EG&G
MOUND APPLIED TECHNOLOGIES

ENVIRONMENTAL RESTORATION PROGRAM

CONRAIL EXCAVATION
MIAMI-ERIE CANAL, OPERABLE UNIT 4

MOUND PLANT
MIAMISBURG, OHIO

October 1993

Department of Energy
Albuquerque Operations Office

FINAL
(Revision 1)

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ACRONYMS

CERCLA	Comprehensive Environmental Response Compensation and Liability Act
cpm	counts per minute
DAO	Dayton Area Office
dpm	disintigrations per minute
DOE	Dayton Area Office
EPA	US Environmental Protection Agency
FIDLER	Field Instrument for Detecting Low Energy Radiation
FFA	Federal Facility Agreement
LDL	Lower Detection Limits
LSA	Low Specific Activity
MOU	memorandium of understanding
nCi/g	nanocuries per gram
NPL	National Priority List
NTS	Nevada Test Site
ODH	Ohio Department of Health
OEPA	Ohio Environmental Protection Agency
OSHA	Occupational Safety and Health Administration
OU4	Operable Unit 4
ppm	Parts per Million
pCi/g	picocuries per gram
RI/FS	Remedial Investigation/Feasibility Study
SAP	Sample and Analysis Plan
TCLP	Toxicity Characteristic Leaching Procedure
TSCA	Toxic Substance Control Act

ACKNOWLEDGMENT

This report was prepared by the ER/CERCLA department of EG&G Mound Applied Technologies Inc. Contributors to this report include M. A. Williams, D. G. Carfagno, and Lyle Smith.

1. SUMMARY OF EVENTS

1.1 INTRODUCTION

The Mound Plant in Miamisburg, Ohio, is operated for the U.S. Department of Energy (DOE) by EG&G Mound Applied Technologies. The plant location is shown in Figure 1.1. The plant started operations in 1949 and today is an integrated research, development, and production facility that operates in support of the DOE weapons and energy programs. (1)

The Mound Plant was placed on the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA; i.e., Superfund) National Priorities List (NPL) in 1989. Pursuant to that status, a CERCLA Section 120 Federal Facility Agreement (FFA) was signed between the U.S. Department of Energy (DOE) and the U.S. Environmental Protection Agency (USEPA). The Federal Facility Agreement requires a remedial investigation/feasibility study (Rl/FS). Because of the number of potential release sites (over 100) and the overall complexity of the RI/FS, the site was divided into nine operable units to facilitate program management. Six of those operable units remain, the others were closed. A portion of the abandoned Miami-Erie canal, offsite from Mound Plant, is designated as Operable Unit 4 (OU4). This designation was made because of the presence of plutonium-238 in canal sediments. Specifically, OU4 encompasses the canal immediately west of Mound Plant (from a point west of the Miamisburg City Park north pond, south to Benner Road), the north and south ponds, the overflow creek (from the canal to the Great Miami River), and the drainage ditch (from Mound Plant west property line to the Canal). The location of the portion of the Miami-Erie Canal which is OU4 is shown in Figure 1.2.

1.2 HAZARDOUS SUBSTANCE RELEASE SUMMARY

During normal operation of the plutonium processing facility at Mound Plant, plutonium-238 waste in an acidic nitrate solution (at a concentration of approximately 5 parts per million [ppm]) was carried from the plutonium processing building to the waste disposal treatment facility via an underground pipeline. On January 23, 1969, this pipeline ruptured, discharging plutonium nitrate solution to the surrounding soil. The rupture area was 4 feet underground and located between building 41 and the waste disposal building. Plant workers noted brown fumes emanating from the ground surface as the acidic nitrate solution containing plutonium-238 was being neutralized, adsorbed, and immobilized by the soils surrounding the pipeline. Plant workers then shut down the waste transfer system (2). Excavation and removal of approximately 964 cu. ft. of plutonium-238 contaminated soil (up to 800 nanocuries per gram [nCi/g]) around the pipeline ensued (3,1).

Figure 1.1 Mound Plant Location

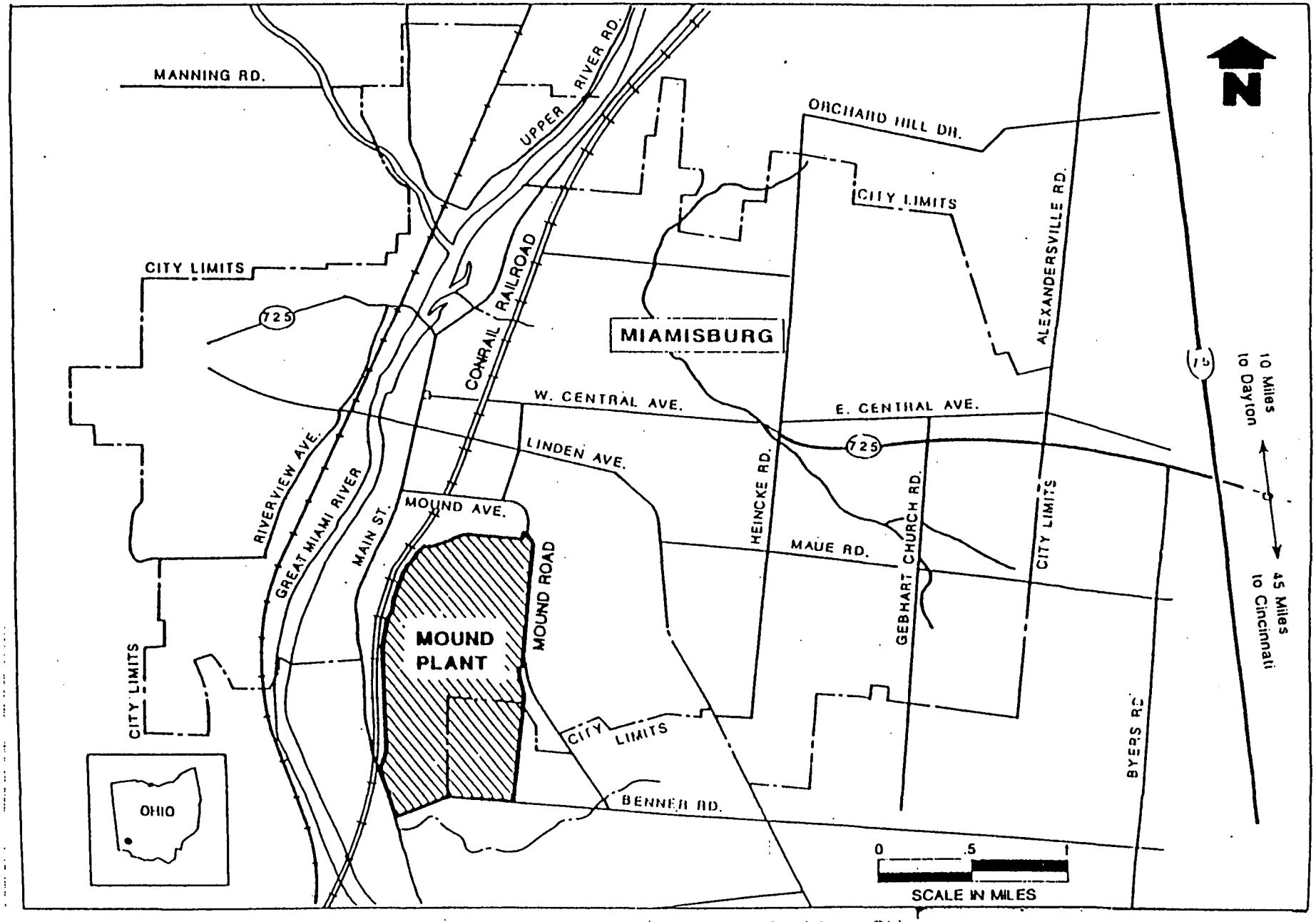

Figure 1.1. Location of Mound Plant, Miamisburg, Ohio.

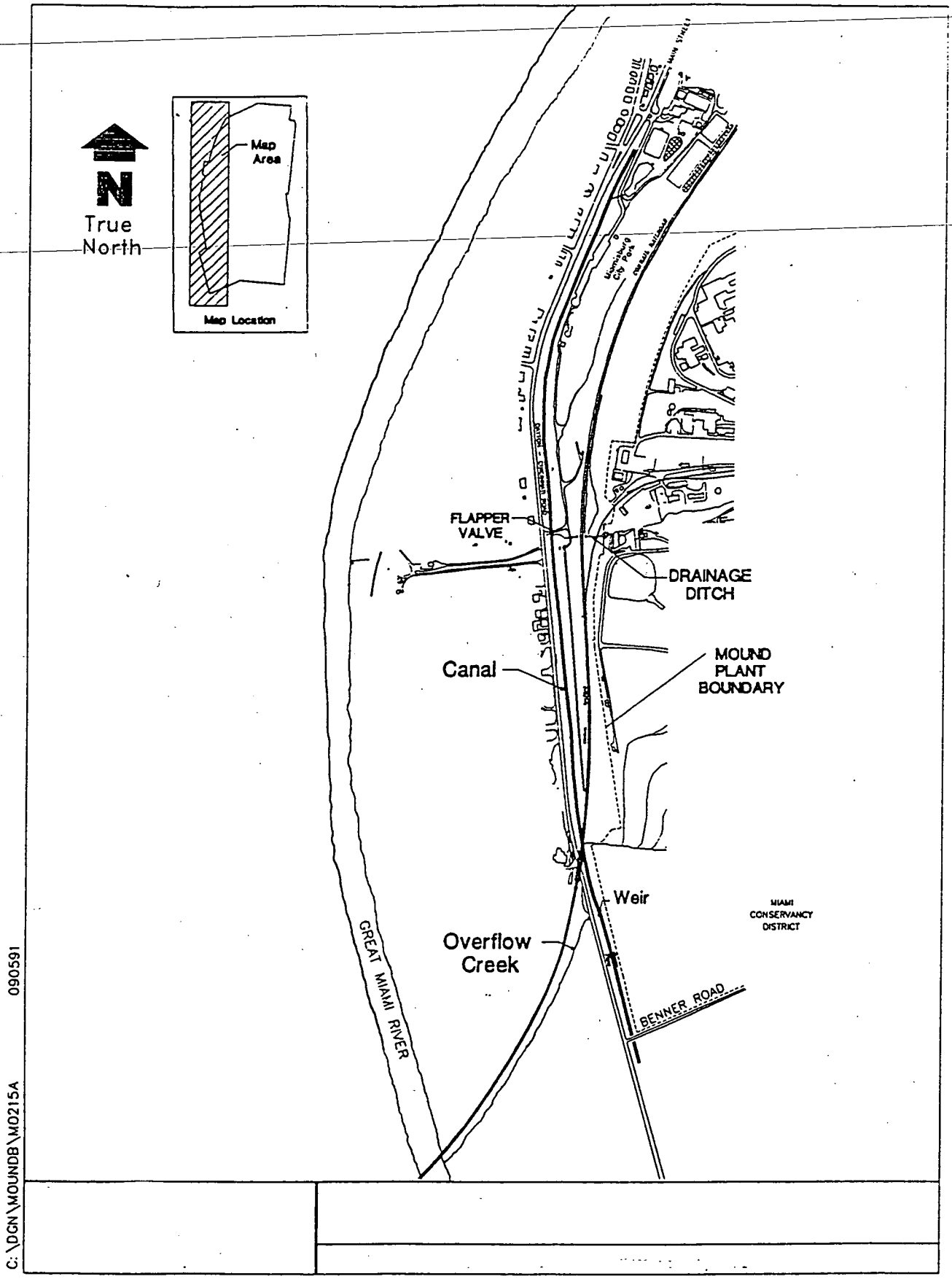

Figure 1.2 Location of Miami-Erie Canal

During the excavation, three days of intense rainfall occurred from January 28 through 30, 1969. Erosion from the excavated areas carried plutonium-238 contaminated soil particles down the drainage ditch and off the Mound Plant property. The contaminated soil particles and runoff water were discharged into portions of the Miami-Erie Canal. As this event occurred prior to installation of the flapper valve on the canal both the north and south canal segments were affected by the discharge (Fig. 1.2). The runoff entering the south canal flowed down the canal to an overflow creek, which discharged into the Great Miami River.

