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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107-4431

August 1, 1995

Mr. Kevin Hess
PA Department of Environmental Protection
Hazardous Sites Cleanup Program
Lee Park, Suite 6010
555 North Lane
Conshohocken, PA 19428

RE: Austin Avenue Radiation Site

Dear Mr. Hess:

Enclosed for the Department's information are three copies of a document titled, "FINAL REPORT; AUSTIN AVENUE RADIATION SITE; SOIL AND GROUND WATER SAMPLING RESULTS..." which was prepared under contract by EPA's Emergency Response Team. The investigation which is the subject of this report was performed in the immediate vicinity of the former Cummings processing facility which was located at South Union and Austin Avenues, Lansdowne, Delaware County, PA. The report presents information regarding the radiological contamination of soils and ground water. The document does not include a risk assessment nor are remedial alternatives offered. EPA anticipates that we will perform an "in-house" risk assessment and that remedial alternatives will be developed in the event that the risk assessment indicates a need for cleanup action(s). The document is currently under review by EPA's technical personnel.

Should the Department wish to offer comments on this document, I would appreciate having those comments on or before September 1, 1995.

Please contact me at 215-597-8996 if you wish to discuss this or any other Site-related matters.

Sincerely,

Victor J. Janosik
Remedial Project Manager

AR300153

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SUBJECT: Austin Avenue Radiation Site
Ground Water Investigation

FROM: Victor J. Janosik, RPM (3HW24)

TO: Bill Belanger (3AT12)
Dawn Iovan (3HW13)
Barbara Rudnick (3HW13)

DATE: 8-1-95

Attached for your review and comment is a copy of a document titled, "FINAL REPORT; AUSTIN AVENUE RADIATION SITE; SOIL AND GROUNDWATER SAMPLING RESULTS..." which was prepared under contract by the EPA Environmental Response Team (ERT). The investigation was performed in March and April 1995 in the vicinity of the (former) Cummings processing facility which was located at South Union and Austin Avenues in the Borough of Lansdowne, Delaware County, PA.

We had previously discussed performing an in-house risk assessment to determine whether the ground water contamination presents a significant risk to human health. After you have had an opportunity to review the document, we should meet and discuss the development of a risk assessment. I am requesting that you complete your review of this document by September 1, 1995. Thanks!

cc: Tony Dappolone (3HW24)
Eric Johnson (3HW13)

AR300154

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION III
841 Chestnut Building
Philadelphia, Pennsylvania 19107

SUBJECT: Austin Avenue Radiation Site
Final G.W./Soils Report

DATE: 9-12-95

FROM: Victor J. Janosik, RPM *Vic*

TO: File

I spoke by telephone with PADEP Project Officer, Kevin Hess today regarding the "Final Report, Austin Avenue Radiation Site, Soil and Groundwater Sampling Results..." dated July 1995, and which pertains to soil and ground water sampling that was conducted in spring of 1995 by EPA/ERT in the vicinity of the former Cummings processing facility. Kevin noted that PADEP will not offer any comments on the report.

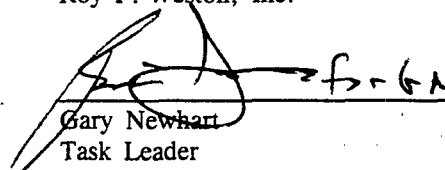
AR300155

FINAL REPORT
AUSTIN AVENUE RADIATION SITE
SOIL AND GROUNDWATER SAMPLING RESULTS
AUSTIN AND S. UNION AVENUE, LANSDOWNE, PENNSYLVANIA
JULY 1995

U.S. EPA Work Assignment No.: 0-095
Weston Work Order No.: 03347-040-001-0095-01
U.S. EPA Contract No.: 68-C4-0022

Prepared by:

Roy F. Weston, Inc.

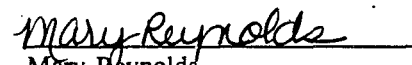

Gary Newhart
Task Leader

7/20/95
Date

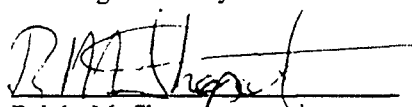
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George Prince
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7/20/95
Date


Ralph M. Shapiro
Program Manager

7/21/95
Date

Received
7-25-95
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AR300156

Significant contributions to this project were made by the following personnel:

Donna Getty	REAC, Edison, NJ	Statistical Analysis of Radiological Data
Thomas Mignone	REAC, Edison, NJ	REAC Health and Safety Officer
Chris Pereira	REAC, Edison, NJ	Radiological Analyses Technician, Health and Safety Advisor
Mary Reynolds	REAC, Edison, NJ	Radiological Analyses Coordinator, Site Health and Safety Coordinator
Wanda Rule	REAC, Edison, NJ	Radiological Analyses Technician
Paul Sarcich	REAC, Edison, NJ	Surveying, Soil Logging Assistance

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AR300157

TECHNICAL REPORT ABSTRACT

WORK ASSIGNMENT NO.: 0-137
REPORT TITLE: Final Report, Austin Avenue Radiation Site
REPORT DATE: July 1995
NO. OF PAGES IN REPORT: 15

CONTRACT NO: 68-C4-0022
PRIME CONTRACTOR: ROY F. WESTON., INC.
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Does this report contain confidential business information?

Yes _____ No XX

KEYWORDS/DESCRIPTORS - Select the scientific or engineering terms that identify the major concepts of the research and are sufficiently specific and precise to be used as index entries for cataloging.

radiation; groundwater; Region 2; uranium; radium; thorium; gross alpha activity; Austin Avenue; Landsdowne

REPORT ABSTRACT - Include a brief (200 word or less) factual summary of the scope and nature of the work performed and reference in the report

The Austin Avenue Radiation site is a former radium processing facility located in Landsdowne, PA. During the radium processing operation, surface soils and the water table aquifer were contaminated with radionuclides, specifically, uranium, thorium and radium. Radioactive mill tailings from the operation were disposed throughout the community and a radioactive liquid effluent was released on-site. REAC developed a sampling grid and installed soil borings using an Ingersoll Rand A-300™ Hollow Stem Auger drill, to evaluate the extent of contamination. Soil samples were collected by split spoon samplers. Bore holes were advanced to a minimum of 12 feet into the saturated zone where temporary well points were installed and groundwater samples were collected. Field screening analytical instrumentation was used to evaluate gross alpha activities in subsurface soil, filtered groundwater, and unfiltered groundwater. Samples were sent to an independent laboratory for specific radioisotopic analysis. Analyses of subsurface soil samples indicate concentrations of the isotopes analyzed for are typical of those found in nature. Groundwater analyses indicate that no unfiltered or filtered groundwater sample exceeded the current U.S. EPA Maximum Contaminant Limit (MCL) for uranium or thorium in drinking water. The current MCL for radium in drinking water was exceeded in one out of 17 unfiltered groundwater samples. No filtered groundwater sample exceeded the current MCL.

AR300158

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1.0 INTRODUCTION

1.1 Objectives

The United States Environmental Protection Agency's (U.S. EPA) Environmental Response Team (ERT) Work Assignment Manager issued Work Assignment # 0-095 requesting Response Engineering and Analytical Contract (REAC) assistance with an extent of contamination (EOC) in groundwater investigation at the Austin Avenue Radiation site in Lansdowne, PA.

The objectives of the EOC investigation were to:

- Develop a sampling grid to collect soil samples at the groundwater/soil interface, and install temporary groundwater sampling points beginning at the southeast corner of the former Cummings warehouse site. Moving in a southern direction, sampling points were advanced at 200-foot intervals, continuing four to six blocks from the former warehouse. Samples were collected in soil bore holes, considered hydraulically up gradient of the former warehouse site, to establish background levels of the target radionuclides.
- Perform field screening of the collected soil and water samples to assess the presence of alpha emitting radionuclide contamination. In addition, quantification of radium-226 will be performed on the water and soil samples by gamma spectroscopy analysis. REAC will provide for the subcontracted analyses of all samples above background, gross alpha contaminated soil and groundwater samples. The samples will be analyzed for the radioisotopes radium-226 (Ra-226), thorium-230 (Th-230), uranium-234 (U-234), and uranium-238 (U-238).

1.2 Site Background

The Austin Avenue Radiation site (site) is located in Lansdowne, Delaware County, PA. The original site was located at the corner of Austin Avenue and South Union Avenue and comprised a land area approximately 150 feet x 150 feet (Figure 1). During the 1920s, a warehouse on the site property operated as a radium processing facility, extracting radium from carnotite ore mined from deposits in Utah and Colorado. Radioactive waste tailings were produced containing uranium, thorium, and radium. During the time of operation, local building and renovation operations used the tailings as fill for mortar and building materials throughout the community. In addition, a liquid effluent containing uranium was discharged during processing activities into cesspool systems on the site property.

Under work assignment # 0-095, REAC personnel were tasked by the U.S. EPA/ERT to determine the extent of contamination in the surficial aquifer, potential threats to human health should contamination exist, and remediation options to counter the contamination threat.

1.2.1 Regional Geology

The Austin Avenue Radiation site is located in the Piedmont Uplands Section of the Piedmont Province. The rock of the Piedmont Upland section are metamorphic and igneous types of late Cambrian to Precambrian age and consist primarily of schists and quartzite. The igneous rock of the Piedmont Upland Section ranges from granite to very basic rocks. Outcrops are scarce. The metamorphic rocks of the section are primarily schists, quartzite, and gneiss.

1.2.2 Site Geology

The soil encountered below the Austin Avenue site, west of South Union Avenue, consisted primarily of fine to medium sands with clay, grading into weathered gneiss and schists (Precambrian), with a speckled to banded tan/brown, olive green, and white appearance. Quartz material which weathered to a greenish gray soil was observed. The white material is a crystalline micaceous marble from the Cockeysville marble rock unit. Mica and graphite occurred in flakes disseminated throughout the gneiss, identified by a tin-white metallic luster. This stratigraphy is indicative of the Wissahickon formation.

The soil to the east of South Union Avenue is as described as above, although soil bore hole SB-14 and SB-15, contained a significant gray clay layer in the unit above the weathered granite-gneiss and schist.

2.0 METHODOLOGY

Site work was performed from 27 March 1995 through 7 April 1995. REAC field members participating in this site work included Mary Reynolds, Wanda Rule, Paul Sarcich, Chris Pereira, Tom Mignone, and Gary Newhart. William M. Reichart Well Drillers of Hanover, PA was contracted to provide geotechnical drilling services to collect the soil and groundwater samples. Teledyne Brown Engineering Laboratory (TBE) was contracted to perform the radiological analyses for gross alpha and specific radioisotopic quantification.

On 27 March 1995, REAC mobilized to begin work at the site. During the soil and groundwater sampling activities, a REAC geotechnical engineer logged the soil bore holes to confirm the site geology and measure the depths to water at the temporary sampling point locations. The data has been interpreted to create a groundwater table, potentiometric surface map.

2.1 Soil and Groundwater Sampling

During the period between 28 March 1995 and 5 April 1995, 17 soil bore holes and temporary well points were installed based on an approximate 200-foot sampling grid, anchored at the southern corner of Austin Avenue and South Union Avenue (Figure 1). An Ingersoll Rand A-300 Hollow Stem Auger drilling rig was used to drill the bore holes; soil samples were collected by split spoon samplers [2-inch outer diameter (OD) by 2-foot long]. Initially, samples were collected from ground surface to 6 feet into the water table (0-2 feet, 2-4 feet, 4-6 feet, 6-8 feet, etc.). This evolved into sampling every other interval from ground surface to the water table (0-2 feet, 4-6 feet, 8-10 feet, 12-14 feet, etc.), then collecting two consecutive split spoons in the saturated zone. The GEOLIS™ logs of each bore hole are located in Appendix A. The bore holes were advanced to a minimum of 10 feet into the saturated zone, where the temporary well point was installed, the augers removed, and the groundwater collection process started. Prior to collecting groundwater samples, the static water level was measured from within the temporary well point. Following the soil and groundwater collection, the site (inclusive of sampling point locations) was surveyed to establish water table contours. A water table contour map is provided as Figure 2.

The temporary well point installed in the bore hole was purged until a relatively clear groundwater sample was obtained (SB-8, SB-14, and SB-15 were odorless and void of any sheen). At a minimum, two gallons were purged from the temporary well points prior to collecting groundwater samples. Three 1-gallon water samples were collected in polyethylene

cube-containers from each temporary well point. Two of the 1-gallon water samples (per sampling location) were acidified and sent to TBE for specific radioisotopic identification and gross alpha activity determination. Chain of Custody Records are located in Appendix B. One 1-gallon sample was given to the on-site radiological screening laboratory for gross alpha activity analysis. On-site analytical evaluation Chain of Custody Records are located in Appendix C.

2.1.1 Shelby Tube Collection

A Shelby tube sample of soil was collected just above the water table from bore hole SB-11, at the 10 to 12 feet below ground surface (bgs) interval. This sample was analyzed at the REAC Engineering Evaluation Unit for bulk density, moisture content, hydraulic conductivity, porosity, and grain size distribution.

2.2 Radiological Field Screening Activities

The radionuclides of concern for this site are U-238 and its associated progeny, specifically U-234, Th-230, and Ra-226. Each of these radionuclides decay with the emission of an alpha particle. To qualitatively assess the presence of these radionuclides, field screening measurements were performed to quantify the gross alpha activity in each sample. Gross alpha activity analysis was performed on water samples and soil samples received from the soil boring activities following Method 900.0, Gross Alpha and Beta Radioactivity In Drinking Water.⁽¹⁾ One filtered and one unfiltered sample was prepared from each water sample. Gross alpha activity in water was calculated in picocuries per liter (pCi/L) using the following formula:

$$\text{Alpha(pCi/L)} = \frac{(A)(1000)}{(2.22)(E)(V)}$$

where,

- A = Alpha count rate per minute (cpm) - background cpm
- E = Daily efficiency of the detector
- V = Volume of aliquot from sample in milliliters (mL)
- 2.22 = Conversion factor disintegrations per minute (dpm/pCi)

One soil sample was prepared from each 2-foot composite sample collected at each well location for gross alpha activity. The sample analysis was performed following the procedure from Ball and Debnam, University of North Carolina, Gross Alpha Activity In Soils.⁽²⁾ Gross alpha activities were calculated in picocuries per gram (pCi/g) using the following formula:

$$\text{Alpha(pCi/g)} = \frac{A}{(2.22)(E)(M_n)}$$

where,

- A = Alpha (cpm) - background (cpm)
- E = Efficiency of the detector
- M_n = Mass of sample (g)
- 2.22 = Conversion factor (dpm/pCi)

Soil samples from within the water table were collected and a composite sample was analyzed for Ra-226 activity. Analysis was performed using an EG&G/ORTEC™ field portable Gamma Spectroscopy system utilizing a 3-inch by 3-inch sodium iodide (NaI) detector following REAC Standard Operating Procedure (SOP) #1716, *EG&G ORTEC Field Portable Gamma Spectroscopy Operation*. As a reference, a sealed U.S. EPA Ra-226 source with an activity of 50 pCi/g was used. The quantification of Ra-226 was determined comparing the net area under the Bismuth-214, 609 kilo electron-volts (keV) gamma ray peak in the standard and unknown sample. Without the capabilities to perfectly seal the sample and allow for the Ra-226 daughter isotopes to reach equilibrium, an empirical correction factor of 1.3 was incorporated into the calculation to adjust for the non-equilibrium daughter isotopes. This approximation was drawn from the National Council on Radiation Protection and Measurements.⁽³⁾ The following formulas were used to calculate the Ra-226 activity and the minimum detectable activity (MDA) for each sample:

$$A_{Ra}(\text{pCi/g}) = \frac{(C_{\text{net sample}})(50\text{pCi/g})(\text{Mass}_{\text{sample}})}{(C_{\text{net std}})(\text{Mass}_{\text{std}})} \times (1.3)$$

$$\text{MDA}(\text{pCi/g}) = 2.71 + 4.65(\text{Counts}_{\text{bkg}})^{1/2} \times \frac{(50\text{pCi/g})(T_{\text{std}})(\text{Mass}_{\text{std}})}{(C_{\text{net std}})(T_{\text{sample}})(\text{Mass}_{\text{sample}})}$$

where,

A_{Ra}	=	Activity Ra-226 (pCi/g)
MDA	=	Minimal detectable activity (pCi/g)
$C_{\text{net sample}}$	=	Sample net counts
$C_{\text{net std}}$	=	Net counts in standard ROI
$\text{Counts}_{\text{bkg}}$	=	Background counts from sample analysis (Gross-Net)
50 pCi/g	=	Activity of standard
T_{sample}	=	Count time of sample in seconds (s)
T_{std}	=	Count time of standard (s)
Mass_{std}	=	Mass of standard (g)
$\text{Mass}_{\text{sample}}$	=	Mass of sample (g)
1.3	=	Correction factor

2.3 Removable Contamination Surveys

Removable contamination surveys were performed to assess any contamination that may have been present on equipment and materials and that could potentially be transported off-site.

Removable contamination surveys consist of wiping an area of approximately 100 square centimeters (cm²) with a wipe test disk. Disks were analyzed using the Ludlum™ Model 2929 Duel Alpha, Beta-Gamma Scaler. Results were compared to background to indicate an activity per cm². In addition to performing wipe tests of laboratory surfaces and equipment, drilling equipment and vehicles used on site were also wipe tested for removable contamination prior to exiting the site. No areas of removable contamination were found during this field event.

2.4 Air Monitoring

During the period of well installation, a representative air sample was collected at each location. In addition, a Real-Time Aerosol Monitor (RAM™) was utilized to assess the real-time concentration of particulates generated during the intrusive work. Concentrations were compared to action limits set for site activities. The air sampler was placed within the work area of the intrusive work to monitor any dusts generated in the breathing zone, as well as to monitor the exposures to the off-site community. Air sampling was performed using a Staplex™ Air Sampler Pump drawing at a rate of 3 to 5 cubic feet per minute (cfm) through a 2-inch diameter glass fiber filter. Air samples were analyzed on-site for gross alpha activity using a Ludlum Model 2929, Dual Alpha, Beta-Gamma Scaler.

Air samples were analyzed after the cessation of sampling and then at a minimum, twice a day until the count rate (cpm) reached an equilibrium. Air filters analyzed immediately after the cessation of sampling showed a high count rate which can be attributed to the natural Radon-222 and Radon-220 present in the air. The Radon-222 and Radon-220 progeny isotopes decay with an effective half life of 30 minutes and 10.6 hours, respectively. At the point of equilibrium it can be presumed that the radon daughter isotopes on the air filter had decayed, leaving any activity on the filters attributed to the long-lived radionuclides. A concentration per unit volume of air sampled was calculated using the following formula:

$$\text{Conc}(\mu\text{Ci/mL}) = \frac{(A_s)(4.505E-07)}{(F_{\text{avg}})(t)(1000)}$$

where,

Conc	=	Concentration
A_s	=	Activity of sample at equilibrium (dpm) - background (dpm)
F_{avg}	=	Average flow rate, liters per minute (LPM)
t	=	Sample time, minute (min)
4.505 E-07	=	Conversion factor, microcuries per disintegrations per minute ($\mu\text{Ci/dpm}$)

2.5 Surveying

During field activities, a survey was performed using a TOPCON™ GTS-3B total station instrument to provide data for base maps, analytical result posting, and volume calculations.

2.6 Sampling Equipment Decontamination

The non-dedicated sampling equipment (split spoon samplers, temporary well points, and groundwater sampling pumps and tubing) were decontaminated before and after each sampling location. The equipment was steam cleaned and allowed to air dry following decontamination.

The drill rig and hollow stem auger flights were decontaminated using high pressure steam prior to entering and leaving the site. The augers were decontaminated before and after each soil boring location. The drill rig was also decontaminated with high pressure steam cleaner following the soil boring activities at sampling locations SB-10 and SB-15.

3.0 RESULTS

3.1 Background Determination

Three soil boring locations were selected to represent background levels from which concentrations of gross alpha and specific radioisotopic concentrations would be compared. SB-5, SB-9 and SB-16 were selected as up-gradient groundwater locations with respect to the site based on a previous groundwater gradient determination. Discussion of "background," unless otherwise cited, reflects the average of these three location points.

3.2 Groundwater Assessment

Based on the measured static groundwater levels, the primary groundwater flow component from the site appears to be in a south to south-east direction (Figure 2). There appears to be a flow away from the original site, to the north (interpreting bore hole SB-9, SB-11 and SB-16). The South Eastern Pennsylvania Transportation Authority (SEPTA) rail line and the B and C Auto Care facility grassy area are contributing recharge areas for the investigated water table aquifer. This recharge may be responsible for a groundwater recharge mound, inducing a localized north to northwest groundwater flow component. Additional contributing recharge areas for the water table aquifer appear to be the "uncovered" areas within the Advanced Chemical property, the lawns surrounding the Pennsylvania Job Placement and Health and Human Services buildings (South Union Avenue), and the residential grassy areas throughout the study area.

The groundwater levels were measured within 1 hour following the installation of the temporary monitoring points. Water level data was collected through the temporary well points; due to the inherent nature of temporary points, the monitoring points were not sand or gravel packed, and were not fully developed. Therefore, the groundwater level data may not fully represent undisturbed conditions, and actual water table contours may vary. Fully developed, permanent monitor wells would yield accurate, reproducible static water levels. Those water levels would define a more accurate water table surface map.

3.3 Shelby Tube Results

A shelly tube sample of soil was collected just above the water table from bore hole SB-11, at the 10 to 12 feet bgs interval. This sample was analyzed at the REAC Engineering Evaluation Unit for bulk density, moisture content, hydraulic conductivity, porosity, and grain size distribution. The results are contained in Appendix E of this report and are summarized as follows:

- Bulk density was measured at 1.77 g/cm³.
- Total porosity was measured at 37.23 percent (%).
- Total pore volume was calculated at 195.93 cm³.

- Total air pore volume was calculated to be 87.06 cm³.
- Moisture content was determined to be 10.44 %.
- The specific gravity of the soil was calculated to be 2.82.
- The permeability of the soil was determined to be 1.42 X 10⁻⁶ cm/sec.

3.4 Gross Alpha Activity Analysis

3.4.1 Groundwater

Following the procedures stated in Section 2.0 Methodology, one filtered and one unfiltered groundwater sample were prepared on-site and analyzed for gross alpha activity to assess the presence of radioactive contamination. Additionally, unfiltered and filtered groundwater samples were prepared and sent to TBE for gross alpha activity determination.

Background gross alpha activity in unfiltered groundwater based on field screening measurements was determined to be an average of 5.76 pCi/L. Gross alpha measurement ranged from less than 1.0 pCi/L to the highest concentration of 34.9 pCi/L at SB-15.

Background gross alpha concentrations could not be calculated for the field screening filtered groundwater samples or TBE analyses, because at least one of the three background samples were less than the MDA, therefore insufficient data exists to allow for this calculation. TBE gross alpha analysis of unfiltered water ranged from less than 2.0 pCi/L to a maximum concentration reported at SB-15 of 31.0 pCi/L.

Table 1 presents the gross alpha activity in unfiltered and filtered water calculated from the on-site field screening analyses and TBE analyses. Figure 3 and Figure 4 presents the gross alpha activity determined by TBE at each sampling location for unfiltered and filtered water, respectively.

3.4.2 Subsurface Soil

A composite soil sample was collected from the split spoon samplers at each 2-foot interval during soil boring. Soil samples were analyzed on-site for gross alpha activity determination (Table 2). Those soils from depths within the groundwater zone were collected and a composite sample was sent to TBE for gross alpha activity determination (Table 3).

From the composite samples, the average background gross alpha activity in soil calculated by field screening results was determined to be 11.6 pCi/g. Soil activities ranged from 3.3 pCi/g to 22.2 pCi/g at SB-7.

The average background gross alpha activity in soil analyzed by TBE was determined to be 17.0 pCi/g. Soil activities ranged from 8.1 pCi/g to 36 pCi/g at SB-13.

3.5 Specific Isotopic Analyses

Specific radioisotopic analyses were performed by TBE. Table 4 presents the isotope and the methodology employed by TBE for radiological analyses.

3.5.1 Groundwater

Groundwater samples were prepared for specific radioisotopic analysis in the on-site screening laboratory. One filtered and one unfiltered water sample was acidified and sent to TBE for U-238, U-234, Th-230 and Ra-226 determination. Water samples were filtered using a Gelman™ 0.45 micrometer (μm) membrane capsule filter. Results of the unfiltered and filtered groundwater analyses are found in Table 5 and Table 6, respectively. Figure 3 and Figure 4 present TBE results for specific radioisotopic analyses in filtered and unfiltered groundwater at each location.

3.5.2 Subsurface Soil

One composite soil sample from each sampling location was prepared on-site for analysis by TBE for U-238, U-234, Th-230 and Ra-226. Soil samples comprised of a composite of the ranges located within the water table. A sample from the composite depths was also analyzed on-site for Ra-226 determination, as stated in Section 2.0 Methodology. TBE results for subsurface soil analyses are presented in Table 7 and Figure 5.

3.6 Air Monitoring Results

Results calculated from daily air sampling activities were compared to the allowable effluent concentration presented in Appendix B, Table 2, of Title 10, Code of Federal Register, Part 20, "Standards for Protection Against Radiation" (10CFR20). Resulting concentrations were compared to Th-230, with an allowable effluent concentration of $2 \text{ E-14 } \mu\text{Ci/mL}$. Table 8 presents the air monitoring results for the sampling period, the concentration at equilibrium and the percent of the allowable effluent concentration. At no time was the effluent concentration reached during this sampling event. Air sampling was not performed on 5 April, 1995 due to rain.

3.7 Personal Protective Equipment Evaluation

During this sampling event, health physics support was provided to the workers by work zone air monitoring, field screening of personal protective equipment (PPE) for alpha contamination, and frequent removable contamination surveys of surfaces in the on-site radiological screening laboratory and equipment. Upon exiting the work areas, field members were scanned by a Ludlum™ Model 12 rate meter and accompanying Model 44-12 alpha scintillation probe. PPE, hands, and work boots were frequently scanned upon entrance to the field lab. In addition, frequent removable contamination surveys were performed to assess any contamination that may have been present on equipment and materials and that could potentially be transported off-site.

3.8 Removable Contamination Surveys

No areas of removable contamination were found during this field event.

3.9 On-Site Soil and Water Evaluation

To monitor the disposal of soils and water generated on-site, water samples were taken from the decontamination pit and analyzed for gross alpha activity in water following the sample procedures stated above. The resulting activity was compared to the release criteria stated in Appendix B, 10CFR20 for release to the sewers. All water samples disposed were below the release criterion and were released on-site. In addition, soils collected were analyzed for Ra-226 activity. All soil samples were within the range for background, and subsequently deposited on-site.

3.10 Petroleum Contaminated Soil

A liquid, petroleum-like substance was recovered in the 6-to 12-foot interval in SB-8, the 8-to 14-foot interval in SB-10, the 8-to 16-foot interval in SB-14, and the 8-to 14-foot interval in SB-15. The material was collected from location SB-10 and analyzed for volatile organic compounds (VOCs) in soil; base neutral acid extractable (BNA) compounds in soil; pesticides and polychlorinated biphenols (Pesticide/PCB) in soil; total petroleum hydrocarbons (TPH), oil and grease in soil; and priority pollutant metal (PP Metals) in soil. The results of the chemical evaluation are reported in the Appendix D.

- The VOC analyses detected 2900 milligrams per kilogram (mg/Kg) of isopropylbenzene, 6000 mg/Kg (parts per million) n-propylbenzene, 3300 ppm sec-butylbenzene, and 4800 ppm n-butylbenzene.
- The BNA analyses detected 96 ppm 2-methylnaphthalene and 29 ppm phenanthrene; dibenzofuran (4.7 ppm), fluorene (12 ppm), and di-n-butylphthalate (7.8 ppm) were detected at levels below the analytical method's detection limit.
- The Pesticide/PCB analyses did not detect any compounds found on the analyte list.
- The PP Metals analyses detected 0.86 ppm arsenic, 7.5 ppm chromium, 36 ppm copper, 16 ppm lead, 14 ppm nickel, and 9.1 ppm zinc.
- The TPH analyses reported 4400 ppm petroleum hydrocarbons.
- The oil and grease analyses detected 5300 ppm oil and grease.

3.11 Statistical Comparison Tests

3.11.1 Groundwater/Subsurface Soil

A statistical comparison of the on-site field screening gross alpha activity method and the TBE analysis gross alpha activity method was conducted to determine if: (1) the two methodologies produced results that could be considered statistically equivalent, and (2) the TBE analysis results could be predicted based on the on-site field screening technique. A statistical comparison of TBE data of gross alpha analyses and specific radioisotopic analysis was performed to determine if sampling location activities were significantly higher than the locations selected as background.

a. Pairwise Comparisons

To address whether the gross alpha results could be considered statistically equivalent, a pairwise comparison of the two methodologies was conducted for the 17 soil samples and 17 unfiltered water samples. Comparisons were not conducted on the filtered water samples because of the high percentage (62.5%) of values listed which were unable to be quantified (<1.0).

To conduct a pairwise comparison, the TBE results were subtracted from the corresponding field screening results. This created new statistical populations of the differences of the two methodologies, for both the soil and the unfiltered water results. Wilkes-Shapiro Test of Normality, Alpha- (α -) level of 0.10, was then performed on the differences, to determine if they were normally distributed. If the calculated probability value (p-value) was greater than 0.10, then the differences would be considered normally distributed and the Pairwise Difference T-test would be used; otherwise, the hypothesis of normality would be rejected and a non-parametric pairwise comparison, Sign Rank Test, would be used. The differences for the unfiltered water samples were determined to come from a normal distribution (p-value=0.4291) while the differences for the soil results were not normally distributed (p-value<0.05).

The Pairwise Difference T-test was conducted on the differences of the unfiltered water results, with an α -level of 0.05. If the calculated p-value was less than 0.05, the null hypothesis, that the mean of the differences equals 0, would be rejected implying that the field screening results and the TBE results for the unfiltered water samples were significantly different from each other. Similarly, a non-parametric Sign-Rank test was performed on the differences of the soil results, also at an α -level of 0.05.

Results of the Pairwise comparisons indicate that no significant difference can be found between the field screening and TBE results for the unfiltered water samples (p-value=0.2121); however, the field screening and TBE results were significantly different for the soil samples.

b. Regression Analysis

Regression analyses were performed on both the gross alpha unfiltered water and the gross alpha subsurface soil sample results to determine if the TBE results could be predicted by the field screening results. No significant regression model could be found for either the unfiltered water or the soil. This implies that the TBE methodology can not be predicted by the field screening technique. Thus, there is some inherent factor contributing to the different results of TBE and the field screening laboratory. One possible factor effecting the results is the acidification of samples sent to TBE prior to shipment. The acidification may have significantly effected the gross alpha activity by keeping the uranium, radium and thorium in solution.

To determine if the gross alpha activity values for sample locations were significantly higher than the calculated background value, 99% upper tolerance interval (UTI) limits were calculated and results from each

location were compared. Results indicate that no field screening, unfiltered groundwater sample and gross alpha activity in subsurface soil exceeded the UTI for the three background locations selected.

To determine if specific isotopic analyses sample locations were significantly higher than the calculated background concentrations, 99% UTI with 99% coverage were constructed around three background samples for U-238, U-234, Th-230, and Ra-226 for soil and unfiltered water results. A UTI could not be calculated for the filtered water samples, because of the unquantifiable results for at least one background sample for each contaminant, which reduced the number of usable background results to $n=2$ (not statistically sufficient). A 99% UTI with 99% coverage is a value for which 99% of the time, upon repeated sampling, 99% of the results will fall below the 99% UTI (with 99% coverage) if the results are part of the same background population. Therefore, if a result exceeds the UTI, there is sufficient evidence to assume that the sample was "above background" or contaminated. Because of the small sample size of background samples available ($n=3$), tests for normality could not be conducted to determine the distribution of the background population. However, historical information suggests that contaminants on hazardous waste sites tend to follow a log-normal distribution in groundwater.⁽⁴⁾ This assumption will also be made for soil. The background data was therefore log-transformed prior to construction of the UTIs. Additionally, because many of the actual results were less than one, a log transformation was utilized that included the addition of 1 to each result prior to computing the log.

An UTI is computed as follows:

$$UTI = x + K(std)$$

where,

x = mean of background samples
std = standard deviation of background samples
K = multiplier

and,

$$K = t_{n-1, 0.05} \sqrt{1 + \frac{1}{n}}$$

In this case, $n=3$ so $t_{2, 0.05} = 2.902$. Therefore,

K = multiplier
n = number of samples
 $t_{n-1, 0.05}$ = Student's t-value from statistical table

$$K = 2.902 \sqrt{1 + \frac{1}{3}}$$

so,

$$K = 2.902(0.577) = 1.674.$$

Calculated UTIs can be found in Table 9. Table 10 contains a comparison of the results at the individual sampling locations to the background UTIs. The results indicate that some sample activities were significantly higher than background.

4.0 DISCUSSION OF RESULTS

4.1 Gross Alpha Activity

Gross alpha activity is one parameter used as an indicator for radiological contamination. The radioisotopes of concern for the Austin Avenue site are Uranium and its decay products, specifically, the long lived decay products: U-238, U-234, Th-230 and Ra-226. Each of these isotopes decay with an emission of an alpha particle. Therefore, gross alpha activity quantification is a good quantitative indicator that there is radiological contamination present in the samples.

It should be noted that for each sampling location, comparing gross alpha activities to the sum of specific isotope activities determined individually does not lead to a direct comparison; the sum of the individual isotopes' activity rarely equals the gross alpha activity. A contributing factor for this disagreement is the chemical yield loss when performing individual isotopic chemical separation. In addition, there may be present in the sample other alpha emitters that will be measured in the gross alpha analysis but may not be one of the specific radioisotopes analyzed for chemically. This is true for the U-238 decay chain, and can be the factor contributing to the difference in gross alpha activity versus the sum of specific isotopic activity seen in the data of the Austin Avenue site.

Statistical comparisons performed on the field screening gross alpha activity in unfiltered groundwater and TBE gross alpha analysis of soil indicated that no samples exceeded those selected as background for the site.

Comparisons to background could not be performed on the gross alpha activities in unfiltered and filtered groundwater from TBE because of the detection limit report for one of the three background samples; that is, insufficient data existed to perform the analysis. A statistical comparison of the field screening data verse TBE analyses data indicate that TBE results could not be predicted from the field screening results.

4.2 Specific Radioisotopic Analyses

4.2.1 Subsurface Soil

Subsurface soil sample results for U-238, U-234, Th-230, and Ra-226 represent concentrations typical of those found in nature. Ra-226 values in soil usually range from 1 to 2 pCi/g; however, concentrations up to 5 pCi/g are not uncommon⁽⁶⁾. Ratios of radium/uranium (Ra/U) concentrations can be used to determine if the concentrations are not in natural equilibrium, and thus anthropogenically enhanced. Typically, if the Ra/U ratios exceed 3 or 4, then the sample may not be considered naturally occurring. Based on the low concentrations and reasonable Ra/U concentrations for the soil samples analyzed for the Austin Avenue site, the data suggests that there are no non-naturally occurring concentrations of the radioisotopes analyzed for in the soil samples. This holds true for soil sample SB-1 and SB-13 which exceeded the background U-238 and U-234 concentration at the 99% upper tolerance interval.

Analysis of soil sample SB-13 indicated the highest Ra-226 concentration of 5.5 pCi/g. The cleanup criteria for Ra-226 is 5.0 pCi/g over background⁽⁵⁾; therefore the cleanup target is usually 6 to 7 pCi/g. The value for SB-13 falls below the cleanup criteria for Ra-226 in soil.

4.2.2 Groundwater

The proposed U.S.EPA maximum contaminant limit (MCL) for uranium in drinking water 30 pCi/L.⁽⁸⁾ None of the results for uranium in unfiltered and/or filtered groundwater exceeded the proposed U.S.EPA MCL. A study of 55,000 groundwater samples taken across the United States indicate the average total uranium (U-238 + U-234 + U-235) concentration to be 3.2 pCi/L, ranging from 0.1 pCi/L to 40 pCi/L.⁽⁷⁾ The average concentration for uranium in groundwater from this region of Pennsylvania was determined to range from 1 to 5 pCi/L.⁽⁶⁾

Statistical comparison of TBE unfiltered groundwater results for U-238 and U-234 indicate that the locations and activities listed below significantly exceeded the background concentration calculated from the three background locations selected for this site. The following Uranium activities were calculated by summing up the U-238 and U-234 TBE analyses results:

Location	Uranium activity (U-238 + U-234) (pCi/L)
SB-4	7.0
SB-7	9.1
SB-11	5.5
SB-13	8.7
SB-14	7.9

No filtered groundwater samples showed Ra-226 concentrations higher than 1.3 pCi/L. Location SB-15 unfiltered groundwater sample, exceeded the MCL for drinking water of 5 pCi/L for combined Ra-226 and Ra-228 activity.⁽⁵⁾ Typical Ra-226 concentrations in groundwater for this region of Pennsylvania are 1 to 5 pCi/L.⁽⁶⁾ Statistical comparison of the TBE data for unfiltered groundwater analysis indicates

that sample location SB-15 with a Ra-226 concentration of 16 pCi/L, has a concentration significantly higher than background.

There is no current standard for thorium activity in drinking water. However, the U.S.EPA drinking water MCL for alpha emitters, excluding radium and uranium, is 15 pCi/L. No unfiltered or filtered groundwater Th-230 activity exceeded this limit. No samples were significantly higher than background for Th-230 analyses.

REFERENCES

- (1) U.S. EPA (United States Environmental Protection Agency). August 1980. *Gross Alpha And Beta Radioactivity in Drinking Water*. Method 900.0. Prescribed Procedures for Measurement of Radioactivity in Drinking Water.
- (2) Ball and Debnam. *Environmental Radiation Surveillance Report and Analysis Procedures*. North Carolina State University. 1978.
- (3) NCRP (National Council on Radiation Protection and Measurement). 1988. *Measurement of Radon and Radon Daughters in Air*. Report No. 97.
- (4) U.S. EPA. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Addendum to Interim Final*. Office of Solid Waste, Washington, D.C. July 1992.
- (5) "Health and Environmental Protection Standards for Uranium and Thorium Mill Tailings". U.S. Environmental Protection Agency. 1991 Title 40, Part 192, Code of Federal Regulations.
- (6) Michel, J., and Jordana, M.J. "Nationwide Distribution of Ra-228, Ra-226, Rn-222, and U in Groundwater." RPI International, Inc. Columbia, SC.
- (7) NCRP. 1984. Exposures from the uranium series with emphasis on radon and its daughter. NCRP Report No.77. Bethesda, MD, National Council on Radiation Protection and Measurements.
- (8) U.S. EPA, 1991, "National Primary Drinking Water Regulations; Radionuclide; Proposed Rule", 56 FR 33050, July 18, 1991.