An investigation into the incident in 1974 concluded that the acidic solution of greater than 1 molar (M) nitric acid (>1M HNO_3) was neutralized when it came into contact with the calcareous native soil (2). The capacity of the soil near the rupture site to buffer the acidic plutonium solution was 4 to 11 milliequivalents of acid per gram of soil. After taking into account the pH and the sorption rate, it was determined that essentially none of the plutonium would remain in solution after moving a very short distance through or on fresh soil (2). This incident is believed to be the source of the majority of the plutonium present in the canal.

Based on worst-case pathway analyses, the overall conclusions reached by the 1974 study about the health and safety aspects of the plutonium deposited in waterways near Mound are:

- The plutonium-238 does not and will not, in the future, present a hazard to people living in this area or the public at large as long as there are no major physical changes in the area.

- There is no apparent reason to restrict the use of the area in or near the waterways because of the plutonium deposits.

1.3 CONRAIL PROJECT

EG&G/Mound was notified by the city of Miamisburg on January 8, 1991 that the Conrail company needed to do some repair work on the railroad bridge abutment adjacent to the Miami-Erie Canal which necessitated excavation of soil. The location of the Conrail bridge is shown in Figure 1.3. This notification was in accordance with the memorandum of understanding (MOU) between the City and the DOE, which committed DOE to monitor the environmental conditions of the canal area on a continuous basis. The City requested EG&G's presence at a meeting the following day at the site of the proposed work. Upon arriving at the scene in January, Mound personnel observed a prefabricated timber bridge in place straddling the canal. (See Photograph, Appendix E, photo 1.3.) Some soil from both banks had been moved by Conrail to allow placement of the temporary bridge. Mound personnel explained that the canal had

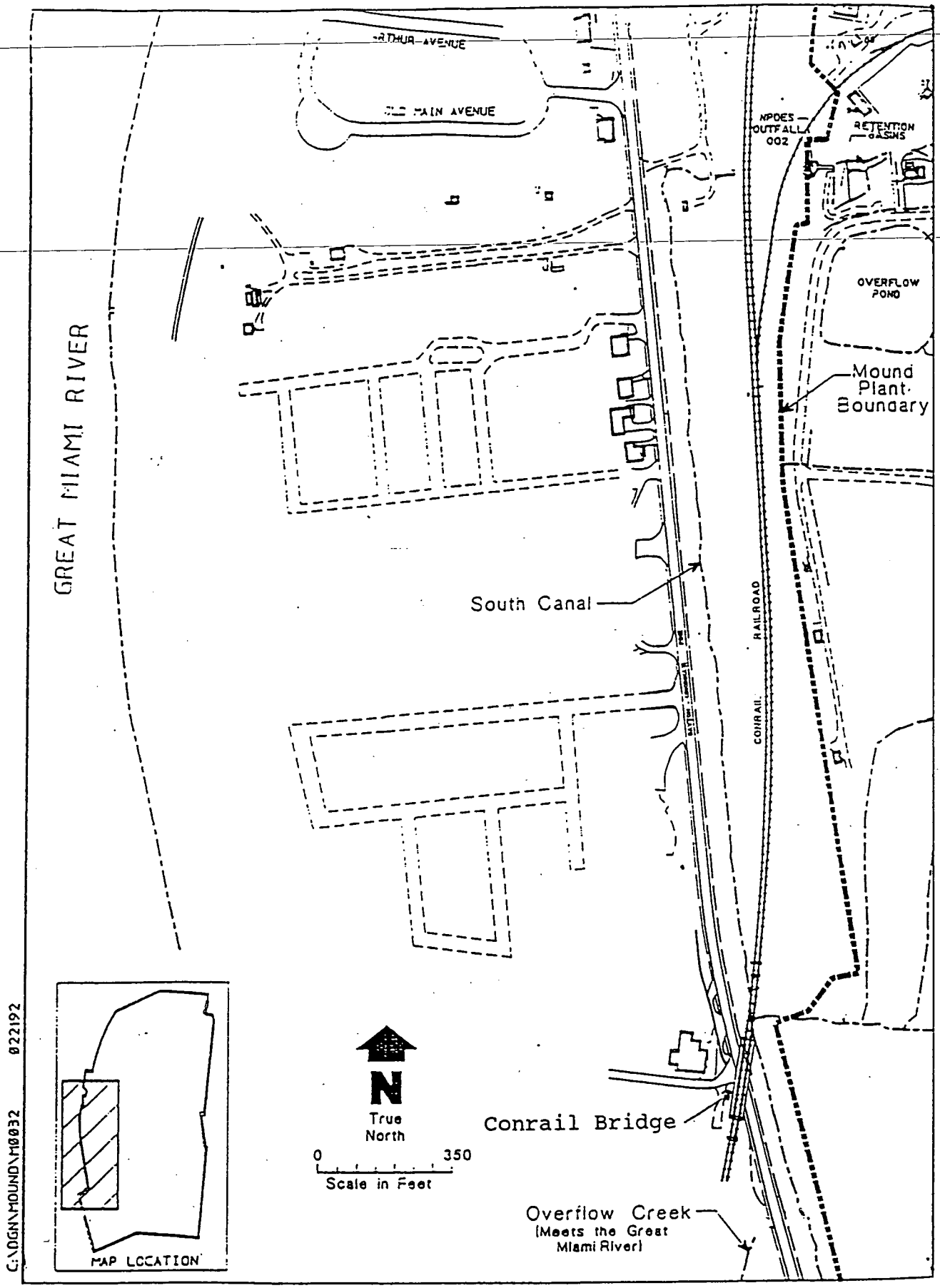

Figure 1.3 Location of Conrail Bridge Over Miami-Erie Canal

been declared an NPL or Superfund site by the US EPA and any disturbance to the site had to be reviewed by USEPA before hand. The foreman of the Conrail work crew accepted this explanation and said he would tell his management. Several phone calls then took place between Conrail Engineering personnel and EG&G Environmental Restoration (ER) Program staff where the canal situation was discussed. As a result of these conversations, sampling of personal clothing, tools and employee homes was proposed. After management approval, wipe samples were collected from five workers homes and a Conrail truck. All wipe samples were below the limit for release to the public (20 disintegrations per minute [dpm]) and all but five of the wipe samples were below the lower detection limit (LDL) of the measurement technique (proportional counting). These five samples ranged from 0.24 to 1.37 dpm. Three 24-hour urine samples were submitted by each employee and were analyzed by Mound's Bioassay laboratory for plutonium 238. All of these results were below the LDL for this analysis (0.018 picocuries [pCi]). (See Results in Appendix D, sec.1.1.)

1.4 SOIL REMOVAL ACTIVITIES

EG&G Mound initiated a plan to perform all of the soil excavation work in order to minimize the spread of contamination and to retain control of the project. Because of the newly signed FFA, it was decided that retaining control of the disposition of the soil was needed until the agreement with the regulatory community could be achieved. (See Work Package, Appendix A.) Prior to generating the work package, the area to be excavated for the repair work was sampled. Nine locations were sampled. (See Figure 2, Appendix A, p-11.) Core samples were collected in one foot increments down to refusal of the sampling tube which was four or five feet in all cases. The plutonium concentration in the one foot increments ranged from < 25 pCi/g to approximately 385 pCi/g. (Table 1.1, Appendix B, p-2.) The Pu-238 contamination did not extend below two feet in seven of the nine locations. The contamination extended to three feet in the other two locations. These data are consistent with data collected from this area in 1974. Based on these concentrations and conservative pathway scenarios, the maximum dose the Conrail workers could have been exposed to was less than one mrem. These scenarios do not take into account the conditions existing when the workers were in the canal area, i.e. wet muddy conditions, which eliminates the major pathway to these workers, resuspension and inhalation of the contaminated soil. The actual exposure then is most probably much less than the maximum dose listed above.

During the excavation of contaminated soil by Mound employees, many steps were taken to assure worker and community safety and to insure that no additional environmental impacts would occur. A Quality Assurance Plan was developed for the Conrail Excavation in accordance with the guidance in Manual MD-10241, Issue 11. (See

Quality Assurance Plan, Appendix C.) Continuous air samplers were set up in three locations around the job site to monitor any possible resuspension of radioactive material. The three locations were north, south, and southwest of the work site. The continuous air samplers were operated whenever work was being done in the designated Conrail excavation area. Throughout the soil removal operation the air samples were routinely analyzed to determine if any airborne radioactive isotopes were present. The results from these air samples confirmed that no significant radioactive contamination was detected during the soil removal operation. A summary of the air sampling results is shown in Table 1.

Table 1. Concentrations of Plutonium-238 in Air During Excavation at Conrail Site

Location	Number of Samples	Plutonium-238 10^{-16}uCi/ml Minimum	Maximum	Average	Average as % of DOE Std.[1]
North	9	1.4	26	6.3	0.02
South	9	1.7	11	4.2	0.01
Southwest	9	0.38	4.8	2.2	0.007

[1]The DOE Workplace Standard for Pu-238 in air is 30,000 x 10^{-16} uCi/ml.

The highest average concentration was found at the north location and was 0.02% of the DOE workplace standard. This calculation assumes a 40 hour per week exposure for 52 weeks. The actual exposure was a total of only 60 hours. (See Air Monitoring Results, Appendix D, sec. 1.2.) Health Physics monitored the soil excavation activities by taking direct readings with a Field Instrument for Detecting Low Energy Radiation (FIDLER). (See direct radiation readings, Appendix D, sec. 1.3 and photograph, Appendix E, photo 1.6.) Soil sampling and analysis, directly monitoring workers clothing, feet, hands, equipment and collecting nose wipes twice daily from all workers was continued throughout the soil removal job. (See Monitoring Results, Appendix D, sec. 1.4.) All of the monitoring results from personnel, equipment, etc., obtained during the project indicated that there was no detectable radioactive contamination present. In addition all personnel working at this site were required to submit a 24 hour urine sample prior to the project initiation and another after project completion. All urine sample results were lower than the detection limit of the analysis.

All of the contaminated soil was placed in Low Specific Activity (LSA) waste boxes for storage and eventual shipment and burial. (See Photograph, Appendix E, photo 1.10.) A representative group of

these containers was sampled to determine if any mixed waste existed (hazardous waste mixed with radioactive). (See Sample and Analysis Plan, Appendix B.) The analytical results for these samples verified that no mixed waste was present[4].

Upon completion of the contaminated soil removal on July 3, 1991, additional uncontaminated soil was removed by Mound employees in order to allow access to the entire structure to be repaired. Conrail was consulted as to what depth and shape the excavation should take in order to facilitate the work. The non-contaminated excavated soil was staged in the area to be used as backfill after repairs were complete. The final excavation work was completed by Mound on July 11. Conrail was then informed that the excavation work was complete and that they could begin the abutment repair.

1.5 CONRAIL ABUTMENT REPAIR

Conrail management indicated that they would have a crew begin work at the site on July 15, after Mound completed the soil removal; however, EG&G was requested to answer Conrail employees questions in a meeting prior to commencement of work. The main topic of the meeting was concern over plutonium contamination in the area. EG&G stated, based on the results from the work Mound had already done, there was no risk of a significant exposure and an extremely low risk of even a detectable result. However, EG&G provided health physics support during the repair phase to mitigate any Contrail employee fears.

Additional inquiries resulted in two independent agencies performing radiation surveys of the work site. A representative of Ohio Department of Health (ODH) performed the survey and no detectable levels of radioactive material were found to be present. An Occupational Safety and Health Administration (OSHA) investigator also performed a radiological survey of the area with no detectable levels of radioactive materials being discovered.

The abutment work continued and on November 21, Conrail completed the repairs and soon after Mound restored the work site to as near original condition as possible. The results of Conrail employee monitoring, which included twice daily nose wipes and 24 hour urine samples before job start and after job completion, showed no detectable radioactive contamination.

1.6 CONCLUSION

From the beginning of soil excavation to project completion took approximately six months. The excavated soil was removed from a localized area of approximately 300 sq. ft. and placed in 39 LSA waste boxes. These LSA waste boxes were sampled, analyzed, and are currently being stored at Mound and are awaiting shipment to the DOE/NTS for disposal. No mixed waste was found in the boxed

Conrail personnel were able to successfully perform their repair work without any interference. Mound was able to adequately control the NPL site and prevent any unnecessary spread of radioactively contaminated soil. Air sampling and personnel monitoring demonstrated that worker exposure was minimal and well within workplace guidelines.

In addition it became apparent that some additional mechanism is required to prevent uncontrolled disturbance of contaminated areas of the canal. The selected option was to register the canal area with the Ohio Utility Protection Service (OUPS). This is the "call before you dig" service which notifies utilities when excavation is going to occur in areas where underground utilities or other obstacles to excavation exist. Signs with instructions to call this service before digging were placed in the canal area. The service provides EG&G/Mound, by telephone and facsimile, the information regarding who needs to excavate and where.

2. REFERENCES

(1) "Phase 1: Installation Assessment Mound (Draft)." Comprehensive Environmental Assessment and Response Program. U.S. Dept. of Energy, Albuquerque Operations Office, Albuquerque, New Mexico. April 1986.

(2) D.R. Rogers, "Mound Laboratory Environmental Plutonium Study, 1974." MLM-2249 Monsanto Research Corporation, September 1975.

(3) R.L. Stought, D.A. Edling, and D.G. Draper. "The Mound Site Survey Project for the Characterization of Radioactive Materials in Site Soils." MLM-3517 Monsanto Research Corp, May 1988.

(4) "Mound Plant Conrail Excavation Soil Sampling For Waste Certification, (Draft)." US Department of Energy, Albuquerque Field Office, Environmental Restoration Program Technical Support Office, Los Alamos National Laboratory, March 1992.

APPENDIX A

WORK PACKAGE

CONRAIL EXCAVATION

MIAMI-ERIE CANAL, OPERABLE UNIT 4

WORK PACKAGE

for

CONRAIL EXCAVATION

MIAMI-ERIE CANAL, OPERABLE UNIT 4

Project AES No.: M76015

Issue of: June 17, 1991

Prepared by: Monte Williams

EG&G Mound Applied Technologies
Miamisburg, Ohio

Approvals:

Monte Williams Project Manager	Monte Williams	Date 6/17/91
Richard A. Neff Project Sponsor	R A Neff	Date 6/17/91
Fred Mintz LP&EC Representative	F.J. Mintz	Date 6/18/91
Rodney N. Rogers Quality Assurance Representative	Rodney N. Rogers	Date 6/19/91
Daniel G. Carfagno ES&H Compliance and Remedial Action Specialist	D.G. Carfagno	Date 6/18/91
Charles J. Goebel TRUESOC Committee	Chas J. Goebel	Date 6/19/91
	Paul E. Figgins Acting Chmn.	6/19/91

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CONRAIL EXCAVATION

MIAMI-ERIE CANAL, OPERABLE UNIT 4

INTRODUCTION

This document outlines the removal of radioactively contaminated soils near a Conrail railroad bridge within the Miami-Erie Canal. This project will generate approximately 560 cu.ft. of LSA waste (< 10 metal LSA boxes). The project duration is expected to be 1 month.

Characterization studies have been performed on this area of the Canal and samples were taken in this specific site on January 10, 1991. The levels ranged from <25 to 681 pCi/g of plutonium 238. A sampling plan will be developed and implemented during soil removal in order to assure that no hazardous chemical waste is present.

All excavation work will be performed by Mound personnel.

JOB SCOPE & WORK SEQUENCE

1. Gain access to the jobsite by constructing a temporary road from Mound's site boundary to the railroad bridge.

2. Prepare staging area for filling of LSA boxes and for noncontaminated soil to be used for backfill.

3. Set up air samplers as necessary (H.P. Procedure Manual, Operation 1.2.1.1). Health Physics to determine type and number of monitors required. Mark the construction zone with signs and barriers.

4. Remove and package all contaminated soil down to a level 2 feet below grade (see Soil Contamination Criteria) within the project boundary (see fig. 1) beginning at the north end and working southward. All waste must be documented per procedures on form 7042A.

5. Sample the soil at the grid points shown in figure 1 in order to determine if any contamination remains.

6. If additional contamination exists, remove and package soils in those areas by hand digging or heavy-duty equipment and resample. If no additional contamination exists, sample at 2' depth increments to the required depth of the excavation. Clean soil will be staged in designated area for use as backfill.

7. If excavation can not be sloped to meet OSHA requirements, provide approved shoring in areas deeper than 5 feet below grade. See Safety Analysis for excavation hazards.

8. Provide pumping system to pump seepage from excavation into creek. Sample water to assure no radioactive contamination above acceptable levels.(see Water Removal)

9. Cover exposed soils and creek bank with tarps in order to prevent possible spread of contamination.

10. Allow Conrail to perform repair work on bridge structure. Health Physics will monitor this work as well.

11. Backfill excavation with clean soil to original grade. Additional backfill material will be procured as required.

DIGGING GUIDELINES

An evaluation of the weather must be made by the Project Engineer or the Inspector and a work or no work decision made prior to 7:30 a.m. and again prior to 11:45 a.m. Work will proceed in mist or light rain. Light rain is defined as scattered drops that do not completely wet an area or when individual drops can be identified. Work will stop temporarily if rain exceeds this and resume after the rain. The Inspector or the Project Engineer will make the rain decision.

Removal of dirt will proceed if wind velocity does not exceed an average of 25 mph. Wind velocity is to be measured and recorded each hour by the Inspector or his delegate. A wind monitoring station is located at Building 33 and Building 101.

Radiation Technician coverage is required anytime soil is disturbed, excavated, and/or boxed.

The Environmental Technician will install and maintain air samplers. They will also obtain soil and water samples and analyze and map the contaminated areas.

Water mist will be sprayed on all freshly exposed soil and rubble as necessary to eliminate dust. The exposed soil may be sprayed with water and/or covered with a tarp before securing for the day as necessary. This is at the Inspectors discretion. The applied water will be just enough to prevent dust, not for soaking or run-off.

Florco must be used in all waste containers. For metal LSA boxes, two bags of Florco is the minimum required and should be placed in the bottom of the box. However, should the soil look very wet, up to three additional bags (for a maximum total of five) can be added to the LSA box. In this case, four of the bags should be placed in the bottom of the box and one on top of the soil (MD-10332, operation 720, LSA Waste-Metal Box Guidelines). If excavated soil is too wet to box (as determined by the Inspector and Project Engineer), it is to be staged on a tarp to air dry before packaging.

SOIL CONTAMINATION CRITERIA

DETERMINATION OF COLD OR LSA SOIL

1. All soil showing Pu-238 alpha contamination levels from 100 pCi/g to 100 nCi/g will be removed and packaged as LSA waste.

2. Excavated soil showing Pu-238 alpha contamination levels from 25 pCi/g to 100 nCi/g will be packaged as LSA waste.

3. Soil showing Pu-238 alpha contamination levels up to 25 pCi/g (based on representative random sampling average) may either be left in place or reused as fill material.

Field measurements will be used to characterize soil using the Fidler instrument according to Table 1 below.

Table 1. Field Measurements

	Pu (Net cpm) Bicron Ch. 1
Cold	Determined by Analytical counting & EPA Sampling
LSA	200 - 50K cpm

The Analytical Screening results will categorize the soil according to the following table.

Table 2. Analytical Screening

	Pu 238
Cold	< 25 pCi/g
LSA 1	> 25 pCi/g - 100 pCi/g
LSA 2	100 pCi/g - 100 nCi/g

After removing the upper two feet of soil, using the Fidler, scan the soil within the project boundaries. If there are any detectable readings above background on the Fidler (up to 50K cpm) the soil will be considered as LSA. It will be excavated and packaged according to the contaminated soil removal guidelines. If the Fidler does not detect any contamination, surface samples should be taken and sent to Analytical for analysis. The samples should be taken per the grid shown in figure 1.