Tables

Table 1a

Gross Alpha Activity in Groundwater -- Unfiltered Sample
Austin Avenue Radiation Site
July 1995

Sample Location	On-Site Field Screening Activity (pCi/L) \pm 2s	TBE Analysis Activity (pCi/L) \pm 2s
SB-1	3.4 \pm 1.8	13.0 \pm 5.0
SB-2	2.3 \pm 1.5	5.0 \pm 2.4
SB-3	<1.0	6.1 \pm 3.4
SB-4	1.7 \pm 1.3	4.8 \pm 3.4
SB-5	5.8 \pm 2.4	2.1 \pm 2.0
SB-6	<1.0	4.9 \pm 3.1
SB-7	<1.0	15.0 \pm 6.0
SB-8	<1.0	12.0 \pm 5.0
SB-9	1.4 \pm 1.2	<2.0
SB-10	n/a	n/a
SB-11	2.6 \pm 1.6	4.6 \pm 2.9
SB-12	<1.0	6.1 \pm 2.9
SB-13	<1.0	19.0 \pm 4.1
SB-14	2.9 \pm 1.7	9.1 \pm 8.0
SB-15	34.9 \pm 5.9	31.0 \pm 10.0
SB-16	10.1 \pm 3.2	9.6 \pm 4.8
SB-17	1.9 \pm 1.4	<3.0

(pCi/L) : picocuries per liter
n/a: data not available

Table 1b

Gross Alpha Activity in Groundwater -- Filtered Sample
Austin Avenue Radiation Site
July 1995

Sample Location	On-Site Field Screening Activity (pCi/L) \pm 2s	TBE Analysis Activity (pCi/L) \pm 2s
SB-1F	<1.0	7.8 \pm 4.4
SB-2F	<1.0	<1.0
SB-3F	2.8 \pm 1.7	<2.0
SB-4F	<1.0	5.0 \pm 3.3
SB-5F	2.6 \pm 1.6	2.1 \pm 1.9
SB-6F	<1.0	<2.0
SB-7F	1.4 \pm 1.2	<4.0
SB-8F	<1.0	<2.0
SB-9F	<1.0	<2.0
SB-10F	n/a	n/a
SB-11F	<1.0	4.4 \pm 2.9
SB-12F	<1.0	<3.0
SB-13F	<1.0	<4.0
SB-14F	1.1 \pm 1.1	<3.0
SB-15F	1.9 \pm 1.4	<3.0
SB-16F	7.9	<3.0
SB-17F	<1.0	3.3 \pm 3.2

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Table 2
Field Screening Results – Gross Alpha Activity in Soils
Austin Avenue Radiation Site
July 1995

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity		
						(pCi/g)	±	1s
SB-1	0-2	0.19	30	14	0.50	1.52	±	1.23
	2-4	0.15	30	10	0.30	0.25	±	0.50
	4-6	0.11	30	13	0.40	1.48	±	1.22
	6-8	0.16	30	11	0.40	1.02	±	1.01
	8-10	0.08	30	12	0.40	2.04	±	1.43
	10-12	0.14	30	32	1.10	7.44	±	2.73
	12-14	0.21	30	27	0.90	3.76	±	1.94
	14-16	0.16	30	24	0.80	4.16	±	2.04
16-18	0.16	30	37	1.20	7.29	±	2.70	

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity		
						(pCi/g)	±	1s
SB-2	0-2	0.22	30	14	0.50	1.31	±	1.15
	2-4	0.11	30	23	0.80	6.05	±	2.46
	4-6	0.07	30	15	0.50	4.12	±	2.03
	6-8	0.10	30	19	0.60	4.14	±	2.00
	8-10	0.11	30	28	0.90	7.19	±	2.68
	10-12	0.14	30	23	0.80	4.75	±	2.18
	12-14	0.11	30	25	0.80	6.05	±	2.46
	14-16	0.15	30	46	1.50	10.29	±	3.21
16-18	0.10	30	24	0.80	6.65	±	2.58	

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity		
						(pCi/g)	±	1s
SB-3	0-2	0.14	30	21	0.70	3.85	±	1.96
	2-4	0.15	30	18	0.60	2.76	±	1.66
	4-6	0.11	30	15	0.50	2.62	±	1.62
	6-8	0.18	30	33	1.10	5.79	±	2.41
	8-10	0.11	30	16	0.50	2.62	±	1.62
	10-12	0.14	30	30	1.00	6.52	±	2.55
	12-14	0.15	30	15	0.50	1.92	±	1.39
	14-16	0.19	30	9	0.60	2.17	±	1.47
18-20	0.14	30	10	0.70	3.84	±	1.96	

Table 2 Continued
 Field Screening Results -- Gross Alpha Activity in Soils
 Austin Avenue Radiation Site
 July 1995

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity	
						(pCi/g)	± 1s
SB-4	0-2	0.09	15	8	0.53	3.66	± 1.91
	2-4	0.09	15	9	0.60	4.61	± 2.15
	4-6	0.07	15	7	0.47	3.54	± 1.88
	6-8	0.14	15	10	0.67	3.57	± 1.89
	8-10	0.17	15	14	0.93	4.91	± 2.22
	10-12	0.10	15	11	0.73	5.83	± 2.41
	12-14	0.17	15	8	0.53	1.95	± 1.40
	14-16	0.18	15	13	0.87	4.17	± 2.04

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity	
						(pCi/g)	± 1s
SB-5	0-2	0.17	15	9	0.60	2.43	± 1.56
	2-4	0.05	15	6	0.40	3.25	± 1.80
	4-6	0.09	15	6	0.40	1.81	± 1.34
	6-8	0.06	15	11	0.73	9.66	± 3.11
	8-10	0.09	15	7	0.47	2.73	± 1.65
	10-12	0.09	15	11	0.73	6.44	± 2.54
	12-14	0.09	15	12	0.80	7.37	± 2.71
	14-16	0.15	15	10	0.67	3.31	± 1.82

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity	
						(pCi/g)	± 1s
SB-6	0-2	0.06	15	10	0.67	8.32	± 2.88
	4-6	0.10	15	8	0.53	3.31	± 1.82
	8-10	0.12	15	11	0.73	4.86	± 2.20
	10-12	0.09	15	9	0.60	4.61	± 2.15
	12-14	0.08	15	13	0.87	9.38	± 3.06

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity	
						(pCi/g)	± 1s
SB-7	0-2	0.04	15	10	0.67	12.48	± 3.53
	4-6	0.12	15	5	0.33	0.66	± 0.81
	4-6 DUP	0.14	15	6	0.40	1.15	± 1.07
	8-10	0.07	15	17	1.13	15.52	± 3.94
	10-12	0.15	15	16	1.07	6.68	± 2.59
	12-14	0.21	15	7	0.47	1.18	± 1.09

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Table 2 Continued
 Field Screening Results – Gross Alpha Activity in Soils
 Austin Avenue Radiation Site
 July 1995

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity (pCi/g) ± 1s
SB-8	0-2	0.34	15	6	0.40	0.47 ± 0.69
	2-4	0.07	15	8	0.53	4.64 ± 2.15
	4-6	0.03	15	5	0.33	2.61 ± 1.61
	6-8	0.03	15	7	0.47	8.09 ± 2.84
	8-10	0.07	15	12	0.80	9.34 ± 3.06
	10-12	0.08	15	9	0.60	5.09 ± 2.26
	12-14	0.11	15	7	0.47	2.21 ± 1.49
	14-16	0.11	15	9	0.60	3.70 ± 1.92
16-18	0.14	15	14	0.93	5.85 ± 2.42	

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity (pCi/g) ± 1s
SB-9	0-2	0.06	15	2	0.13	<0.37
	2-4	0.07	15	5	0.33	1.12 ± 1.06
	4-6	0.12	15	7	0.47	2.02 ± 1.42
	6-8	0.11	15	6	0.40	1.46 ± 1.27
	8-10	0.12	15	11	0.73	4.77 ± 2.18
	10-12	0.10	15	6	0.40	1.60 ± 1.27
	12-14	0.08	15	11	0.73	7.15 ± 2.67
	14-16	0.09	15	7	0.47	2.70 ± 1.64
16-18	0.09	15	12	0.80	7.27 ± 2.70	

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity (pCi/g) ± 1s
SB-10	0-2	0.13	15	6	0.40	1.24 ± 1.11
	4-6	0.17	15	7	0.47	1.44 ± 1.20
	8-10	0.08	15	10	0.67	6.15 ± 2.48
	12-14	0.05	15	1	0.07	<0.36

Table 2 Continued
 Field Screening Results – Gross Alpha Activity in Soils
 Austin Avenue Radiation Site
 July 1995

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity	
						(pCi/g)	± 1s
SB-11	0-2	0.04	15	8	0.53	8.12	± 2.85
	2-4	0.09	15	10	0.67	5.44	± 2.33
	4-6	0.09	15	5	0.33	0.87	± 0.93
	6-8	0.07	15	6	0.40	2.29	± 1.51
	8-10	0.08	15	8	0.53	4.06	± 2.02
	12-14	0.08	15	12	0.80	8.22	± 2.87
	14-16	0.12	15	12	0.80	5.48	± 2.34
	16-18	0.13	15	10	0.67	3.79	± 1.95

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity	
						(pCi/g)	± 1s
SB-12	0-2	0.07	15	5	0.33	1.12	± 1.06
	4-6	0.07	15	8	0.53	4.67	± 2.16
	8-10	0.10	15	10	0.67	4.92	± 2.22
	10-12	0.07	15	11	0.73	8.21	± 2.87
	14-16	0.05	15	7	0.47	4.88	± 2.21

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity	
						(pCi/g)	± 1s
SB-13	0-2	0.15	15	4	0.27	<0.36	
	4-6	0.06	15	9	0.60	6.83	± 2.61
	8-10	0.04	15	8	0.53	8.17	± 2.86
	12-14	0.10	15	8	0.53	3.27	± 1.81
	14-16	0.09	15	7	0.47	2.71	± 1.65

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity	
						(pCi/g)	± 1s
SB-14	0-2	0.13	15	5	0.33	0.60	± 0.78
	4-6	0.08	15	4	0.27	<0.36	
	8-10	0.06	15	4	0.27	<0.36	
	12-14	0.04	15	6	0.40	4.03	± 2.01
	14-16	0.08	15	15	1.00	11.32	± 3.37

Table 2 Continued
 Field Screening Results -- Gross Alpha Activity in Soils
 Austin Avenue Radiation Site
 July 1995

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity (pCi/g) ± 1s
SB-15	0-2	0.08	15	6	0.40	2.02 ± 1.42
	4-6	0.07	15	3	0.20	<0.36
	8-10	0.17	15	2	0.13	<0.36
	12-14	0.07	15	8	0.53	4.68 ± 2.16

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity (pCi/g) ± 1s
SB-16	0-2	0.06	15	3	0.20	<0.36
	4-6	0.08	15	16	1.07	12.39 ± 3.52
	8-10	0.06	15	10	0.67	8.23 ± 2.87
	12-14	0.07	15	8	0.53	4.68 ± 2.16
	14-16	0.15	15	16	1.07	6.61 ± 2.57

Sample Location	Sample Depth (ft)	Net Weight (g)	Count Time (min)	Gross Alpha (counts)	cpm	Alpha Activity (pCi/g) ± 1s
SB-17	0-2	0.14	15	10	0.67	3.53 ± 1.88
	4-6	0.08	15	6	0.40	2.02 ± 1.42
	8-10	0.07	15	7	0.47	3.49 ± 1.87
	10-12	0.10	15	8	0.53	3.27 ± 1.81

(ft): feet

(g): grams

(min): minutes

(cpm): counts per minute

(pCi/g): picocuries per gram

(1s): 1 standard deviation

Table 3
Radiological Analyses in Soil -- Gross Alpha
Austin Avenue Radiation Site
July 1995

Sample Location	Composite Range (ft)	On-Site Field Screening Gross Alpha Activity (pCi/g) \pm 1s		TBE Analysis Gross Alpha Activity (pCi/g) \pm 1s	
SB-1	12-16	15.2 \pm	6.7	18.0 \pm	7.0
SB-2	12-16	23.0 \pm	8.3	31.0 \pm	9.0
SB-3	12-16	7.9 \pm	4.8	16.0 \pm	7.0
SB-4	10-14	7.8 \pm	3.8	15.0 \pm	6.0
SB-5	10-14	13.8 \pm	5.3	19.0 \pm	7.0
SB-6	8-12	9.5 \pm	4.4	15.0 \pm	6.0
SB-7	8-12	22.2 \pm	6.5	10.0 \pm	6.0
SB-8	12-16	5.9 \pm	3.4	26.0 \pm	8.0
SB-9	12-16	9.9 \pm	4.3	15.0 \pm	6.0
SB-10	8-14	6.5 \pm	2.5	17.0 \pm	7.0
SB-11	12-16	13.7 \pm	5.2	21.0 \pm	7.0
SB-12	10-12 14-16	13.1 \pm	5.1	15 \pm	6
SB-13	12-16	6.0 \pm	3.5	36.0 \pm	9.0
SB-14	8-10 12-16	15.7 \pm	5.4	23.0 \pm	8.0
SB-15	oilywaste 12-14	4.7 \pm	2.2	27.0 \pm	8.0
SB-16	12-16	11.3 \pm	4.7	17.0 \pm	7.0
SB-17	10-12	3.3 \pm	1.8	8.1 \pm	5.2

(ft): feet

(pCi/g) : picocuries per gram

(1s): 1 sigma standard deviation

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Table 4
TBE Radiological Analysis Methodology
Austin Avenue Radiation Site
July 1995

Parameter/Radioisotope	TBE Methodology
Gross Alpha Activity	Gross Alpha
Uranium-238	Alpha Spectroscopy
Uranium-234	Alpha Spectroscopy
Thorium-230	Alpha Spectroscopy
Radium-226	Radon Emanation
Radionuclide Identification	Gamma Spectroscopy

Table 5
 TBE Radiological Analyses – Unfiltered Water
 Austin Avenue Radiation Site
 July 1995

Sample Location	U-238 (pCi/L)	U-234 (pCi/L)	Th-230 (pCi/L)	Ra-226 (pCi/L)
SB-1	n/a	n/a	0.22 ± 0.12	0.84 ± 0.11
SB-2	0.82 ± 0.21	1.2 ± 0.3	0.24 ± 0.11	1.1 ± 0.1
SB-3	1.0 ± 0.4	1.2 ± 0.4	0.11 ± 0.08	1.1 ± 0.1
SB-4	3.6 ± 3.4	3.4 ± 1.3	0.21 ± 0.10	0.84 ± 0.10
SB-5	0.43 ± 0.24	0.58 ± 0.28	0.096 ± 0.067	0.51 ± 0.10
SB-6	n/a	n/a	0.27 ± 0.12	0.71 ± 0.12
SB-7	4.1 ± 0.6	5.0 ± 0.6	0.16 ± 0.10	1.9 ± 0.1
SB-8	n/a	n/a	<0.09	4.3 ± 0.1
SB-9	0.36 ± 0.12	0.28 ± 0.11	0.073 ± 0.065	0.73 ± 0.10
SB-10	n/a			
SB-11	2.6 ± 0.4	2.9 ± 0.4	0.31 ± 0.23	0.6 ± 0.18
SB-12	1.5 ± 0.3	1.8 ± 0.3	0.60 ± 0.15	1.6 ± 0.1
SB-13	3.3 ± 0.7	5.4 ± 0.9	0.32 ± 0.14	5.7 ± 0.1
SB-14	3.6 ± 0.4	4.3 ± 0.5	0.97 ± 0.22	3.9 ± 0.2
SB-15	n/a	n/a	0.48 ± 0.18	16 ± 1.0
SB-16	1.0 ± 0.2	1.2 ± 0.2	1.1 ± 0.3	2.5 ± 0.1
SB-17	0.79 ± 0.25	0.84 ± 0.26	0.14 ± 0.13	0.59 ± 0.17

(pCi/L) : picocuries per liter

n/a: data not available

Table 6
TBE Radiological Analyses – Filtered Groundwater
Austin Avenue Radiation Site
July 1995

Sample Location	U-238 (pCi/L)	U-234 (pCi/L)	Th-230 (pCi/L)	Ra-226 (pCi/L)
SB-1F	n/a	n/a	0.12 ± 0.10	0.23 ± 0.09
SB-2F	0.27 ± 0.12	0.22 ± 0.11	<0.1	0.35 ± 0.1
SB-3F	0.41 ± 0.14	0.79 ± 0.20	<0.06	0.52 ± 0.10
SB-4F	3.0 ± 0.4	3.5 ± 0.5	<0.07	0.66 ± 0.1
SB-5F	n/a	n/a	<0.07	0.26 ± 0.09
SB-6F	4.1 ± 0.6	5.0 ± 0.6	<0.06	0.92 ± 0.09
SB-7F	0.25 ± 0.15	0.37 ± 0.17	<0.07	0.46 ± 0.09
SB-8F	0.11 ± 0.07	0.11 ± 0.07	<0.01	0.34 ± 0.1
SB-9F	0.13 ± 0.03	0.13 ± 0.10	<0.06	0.2
SB-10F	n/a			
SB-11F	2.2 ± 0.3	2.7 ± 0.4	0.087 ± 0.071	0.48 ± 0.08
SB-12F	0.19 ± 0.14	0.40 ± 0.19	<0.05	0.21 ± 0.08
SB-13F	0.14 ± 0.11	0.76 ± 0.24	0.083 ± 0.067	0.31 ± 0.12
SB-14F	2.0 ± 0.3	2.4 ± 0.4	<0.1	1.3 ± 0.1
SB-15F	0.67 ± 0.22	0.09 ± 0.25	<0.1	0.68 ± 0.09
SB-16F	0.12 ± 0.08	0.18 ± 0.10	0.09 ± 0.088	0.75 ± 0.12
SB-17F	0.14 ± 0.08	0.08 ± 0.10	<0.2	0.46 ± 0.08

(pCi/L) : picocuries per liter

n/a: data not available

Table 7
 TBE Radiological Analyses -- Subsurface Soil
 Austin Avenue Radiation Site
 July 1995

Sample Location	Composite Range (ft)	U-238	U-234	Th-230	Ra-226
		(pCi/g)	(pCi/g)	(pCi/g)	(pCi/g)
SB-1	12-16	1.8 ± 0.1	1.8 ± 0.1	0.39 ± 0.06	3.5 ± 0.6
SB-2	12-16	0.49 ± 0.06	0.53 ± 0.06	0.26 ± 0.04	2.6 ± 0.7
SB-3	12-16	0.39 ± 0.05	0.39 ± 0.05	0.21 ± 0.04	1.4 ± 0.5
SB-4	10-14	1.1 ± 0.1	1.4 ± 0.1	0.86 ± 0.11	2.8 ± 0.7
SB-5	10-14	0.75 ± 0.08	0.76 ± 0.08	0.32 ± 0.04	3.0 ± 0.6
SB-6	8-12	0.42 ± 0.06	0.50 ± 0.06	0.36 ± 0.05	1.9 ± 0.4
SB-7	8-12	0.19 ± 0.04	0.15 ± 0.03	0.19 ± 0.03	1.7 ± 0.4
SB-8	12-16	0.20 ± 0.04	0.21 ± 0.04	0.94 ± 0.01	3.2 ± 0.6
SB-9	12-16	0.21 ± 0.04	0.24 ± 0.04	0.68 ± 0.08	1.2 ± 0.5
SB-10	8-14	0.52 ± 0.07	0.53 ± 0.07	0.23 ± 0.04	1.5 ± 0.3
SB-11	12-16	0.70 ± 0.07	0.69 ± 0.07	0.38 ± 0.06	1.4 ± 0.5
SB-12	10-12 14-16	0.33 ± 0.05	0.28 ± 0.04	0.22 ± 0.04	1.4 ± 0.4
SB-13	12-16	1.8 ± 0.2	2.2 ± 0.2	0.82 ± 0.12	5.5 ± 0.9
SB-14	8-10 12-16	0.50 ± 0.06	0.54 ± 0.07	1.0 ± 0.1	1.6 ± 0.4
SB-15	12-14	0.80 ± 0.1	0.69 ± 0.09	0.37 ± 0.05	3.5 ± 0.7
SB-16	12-16	0.65 ± 0.13	0.62 ± 0.12	0.4 ± 0.06	2.0 ± 0.5
SB-17	10-12	0.27 ± 0.04	0.26 ± 0.04	0.24 ± 0.04	1.3 ± 0.5

(ft): feet

(pCi/g) : picocuries per gram

Table 8
 Field Screening Results - Air Monitoring
 Austin Avenue Radiaiton Site
 July 1995

Sample ID	Sampling Date	Start Time	Flow Rate (cfm)	End Time	Flow Rate (cfm)	Air Volume Sampled (L)	cpm	dpm	Concentration at Equilibrium $\mu\text{Ci/mL}$	Percent of the Allowable Effluent Concentration
AIR-1	03/28/95	725	4.0	1630	3.8	59973.26	0.50	1.39	1.05E-14	52.3
AIR-2	03/29/95	1128	3.8	1830	3.8	45327.86	0.40	1.11	1.11E-14	55.4
AIR-3	03/30/95	1100	4.0	1651	4.0	37450.37	0.10	0.28	3.34E-15	16.7
AIR-4	03/31/95	935	4.0	1255	4.0	21749.76	0.30	0.84	1.74E-14	86.8
AIR-5	04/03/95	950	4.0	1915	3.8	63949.39	0.90	2.47	1.74E-14	86.9
AIR-6	04/04/95	915	4.0	1850	4.0	63550.08	0.65	1.79	1.27E-14	63.5

(cfm): cubic feet per minute

(L): liters

(cpm): counts per minute

(dpm): distintegrations per minute

($\mu\text{Ci/mL}$): microcuries per milliliter

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Table 9
 99 % Upper Tolerance Intervals
 Austin Avenue Radiation Site
 July 1995

Matrix	Contaminant	K	Mean	Standard Deviation	99%UTI
Soil (Radiological Analysis)	U-238	2.6202	0.4170	0.1982	0.9363
	U-234	2.6202	0.4210	0.1830	0.9005
	Th-230	2.6202	0.3776	0.1257	0.7070
	Ra-226	2.6202	1.0911	0.2990	1.8745
Unfiltered Water (Radiological Analysis)	U-238	2.6202	0.4528	0.2907	1.2145
	U-234	2.6202	0.4976	0.2730	1.2129
	Th-230	2.6202	0.3014	0.3817	1.3015
	Ra-226	2.6202	0.7376	0.4512	1.9198
Unfiltered Water (Field Screening)	Gross Alpha	2.6202	1.469	1.0192	4.1395

99%UTI = Mean + K(Standard Deviation)

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Table 10
Log Transformed Data
Austin Avenue Radiation Site
July 1995

SOIL								
Location	U-238	LN(U-238 + 1)	U-234	LN(U-234 + 1)	Th-230	LN(Th-230 + 1)	Ra-226	LN(Ra-226 + 1)
SB-1	1.8	1.0296	1.8	1.0296	0.39	0.3293	3.5	1.5041
SB-2	0.49	0.3988	0.53	0.4253	0.26	0.2311	2.6	1.2809
SB-3	0.39	0.3293	0.39	0.3293	0.21	0.1906	1.4	0.8755
SB-4	1.1	0.7419	1.4	0.8755	0.86	0.6206	2.8	1.3350
SB-6	0.42	0.3507	0.5	0.4055	0.36	0.3075	1.9	1.0647
SB-7	0.19	0.1740	0.15	0.1398	0.19	0.1740	1.7	0.9933
SB-8	0.2	0.1823	0.21	0.1906	0.94	0.6627	3.2	1.4351
SB-10	0.52	0.4187	0.53	0.4253	0.23	0.2070	1.5	0.9163
SB-11	0.7	0.5306	0.69	0.5247	0.38	0.3221	1.4	0.8755
SB-12	0.33	0.2852	0.28	0.2469	0.22	0.1989	1.4	0.8755
SB-13	1.8	1.0296	2.2	1.1632	0.82	0.5988	5.5	1.8718
SB-14	0.5	0.4055	0.54	0.4318	1	0.6931	1.6	0.9555
SB-15	0.8	0.5878	0.69	0.5247	0.37	0.3148	3.5	1.5041
SB-17	0.27	0.2390	0.26	0.2311	0.24	0.2151	1.3	0.8329

UNFILTERED WATER								
Location	U-238	LN(U-238 + 1)	U-234	LN(U-234 + 1)	Th-230	LN(Th-230 + 1)	Ra-226	LN(Ra-226 + 1)
SB-1	n/a		n/a		0.22	0.1989	0.84	0.6098
SB-2	0.82	0.5988	1.2	0.7885	0.24	0.2151	1.1	0.7419
SB-3	1	0.6931	1.2	0.7885	0.11	0.1044	1.1	0.7419
SB-4	3.6	1.5261	3.4	1.4816	0.21	0.1906	0.84	0.6098
SB-6	n/a		n/a		0.27	0.2390	0.71	0.5365
SB-7	4.1	1.6292	5	1.7918	0.16	0.1484	1.9	1.0647
SB-8	n/a		n/a		0.09	0.0862	4.3	1.6677
SB-10	n/a		n/a		n/a		n/a	
SB-11	2.6	1.2809	2.9	1.3610	0.31	0.2700	0.6	0.4700
SB-12	1.5	0.9163	1.8	1.0296	0.6	0.4700	1.6	0.9555
SB-13	3.3	1.4506	5.4	1.8563	0.32	0.2776	5.7	1.9021
SB-14	3.6	1.5261	4.3	1.6677	0.97	0.6780	3.9	1.5892
SB-15	n/a		n/a		0.48	0.3920	16	2.8332
SB-17	0.79	0.5822	0.84	0.6098	0.14	0.1310	0.59	0.4637

FIELD SCREENING - GROSS ALPHA		
Location	Gross Alpha	LN(Gross Alpha)
SB-1	3.4	1.22
SB-2	2.3	0.83
SB-3	MDA	
SB-4	1.7	0.53
SB-6	MDA	
SB-7	MDA	
SB-8	MDA	
SB-10	N/A	
SB-11	2.6	0.96
SB-12	MDA	
SB-13	MDA	
SB-14	2.9	1.06
SB-15	34.9	3.55
SB-17	1.9	0.64

(LN): Natural Log

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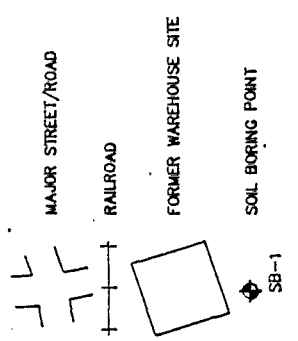
AR300192

Figures

Figures

AR300193

LEGEND:



GRAPHIC SCALE

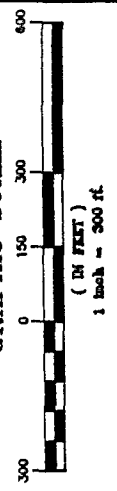


FIGURE 1
WELL POINT LOCATION MAP
AUSTIN AVENUE RADIATION SITE
LANDSDOWNE, PENNSYLVANIA
JULY 1995

U.S. EPA ENVIRONMENTAL RESPONSE TEAM
 RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
 C-10-95-002
 VOL. 8337-848-88-0025-B

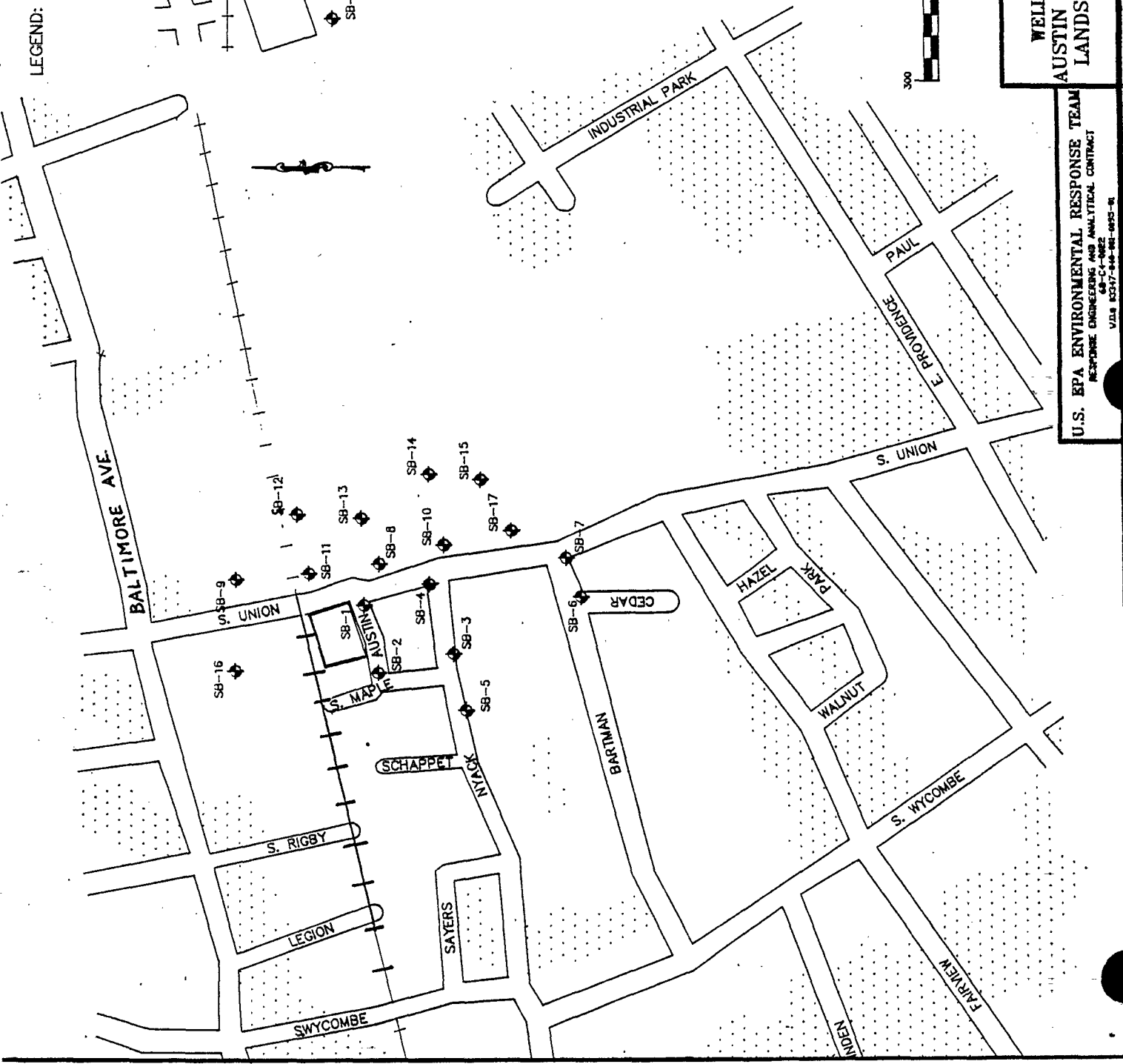
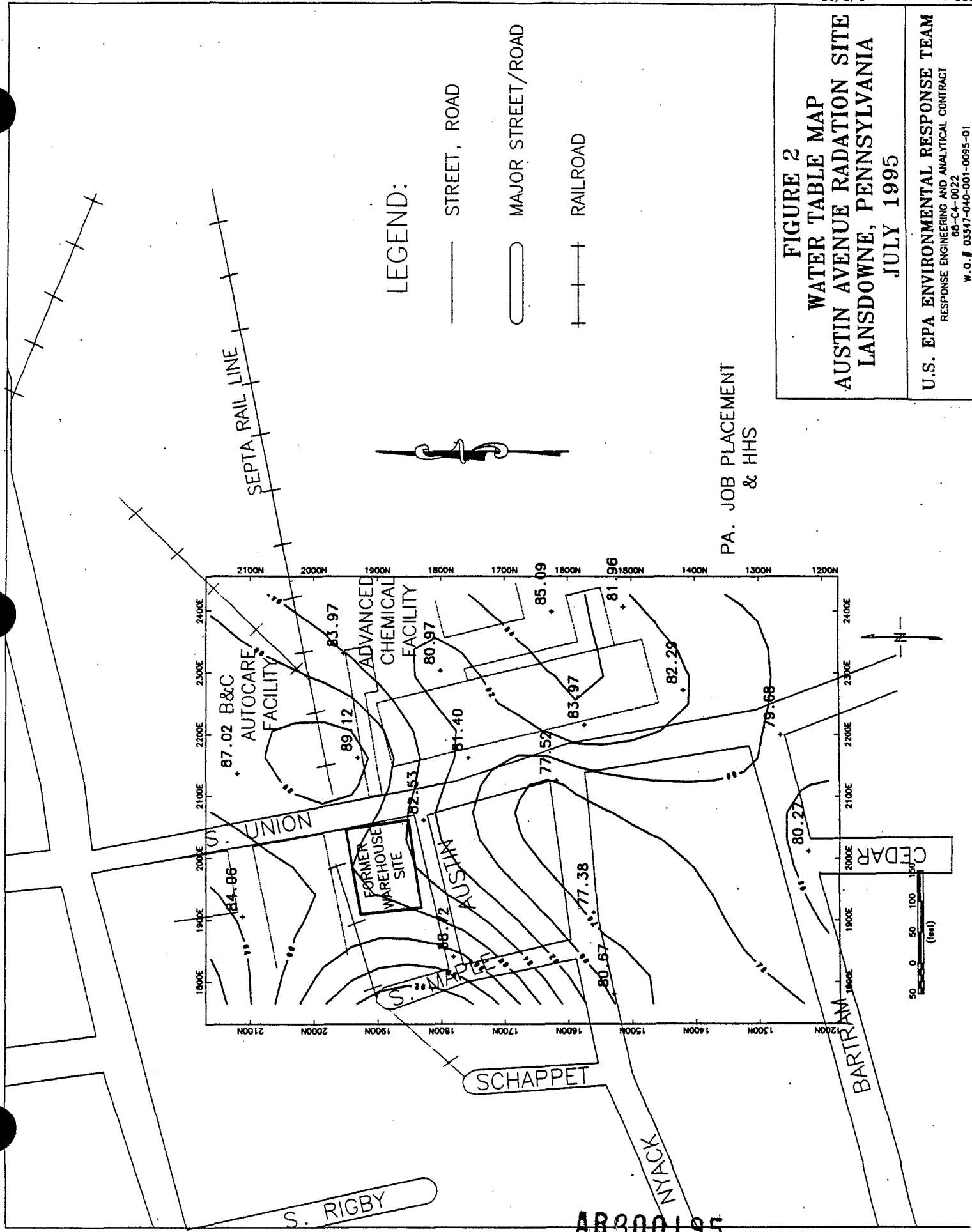


FIGURE 2
WATER TABLE MAP
AUSTIN AVENUE RADATION SITE
LANSLOWNE, PENNSYLVANIA
JULY 1995

U.S. EPA ENVIRONMENTAL RESPONSE TEAM
 RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
 W.O.# 03347-040-001-0095-01



LEGEND:

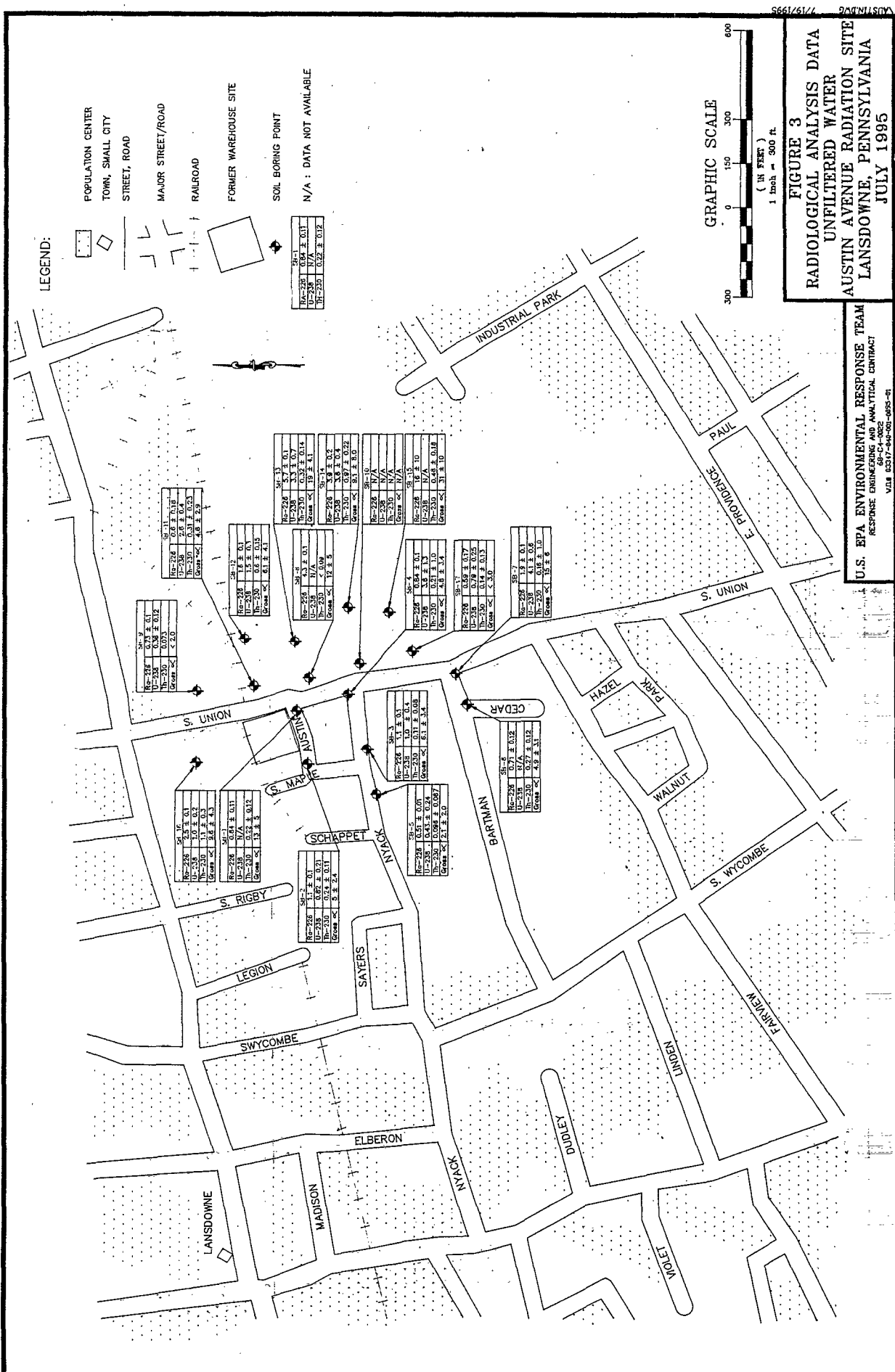
— STREET, ROAD

— MAJOR STREET/ROAD

+ RAILROAD

PA. JOB PLACEMENT & HHS

AR300195



LEGEND:

- POPULATION CENTER
- TOWN, SMALL CITY STREET, ROAD
- MAJOR STREET/ROAD
- RAILROAD
- FORMER WAREHOUSE SITE
- SOIL BORING POINT
- N/A : DATA NOT AVAILABLE