The soil samples must average less than 100 pCi/g with none of the samples reading over 300 pCi/g.

If the excavated area does not meet the above requirements, continue excavating the hot spots and resampling until it does.

If the excavated area does meet the above requirements, it will be considered decontaminated and the area will be reviewed for release by the Project Engineer. Upon granting this release further excavation of cold soil will continue to the extent required for completion of the bridge repair. This soil will be staged for use as backfill material.

All soils placed in LSA boxes will be sampled for hazardous chemicals per the "Sampling Plan".

No backfilling will be permitted until the Analytical results are obtained and release for backfilling is given by the Project Engineer.

CONTAMINATED SOIL REMOVAL

1. Work will be performed in designated areas and using appropriate Health Physics procedures. It is expected that contamination levels existing within the project boundaries will not be excessive and that a clothing change area will not be required.

2. LSA contaminated dirt will be excavated, removed and placed in metal LSA boxes and the boxes will be weighed and sealed using metal clips per specification for handling Strong-Tight Containment Packaging per Decon Manual #MD-10332, Operation 750. Weigh boxes and record weights.

3. Cover the box exchange area with an appropriate sized plastic tarp to protect from any material that would spill from the excavator bucket.

4. Place the TRU or LSA box on the plastic tarp close to the excavation area.

5. Contaminated dirt will be excavated by hand shovel or heavy-

duty equipment, as determined by the Inspector or Project Engineer.

6. LSA (MD-10332 Operation 750) boxes will be sealed, surveyed, and the paperwork completed per procedure prior to removal from the control area.

7. Air samples taken during the digging operations will be collected and analyzed by Environmental personnel. Environmental evaluates these data to insure that the project remains within allowable limits and no airborne release has occurred.

WATER REMOVAL

It is anticipated that rainwater and water seepage from the nearby creek will enter the excavation. If this occurs the following actions will take place.

Water that has collected in the excavation will be sampled and analyzed (Analytical Lab/ext. 3228). If it is below 1 dpm/ml, it will be pumped into the adjacent creek. If it is above 1 dpm/ml, a decision will be made by the ES&H Compliance and Remedial Action Specialist as to how to dispose of it.

SHUTDOWN

If work is temporarily halted for more than 30 days for any reason; i.e. equipment failure, work priority, funding, environmental regulations, etc.; the following shutdown actions will be implemented.

1. Surface samples shall be taken at each grid point in the excavation area and sent to Analytical for analysis and mapping.

2. Survey, clean, and release heavy-duty equipment.

3. Secure and identify contaminated areas.

4. Prior to startup, initiate an updated work package including new permits and any necessary revisions.

SAFETY ANALYSIS

The Inspector and Project Engineer are responsible for ensuring that the safety items listed below are adhered to.

This project will require that all personnel in the work area wear hard hats, safety glasses, safety shoes, ear protection (if necessary), and gloves (if necessary). Based on past practice, (per TRUESOC recommendation) employees performing work in this area will be required to wear radiation blue clothing. Based on the low levels of contamination present a half face respirator worn around the neck is optional.

HAZARDS

1. Excavations

All excavations must be sloped, shored or shielded per OSHA Standard CFR Part 1926.

The following precautions must be taken whenever excavations exceed five feet in depth, are less than 20 feet in depth, and personnel are required to enter the excavation.

a. 1V:1-1/2H slope measured from the bottom of the hole to the narrowest excavation at the top.

b. Protection barrier, metal chain, and /or rope will be erected during working and nonworking hours. Materials and equipment will be kept at least 2 feet from the edge of the excavation and/or be sufficiently retained from falling into the excavation.

c. Excavated dirt must be placed ten (10) feet from the trench to minimize cave-in.

d. Workers are allowed in the excavation only when the safety requirements in 29 CFR 1926 are met and observed. This includes, but is not limited to, daily or more, as needed, inspections; testing for hazardous atmospheres, when reasonably expected to exist; adequate access and egress; stability of adjacent structures; and protection from loose soil.

Excavations deeper than twenty (20) feet (of which there should be none on this project) will require a design signed off and supervised by a Registered Professional Engineer.

2. Slips and Falls

Good housekeeping practices are to be observed at all times.

3. Heat Stress/Stroke

Heat stress guidelines will be posted at the jobsite. If anyone should show signs of heat stress or stroke, the Fire Department is to be called at extension 7111.

4. Electrical

Ground fault interrupters are to be used whenever electrical devices are used.

5. Heavy Duty Equipment

Remain clear of all heavy-duty equipment while it is in operation. Remain clear of all loads that are being moved or lifted either directly or by chains/straps by the heavy-duty equipment.

General

Regular housekeeping will be in practice to eliminate slipping, falling, or other safety hazards.

Common sense and good judgement will be expected of all workers, supervision, or visitors at all times.

Mound's Maintenance and Utilities Safety Handbook MLM-MU-89-70-0001, Safety & Hygiene Manual MD-10286, and Nuclear Radiation Safety Manual MD-10019, issue 4, will be used as the guideline for all general safety requirements.

A "pre-job" meeting is to be held at the site and all applicable permits, i.e. Excavation Permit, etc., are to be completed and signed by the responsible parties before work is initiated.

All personnel (including Conrail employees) will be required to submitted bio-assay samples prior to start of excavation and after project completion. Nosewipes will be required on a daily basis.

REFERENCES

Quality Assurance Plan for Conrail Excavation, Miami-Erie Canal, Operable Unit 4, Issue of May 20, 1991.

Sampling and Analysis Plan, Conrail Excavation, OU-4, Miami-Erie Canal; May, 1991 Draft.

Mound Manual MD-10332, Issue 1, D&D Decontamination Procedures

Mound Manual Md-10286, Safety and Hygiene Manual.

Mound Manual Mc-10019, Nuclear Radiation Safety Manual, Issue 4.

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Mound Maintenance and Utilities Safety Handbook, MLM-MU-89-70-0001.

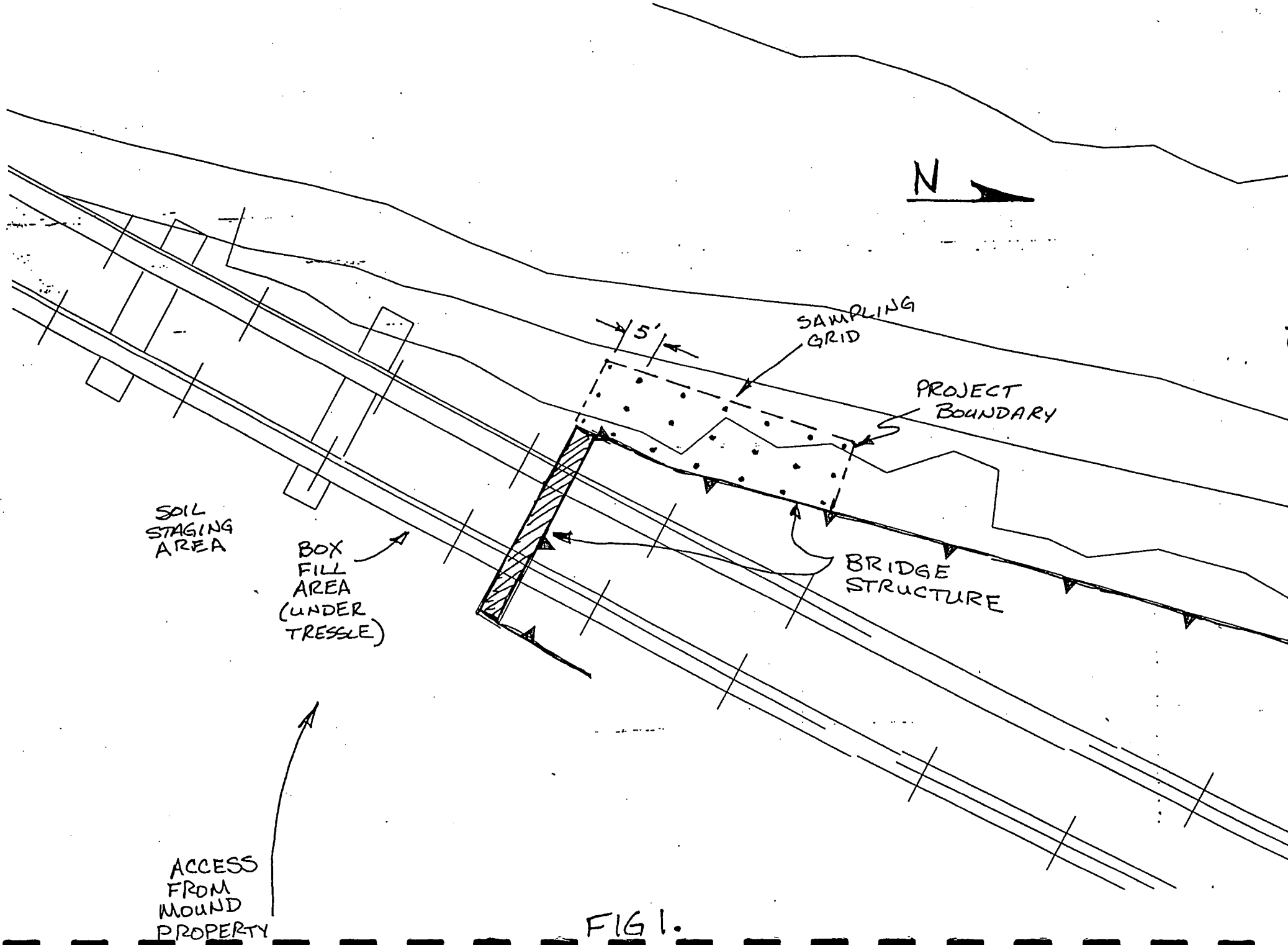
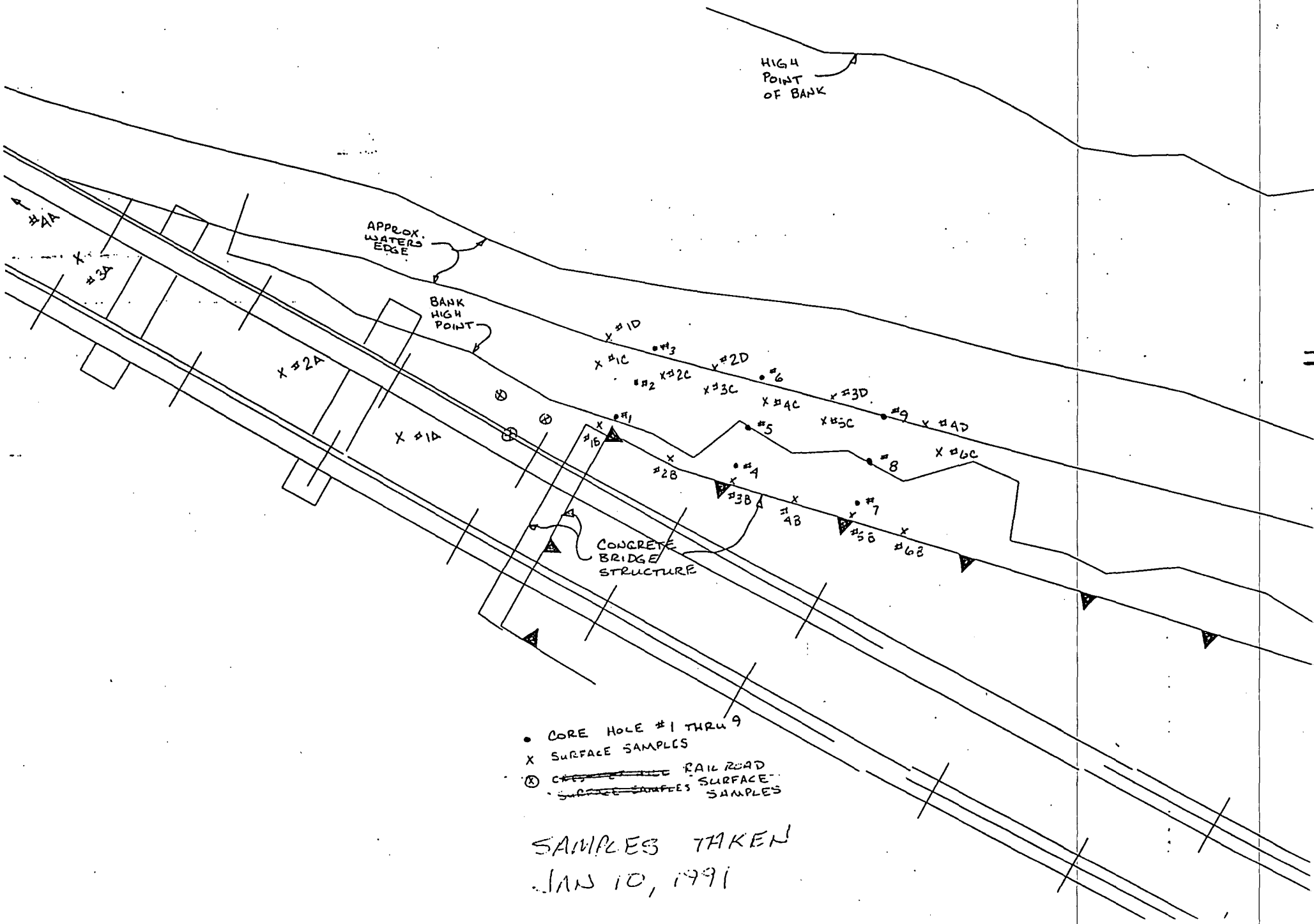

N
5'
SAMPLING GRID
PROJECT BOUNDARY
SOIL STAGING AREA
BOX FILL AREA (UNDER TRESSLE)
BRIDGE STRUCTURE
ACCESS FROM MOUND PROPERTY

FIG 1.



SAMPLES TAKEN
JAN 10, 1991

FIG 2.

APPENDIX B

SAMPLING AND ANALYSIS PLAN

CONRAIL EXCAVATION

OU-4, MIAMI-ERIE CANAL

SAMPLING AND ANALYSIS PLAN
CONRAIL EXCAVATION
OU-4, MIAMI-ERIE CANAL

MAY, 1991

DRAFT

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1. INTRODUCTION

A railroad bridge owned by the Conrail Company and located within the boundaries of Operable Unit 4, Miami-Erie Canal, is in need of repair. In order to perform the work, soil must be excavated from around the base of the bridge. The soil within the project boundary was sampled on January 10, 1991 and found to contain plutonium-238. EG&G Mound Applied Technologies has agreed to perform the excavation work in order to minimize the spread of contamination and to retain control of the project. The contaminated soils are proposed for shipment to the Nevada Test Site (NTS) for disposal as low-level radioactive waste.

At a meeting in Las Vegas on October, 26, 1990, DOE Nevada Operations Office (DOE-NV_ and NTS representatives requested that the Mound Plant D&D soils proposed for shipment to NTS at that time be sampled for Toxicity Characteristic Leaching Procedure (TCLP) constituents. The soils which will be generated during this project are similar to D&D soils. The purpose of this plan is to document the proposed sampling and analysis of these soils.

1.1 PREVIOUS SAMPLING OF THE CONRAIL SITE AREA SOILS

In January of 1991, environmental samples were taken of the soils in the area of the Conrail site. These samples were analyzed for radioactive constituents and found to contain plutonium-238 at levels as high as 681 pCi/g (see table 1.1). This area has not been sampled for Target Compound List and Target Analyte List constituents. Sampling for these components is proposed as the soils are excavated.

2 PROPOSED SAMPLING OF SOIL

As part of the Mound Plant Waste Management Program efforts to receive approval to ship low-level radioactive waste to NTS, the soils from the Conrail Excavation Site, OU-4, Miami-Erie Canal will be sampled for TCLP constituents (table 11.1).

It is anticipated that approximately 15 packages of soil will be excavated and proposed for shipment to NTS. The D&D Sampling Plan, which was generated as a result of the meeting referenced in section 1, requires that 5% of those soil packages be sampled. Due to the small volume of soil generated on this project and the concentrated area from which the soil will be removed, it is proposed that every third package be sampled for a total of 5 samples.

CONRAIL EXCAVATION

OU - 4, MIAMI-ERIE CANAL

SOIL SCREENING RESULTS FROM JANUARY 10, 1991

CORE LOCATION	DEPTH (FT)	Pu-238 (pCi/g)	SURFACE LOCATION	Pu-238 (pCi/g)
1	0 - 1	62	1A	<25
	1 - 2	151	2A	<25
	2 - 3	51	3A	<25
	3 - 4	37	4A	32
	4 - 5	<25	1B	79
2	0 - 1	71	2B	114
	1 - 2	26	3B	35
	2 - 3	<25	4B	26
	3 - 4	32	5B	101
	4 - 5	27	6B	215
3	0 - 1	219	1C	144
	1 - 3	204	2C	378
	3 - 4	32	3C	228
4	0 - 1	153	4C	98
	1 - 2	53	5C	117
	2 - 3	312	6C	68
	3 - 4	<25	1D	169
	4 - 5	<25	2D	259
5	0 - 1	100	3D	201
	1 - 2	<25	4D	173
	2 - 3	<25		
	3 - 4	<25	RR #1	598
	4 - 5	<25	RR #2	681
6	0 - 1	160	RR #3	248
	1 - 2	331		
	2 - 4	<25	HILLCREST #1	<25
7	0 - 1	247	HILLCREST #2	29
	1 - 2	385	HILLCREST #3	29
	2 - 3	356		
	3 - 4	26		
	4 - 5	<25		
8	0 - 1	182		
	1 - 2	<25		
	2 - 3	<25		
	3 - 4	<25		
	4 - 5	98		
9	0 - 1	200		
	1 - 2	303		
	2 - 3	25		
	3 - 4	37		

TABLE 1.1

TABLE II.1
TCLP CONSTITUENTS

Compound	Regulatory Level (mg/L)
benzene	0.5
carbon tetrachloride	0.5
chlordane	0.03
chlorobenzene	100.0
chloroform	6.0
o-cresol	200.0
m-cresol	200.0
p-cresol	200.0
1,4-dichlorobenzene	7.5
1,2-dichloroethane	0.5
1,1-dichloroethene	0.7
2,4-dinitrotoluene	0.13
heptachlor	0.008
hexachlorobenzene	0.13
hexachloro-1,3-butadiene	0.5
hexachloroethane	3.0
methyl ethyl ketone[a]	200.0
nitrobenzene	2.0
pentachlorophenol	100.0
pyridine	5.0
tetrachloroethene	0.7
trichloroethene	0.5
2,4,5-trichlorophenol	400.0
2,4,6-trichlorophenol	2.0
vinyl chloride	0.2
arsenic	5.0
barium	100.0
cadmium	1.0
chromium	5.0
lead	5.0
mercury	0.2
selenium	1.0
silver	5.0
endrin	0.02
lindane	0.4
methoxychlor	10.0
toxaphene	0.5
2,4-D[b]	10.0
2,4,5-TP (silvex)[c]	1.0

Reference: March 29, 1990 Federal Register (55 FR 11798)

[a] Methyl ethyl ketone is also known as 2-butanone.

[b] 2,4-D is also known as 2,4-dichlorophenoxy acetic acid.

[c] 2,4,5-TP (silvex) is also known as 2,4,5-trichlorophenoxy propionic acid.

2.1 SAMPLING METHODS

Due to the potential for preferential distribution of soil particles and contaminants according to mass and shape, it is necessary to obtain a core sample from each of the soil boxes to be sampled. Therefore, the sampling device that will be used will be a thin-walled, hammer driven tube sampler (Figure 2.1) equipped with 2 ft. long acetate tubes that can hold approximately 300 ml of soil. A core sample will be obtained from each waste package using the following procedure.

(1) Prior to use, the tube sampler will be decontaminated according to the requirements given in SOP 1.6, General Equipment Decontamination (Revision 0), which is provided in Appendix ~~C~~A An acetate tube is then inserted in the clean sampling device.

(2) The tube sampler is driven into the soils, resulting in the acetate tube being filled with a soil core. the sampler with the full acetate tube is then removed from the soil. When possible, the core sample will be obtained from the center of the soil package. If refusal occurs due to the presence of large rocks the location will be offset slightly.

(3) The acetate tube is then removed from the tube sampler, and the ends capped.

(4) The outside of the acetate tube is then wiped using a paper towel to remove any loose soil adhering to the tube.

(5) A completed soil sample label is then attached to the (clean) acetate tube. An example of this label is provided in SOP 1.3, Sample Control and Documentation (Revision 0), which is provided in Appendix ~~C~~.A

(6) The sealed acetate tube is wrapped in aluminum foil to prevent the infiltration of light.