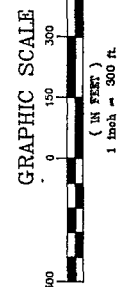
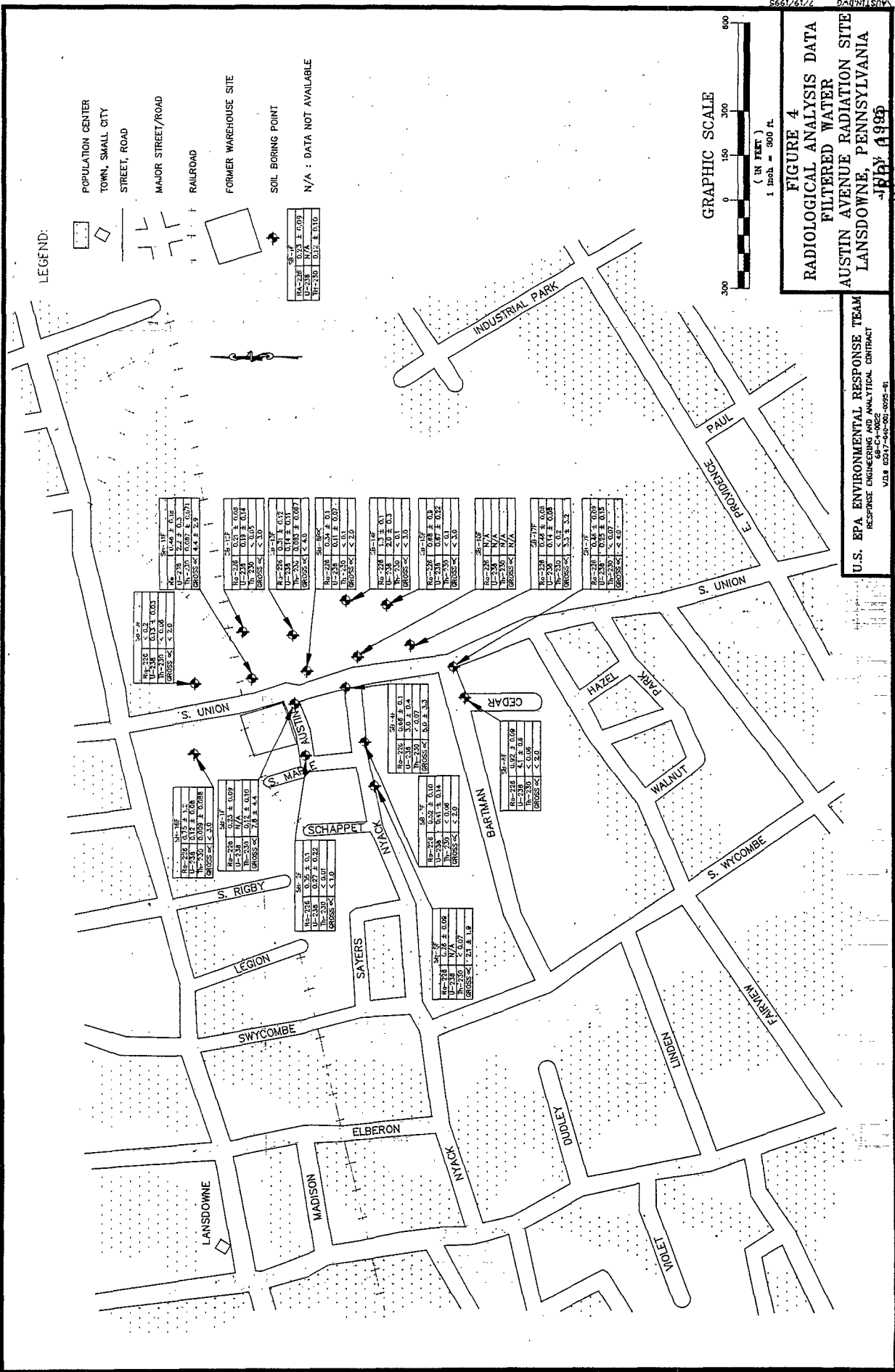


FIGURE 3
RADIOLOGICAL ANALYSIS DATA
UNFILTERED WATER
AUSTIN AVENUE RADIATION SITE
LANSDOWNE, PENNSYLVANIA
JULY 1995

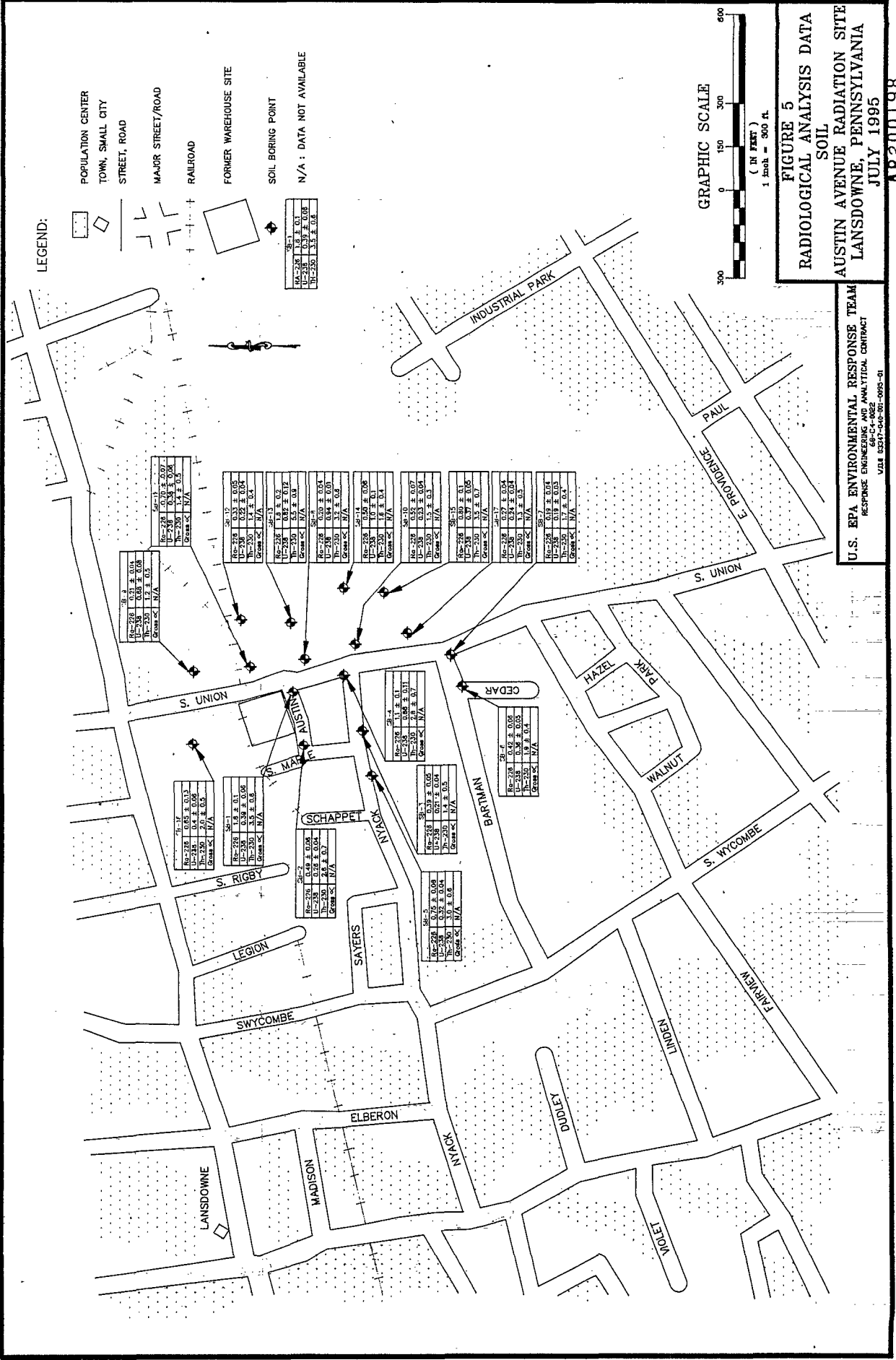
U.S. EPA ENVIRONMENTAL RESPONSE TEAM
 RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
 68-C-1082
 V018 03317-949-001-005-01

AR300196

Point ID	Depth (ft)	Activity (dpm/100g)	Activity (dpm/l)	Notes
SP-1	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	
	0.50 ± 0.12	0.50 ± 0.12	0.50 ± 0.12	
	0.0	< 0.0	< 0.0	
	0.0	< 0.0	< 0.0	
SP-2	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	
	0.50 ± 0.12	0.50 ± 0.12	0.50 ± 0.12	
	0.0	< 0.0	< 0.0	
	0.0	< 0.0	< 0.0	
SP-3	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	
	0.50 ± 0.12	0.50 ± 0.12	0.50 ± 0.12	
	0.0	< 0.0	< 0.0	
	0.0	< 0.0	< 0.0	
SP-4	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	
	0.50 ± 0.12	0.50 ± 0.12	0.50 ± 0.12	
	0.0	< 0.0	< 0.0	
	0.0	< 0.0	< 0.0	
SP-5	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	
	0.50 ± 0.12	0.50 ± 0.12	0.50 ± 0.12	
	0.0	< 0.0	< 0.0	
	0.0	< 0.0	< 0.0	
SP-6	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	
	0.50 ± 0.12	0.50 ± 0.12	0.50 ± 0.12	
	0.0	< 0.0	< 0.0	
	0.0	< 0.0	< 0.0	
SP-7	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	
	0.50 ± 0.12	0.50 ± 0.12	0.50 ± 0.12	
	0.0	< 0.0	< 0.0	
	0.0	< 0.0	< 0.0	
SP-8	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	
	0.50 ± 0.12	0.50 ± 0.12	0.50 ± 0.12	
	0.0	< 0.0	< 0.0	
	0.0	< 0.0	< 0.0	
SP-9	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	
	0.50 ± 0.12	0.50 ± 0.12	0.50 ± 0.12	
	0.0	< 0.0	< 0.0	
	0.0	< 0.0	< 0.0	
SP-10	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	
	0.50 ± 0.12	0.50 ± 0.12	0.50 ± 0.12	
	0.0	< 0.0	< 0.0	
	0.0	< 0.0	< 0.0	
SP-11	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	
	0.50 ± 0.12	0.50 ± 0.12	0.50 ± 0.12	
	0.0	< 0.0	< 0.0	
	0.0	< 0.0	< 0.0	
SP-12	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	
	0.50 ± 0.12	0.50 ± 0.12	0.50 ± 0.12	
	0.0	< 0.0	< 0.0	
	0.0	< 0.0	< 0.0	
SP-13	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	
	0.50 ± 0.12	0.50 ± 0.12	0.50 ± 0.12	
	0.0	< 0.0	< 0.0	
	0.0	< 0.0	< 0.0	
SP-14	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	
	0.50 ± 0.12	0.50 ± 0.12	0.50 ± 0.12	
	0.0	< 0.0	< 0.0	
	0.0	< 0.0	< 0.0	
SP-15	0.75 ± 0.1	0.75 ± 0.1	0.75 ± 0.1	
	0.50 ± 0.12	0.50 ± 0.12	0.50 ± 0.12	
	0.0	< 0.0	< 0.0	
	0.0	< 0.0	< 0.0	



AR300197



LEGEND:

- POPULATION CENTER
- TOWN, SMALL CITY
- STREET, ROAD
- MAJOR STREET/ROAD
- RAILROAD
- FORMER WAREHOUSE SITE
- SOIL BORING POINT
- N/A : DATA NOT AVAILABLE

Re-226	1.8 ± 0.1
U-235	0.39 ± 0.08
U-238	2.3 ± 0.8

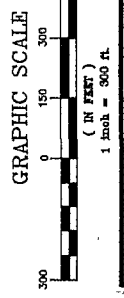


FIGURE 5
RADIOLOGICAL ANALYSIS DATA
SOIL
AUSTIN AVENUE RADIATION SITE
LANSDOWNE, PENNSYLVANIA
JULY 1995
AR300198

U.S. EPA ENVIRONMENTAL RESPONSE TEAM
RESPONSE ENGINEERING AND ANALYTICAL CONTRACT
VOL 8 85347-50-90-005-01

Re-226	0.31 ± 0.08
U-235	1.2 ± 0.3
U-238	N/A

Re-226	0.34 ± 0.08
U-235	1.4 ± 0.3
U-238	N/A

Re-226	0.32 ± 0.08
U-235	1.4 ± 0.3
U-238	N/A

Re-226	0.40 ± 0.08
U-235	1.4 ± 0.3
U-238	N/A

Re-226	0.39 ± 0.07
U-235	0.33 ± 0.04
U-238	N/A

Re-226	0.37 ± 0.05
U-235	1.7 ± 0.7
U-238	N/A

Re-226	0.27 ± 0.04
U-235	0.24 ± 0.04
U-238	N/A

Re-226	0.19 ± 0.04
U-235	1.7 ± 0.3
U-238	N/A

Re-226	0.48 ± 0.08
U-235	1.8 ± 0.1
U-238	0.4 ± 0.08

Re-226	0.4 ± 0.08
U-235	3.5 ± 0.8
U-238	N/A

Re-226	0.49 ± 0.08
U-235	1.8 ± 0.1
U-238	0.4 ± 0.08

Re-226	0.72 ± 0.08
U-235	3.0 ± 0.8
U-238	N/A

Re-226	0.71 ± 0.04
U-235	1.4 ± 0.2
U-238	N/A

Re-226	0.52 ± 0.05
U-235	0.3 ± 0.05
U-238	N/A

Re-226	0.34 ± 0.05
U-235	1.9 ± 0.4
U-238	N/A

Appendix A

Appendix A

AR300199

APPENDIX A
GEOLIS™ Logs
Austin Avenue Radiation Site
Final Report
July 1995

095\del\fr\9505\fr0095

AR300200

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-1 PROJECT NAME: AUSTIN AVE RADIATION SITE
BEGIN DATE : 03/28/95 END DATE : 03/28/95

LOGGER/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) : 0

TOTAL DEPTH : 19.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 19.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : WM. M. REICHART
DRILLER : BILL AND TODD REICHART
DRILL RIG TYPE : INGERSOL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	94.930
N. COORDINATE :	0.0000	985.6100
E. COORDINATE :	0.0000	1277.4300

WELL PERMIT.....(Y)es (N)o: N PERMIT # :

HOLE ABANDONED... (Y)es (N)o: Y

WELL INSTALLED... (Y)es (N)o: Y

WELL CLUSTER..... (Y)es (N)o: N No. OF WELLS : 0

WELL NEST..... (Y)es (N)o: N No. OF WELLS : 0

PUMPS INSTALLED.. (Y)es (N)o: Y	TYPE	DEPTH
	PURGE : WHALE ELECT PMP	19.00
	SAMPLE : WHALE ELECT PMP	19.00

BOREHOLE TESTING

BOREHOLE GEOPHYSICS..... (Y)es (N)o: N
SLUG TESTS..... (Y)es (N)o: N
PACKER TESTS..... (Y)es (N)o: N
PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :

HOLE ABANDONED. BACKFILLED W/CUTTINGS TO ~5 FT BGS. REMAIN-
ING 5 FT PLUGGED W/5-25% PORTLAND SLURRY. TEMP WEIR POINT
INSTALLED: 2 FT 0.010 SLOT SCREEN; GW EXTRACTED; WEIR PULLED

DATE: 04/20/95 ***** Roy F. WESTON, Inc. LITHOLOGICAL DATA FOR - CLIENT ID: COE4 *** PAGE: 1

BOREHOLE /WELL ID	SMP NUM	LTH NUM	LITHOLOGY (FT BGS)	SAMPLING METHOD	SIZE GRAVEL PCT.	GRAVEL SIZE	SAND PCT	SAND SIZE	SILT PCT	CLAY PCT	CLAY PCT	ORGANIC PCT	ROCK TYPE	PLAST SORT	STRENGTH	MOISTURE	STRAT UNIT	
																		SPS
SB-1	1	1	0.00	2.00	SPS	0	F	50	40	5	5	5		LOW	WEL	SFT	DRY	
SB-1	2	1	2.00	4.00	SPS	0	F	55	35	5	5	5				SFT	MST	
SB-1	3	1	4.00	6.00	SPS	0	F	40	50	10	0	0				SFT	MST	
SB-1	4	1	6.00	7.00	SPS	M	MF	35	40	5	5	5				FRM	DRY	
SB-1	4	2	7.00	8.00	SPS			0	0	0	0	0				FRM	DRY	
SB-1	5	1	8.00	9.00	SPS	M	FM	30	30	20	0	0				FRM	DRY	
SB-1	5	2	9.00	10.00	SPS			0	0	0	0	0						
SB-1	6	1	10.00	11.00	SPS	M	CM	50	0	10	5	5				LOW	MST	
SB-1	6	2	11.00	12.00	SPS			0	0	0	0	0						
SB-1	7	1	12.00	14.00	SPS	MF	MF	70	10	0	0	0				LOW	MST	
SB-1	8	1	14.00	16.00	SPS			0	0	0	0	0				MOD	MST	
SB-1	9	1	16.00	18.00	SPS	M	FM	60	0	0	0	0				FRM	WET	

AR300202

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 19.00
SITE NAME : COE4-AUSTIN AVE	LOGGER : G. NEWHART
LOG ID : SB-1	DRILLING COMPANY : WM. M. REICHART
DEPTH : 985.6100 surveyed	DRILLING RIG : INGERSOL RAND A-300
EASTING : 1277.4300 surveyed	DATE STARTED : 03/28/95
ELEVATION : 94.930 surveyed	DATE COMPLETED : 03/28/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
93.1	1	[Pattern]	100	Silty sand, SM	LT BROWN	SFT	DRY	3 8 11		
92.2	2	[Pattern]	100	Silty sand, SM	LT BROWN GRAY	SFT	MST	11 7 10 16		MOTTLED-IRON OXIDE.
90.4	4	[Pattern]	100	Not Classified - Incomplete Data	GRAY	SFT	MST	4 8 8 11		SOME FALL IN % OF MOTTLED RED (IRON OXIDE).
88.6	6	[Pattern]	50	Sandy silt, ML	RED GRAY	FRM	DRY	5 6 8 13		GRADUAL CONTACT.
87.7	7	[Pattern]		No Sample Recovered						
86.8	8	[Pattern]	50	Silty sand with gravel, SM	RED GRAY	FRM	DRY	4 6 11 13		
85.9	9	[Pattern]		No Sample Recovered						
84.10	10	[Pattern]	50	Clayey sand with gravel, SC	GRN RED PINK		MST	4 7 4 5		

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 19.00
SITE NAME : COE4-AUSTIN AVE	LOGGER : G. NEWHART
BORING ID : SB-1	DRILLING COMPANY : WM. M. REICHART
NORTHING : 985.6100 surveyed	DRILLING RIG : INGERSOL RAND A-300
EASTING : 1277.4300 surveyed	DATE STARTED : 03/28/95
ELEVATION : 94.930 surveyed	DATE COMPLETED : 03/28/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
83	11			Clayey sand with gravel, SC	GRN RED PINK		MST			
				No Sample Recovered						
82	12		100	Not Classified - Incomplete Data	OLIVE GRN		MST	4 6 9		RED-IRON OXIDE, INTER-BEDDED WHITE SAND (MORE COARSE THAN SUGAR SAND). SILICEOUS QUARTZ.
81	13									
80	14		100	Not Classified - Incomplete Data	OLIVE GREEN		MST	4 7 13 16		MED-FINE SANDS/RED-IRON OXIDE.
79	15									
78	16		100	Not Classified - Incomplete Data	BRN GRN OLIVE	FRM	WET	13 16 22 26		COHESIVE-FIRM, NOT HARD. VARVED.
77	17									
76	18									
75	19									
74	20									

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-2 PROJECT NAME: AUSTIN AVE RADIATION SITE
BEGIN DATE : 03/28/95 END DATE : 03/28/95

LOGGER/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) : 0

TOTAL DEPTH : 24.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 24.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : WM. M. REICHART
DRILLER : BILL AND TODD REICHART
DRILL RIG TYPE : INGERSOLL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	104.930
N. COORDINATE :	0.0000	767.7000
E. COORDINATE :	0.0000	1334.3900

WELL PERMIT..... (Y)es (N)o: N PERMIT # :

HOLE ABANDONED... (Y)es (N)o: Y

WELL INSTALLED... (Y)es (N)o: Y

WELL CLUSTER..... (Y)es (N)o: N No. OF WELLS : 0

WELL NEST..... (Y)es (N)o: N No. OF WELLS : 0

PUMPS INSTALLED.. (Y)es (N)o: Y	TYPE	DEPTH
	PURGE : WHALE ELECT PMP	24.00
	SAMPLE : WHALE ELECT PMP	24.00

BOREHOLE TESTING

BOREHOLE GEOPHYSICS..... (Y)es (N)o: N
SLUG TESTS..... (Y)es (N)o: N
PACKER TESTS..... (Y)es (N)o: N
PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :

HOLE ABANDONED. BACKFILLED W/CUTTINGS TO ~5 FT BGS. REMAINING VOID SPACE BACKFILLED W/5-25% PORTLAND CEMENT/H2O SLURRY
TEMP WELL PNT INSTALLED: 0.010 SLOT WELL SCREEN-GW RECOV.

BOREHOLE /WELL ID	SMP NUM	LTH NUM	LITHOLOGY INT. (FT BGS)	SAMPLING METHOD	SIZE GRAVEL PCT.	SIZE GRAVEL PCT.	SAND SIZE	SAND PCT	SILT PCT	CLAY PCT	ORGANIC PCT	ROCK TYPE	PLAST SORT	STRENGTH	MOISTURE	UNIT	STRAT
SB-2	1	1	0.00	2.00	SPS		F	45	45	5	5			FRM		FRM	DRY
SB-2	2	1	2.00	3.00	SPS		F	45	45	5	5						
SB-2	2	2	3.00	4.00	SPS			0	0	0	0						
SB-2	3	1	4.00	5.00	SPS		F	50	45	0	0						MST
SB-2	3	2	5.00	5.50	SPS	F		0	45	50	0	LOW		SFT			
SB-2	3	3	5.50	6.00	SPS			0	0	0	0						
SB-2	4	1	6.00	7.00	SPS	M	FM	45	10	5	0			FRM		FRM	DRY
SB-2	4	2	7.00	7.50	SPS			60	30	0	0			FRM		FRM	MST
SB-2	4	3	7.50	8.00	SPS			0	0	0	0						
SB-2	5	1	8.00	9.50	SPS		FM	60	30	0	10	LOW					MST
SB-2	5	2	9.50	10.00	SPS			0	0	0	0						
SB-2	6	1	10.00	11.50	SPS		FM	50	40	0	1	NON					MST
SB-2	6	2	11.50	12.00	SPS			0	0	0	0						
SB-2	7	1	12.00	13.00	SPS		F	60	35	0	0	NON					MST
SB-2	7	2	13.00	13.50	SPS		FM	90	0	0	0	NON					DRY
SB-2	7	3	13.50	14.00	SPS			0	0	0	0						
SB-2	8	1	14.00	15.00	SPS		MF	80	15	5	0	NON					WET
SB-2	8	2	15.00	15.50	SPS		FM	80	15	5	0	LOW					WET
SB-2	8	3	15.50	16.00	SPS			0	0	0	0						
SB-2	9	1	16.00	16.50	SPS		FM	60	35	0	5						
SB-2	9	2	16.50	17.00	SPS		MF	95	0	0	0						
SB-2	9	3	17.00	17.50	SPS			60	40	0	0						
SB-2	9	4	17.50	18.00	SPS			0	0	0	0						
SB-2	10	1	18.00	24.00	NS			0	0	0	0						

AR300206

Borehole Log

Roy F. WESTON, Inc.

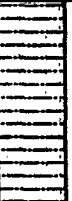
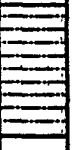




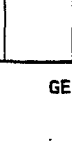

PROJECT :	AUSTIN AVE RADIATION SITE	TOTAL DEPTH :	24.00
SITE NAME :	COE4 - AUSTIN AVE.	LOGGER :	G. NEWHART
WELL ID :	SB-2	DRILLING COMPANY :	WM. M. REICHART
NORTHING :	767.7000 surveyed	DRILLING RIG :	INGERSOLL RAND A-300
EASTING :	1334.3900 surveyed	DATE STARTED :	03/28/95
ELEVATION :	104.930 surveyed	DATE COMPLETED :	03/28/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
103	1		100	Not Classified - Incomplete Data	LT BROWN	FRM	DRY	6 8		MED BROWN TO DK BROWN-ORGANIC. POSSIBLE FILL MATERIAL.
102	2		50	Not Classified - Incomplete Data	LT BROWN TAN			3 6 8 11		MINOR RIBBONING-SMEARING.
101	3			No Sample Recovered						
100	4		75	Silty sand, SM	REDDISH BROWN		MST	5 8 10 13		POSSIBLE FILL MATERIAL.
99	5			Lean clay, CL	GRAY	SFT				
				No Sample Recovered						
98	6		75	Silty sand with gravel, SM	GRY. RED PINK	FRM	DRY	8 9 8 11		PINK SANDS/NON-CEMENTED.
97	7			Silty sand, SM	BROWN	FRM	MST			NON-CEMENTED.
				No Sample Recovered						
96	8		75	Silty sand, SM	WHITE BLACK		MST	4 5 6 7		LAMINATED. NON-CEMENTED.
95	9			No Sample Recovered						
94	10		75	Silty sand, SM	OL GRN/WHT/BRN		MST	3 4 7 8		SOME DARK BROWN ORGANIC.

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 24.00
SITE NAME : COE4 - AUSTIN AVE.	LOGGER : G. NEWHART
BORING ID : SB-2	DRILLING COMPANY : WM. M. REICHART
NORTHING : 767.7000 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1334.3900 surveyed	DATE STARTED : 03/28/95
ELEVATION : 104.930 surveyed	DATE COMPLETED : 03/28/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
93	11			Silty sand, SM	OL GRN/WHT/BRN		MST			SOME DARK BROWN ORGANIC.
				No Sample Recovered						
92	12		75	Silty sand, SM	WHITE BROWN		MST	7 12 17		NON-CEMENTED.
				No Sample Recovered						
91	13			Not Classified - Incomplete Data	WHITE		DRY			NON-CEMENTED.
				No Sample Recovered						
90	14		75	Silty sand, SM	WHITE	FRM	WET	7 11 10 9		
				No Sample Recovered						
89	15			Silty sand, SM	BROWN	FRM	WET			
				No Sample Recovered						
88	16		75	Silty sand, SM	LT BRN/BLACK			7 13 17		
				Not Classified - Incomplete Data	WHITE					
87	17			Silty sand, SM	WHITE					
				No Sample Recovered						
86	18			Interval Not Sampled						AUGERED INTERVAL.
85	19									
84	20									

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 24.00
SITE NAME : COE4 - AUSTIN AVE.	LOGGER : G. NEWHART
LOG ID : SB-2	DRILLING COMPANY : WM. M. REICHART
NORTHING : 767.7000 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1334.3900 surveyed	DATE STARTED : 03/28/95
ELEVATION : 104.930 surveyed	DATE COMPLETED : 03/28/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Interval Not Sampled						AUGERED INTERVAL.
83	21									
82	22									
81	23									
80	24									
79	25									
78	26									
77	27									
76	28									
75	29									
74	30									

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-3
BEGIN DATE : 03/29/95

PROJECT NAME: AUSTIN AVE RADIATION SIT
END DATE : 03/29/95

LOGGER/COMPANY : BOR

BOREHOLE COMPLETED IN (<O>verburden edrock) : 0

TOTAL DEPTH : 22.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 22.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : WM. W. REICHART
DRILLER : TODD AND BILL REICHART
DRILL RIG TYPE : INGERSOLL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	94.890
N. COORDINATE :	0.0000	848.8500
E. COORDINATE :	0.0000	1551.0600
WELL PERMIT..... (Y)es (N)o: N	PERMIT # :	
HOLE ABANDONED... (Y)es (N)o: Y		
WELL INSTALLED... (Y)es (N)o: Y		
WELL CLUSTER..... (Y)es (N)o: N	No. OF WELLS : 0	
WELL NEST..... (Y)es (N)o: N	No. OF WELLS : 0	
PUMPS INSTALLED.. (Y)es (N)o: Y	TYPE	DEPTH
	PURGE : WHALE ELECT PMP	22.00
	SAMPLE : GW	22.00

BOREHOLE TESTING
BOREHOLE GEOPHYSICS..... (Y)es (N)o: N
SLUG TESTS..... (Y)es (N)o: N
PACKER TESTS..... (Y)es (N)o: N
PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :
BACKFILLED W/NATIVE SOILS-5 FT PORTLAND SLURRY PLUG. TEMP
WELL POINT INSTALLED ~2 FT 0.010 SLOT GALVANIZED WELL PNT.
GW SAMPLES COLLECTED. WELL POINT REMOVED/DECONTAMINATED.

WELL ID	SMP LTH NUM	LITHOLOGY INT. (FT BGS)	SAMPLING METHOD	SIZE GRAVEL	SIZE GRAVEL PCT.	SAND SIZE	SAND PCT	SILT PCT	CLAY PCT	ORGANIC PCT	ROCK TYPE	PLAST SORT	STRENGTH	MOISTURE	STRAT UNIT
SB-3	1	0.00	1.50	SPS	5	F	60	35	0	0		NON		DRY	
SB-3	1	1.50	2.00	SPS	0		0	0	0	0					
SB-3	2	2.00	2.50	SPS	10	FM	50	40	0	0		NON		DRY	
SB-3	2	2.50	3.00	SPS	5	FM	55	35	5	0				DRY	
SB-3	2	3.00	4.00	SPS	0		0	0	0	0				DRY	
SB-3	3	4.00	5.00	SPS	5	FM	50	35	10	0		LOW	FRM	DRY	
SB-3	3	5.00	5.50	SPS	10	F	55	35	0	0				DRY	
SB-3	3	5.50	6.00	SPS	0		0	0	0	0					
SB-3	4	6.00	8.00	SPS	0	FM	85	10	5	0		LOW	SFT	MST	
SB-3	5	8.00	9.50	SPS	0	MF	70	25	5	0			SFT	MST	
SB-3	5	9.50	10.00	SPS	0		0	0	0	0		MOD		MST	
SB-3	6	10.00	10.50	SPS	5		50	35	10	0					
SB-3	6	10.50	11.00	SPS	15	MF	65	20	0	0					
SB-3	6	11.00	12.00	SPS	0		0	0	0	0					
SB-3	7	12.00	13.50	SPS	5	FMC	90	5	0	0		LOW	FRM	MST	
SB-3	7	13.50	14.00	SPS	0		0	0	0	0					
SB-3	8	14.00	14.50	SPS	2	MCF	90	8	0	0			FRM	MST	
SB-3	8	14.50	16.00	SPS	0		0	0	0	0					
SB-3	9	16.00	18.00	NS	0		0	0	0	0					
SB-3	10	18.00	19.00	SPS	0	MCF	95	5	0	0		NON	SFT	WET	
SB-3	10	19.00	19.50	SPS	5	FM	90	5	0	0			FRM	MST	
SB-3	10	19.50	20.00	SPS	0		0	0	0	0					
SB-3	11	20.00	22.00	NS	0		0	0	0	0					

AR300211

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 22.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : BOR
BORING ID : SB-3	DRILLING COMPANY : WM. W. REICHART
NORTHING : 848.8500 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1551.0600 surveyed	DATE STARTED : 03/29/95
ELEVATION : 94.890 surveyed	DATE COMPLETED : 03/29/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
93	1		75	Silty sand, SM	GRAY		DRY	2 10		RED IRON OXIDE STAINING.
				No Sample Recovered						
92	2		50	Silty sand, SM	GRAY		DRY	6 10 11		IRON STAINED. NON-CEMENTED.
				Silty sand, SM	GRAY		DRY			NON-CEMENTED.
91	3			No Sample Recovered						
90	4		75	Silty sand, SM	GRAY PINK	FRM	DRY	6 8		REDDISH STAINED SAND.
89	5			Silty sand, SM	DK GRAY/BRN		DRY			
				No Sample Recovered						
88	6		100	Silty sand, SM	GREEN WHITE	SFT	MST	2 4		RIBBONS EASILY. BREAKS THROUGH. OLIVE GREEN WHITE-LAMINATED LAYER.
87	7									
86	8		75	Silty sand, SM	BROWN RED	SFT	MST	2 4		SLIGHTLY PLASTIC-RIBBON EASILY BREAKS.
85	9			No Sample Recovered						
84	10		50	Silty sand, SM	DK GRAY		MST	2 4		PLASTIC-RIBBONS AND ROLLS

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 22.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : BOR
LOGGING ID : SB-3	DRILLING COMPANY : WM. W. REICHART
NORTHING : 848.8500 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1551.0600 surveyed	DATE STARTED : 03/29/95
ELEVATION : 94.890 surveyed	DATE COMPLETED : 03/29/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Silty sand, SM	DK GRAY		MST			PLASTIC-RIBBONS AND ROLLS
				Silty sand with gravel, SM	REDDISH BROWN					LAMINATED. SANDS ARE BRN, REDDISH BROWN, & WHITE. VEINS OF IRON OXIDE-RED. EVIDENCE OF MICA.
83	11			No Sample Recovered						
			75	Not Classified - Incomplete Data	RED WHT GRN	FRM	MST	11 19 30 32		LAMINATED.
82	12			No Sample Recovered						
			25	Not Classified - Incomplete Data	GREEN	FRM	MST	30 40 00		LAMINATE. GREEN MICACEOUS LAYER. INTERBEDDED GNEISS LIKE. DRILLING BECAME HARDER AT 15 FT.
81	13			No Sample Recovered						
80	14			Interval Not Sampled						AUGERED INTERVAL.
79	15									
78	16									
77	17									
			75	Not Classified - Incomplete Data	GRAY BROWN	SFT	WET	34 24 13 52		
76	18									
				Not Classified - Incomplete Data		FRM	MST			LAMINATE AS PREVIOUS INTERVAL.
75	19			No Sample Recovered						
				Interval Not Sampled						AUGERED INTERVAL. BOTTOM OF HOLE-22 FT.
74	20									

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 22.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : BOR
BORING ID : SB-3	DRILLING COMPANY : WM. W. REICHART
NORTHING : 848.8500 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1551.0600 surveyed	DATE STARTED : 03/29/95
ELEVATION : 94.890 surveyed	DATE COMPLETED : 03/29/95

ELEVATION	DEPTH	MATERIAL	RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Interval Not Sampled						AUGERED INTERVAL BOTTOM OF HOLE-22 FT.
73	21									
72	22									
71	23									
70	24									
69	25									
68	26									
67	27									
66	28									
65	29									
64	30									

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-4 PROJECT NAME: AUSTIN AVE RADIATION SITE
BEGIN DATE : 03/29/95 END DATE : 03/29/95
LOGGER/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) : 0

TOTAL DEPTH : 22.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 22.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : REICHART
DRILLER : BILL AND TODD REICHART
DRILL RIG TYPE : INGERSOL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	92.730
N. COORDINATE :	0.0000	1059.1900
E. COORDINATE :	0.0000	1483.6700

WELL PERMIT.....(Y)es (N)o: N PERMIT # :

HOLE ABANDONED... (Y)es (N)o: Y

WELL INSTALLED... (Y)es (N)o: Y

WELL CLUSTER.....(Y)es (N)o: N No. OF WELLS : 0

WELL NEST.....(Y)es (N)o: N No. OF WELLS : 0

PUMPS INSTALLED..(Y)es (N)o: Y	TYPE	DEPTH
	PURGE : WHALE ELECT PMP	22.00
	SAMPLE : WHALE ELECT PMP	22.00

BOREHOLE TESTING

BOREHOLE GEOPHYSICS.....(Y)es (N)o: N

SLUG TESTS.....(Y)es (N)o: N

PACKER TESTS.....(Y)es (N)o: N

PUMPING TESTS.....(Y)es (N)o: N

COMMENTS :

TEMP WEIR POINT INSTALLED TO 22'-0.010 SLOT GALVANIZED; GW SAMPLE COLLECTED. WEIR PT REMOVED & HOLE ABANDONED WITH NATIVE CUTTINGS TO ~5'. REMAINING BACKFILLED W/5-25% PORTLAND.

DATE: 04/21/95 ***** Roy F. WESTON, Inc. LITHOLOGICAL DATA FOR - CLIENT ID: COE4 *** PAGE: 1

Borehole / Well ID	SMP Num	LTH Num	Lithology Int. (ft BGS)	Sampling Method	Sampling Int.	Gravel Size	Gravel Pct.	Sand Size	Sand Pct.	Silt Pct.	Clay Pct.	Organic Pct.	Rock Type	Plast Sort	Strength	Moisture	Strat Unit
SB-4	1	1	0.00	0.50	SPS		0	F	20	30	50	0		HGH	FRM	DRY	
SB-4	1	2	0.50	2.00	SPS		0		0	0	0	0					
SB-4	2	1	2.00	2.75	SPS		5	F	15	30	50	0			FRM	DRY	
SB-4	2	2	2.75	3.00	SPS		10	FM	40	30	20	0					
SB-4	2	3	3.00	4.00	SPS		0		0	0	0	0					
SB-4	3	1	4.00	4.50	SPS	M	10	FM	60	20	10	0		SL			
SB-4	3	2	4.50	4.75	SPS		0	MF	90	10	0	0					
SB-4	3	3	4.75	5.50	SPS		5	FM	65	23	7	0			FRM	DRY	
SB-4	3	4	5.50	6.00	SPS		0		0	0	0	0					
SB-4	4	1	6.00	6.25	SPS		0		65	20	15	0		LOW	SFT	DRY	
SB-4	4	2	6.25	6.75	SPS		0		40	35	25	0		LOW	SFT	DRY	
SB-4	4	3	6.75	7.00	SPS		5		40	30	25	0					
SB-4	4	4	7.00	8.00	SPS		0		0	0	0	0					
SB-4	5	1	8.00	8.50	SPS	M	30	FM	20	20	30	0		HGH			
SB-4	5	2	8.50	8.70	SPS		0	C	100	0	0	0			SFT		
SB-4	5	3	8.70	9.00	SPS		3	F	72	25	0	0		NON			
SB-4	5	4	9.00	10.00	SPS		0		0	0	0	0					
SB-4	6	1	10.00	10.50	SPS		5	FM	45	35	15	0		MOD	SFT	MST	
SB-4	6	2	10.50	11.50	SPS		0	MF	60	20	0	0		NON			
SB-4	6	3	11.50	12.00	SPS		0		0	0	0	0					
SB-4	7	1	12.00	13.00	SPS		0	MF	73	2	0	0		NON	FRM	MST	
SB-4	7	2	13.00	14.00	SPS		0		0	0	0	0					
SB-4	8	1	14.00	14.75	SPS		0	MCF	75	10	0	0		NON	FRM		
SB-4	8	2	14.75	16.00	SPS		0		0	0	0	0					
SB-4	9	1	16.00	22.00	NS		0		0	0	0	0					

AR300216

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 22.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : G. NEWHART
LOG ID : SB-4	DRILLING COMPANY : REICHART
NORTHING : 1059.1900 surveyed	DRILLING RIG : INGERSOL RAND A-300
EASTING : 1483.6700 surveyed	DATE STARTED : 03/29/95
ELEVATION : 92.730 surveyed	DATE COMPLETED : 03/29/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
			25	Fat clay with sand, CH	GRAY	FRM	DRY	7		MALIBABLE MATERIAL. FILL.
				No Sample Recovered				6		
91	1									
			50	Not Classified - Incomplete Data	GRAY GREEN			4		FILL MATERIAL. CLAY GRAY WITH GREEN MOTTLING.
90	2							8		
				Silty sand, SM	GRAY	FRM	DRY	14		
89	3			No Sample Recovered				11		
			75	Silty sand, SM	RED LT BROWN		DRY	5		
88	4			Not Classified - Incomplete Data	LT TAN			4		SHARP INTERFACE.
				Silty sand, SM	REDDISH	FRM	DRY			
87	5			No Sample Recovered						
			50	Silty sand, SM	REDDISH BROWN	SFT	DRY	2		CLAYEY.
86	6			Sandy silt, ML	REDDISH BROWN	SFT	DRY	3		POCKETS OF ORGANICS.
				Not Classified - Incomplete Data				4		
85	7			No Sample Recovered						
			50	Clayey gravel with sand, GC	BROWN GRN OLV			4		VERY PLASTIC. RIBBON MATERIAL. PINK MEDIUM SAND.
84	8			Not Classified - Incomplete Data	WHITE			6		WHITE COARSE SAND.
				Silty sand, SM	OLV GRN/BRN WHT	SFT		9		OLIVE GRN W/BROWN & WHITE INTERTWINNED LAYERS OF SAND. GREEN/BROWN MICA FLECKS.
83	9			No Sample Recovered				10		
			75	Silty sand, SM	LT BRN-BRN			2		SPHOON IS WET ON EXTERIOR. PLASTIC-ROOSAND RIBBONS. MICA INTERSPERSED.
82	10							4		
								14		
								23		

AR300217

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 22.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : G. NEWHART
BORING ID : SB-4	DRILLING COMPANY : REICHART
NORTHING : 1059.1900 surveyed	DRILLING RIG : INGERSOL RAND A-300
EASTING : 1483.6700 surveyed	DATE STARTED : 03/29/95
ELEVATION : 92.730 surveyed	DATE COMPLETED : 03/29/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
81	11			Silty sand, SM	LT BRN-BRN					SPOON IS WET ON EXTERIOR. PLASTIC-ROOSAND RIBBONS. MICA INTERSPERSED. MARBLED GREEN WHITE SANDS WITH MICA. WILL NOT ROLL. SLIGHT RIBBON.
				Silty sand, SM	GRN WHITE	SFT	MST			
				No Sample Recovered						
80	12		50	Not Classified - Incomplete Data	WHT/OLV-DRK GRN	FRM	MST	20 42 30 30		VARVED-LAMINATED. WHITE/OLIVE GREEN-DARK GREEN/LIGHT TO MED BROWN.
79	13			No Sample Recovered						
78	14		37	Not Classified - Incomplete Data	WHT/OLV-DK GRN	FRM		34 44 44 44		VARVED-LAMINATED. WHITE/OLIVE-DARK GREEN/REDDISH BROWN/BLACK AND OPAQUE SANDS W/MICA BEDS.
77	15			No Sample Recovered						
76	16			Interval Not Sampled						AUGERED. V FIRM-HARD TEMP WELL DOWN HOLE. PURGED -1.5 GAL. BEGIN WATER SAMP COLLECTION. DTW=10.2
75	17									
74	18									
73	19									
72	20									

AR300218

Borehole Log

Roy F. WESTON, Inc.

PROJECT	: AUSTIN AVE RADIATION SITE	TOTAL DEPTH	: 22.00
SITE NAME	: COE4-AUSTIN AVE.	LOGGER	: G. NEWHART
LOGGING ID	: SB-4	DRILLING COMPANY	: REICHART
NORTHING	: 1059.1900 surveyed	DRILLING RIG	: INGERSOL RAND A-300
EASTING	: 1483.6700 surveyed	DATE STARTED	: 03/29/95
ELEVATION	: 92.730 surveyed	DATE COMPLETED	: 03/29/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Interval Not Sampled						AUGERED. V FIRM-HARD TEMP WELL DOWN HOLE. PURGED -10 GAL. BEGIN WATER SAMP COLLECTION. DTW=10.2
71	21									
70	22									
69	23									
68	24									
67	25									
66	26									
65	27									
64	28									
63	29									
62	30									

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-5
BEGIN DATE : 03/29/95

PROJECT NAME: AUSTIN AVE RADIATION SI'
END DATE : 03/29/95

LOGGER/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) :

TOTAL DEPTH : 24.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 24.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : WM. M. REICHART WELL DRILLERS
DRILLER : BILL AND TODD REICHART
DRILL RIG TYPE : INGERSOLL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	96.190
N. COORDINATE :	0.0000	719.0600
E. COORDINATE :	0.0000	1588.7400
WELL PERMIT.....(Y)es (N)o: N	PERMIT # :	
HOLE ABANDONED... (Y)es (N)o: Y		
WELL INSTALLED... (Y)es (N)o: Y		
WELL CLUSTER..... (Y)es (N)o: N	No. OF WELLS : 0	
WELL NEST..... (Y)es (N)o: N	No. OF WELLS : 0	
PUMPS INSTALLED.. (Y)es (N)o: N		
	TYPE	DEPTH
	PURGE : WHALE ELECT PMP	24.00
	SAMPLE : WHALE ELECT PMP	24.00

BOREHOLE TESTING

BOREHOLE GEOPHYSICS..... (Y)es (N)o: N
SLUG TESTS..... (Y)es (N)o: N
PACKER TESTS..... (Y)es (N)o: N
PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :

TEMP WELL PT (0.010 SLOT GALVANIZED) INSTALLED, GW SAMPLE COLLECTED. WELL PT REMOVED. ABANDONED W/NATIVE CUTTINGS TO ~ 5'. REMAINING BACKFILLED W/5-25% PORTLAND CEMENT/SLURRY.

BOREHOLE /WELL ID	SMP LTH NUM	LITHOLOGY INT. (FT BGS)	SAMPLING METHOD	SIZE GRAVEL PCT.	GRAVEL SIZE	SAND SIZE	SAND PCT	SILT PCT	CLAY PCT	ORGANIC PCT	ROCK TYPE	PLAST SORT	STRENGTH	MOISTURE	UNIT	STRAT
SB-5	1	0.00	2.00	SPS	M	100	0	0	0	0			FRM	DRY		
SB-5	2	2.00	3.00	SPS		5	F	20	55	20	0	MOD				
SB-5	2	3.00	3.50	SPS		5	F	30	45	20	0					
SB-5	2	3.50	4.00	SPS		0		0	0	0	0					
SB-5	3	4.00	5.50	SPS		10	F	40	30	20	0	MOD	FRM	DRY		
SB-5	3	5.50	6.00	SPS		0		0	0	0	0					
SB-5	4	6.00	6.50	SPS		5	FM	55	30	0	0	LOW	FRM			
SB-5	4	6.50	8.00	SPS		0		0	0	0	0					
SB-5	5	8.00	8.75	SPS		0	F	50	30	10	0	MOD	STF			
SB-5	5	8.75	9.00	SPS		0	FM	60	30	10	0	MOD	FRM	DRY		
SB-5	5	9.00	10.00	SPS		0		0	0	0	0					
SB-5	6	10.00	10.50	SPS		0	MF	60	30	10	0	MOD	FRM	DRY		
SB-5	6	10.50	10.75	SPS	M	60	M	40	0	0	0		SFT	WET		
SB-5	6	10.75	11.25	SPS		40	M	60	0	0	0			WET		
SB-5	6	11.25	11.50	SPS		0	MF	75	10	0	0		SFT	MST		
SB-5	6	11.50	12.00	SPS		0		0	0	0	0					
SB-5	7	12.00	13.25	SPS		0	MF	70	10	0	0	NON	SFT	MST		
SB-5	7	13.25	13.50	SPS		0	MF	70	10	0	0					
SB-5	7	13.50	14.00	SPS		0		0	0	0	0					
SB-5	8	14.00	14.50	SPS		0	F	70	10	0	0	NON	SFT	MST		
SB-5	8	14.50	15.50	SPS		0	CF	80	0	0	0	NON	FRM	MST		
SB-5	8	15.50	16.00	SPS		0		0	0	0	0					
SB-5	9	16.00	24.00	NS		0		0	0	0	0					

AR300221

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 24.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : G. NEWHART
BORING ID : SB-5	DRILLING COMPANY : WM. M. REICHART WELL DRILL
NORTHING : 719.0600 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1588.7400 surveyed	DATE STARTED : 03/29/95
ELEVATION : 96.190 surveyed	DATE COMPLETED : 03/29/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
95	1			Not Classified - Incomplete Data				6		
94	2		75	Elastic silt with sand, MH	GRAY RED	FRM	DRY	5		GRAY WITH RED STAINING. COMPETENT SILT.
93	3			Not Classified - Incomplete Data	DK GRY/RD BRN					QUARTZ-LRG AND SMALL GRAV
				No Sample Recovered						
92	4		75	Silty sand, SM	GRAY/RD BRN	FRM	DRY	6		PREDOMINANTLY CLAY/FINE SILTS WITH SANDS.
								8		
								10		
91	5			No Sample Recovered						
90	6		75	Silty sand, SM	LT GRN/GRY RED	FRM		4		MICA-10%. RIBBONS. ROLLS-SLIGHT PLASTICITY.
				No Sample Recovered				9		
89	7									
88	8		50	Silty sand, SM	REDDISH GRAY	STF		5		
								9		
87	9			Silty sand, SM	GRAY/RED	FRM	DRY			RED IRON OXIDE STAINING.
				No Sample Recovered						
86	10		75	Silty sand, SM	GRAY/RED	FRM	DRY	2		RED IRON OXIDE SPOTTING/STAINING.
								7		
								8		

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 24.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : G. NEWHART
WELL ID : SB-5	DRILLING COMPANY : WM. M. REICHART WELL DRILLERS
NORTHING : 719.0600 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1588.7400 surveyed	DATE STARTED : 03/29/95
ELEVATION : 96.190 surveyed	DATE COMPLETED : 03/29/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Silty sand, SM	GRAY/RED	FRM	DRY			RED IRON OXIDE SPOTTING/STAINING.
85	11			Not Classified - Incomplete Data	GREENISH GRAY	SFT	WET			GRAVEL SAND LAYER.
				Not Classified - Incomplete Data	PINK		WET			
				Not Classified - Incomplete Data	GRN/WHT/GRN/RED	SFT	MST			LAMINATED, LAYERED-GREEN, WHITE, DARK GREEN, RED SANDS. MICA/SAND LAYER.
84	12		75	No Sample Recovered						
				Not Classified - Incomplete Data	WHT/LT BRN	SFT	MST	11 13 14 25		
83	13			No Sample Recovered						
				Not Classified - Incomplete Data						MOTTLING IS DARKER THAN PREVIOUS INTERVAL. DEMARCATION BY -- IRON OXIDE LAYER -2 MM THICK.
82	14		75	Not Classified - Incomplete Data	DK GRN BROWN	SFT	MST	7 20 24 20		
				Not Classified - Incomplete Data	BRN RED OLV GRN	FRM	MST			BEDDING ON 45 DEGREES. MICACEOUS FINES. BLACK 2 MM BANK-PARALLEL TO GS (PEAT-ORGANICS)
81	15			No Sample Recovered						
80	16			Interval Not Sampled						AUGERED TO 24" SET SCREEN COLLECT GW SAMPLE. PURGE -1 GAL. DTW - 10.5 FT BGS
79	17									
78	18									
77	19									
76	20									

Borehole Log

Roy F. WESTON, Inc.

PROJECT :	AUSTIN AVE RADIATION SITE	TOTAL DEPTH :	24.00
SITE NAME :	COE4-AUSTIN AVE.	LOGGER :	G. NEWHART
BORING ID :	SB-5	DRILLING COMPANY :	WM. M. REICHART WELL DRILLERS
NORTHING :	719.0600 surveyed	DRILLING RIG :	INGERSOLL RAND A-300
EASTING :	1588.7400 surveyed	DATE STARTED :	03/29/95
ELEVATION :	96.190 surveyed	DATE COMPLETED :	03/29/95

ELEVATION	DEPTH	MATERIAL	RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Interval Not Sampled						
75	21									
74	22									
73	23									
72	24									
71	25									
70	26									
69	27									
68	28									
67	29									
66	30									

AUGERED TO 24' SET SCREEN
 COLLECT GW SAMPLE. PURGE
 -1 GAL. DTW - 10.5 FT BGS

AR300224

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-6 PROJECT NAME: AUSTIN AVE RADIATION SITE
BEGIN DATE : 03/30/95 END DATE : 03/30/95
LOGGERS/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) :

TOTAL DEPTH : 19.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 19.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : WM. M. REICHART WELL DRILLING
DRILLER : BILL AND TODD REICHART
DRILL RIG TYPE : INGERSOLL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	94.880
N. COORDINATE :	0.0000	1228.4300
E. COORDINATE :	0.0000	1293.8300

WELL PERMIT..... (Y)es (N)o: N PERMIT # :

HOLE ABANDONED... (Y)es (N)o: Y

WELL INSTALLED... (Y)es (N)o: Y

WELL CLUSTER..... (Y)es (N)o: N No. OF WELLS : 0

WELL NEST..... (Y)es (N)o: N No. OF WELLS : 0

	TYPE	DEPTH
PUMPS INSTALLED.. (Y)es (N)o: Y	PURGE : WHALE ELECT PMP	19.00
	SAMPLE : WHALE ELECT PMP	19.00

BOREHOLE TESTING

BOREHOLE GEOPHYSICS..... (Y)es (N)o: N

SLUG TESTS..... (Y)es (N)o: N

PACKER TESTS..... (Y)es (N)o: N

PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :

TEMP WELL PNT PLACE @ BOTTOM OF BOREHOLE. (0.010 SLOT, GALVANIZED WELL PNT). GW EXTRACTED. WEIR PNT REMOVED. BORING BACKFILLED W/NATIVED CUTTINGS TO ~5'. REMAINING BACKFILLED.

BOREHOLE /WELL ID	SMP NUM	LTH NUM	LITHOLOGY INT. (FT BGS)	SAMPLING METHOD	SIZE GRAVEL PCT.	GRAVEL SIZE	SAND SIZE	SAND PCT	SILT PCT	CLAY PCT	ORGANIC PCT	ROCK TYPE	PLAST SORT	STRENGTH	MOISTURE	STRAT UNIT
SB-6	1	1	0.00	1.00	SPS	5	F	25	30	40	0		MOD	FRM	DRY	
SB-6	1	2	1.00	2.00	SPS	0		0	0	0	0					
SB-6	2	1	2.00	4.00	NS	0		0	0	0	0					
SB-6	3	1	4.00	5.00	SPS	M	F	15	30	45	0		HGH	FRM	DRY	
SB-6	3	2	5.00	5.50	SPS	CM	MCF	30	15	15	0			SFT	WET	
SB-6	3	3	5.50	6.00	SPS	0		0	0	0	0					
SB-6	4	1	6.00	8.00	NS	0		0	0	0	0					
SB-6	5	1	8.00	9.50	SPS	10	MF	70	15	0	0		NON	SFT		
SB-6	5	2	9.50	10.00	SPS	0		0	0	0	0					
SB-6	6	1	10.00	11.00	SPS	0	MF	80	20	0	0		NON	SFT	SAT	
SB-6	6	2	11.00	11.25	SPS	0	F	20	40	40	0		HGH	FRM		
SB-6	6	3	11.25	11.50	SPS	40	CM	50	10	0	0		NON	SFT	WET	
SB-6	6	4	11.50	11.75	SPS	20	MF	50	10	0	0					
SB-6	6	5	11.75	12.00	SPS	0		0	0	0	0					
SB-6	7	1	12.00	12.20	SPS	0	MC	60	10	0	0		NON		MST	
SB-6	7	2	12.20	14.00	SPS	0		0	0	0	0					
SB-6	8	1	14.00	19.00	NS	0		0	0	0	0					

AR300226

Borehole Log

Roy F. WESTON, Inc.

PROJECT	: AUSTIN AVE RADIATION SITE	TOTAL DEPTH	: 19.00
SITE NAME	: COE4-AUSTIN AVE.	LOGGER	: G. NEUHART
WELL ID	: SB-6	DRILLING COMPANY	: WM. M. REICHART WELL DRILLING
NORTHING	: 1228.4300 surveyed	DRILLING RIG	: INGERSOLL RAND A-300
EASTING	: 1293.8300 surveyed	DATE STARTED	: 03/30/95
ELEVATION	: 94.880 surveyed	DATE COMPLETED	: 03/30/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
			50	Sandy lean clay, CL	GRAY W/RED	FRM	DRY	14 10 7		COHESIVE. MOVE OFF HOLE -1 FT TOWARDS UNION.
93	1			No Sample Recovered						
92	2			Interval Not Sampled						
91	3									
90	4		75	Fat clay with sand, CH	GRAY BRN OL GN	FRM	DRY	10 10 10		
89	5			Silty sand with gravel, SM	LT BRN W/GRAY	SFT	WET			LT BROWN WITH GRAY CLAY STRINGERS.
				No Sample Recovered						
88	6			Interval Not Sampled						
87	7									
86	8		75	Silty sand, SM	RED/BRN/LT BRN	SFT		3 4 6 10		
85	9			No Sample Recovered						
84	10		87	Silty sand, SM	REDDISH BRN	SFT	SAT	1 3 8 14		GRADES FROM FINE TO MED SANDS.

Borehole Log

Roy F. WESTON, Inc.

PROJECT :	AUSTIN AVE RADIATION SITE	TOTAL DEPTH :	19.00
SITE NAME :	COE4-AUSTIN AVE.	LOGGER :	G. NEUHART
BORING ID :	SB-6	DRILLING COMPANY :	WM. M. REICHART WELL DRILLING
NORTHING :	1228.4300 surveyed	DRILLING RIG :	INGERSOLL RAND A-300
EASTING :	1293.8300 surveyed	DATE STARTED :	03/30/95
ELEVATION :	94.880 surveyed	DATE COMPLETED :	03/30/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Silty sand, SM	REDDISH BRN	SFT	SAT			GRADES FROM FINE TO MED SANDS.
83	11			Elastic silt with sand, MH	YLLW-RED BRN	FRM				CLAY LAYER.
				Not Classified - Incomplete Data		SFT	WET			
				Not Classified - Incomplete Data	DK/LT BRN WHT					VARVED. LAMINATED. BREAKS EASILY THOUGH FIRM
82	12		10	No Sample Recovered						
				Not Classified - Incomplete Data			MST	40000		MICA-W/BLACK ORGANIC MATERIAL. WHITE SANDS-MICA-WEATHERED GNEIS.
				No Sample Recovered						
81	13									
80	14			Interval Not Sampled						BORE DOWN TO 19 FT. SET WEIR - BEGIN DEVELOPMENT DTW (STATIC) TO GS-9.6 FT
79	15									
78	16									
77	17									
76	18									
75	19									
74	20									

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-7 PROJECT NAME: AUSTIN AVE RADIATION SITE
BEGIN DATE : 03/30/95 END DATE : 03/30/95

LOGGER/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) : 0

TOTAL DEPTH : 15.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 15.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : WM. M. REICHART WELL DRILLING
DRILLER : BILL AND TODD REICHART
DRILL RIG TYPE : INGERSOLL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	93.290
N. COORDINATE :	0.0000	1148.6800
E. COORDINATE :	0.0000	1831.6100
WELL PERMIT.....(Y)es (N)o: N	PERMIT # :	
HOLE ABANDONED... (Y)es (N)o: Y		
WELL INSTALLED... (Y)es (N)o: Y		
WELL CLUSTER..... (Y)es (N)o: N	No. OF WELLS : 0	
WELL NEST..... (Y)es (N)o: N	No. OF WELLS : 0	
PUMPS INSTALLED.. (Y)es (N)o: Y		
	TYPE	DEPTH
	PURGE : WHALE ELECT PMP	15.00
	SAMPLE : WHALE ELECT PMP	15.00

BOREHOLE TESTING

BOREHOLE GEOPHYSICS..... (Y)es (N)o: N
SLUG TESTS..... (Y)es (N)o: N
PACKER TESTS..... (Y)es (N)o: N
PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :

TEMP WEIR PT (0.010 SLOT GALVANIZED /SCREEN) INSTALLED. GW COLLECTED. WELL PT REMOVED/DECONTAMINATED. BOREHOLE ABANDONED W/NATIVE CUTTINGS TO ~5'. REMAINING BACKFILLED W/PORTLAND

DATE: 04/24/95 ***** Roy F. WESTON, Inc. LITHOLOGICAL DATA FOR - CLIENT ID: COE4 *** PAGE: 2

BOREHOLE /WELL ID	SMP NUM	LTH NUM	LITHOLOGY INT. (FT BGS)	SAMPLING METHOD	SIZE GRAVEL PCT.	GRAVEL SIZE	SAND SIZE	SILT PCT	CLAY PCT	ORGANIC PCT	ROCK TYPE	PLAST SORT	STRENGTH	MOISTURE	UNIT	STRAT
SB-7	1	1	0.00	2.00	SPS	0	MF	40	40	20	0	LOW	FRM	DRY		
SB-7	2	1	2.00	4.00	NS	0	0	0	0	0	0					
SB-7	3	1	4.00	4.25	SPS	15	FM	60	15	10	0	LOW	FRM			
SB-7	3	2	4.25	4.40	SPS	40	CM	60	0	0	0	NOM	SFT	MST		
SB-7	3	3	4.40	5.50	SPS	10	MF	50	25	15	0	LOW	FRM			
SB-7	3	4	5.50	6.00	SPS	0	0	0	0	0	0					
SB-7	4	1	6.00	8.00	NS	0	0	0	0	0	0					
SB-7	5	1	8.00	9.00	SPS	40	CMF	60	0	0	0	NOM	SFT	WET		
SB-7	5	2	9.00	9.50	SPS	15	MF	55	0	0	0	NOM	SFT	MST		
SB-7	5	3	9.50	10.00	SPS	0	0	0	0	0	0					
SB-7	6	1	10.00	10.25	SPS	0	FM	60	30	10	0	LOW	SFT	SAT		
SB-7	6	2	10.25	10.30	SPS	80	C	20	0	0	0					
SB-7	6	3	10.30	10.50	SPS	20	MF	40	20	0	0	NOM	FRM			
SB-7	6	4	10.50	12.00	SPS	0	0	0	0	0	0					
SB-7	7	1	12.00	12.25	SPS	0	FM	60	10	0	0	NOM	FRM			
SB-7	7	2	12.25	14.00	SPS	0	0	0	0	0	0					

AR300230

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 15.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : G. NEWHART
WELL ID : SB-7	DRILLING COMPANY : WM. M. REICHART WELL DRILLING
NORTHING : 1148.6800 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1831.6100 surveyed	DATE STARTED : 03/30/95
ELEVATION : 93.290 surveyed	DATE COMPLETED : 03/30/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
92	1		100	Sandy silt, ML	GRAY	FRM	DRY	3 14 18		GRAY WITH REDDISH COPPER STREAKS.
91	2			Interval Not Sampled						AUGERED INTERVAL.
89	4		75	Silty sand with gravel, SM	GRAY	FRM		4 5 6		REDDISH SANDS WITH LT. GRAY INTERBEDDED SANDS. RIBBONS ROLL. FIRM-BUT BREAKS EASILY.
				Not Classified - Incomplete Data Silty sand, SM	LT BROWN REDDISH/GRAY	SFT FRM	MST			
88	5			No Sample Recovered						
87	6			Interval Not Sampled						
85	8		75	Not Classified - Incomplete Data		SFT	WET	4 6 14 49		COARSE SAND AND GRAVEL.
84	9			Not Classified - Incomplete Data	GRN/WHT/LT BRN		MST			BEDDED MICA WITH SANDS. GREEN/OLIVE GREEN/WHITE/LT BROWN BEDDING.
				No Sample Recovered						
83	10		25	Silty sand, SM	RED	SFT	SAT	14 30 00		SATURATED RED SAND WITH SILT. RIBBONS EASILY.

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 15.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : G. NEUHART
BORING ID : SB-7	DRILLING COMPANY : WM. M. REICHART WELL DRILLING
NORTHING : 1148.6800 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1831.6100 surveyed	DATE STARTED : 03/30/95
ELEVATION : 93.290 surveyed	DATE COMPLETED : 03/30/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
82	11			Silty sand, SM Not Classified - Incomplete Silty sand with gravel, SM No Sample Recovered	RED GRN/BLK-BRN	SFT FRM	SAT			SATURATED RED SAND WITH SILT. RIBBONS EASILY. LAMINATED WEATHERED GNEISS WITH GRAVEL. SAND/SILT MICA. RIBBONS.
81	12		12	Not Classified - Incomplete Data No Sample Recovered		FRM		40 40 0		FIRM BUT BREAKS EASILY. SALT & PEPPER. WEATHERED GNEISS SAND. MICA AND BOBESIDES. WELL POINTS IN THE HOLE.
80	13									
79	14									
78	15									
77	16									
76	17									
75	18									
74	19									
73	20									

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-8 PROJECT NAME: AUSTIN AVE RADIATION SITE
BEGIN DATE : 03/30/95 END DATE : 03/30/95
LOGGERS/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) :

TOTAL DEPTH : 22.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 22.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : WM. M. REICHART WELL DRILLING
DRILLER : BILL AND TODD REICHART
DRILL RIG TYPE : INGERSOLL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	100.900
N. COORDINATE :	0.0000	1089.0700
E. COORDINATE :	0.0000	1343.5500

WELL PERMIT..... (Y)es (N)o: N PERMIT # :

HOLE ABANDONED... (Y)es (N)o: Y

WELL INSTALLED... (Y)es (N)o: Y

WELL CLUSTER..... (Y)es (N)o: N No. OF WELLS : 0

WELL NEST..... (Y)es (N)o: N No. OF WELLS : 0

PUMPS INSTALLED.. (Y)es (N)o: N TYPE

PURGE :	0.00
SAMPLE :	0.00

BOREHOLE TESTING

BOREHOLE GEOPHYSICS..... (Y)es (N)o: N

SLUG TESTS..... (Y)es (N)o: N

PACKER TESTS..... (Y)es (N)o: N

PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :

TEMP WELL PNT INSTALLED (0.010 SLOT GALVANIZED). GW SAMPLE COLLECTED. WELL PNT REMOVED & DECONNED. BACKFILLED W/NATIVE CUTTINGS TO ~5 FT. REMAINING BACKFILLED W/5-25% PORTLAND.

DATE: 04/24/95 ***** Roy F. WESTON, Inc. LITHOLOGICAL DATA FOR - CLIENT ID: COE4 *** PAGE: 1

BOREHOLE /WELL ID	SMP NUM	LTH NUM	LITHOLOGY INT. (FT BGS)	SAMPLING METHOD	GRAVEL SIZE	GRAVEL PCT.	SAND SIZE	SAND PCT.	SILT PCT.	CLAY PCT.	ORGANIC PCT.	ROCK TYPE	PLAST SORT	STRENGTH	MOISTURE	STRAT UNIT
SB-8	1	1	0.00	1.00	SPS	20	M	30	20	30	0	MOD			DRY	
SB-8	1	2	1.00	2.00	SPS	0		0	0	0	0					
SB-8	2	1	2.00	2.50	SPS	10	MF	70	0	0	10	NON		SFT	MST	
SB-8	2	2	2.50	3.00	SPS	10	F	10	40	40	0					
SB-8	2	3	3.00	4.00	SPS	0		0	0	0	0					
SB-8	3	1	4.00	5.00	SPS	0	F	20	40	40	0	HGH				
SB-8	3	2	5.00	5.50	SPS	0	F	40	35	25	0	MOD				
SB-8	3	3	5.50	6.00	SPS	0		0	0	0	0					
SB-8	4	1	6.00	6.50	NS	0	F	45	40	15	0	LOW		FRM	DRY	
SB-8	4	2	6.50	7.50	NS	0	F	45	35	20	0	MOD		FRM	MST	
SB-8	4	3	7.50	8.00	NS	0		0	0	0	0					
SB-8	5	1	8.00	9.00	SPS	0	F	20	50	30	0	MOD		SFT		
SB-8	5	2	9.00	9.50	SPS	0		0	0	0	0					
SB-8	5	3	9.50	10.00	SPS	0		0	0	0	0					
SB-8	6	1	10.00	10.50	SPS	0		0	0	0	0	MOD		FRM	MST	
SB-8	6	2	10.50	11.00	SPS	0	FM	60	25	5	0	LOW				
SB-8	6	3	11.00	12.00	SPS	0		0	0	0	0					
SB-8	7	1	12.00	13.00	SPS	20	CHF	80	0	0	0	NON			WET	
SB-8	7	2	13.00	13.10	SPS	60	CM	40	0	0	0				WET	
SB-8	7	3	13.10	13.50	SPS	5	FM	50	30	15	0				MST	
SB-8	7	4	13.50	14.00	SPS	0		0	0	0	0					
SB-8	8	1	14.00	14.30	SPS	M	CM	70	0	0	0	NON			WET	
SB-8	8	2	14.30	14.50	SPS	0	F	30	30	40	0	HGH			MST	
SB-8	8	3	14.50	14.60	SPS	100		0	0	0	0					
SB-8	8	4	14.60	15.50	SPS	M	CF	55	10	20	0	MOD				
SB-8	8	5	15.50	16.00	SPS	0		0	0	0	0					
SB-8	9	1	16.00	17.00	SPS	0	F	45	20	0	5	NON			MST	
SB-8	10	1	17.00	22.00	NS	0		0	0	0	0					

AR300234

Borehole Log

Roy F. WESTON, Inc.

PROJECT :	AUSTIN AVE RADIATION SITE	TOTAL DEPTH :	22.00
WELL NAME :	COE4-AUSTIN AVE.	LOGGER :	G. NEWHART
WELL ID :	SB-8	DRILLING COMPANY :	WM. M. REICHART WELL DRILLING
NORTHING :	1089.0700 surveyed	DRILLING RIG :	INGERSOLL RAND A-300
EASTING :	1343.5500 surveyed	DATE STARTED :	03/30/95
ELEVATION :	100.900 surveyed	DATE COMPLETED :	03/30/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
99	1		50	Clayey sand with gravel, SC			DRY	14 14 12		DARK ORGANIC SOIL WITH BRICK FRAGS. FILL MAT.
				No Sample Recovered						
98	2		50	Not Classified - Incomplete Data	BLACK	SFT	MST	4 4		ORGANIC PEAT THROUGHOUT. BLACK ORGANIC W/MED SAND.
				Not Classified - Incomplete Data	LT BROWN/GRAY					LT BROWN CLAYEY MAT. MOTTLED W/GRAY CLAY AND ORGANIC MATERIAL.
97	3			No Sample Recovered						
96	4		75	Elastic silt with sand, MH	GRAY/ORG			3 11		GRAY CLAYEY MATERIAL MOTTLED WITH ORANGE-RED STAINING. ROLLS AND RIBBONS.
95	5			Sandy elastic silt, MH	GRAY					MORE FINE SAND THAN PREVIOUS INTERVAL WITH SILT. RIBBONS, NO ROLLS.
				No Sample Recovered						
94	6		75	Interval Not Sampled	GRAY/GRN OLIVE	FRM	DRY	5 6		GRAY SAND SILTY MAT WITH GREEN OLIVE BEDDING. RIBBONS, NO ROLL.
				Interval Not Sampled	GRAY GREEN	FRM	MST			PETROLEUM HYDROCARBON ODOOR.
93	7			Interval Not Sampled						
92	8		75	Elastic silt with sand, MH	GRAY	SFT		2 4		SOFT BUT FIRM GRAY CLAY. PETROLEUM HYDROCARBON ODOOR. OIL STAINED.
91	9			Not Classified - Incomplete Data						SAME AS ABOVE. SIGNIFICANT PETROLEUM HYDROCARBON ODOOR.
				No Sample Recovered						
90	10		75	Not Classified - Incomplete Data		FRM	MST	2 7		PETRO-STAINED/ODOOR. SOLVENT STAINED AND MOISTENED.

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE
 SITE NAME : COE4-AUSTIN AVE.
 BORING ID : SB-8
 NORTHING : 1089.0700 surveyed
 EASTING : 1343.5500 surveyed
 ELEVATION : 100.900 surveyed

TOTAL DEPTH : 22.00
 LOGGER : G. NEUHART
 DRILLING COMPANY : WM. M. REICHART WELL DRILLING
 DRILLING RIG : INGERSOLL RAND A-300
 DATE STARTED : 03/30/95
 DATE COMPLETED : 03/30/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
89	11			Not Classified - Incomplete Data		FRM	MST			PETRO-STAINED/ODOR. SOLVENT STAINED AND MOISTENED.
				Silty sand, SM	GRAY					MED ROUNDED QUARTZ GRAV. MORE SAND. LESS CLAY.
				No Sample Recovered						
88	12		75	Not Classified - Incomplete Data	GRAY		WET	2		
87	13			Not Classified - Incomplete Data	WHITE GREEN OL W/RED		WET			WHITE SAND/GRAVEL. RED SANDS-RIBBONS. ROLLS. CLAYEY WITH MICA FLAKES.
				Silty sand, SM			MST			
				No Sample Recovered						
86	14		75	Not Classified - Incomplete Data	GRAY		WET	3		COARSE-MED SANDS WITH MED GRAVEL. CLAYEY MATERIAL.
				Sandy fat clay, CH	GRAY W/OLIVE		MST	4		"STONES"-LARGE GRAVEL. CLAYEY MATERIAL W/INTERSPERSED COARSE SAND LENSES. PLASTIC-RIBBONS AND ROLLS.
				Not Classified - Incomplete Data	LT BROWN GRN/GRAY			5		
				Clayey sand with gravel, SC						
				No Sample Recovered						
85	15									
84	16		50	Silty sand, SM	ORG/RED/GRN/WHT		MST	22		WEATHERED GNEISS?-LAMINATED. SALT PEPPER-LIKE MICACEOUS MATERIAL (SHINY MICA). CRUMBLES EASILY
								30		
								0		
83	17			Interval Not Sampled						BOTTOM OF BORING AT 22 FT DTW-STATIC - 12.9 FT.
82	18									
81	19									
80	20									

AR300236

Borehole Log

Roy F. WESTON, Inc.

PROJECT	: AUSTIN AVE RADIATION SITE	TOTAL DEPTH	: 22.00
SITE NAME	: COE4-AUSTIN AVE.	LOGGER	: G. NEUHART
BORING ID	: SB-8	DRILLING COMPANY	: WM. M. REICHART WELL DRILLING
NORTHING	: 1089.0700 surveyed	DRILLING RIG	: INGERSOLL RAND A-300
EASTING	: 1343.5500 surveyed	DATE STARTED	: 03/30/95
ELEVATION	: 100.900 surveyed	DATE COMPLETED	: 03/30/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Interval Not Sampled						BOTTOM OF BORING AT 22 FT DTW-STATIC - 12.9 FT.
79	21									
78	22									
77	23									
76	24									
75	25									
74	26									
73	27									
72	28									
71	29									
70	30									

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-9 PROJECT NAME: AUSTIN AVE RADIATION SITE
 BEGIN DATE : 03/31/95 END DATE : 03/31/95

LOGGER/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) : 0

TOTAL DEPTH : 24.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
 INTERVAL: 0.00 ft. to 24.00 ft. BGS
 METHOD : HSA FLUID :

BOREHOLE DIAMETER #2:
 INTERVAL:
 METHOD : FLUID :

BOREHOLE DIAMETER #3:
 INTERVAL:
 METHOD : FLUID :

DRILLING COMPANY : W.M. REICHART WELL DRILLING
 DRILLER : BILL REICHART
 DRILL RIG TYPE : INGERSOLL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	99.820
N. COORDINATE :	0.0000	1047.5600
E. COORDINATE :	0.0000	981.9900
WELL PERMIT..... (Y)es (N)o: N	PERMIT # :	
HOLE ABANDONED... (Y)es (N)o: Y		
WELL INSTALLED... (Y)es (N)o: Y		
WELL CLUSTER..... (Y)es (N)o: N	No. OF WELLS : 0	
WELL NEST..... (Y)es (N)o: N	No. OF WELLS : 0	
PUMPS INSTALLED.. (Y)es (N)o: N	TYPE	DEPTH
	PURGE :	0.00
	SAMPLE :	0.00

BOREHOLE TESTING

BOREHOLE GEOPHYSICS..... (Y)es (N)o: N
 SLUG TESTS..... (Y)es (N)o: N
 PACKER TESTS..... (Y)es (N)o: N
 PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :

TEMP WELL PNT (0.010 SLOT GALVANIZED WELL SCREEN) INSTALLED
 AT 24 FT. GW SAMPLES COLLECTED. WELL PNT REMOVED/DECONNED.
 BACKFILLED W/NATIVE CUTTINGS TO ~5 FT. PORTLAND CEMENT

AR300238

BOREHOLE /WELL ID	SMP NUM	LTH NUM	LITHOLOGY INT. (FT BGS)	SAMPLING METHOD	SIZE GRAVEL PCT.	SIZE GRAVEL PCT.	SIZE SAND PCT.	SIZE SAND PCT.	SILT PCT	CLAY PCT	ORGANIC PCT	ROCK TYPE	PLAST SORT	STRENGTH	MOISTURE	UNIT	STRAT
SB-9	1	1	0.00	1.50	SPS	20	MC	30	30	20	0		NON	SFT	DRY		
SB-9	1	2	1.50	2.00	SPS	0		0	0	0	0						
SB-9	2	1	2.00	3.50	SPS	0	F	20	40	40	0		HGH		MST		
SB-9	2	2	3.50	4.00	SPS	0		0	0	0	0						
SB-9	3	1	4.00	5.00	SPS	M	F	55	30	10	0		LOW	FRM	MST		
SB-9	3	2	5.00	5.50	SPS	M	MF	50	30	10	0		NON		DRY		
SB-9	3	3	5.50	6.00	SPS			0	0	0	0						
SB-9	4	1	6.00	6.50	SPS	M	F	40	30	10	0		LOW	FRM	DRY		
SB-9	4	2	6.50	7.00	SPS		M	60	30	0	0		NON	FRM			
SB-9	4	3	7.00	8.00	SPS			0	0	0	0						
SB-9	5	1	8.00	9.25	SPS		MF	60	20	20	0		NON	FRM			
SB-9	5	2	9.25	10.00	SPS			0	0	0	0						
SB-9	6	1	10.00	11.00	SPS		MF	60	15	0	0		NON	FRM	MST		
SB-9	6	2	11.00	11.20	SPS	10	C	80	10	0	0		NON		MST		
SB-9	6	3	11.20	11.50	SPS		MF	60	10	0	0		NON		MST		
SB-9	6	4	11.50	12.00	SPS			0	0	0	0						
SB-9	7	1	12.00	14.00	SPS		FMC	75	0	0	0		NON	FRM	MST		
SB-9	8	1	14.00	15.50	SPS		F	60	10	0	0		NON	SFT	MST		
SB-9	8	2	15.50	16.00	SPS			0	0	0	0						
SB-9	9	1	16.00	17.50	SPS		FM	70	0	0	0		NON	SFT	WET		
SB-9	9	2	17.50	17.80	SPS			60	0	10	0			FRM	DRY		
SB-9	9	3	17.80	18.00	SPS	M	C	60	0	0	0		NON		WET		
SB-9	10	1	18.00	24.00	NS	0		0	0	0	0						

AR300239

Borehole Log

Roy F. WESTON, Inc.

PROJECT :	AUSTIN AVE RADIATION SITE	TOTAL DEPTH :	24.00
SITE NAME :	COE4-AUSTIN AVE.	LOGGER :	G. NEUHART
BORING ID :	SB-9	DRILLING COMPANY :	W.M. REICHART WELL DRILLING
NORTHING :	1047.5600 surveyed	DRILLING RIG :	INGERSOLL RAND A-300
EASTING :	981.9900 surveyed	DATE STARTED :	03/31/95
ELEVATION :	99.820 surveyed	DATE COMPLETED :	03/31/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
98	1		75	Silty sand with gravel, SM	BLACK	SFT	DRY	5		FILL MATERIAL. ORGANIC MATERIAL - BLACK HUMUS. BROKEN RED BRICK.
				No Sample Recovered						
97	2		75	Elastic silt with sand, MH	YLLW TAN		MST	6		CLAYEY MATERIAL.
				No Sample Recovered						
96	3									
				No Sample Recovered						
95	4		75	Silty sand, SM	YLLW TAN	FRM	MST	6		BREAKS APART EASILY.
94	5									
				Silty sand, SM	GRAY		DRY			GRAY MATERIAL-SHARP BREAK
				No Sample Recovered						
93	6		50	Silty sand with gravel, SM	GRAY	FRM	DRY	3		
				Silty sand, SM	OLV GRN/ORG	FRM				SHARP BREAK.
				No Sample Recovered						
91	8		62	Silty sand, SM	GRN OLV/WHITE	FRM		3		INTRUSION @ -8.5-8.6 FT. SILT-45; CLAY-15; SANDS-40. GRAY. SL PLASTIC. NON CEMENTED. DAMP.
				No Sample Recovered						
89	10		75	Silty sand, SM	OLV GRN/WHITE	FRM	MST	2		MOTTLED. "SALT-PEPPER" SAND WITH MICA FLAKES.