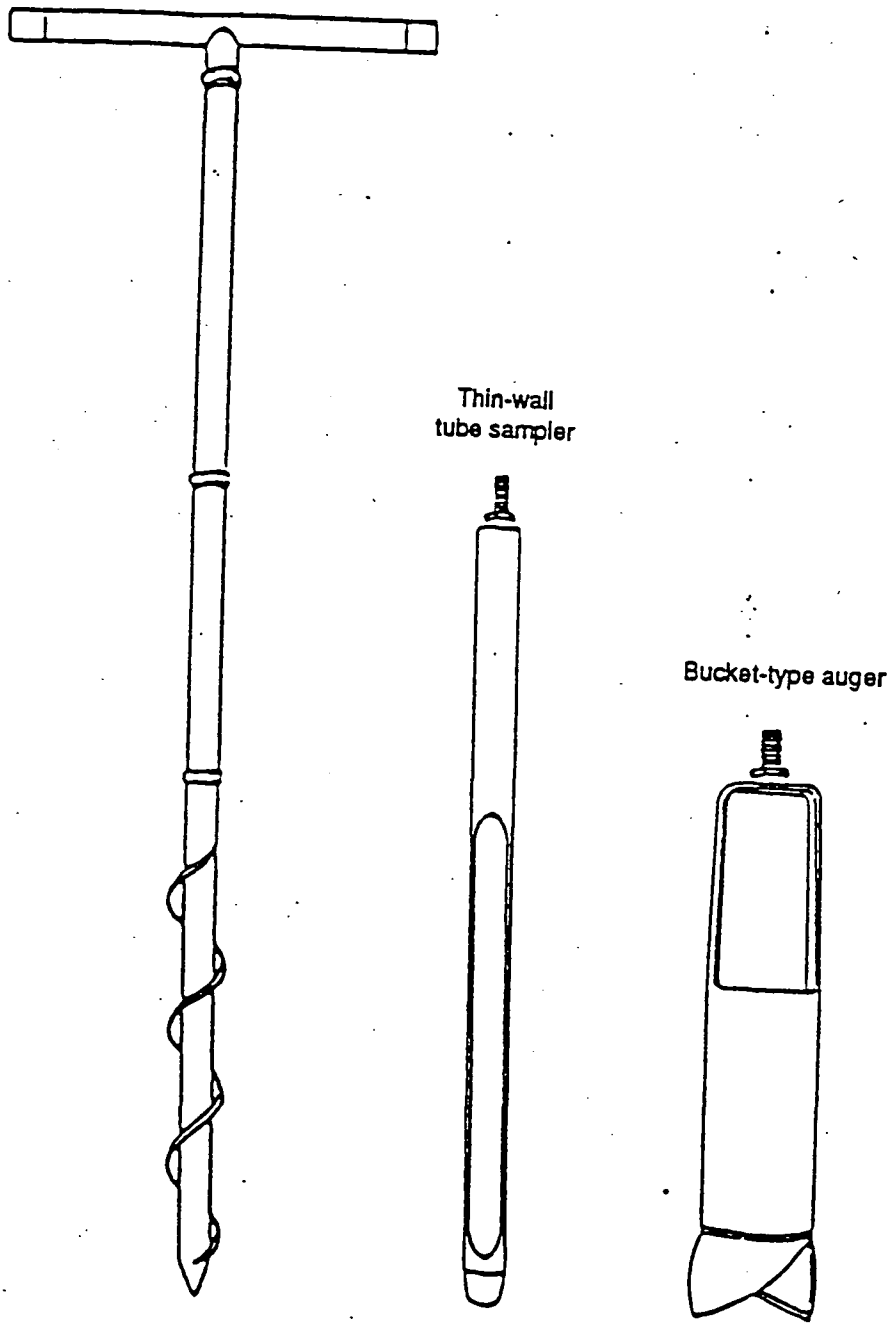
(7) A signed and dated custody seal is attached to each sample so that any attempts to remove the foil and tamper with the sample will be detected.

(8) The wrapped acetate tube is then placed in a cooler containing ice.

(9) the tube sampler is then decontaminated according to the requirements given in SOP 1.6.

(10) After decontamination, a new acetate tube is placed in the tube sampler in preparation for sampling of the next soil box.

Figure 2.1.
AUGERS THIN-WALL TUBE SAMPLER



The use of the acetate tubes will result in less handling of the soil samples, greatly reducing the potential for loss of volatile organic compounds.

The back-up sampling device will be a hand auger equipped with a one foot long bucked-type auger (figure 2.1). Using this device, a sample is obtained by rotating the hand auger down into the soil box, forcing soil into the bucket-type auger. The soil is then removed from the auger and placed into 250 ml amber glass jars with teflon -lined caps. If used, this hand auger will also be decontaminated before and after sampling each box. The samples in 250 ml jars will also be labeled and placed into a cooler containing ice. This hand auger will be used in case of breakage or problems with the acetate tube device.

3. ANALYTICAL PARAMETERS AND SAMPLE VOLUMES

The analyses that will be performed on the samples obtained from the Conrail Excavation Site soil boxes will include the following:

An EPA dish sample will be taken adjacent to the auger sample location to be used for onsite screening for plutonium-238 activity at the Mound Plant Soil Screening Facility (located in H Building). The results will be used to determine the appropriate transportation categories for the samples being shipped offsite for analysis; and

TCLP (zero headspace extraction) will be performed on the auger sample at the Controls for Environmental Pollution (CEP) laboratory in Santa Fe, New Mexico or another approved lab.

The Mound Plant screening facility utilizes a FIDLER detection system calibrated to detect the low-energy X-rays emitted during the decay of plutonium-238 and thorium-232, or by the associated decay products. Although the main contaminant in the Conrail Excavation Site soils is plutonium-238, screening for thorium-232 will also be included because the detection system is calibrated for both radionuclides. The detection limits of the system for plutonium-238 and thorium-232 are 25 $\pm$ 25 pCi/g and 2 $\pm$ 1 pCi/g, respectively. There are currently no Department of Transportation (DOT) requirements(methods,instrumentation, calibration, etc.) for identifying the radioactivity levels in materials designated for transportation. Because materials with specific activities less than 2,000 pCi/g are not required to be identified as radioactive (49 CFR 173.403, y), the Mound FIDLER system is considered adequate for use in determining transportation categories.

The TCLP (zero headspace extraction) analyses performed will follow EPA Method 1311, as given in the corrected Final Rule that was published in the June 29, 1990 Federal Register. Table III.1 gives the additional analytical methods that will be used in analyzing the Conrail Excavation Site soils. Data will be reported using the

TABLE III.1.
ANALYTICAL METHODS

Parameter	EPA Method[a]
TCLP-ZHE	1311 (FR 1990)
TCLP volatiles	8240
TCLP semivolatiles	8270
TCLP metals	6010 for Ba, Cd, Cr, Pb and Ag 7060 for As 7470 for Hg 7740 for Se
TCLP pesticides	8080
TCLP herbicides	509B (Standard Methods)
PCBs	8080
Free liquids (paint filter test)	9095
Particle size distribution	ASTM D-422-63

TCLP - Toxicity characteristic leaching procedure
ZHE - zero headspace extraction
[a] Unless otherwise noted, methods are from SW 846, Third Edition (EPA 1986).

forms given in Appendix ~~D~~. B

Table 111.2 gives the minimum sample volumes, containers, and preservation requirements for these analyses. Because soils are being sampled, no chemical preservation or additional sample preparation in the field is necessary. Samples will be prepared for analysis in the laboratory according to the requirements given in the analytical methods listed in Table 111.1

Table 111.3 gives the holding time requirements for the offsite analyses. There are no holding time requirements for the plutonium-238 and thorium-232 screening. However, because samples cannot be shipped to the offsite lab without these results, the turn around time for this screening must be one day.

4. QUALITY CONTROL REQUIREMENTS

In order to determine the validity of the laboratory data received, several types of quality control samples will be prepared and analyzed with the soil samples. These samples are described below. In addition to the following requirements, the analytical laboratory will also comply with the quality assurance protocols specified in the analytical methods listed in Table 111.1.

Laboratory blanks. Two types of laboratory blanks are used to asses contamination that may be introduced by the analytical laboratory during either sample preparation or analysis. Process blanks consist of laboratory grade water (ASTM Type I) that is taken through the entire TCLP process (preparation, zero headspace extraction, and analysis). Because zero headspace extractions are performed, process blanks are most applicable to organic fractions. However, they can also be analyzed for inorganics. Method blanks consist of laboratory grade water that is prepared and analyzed with the samples. Because zero headspace extraction is not performed, method blanks are usually run with the inorganics fraction (TCLP metals), but they can also be analyzed for organics.

EPA Method 1311 requires that a minimum of one blank must be analyzed for every sample batch, or a minimum of one blank for every 20 extractions that have been conducted with an extraction vessel (zero headspace extractor). Therefore, at least one blank (process or method) will be prepared and analyzed for each batch of Conrail Excavation Site soil samples. (A sample batch is defined as those samples that are analyzed together in the same time period and with the same reagents) It is expected that only one batch of samples will be required to complete the analysis of the Conrail Excavation Site soils.

The compounds most frequently detected in laboratory blanks are volatile or semivolatile organic compounds. If any of the TCLP compounds are detected in the process blanks at levels of 5% or

TABLE III.2.
CONTAINER AND VOLUME REQUIREMENTS

Analytical Parameter	Container	Volume or Weight	Preservation
Onsite Screening (Pu-238/Th-232)	plastic	500 g	None
TCLP	amber glass (Teflon lined cap)	250 mL	4°C
	or acetate tube	300 mL	4°C
PCBs	amber glass (Teflon lined cap)	250 mL	4°C
	or acetate tube	300 mL	4°C
Particle size distribution	amber glass (Teflon lined cap)	250 mL	None
	or acetate tube	300 mL	None
Free liquids (paint filter)	amber glass (Teflon lined cap)	250 mL	4°C
	or acetate tube	300 mL	4°C

TABLE III.3.
HOLDING TIMES (DAYS)

Parameter	Collection to TCLP extract	TCLP extract to prep extract	Prep extract to analysis
(TCLP constituents)			
Volatiles	14	NA	14
Semivolatiles	14	7	40
Pesticides	14	7	40
Herbicides	14	7	40
Mercury	28	NA	28
Other metals	180	NA	180

(Additional parameters)

Parameter	Collection to extraction	Extraction to analysis
PCBs	14	40
Particle size	NA	NA
Free liquids	NA	NA

more of the regulatory level, the analytical batch will be re-extracted and analyzed. If compounds are detected that are not on the TCLP, these results will be evaluated as to potential impact on the sample results.

Matrix spikes. Matrix spikes are samples that are spiked with a known amount of certain analytes. They are prepared to monitor the performance of the analytical methods and to identify analytical bias present due to matrix interferences. If the percent recovery for a spiked compound is below 100%, it is then used to correct the measured sample results for analytical bias using the following formula:

corrected results = 100(measured result/%recovery)

EPA Method 1311 requires that a minimum of one matrix spike be prepared and analyzed for every sample batch and for every waste type, or a minimum of one matrix spike for every 20 extractions that have been conducted with an extraction vessel (zero headspace extractor). Therefore, one matrix spike will be prepared and analyzed for the batch of Conrail Excavation Site soil samples. If additional spiking is necessary due to a decrease in batch size, the analytical laboratory will contact EG&G Mound for approval and identification of additional samples to be spiked.