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 24.00
WELL NAME : COE4-AUSTIN AVE.	LOGGER : G. NEWHART
WELL ID : SB-9	DRILLING COMPANY : W.M. REICHART WELL DRILLING
NORTHING : 1047.5600 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 981.9900 surveyed	DATE STARTED : 03/31/95
ELEVATION : 99.820 surveyed	DATE COMPLETED : 03/31/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
88	11			Silty sand, SM	OLV GRN/WHITE	FRM	MST			MOTTLED "SALT-PEPPER", SAND WITH MICA FLAKES.
				Not Classified - Incomplete Data	RED		MST			RED SANDS. SHARP BREAK.
				Not Classified - Incomplete Data	OLV GRN/WHITE		MST			SAND WITH MICA.
				No Sample Recovered						
87	12		100	Not Classified - Incomplete Data	WHT/OLV GRN/BLK	FRM	MST			BLACK MICA CHIPS & FLAKES WITH SOME REDDISH MAT. "SALT & PEPPER"
86	13									
85	14		75	Not Classified - Incomplete Data	GRN-OLV/LT BRN	SFT	MST	1 3 5		WEATHERED GNEISS? TAN WITH BLACK SPOTTING.
84	15			No Sample Recovered						
83	16		100	Not Classified - Incomplete Data	OLV GRN/LT BRN	SFT	WET	4 6 7		OLIVE GREEN/LT BROWN/TAN (FLOWING).
82	17			Not Classified - Incomplete Data		FRM	DRY			MATERIAL AS PREVIOUS INTERVAL.
81	18			Not Classified - Incomplete Data	WHITE		WET			BOTTOM OF BORING 24 FT. INSTALL TEMP. WELL & PUMP. DTW=12.8 FT. GW COLLECTION COMPLETE.
				Interval Not Sampled						
80	19									
79	20									

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 24.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : G. NEWHART
BORING ID : SB-9	DRILLING COMPANY : W.M. REICHART WELL DRILLING
NORTHING : 1047.5600 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 981.9900 surveyed	DATE STARTED : 03/31/95
ELEVATION : 99.820 surveyed	DATE COMPLETED : 03/31/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Interval Not Sampled						BOTTOM OF BORING 24 FT. INSTALL TEMP WELL & PUMP. DTW=12.8 FT. GW COLLECT- ION COMPLETE.
78	21									
77	22									
76	23									
75	24									
74	25									
73	26									
72	27									
71	28									
70	29									
69	30									

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-10 PROJECT NAME: AUSTIN AVE RADIATION SITE
BEGIN DATE : 03/31/95 END DATE : 03/31/95

LOGGER/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) :

TOTAL DEPTH : 14.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 14.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : WM. M. REICHART WELL DRILLING
DRILLER : BILL AND TODD REICHART
DRILL RIG TYPE : INGERSOLL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	97.950
N. COORDINATE :	0.0000	1150.9700
E. COORDINATE :	0.0000	1523.6100

WELL PERMIT..... (Y)es (N)o: N PERMIT # :

HOLE ABANDONED... (Y)es (N)o: Y

WELL INSTALLED... (Y)es (N)o: N

WELL CLUSTER..... (Y)es (N)o: N No. OF WELLS : 0

WELL NEST..... (Y)es (N)o: N No. OF WELLS : 0

PUMPS INSTALLED.. (Y)es (N)o: N	TYPE	DEPTH
	PURGE :	0.00
	SAMPLE :	0.00

BOREHOLE TESTING

BOREHOLE GEOPHYSICS..... (Y)es (N)o: N

SLUG TESTS..... (Y)es (N)o: N

PACKER TESTS..... (Y)es (N)o: N

PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :

BACKFILLED W/NATIVE MAT TO ~5 FT. BGS. PORTLAND CEMENT (5-25%)/H2O SLURRY USED TO COMPLETE THE BOREHOLE TO GRADE. OILY SYPE SOIL ENCOUNTERED..

AR300243

DATE: 04/24/95 ***** Roy F. WESTON, Inc. LITHOLOGICAL DATA FOR - CLIENT ID: COE4 *** PAGE: 1


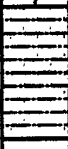
BOREHOLE /WELL ID	SMP NUM	LTH NUM	LITHOLOGY INT. (FT BGS)	SAMPLING METHOD	GRAVEL SIZE GRAVEL PCT.	GRAVEL SIZE	SAND PCT	SILT PCT	CLAY PCT	ORGANIC PCT	ROCK TYPE	PLAST SORT	STRENGTH	MOISTURE	STRAT UNIT
SB-10	1	1	0.00	1.50	SPS	M	20	M	50	30	0	0	0	0	MST
SB-10	1	2	1.50	2.00	SPS		0	0	0	0	0	0	0	0	
SB-10	2	1	2.00	4.00	NS		0	0	0	0	0	0	0	0	
SB-10	3	1	4.00	5.00	SPS		0	MC	80	10	0	10	0	0	MST
SB-10	3	2	5.00	6.00	SPS		0	0	0	0	0	0	0	0	
SB-10	4	1	6.00	8.00	NS		0	0	0	0	0	0	0	0	
SB-10	5	1	8.00	9.00	SPS	M	10	F	30	30	30	0	0	0	MST
SB-10	5	2	9.00	10.00	SPS		0	0	0	0	0	0	0	0	
SB-10	6	1	10.00	12.00	NS		0	0	0	0	0	0	0	0	
SB-10	7	1	12.00	12.25	SPS		0	0	0	0	0	0	0	0	
SB-10	7	2	12.25	14.00	SPS		0	0	0	0	0	0	0	0	

AR300244

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 14.00
WELL NAME : COE4-AUSTIN AVE.	LOGGER : G. NEUHART
WELL ID : SB-10	DRILLING COMPANY : WM. M. REICHART WELL DRILLING
NORTHING : 1150.9700 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1523.6100 surveyed	DATE STARTED : 03/31/95
ELEVATION : 97.950 surveyed	DATE COMPLETED : 03/31/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
96	1		75	Silty sand with gravel, SM	DK BROWN		MST	2 1 1		FILL MATERIAL - GRAVEL, BROKEN BRICK, RUBBLE.
				No Sample Recovered						
95	2			Interval Not Sampled						
94	3									
93	4		50	Silty sand, SM	DK BROWN	SFT	MST	2 1 1		FILL MATERIAL.
92	5			No Sample Recovered						
91	6			Interval Not Sampled						
90	7									
89	8		50	Not Classified - Incomplete Data	BLUE-GRAY	SFT	MST	2 1 1		OILY FLUID ON CUTTING BIT. "FREE-PRODUCT".
88	9			No Sample Recovered						
87	10			Interval Not Sampled						

Borehole Log

Roy F. WESTON, Inc.

PROJECT :	AUSTIN AVE RADIATION SITE	TOTAL DEPTH :	14.00
SITE NAME :	COE4-AUSTIN AVE.	LOGGER :	G. NEUHART
BORING ID :	SB-10	DRILLING COMPANY :	WM. M. REICHART WELL DRILLING
NORTHING :	1150.9700 surveyed	DRILLING RIG :	INGERSOLL RAND A-300
EASTING :	1523.6100 surveyed	DATE STARTED :	03/31/95
ELEVATION :	97.950 surveyed	DATE COMPLETED :	03/31/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Interval Not Sampled						
86	11									
85	12		12	Not Classified - Incomplete Data No Sample Recovered				2227	OVA 1000.0	OILY-SOLT. FUEL/SOLVENT SMELL. STOPPED DRILLING AND PULLED AUGERS OUT. OVM=>1000.
84	13									
83	14									
82	15									
81	16									
80	17									
79	18									
78	19									
77	20									

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-11 PROJECT NAME: AUSTIN AVE RADIATION SITE
BEGIN DATE : 04/03/95 END DATE : 04/03/95
LOGGER/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) : 0

TOTAL DEPTH : 24.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 24.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : WM. M. REICHART WELL DRILLERS
DRILLER : BILL AND TODD REICHART
DRILL RIG TYPE : INGERSOLL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	102.020
N. COORDINATE :	0.0000	1081.6000
E. COORDINATE :	0.0000	1169.5500

WELL PERMIT.....(Y)es (N)o: N PERMIT # :

HOLE ABANDONED... (Y)es (N)o: Y

WELL INSTALLED... (Y)es (N)o: Y

WELL CLUSTER..... (Y)es (N)o: N No. OF WELLS : 0

WELL NEST..... (Y)es (N)o: N No. OF WELLS : 0

	TYPE	DEPTH
PUMPS INSTALLED.. (Y)es (N)o: Y	PURGE : WHALE ELECT PMP	24.00
	SAMPLE : WHALE ELECT PMP	24.00

BOREHOLE TESTING

BOREHOLE GEOPHYSICS..... (Y)es (N)o: N

SLUG TESTS..... (Y)es (N)o: N

PACKER TESTS..... (Y)es (N)o: N

PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :

TEMP WELL PNT INSTALLED @ 24' (0.010 SLOT SCREEN, 2'-GALVAN SCREEN/RISER). GW COLLECTED. WELL PNT REMOVED/DECONNED. BACK FILLED W/NATIVE CUTTINGS. REMAINING BACKFILLED W/5-25 % PORT

BOREHOLE /WELL ID	SMP NUM	LTH NUM	LITHOLOGY INT. (FT BGS)	SAMPLING METHOD	SIZE GRAVEL PCT.	GRAVEL SIZE	SAND PCT	SILT PCT	CLAY PCT	ORGANIC PCT	ROCK TYPE	PLAST SORT	STRENGTH	MOISTURE	STRAT UNIT		
																SPS	M
SB-11	1	1	0.00	1.00	SPS	M	20	MF	60	20	0	0	0	0	NON	SFT	MST
SB-11	1	2	1.00	2.00	SPS		0	0	0	0	0	0	0	0	LOW		DRY
SB-11	2	1	2.00	3.50	SPS	5	F	35	50	10	0	0	0	0	NON	FRM	DRY
SB-11	2	2	3.50	4.00	SPS	0	F	35	50	8	0	0	0	0	LOW	FRM	DRY
SB-11	3	1	4.00	6.00	SPS	0	CMF	40	30	10	0	0	0	0	NON	FRM	DRY
SB-11	4	1	6.00	7.50	SPS	20	CMF	40	30	10	0	0	0	0	NON	FRM	DRY
SB-11	4	2	7.50	8.00	SPS	0		0	0	0	0	0	0	0	NON	FRM	DRY
SB-11	5	1	8.00	8.50	SPS	10	F	40	40	10	0	0	0	0	NON	FRM	DRY
SB-11	5	2	8.50	9.00	SPS	20	CMF	60	20	0	0	0	0	0	NON	FRM	DRY
SB-11	5	3	9.00	10.00	SPS	0		0	0	0	0	0	0	0	NON		
SB-11	6	1	10.00	12.00	STS	0		0	0	0	0	0	0	0	NON	SFT	WET
SB-11	7	1	12.00	12.20	SPS	0	MC	60	30	0	0	0	0	0	NON	FRM	WET
SB-11	7	2	12.20	12.50	SPS	0	CM	100	0	0	0	0	0	0	NON	FRM	WET
SB-11	7	3	12.50	13.50	SPS	0	M	60	10	0	0	0	0	0	NON		
SB-11	7	4	13.50	14.00	SPS	0		0	0	0	0	0	0	0	NON	FRM	WET
SB-11	8	1	14.00	14.75	SPS	0	FM	60	15	0	0	0	0	0	NON		MST
SB-11	8	2	14.75	14.85	SPS	0	C	20	20	40	0	0	0	0	NON		
SB-11	8	3	14.85	15.50	SPS	0	FM	55	15	0	0	0	0	0	NON		
SB-11	8	4	15.50	16.00	SPS	0		0	0	0	0	0	0	0	NON		
SB-11	9	1	16.00	17.00	SPS	0	CM	60	10	0	0	0	0	0	NON	FRM	WET
SB-11	9	2	17.00	17.10	SPS	0	C	70	0	0	0	0	0	0	NON		WET
SB-11	9	3	17.10	17.50	SPS	0	CM	60	10	0	0	0	0	0	NON	FRM	MST
SB-11	9	4	17.50	18.00	SPS	0		0	0	0	0	0	0	0	NON		
SB-11	10	1	18.00	24.00	NS	0		0	0	0	0	0	0	0	NON		

300248

Borehole Log

Roy F. WESTON, Inc.

PROJECT :	AUSTIN AVE RADIATION SITE	TOTAL DEPTH :	24.00
NAME :	COE4-AUSTIN AVE.	LOGGER :	G. NEUHART
BORING ID :	SB-11	DRILLING COMPANY :	WM. M. REICHART WELL DRILLERS
NORTHING :	1081.6000 surveyed	DRILLING RIG :	INGERSOLL RAND A-300
EASTING :	1169.5500 surveyed	DATE STARTED :	04/03/95
ELEVATION :	102.020 surveyed	DATE COMPLETED :	04/03/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
			50	Silty sand with gravel, SM	BLACK	SFT	MST	4 1000-4 10		BLACK FILL/ORGANIC MATERIAL.
101	1			No Sample Recovered						
100	2		75	Sandy silt, ML	LT BRN/TAN/RED		DRY	3 10		LT BROWN/TAN-REDDISH HUE WITH DARK (ORGANIC) SPOTS.
99	3			No Sample Recovered						
98	4		100	Sandy silt, ML	GRAY TAN W/RED	FRM	DRY	3 10		MICA INTERSPERSED THROUGHOUT PREDOMINANTLY TAN W/REDDISH HUE. FLAKES OF MICA.
97	5									
96	6		75	Silty sand with gravel, SM	GRAY	FRM	DRY	3 12		RIBBONS, NO ROLL.
95	7			No Sample Recovered						
94	8		50	Silty sand, SM	GRAY W/RED-ORG	FRM	DRY	5 0-0-0		HARD-FIRM. GRAY COLOR W/REDDISH ORANGE. STAINING (LIMITED).
				Silty sand with gravel, SM	GRAY	FRM	DRY			CRUMBLES EASILY.
93	9			No Sample Recovered						
92	10			Not Classified - Incomplete Data						COLLECT SHELBY TUBE SAMPLE.

Borehole Log

Roy F. WESTON, Inc.

PROJECT :	AUSTIN AVE RADIATION SITE	TOTAL DEPTH :	24.00
SITE NAME :	COE4-AUSTIN AVE.	LOGGER :	G. NEWHART
BORING ID :	SB-11	DRILLING COMPANY :	WM. M. REICHART WELL DRILLERS
NORTHING :	1081.6000 surveyed	DRILLING RIG :	INGERSOLL RAND A-300
EASTING :	1169.5500 surveyed	DATE STARTED :	04/03/95
ELEVATION :	102.020 surveyed	DATE COMPLETED :	04/03/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
91	11			Not Classified - Incomplete Data						COLLECT SHELBY TUBE SAMPLE.
90	12		75	Silty sand, SM	GRAY/BROWN	SFT	WET	3		WHITE GRADUALLY GRADES TO GRAY/LY BROWN-TAN SAND W/MICA-WEATHERED GNEISS/SCHIST.
				Not Classified - Incomplete Data	WHT-GRY/BRN-TAN	FRM	WET	5		
				Not Classified - Incomplete Data	BRN/WHT/OLV GRN	FRM	WET	9		
89	13			No Sample Recovered						
88	14		75	Silty sand, SM	DK BRN/OLV GRN	FRM	WET	2		SPARKLING MICA FLAKES. WHT/BRN/SILVER/OLV/GRN/CA WEATHERED GNEISS OR SCHIST.
				Not Classified - Incomplete Data	WHT/SILVER		MST	6		
				Silty sand, SM	OLV GRN/WHT/RED			8		
87	15			No Sample Recovered						
86	16		75	Not Classified - Incomplete Data	OLV GRN/WHT/BRN	FRM	WET	5		COARSE WET SAND W/MICA.
				Not Classified - Incomplete Data	GRAY			4		
				Not Classified - Incomplete Data	OLV GRN/WHT/RED	FRM	MST	12		
85	17			No Sample Recovered						
84	18			Interval Not Sampled						AUGERED INTERVAL. DTW= ~12.9 FT. AT GS.
83	19									
82	20									

AR300250

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 24.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : G. NEWHART
LOG ID : SB-11	DRILLING COMPANY : WM. M. REICHART WELL DRILLERS
DEPTH : 1081.6000 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1169.5500 surveyed	DATE STARTED : 04/03/95
ELEVATION : 102.020 surveyed	DATE COMPLETED : 04/03/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Interval Not Sampled						AUGERED INTERVAL. DTW= -12.9 FT. AT GS.
81	21									
80	22									
79	23									
78	24									
77	25									
76	26									
75	27									
74	28									
73	29									
72	30									

AR300251

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-12
BEGIN DATE : 04/03/95

PROJECT NAME: AUSTIN AVE RADIATION SITE
END DATE : 04/03/95

LOGGER/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) : 0

TOTAL DEPTH : 22.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 22.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : WM. M. REICHART WELL DRILLING
DRILLER : BILL AND TODD REICHART
DRILL RIG TYPE : INGERSOLL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	96.970
N. COORDINATE :	0.0000	1249.5500
E. COORDINATE :	0.0000	1139.9900

WELL PERMIT.....(Y)es (N)o: N PERMIT # :

HOLE ABANDONED... (Y)es (N)o: Y

WELL INSTALLED... (Y)es (N)o: Y

WELL CLUSTER..... (Y)es (N)o: N No. OF WELLS : 0

WELL NEST..... (Y)es (N)o: N No. OF WELLS : 0

PUMPS INSTALLED.. (Y)es (N)o: Y	TYPE	DEPTH
	PURGE : WHALE ELECT PMP	22.00
	SAMPLE : WHALE ELECT PMP	22.00

BOREHOLE TESTING

BOREHOLE GEOPHYSICS..... (Y)es (N)o: N

SLUG TESTS..... (Y)es (N)o: N

PACKER TESTS..... (Y)es (N)o: N

PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :

INSTALLED 2", 0.010 SLOT WELL SCREEN PNT (~2' LONG) - GALVAN-
IZED W/GALVAN RIZER PIPE; W/DRAW GW SAMPLE; REMOVE TEMP WELL
PNT. BACKFILL W/NATIVE CUTTINGS. COMPLETE ABANDONMENT

AR300252

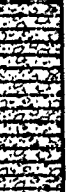


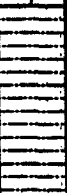


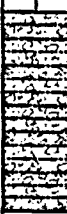



BOREHOLE /WELL ID	SMP NUM	LTH NUM	LITHOLOGY INT. (FT_BGS)	SAMPLING METHOD	SIZE GRAVEL	SIZE GRAVEL PCT.	SAND SIZE	SAND PCT	SILT PCT	CLAY PCT	ORGANIC PCT	ROCK TYPE	PLAST SORT	STRENGTH	MOISTURE	UNIT	STRAT
SB-12	1	1	0.00	1.50	SPS	20	CM	40	40	0	0	NON	FRM	FRM	MST		
SB-12	1	2	1.50	2.00	SPS	0		0	0	0	0						
SB-12	2	1	2.00	4.00	NS	0		0	0	0	0						
SB-12	3	1	4.00	5.50	SPS	0	F	50	40	10	0	LOW	FRM	FRM	MST		
SB-12	3	2	5.50	6.00	SPS	0		0	0	0	0						
SB-12	4	1	6.00	8.00	NS	0		0	0	0	0						
SB-12	5	1	8.00	9.50	SPS	20	MC	65	10	5	0	NON	FRM	FRM	MST		
SB-12	5	2	9.50	10.00	SPS	0		0	0	0	0						
SB-12	6	1	10.00	11.00	SPS	15	FM	60	15	10	0	LOW	FRM	FRM	MST		
SB-12	6	2	11.00	12.00	SPS	35	CM	50	10	5	0	NON	FRM	FRM	VET		
SB-12	7	1	12.00	14.00	NS	0		0	0	0	0						
SB-12	8	1	14.00	15.80	SPS	0	CMF	80	10	0	0	NON	FRM	FRM	VET		
SB-12	8	2	15.80	16.00	SPS	0	CMF	80	10	0	0						
SB-12	9	1	16.00	22.00	NS	0		0	0	0	0						

AR300253

Borehole Log

Roy F. WESTON, Inc.


PROJECT :	AUSTIN AVE RADIATION SITE	TOTAL DEPTH :	22.00
SITE NAME :	COE4-AUSTIN AVE	LOGGER :	G. NEWHART
BORING ID :	SB-12	DRILLING COMPANY :	WM. M. REICHART WELL DRILLING
NORTHING :	1249.5500 surveyed	DRILLING RIG :	INGERSOLL RAND A-300
EASTING :	1139.9900 surveyed	DATE STARTED :	04/03/95
ELEVATION :	96.970 surveyed	DATE COMPLETED :	04/03/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
95	1		75	Silty sand with gravel, SM	BLACK	FRM	MST	1 0 4 0		ALMOST ALL BLACK MAT. W/ BRICK FRAGS. ORGANIC FILL MAT-OLD TRAIN TRACK BED.
				No Sample Recovered						
94	2			Interval Not Sampled						
93	3									
92	4		75	Silty sand, SM	LT GRAY/RED BRN	FRM	MST	4 9 12 15		REDDISH BROWN STREAKS AND MOTTLING. WET FROM OVER- BURDEN BEING MORE PERME- ABLE.
91	5			No Sample Recovered						
90	6			Interval Not Sampled						
89	7									
88	8		75	Silty sand with gravel, SM	GRAY W/PINK	FRM	MST	11 10 13 14		
87	9			No Sample Recovered						
86	10		100	Silty sand with gravel, SM	GRAY	FRM	MST	4 0 0 0		CRUMBLES.

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 22.00
SITE NAME : COE4-AUSTIN AVE	LOGGER : G. NEWHART
LOGGING ID : SB-12	DRILLING COMPANY : WM. M. REICHART WELL DRILLING
DEPTH : 1249.5500 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1139.9900 surveyed	DATE STARTED : 04/03/95
ELEVATION : 96.970 surveyed	DATE COMPLETED : 04/03/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
85	11			Silty sand with gravel, SM	GRAY	FRM	MST			CRUMBLES.
				Silty sand with gravel, SM	GRAY/BRN	FRM	WET			GRAY W/MINOR BROWN MOTTLING.
84	12			Interval Not Sampled						
83	13									
82	14		100	Not Classified - Incomplete Data	LT-RD BRN W/WHT	FRM	WET	3 4 3 6		LT BROWN, REDDISH BROWN W/WHITE MOTTLED SAND W/MICA FLAKES.
81	15									
80	16			Not Classified - Incomplete Data	RED BRN					REDDISH BROWN SANDS W/MICA FLAKES LOGGED TO 22 FT. DTW=-13 FT.
79	17			Interval Not Sampled						
78	18									
77	19									
76	20									

Borehole Log

Roy F. WESTON, Inc.

PROJECT :	AUSTIN AVE RADIATION SITE	TOTAL DEPTH :	22.00
SITE NAME :	COE4-AUSTIN AVE	LOGGER :	G. NEWHART
BORING ID :	SB-12	DRILLING COMPANY :	WM. M. REICHART WELL DRILLING
NORTHING :	1249.5500 surveyed	DRILLING RIG :	INGERSOLL RAND A-300
EASTING :	1139.9900 surveyed	DATE STARTED :	04/03/95
ELEVATION :	96.970 surveyed	DATE COMPLETED :	04/03/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Interval Not Sampled						AUGERED TO 22 FT. DTW= -13 FT.
75	21									
74	22									
73	23									
72	24									
71	25									
70	26									
69	27									
68	28									
67	29									
66	30									

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-13 PROJECT NAME: AUSTIN AVE RADIATION SITE
BEGIN DATE : 04/03/95 END DATE : 04/03/95
LOGGERS/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) : 0

TOTAL DEPTH : 22.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 22.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : WM. W. REICHART DRILLING
DRILLER : BILL AND TODD REICHART
DRILL RIG TYPE : INGERSOLL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	94.770
N. COORDINATE :	0.0000	1228.4800
E. COORDINATE :	0.0000	1293.8300

WELL PERMIT.....(Y)es (N)o: N PERMIT # :

HOLE ABANDONED... (Y)es (N)o: Y

WELL INSTALLED... (Y)es (N)o: Y

WELL CLUSTER..... (Y)es (N)o: N No. OF WELLS : 0

WELL NEST..... (Y)es (N)o: N No. OF WELLS : 0

PUMPS INSTALLED.. (Y)es (N)o: Y	TYPE	DEPTH
	PURGE : WHALE ELECT PMP	22.00
	SAMPLE : WHALE ELECT PMP	22.00

BOREHOLE TESTING

BOREHOLE GEOPHYSICS..... (Y)es (N)o: N

SLUG TESTS..... (Y)es (N)o: N

PACKER TESTS..... (Y)es (N)o: N

PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :

AUGER TO 22'. INSTALL TEMP WELL PNT (2" DIA, 2' LENGTH; GALVANIZED 0.010 SLOT SCREEN; GALVAN RISER). REMOVE GW & TEMP PNT. BACKFILL W/NATIVE CUTTINGS TO ~5 FT. COMPLETE W/5-25%

AR300257

DATE: 04/25/95 **** Roy F. WESTON, Inc. LITHOLOGICAL DATA FOR - CLIENT ID: COE4 *** PAGE: 1

BOREHOLE	SHP	LTH	LITHOLOGY INT.	SAMPLING METHOD	GRAVEL SIZE	GRAVEL PCT.	SAND SIZE	SAND PCT	SILT PCT	CLAY PCT	ORGANIC PCT	ROCK TYPE	PLAST SORT	STRENGTH	MOISTURE	UNIT	STRAIT
/WELL ID	NUM	NUM	(FT BGS)														
SB-13	1	1	0.00	1.50	SPS	20	CM	60	20	0	0		NON	SFT	DRY		
SB-13	1	2	1.50	2.00	SPS	0		0	0	0	0						
SB-13	2	1	2.00	4.00	NS	0		0	0	0	0						
SB-13	3	1	4.00	5.00	SPS	0	F	60	35	5	0		LOW	FRM	DRY		
SB-13	3	2	5.00	6.00	SPS	0		0	0	0	0						
SB-13	4	1	6.00	8.00	NS	0		0	0	0	0						
SB-13	5	1	8.00	8.50	SPS	0	F	40	50	10	0			FRM	MST		
SB-13	5	2	8.50	9.30	SPS	0	F	40	50	5	0		LOW	FRM	MST		
SB-13	5	3	9.30	9.50	SPS	0	MF	55	20	15	0		LOW	FRM	MST		
SB-13	5	4	9.50	10.00	SPS	0		0	0	0	0						
SB-13	6	1	10.00	12.00	NS	0		0	0	0	0						
SB-13	7	1	12.00	12.50	SPS	10	MF	35	20	35	0		MOD		DRY		
SB-13	7	2	12.50	13.50	SPS	M	CM	50	20	20	0		LOW	FRM	MST		
SB-13	7	3	13.50	14.00	SPS	20	CM	70	0	0	0		NON	SFT	WET		
SB-13	8	1	14.00	15.50	SPS	M	CM	65	15	5	0		LOW	FRM	WET		
SB-13	8	2	15.50	16.00	SPS	0		0	0	0	0						
SB-13	9	1	16.00	22.00	NS	0		0	0	0	0						

AR300258

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE
 SITE NAME : COE4-AUSTIN AVE.
 HOLE ID : SB-13
 BATHYMETRY : 1228.4800 surveyed
 EASTING : 1293.8300 surveyed
 ELEVATION : 94.770 surveyed

TOTAL DEPTH : 22.00
 LOGGER : G. NEUHART
 DRILLING COMPANY : WM. W. REICHART DRILLING
 DRILLING RIG : INGERSOLL RAND A-300
 DATE STARTED : 04/03/95
 DATE COMPLETED : 04/03/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
93	1		75	Silty sand with gravel, SM	DK BRN/BLACK	SFT	DRY	10 12		ORGANIC-DARK BROWN AND BLACK SOIL.
				No Sample Recovered						
92	2			Interval Not Sampled						
91	3									
90	4		50	Silty sand, SM	GRAY/RED-BRN	FRM	DRY	1 5 6		RIBBONS.
89	5			No Sample Recovered						
88	6			Interval Not Sampled						
87	7									
86	8		75	Not Classified - Incomplete Data	LT BRN/GRY/GRN	FRM	MST	2 8 14 18		MICA SHEEN. RIBBONS, NO ROLL.
				Sandy silt, ML	GRAY RED/BRN	FRM	MST			SL REDDISH BRN STAINING.
85	9			Silty sand, SM	GRAY	FRM	MST			COARSE SAND W/MICA AND FINE SILTS AND SANDS.
				No Sample Recovered						
84	10			Interval Not Sampled						

Borehole Log

Roy F. WESTON, Inc.

PROJECT :	AUSTIN AVE RADIATION SITE	TOTAL DEPTH :	22.00
SITE NAME :	COE4-AUSTIN AVE.	LOGGER :	G. NEWHART
BORING ID :	SB-13	DRILLING COMPANY :	WM. W. REICHART DRILLING
NORTHING :	1228.4800 surveyed	DRILLING RIG :	INGERSOLL RAND A-300
EASTING :	1293.8300 surveyed	DATE STARTED :	04/03/95
ELEVATION :	94.770 surveyed	DATE COMPLETED :	04/03/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
83	11			Interval Not Sampled						
82	12		100	Sandy lean clay, CL	DK GRAY		DRY			
				Silty sand, SM	GRAY/ORG	FRM	MST	12		GRAY MATERIAL WITH RED/ORANGE STAINING. COARSE SAND WITH MICA.
81	13			Not Classified - Incomplete Data	GRAY	SFT	WET			COARSE SAND WITH SMALL GRAVEL.
80	14		75	Silty sand, SM	GRAY	FRM	WET	13		
79	15			No Sample Recovered						
78	16			Interval Not Sampled						AUGER TO 22'. REFUSAL AT 21-22 FT. DTW -13.8 FT.
77	17									
76	18									
75	19									
74	20									

Borehole Log

Roy F. WESTON, Inc.

PROJECT :	AUSTIN AVE RADIATION SITE	TOTAL DEPTH :	22.00
SITE NAME :	COE4-AUSTIN AVE.	LOGGER :	G. NEWHART
BORING ID :	SB-13	DRILLING COMPANY :	WM. W. REICHART DRILLING
DEPTH :	1228.4800 surveyed	DRILLING RIG :	INGERSOLL RAND A-300
EASTING :	1293.8300 surveyed	DATE STARTED :	04/03/95
ELEVATION :	94.770 surveyed	DATE COMPLETED :	04/03/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Interval Not Sampled						AUGER TO 22', REFUSAL AT 21-22 FT. DTW -15.8 FT.
73	21									
72	22									
71	23									
70	24									
69	25									
68	26									
67	27									
66	28									
65	29									
64	30									

AR300261

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-14
BEGIN DATE : 04/03/95

PROJECT NAME: AUSTIN AVE RADIATION SITE
END DATE : 04/04/95

LOGGER/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) : 0

TOTAL DEPTH : 18.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 18.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : WM. M. REICHART WELL DRILLING
DRILLER : BILL AND TODD REICHART
DRILL RIG TYPE : INGERSOLL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	93.190
N. COORDINATE :	0.0000	1331.6900
E. COORDINATE :	0.0000	1464.2700

WELL PERMIT..... (Y)es (N)o: N PERMIT # :

HOLE ABANDONED... (Y)es (N)o: Y

WELL INSTALLED... (Y)es (N)o: Y

WELL CLUSTER..... (Y)es (N)o: N No. OF WELLS : 0

WELL NEST..... (Y)es (N)o: N No. OF WELLS : 0

PUMPS INSTALLED.. (Y)es (N)o: Y	TYPE	DEPTH
	PURGE : WHALE ELECT PMP	18.00
	SAMPLE : WHALE ELECT PMP	18.00

BOREHOLE TESTING

BOREHOLE GEOPHYSICS..... (Y)es (N)o: N

SLUG TESTS..... (Y)es (N)o: N

PACKER TESTS..... (Y)es (N)o: N

PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :

INSTALL BORING TO 18'. INSTALL TEMP WELL SCREEN (2" DIA, 2' LONG, GALVAN., RISER-GALVAN). REMOVE GW SAMPLE, SCREEN, AND RISER. BACKFILL W/NATIVE CUTTINGS TO 5'.

AR300262

BOREHOLE /WELL ID	SMP LTH NUM	LITHOLOGY INT. (FT BGS)	SAMPLING METHOD	GRAVEL SIZE	GRAVEL PCT.	SAND SIZE	SAND PCT	SILT PCT	CLAY PCT	ORGANIC PCT	ROCK TYPE	PLAST SORT	STRENGTH	MOISTURE	UNIT	STRAT
SB-14	1	0.00	2.00	SPS	0	MC	60	40	0	0	NON	FRM	FRM	DRY		
SB-14	2	2.00	4.00	NS	0		0	0	0	0	NON	FRM	FRM	MST		
SB-14	3	4.00	4.25	SPS	0	C	75	25	0	0	NON	SFT	SFT	MST		
SB-14	3	4.25	5.25	SPS	0		0	0	0	0	NON					
SB-14	3	5.25	6.00	SPS	0		0	0	0	0	NON					
SB-14	4	6.00	8.00	NS	0		0	0	0	0	NON					
SB-14	5	8.00	8.20	SPS	60	C	40	0	0	0	NON					
SB-14	5	8.20	10.00	SPS	0		0	0	0	0	NON					
SB-14	6	10.00	12.00	NS	0		0	0	0	0	MOD		FRM			
SB-14	7	12.00	12.50	SPS	0	F	15	45	40	0	MOD					
SB-14	7	12.50	14.00	SPS	0		0	0	0	0	MOD					
SB-14	8	14.00	15.00	SPS	5	MF	55	30	10	0	MOD		FRM	SAT		
SB-14	8	15.00	15.50	SPS	0	CMF	80	0	0	0	NON		SFT	WET		
SB-14	8	15.50	16.00	SPS	0		0	0	0	0	NON					
SB-14	9	16.00	18.00	NS	0		0	0	0	0	NON					

AR300263

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 18.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : G. NEWHART
BORING ID : SB-14	DRILLING COMPANY : WM. M. REICHART WELL DRILLING
NORTHING : 1331.6900 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1464.2700 surveyed	DATE STARTED : 04/03/95
ELEVATION : 93.190 surveyed	DATE COMPLETED : 04/04/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
92	1	[Hatched]	100	Silty sand, SM	DK BRN/BLK	FRM	DRY	11		FILL MATERIAL. BROKEN GLASS AND BRICK.
91	2	[Hatched]		Interval Not Sampled				10		
90	3	[Hatched]								
89	4	[Hatched]	62	Silty sand, SM	DK BRN/BLACK	FRM	MST	2		FILL MATERIAL.
		[Hatched]		Not Classified - Incomplete Data	RED/BLACK	SFT	MST	5		100% SLAG. SLAG - CINDER-LIKE FILL MATERIAL. GRAVEL-LIKE-SOFT.
88	5	[Hatched]		No Sample Recovered						
87	6	[Hatched]		Interval Not Sampled						
86	7	[Hatched]								
85	8	[Hatched]	10	Not Classified - Incomplete Data	BROWN/BLACK		WET	3		PETROLEUM.
		[Hatched]		No Sample Recovered				6		
84	9	[Hatched]								
83	10	[Hatched]		Interval Not Sampled						

AR300264

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 18.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : G. NEWHART
BORING ID : SB-14	DRILLING COMPANY : WM. M. REICHART WELL DRILLING
GRID NORTHING : 1331.6900 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1464.2700 surveyed	DATE STARTED : 04/03/95
ELEVATION : 93.190 surveyed	DATE COMPLETED : 04/04/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
82	11			Interval Not Sampled						
81	12		25	Elastic silt with sand, MH	GRAY	FRM		2-4		OILY. PLASTIC (MAY BE DUE TO OILY-PETROLEUM SUBSTANCE).
80	13			No Sample Recovered						
79	14		75	Silty sand, SM	BROWN	FRM	SAT	1-2 6-13		MILK CHOCOLATE BROWN MATERIAL. PLASTIC (DUE TO OIL?).
78	15			Not Classified - Incomplete Data	WHT/GRN/LT BRN	SFT	WET			FOLIATED WEATHERED GNEISS CRUMBLES EASILY.
77	16			No Sample Recovered						
76	17			Interval Not Sampled						AUGER TO 18 FT. TEMP WELL POINT INSTALLED. DTW-8.1 FT.
75	18									
74	19									
73	20									

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-15
BEGIN DATE : 04/04/95

PROJECT NAME: AUSTIN AVE RADIATION SITE
END DATE : 04/05/95

LOGGER/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) : 0

TOTAL DEPTH : 24.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 24.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : WM. M. REICHART WELL DRILLING
DRILLER : BILL AND TODD REICHART
DRILL RIG TYPE : INGERSOLL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	87.760
N. COORDINATE :	0.0000	1344.2900
E. COORDINATE :	0.0000	1576.8700
WELL PERMIT.....(Y)es (N)o: N	PERMIT # :	
HOLE ABANDONED... (Y)es (N)o: Y		
WELL INSTALLED... (Y)es (N)o: Y		
WELL CLUSTER..... (Y)es (N)o: N	No. OF WELLS : 0	
WELL NEST..... (Y)es (N)o: N	No. OF WELLS : 0	
PUMPS INSTALLED.. (Y)es (N)o: Y	TYPE	DEPTH
	PURGE : WHALE ELECT PMP	24.00
	SAMPLE : WHALE ELECT PMP	24.00

BOREHOLE TESTING
BOREHOLE GEOPHYSICS..... (Y)es (N)o: N
SLUG TESTS..... (Y)es (N)o: N
PACKER TESTS..... (Y)es (N)o: N
PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :
BORE TO 24'. PLACE TEMP WELL SCREEN (WELL SCREEN=0.010 SLOT, 2' LONG, 2" DIA, GALVAN, RISER-GALVAN). COLLECT GW SAMPLE.
REMOVE WELL SCREEN PNT, DECON. BACKFILLED W/NATIVE CUTTINGS.

BOREHOLE /WELL ID	SMP LTH NUM	LITHOLOGY INT. (FT BGS)	SAMPLING METHOD	GRAVEL SIZE	GRAVEL PCT.	SAND SIZE	SAND PCT	SILT PCT	CLAY PCT	ORGANIC PCT	ROCK TYPE	PLAST SORT	STRENGTH	MOISTURE	UNIT	STRAT
SB-15	1	0.00	1.50 SPS	30	C	60	10	0	0	0	NON	SFT	DRY			
SB-15	1	1.50	2.00 SPS	0		0	0	0	0	0						
SB-15	2	2.00	4.00 NS	0		0	0	0	0	0						
SB-15	3	4.00	4.50 SPS	M	C	50	30	0	0	0	NON	FRM	DRY			
SB-15	3	4.50	6.00 SPS	0		0	0	0	0	0						
SB-15	4	6.00	8.00 NS	0		0	0	0	0	0						
SB-15	5	8.00	10.00 SPS	0	CM	70	30	0	0	0	NON	SFT	SAT			
SB-15	6	10.00	10.50 SPS	0	C	70	30	0	0	0	NON	SFT	SFT			
SB-15	6	10.50	12.00 SPS	15	F	50	25	10	0	0	NON	FRM	MST			
SB-15	7	12.00	24.00 NS	0		0	0	0	0	0						

AR300267

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 24.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : G. NEWHART
BORING ID : SB-15	DRILLING COMPANY : WM. M. REICHART WELL DRILLING
NORTHING : 1344.2900 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1576.8700 surveyed	DATE STARTED : 04/04/95
ELEVATION : 87.760 surveyed	DATE COMPLETED : 04/05/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
86.1	1		75	Not Classified - Incomplete Data	DK BRN-BRN	SFT	DRY	12		BACKFILL MAT. ORGANIC LAYER ON TOP GRADING INTO CINDER/SLAG AND C-M GRAV.
				No Sample Recovered						
85.2	2			Interval Not Sampled						
84.3	3									
83.4	4		25	Silty sand with gravel, SM	DK BRN/BLACK	FRM	DRY	2		FILL MATERIAL. BRICK.
				No Sample Recovered						
82.5	5									
81.6	6			Interval Not Sampled						
80.7	7									
79.8	8		100	Silty sand, SM		SFT	SAT	1		OILY ODOR. OILY PETROLEUM MATERIAL SATURATES THE SOIL.
78.9	9							1		
77.10	10		100	Silty sand, SM	BLACK	SFT		1		SATURATED WITH OILY MATERIAL. RUNNY SANDS.

Borehole Log

Roy F. WESTON, Inc.

PROJECT	: AUSTIN AVE RADIATION SITE	TOTAL DEPTH	: 24.00
SITE NAME	: COE4-AUSTIN AVE.	LOGGER	: G. NEWHART
BORING ID	: SB-15	DRILLING COMPANY	: WM. M. REICHART WELL DRILLING
DEPTH	: 1344.2900 surveyed	DRILLING RIG	: INGERSOLL RAND A-300
EASTING	: 1576.8700 surveyed	DATE STARTED	: 04/04/95
ELEVATION	: 87.760 surveyed	DATE COMPLETED	: 04/05/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Silty sand, SM	BLACK	SFT				SATURATED WITH OILY MATERIAL. RUNNY SANDS.
76	11			Silty sand with gravel, SM	GRAY	FRM	MST			OILY ODOR.
75	12			Interval Not Sampled					OVA 1000.0	OVA=>1000 UNITS ABOUT BACKGROUND.
74	13									
73	14									
72	15									
71	16									
70	17									
69	18									
68	19									
67	20									

AR300269

Borehole Log

Roy F. WESTON, Inc.

PROJECT :	AUSTIN AVE RADIATION SITE	TOTAL DEPTH :	24.00
SITE NAME :	COE4-AUSTIN AVE.	LOGGER :	G. NEWHART
BORING ID :	SB-15	DRILLING COMPANY :	WM. M. REICHART WELL DRILLING
NORTHING :	1344.2900 surveyed	DRILLING RIG :	INGERSOLL RAND A-300
EASTING :	1576.8700 surveyed	DATE STARTED :	04/04/95
ELEVATION :	87.760 surveyed	DATE COMPLETED :	04/05/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Interval Not Sampled					OVA 1000.0	OVA > 1000 UNITS ABOUT BACKGROUND.
66	21									
65	22									
64	23									
63	24									
62	25									
61	26									
60	27									
59	28									
58	29									
57	30									

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-16 PROJECT NAME: AUSTIN AVE RADIATION SITE
BEGIN DATE : 04/04/95 END DATE : 04/04/95
LOGGERS/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) : 0

TOTAL DEPTH : 24.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 24.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : WM M. REICHART WELL DRILLING
DRILLER : BILL AND TODD REICHART
DRILL RIG TYPE : INGERSOLL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	99.560
N. COORDINATE :	0.0000	816.5300
E. COORDINATE :	0.0000	1000.0000

WELL PERMIT.....(Y)es (N)o: N PERMIT # :

HOLE ABANDONED... (Y)es (N)o: Y

WELL INSTALLED... (Y)es (N)o: Y

WELL CLUSTER..... (Y)es (N)o: N No. OF WELLS : 0

WELL NEST..... (Y)es (N)o: N No. OF WELLS : 0

	TYPE	DEPTH
PUMPS INSTALLED.. (Y)es (N)o: Y	PURGE : WHALE ELECT PMP	24.00
	SAMPLE : WHALE ELECT PMP	24.00

BOREHOLE TESTING

BOREHOLE GEOPHYSICS..... (Y)es (N)o: N

SLUG TESTS..... (Y)es (N)o: N

PACKER TESTS..... (Y)es (N)o: N

PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :

TEMP WELL PNT (2" DIA, 2' LONG, 0.010 SLOT, GALVANIZED WELL SCREEN) W/ GALVANIZED RISER. COLLECT GW SAMPLE. REMOVE & DECON WELL PNT. ABANDON TO ~5 FT W/NATIVE CUTTINGS.

DATE: 04/25/95 **** Roy F. WESTON, Inc. LITHOLOGICAL DATA FOR - CLIENT ID: COE4 *** PAGE: 1

BOREHOLE /WELL ID	SMP NUM	LTH NUM	LITHOLOGY INT. (FT BGS)	SAMPLING METHOD	SIZE GRAVEL PCT.	GRAVEL SIZE SAND PCT.	SIZE SAND PCT.	SILT PCT.	CLAY PCT.	ORGANIC PCT.	ROCK TYPE	PLAST. SORT	STRENGTH	MOISTURE	STRAT UNIT
SB-16	1	1	0.00	1.00	SPS	5	F	50	40	5	0	NON	FRM	DRY	
SB-16	1	2	1.00	2.00	SPS	0		0	0	0	0				
SB-16	2	1	2.00	4.00	NS	0		0	0	0	0				
SB-16	3	1	4.00	5.00	SPS	0	MF	70	20	0	0	NON	FRM	MST	
SB-16	3	2	5.00	5.50	SPS	0	MF	75	0	0	0	NON	FRM		
SB-16	3	3	5.50	6.00	SPS	0		0	0	0	0				
SB-16	4	1	6.00	8.00	NS	0		0	0	0	0				
SB-16	5	1	8.00	9.00	SPS	0	FM	60	20	0	0	NON	SFT	MST	
SB-16	5	2	9.00	9.50	SPS	0	CM	60	15	5	0	LOW		MST	
SB-16	5	3	9.50	10.00	SPS	0		0	0	0	0				
SB-16	6	1	10.00	12.00	NS	0		0	0	0	0				
SB-16	7	1	12.00	13.00	SPS	0	CM	60	10	0	0	NON	FRM	SAT	
SB-16	7	2	13.00	14.00	SPS	0		0	0	0	0				
SB-16	8	1	14.00	14.50	SPS	0	CM	90	0	0	0	NON	SFT	SAT	
SB-16	8	2	14.50	15.50	SPS	0	CM	60	15	0	0	NON	FRM	WET	
SB-16	8	3	15.50	16.00	SPS	0		0	0	0	0				
SB-16	9	1	16.00	24.00	NS	0		0	0	0	0				

AR300272

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 24.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : G. NEWHART
WELL ID : SB-16	DRILLING COMPANY : WM M. REICHART WELL DRILLING
NORTHING : 816.5300 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1000.0000 surveyed	DATE STARTED : 04/04/95
ELEVATION : 99.560 surveyed	DATE COMPLETED : 04/04/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
98	1		50	Silty sand, SM	TAN/LT BRN	FRM	DRY	7		
				No Sample Recovered						
97	2			Interval Not Sampled						
96	3									
95	4		75	Silty sand, SM	YLLW/TAN/LT BRN	FRM	MST	5		
94	5			Not Classified - Incomplete Data	LT TAN/GRN/RED	FRM				MOT LT TAN/DK GREEN/RED/WHITE WEATHERED GNEISS. LAMINATED. RIBBON. SLIPPERY.
				No Sample Recovered						
93	6			Interval Not Sampled						
92	7									
91	8		75	Silty sand, SM	LT TAN/WHT/GRN	SFT	MST	10		SOFT BUT FIRM-CRUMBLES. NOT AS MOTTLED AS PREVIOUS.
90	9			Silty sand, SM	GRN/WHT/LT TAN		MST			HARD, COMPACT, GREEN-OLIV STREAKS W/WHITE, LT TAN SAND.
				No Sample Recovered						
89	10			Interval Not Sampled						

AR300273

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 24.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : G. NEWHART
BORING ID : SB-16	DRILLING COMPANY : WM M. REICHART WELL DRILLING
NORTHING : 816.5300 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1000.0000 surveyed	DATE STARTED : 04/04/95
ELEVATION : 99.560 surveyed	DATE COMPLETED : 04/04/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Interval Not Sampled						
88	11									
87	12		50	Not Classified - Incomplete Data	LT TAN/WHT/GRN	FRM	SAT	7 7 10 14		V. LT TAN. WHITE. OLIVE GREEN MICA INTRUSION.
86	13			No Sample Recovered						
85	14		75	Not Classified - Incomplete Data	LT TAN/YLLW/WHT	SFT	SAT	1 11 12 16		
				Silty sand, SH	WHITE/BRN/GRN	FRM	WET			VARVED-MOTTLED OLIVE GRN -REDDISH ORANGE. WHITE BROWN. TRACE CLAY.
84	15			No Sample Recovered						
83	16			Interval Not Sampled						AUGER TO 24 FT. DTW - 15.5 FT.
82	17									
81	18									
80	19									
79	20									

AR300274

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 24.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : G. NEWHART
BORING ID : SB-16	DRILLING COMPANY : WM M. REICHART WELL DRILLING
NORTHING : 816.5300 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1000.0000 surveyed	DATE STARTED : 04/04/95
ELEVATION : 99.560 surveyed	DATE COMPLETED : 04/04/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
				Interval Not Sampled						AUGER TO 24 FT. DTW - 15.5 FT.
78	21									
77	22									
76	23									
75	24									
74	25									
73	26									
72	27									
71	28									
70	29									
69	30									

Borehole Location Data

Roy F. WESTON, Inc.

BOREHOLE ID : SB-17
BEGIN DATE : 04/04/95

PROJECT NAME: AUSTIN AVE RADIATION SITE
END DATE : 04/05/95

LOGGER/COMPANY : G. NEWHART

BOREHOLE COMPLETED IN (<O>verburden edrock) : 0

TOTAL DEPTH : 24.00 DEPTH TO BEDROCK : 0.00

BOREHOLE DIAMETER #1: 4.25
INTERVAL: 0.00 ft. to 24.00 ft. BGS
METHOD : HSA FLUID : NONE

BOREHOLE DIAMETER #2:
INTERVAL:
METHOD : FLUID :

BOREHOLE DIAMETER #3:
INTERVAL:
METHOD : FLUID :

DRILLING COMPANY : WM. W. REICHART WELL DRILLING
DRILLER : BILL AND TODD REICHART
DRILL RIG TYPE : INGERSOLL RAND A-300

	ESTIMATED	SURVEYED
SURFACE ELEVATION :	0.000	97.200
N. COORDINATE :	0.0000	1213.8700
E. COORDINATE :	0.0000	1676.0200

WELL PERMIT.....(Y)es (N)o: N PERMIT # :

HOLE ABANDONED... (Y)es (N)o: Y

WELL INSTALLED... (Y)es (N)o: Y

WELL CLUSTER..... (Y)es (N)o: N No. OF WELLS : 0

WELL NEST..... (Y)es (N)o: N No. OF WELLS : 0

PUMPS INSTALLED.. (Y)es (N)o: Y	TYPE	DEPTH
	PURGE : WHALE ELECT PMP	24.00
	SAMPLE : WHALE ELECT PMP	24.00

BOREHOLE TESTING
BOREHOLE GEOPHYSICS..... (Y)es (N)o: N
SLUG TESTS..... (Y)es (N)o: N
PACKER TESTS..... (Y)es (N)o: N
PUMPING TESTS..... (Y)es (N)o: N

COMMENTS :
TEMP WELL PNT-2' X 2' X 0.010 SLOT GALVANIZED WELL. BACKFILL W/NATIVE CUTTINGS TO 5'. COMPLETE ABANDONMENT W/5-25% PORTLAND CEMENT/H2O SLURRY GROUT.

AR300276

BOREHOLE /WELL ID	SMP NUM	LTH NUM	LITHOLOGY INT. (FT BGS)	SAMPLING METHOD	SIZE GRAVEL PCT.	GRAVEL SIZE	SAND PCT.	SIZE SAND PCT.	SILT PCT.	CLAY PCT.	ORGANIC PCT.	ROCK TYPE	PLAST SORT	STRENGTH	MOISTURE	UNIT	STRAT
SB-17	1	1	0.00	1.00	0	FM	90	10	0	0	0	NON	SFT	MST			
SB-17	1	2	1.00	2.00	0		0	0	0	0	0						
SB-17	2	1	2.00	4.00	0		0	0	0	0	0						
SB-17	3	1	4.00	4.50	10	CM	80	0	0	10	10	NON	LSE	MST			
SB-17	3	2	4.50	6.00	0		0	0	0	0	0						
SB-17	4	1	6.00	8.00	0		0	0	0	0	0						
SB-17	5	1	8.00	8.50	0	F	45	35	20	0	0	LOW	FRM	MST			
SB-17	5	2	8.50	8.75	0	F	45	35	20	0	0	LOW	FRM	MST			
SB-17	5	3	8.75	9.00	20	C	60	20	0	0	0	NON		MST			
SB-17	5	4	9.00	10.00	0		0	0	0	0	0						
SB-17	6	1	10.00	11.00	10	CM	60	20	10	0	0	LOW		SAT			
SB-17	6	2	11.00	11.25	30	M	40	20	10	0	0	NON					
SB-17	6	3	11.25	11.50	30	FM	30	20	15	0	0						
SB-17	6	4	11.50	12.00	0		0	0	0	0	0						
SB-17	7	1	12.00	24.00	0		0	0	0	0	0						

AR300277

Borehole Log

Roy F. WESTON, Inc.

PROJECT : AUSTIN AVE RADIATION SITE	TOTAL DEPTH : 24.00
SITE NAME : COE4-AUSTIN AVE.	LOGGER : G. NEWHART
BORING ID : SB-17	DRILLING COMPANY : WM. W. REICHART WELL DRILLING
NORTHING : 1213.8700 surveyed	DRILLING RIG : INGERSOLL RAND A-300
EASTING : 1676.0200 surveyed	DATE STARTED : 04/04/95
ELEVATION : 97.200 surveyed	DATE COMPLETED : 04/05/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
			50	Not Classified - Incomplete Data	DK BRN	SFT	MST	4		ORGANIC MATERIAL.
96	1			No Sample Recovered						
95	2			Interval Not Sampled						
94	3									
93	4		25	Not Classified - Incomplete Data	RED-BRN/BRN	LSE	MST	3		FILL MATERIAL, SLAG/LIGHT MATERIAL (PUMICE-LIKE). PIECES OF BRICK, GRAVEL.
				No Sample Recovered				2		
92	5							1		
91	6			Interval Not Sampled						
90	7									
89	8		50	Sandy silt, ML	DK GRAY	FRM	MST	1		
				Sandy silt, ML	GREEN	FRM	MST	8		
				Silty sand with gravel, SM	GRN/LT BRN/GRAY		MST	19		
88	9			No Sample Recovered				6		MORE LAYERED, LAMINATED IN 5" BEDS OF GREEN, LT BROWN, GRAY.
87	10		75	Silty sand, SM	DK GRAY		SAT			

Borehole Log

Roy F. WESTON, Inc.

PROJECT	: AUSTIN AVE RADIATION SITE	TOTAL DEPTH	: 24.00
SITE NAME	: COE4-AUSTIN AVE.	LOGGER	: G. NEWHART
LOG ID	: SB-17	DRILLING COMPANY	: WM. W. REICHART WELL DRILLING
DEPTH	: 1213.8700 surveyed	DRILLING RIG	: INGERSOLL RAND A-300
EASTING	: 1676.0200 surveyed	DATE STARTED	: 04/04/95
ELEVATION	: 97.200 surveyed	DATE COMPLETED	: 04/05/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOW COUNT	FIELD INSTRUMENT READING	COMMENTS
86	11			Silty sand, SM	DK GRAY		SAT			
				Silty sand with gravel, SM	LT GRAY/RED					HARD. LT GRAY WITH IRON RED MOTTLING. HARD.
				Silty sand with gravel, SM	LT GRY/GRN/BRN		MST			
				No Sample Recovered						
85	12			Interval Not Sampled						AUGER TO 24 FT. DTW=9.9 FT.
84	13									
83	14									
82	15									
81	16									
80	17									
79	18									
78	19									
77	20									

AR300279

Borehole Log

Roy F. WESTON, Inc.

PROJECT	: AUSTIN AVE RADIATION SITE	TOTAL DEPTH	: 24.00
SITE NAME	: COE4-AUSTIN AVE.	LOGGER	: G. NEUHART
BORING ID	: SB-17	DRILLING COMPANY	: WM. W. REICHART WELL DRILLING
NORTHING	: 1213.8700 surveyed	DRILLING RIG	: INGERSOLL RAND A-300
EASTING	: 1676.0200 surveyed	DATE STARTED	: 04/04/95
ELEVATION	: 97.200 surveyed	DATE COMPLETED	: 04/05/95

ELEVATION	DEPTH	MATERIAL	% RECOVERY	CLASSIFICATION	COLOR	STRENGTH	MOISTURE	BLOM COUNT	FIELD INSTRUMENT READING	COMMENTS
				Interval Not Sampled						AUGER TO 24 FT. DTW=9.9 FT.
76	21									
75	22									
74	23									
73	24									
72	25									
71	26									
70	27									
69	28									
68	29									
67	30									

Appendix B

Appendix B

AR300281

APPENDIX B
Chain of Custody Records
Austin Avenue Radiation Site
Final Report
July 1995

095\del\fr\9505\fr0095

AR300282

REAC, Edison, NJ
 (908) 321-4200
 EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD

Project Name: THE TOWN OF EDISON - HUNTERDON
 Project Number: 68-017 (V.P. C.C. 0252-01)
 RFW Contact: CHRIS NICHOLS Phone: 973-211-1100

No: **00321**

SHEET NO. 1 OF 1

Sample Identification

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	Analysis Requested	Analysis Requested	Analysis Requested	Analysis Requested
	SB-14	SB-14	W	4-4-95	1	MILITARY USE / HINC.	✓	✓	✓	✓
	B-11	SB-11	W	4-5-95	1		✓	✓	✓	✓
	SB-15	SB-15	W	4-5-95	1		✓	✓	✓	✓
	SB-15F	SB-15	W	4-5-95	1		✓	✓	✓	✓
	SB-14F	SB-14	W	4-4-95	1		✓	✓	✓	✓
	SB-16F	SB-16	W	4-1-95	1		✓	✓	✓	✓

Matrix:
 SD - Sediment
 DS - Drum Solids
 DL - Drum Liquids
 X - Other

PW - Potable Water
 GW - Groundwater
 SW - Surface Water
 SL - Sludge

S - Soil
 W - Water
 O - Oil
 A - Air

Special Instructions:

FOR SUBCONTRACTING USE ONLY
FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Relinquished By	Date	Received By	Date	Time

AR300284

REAC [redacted] son, NJ
 (908) 320-2000
 EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD

Project Name: ALLEN AVENUE REMEDIATION SITE
 Project Number: 025017 CUP 07 COM-01
 RFW Contact: CHUCK VACCARELLI Phone: 973-221-4117

No. **00322**

SHEET NO. 1 OF 1

Sample Identification

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	Analyses Requested
	SB-13	SB-13	GW	4-4-95	1	600L PRESERVATIVE / NONE	✓ 1-235 ✓ 11-734 ✓ 14-720 ✓ 20-224 ✓ 5DEC
	SB-13F	SB-13	↓	↓	1	↓	✓ ✓ ✓ ✓ ✓
	SB-14	SB-14	↓	↓	1	↓	✓ ✓ ✓ ✓ ✓
AR 300							

Matrix:

SD - Sediment
 DS - Drum Solids
 DL - Drum Liquids
 X - Other

PW - Potable Water
 GW - Groundwater
 SW - Surface Water
 SL - Sludge

S - Soil
 W - Water
 O - Oil
 A - Air

Special Instructions:

FOR SUBCONTRACTING USE ONLY
FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Relinquished By	Date	Received By	Date	Time
	[Signature]	4-9-95							

REAC, Edison, NJ
 (908) 321-4200
 EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD

Project Name: ALSTON AVENUE RADIIATION SITE
 Project Number: 03301-010 DC1-CD95-01
 RFW Contact: GILKEY NEWMARKET Phone: 908-444-4444
 301 11200

No: 00323

SHEET NO. 1 OF 1

Sample Identification

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	1/23/11	3/26/11	3/28/11	3/29/11	3/30/11	3/31/11	4/4/11
	SB-1	SB-1 (CMP 12-16)	S	3-28-95	1	PLASTIC, BRAGGLIC	✓	✓	✓	✓	✓	✓	✓
	SB-2	SB-2 (CMP 12-16)	S	3-29-95	1		✓	✓	✓	✓	✓	✓	✓
	SB-3	SB-3 (CMP 12-16)	S	3-29-95	1		✓	✓	✓	✓	✓	✓	✓
	SB-4	SB-4 (CMP 12-16)	S	3-29-95	1		✓	✓	✓	✓	✓	✓	✓
	SB-5	SB-5 (CMP 12-16)	S	3-29-95	1		✓	✓	✓	✓	✓	✓	✓
	SB-6	SB-6 (CMP 8-12)	S	3-29-95	1		✓	✓	✓	✓	✓	✓	✓
	SB-8	SB-8 (CMP 12-16)	S	3-30-95	1		✓	✓	✓	✓	✓	✓	✓
	SB-9	SB-9 (CMP 12-16)	S	3-31-95	1		✓	✓	✓	✓	✓	✓	✓
	SB-16	SB-16 (CMP 12-16)	S	4-4-95	1		✓	✓	✓	✓	✓	✓	✓

Analyses Requested

Matrix:
 SD - Sediment
 DS - Drum Solids
 DL - Drum Liquids
 X - Other

PW - Potable Water
 GW - Groundwater
 SW - Surface Water
 SL - Sludge

S - Soil
 W - Water
 O - Oil
 A - Air

Special Instructions: *PS*

FOR SUBCONTRACTING USE ONLY
FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Relinquished By	Date	Received By	Date	Time

REAC, Edison, NJ
(908) 321-0000
EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD

Project Name: WINDY RIDGE LUNN S.W.
Project Number: 68-C4-0022
RFW Contact: CALLY A. BILLY Phone: 908-321-0220

No: **0324**

SHEET NO. 1 OF 1

Sample Identification

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	GRCS#	1-234	1-235	1-236	1-237	1-238	1-239	1-240	1-241	1-242	1-243	1-244	1-245	
	SB-7 temp	SB-7 COMP 8-14	S	3-30-95	1	PLASTIC BOTTLE		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	SB-10	SB-10 COMP 8-14	S	3-31-95				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	SB-11	SB-11 COMP 12-16	S	4-3-95				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	SB-12	SB-12 COMP 12-16	S	4-3-95				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	SB-13	SB-13 COMP 12-16	S	4-3-95				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	SB-14	SB-14 COMP 12-16	S	4-3-95				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	SB-15	SB-15 COMP 12-14	S	4-4-95				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
	SB-17	SB-17 COMP 10-12	S	4-4-95				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
<i>WASTY</i>																				

Analyses Requested

Special Instructions: * *oil waste*

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

FOR SUBCONTRACTING USE ONLY
FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Relinquished By	Date	Received By	Date	Time
		1-7-95							

REAC, Edison, NJ
(908) 321-4200
EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD

Project Name: AUSTIN AVENUE
Project Number: 03347-040-001-0095-01
RFW Contact: GARY NEWHART Phone: 908-321-4200

No: **00478**

SHEET NO. 1 OF 1

Sample Identification

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	V-238	U-234	Th-234	Ka-226	60055 d.s
	A01245	SB-4	GW	3-29-95	1	Poly Cube/HNO ₃	✓	✓	✓	✓	✓
	A01244	SB-4F	GW	3-29-95	1	Poly Cube/HNO ₃	✓	✓	✓	✓	✓
	A01243	SB-5	GW	3-29-95	1	Poly Cube/HNO ₃	✓	✓	✓	✓	✓
	A01242	SB-5F	GW	3-29-95	1	Poly Cube/HNO ₃	✓	✓	✓	✓	✓
	A01241	SB-6	GW	3-30-95	1	Poly Cube/HNO ₃	✓	✓	✓	✓	✓
	A01240	SB-6F	GW	3-30-95	1	Poly Cube/HNO ₃	✓	✓	✓	✓	✓
	A01239	SB-7	GW	3-30-95	1	Poly Cube/HNO ₃	✓	✓	✓	✓	✓
	A01238	SB-7F	GW	3-30-95	1	Poly Cube/HNO ₃	✓	✓	✓	✓	✓
	A01237	SB-8	GW	3-30-95	1	Poly Cube/HNO ₃	✓	✓	✓	✓	✓
	A01236	SB-8F	GW	3-30-95	1	Poly Cube/HNO ₃	✓	✓	✓	✓	✓
	A01235	SB-9	GW	3-31-95	1	Poly Cube/HNO ₃	✓	✓	✓	✓	✓
	A01234	SB-9F	GW	3-31-95	1	Poly Cube/HNO ₃	✓	✓	✓	✓	✓
	A01233	SB-11	GW	4-3-95	1	Poly Cube/HNO ₃	✓	✓	✓	✓	✓
	A01232	SB-11F	GW	4-3-95	1	Poly Cube/HNO ₃	✓	✓	✓	✓	✓

Matrix:

SD - Sediment
DS - Drum Solids
DL - Drum Liquids
X - Other

Special Instructions:

PW - Potable Water
GW - Groundwater
SW - Surface Water
SL - Sludge

S - Soil
W - Water
O - Oil
A - Air

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

Items/Reason	Relinquished By	Date	Received By	Date	Refiniquished By	Date	Received By	Date	Time

AR30028

CHAIN OF CUSTODY RECORD

REAC, Edison, NJ
 (908) 320
 EPA Contract 68-C4-0022

Project Name: HUMMEL AVE
 Project Number: 0547-040-001-0025
 RFW Contact: GARY NEWHAFT Phone: 10X-321-4200

No. **00409**

SHEET NO. 1 OF 1

Sample Identification

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	7-238	11-234	11-234	11-234	GEOS
	A01204	SB-1	SW	3-28-95	1	PolyCube/HNO ₃	✓	✓	✓	✓	✓
	A01250	SB-1F	SW	3-28-95	1	PolyCube/HNO ₃	✓	✓	✓	✓	✓
	A01249	SB-2	SW	3-28-95	1	PolyCube/HNO ₃	✓	✓	✓	✓	✓
	A01248	SB-2F	SW	3-28-95	1	PolyCube/HNO ₃	✓	✓	✓	✓	✓
	A01247	SB-3	SW	3-29-95	1	PolyCube/HNO ₃	✓	✓	✓	✓	✓
	A01246	SB-3F	SW	3-29-95	1	PolyCube/HNO ₃	✓	✓	✓	✓	✓

Analyses Requested

Special Instructions:

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

FOR SUBCONTRACTING USE ONLY
FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Relinquished By	Date	Received By	Date	Time

AR300289

REAC, E.C. n, NJ
 (908) 321-4200
 EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD

Project Name: Aurshin Avenue Radiation Silt
 Project Number: 03347 - 040-001-0095-01
 RFW Contact: NAVINAGI Phone: 308-344-4317

No: 00500

SHEET NO. 1 OF 1

Sample Identification

Analyses Requested

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	VCA	PANA	Rst/Res	P.P. Metals
108	BA1231 SB-150	SB-15-8/10	S	April 4, 1995	1	Glass / 4% PBA	✓	✓	✓	✓
109	BA1231 SB-150	SB-15-8/10	S	April 4, 1995	1	Glass / 4% PBA	✓	✓	✓	✓
Remaining rows are crossed out with a large X.										

Matrix:

- SD - Sediment
- DS - Drum Solids
- DL - Drum Liquids
- Other

- PW - Potable Water
- GW - Groundwater
- SW - Surface Water
- SL - Sludge

- S - Soil
- W - Water
- O - Oil
- A - Air

Special Instructions:

Note: Highly Contaminated

FOR SUBCONTRACTING USE ONLY
FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Relinquished By	Date	Received By	Date	Time
2/Analysis Contaminated	JJ	4/7/95	B. Zeman	4/7/95	B. Zeman	4/7/95	Blond Orendo	4/7/95	15:00

03050
 300290

Appendix C

AR300291

APPENDIX C
Field Laboratory Chain of Custody Records
Austin Avenue Radiation Site
Final Report
July 1995

095\del\fr\9505\fr0095

AR300292

REAC, Ed NJ
 (908) 321-
 EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD
 Project Name: AVSTRA AVENUE RADIATION SITE
 Project Number: 03347-040-001-0095-01
 RFW Contact: GARY NEWHART Phone: 908-321-4200

No. **0317**

SHEET NO. 2 OF 1

Sample Identification

Analyses Requested

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	Analyses Requested
	SB-3-0-2	SB-3	S	3-29-95	1/3	PLASTIC BAGGIE	GROSS ALPHA
	SB-3-2-4						
	SB-3-4-6						
	SB-3-6-8						
	SB-3-8-10						
	SB-3-12-12						
	SB-3-12-14						
	SB-3-14-16						
	SB-3-16-20						
	SB-3	SB-3	GW	3-29-95	3	IGAL-POLY CUBE GROSS α	
	SB-4-0-2	SB-4	S		1/3	PLASTIC BAGGIE	
	SB-4-2-4						
	SB-4-4-6						
	SB-4-6-8						
	SB-4-8-10						
	SB-4-10-12						
	SB-4-12-14						
	SB-4-14-16						
	SB-4-16-18						

Special Instructions:

Matrix: Sediment
 Drum Solids
 Drum Liquids
 Other

PW - Potable Water
 GW - Groundwater
 SW - Surface Water
 SL - Sludge

S - Soil
 W - Water
 O - Oil
 A - Air

FOR SUBCONTRACTING USE ONLY
FROM CHAIN OF CUSTODY #

Item/Reason	Relinquished By	Date	Received By	Date	Time	Item/Reason	Relinquished By	Date	Received By	Date	Time

00293

REAC, E. NJ
 (908) 321-4000
 EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD
 Project Name: AUSTIN AVE RADIATION SITE
 Project Number: 03347-040-001-0095-01
 RFW Contact: GARY NEWHART Phone: 908-321-4200

No: 00408

SHEET NO 3 OF 7

Sample Identification

Analyses Requested

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	Analyses Requested
	SB-4	SB-4	GW	3-29-95	3	1 GAL POLY CUBE	GROSS
	SB-5-0-2	SB-5	S		1/3	PLASTIC BAGGIE	
	SB-5-2-4						
	SB-5-4-6						
	SB-5-6-8						
	SB-5-8-10						
	SB-5-10-12						
	SB-5-12-14						
	SB-5-14-16	SB-5	S	3-29-95	1/3	PLASTIC BAGGIE	GROSS
	SB-5	SB-5	GW	3-29-95	3	1 GAL POLY CUBE	GROSS
	SB-6-0-2	SB-6	S	3-30-95	1/4	PLASTIC BAGGIE	
	SB-6-4-6						
	SB-6-8-10						
	SB-6-10-12						
	SB-6-12-14						
	SB-7-0-2	SB-7	S	3-30-95	1/4	PLASTIC BAGGIE	GROSS
	SB-7-4-6						
	SB-7-8-10						
	SB-7-10-12						
	SB-7-13-14						

Special Instructions:

Sediment
 Drum Solids
 Drum Liquids
 Other

PW - Potable Water
 GW - Groundwater
 SW - Surface Water
 SL - Sludge

S - Soil
 W - Water
 O - Oil
 A - Air

FOR SUBCONTRACTING USE ONLY
 FROM CHAIN OF CUSTODY #

Items/Reason	Relinquished By	Date	Received By	Date	Relinquished By	Date	Received By	Date	Time

REAC, Edison, NJ
 (908) 321-4200
 EPA Contract 88-C4-0022

CHAIN OF CUSTODY RECORD
 Project Name: AUSTIN AVENUE RADIATION SITE
 Project Number: 03347-040-001-C025-D1
 RFW Contact: GARY NEUBART Phone: 908-331-4200

No: 00410
 SHEET NO. 4 OF 7

Sample Identification

Analyses Requested

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	Analyses Requested
	SB-1c	SB-1c	GW	3-30-95	3	1 GAL POLY CUBE	GRUSS α
	SB-7a-2	SB-7	S	3-30-95	1/3	PLASTIC BAGS	
	SB-7-4-6						
	SB-7-8-10						
	SB-7-10-12						
	SB-7-12-N						
	SB-7	SB-7	GW	3-30-95	3	1 GAL POLY CUBE	
	SB-8-02	SB-8	S	3-30-95	1/3	PLASTIC BAGS	
	SB-8-4-6						
	SB-8-7-4						
	SB-8-12-N						
	SB-8-14-6						
	SB-8-8-10						
	SB-8-6-8						
	SB-8-16-18						
	SB-8-10-12						
	Decon 1	Decon pit	W	3-30-95	1	1 gal Poly Cube Gross	
	SB-8	SB-8	GW	3-31-95	3	1 GAL POLY CUBE	
	SB-9-02	SB-9	S	3-31-95	1/3	PLASTIC BAGS	
	SA-9-2-4						

Special Instructions:

- Sediment
- Drum Solids
- Drum Liquids
- Other
- Potable Water
- Groundwater
- Surface Water
- Sludge
- Soil
- Water
- Oil
- Air

FOR SUBCONTRACTING USE ONLY
 FROM CHAIN OF CUSTODY #

Item/Reason	Refiniquished By	Date	Received By	Date	Time

REAC, Edison, NJ
 (908) 321-4200
 EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD

Project Name: AUSTIN AVE RADIATION SITE
 Project Number: 08347-040-001-0095-01
 RFW Contact: GARY NEWHART Phone: 908-321-4200

No: 00411

SHEET NO. 5 OF 7

Sample Identification				Analyses Requested			
REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	GROSS α
	SB-9-4-6	SB-9	S	3-31-95	1/3	PLASTIC BAGGIE	 [REDACTED CONTENT]
	SB-9-6-8						
	SB-9-8-10						
	SB-9-10-12						
	SB-9-12-14						
	SB-9-14-16						
	SB-9-16-18						
	SB-9						
	SB-10-02	SB-10	GW	3-31-95	3	1 GAL Poly Cube	
	SB-10-4-6		S	3-31-95	1/3	PLASTIC BAGGIE	
	SB-10-8-10						
	SB-10-12-14						
	SB-11-0-2	SB-11	S	3-4-95	1/3	PLASTIC BAGGIE	
	SB-11-2-4						
	SB-11-4-6						
	SB-11-6-8						
	SB-11-8-10						
	SB-11-12-14						
	SB-11-14-16						
	SB-11-16-18						

Special Instructions:

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

FOR SUBCONTRACTING USE ONLY
FROM CHAIN OF CUSTODY #

Item/Reason	Relinquished By	Date	Received By	Date	Relinquished By	Date	Received By	Date	Time

REAC, Edison, NJ
 (908) 321-4200
 EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD
 Project Name: AUSTIN AVENUE RADIATION SITE
 Project Number: 033H7-040-CO1-0095-01
 RFW Contact: GARY NEWHART Phone: 908-321-4200

No: 00412

SHEET NO. 6 OF 7

Sample Identification

Analyses Requested

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	Gross α
	SB-11	SB-11	GW	4/3/95	3	1 Gal Poly Cube	
	SB-12-0-2	SB-12	S		1/3	PLASTIC BAGGIE	
	SB-12-4-6						
	SB-12-8-10						
	SB-12-12-14						
	SB-12-H-16						
	SB-12	SB-12	GW	4-3-95	3	1 Gal Poly Cube	
	SB-13-0-2	SB-13	S		1/3	PLASTIC BAGGIE	
	SB-13-4-6						
	SB-13-8-10						
	SB-13-12-14						
	SB-13-14-16						
	SB-14-0-2	SB-14	S	4-3-95	1/3	PLASTIC BAGGIE	GROSS α
	SB-14-4-6						
	SB-14-8-10						
	SB-14-12-14						
	SB-14-H-16						
	SB-14	SB-14	GW	4-4-95	3	1 Gal Poly Cube	
	SB-15-0-2	SB-15	S		1/3	PLASTIC BAGGIE	
	SB-15-4-6						

Special Instructions:

- Matrix: Sediment, Drum Solids, Drum Liquids, Other
- PW - Potable Water
- GW - Groundwater
- SW - Surface Water
- SL - Sludge
- S - Soil
- W - Water
- O - Oil
- A - Air

FOR SUBCONTRACTING USE ONLY
 FROM CHAIN OF CUSTODY #

Item/Reason	Relinquished By	Date	Received By	Date	Relinquished By	Date	Received By	Date	Time

620298

REAC, Edison, NJ
 (908) 321-4200
 EPA Contract 68-C4-0022

CHAIN OF CUSTODY RECORD
 Project Name: ALSTIN AVE RADIATION SITE
 Project Number: 03347-D40-001-0095-01
 RFW Contact: CARY NEWHART Phone: 908-321-4100

No: 00479

SHEET NO. 7 OF 7

Sample Identification

Analyses Requested

REAC #	Sample No.	Sampling Location	Matrix	Date Collected	# of Bottles	Container/Preservative	Analyses Requested
	SA-57-10	SB-15	S	4-4-95	1/3	PLASTIC BAGGIE	GROSS
	SB-15-12-14						
	SB-14		GW	4-4-95	3	1 GAL PolyCube	
	SB-13		GW	4-4-95	3	1 GAL PolyCube	
	SB-16		GW	4-4-95	3	1 GAL PolyCube	
	SB-16-D-2		S	4-4-95	1/3	PLASTIC BAGGIE	GROSS
	SB-16-4-6						
	SB-16-B-D						
	SB-16-12-14						
	SB-16-H-16						
	SB-17-D-2	SB-17	S	4-4-95	1/3	PLASTIC BAGGIE	
	SB-17-4-6						
	SB-17-8-10						
	SB-17-D-12						
	SB-17		GW	4-5-95	3	1 GAL PolyCube	GROSS
	SB-15	SB-15	GW	4-5-95	3	1 GAL PolyCube	GROSS

Special Instructions:

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

FOR SUBCONTRACTING USE ONLY
 FROM CHAIN OF CUSTODY #

Item/Reason	Relinquished By	Date	Received By	Date	Relinquished By	Date	Received By	Date	Time

00299

Appendix D

AR300300

APPENDIX D
Chemical Analyses
Austin Avenue Radiation Site
Final Report
July 1995

095\del\fr\9505\fr0095

AR300301

ANALYTICAL REPORT

Prepared by
Roy F. Weston, Inc.

Austin Avenue Radiation Site
Delaware County, Pennsylvania

May, 1995

EPA Work Assignment No.: 0-095
Weston Work Order No.: 03347-040-001-0095-01
EPA Contract No.: 68-C4-0022

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AR300302

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INTRODUCTION

REAC, in response to ERT Work Assignment 0-095, provided analytical support for samples collected from the Austin Avenue Radiation Site in Delaware County, Pennsylvania, summarized in the following table. This support included the analysis of soil samples by REAC and Pace/NJ, QA/QC, data review, and preparation of an analytical report summarizing the analytical procedures, results and QA/QC results.

The samples were treated with procedures consistent with SOP# 1008 and are summarized in the following table:

COC #	Number of Samples	Sampling Date	Date Received	Matrix	Analysis	Laboratory
00500	1	4/4/95	4/7/95	Soil	VOC	REAC
					BNA	
					Pesticide/PCB	
					PP Metals	
					TPH	
					Oil & Grease	

Case Narrative

REAC Data Package E-122 - VOC

One soil sample from Chain of Custody 00500 was analyzed for VOC using a GC/MSD.

Sample 01231 was analyzed for VOC on 4/7/95. Due to the high levels of contaminants found, this sample was analyzed at medium levels by adding 5 g sample to 5 ml methanol. A 25 µg aliquot of the methanol extraction was then spiked into 5 ml of water.

REAC Data Package E-136 - BNA

One soil sample was received for BNA analysis. The sample was extracted and analyzed by GC/MS with the following modifications to the method:

The sample was contaminated with what appeared to be a large amount of fuel oil. The chain of custody indicated that it was highly contaminated. The sample, blank, and MS/MSD were spiked with a 500 ppm surrogate mixture containing 2-fluorobiphenyl and 2,4,6-tribromophenol. The samples were concentrated to a final volume of 10 ml, resulting in a surrogate concentration of 50 µg/ml per compound. The MS/MSD were spiked with a mixture of naphthalene, pentachlorophenol, and benzo(a)pyrene.

The method blank contained 1.8 mg/kg of di-n-butylphthalate. Since the concentration of this analyte is less than 9 mg/kg in the sample, the analyte detected in the sample is considered to be undetected (U).

The calibration daily check standard analyzed on 4/11/95 exceeds the QC limits for benzo-(g,h,i)-perylene. As this compound was not detected in the sample, the data are not affected.

Acid surrogate recovery is outside the QC limits for A01231, A01231MS, and A01231MSD. All acid compounds

in the samples are considered to be estimated.

The recovery of PCP in A01231MS is outside the QC limits (115%). The data are not affected.

REAC Data Package E-125 - Pesticide/PCB

One soil sample was received for Pesticide/PCB analysis by GC.

The sample contained sulfur, necessitating TBA clean-up.

The end of sequence continuing calibration check standard run on 4/12/95 was outside the 25%D criteria for Endrin aldehyde (29%) and Endrin ketone (37%) The data are not affected since the initial continuing calibration check standard in the sequence was acceptable.

The surrogate TCMX was outside the QC limits for the following samples: A01231 and A01231MS. The data are not affected.

The surrogate TCMX in sample A01231 was outside the retention time window but did not have any impact on the process of compound identification.