Surrogate spikes. Surrogate spiking compounds, consisting of specific (deuterated) volatile and semivolatile organic compounds, are added to every sample and blank analyzed in order to monitor the preparation and analysis of samples. The surrogate compounds and the analytical requirements are given in Table IV.1. Corrective actions and reanalysis of the associated sample will be performed if any of the following conditions exist for the sample surrogates (EPA 1990):

recovery of one surrogate compound in the volatile fraction is outside the required surrogate spike recovery limits;

recovery of one surrogate compound in either the base neutral or acid fraction is below 10%; or

if recoveries of two surrogate compounds in either the acid or base neutral fractions are outside the surrogate recovery limits.

If one of these conditions is met, the laboratory will reanalyze the sample. If the condition still exists, EG&G Mound will be notified for approval to re-extract the sample and reanalyze. If the condition is still present, a matrix interference exists and will be reported as such to EG&G Mound.

5. SAMPLE SHIPMENT FOR OFFSITE ANALYSIS

TABLE IV.1.
SURROGATE SPIKE REQUIREMENTS

Compound	Surrogate % Recovery[a]
(Volatiles)	
toluene-d8	88-110
bromofluobenzene	86-115
1,2-dichloroethane-d4	76-114
(Semivolatiles)	
nitrobenzene-d5	35-114
2-fluorobiphenyl	43-116
p-terphenyl-d14	33-141
phenol-d5	10-110
2-flurophenol	21-110
2,4,6-tribromophenol	10-123
(Pesticides)	
dibutylchlorendate	40-136

[a] Because the soils samples are extracted as part of the TCLP procedure, the % recovery limits listed are for water.

Reference: EPA 1990.

The soil samples will be shipped to the offsite laboratory for analysis within 24 hours of collection according to the requirements in SOP 1.5, Guide to the Handling, Packaging, and Shipping of Samples (Revision 0), which is provided in Appendix ~~C~~.A As discussed in section 3, results obtained from the Mound Soil Screening Facility will be used to determine the appropriate DOT shipping category. The packaging and labelling requirements will be then determined for each sample. It is anticipated that the following DOT categories (for materials containing plutonium-238) will be applicable to the Conrail Excavation Site samples.

Samples with less than 2,000 pCi/g will be shipped as environmental samples (40 CFR 173.403,y).

Samples with greater than 2,000 pCi/g, but less than 3 uCi total activity/package will be shipped as excepted radioactive material, UN2910 (40 CFR 173.423).

Samples with less than 0.1 nCi/g, and between 3 uCi and 3 mCi total activity/package will be shipped as low specific activity (LSA), UN2912 (40 CFR 173.403 and 435).

6. DOCUMENTATION OF SAMPLING AND SHIPMENT ACTIVITIES

All sampling will be performed by employees of Roy R. Weston, Inc. and documented in field logbooks, which will be used to prepare a report on the sampling activities when laboratory results are available. Information to be included in the logbooks will include personnel involved, time and date of sample collection, a description of the contents of the boxes, sample volumes and containers used, and other pertinent observations. In addition, the soil sample labels will include the date and time of sampling, personnel performing the sampling, and the analytical parameters.

When the screening results are available, these results will also be provided to the analytical laboratory, so that they can be made aware of the radioactivity levels associated with the samples. As discussed in section 4, these results will also be used to identify the appropriate shipment category.

Sample analytical parameters and numbers will also be documented using chain-of-custody forms. An example of the chain-of-custody form is given in SOP 1.5. As discussed in section 3, signed and dated custody seals will be placed on each sample in order to discourage sample tampering. The analytical laboratory will be contacted to make sure that all samples arrive on time and in good shape.

REFERENCES

EG&G Mound Applied Technologies, Inc. Sampling and Analysis Plan for Mound Plant D&D Soils Packages, February 1991, Revision 1

APPENDIX A

STANDARD OPERATING PROCEDURE 1.3

SAMPLE CONTROL AND DOCUMENTATION

1. PURPOSE

To define the steps necessary for sample control and identification, data recording, and chain-of-custody documentation.

2. DISCUSSION

The Field Sampling Plan (FSP) or Work Plan (WP) contains specific details about the procedures and equipment for this SOP. Refer to the FSP or WP for the type of samples to be collected and the destination of the collected samples. Collection and measurement of samples and the documentation of data will be performed as described in specific SOPs.

This SOP describes the methodology of sample control and documentation for all projects. Sample control and documentation are necessary to ensure the defensibility of data and to verify the quality and quantity of work performed in the field. Accountable documents include logbooks, data collection forms, correspondence, sample labels or tags, chain-of-custody reports, photographs, and analytical records. Waterproof black ink must be used in recording all data in documents bearing serial numbers.

The logbooks are under the supervision of the quality control officer. There may be several logbooks; for example, there may be a separate logbook for field activities, one for samples, and one for instruments. The quality control officer numbers the logbooks and assigns them to individuals designated for specific tasks of the project. All information pertinent to a field activity must be entered into a logbook. A record of uncompleted work is kept in a logbook. All project logbooks are turned over to the document control officer at the end of each work period and to a central file at the end of the field activity.

All logbooks are numbered and bound, and the pages are numbered. Waterproof black ink is used for recording all data. Logbook pages should never be removed, and no data should removed. To change an incorrect entry, the individual draws a line through the entry, writes the change above the entry, dates and initials the change. If anyone other than the person to whom the logbook is assigned makes an entry, that person dates and signs the entry.

Record all information pertinent to the sampling activity (for example, date, site, ID number, and location) in the logbook. Note the field conditions, weather conditions, and any unusual circumstances. Notes should be as descriptive and inclusive as possible. A person reading the entries should be able to reconstruct the sampling situation from the recorded information. Language should be objective, factual, and free of personal feelings and inappropriate terminology.

3. PROCEDURES

3.1. Associated Procedures

Before every operation, a review of the SOPs 1.1-1.10 is necessary. These SOPs contain information on the performance of field activities. They should be consulted for specific information about equipment and supplies; sample collection, preservation, packaging, and shipping; decontamination procedures; and documentation requirements. Procedures directly associated with this SOP are listed below.

SOP No.	SOP Title
1.1	General Instructions for Field Personnel
1.4	Sample Containers and Preservation
1.5	Guide to the Handling, Packaging, and Shipping of Samples

3.2. Preparation

3.2.1. Office

A. Review the FSP or WP and SOPs listed in Section 3.1.

B. Coordinate schedules/actions with the installation staff.

C. Obtain appropriate permission for property access.

D. Assemble the equipment and supplies listed in Appendix 5.1. Ensure the proper operation of all sampling equipment.

E. Notify the analytical laboratory of sample types, the number of samples, and the approximate arrival date.

F. Contact the carrier that will transport samples to obtain information on regulations and specifications.

3.2.2. Documentation

A. Obtain a logbook from the QA officer.

B. Record results of the equipment check in the logbook.

C. Obtain a sufficient number of the appropriate ER Program data collection forms (see INDEX TO SOPs).

D. Consult the ER Program data administrator for a current list of information management codes, location IDs, and sample numbers used in the completion of data forms.

3.2.3. Field

Field preparation requires organizing sample bottles, sample labels, and documentation in an orderly, systematic manner that promotes consistency and traceability of all data. Appropriate items should be completed before a sample is collected.

A. Record all pertinent information (for example, date, site, ID number, and location) in the logbook. Note field conditions, unusual circumstances, and weather conditions.

B. Fill out information on the sample identification label and attach the label to a sample bottle.

C. Complete initial information required on data collection forms.

3.3. Operation

3.3.1. Logbook

Enter all information pertinent to a field activity in a bound logbook with consecutively numbered pages. Enter information that does not require data entry into the logbook. If not included on a data collection form, entries in the logbook should include at least the information listed below.

- Date and time of entry
- Purpose of sampling
- Name and address of field contact
- Site identification
- Type of process producing waste (if known)
- Type of sample (soil, water, sediment, etc.)
- Sample identifier and size of sample taken
- Type of analysis requested
- Description of sampling point or location number
- Date and time for collection of sample
- Collector's sample identification number(s) and/or name
- References of the sampling site (like maps or photographs)
- Field observations and sampling locations
- Associated field measurements
- Method of sample collection, preservation techniques, and any deviations or anomalies noted

- Transfer of a logbook to individuals designated for specific tasks of the project

- Any uncompleted work

For water samples, the TEGD suggests the following additional information.

- Presence of immiscible layers and detection method

- Collection method for immiscible layers

- Sample distribution and transporter

- Climatic conditions including air temp

- Internal temperature of field and shipping container

Because sampling situations vary widely, make notes as descriptive and inclusive as possible. A person reading the entries should be able to reconstruct the sampling situation from the recorded information. Use language that is objective, factual, and free of personal feelings or any other inappropriate terminology. If anyone other than the person to whom the logbook was assigned makes an entry, he/she should date and sign the entry. Never remove logbook pages. If a mistake is made, draw a single line through the mistake, write the new information above the line, and date and initial the change.

3.3.2. Photographs

Photographs provide the most accurate record of the field worker's observations. They can be significant during future inspections, informal meetings, and hearings. A photograph must be documented to be a valid representation of an existing situation. For each photograph taken, record the items listed below in the logbook and on the back of each processed photograph.

- Date and time

- Signature of photographer

- Name and identification number of site

- Type of camera, lens, f-stop, shutter speed, and film used

- General direction faced and description of the subject

- Distance from photographer to object

- Location at the site

- Sequential number of photograph and the roll number

Any remarks about the contents of a photograph could jeopardize its value as legal evidence, so limit comments to the photograph's location. Photographs should be taken with a perspective similar to that afforded by the naked eye. Telephoto or wide-angle shots cannot be used in enforcement proceedings.

3.3.3. Sample Labels

Use soil and water sample identification labels to tag or label sample containers. Seal each sample immediately after it is collected and labeled with waterproof black ink. Label tags may be filled out before collection to minimize the handling of the sample containers. Appendix 5.1, Soil Sample and Water Sample Identification Labels, provides examples of the common sample labels to be used. Instructions for completing the labels are included in Appendix 1.3, Data Form Completion.

When appropriate, use an etching tool to mark sample containers in the field, rather than immediately applying a sample label or tag. This avoids possible label contamination problems and subsequent decontamination difficulties. In this case, write the data intended for the sample label in the logbook and transcribe them onto the label after the sample containers have been decontaminated.

Firmly attach the labels to the sample containers. The containers must be dry enough for gummed labels to be securely attached.