The MS/MSD results were fine, except for g-BHC in sample A01231, where the MS % recovery was outside the QC limit.

REAC Data Package E-128 - TPH and Oil & Grease

One soil sample was received for oil & grease and total petroleum hydrocarbons (TPH) analysis by FTIR. The samples were extracted by Soxhlet and the results reported in µg/g.

The recoveries for MS and MSD were 159 and 94% for oil and grease and 179 and 108% for TPH.

REAC Data Package E-138 - Metals

The metals analysis was satisfactory.

Summary of Abbreviations

B	The analyte was found in the blank
BFB	Bromofluorobenzene
BPQL	Below the Practical Quantitation Limit
C	Centigrade
D	(Surrogate Table) this value is from a diluted sample and was not calculated (Result Table) this result was obtained from a diluted sample
CLP	Contract Laboratory Protocol
COC	Chain of Custody
CONC	Concentration
CRDL	Contract Required Detection Limit
DFTPP	Decafluorotriphenylphosphine
DL	Detection Limit
E	The value is greater than the highest linear standard and is estimated
EMPC	Estimated maximum possible concentration
J	The value is below the method detection limit and is estimated
HHL	High Hazard Laboratory, Brunswick, GA
IDL	Instrument Detection Limit
ISTD	Internal Standard
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MI	Matrix Interference
MS	Matrix spike
MSD	Matrix spike duplicate
MW	Molecular weight
NA	either Not Applicable or Not Available
NC	Not Calculated
NR	Not Requested
NS	Not Spiked
% D	Percent difference
% REC	Percent Recovery
PQL	Practical quantitation limit
PPBV	Parts per billion by volume
QL	Quantitation Limit
RPD	Relative percent difference
RSD	Relative Standard Deviation
SIM	Selected Ion Mode
U	Not Detected

m ³	cubic meter	kg	kilogram
l(L)	liter	g	gram
dl	deciliter	cg	centigram
ml	milliliter	mg	milligram
μl	microliter	μg	microgram
		ng	nanogram
		pg	picogram

* denotes a value that exceeds the acceptable QC limit

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

Revised 1/9/95

Analytical Procedure for VOC in Soil

A modified method 524.2 was used for the analysis of Volatile Organic Compounds in soil. Samples were purged, trapped, and desorbed to a GC/MS system. Prior to purging, the samples were spiked with a three component surrogate mixture consisting of toluene-d₈, 4-bromofluorobenzene and 1,2-dichloroethane-d₄, and a three component internal standard mixture consisting of bromochloromethane, 1,4-difluorobenzene, and chlorobenzene-d₅. The following conditions and parameters were utilized:

- 1) **Purge and Trap Unit:** A Tekmar concentrator (LSC 2000) equipped with an autosampler (ALS2016) was utilized.

Purge and Trap parameters:

Purge:	10 min at 25° C	Dry Purge	2 min at 25° C
Desorb:	4 min at 250° C	Desorb Preheat	245° C
Purge Flow Rate:	40 ml/min	Bake	8 min at 260° C

Trap: VOCARB 4000 (Supelco) which consists of four adsorbent beds: Carbopack B (graphitized carbon 60/80 mesh), Carbopack C (graphitized carbon 60/80 mesh), Carboxen-1000 (60/80 mesh), and Carboxen-1001 (60/80 mesh).

- 2) **GC/MS System:** A Hewlett Packard 5970 GC/MSD equipped with an RTE-A data system was used.

GC Column: 30 meter x 0.53mm ID, RTx - Volatiles (Restek Corp.) column with thickness.

GC Temperature Program: 5 min at 10° C; 6° C/min to 140° C
0.1 min at 140° C; 12° C/min to 160° C
5 min at 160° C

GC Flow Rate: Helium at 10 ml/min

GC/MS Interface: Glass jet separator with 30 ml make-up gas at 250° C.

Mass Spectrometer: Electron Impact Ionization at a nominal electron energy of 70 electron volts, scanning from 35-300 amu at one scan/sec.

Computer: Preprogrammed to plot Extracted Ion Current Profile (EICP); capable of integrating ions and plotting abundances vs time or scan number. A library search (NBS-Wiley) for tentatively identified compounds was performed on samples.

The GC/MS system was calibrated using 6 VOC standards at 5, 20, 50, 100, 150, and 200 µg/l. Before analysis each day, the system was tuned with 50 ng BFB and passed a continuing calibration check when analyzing a 50 µg/l standard mixture in which the responses were evaluated by comparison to the average response of the calibration curve.

The medium level soil extracts were analyzed by extracting 5.0 g soil with 5 ml methanol, diluting an aliquot with 5 ml water and analyzing the solution by the purge and trap method. The results are in Table 1.1; the tentatively identified compounds are listed in Table 1.2. The concentrations of the analytes were calculated using the following equation:

$$C_u = \frac{DF \times A_x \times I_{is}}{A_{is} \times RF \text{ (or } RF_{ave}) \times W_s \times D}$$

where

- C_u = Concentration of target analyte ($\mu\text{g/kg}$) on a dry weight basis
- DF = Dilution Factor
- A_x = Area of the target analyte
- I_{is} = mass of specific internal standard (ng)
- A_{is} = Area of the specific internal standard
- RF = Response Factor
- RF_{ave} = average Response Factor
- W_s = Weight of sample (g)
- D = Decimal percent solids

The average response factor is used when a sample is associated with an initial calibration curve. The response factor is used when a sample is associated with a continuing calibration curve.

Response factor (RF) calculation:

The response factor for each specific analyte is quantitated based on the area response from the continuing calibration check as follows:

$$RF = \frac{A_c \times I_{is}}{A_{is} \times I_c}$$

where

- RF = Response factor for a specific analyte
- A_c = Area of the analyte in the standard
- I_{is} = Mass of the specific internal standard
- A_{is} = Area of the specific internal standard
- I_c = Mass of the analyte in the standard
- $RF_{ave} = \frac{RF_1 + \dots + RF_n}{n}$
- n = number of Samples

Analytical Procedure for BNA in Soil

Extraction Procedure

Prior to extraction each sample was spiked with a six component surrogate mixture consisting of nitrobenzene-d₅, 2-fluorobiphenyl, terphenyl-d₁₄, phenol-d₅, 2-fluorophenol, and 2,4,6-tribromophenol. Thirty grams of sample was mixed with 30 g anhydrous sodium sulfate, and Soxhlet extracted for 16 hours with 300 ml of 1:1 acetone:methylene chloride. The extract was concentrated to 1.0 ml., an internal standard mixture consisting of 1,4-dichlorobenzene-d₄, naphthalene-d₈, acenaphthene-d₁₀, phenanthrene-d₁₀, chrysene-d₁₂, and perylene-d₁₂ was added, and analyzed.

Analysis Procedure

An HP 5995C Gas Chromatograph/Mass Spectrometer (GC/MS), equipped with a 7673A autosampler and controlled by an HP-1000 RTE-6/VM computer was used to analyze the samples.

The instrument conditions were:

Column:	Restek Rtx-5 (crossbonded SE-54) 30 meter x 0.32mm ID, 0.50 µm film thickness
Injection Temperature:	290° C
Transfer Temperature:	290° C
Source Temperature:	240° C
Analyzer Temperature:	240° C
Temperature Program:	40° C for 3 min 8° C/min to 295° C hold for 12 min
Splitless Injection:	Split time = 1.00 min
Injection Volume:	1 µl

The GC/MS system was calibrated using 5 BNA standard mixtures at 20, 50, 80, 120, and 160 µg/ml. Before analysis each day, the system was tuned with 50 ng decafluorotriphenylphosphine (DFTPP) passed a continuing calibration check when analyzing a 50 µg/ml standard mixture in which the responses were evaluated by comparison to the average response of the calibration curve.

The BNA results, based on dry weight, are listed in Table 1.2. The concentration of the detected compounds was calculated using the following equation:

$$C_u = \frac{DF \times A_u \times I_{is} \times V_i}{A_{is} \times RF \text{ (or } RF_{ave}) \times V_i \times W \times D}$$

where

- C_u = Concentration of target analyte ($\mu\text{g/Kg}$)
- DF = Dilution Factor
- A_u = Area of target analyte
- I_{is} = Mass of specific internal standard (ng)
- V_i = Volume of extract (μl)
- A_{is} = Area of specific internal standard
- RF = Response Factor (unitless)
- RF_{ave} = average Response Factor
- V_i = Volume of extract injected (μl)
- W = Weight of sample (g)
- D = Decimal per cent solids

The RF_{ave} is used when a sample is associated with an initial calibration curve. The RF is used when a sample is associated with a continuing calibration.

Response factor calculation:

The RF for each specific analyte is quantitated based on the area response from the continuing calibration check as follows:

$$RF = \frac{A_c \times I_{is}}{A_{is} \times I_c}$$

where

- RF = Response factor for a specific analyte
- A_c = Area of the analyte in the standard
- I_{is} = Mass of the specific internal standard
- A_{is} = Area of the specific internal standard
- I_c = Mass of the analyte in the standard

$$RF_{ave} = \frac{RF_1 + \dots + RF_n}{n}$$

and

n = number of Samples

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Analytical Procedure for Pesticide/PCB in Soil

Extraction Procedure

Ten grams of sample was spiked with a surrogate solution consisting of tetrachloro-m-xylene and decachlorobiphenyl, 30 g anhydrous sodium sulfate and Soxhlet extracted with 16 hours with 300 ml 1:1 hexane: acetone. The extract was concentrated to 5.0 ml.

Gas Chromatographic Analysis

The extract was analyzed for pesticides and PCBs using simultaneous dual column injections. The analysis was done on an HP 5890 GC/ECD system, equipped with an HP 7673A automatic sampler, and controlled with an HP-CHEM STATION. The following conditions were employed:

First Column	DB-608, 30 meter, 0.53mm fused silica capillary, 0.83 μ m film thickness
Injector Temperature	250° C
Detector Temperature	325° C
Temperature Program	150°C for 1 minute 7°C/min to 265°C 18 min at 265°
Second Column	Rtx-1701, 30 meter, 0.53mm fused silica capillary, 0.50 μ m film thickness
Injector Temperature	250° C
Detector Temperature	325° C
Temperature Program	150° C for 1 minute 17°C/min to 265°C 18 min at 265°

The gas chromatographs were calibrated using 5 pesticide standards at 20, 50, 100, 200, and 500 μ g/L. The results from each mixture were used to calculate the response factor (RF) of each analyte and the average Response Factor was used to calculate the concentration of pesticide in the sample. Quantification was based on the DB-60 column (signal 1) and the identity of the analyte was confirmed using the Rtx-1701 column (signal 2). A fingerprint chromatogram was run using each of the seven Aroclor mixtures and toxaphene; calibration curves were run only if a particular Aroclor or toxaphene was found in the sample.

The pesticide/PCB results, listed in Table 1.5, are calculated by using the following formula:

$$C_x = \frac{DF \times A_x \times V_i}{RF_{ave} \times V_i \times W \times D}$$

where

- C_x = Concentration of analyte ($\mu\text{g}/\text{Kg}$)
- DF = Dilution Factor
- A_x = Area or peak height
- V_i = Volume of sample (ml)
- RF_{ave} = Average response factor
- V_i = Volume of extract injected (μl)
- W = Weight of sample (g)
- D = Decimal per cent solids

Response Factor calculation:

The RF for each specific analyte is quantitated based on the area response from the continuing calibration check as follows:

$$RF = \frac{A_x}{\text{total pg injected}}$$

where

- A_x = Area or peak height

and

$$RF_{ave} = \frac{RF_1 + \dots + RF_n}{n}$$

where

- n = number of samples

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Analytical Procedure for Metals in Soil

One gram of sample, weighed to 0.01 g accuracy, was thoroughly mixed with 10 ml of 1:1 nitric acid:water and digested according to method #3050 contained in Test Methods for Evaluating Solid Wastes, USEPA, SW-846, September, 1987. The metal analyses were performed on either a Varian SpectrAA-20, -300, or -400Z Atom Absorption Spectrophotometer, and analyzed using methods SW-846 7000/6010 as given by Test Methods for Evaluating Solid Waste, USEPA, SW-846, September, 1986.

Mercury was analyzed separately on a Varian SpectrAA-300 Atomic Absorption Spectrophotometer equipped with a Varian VGA-76 vapor gas analyzer using method SW-846 7471.

Results of the analyses are listed in Table 1.6.

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Analytical Procedure for TPH and Oil & Grease in Soil

Extraction Procedure

The soil samples were extracted by the Soxhlet method. A 30 g aliquot of sample and 30 g of anhydrous sodium sulfate were mixed together and Soxhlet extracted with 300 ml of freon for 16 hours. After extraction, the volume was adjusted to 300 ml with freon; an aliquot of this extract was used for the oil and grease analysis. An additional 10 ml aliquot was transferred to a 10 ml vial with 3 g of silica gel. The sample and the silica gel were shaken on a shaker table for 10 minutes. The silica gel treated sample was used for the total petroleum hydrocarbon (TPH) analysis.

FTIR Analysis

The extracts were analyzed for oil and grease and TPH. The analysis was performed on a Perkin-Elmer Model 1600 Fourier Transform Infrared Spectrometer (FTIR).

The FTIR was calibrated using a blend of isooctane and cetane solution at 406, 203, 50.7, 6.08, and 2.03 ppm. The quantification was based on this calibration and the final concentration of each sample was calculated based on its dry weight.

The oil and grease and TPH results are calculated by using the following formulae:

$$Y = m X + b$$

which is the equation of a straight line, where

m = slope
b = y intercept
X = concentration
Y = absorbance

and

$$C_u = X = ((Y - b) / m) * V_f * DF / (W * D)$$

where

C_u = X = concentration of analyte (mg/Kg)
Y = absorbance of analyte
 V_f = final volume of sample
DF = dilution factor
W = weight of sample
D = decimal percent solids

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TABLE 1.1
RESULTS OF THE ANALYSIS FOR VOC IN SOIL
AUSTIN AVENUE RADIATION SITE WA# 0-095

SAMPLE # : MEOH BLANK 01231
LOCATION : SB-15-8/10
COLLECTED : 04/04/95
ANALYZED : 04/07/95 04/07/95
INJECTED : 14:17 20:41
FILE # : ^V3024 ^V3032
DIL. FACT.: 50 200
% SOLID : 100 80
UNIT : ug/Kg mg/Kg

COMPOUND	CONC.	MDL	CONC.	MDL
Dichlorodifluoromethane	U	50	U	250
Chloromethane	U	50	U	250
Vinyl Chloride	U	50	U	250
Bromomethane	U	100	U	500
Chloroethane	U	50	U	250
Trichlorofluoromethane	U	50	U	250
Acetone	U	100	U	500
1,1-Dichloroethene	U	50	U	250
Carbon Disulfide	U	50	U	250
Methylene Chloride	U	50	U	250
Methyl-tertiary-butylether	U	50	U	250
trans-1,2-Dichloroethene	U	50	U	250
1,1-Dichloroethane	U	50	U	250
2-Butanone	U	200	U	1000
2,2-Dichloropropane	U	50	U	250
cis-1,2-Dichloroethene	U	50	U	250
Chloroform	U	50	U	250
1,1-Dichloropropene	U	50	U	250
1,2-Dichloroethane	U	50	U	250
1,1,1-Trichloroethane	U	50	U	250
Carbon Tetrachloride	U	50	U	250
Benzene	U	50	U	250
Trichloroethene	U	50	U	250
1,2-Dichloropropane	U	50	U	250
Dibromomethane	U	50	U	250
Bromodichloromethane	U	50	U	250
cis-1,3-Dichloropropene	U	50	U	250
trans-1,3-Dichloropropene	U	50	U	250
1,1,2-Trichloroethane	U	50	U	250
1,3-Dichloropropane	U	50	U	250
Dibromochloromethane	U	50	U	250
1,2-Dibromoethane	U	50	U	250
Bromoform	U	50	U	250
4-Methyl-2-Pentanone	U	100	U	500

TABLE 1.1 (cont.)
 RESULTS OF THE ANALYSIS FOR VOC IN SOIL
 AUSTIN AVENUE RADIATION SITE WA# 0-095

SAMPLE # : MEOH BLANK 01231
 LOCATION : SB-15-8/10
 COLLECTED : 04/04/95
 ANALYZED : 04/07/95
 INJECTED : 14:17 20:41
 FILE # : ^V3024 ^V3032
 DIL. FACT.: 50 200
 % SOLID : 100 80
 UNIT : ug/Kg mg/Kg

COMPOUND	CONC.	MDL	CONC.	MDL
Toluene	U	50	U	250
2-Hexanone	U	100	U	500
Tetrachloroethene	U	50	U	250
Chlorobenzene	U	50	U	250
1,1,1,2-Tetrachloroethane	U	50	U	250
Ethylbenzene	U	50	U	250
p & m-Xylene	U	50	U	250
o-Xylene	U	50	U	250
Styrene	U	50	U	250
Isopropylbenzene	U	50	2900	250
1,1,2,2-Tetrachloroethane	U	50	U	250
1,2,3-Trichloropropane	U	50	U	250
Bromobenzene	U	50	U	250
n-Propylbenzene	U	50	6000	250
2-Chlorotoluene	U	50	U	250
4-Chlorotoluene	U	50	U	250
1,3,5-Trimethylbenzene	U	50	U	250
tert-Butylbenzene	U	50	U	250
1,2,4-Trimethylbenzene	U	50	U	250
sec-Butylbenzene	U	50	3300	250
1,3-Dichlorobenzene	U	50	U	250
p-Isopropyltoluene	U	50	U	250
1,4-Dichlorobenzene	U	50	U	250
1,2-Dichlorobenzene	U	50	U	250
n-Butylbenzene	U	50	4800	250
1,2-Dibromo-3-Chloropropane	U	50	U	250
1,2,4-Trichlorobenzene	U	50	U	250
Naphthalene	U	50	U	250
Hexachlorobutadiene	U	50	U	250
1,2,3-Trichlorobenzene	U	50	U	250

Table 1.2 Results Of The Analysis For VOC TICs In Soil

Table 1. (cont.) Results of Tentatively Identified Compounds for 10A in Soil
 WA# 0-095 Quaker Ave.

Sample Number
 Lab File #

01231
2K3032

Unit
 Conversion Factor

µg/kg
250

80% S

CAS#	Compound Name		Q	RT	Con
1.	Cycloalkane	C ₈ H ₁₆	-	16.05	280
2.	Cycloalkane	C ₉ H ₁₈	-	17.80	180
3.	Unknown		-	18.95	180
4.	Cycloalkane	C ₉ H ₁₈	-	19.20	140
5.	Unknown		-	20.73	150
6.	Alkyl Benzene	C ₁₀ H ₁₄	-	23.24	270
7.	Alkyl Benzene	C ₁₀ H ₁₄	-	24.28	250
8.	Alkyl Benzene	C ₁₀ H ₁₄	-	25.10	280
9.	Unknown PAH		-	25.84	150
10.	Alkyl Benzene	C ₁₀ H ₁₄	-	26.28	
11.	Alkyl Benzene	C ₁₁ H ₁₆	-	26.60	180
12.	Unknown		-	27.23	33
13.	PAH	C ₁₁ H ₁₄	-	27.48	150
14.	PAH	C ₁₁ H ₁₄	-	28.60	130
15.	PAH	C ₁₁ H ₁₄	-	29.01	43
16.	PAH	C ₁₂ H ₁₆	-	29.45	28
17.	Unknown PAH		-	29.75	130
18.	PAH	C ₁₁ H ₁₀	-	29.94	110
19.	PAH	C ₁₁ H ₁₀	-	30.46	50
20.	PAH	C ₁₂ H ₁₂	-	32.68	21
21.					
22.					
23.					

* Estimated Concentration (Response Factor = 1.0)

Table 1.2 Results Of The Analysis For VOC TICs In Soil (cont.)

Table 1. (cont.) Results of Tentatively Identified Compounds for VIA in Soil
 WA# 1-095 Austin Ave.

Sample Number MEOH Blank-outlets Unit ug/kg
 Lab File # 2024 Conversion Factor 50

CAS#	Compound Name	Q	RT	Conc.*
1.	<i>No peaks found</i>			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				

* Estimated Concentration (Response Factor = 1.0)

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TABLE 1.3 Results of the Analysis for BNA in Soil
 WA# 0-095 Austin Radiation Site
 Results are Based on Dry Weight

Sample ID	SBLK041095	A01231		
Sample Location	Sand Blank	SB-15-8/10		
GC/MS File Name	>WB019	>WB020		
Matrix	Soil	Soil		
Dilution Factor	1.0	1.0		
% Solid	100	82		
Units	mg/Kg	mg/Kg		
Compound Name	Conc.	MDL	Conc.	MDL
Phenol	U	3.3	U	12
bis(-2-Chloroethyl)Ether	U	3.3	U	12
2-Chlorophenol	U	3.3	U	12
1,3-Dichlorobenzene	U	3.3	U	12
1,4-Dichlorobenzene	U	3.3	U	12
Benzyl alcohol	U	3.3	U	12
1,2-Dichlorobenzene	U	3.3	U	12
2-Methylphenol	U	3.3	U	12
bis(2-Chloroisopropyl)ether	U	3.3	U	12
4-Methylphenol	U	3.3	U	12
N-Nitroso-Di-n-propylamine	U	3.3	U	12
Hexachloroethane	U	3.3	U	12
Nitrobenzene	U	3.3	U	12
Isophorone	U	3.3	U	12
2-Nitrophenol	U	3.3	U	12
2,4-Dimethylphenol	U	3.3	U	12
bis(2-Chloroethoxy)methane	U	3.3	U	12
2,4-Dichlorophenol	U	3.3	U	12
1,2,4-Trichlorobenzene	U	3.3	U	12
Naphthalene	U	3.3	U	12
4-Chloroaniline	U	3.3	U	12
Hexachlorobutadiene	U	3.3	U	12
4-Chloro-3-methylphenol	U	3.3	U	12
2-Methylnaphthalene	U	3.3	96	12
Hexachlorocyclopentadiene	U	3.3	U	12
2,4,6-Trichlorophenol	U	3.3	U	12
2,4,5-Trichlorophenol	U	3.3	U	12
2-Chloronaphthalene	U	3.3	U	12
2-Nitroaniline	U	3.3	U	12
Dimethylphthalate	U	3.3	U	12
Acenaphthylene	U	3.3	U	12
3-Nitroaniline	U	3.3	U	12
Acenaphthene	U	3.3	U	12
2,4-Dinitrophenol	U	3.3	U	12
4-Nitrophenol	U	3.3	U	12
Dibenzofuran	U	3.3	4.7 (J)	12
2,6-Dinitrotoluene	U	3.3	U	12
2,4-Dinitrotoluene	U	3.3	U	12
Diethylphthalate	U	3.3	U	12
4-Chlorophenyl-phenylether	U	3.3	U	12
Fluorene	U	3.3	12 (J)	12
4-Nitroaniline	U	3.3	U	12
4,6-Dinitro-2-methylphenol	U	3.3	U	12
N-Nitrosodiphenylamine	U	3.3	U	12
4-Bromophenyl-phenylether	U	3.3	U	12
Hexachlorobenzene	U	3.3	U	12
Pentachlorophenol	U	3.3	U	12
Phenanthrene	U	3.3	29	12
Anthracene	U	3.3	U	12
Carbazole	U	3.3	U	12
Di-n-butylphthalate	1.8 (J)	3.3	7.8 (J)	12
Fluoranthene	U	3.3	U	12
Pyrene	U	3.3	U	12
Butylbenzylphthalate	U	3.3	U	12
3,3'-Dichlorobenzidine	U	3.3	U	12
Benzo(a)anthracene	U	3.3	U	12
Bis(2-Ethylhexyl)phthalate	U	3.3	U	12
Chrysene	U	3.3	U	12
Di-n-octylphthalate	U	3.3	U	12
Benzo(b)fluoranthene	U	3.3	U	12
Benzo(k)fluoranthene	U	3.3	U	12
Benzo(a)pyrene	U	3.3	U	12
Indeno(1,2,3-cd)pyrene	U	3.3	U	12
Dibenzo(a,h)anthracene	U	3.3	U	12
Benzo(g,h,i)perylene	U	3.3	U	12

Table 1.4 Results Of The Analysis For BNA TICs In Soil

Table 1. (cont.) Results of Tentatively Identified Compounds for BNA in Soil
 WA# 0-095 Austin Arc Radiation

Sample Number AO1231 Unit mg/kg ppm
 Lab File # >WB020 Conversion Factor = quant / .821
10g = 10ml 82.1 % solid

CAS#	Compound Name	Q	RT	Conc.*
1.	unknown Alkane		14.31	33 33000 28
2.	Cyclo alkane C ₁₁ H ₂₂		14.85	22
3.	unknown alkane		15.43	43
4.	methyl naphthalene isomer		16.41	41
5.	cyclo alkane C ₁₁ H ₂₂		16.81	23
6.	unknown alkane		17.80	23
7.	ethyl naphthalene isomer		17.89	26
8.	Dimethyl naphthalene isomer		18.09	57
9.	" " "		18.31	66
10.	" " "		18.42	41
11.	Unknown ALKANE		18.78	58
12.	TRIMETHYL NAPHTHALENE ISOMER		20.11	19
13.	" " "		20.20	24
14.	" " "		20.45	47
15.	" " "		20.73	32
16.	unknown		21.38	23
17.	unknown alkane		21.71	41
18.	" " "		22.55	71
19.	methyl Fluorene isomer		22.93	16
20.	unknown alkane		25.08	17
21.				
22.				
23.				

* Estimated Concentration (Response Factor = 1.0)

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Table 1.4 Results Of The Analysis For BNA TICs In Soil (cont.)

Table 1. (cont.) Results of Tentatively Identified Compounds for BNA in Soil
 WA# 0-095 Austin Ave. Radiation

Sample Number
 Lab File #

SBLK041095
WB019

Unit
 Conversion Factor

ug/kg ppm
ugwt ÷ 3
y

CAS#	Compound Name	Q	RT	Conc.*
1.	None Found			
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
17.				
18.				
19.				
20.				
21.				
22.				
23.				

* Estimated Concentration (Response Factor = 1.0)

TABLE 1.5 Results of the Analysis for Pesticide/PCB in Soil
 WA#0-095 Austin Avenue Radiation Site
 Based on Dry Weight

Client ID	SBLK041095		A01231	
Location	-		SB-15-8/10	
Percent Soild	100		82.1	
Analyte	$\mu\text{g}/\text{Kg}$	MDL $\mu\text{g}/\text{Kg}$	$\mu\text{g}/\text{Kg}$	MDL $\mu\text{g}/\text{Kg}$
a-BHC	U	3.3	U	12
g-BHC	U	3.3	U	12
b-BHC	U	3.3	U	12
Heptachlor	U	3.3	U	12
d-BHC	U	3.3	U	12
Aldrin	U	3.3	U	12
Heptachlor Epoxide	U	3.3	U	12
g-Chlordane	U	3.3	U	12
a-Chlordane	U	3.3	U	12
Endosulfan (I)	U	3.3	U	12
p,p'-D D E	U	3.3	U	12
Dieldrin	U	3.3	U	12
Endrin	U	3.3	U	12
p,p'-D D D	U	3.3	U	12
Endosulfan (II)	U	3.3	U	12
p,p'-D D T	U	3.3	U	12
Endrin Aldehyde	U	3.3	U	12
Endosulfan Sulfate	U	3.3	U	12
Methoxychlor	U	3.3	U	12
Endrin Ketone	U	3.3	U	12
Toxaphene	U	83	U	300
Aroclor 1016	U	42	U	150
Aroclor 1221	U	83	U	300
Aroclor 1232	U	42	U	150
Aroclor 1242	U	42	U	150
Aroclor 1248	U	42	U	150
Aroclor 1254	U	42	U	150
Aroclor 1260	U	42	U	150

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Table 1.6 Results of the Analysis for Metals in Soil
 WA# 0-095 Austin Avenue Radiation Site
 Based on Dry Weights

Client ID Location		Method Blank Lab		A01231 SB-15-8/10	
Parameter	Analysis Method	Conc mg/kg	MDL mg/kg	Conc mg/kg	MDL mg/kg
Antimony	AA-Fur	U	1.0	U	0.6
Arsenic	AA-Fur	U	0.5	0.86	0.3
Beryllium	ICAP	U	0.2	U	0.2
Cadmium	ICAP	U	0.3	U	0.3
Chromium	ICAP	U	0.8	7.5	0.7
Copper	ICAP	U	0.6	36	0.5
Lead	ICAP	U	4.0	16	3.5
Mercury	Cold Vapor	U	0.04	U	0.04
Nickel	ICAP	U	2.0	14	1.8
Selenium	AA-Fur	U	0.5	U	0.3
Silver	ICAP	U	0.5	U	0.4
Thallium	AA-Fur	U	0.5	U	0.3
Zinc	ICAP	U	2.0	9.1	1.8

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TABLE 1.7 Results of the Analyses for TPH and Oil & Grease in Soil
WA#0-095 Austin Avenue Radiation Site
Results are Based on Dry Weight

Sample ID	Location	OIL & GREASE (#/#)	PETROLEUM HYDROCARBONS (#/#)	QL (#/#)
SBLK041295 A 01231	- SB-15-8/10	U 5300	U 4400	20 615

00021

AR300324

Appendix E

Appendix E

AR000325

APPENDIX E
Shelby Tube Analysis
Austin Avenue Radiation Site
Final Report
July 1995

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AR300326

DATA TABLE 9B-11 12 F1

Sieve Analysis

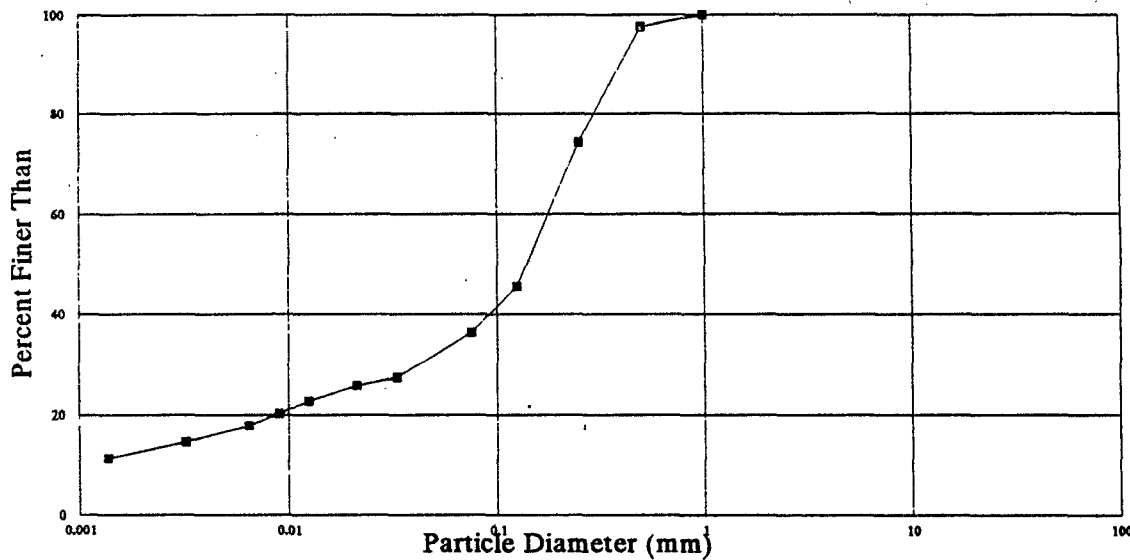
Sieve Size (mm)	Mass Retained (g)	Hygroscopic Corrected Mass Retained (g)	Mass Retained Corrected for F (g)	Mass Passing (g)	Percent Finer Than
16	0.00	0.00	ERR	ERR	ERR
9.5	0.00	0.00	ERR	ERR	ERR
4	0.00	0.00	ERR	ERR	ERR
2	0.00	0.00	ERR	ERR	ERR

Hydrometer Test Analysis

Time, T (Minutes)	Hydrometer Reading	Corrected Reading	Length, L (cm)	Diameter (mm)	Percent Suspended
2	1.022	1.017	11.90	0.0331531	27.42
5	1.021	1.016	12.06	0.0212016	25.81
15	1.019	1.014	12.59	0.0125063	22.58
30	1.0175	1.0125	12.99	0.0089816	20.16
60	1.016	1.011	13.39	0.0064472	17.74
250	1.014	1.009	13.91	0.0032203	14.52
1440	1.012	1.007	14.44	0.0013671	11.29

Sieve Analysis <No.10

Sieve size (mm)	Mass Retained (g)	Mass Passing (g)	Percent Finer Than
1	0.00	96.00	100.00
0.5	2.29	93.77	97.82
0.25	22.48	71.29	74.21
0.125	27.49	43.80	45.80
0.075	8.90	34.90	36.33
TOTAL	81.16		



Particle Dia. (mm)	Percent Finer
0.0331531	ERR
0.0212016	ERR
0.0125063	ERR
0.0089816	ERR
0.0064472	100
0.0032203	97.6161
0.0013671	74.21428
	45.59703
	36.33208
0.033153	27.42078
0.021202	25.8078
0.012506	22.58182
0.008982	20.16234
0.006447	17.74286
0.00322	14.51689
0.001367	11.29091

TABLE A9. BULK DENSITY AND TOTAL POROSITY CALCULATION SHEET

Date: 5/5/95 Time: _____ Tested By: BA
Project: Austin Ave Job No.: 0-095

Bulk Density (ρ_B) g/cm³

1. Soil weight = W_s (from Table A8 or A10) 1042.8 g
(2c.) + (4.)
_____ x 1000
(2.)
2. Moisture %M (from moisture determination) 10.44 %

Volume of soil in column (V_s) cm³
Column ID (cm) = D_c 7.1 cm
Column height (cm) = H 13.3 cm
3. $V_s = 0.7854 \times D^2 \times H$ 526.28 cm³
4. $\rho_B = \frac{W_s \times (1 - \%M/100)}{V_s}$ 1.77 g/cm³

Total Porosity (θ) dimensionless

4. ρ_B (from (3.) above) 1.77 g/cm³
5. $S_G = \rho_G$ (Table A6) 2.82 g/cm³
(Assume water density = 1 g/cm³)
6. $\theta = \frac{S_G - \rho_B}{S_G}$ 0.3723

Approved By: _____

AR300328

TABLE A11. AIR-FILLED PORE VOLUME DATA AND CALCULATION SHEET

Date: 5/5/95 Time: _____ Tested By: TBH
Project: Austin Ave Job No.: 0-095

Total Pore Volume (V_p) cm^3

- 1. θ (from Table A9 (6.)) 0.3723
- 2. V_s (from Table A9 (3.)) 526.28 cm^3
- 3. $V_p = (\theta/100) \times V_s$ (cm^3) 0.196 cm^3
195.93

- 4. %M (from moisture determination) 10.44 %
- 5. W_s (from Table A9 (1.)) 1042.8 g
- 6. $V_w = (W_s \times \%M/100)/1$ (cm^3)
 V_w = volume of water in pores 108.87 cm^3
195.93
- 7. $V_p =$ (from above (3.)) 0.196 cm^3
- 8. $V_a = V_p - V_w$ 87.06 cm^3

Approved By: _____

~~Soil Vapor Extraction Screening Protocol~~
~~Revision 2~~
~~Date: 6/28/93~~

TABLE A5. DETERMINATION OF MOISTURE CONTENT

Project: Austin Ave Job No.: 0-095
Location of Project: SB-11
Description of Soil: Med Sand + Clay
Tested By: BH Date of Testing: 5/4/95

Moisture Content of Soil

Weight of the aluminum container (a)	=	<u>96.78</u>	g
Weight of the container + Soil (b)	=	<u>115.37</u>	g
Weight of the container + dry soil (c)	=	<u>113.43</u>	g
Moisture content of the soil (%) = $(b-c)/(b-a) \times 100$	=	<u>10.74</u>	%

Approved By: _____

ARB00330

~~Soil Vapor Extraction Screening Protocol~~
~~Revision: 2~~
~~Date: 6/28/91~~

TABLE A6. DATA SHEET FOR DETERMINATION OF SPECIFIC GRAVITY OF SOILS

Date: 5/5/95 Time: _____ Tested By: BH
Project: Austin Ave Job No.: 0-095

Wt. of flask + water (W_a) = 283.47 g
Wt. of flask + water + soil (W_b) = 298.09 g
Wt. of soil (W_o) = 25.26 g

$$\text{Specific gravity } (S_g) = \frac{W_o}{W_o + W_a - W_b}$$

$$\text{Specific gravity after temperature correction} = \frac{K W_o}{W_o + W_a - W_b}$$

K = A number obtained by dividing the relative density of water at temperature T_c by the relative density of water at 20 C. Values for a range of temperatures are given in ASTM D854 procedure.

Example of Calculation

$W_o = 95.59$ g
 $W_a = 693.27$ g
 $W_b = 753.66$ g
 $T_c = 23C$

$$S_g = \frac{95.59}{95.59 + 693.27 - 753.66} = \frac{95.59}{35.20} = 2.715$$

K = 0.99757 (From the Table in ASTM D854)

After temperature correction

$$S_g = 2.71$$

moisture = 10.44%

T = 26°C

K = 0.9991

Sg = 2.82

Approved By: _____

AR300331

PERMEABILITY TEST

SITE: AUSTIN AVE
 TECHNICIAN'S NAME: HOLDERNESS

Sample No.: SB-11
 Depth: 10-12'
 Description (optional): SAMPLE REQUIRED MINOR RECONSTRUCTION BEFORE TEST.
 APPROX DEPTH OF TESTED CORE, 12 FT.

Chamber Constants
 Test Fluid: D.I. water
 System Constant (C)cm²: 0.477
 hu(Vu) (cm): 43.79
 hL(VL) (cm): 44

Chamber Pressures
 Chamber, PC: 30
 Upper Burette, PU: 10
 Lower Burette, PL: 20

Specimen Dimensions
 Final length, Lf (cm): 13.25
 Final diameter (cm): 7.3
 Final Area, Af (cm²): 41.83265

Manual Formula Input (optional):
 $h(t) = (hL(VL(t)) - hU(VU(t))) + (PL - PU) * 70.37$
 $kA/L = C/12 - 11 * LN(h(t1)/h(t2))$
 $k20 = R(T)(kA/L)(L/Af)$

Date	Time (Minutes from T=0)	Elap. Time (min)	Temp. C	Burette Readings		Inflow (ml) Incremental	Outflow (ml) Incremental	Head Difference h(t) (cm)	Preliminary kA/L (cm ² /sec)	Final k20 (x10 ⁻⁴) (cm/sec)
				Upper VU(t) (ml)	Lower VL(t)					
	0	0	21	18.1	6.5	0	0	715.51	ERR	ERR
	4	4	21	17.2	7.4	0.9	-0.9	713.71	0.0015133	4.79E-04
	22	22	21	12.7	11.9	4.5	-4.5	704.71	0.000111	3.52E-05
	29	29	21	10.9	13.7	1.8	-1.8	701.11	0.0000376	1.19E-05
	32	32	21	10.1	14.5	0.8	-0.8	699.51	0.0001069	3.39E-05
	42	42	21	7.6	17	2.5	-2.5	694.51	0.0000623	1.97E-05
	50	50	21	5.7	18.9	1.9	-1.9	690.71	0.0000443	1.40E-05
	56	56	21	4.1	20.5	1.6	-1.6	687.51	0.0000124	3.93E-06
	58	58	21	3.6	21	0.5	-0.5	686.51	0	0.00E+00
	59	59	21	3.8	21.2	0.2	0.2	686.51	0.000013	4.11E-06
	60	60	21	3	21.5	0.3	-0.3	685.41	5.80E-06	1.84E-06
	61	61	21	2.8	21.8	0.3	-0.2	684.91	5.71E-06	1.81E-06
	62	62	21	2.6	22.1	0.3	-0.2	684.41	4.50E-06	1.42E-06
	63	63	21	2.4	22.3	0.2	-0.2	684.01	-0.000217	-6.88E-05
	0	0	21			-22.3	-2.4	703.91	ERR	ERR

PERMEABILITY TEST

SITE: AUSTIN AVE
 TECHNICIAN'S NAME: HOLDERNESS

Sample No.: SB-11
 Depth: 10-12'
 Description (optional): SAMPLE REQUIRED MINOR RECONSTRUCTION BEFORE TEST.
 APPROX DEPTH OF TESTED CORE, 12 FT.

Chamber Constants
 Test Fluid: D.I. water
 System Constant (C) cm²: 0.477
 hu(Vu) (cm): 43.79
 hL(VL) (cm): 44

Chamber Pressures
 Chamber, PC: 30
 Upper Burette, PU: 10
 Lower Burette, PL: 20

Specimen Dimensions
 Final length, Lf (cm): 13.25
 Final diameter (cm): 7.3
 Final Area, Af (cm²): 41.83265

Manual Formula Input (optional):
 $h(t) = (hL(VL(t)) - hU(VU(T))) + (PL - PU) * 70.37$
 $kA/L = C/2 - 1 * LN(h(t)/h(2))$
 $k20 = R(T) (kA/L) (L/Af)$

Date	Time (Minutes from T=0)	Elap. Time (min)	Temp. C	Burette Readings		Inflow (ml) Incremental	Outflow (ml) Incremental	Head Difference h(t) (cm)	Preliminary kA/L (cm ² /sec)	Final k20 (x10-) (cm/sec)
				Upper VU(t) (ml)	Lower VL(t) (ml)					
	0	0	21	18.1	6.5	0	0	715.51	ERR	ERR
	4	4	21	17.2	7.4	0.8	-0.9	713.71	0.0015133	4.79E-04
	22	22	21	12.7	11.9	4.5	-4.5	704.71	0.000111	3.52E-05
	29	29	21	10.9	13.7	1.8	-1.8	701.11	0.000376	1.19E-05
	32	32	21	10.1	14.5	0.8	-0.8	699.51	0.0001089	3.39E-05
	42	42	21	7.6	17	2.5	-2.5	694.51	0.000623	1.97E-05
	50	50	21	5.7	18.9	1.9	-1.9	690.71	0.0000443	1.40E-05
	56	56	21	4.1	20.5	1.6	-1.6	687.51	0.0000124	3.93E-06
	58	58	21	3.6	21	0.5	-0.5	686.51	0	0.00E+00
	59	59	21	3.8	21.2	0.2	0.2	686.51	0.000013	4.11E-06
	60	60	21	3	21.5	0.3	-0.8	685.41	5.80E-06	1.84E-06
	61	61	21	2.8	21.8	0.3	-0.2	684.91	5.71E-06	1.81E-06
	62	62	21	2.6	22.1	0.3	-0.2	684.41	4.50E-06	1.42E-06
	63	63	21	2.4	22.3	0.2	-0.2	684.01	-0.000217	-6.88E-05
	0	0	21	2.4	22.3	-2.2	-2.4	703.91	ERR	ERR

PARTICLE SIZE ANALYSIS

Technician's name: **Holdemss**
 Date: **5-16-95**
 Site name: **Austin Avenue**
 Sample No.: **SB-11 12 FT**

Sample Data

Mass of sample split on No. 10 sieve (g): **280.03**
 Mass retained on No. 10 sieve (g): **0**
 Mass passing No. 10 sieve (g): **280.03**
 Percent passing No. 10 sieve (g): **100**

Mass used in Hydrometer test (g): **100.13**
 Specific gravity of soil: **2.82**
 Correction factor: **0.96**
 Corrected mass of soil used in hydrometer test (g): **96.1248**

Hygroscopic Moisture

Wet mass of hygroscopic test sample (g): **15.05**
 Oven-dry mass of test sample (g): **15.04**
 Percent hygroscopic moisture: **0.067452**
 Corrected mass of soil used in hydrometer test (g): **96.05736**

Hydrometer Test

Hydrometer type: **151H**
 Hydrometer correction: **0**
 Average temperature (C): **23**
 Temperature correction factor: **0.005**
 Total Hydrometer correction: **0.005**

Values

K: **0.01365**
 W: **96.06**
 F: **0.00**

Appendix F

Appendix F

AR300335


APPENDIX F
Teledyne Brown Engineering Laboratories Data Package
Austin Avenue Radiation Site
Final Report
July 1995

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AR300336



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

DATE: 4/27/95
TO: R.Singhvi, ERT/EPA
FROM: George Armstrong, Data Validation and Report Writing Group Leader 
SUBJECT: Preliminary Results of Project Austin Ave., WA# 0095

Attached please find the preliminary results of the above referenced project for the following samples.

Chain of Custody No.

Analyses

00409	6 water samples for Ra226, Gross alpha
00478	14 water samples for Ra226, Gross alpha
00320	3 water samples for Ra226, Gross alpha
00321	6 water samples for Ra226, Gross alpha
00322	3 water samples for Ra226, Gross alpha
00323	9 soil samples for Gross alpha
00324	8 soil samples for Gross alpha

cc: Archives
Subcontracting
George Armstrong
WAM: G. Powell
Task Leader M. Reynolds/G. Newhart

AR300337




**TELEDYNE
BROWN ENGINEERING
Environmental Services**

50 VAN BUREN AVENUE

P.O. BOX 1235

WESTWOOD, NEW JERSEY 07675-1235

(201) 664-7070 FAX (201) 664-5586

WESTON/AUSTIN AVENUE SITE**Case Narrative/Cover Sheet for Reports of Analysis
and Lab Data**

Date 03-26-95
 TI #'s 80267 - 80286, 80292 - 80301
 WO #'s 4-6463

**NO QC EVALUATION HAS BEEN PERFORMED.
 DATA VALIDITY IS UNSUBSTANTIATED
 AND THE DATA SHOULD BE USED
 WITH DISCRETION.**

Preliminary Comments:

Some samples in this batch show positive Bi-214 & Pb-214 activity by gamma analysis which is attributed to dissolved Rn-222 rather than due to Ra-226. This was confirmed by counting one sample a second time seven days later. The Bi-214 & Pb-214 results are calculated at the count time rather than decaying to the collection time. One reason for doing this is that some Rn-222 (and consequently Bi-214 & Pb-214) would have been lost during the loading of the samples into Marinellis.

Matrix Spike Activity for TI #80296

<u>Nuclide</u>	<u>Activity pCi/l</u>	<u>Acceptable Range</u>
Cesium-137	211.	206. - 216.

Matrix Spike Duplication Activity for TI # 80297

<u>Nuclide</u>	<u>Activity pCi/l</u>	<u>Acceptable Range</u>
Cesium-137	211.	206. - 216.

<u>Contents:</u>	<u>Procedure #'s</u>	<u>Bench & Work Sheet Pages</u>	<u>Calibration, Background & Source Checks</u>
Reports of Analysis		10	
Gamma	PRO-042-5	-	
Uranium	PRO-062-110	-	
Thorium	PRO-062-114	-	
C-O-C		-	
Other		-	

AR300338

WORK ORDER NUMBER 4-6463

CUSTOMER P.O. NUMBER 08-31756

DATE RECEIVED 04/05/95

DELIVERY DATE 04/19/95

MR JOHN JOHNSON

ROY E WESTON, INC (REACT)

GSA RARITAN DEPOT-209F

2890 WOODBRIDGE AVENUE

EDISON NJ 08837-3679

INCOMPLETE

WATER - GROUND

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	STOP DATE	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-R U/M	MID-COUNT TIME DATE	VOLUME - UNITS ASM-WGHT-R	LAB.
80267	A01204	S8-1	03/28							
GAS ANALYSIS - GROUND WATER FOR RA-226										
					PB-214	L.T. 1. E 01		04/07		0000
					BI-214	L.T. 9. E 00		04/07		4
					PB-212	L.T. 1.7 +-0.4 E 01		04/07		4
					TL-208	L.T. 4. E 00		04/07		4
					K-40	4.4 +-2.3 E 01		04/07		4
					U-234 BY ALPHA SPEC. - WATER					
					TH-230 BY ALPHA SPEC. - WATER					
					U-238 BY ALPHA SPEC. - WATER					
80268	A01250	S8-1F	03/28							
GAS ANALYSIS - GROUND WATER FOR RA-226										
					PB-214	L.T. 1. E 01		04/07		0000
					BI-214	L.T. 9. E 00		04/07		4
					PB-212	5.1 +-2.7 E 00		04/07		4
					TL-208	L.T. 4. E 00		04/07		4
					K-40	L.T. 5. E 01		04/07		4
					U-234 BY ALPHA SPEC. - WATER					
					TH-230 BY ALPHA SPEC. - WATER					
					U-238 BY ALPHA SPEC. - WATER					
80269	A01249	S8-2	03/28							
GAS ANALYSIS - GROUND WATER FOR RA-226										
					PB-214	9.3 +-0.9 E 01		04/07		0000
					BI-214	8.0 +-0.8 E 01		04/07		4
					PB-212	6.4 +-3.7 E 00		04/07		4
					TL-208	6.6 +-3.2 E 00		04/07		4
					K-40	L.T. 9. E 01		04/07		4
					U-234 BY ALPHA SPEC. - WATER					
					TH-230 BY ALPHA SPEC. - WATER					
					U-238 BY ALPHA SPEC. - WATER					

**NO QC EVALUATION HAS BEEN PERFORMED.
DATA VALIDITY IS UNSUBSTANTIATED
AND THE DATA SHOULD BE USED
WITH DISCRETION.**

AR300339

4-6463

08-31756

04/05/95

04/19/95

MR JOHN JOHNSON

ROY-F WESTON INC
GSA RARITAN DEPOT-209F
2890 WOODBRIDGE AVENUE
EDISON NJ

08837-3679

INCOMPLETE

WATER - GROUND

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	STOP DATE	NUCLIDE	ACTIVITY I PCI/LITERI	NUCL-UNIT-R U/M	MID-COUNT TIME DATE	VOLUME - UNITS ASH-WGHT-R	LAB.
80270	A01248	SB-2F	03/28							
GAS ANALYSIS - GROUND WATER FOR RA-226										
					PB-214	5.3 ±0.8 E 01		04/07		9000
					BI-214	5.5 ±0.8 E 01		04/07		4
					PB-212	1.4 ±0.5 E 01		04/07		4
					TL-208	L.T. 4. E 00		04/07		4
					K-40	L.T. 4. E 01		04/07		4
					U-234 BY ALPHA SPEC. - WATER					0000
					TH-230 BY ALPHA SPEC. - WATER					0000
					U-238 BY ALPHA SPEC. - WATER					0000
WATER - GROUND										
80271	A01247	SB-3	03/29							
GAS ANALYSIS - GROUND WATER FOR RA-226										
					PB-214	1.4 ±0.1 E 02		04/07		9000
					BI-214	1.4 ±0.1 E 02		04/07		4
					PB-212	9.5 ±0.4 E 00		04/07		4
					TL-208	5.5 ±2.9 E 00		04/07		4
					K-40	L.T. 6. E 01		04/07		4
					U-234 BY ALPHA SPEC. - WATER					0000
					TH-230 BY ALPHA SPEC. - WATER					0000
					U-238 BY ALPHA SPEC. - WATER					0000
80272	A01246	SB-3F	03/29							
GAS ANALYSIS - GROUND WATER FOR RA-226										
					PB-214	9.9 ±1.4 E 01		04/07		9000
					BI-214	9.9 ±1.0 E 01		04/07		4
					PB-212	8.9 ±4.3 E 00		04/07		4
					TL-208	5.5 ±3.2 E 00		04/07		4
					K-40	L.T. 1. E 02		04/07		4
					U-234 BY ALPHA SPEC. - WATER					0000
					TH-230 BY ALPHA SPEC. - WATER					0000
					U-238 BY ALPHA SPEC. - WATER					0000

**NO QC EVALUATION HAS BEEN PERFORMED.
DATA VALIDITY IS UNSUBSTANTIATED
AND THE DATA SHOULD BE USED
WITH DISCRETION.
AR300340**

WORK ORDER NUMBER 4-6463 CUSTOMER P.O. NUMBER 08-31756 DATE RECEIVED 04/05/95 DELIVERY DATE 04/19/95

MR JOHN JOHNSON

ROY F. WESTON INC (REAG)
 GSA RARITAN DEPOT-209F
 2890 WOODBRIDGE AVENUE
 EDISON NJ 08837-3679

INCOMPLETE

WATER - GROUND

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	STOP DATE	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-X U/M #	MID-COUNT TIME DATE	VOLUME - UNITS ASH-WGHT-%	LAB.
80273	A01245	SB-4	03/29							***
GAS ANALYSIS - GROUND WATER FOR RA-226										
					PB-214	8.4	+0.8 E 01	04/07		4
					BI-214	8.1	+0.8 E 01	04/07		4
					PB-212	7.9	+3.2 E 00	04/07		4
					TL-208	L.T.	4. E 00	04/07		4
					K-40	L.T.	9. E 01	04/07		4
					U-234	BY ALPHA SPEC. - WATER				***
					TH-230	BY ALPHA SPEC. - WATER				***
					U-238	BY ALPHA SPEC. WATER				***
80274	A01246	SB-4F	03/29							***
GAS ANALYSIS - GROUND WATER FOR RA-226										
					PB-214	2.5	+0.6 E 01	04/07		4
					BI-214	3.0	+0.4 E 01	04/07		4
					PB-212	L.T.	6. E 00	04/07		4
					TL-208	L.T.	4. E 00	04/07		4
					K-40	L.T.	5. E 01	04/07		4
					U-234	BY ALPHA SPEC. - WATER				***
					TH-230	BY ALPHA SPEC. - WATER				***
					U-238	BY ALPHA SPEC. WATER				***
80275	A01243	SB-5	03/29							***
GAS ANALYSIS - GROUND WATER FOR RA-226										
					PB-214	5.3	+0.6 E 01	04/07		4
					BI-214	5.1	+0.6 E 01	04/07		4
					PB-212	L.T.	6. E 00	04/07		4
					TL-208	L.T.	4. E 00	04/07		4
					K-40	L.T.	8. E 01	04/07		4
					U-234	BY ALPHA SPEC. - WATER				***
					TH-230	BY ALPHA SPEC. - WATER				***
					U-238	BY ALPHA SPEC. WATER				***

**NO QC EVALUATION HAS BEEN PERFORMED.
 DATA VALIDITY IS UNSUBSTANTIATED
 AND THE DATA SHOULD BE USED
 WITH DISCRETION.**

AR300341

WORK ORDER NUMBER 4-6463 CUSTOMER P.O. NUMBER 08-31756 DATE RECEIVED 04/05/95 DELIVERY DATE 04/19/95

MR JOHN JOHNSON
ROY F. WESTON, INC. (REAC)
CSA RARIAN DEPOT-209F
2890 WOODBRIDGE AVENUE
EDISON NJ 08837-3679

INCOMPLETE

WATER - GROUND

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	STOP DATE	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-X U/M	MID-COUNT TIME DATE	VOLUME - UNITS ASH-WGHT-X	LAB.
80276	A01242	SB-5F	03/29		GAS ANALYSIS - GROUND WATER FOR RA-226					***
					PB-214	6.7 ± 0.8 E 01		04/09		4
					BI-214	5.0 ± 0.7 E 01		04/09		4
					PB-212	L.T. 7. E 00		04/09		4
					TL-208	L.T. 4. E 00		04/09		4
					K-40	6.4 ± 3.0 E 01		04/09		4
					U-234 BY ALPHA SPEC. - WATER					***
					TH-230 BY ALPHA SPEC. - WATER					***
					U-238 BY ALPHA SPEC. - WATER					***
80277	A01241	SB-6	03/30		GAS ANALYSIS - GROUND WATER FOR RA-226					***
					PB-214	3.2 ± 0.7 E 01		04/09		4
					BI-214	3.1 ± 0.7 E 01		04/09		4
					PB-212	7.6 ± 3.7 E 00		04/09		4
					TL-208	L.T. 5. E 00		04/09		4
					K-40	L.T. 1. E 02		04/09		4
					U-234 BY ALPHA SPEC. - WATER					***
					TH-230 BY ALPHA SPEC. - WATER					***
					U-238 BY ALPHA SPEC. - WATER					***
80278	A01240	SB-6F	03/30		GAS ANALYSIS - GROUND WATER FOR RA-226					***
					PB-214	3.6 ± 0.7 E 01		04/09		4
					BI-214	4.3 ± 0.6 E 01		04/09		4
					PB-212	7.0 ± 4.0 E 00		04/09		4
					TL-208	L.T. 5. E 00		04/09		4
					K-40	L.T. 5. E 01		04/09		4
					U-234 BY ALPHA SPEC. - WATER					***
					TH-230 BY ALPHA SPEC. - WATER					***
					U-238 BY ALPHA SPEC. - WATER					***

**NO QC EVALUATION HAS BEEN PERFORMED.
DATA VALIDITY IS UNSUBSTANTIATED
AND THE DATA SHOULD BE USED
WITH DISCRETION.**

AR300342

WORK ORDER NUMBER 4-6463 CUSTOMER P.O. NUMBER 08-31756 DATE RECEIVED 04/05/95 DELIVERY DATE 04/19/95

MR JOHN JOHNSON
 ROY E. WESTON INC (REACT)
 CSA KANTAN DEPOT-209F
 2890 WOODBRIDGE AVENUE
 EDISON NJ 08837-3679

INCOMPLETE

WATER - GROUND

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUN	COLLECTION-DATE START DATE	STOP DATE	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-X U/M	MID-COUNT TIME DATE	VOLUME - UNITS ASH-WGHT-%	LAB.
80279	A01239	SB-7	03/30		GAS ANALYSIS - GROUND WATER FOR RA-226					***
					P6-214	4.0 ±0.6 E 01		04/09		4
					B1-214	5.1 ±0.6 E 01		04/09		4
					PB-212	9.9 ±3.9 E 00		04/09		4
					TL-208	L.T. 4. E 00		04/09		4
					K-40	L.T. 6. E 01		04/09		4
					U-234 BY ALPHA SPEC. - WATER					***
					TH-230 BY ALPHA SPEC. - WATER					***
					U-238 BY ALPHA SPEC. - WATER					***
80280	A01238	SB-7F	03/30		GAS ANALYSIS - GROUND WATER FOR RA-226					***
					P6-214	1.7 ±0.7 E 01		04/09		4
					B1-214	2.2 ±0.6 E 01		04/09		4
					PB-212	L.T. 8. E 00		04/09		4
					TL-208	L.T. 5. E 00		04/09		4
					K-40	L.T. 6. E 01		04/09		4
					U-234 BY ALPHA SPEC. - WATER					***
					TH-230 BY ALPHA SPEC. - WATER					***
					U-238 BY ALPHA SPEC. - WATER					***
80281	A01237	SB-8	03/30		GAS ANALYSIS - GROUND WATER FOR RA-226					***
					P6-214	L.T. 2. E 01		04/09		4
					B1-214	L.T. 1. E 01		04/09		4
					PB-212	2.2 ±0.3 E 01		04/09		4
					TL-208	8.1 ±2.7 E 00		04/09		4
					K-40	1.8 ±0.3 E 02		04/09		4
					U-234 BY ALPHA SPEC. - WATER					***
					TH-230 BY ALPHA SPEC. - WATER					***
					U-238 BY ALPHA SPEC. - WATER					***

NO DATA WAS OBTAINED FOR THIS ANALYSIS. DATA VALIDITY IS UNSUBSTANTIATED AND THE DATA SHOULD BE USED WITH DISCRETION.

AR800343

MR JOHN JOHNSON
 401 F WESTBROOK INC (REACT)
 CSA RARITAN DEPOT-209F
 2890 WOODBRIDGE AVENUE
 EDISON NJ 08837-3679

INCOMPLETE

WATER - GROUND

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	STOP DATE	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-X U/M *	MID-COUNT TIME DATE	VOLUME - UNITS ASH-WEIGHT-%	LAB.
80282	A01235	SB-8F	03/30		GAS ANALYSIS - GROUND WATER FOR RA-226					****
					PB-214	1.5 +-0.5 E 01		04/09		4
					BI-214	1.6 +-0.4 E 01		04/09		4
					PB-212	L.T. 5. E 00		04/09		4
					TL-208	L.T. 3. E 00		04/09		4
					K-40	L.T. 4. E 01		04/09		4
					U-234 BY ALPHA SPEC. - WATER			****		****
					TH-230 BY ALPHA SPEC. - WATER			****		****
					U-238 BY ALPHA SPEC. - WATER			****		****
80283	A01235	SB-9	03/31		GAS ANALYSIS - GROUND WATER FOR RA-226					****
					PB-214	2.1 +-0.5 E 01		04/09		4
					BI-214	2.4 +-0.5 E 01		04/09		4
					PB-212	5.5 +-2.6 E 00		04/09		4
					TL-208	4.2 +-1.8 E 00		04/09		4
					K-40	L.T. 4. E 01		04/09		4
					U-234 BY ALPHA SPEC. - WATER			****		****
					TH-230 BY ALPHA SPEC. - WATER			****		****
					U-238 BY ALPHA SPEC. - WATER			****		****
80284	A01234	SB-9F	03/31		GAS ANALYSIS - GROUND WATER FOR RA-226					****
					PB-214	2.9 +-0.6 E 01		04/09		4
					BI-214	2.3 +-0.4 E 01		04/09		4
					PB-212	1.2 +-0.5 E 01		04/09		4
					TL-208	L.T. 4. E 00		04/09		4
					K-40	L.T. 8. E 01		04/09		4
					U-234 BY ALPHA SPEC. - WATER			****		****
					TH-230 BY ALPHA SPEC. - WATER			****		****
					U-238 BY ALPHA SPEC. - WATER			****		****

**NO QC EVALUATION HAS BEEN PERFORMED.
 DATA VALIDITY IS UNSUBSTANTIATED
 AND THE DATA SHOULD BE USED
 WITH DISCRETION.**

WORK ORDER NUMBER 4-6463

CUSTOMER P.O. NUMBER 08-31756

DATE RECEIVED 04/05/95

DELIVERY DATE 04/19/95

PAGE 7

MR JOHN JOHNSON
ROY F WESTON INC (REACT)
GSA MARITAN DEPOT-209F
2890 WOODBRIDGE AVENUE
EDISON NJ 08837-3679

08-31756

INCOMPLETE

WATER - GROUND

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	STOP DATE	NUCLEIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-X U/M	MID-COUNT DATE	TIME	VOLUME - UNITS ASH-NCHT-X	LAB.
60285	A01233	58-11	04/03								
GAS ANALYSIS - GROUND WATER FOR RA-226											
					PB-214	1.0 +/-0.1	E 02	04/09			0.000
					BI-214	8.9 +/-0.9	E 01	04/09			0.000
					PB-212	8.4 +/-3.6	E 00	04/09			0.000
					TL-208	L.T.	4. E 00	04/09			0.000
					K-40	L.T.	5. E 01	04/09			0.000
					U-234 BY ALPHA SPEC.	- WATER					0.000
					TH-230 BY ALPHA SPEC.	- WATER					0.000
					U-238 BY ALPHA SPEC.	- WATER					0.000
GAS ANALYSIS - GROUND WATER FOR RA-226											
80286	A01232	58-11F	04/03								
					PB-214	1.1 +/-0.1	E 02	04/09			0.000
					BI-214	1.1 +/-0.1	E 02	04/09			0.000
					PB-212	L.T.	6. E 00	04/09			0.000
					TL-208	L.T.	4. E 00	04/09			0.000
					K-40	L.T.	7. E 01	04/09			0.000
					U-234 BY ALPHA SPEC.	- WATER					0.000
					TH-230 BY ALPHA SPEC.	- WATER					0.000
					U-238 BY ALPHA SPEC.	- WATER					0.000
80292	A01204 80267	MS	/	/							
					U-234 BY ALPHA SPEC.	- WATER					0.000
					U-238 BY ALPHA SPEC.	- WATER					0.000
80293	A01204 80267	MSD	/	/							
					U-234 BY ALPHA SPEC.	- WATER					0.000
					U-238 BY ALPHA SPEC.	- WATER					0.000
80294	A01250 80268	MS	/	/							
					TH-230 BY ALPHA SPEC.	- WATER					0.000

NO QC EVALUATION HAS BEEN PERFORMED.
DATA VALIDITY IS UNSUBSTANTIATED
AND THE DATA SHOULD BE USED
WITH DISCRETION.

AR300345

MR. JOHN JOHNSON
 ROY-F. WESTON, INC. (IR-EGE)
 GSA RARITAN DEPOT-209F
 2890 WOODBRIDGE AVENUE
 EDISON NJ 08837-3679

INCOMPLETE

WATER - GROUND

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	STOP DATE	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-R U/K *	MID-COUNT DATE	TIME	VOLUME - UNITS ASH-NIGHT-R *	LAB.
80295	A01250 80268	MSD	/	/	TH-230 BY ALPHA SPEC. - WATER						***
80296	A01249 80269	MS	/	/	Pb-214	1.7 +-0.6 E 01		04/11			4
					Bi-214	9.6 +-5.5 E 00		04/11			4
					Pb-212	L.T. 6. E 00		04/11			4
					Tl-208	L.T. 4. E 00		04/11			4
					K-40	8.0 +-0.8 E 01		04/11			4
					Cs-137	2.3 +-0.2 E 02		04/11			4
80297	A01249 80269	MSD	/	/	Pb-214	L.T. 2. E 01		04/12			4
					Bi-214	L.T. 1. E 01		04/12			4
					Pb-212	L.T. 7. E 00		04/12			4
					Tl-208	L.T. 5. E 00		04/12			4
					K-40	L.T. 1. E 02		04/12			4
					Cs-137	2.2 +-0.2 E 02		04/12			4
80298	A01248 80270	MS	/	/	GAS ANALYSIS - GROUND WATER FOR RA-226						****
80299	A01248 80270	MSD	/	/	GAS ANALYSIS - GROUND WATER FOR RA-226						****

**NO QC EVALUATION HAS BEEN PERFORMED.
 DATA VALIDITY IS UNSUBSTANTIATED
 AND THE DATA SHOULD BE USED
 WITH DISCRETION.**

AR300346

WORK ORDER NUMBER 4-6463 CUSTOMER P.O. NUMBER 08-31756 DATE RECEIVED 04/05/95 DELIVERY DATE 04/19/95

MR JOHN JOHNSON 08-31756 04/05/95 04/19/95

ROY F WESTON INC (TRACT)
GSA KARITAN DEPOT -209F
2890 WOODBRIDGE AVENUE
EDISON NJ 08837-3679

INCOMPLETE

W A T E R

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	STOP DATE	NUCLIDE	ACTIVITY (PCI/LITER) U/W *	NUCL-UNIT-%	MID-COUNT TIME DATE	VOLUME - UNITS ASH-WGHT-%	LAB.
80267	A01204	SB-1	03/28		GR-A	1.3 +-0.5 E 01		04/09		3
80268	A01250	SB-1F	03/28		GR-A	7.8 +-4.4 E 00		04/09		3
80269	A01249	SB-2	03/28		GR-A	5.0 +-2.4 E 00		04/09		3
80270	A01248	SB-2F	03/28		GR-A	L.T. 1. E 00		04/09		3
80271	A01247	SB-3	03/29		GR-A	6.1 +-3.4 E 00		04/09		3
80272	A01246	SB-3F	03/29		GR-A	L.T. 2. E 00		04/09		3
80273	A01245	SB-4	03/29		GR-A	4.8 +-3.4 E 00		04/09		3
80274	A01244	SB-4F	03/29		GR-A	5.0 +-3.3 E 00		04/09		3
80275	A01243	SB-5	03/29		GR-A	2.1 +-2.0 E 00		04/09		3
80276	A01242	SB-5F	03/29		GR-A	2.1 +-1.9 E 00		04/09		3
80277	A01241	SB-6	03/30		GR-A	4.9 +-3.1 E 00		04/09		3
80278	A01240	SB-6F	03/30		GR-A	L.T. 2. E 00		04/09		3
80279	A01239	SB-7	03/30		GR-A	1.5 +-0.6 E 01		04/09		3
80280	A01238	SB-7F	03/30		GR-A	L.T. 4. E 00		04/09		3

**NO QC EVALUATION HAS BEEN PERFORMED.
DATA VALIDITY IS UNSUBSTANTIATED
AND THE DATA SHOULD BE USED
WITH DISCRETION.**

AR300347

TELEDYNE BROWN ENGINEERING ENVIRONMENTAL SERVICES

REPORT OF ANALYSIS

RUN DATE 04/26/95

PAGE 10

DATE RECEIVED DELIVERY DATE

CUSTOMER P.O. NUMBER

WORK ORDER NUMBER

04/05/95 04/19/95

08-31756

4-6463

MR JOHN JOHNSON
ROY F WESTON INC (REACT)
65A MARITAN DEPOT-209F
2890 HOOBRIDGE AVENUE
EDISON NJ

08837-3679

INCOMPLETE

WATER

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA MUN	COLLECTION-DATE START DATE	STOP DATE	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-% U/R	MID-COUNT TIME DATE	VOLUME - UNITS ASH-WEIGHT-X	LAB.
80281	A01237	SB-8	03/30		GR-A	1.2 +-0.5 E 01		04/09		3
80282	A01236	SB-8F	03/30		GR-A	L.T. 2. E 00		04/09		3
80283	A01235	SB-9	03/31		GR-A	L.T. 2. E 00		04/09		3
80284	A01234	SB-9F	03/31		GR-A	L.T. 2. E 00		04/09		3
80285	A01233	SB-11	04/03		GR-A	4.6 +-2.9 E 00		04/09		3
80286	A01232	SB-11F	04/03		GR-A	4.4 +-2.9 E 00		04/09		3
80300	A01247 80271	MS	/		GR-A	3.3 +-0.7 E 01		04/09		3
80301	A01247 80271	MSD	/		GR-A	3.1 +-0.7 E 01		04/09		3

LAST PAGE OF REPORT

*** ALL ANALYSIS HAVE NOT BEEN COMPLETED ***

**NO QC EVALUATION HAS BEEN PERFORMED.
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AND THE DATA SHOULD BE USED
WITH DISCRETION.**

MR JOHN JOHNSON
 ROY F WESTON JNC (REACT)
 GSA RARITAN DEPOT-209F
 2890 WOODBRIDGE AVENUE
 EDISON NJ 08837-3679

INCOMPLETE

WATER - GROUND

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	STOP DATE	NUCLIDE	ACTIVITY (PCI/LITER)	NUCL-UNIT-U/M	MID-COUNT TIME DATE	VOLUME - UNITS ASH-WGHT-%	LAB.	
80672	SB-17F	SB-17F	04/03							0.000	
GAS ANALYSIS - GROUND WATER FOR RA-226											
					PB-214	3.7 +-0.7	E 01	04/12		4	
					BI-214	2.8 +-0.7	E 01	04/12		4	
					AC-228	L.T.	E 01	04/12		4	
					PB-212	L.T.	E 00	04/12		4	
					TL-208	L.T.	E 00	04/12		4	
					K-40	L.T.	E 01	04/12		4	
					U-234 BY ALPHA SPEC. - WATER						0.000
					TH-230 BY ALPHA SPEC. - WATER						0.000
					U-238 BY ALPHA SPEC. - WATER						0.000
80673	SB-12	SB-12	04/03							0.000	
GAS ANALYSIS - GROUND WATER FOR RA-226											
					PB-214	5.1 +-0.7	E 01	04/12		4	
					BI-214	6.6 +-0.7	E 01	04/12		4	
					AC-228	L.T.	E 01	04/12		4	
					PB-212	L.T.	E 00	04/12		4	
					TL-208	L.T.	E 00	04/12		4	
					K-40	L.T.	E 01	04/12		4	
					U-234 BY ALPHA SPEC. - WATER						0.000
					TH-230 BY ALPHA SPEC. - WATER						0.000
					U-238 BY ALPHA SPEC. - WATER						0.000
80674	SB-12F	SB-12F	04/03							0.000	
GAS ANALYSIS - GROUND WATER FOR RA-226											
					PB-214	1.5 +-0.7	E 01	04/12		4	
					BI-214	1.2 +-0.6	E 01	04/12		4	
					AC-228	L.T.	E 01	04/12		4	
					PB-212	L.T.	E 00	04/12		4	
					TL-208	L.T.	E 00	04/12		4	
					K-40	L.T.	E 01	04/12		4	
					U-234 BY ALPHA SPEC. - WATER						0.000
					TH-230 BY ALPHA SPEC. - WATER						0.000
					U-238 BY ALPHA SPEC. - WATER						0.000

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ARS00349

REPORT OF ANALYSIS

RUN DATE 04/26/95

PAGE 2

DELIVERY DATE

CUSTOMER P.O. NUMBER

WORK ORDER NUMBER

05/05/95

04/10/95

08-31756

4-6496

MR JOHN JOHNSON
RDY F WESTON INC (REAC)
65A RARITAN DEPOT-209F
2890 WOODBRIDGE AVENUE
EDISON NJ 08837-3679

INCOMPLETE

WATER - GROUND

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	STOP DATE	NUCLIDE	ACTIVITY I PCI/LITER	HUCL-UNIT-X U/M #	MID-COUNT TIME DATE	VOLUME - UNITS	ASH-WEIGHT-X #	LAB.
80675	SB-14	SB-14	04/04								###
GAS ANALYSIS - GROUND WATER FOR RA-226											
					PB-214	2.8	+0.3 E 02	04/12			4
					BI-214	2.7	+0.3 E 02	04/12			4
					AC-228	L.T.	2. E 01	04/12			4
					PB-212	L.T.	1. E 01	04/12			4
					TL-208	1.1	+0.5 E 01	04/12			4
					K-40	L.T.	7. E 01	04/12			4
U-234 BY ALPHA SPEC. - WATER											
TH-230 BY ALPHA SPEC. - WATER											
U-238 BY ALPHA SPEC. - WATER											
80676	SB-17	SB-17	04/05								###
GAS ANALYSIS - GROUND WATER FOR RA-226											
					PB-214	1.1	+0.1 E 02	04/12			4
					BI-214	1.1	+0.1 E 02	04/12			4
					AC-228	L.T.	1. E 01	04/12			4
					PB-212	L.T.	7. E 00	04/12			4
					TL-208	L.T.	4. E 00	04/12			4
					K-40	L.T.	5. E 01	04/12			4
U-234 BY ALPHA SPEC. - WATER											
TH-230 BY ALPHA SPEC. - WATER											
U-238 BY ALPHA SPEC. - WATER											
80677	SB-15	SB-15	04/05								###
GAS ANALYSIS - GROUND WATER FOR RA-226											
					PB-214	1.8	+0.2 E 02	04/12			4
					BI-214	1.6	+0.2 E 02	04/12			4
					AC-228	1.9	+0.9 E 01	04/12			4
					PB-212	1.6	+0.4 E 01	04/12			4
					TL-208	4.6	+2.6 E 00	04/12			4
					K-40	1.6	+0.3 E 02	04/12			4
U-234 BY ALPHA SPEC. - WATER											
TH-230 BY ALPHA SPEC. - WATER											
U-238 BY ALPHA SPEC. - WATER											

AR300350

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WORK ORDER NUMBER 4-6496 CUSTOMER P.O. NUMBER 08-31756 DATE RECEIVED 04/10/95 DELIVERY DATE 05/05/95

MR JOHN JOHNSON
ROY F WESTON INC (REACT)
CSA KARITAN DEPOT-209F
2890 WOODBRIDGE AVENUE
EDISON NJ 08837-3679

INCOMPLETE

WATER - GROUND

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	STGR TIME	NUCLIDE	ACTIVITY (PC/LITER)	NUCL-UNIT-R U/M #	MID-COUNT TIME DATE	VOLUME - UNITS ASH-WGHT-X #	LAB.	
80678	SB-15F	SB-15F	04/05			GAS ANALYSIS - GROUND WATER FOR RA-226					####
					PB-214	1.4 +-0.1	E 02	04/12		4	
					BI-214	1.2 +-0.1	E 02	04/12		4	
					AC-228	L.T.	E 01	04/12		4	
					PB-212	L.T.	E 00	04/12		4	
					TL-208	L.T.	E 00	04/12		4	
					K-40	L.T.	E 02	04/12		4	
					U-234 BY ALPHA SPEC. - WATER					####	
					TH-230 BY ALPHA SPEC. - WATER					####	
					U-238 BY ALPHA SPEC. - WATER					####	
80679	SB-14F	SB-14F	04/04			GAS ANALYSIS - GROUND WATER FOR RA-226					####
					PB-214	1.7 +-0.2	E 02	04/12		4	
					BI-214	1.5 +-0.2	E 02	04/12		4	
					AC-228	L.T.	E 01	04/12		4	
					PB-212	L.T.	E 00	04/12		4	
					TL-208	L.T.	E 00	04/12		4	
					K-40	L.T.	E 01	04/12		4	
					U-234 BY ALPHA SPEC. - WATER					####	
					TH-230 BY ALPHA SPEC. - WATER					####	
					U-238 BY ALPHA SPEC. - WATER					####	
80680	SB-16F	SB-16F	04/04			GAS ANALYSIS - GROUND WATER FOR RA-226					####
					PB-214	5.2 +-0.8	E 01	04/13		4	
					BI-214	5.5 +-0.8	E 01	04/13		4	
					AC-228	L.T.	E 01	04/13		4	
					PB-212	1.0 +-0.5	E 01	04/13		4	
					TL-208	L.T.	E 00	04/13		4	
					K-40	L.T.	E 01	04/13		4	
					U-234 BY ALPHA SPEC. - WATER					####	
					TH-230 BY ALPHA SPEC. - WATER					####	
					U-238 BY ALPHA SPEC. - WATER					####	

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AR300351

05/05/95

04/10/95

08-31756

4-6496

MR JOHN JOHNSON
ROY F WESTON INC (REACI)
65A RARITAN DEPOT-209F
289D WOODBRIDGE AVENUE
EDISON NJ 08837-3679

INCOMPLETE

WATER - GROUND

TELEDYNE SAMPLE NUMBER	CUSTOMER'S IDENTIFICATION	STA NUM	COLLECTION-DATE START DATE	STOP DATE	ACTIVITY (PCI/LITER)	NUCL-UNIT-X U/M	GAS ANALYSIS - GROUND WATER FOR RA-226	MID-COUNT TIME DATE	VOLUME - UNITS ASH-WGHT-X	LAB.
80681	SB-13	SB-13	04/04				PB-214 4.2 +-1.0 E 01 BI-214 3.7 +-0.8 E 01 AC-228 2.3 +-1.0 E 01 PB-212 1.9 +-0.5 E 01 TL-208 1.1 +-0.4 E 01 K-40 1.1 +-0.4 E 02 U-234 BY ALPHA SPEC. - WATER TH-230 BY ALPHA SPEC. - WATER U-238 BY ALPHA SPEC. - WATER	04/13 04/13 04/13 04/13 04/13 04/13		**** * * * * * **** **** ****
80682	SB-13F	SB-13F	04/04				GAS ANALYSIS - GROUND WATER FOR RA-226 PB-214 1.3 +-0.6 E 01 BI-214 1.8 +-0.6 E 01 AC-228 L.T. 1. E 01 PB-212 L.T. 6. E 00 TL-208 L.T. 5. E 00 K-40 L.T. 1. E 02 U-234 BY ALPHA SPEC. - WATER TH-230 BY ALPHA SPEC. - WATER U-238 BY ALPHA SPEC. - WATER	04/13 04/13 04/13 04/13 04/13		**** * * * * **** **** ****
80683	SB-16	SB-16	04/04				GAS ANALYSIS - GROUND WATER FOR RA-226 PB-214 6.3 +-0.7 E 01 BI-214 6.9 +-0.7 E 01 AC-228 L.T. 1. E 01 PB-212 L.T. 7. E 00 TL-208 L.T. 4. E 00 K-40 L.T. 6. E 01 U-234 BY ALPHA SPEC. - WATER TH-230 BY ALPHA SPEC. - WATER U-238 BY ALPHA SPEC. - WATER	04/13 04/13 04/13 04/13 04/13		**** * * * * **** **** ****

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AR300352