3.3.4. Sample Collection and Inventory

The number of persons involved in collecting and handling samples should be kept to a minimum. Use the guidelines established in this SOP and SOP 1.5, Guide to the Handling, Packaging, and Shipping of Samples. Complete data collection forms at the time the sample is collected and have the sample collector(s) sign or initial them. Include the date and time. On liquid containers, mark the liquid level with waterproof black ink. This requirement is not necessary for completely filled volatile organics analysis (VOA) septum vials. If the volume received by the laboratory is different than when collected, the sample container may have leaked, been tampered with, or spilled hazardous materials. Use the Custody Transfer Record/Lab Work Request form, Appendix 5.2, to inventory all samples collected in the field. Instructions for the form are in Appendix 5.3, Data Form Completion.

3.3.5. Chain of Custody

A. Objectives

The primary objective of the chain-of-custody procedure is to create an accurate written record that can be used to trace the possession and handling of the sample from the moment of its collection through analysis and introduction as evidence. A sample is in someone's custody when one of the criteria listed below has been satisfied.

1. The sample is in one's actual possession.

2. The sample is in one's view after being in one's physical possession.

3. The sample is in one's physical possession and is then locked up so that no one can tamper with it.

4. The sample is kept in a secured area that is restricted to authorized personnel.

B. Transfer of Custody and Shipment

When transferring the samples, the transferee should sign and record the date and time on the Custody Transfer Record/Lab Work Request form. Custody transfers made to a sample custodian in the field should account for each sample, although samples may be transferred as a group. Every person who takes custody should fill in the appropriate section of the Custody Transfer Record/Lab Work Request form. To reduce the number of custody records, minimize the number of custodians in the chain of possession.

The field custodian is responsible for properly packaging and dispatching samples to the appropriate laboratory. This responsibility includes filling out, dating, and signing the appropriate portion of the Custody Transfer Record/Lab Work Request form. The chain-of-custody form is then placed in a sealed plastic bag and taped to the inside of the cooler lid, where it is immediately visible when the cooler is opened. Signed and dated chain-of-custody seals are also placed on the sample container lids to detect sample tampering.

In general, packaging of environmental samples will include the following: placement of sample containers in zip-lock plastic bags to reduce the chance of both breakage and release of sample if breakage does occur, and placement of the bagged sample containers in a cooler containing sufficient vermiculite to prevent breakage and to absorb any material that leaks. For water samples in 4L amber glass containers, the samples will be wrapped in "bubble wrap" to prevent breakage. Ice or blue ice is used to maintain sample temperatures at 4°C. If ice is used, it must be double-bagged in zip-lock bags. Experience has shown that fully 1/4 to 1/3 of the cooler volume must be ice, packaged around and over the sample containers, to maintain temperatures at 4°C.

Send all packages to the laboratory with the chain-of-custody record and other pertinent forms. Retain a copy of these forms at the originating office (either carbon or photocopy). Register mailed packages with a return receipt requested. For packages sent by common carrier, retain receipts as part of the permanent chain-of-custody documentation. Pack samples so that they do not break in shipment. Seal the cooler with chain-of-custody seals so that any tampering can be readily detected. SOP 1.5, Guide to the Handling, Packaging, and Shipping of Samples, describes these procedures in detail.

3.4. Postoperation

3.4.1. Field

A. Verify that all sample bottles have been correctly identified and labels have all necessary information (location, time, and date).

B. Cross-check filled sample bottles in possession against those recorded in the logbook. Maintain custody of filled sample bottles by keeping them in actual possession, within view, locked or sealed up to prevent tampering, or bringing them into a secure area.

C. Prepare samples for transport according to SOP 1.3, Sample Control and Documentation; SOP 1.4, Sample Containers and Preservation; and SOP 1.5, Guide to Handling, Packaging, and Shipping of Samples.

3.4.2. Documentation

A. Record data and any uncompleted work in the logbook.

B. Complete logbook entries, verify the accuracy of entries, and sign/initial all pages.

C. Document the chain of custody on the Custody Transfer Record/Lab Work Request form.

D. Review data collection forms for completeness.

3.4.3. Office

A. Deliver original forms and logbooks to the site manager for technical review. He/she will review, sign forms, and transmit to the document control officer (copies to the files) for eventual delivery to the Department of Energy.

B. Inventory equipment and supplies. Repair or replace all broken or damaged equipment. Replace expendable items. Return equipment to the equipment manager and report incidents of malfunction or damage.

C. Contact the analytical laboratory to ensure that samples arrived safely and instructions for sample analyses are clearly understood.

4. SOURCE

EPA. 1986. "RCRA Ground-water Monitoring Technical Enforcement Guidance Document." U.S. Environmental Protection Agency document. Washington, D.C.: U.S. Government Printing Office.

5. APPENDIXES

5.1. Soil Sample and Water Sample Identification Labels

5.2. Custody Transfer Record/Lab Work Request Form

5.3. Data Form Completion

APPENDIX 5.1

SOIL SAMPLE AND WATER SAMPLE IDENTIFICATION LABELS

SOIL SAMPLE IDENTIFICATION LABEL

FACILITY CODE _____ LOCATION ID _____

SAMPLE ID _____ LOG DATE _____

LAB CODE _____ LOG TIME _____

SAMPLER _____ LOGGER CODE _____

SAMPLE DEPTH INTERVAL FROM DATUM

BEGINNING DEPTH (FT FROM DATUM) _____

ENDING DEPTH (FT FROM DATUM) _____

ANALYSIS REQUESTED _____

COMMENTS _____

SSL-132

WATER SAMPLE IDENTIFICATION LABEL

FACILITY CODE _____ LOCATION ID _____

SAMPLE ID _____ LOG DATE _____

LAB CODE _____ LOG TIME _____

SAMPLER _____ LOGGER CODE _____

ANALYSIS REQUESTED _____

PRESERVATION METHOD _____

COMMENTS _____

WSL-133

APPENDIX 5.2

CUSTODY TRANSFER RECORD/LAB WORK REQUEST FORM

WESTON

WESTON Analytics Use Only

Custody Transfer Record/Lab Work Request

Client _____
Work Order _____
Date Rec'd. _____ Date Due _____
RFW Contact _____
Client Contact/Phone _____

Refrigerator#											
#/Type Container											
Containers/Volume											
Preservative											
ANALYSES REQUESTED ➡											
WA Use Only Lab ID	Client ID/Description	Matrix	Date Collected								

Matrix:
S - Soil
SE - Sediment
SO - Solid
W - Water
O - Oil
A - Air
DS - Drum Solids
DL - Drum Liquids
F - Fish
X - Other

Special Instructions:

Item/Reason	Relinquished by	Received by	Date	Time	Item/Reason	Relinquished by	Received by	Date	Time

WESTON Analytics Use Only

Samples Were:
1 Shipped or Hand-Delivered
NOTES:

2 Ambient or Chilled
NOTES:

3 Received Broken/Leaking (Improperly Sealed)
Y N
NOTES:

4 Properly Preserved
Y N
NOTES:

5 Received Within Holding Times
Y N
NOTES:

COC Tape Was:
1 Present on Outer Package Y N
2 Unbroken on Outer Package Y N
3 Present on Sample Y N
4 Unbroken on Sample Y N
NOTES:

COC Record Was:
1 Present Upon Receipt of Samples Y N

Discrepancies Between Sample Labels and COC Record? Y N
NOTES:

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7 115

APPENDIX 5.3

DATA FORM COMPLETION

Use a pen with black ink that is not water soluble (not a felt-tip pen). Make an entry in each blank. Where there is no data entry, enter UNK for Unknown, NA for Not Applicable, or ND for Not Done. If any procedure was not performed as prescribed, give the reason for the change or omission on the form. To change an entry, draw a single line through it, add the correct information above it, and initial the change.

SOIL SAMPLE IDENTIFICATION LABEL

1. Facility Code. Five-character code abbreviating the facility name where program activity is being conducted. The first three characters indicate the facility, and the remaining two numbers designate the specific site within the facility.

2. Sample ID. Four-digit number assigned to ensure that data collected retains uniqueness from other data collected at the same location ID.

3. Lab Code. Three-character code identifying the company responsible for performing the analysis of water, soil, biota, and air samples.

4. Sampler. Name of person(s) collecting sample.

5. Location ID. Four-character code assigned sequentially to each borehole, test pit, or surface location where chemical, biological, radiological, and other measurements are taken.

6. Log Date. The date the information recorded on the label was obtained in the format DD-MMM-YY (01-JAN-88).

7. Log Time. The time the sample was collected (HH:MM).

8. Logger Code. Three-character or four-character code identifying the company responsible for collecting the information recorded on the form.

9. Sample Depth Interval from Datum:

   a. Beginning Depth (Ft From Datum). Depth from the ground surface to the top of the sampling interval in the format of feet and tenths of feet.

   b. Ending Depth (Ft From Datum). Depth from the ground surface to the bottom of the sampling interval in the format of feet and tenths of feet.

10. Analysis Requested. Type of analysis requested.

11. Comments. Any additional information.

APPENDIX 5.3, Continued

WATER SAMPLE IDENTIFICATION LABEL FORM

1. Facility Code. Five-character code abbreviating the facility name where program activity is being conducted. The first three characters indicate the facility, and the remaining two numbers designate the specific site within the facility.

2. Sample ID. Four-digit number assigned to ensure that data collected retains uniqueness from other data collected at the same location ID.

3. Lab Code. Three-character code identifying the laboratory responsible for performing the analysis.

4. Sampler. Name of person(s) collecting sample.

5. Location ID. Four-character code assigned sequentially to each borehole, test pit, or surface location where chemical, biological radiological, and other measurements are taken.

6. Log Date. The date the information recorded on the form was obtained in the format DD-MMM-YY (01-JAN-88).

7. Log Time. Time the sample was collected (HH:MM).

8. Logger Code. Three-character or four-character code identifying the company responsible for collecting the information recorded on the form.

9. Analysis Requested. Type of analysis requested from the laboratory.

10. Preservation Method. Type of preservative used.

11. Comments. Any additional information.

APPENDIX 5.3, Continued

CUSTODY TRANSFER/LAB WORK REQUEST FORM

1. Received By. Completed by lab.

2. Date. Completed by lab.

3. Assigned To. Completed by lab.

4. Client. Client name.

5. Client Contact. WESTON person who will be laboratory contact.

6. Phone. Phone number of WESTON contact.

7. RFW Contact. Laboratory contact.

8. Date Due. Date analysis is due from the laboratory.

9. Project Number. Project number under which work is billed.

10. Sample No. Completed by laboratory.

11. Client ID No. Three-part identifier consisting of facility code, location ID, and sample ID and separated by dashes (for example, KCP01-01-01 and PXT02-0002-0001). See the ER Program data administrator for conventions to identify field quality control samples.

12. Description. Any descriptive information about the sample.

13. Matrix. Matrix type for sample; see valid matrix codes on lower half of form.

14. Date Collected. Date the sample was collected in the format DD-MMM-YY (01-JAN-88).

15. Container/Preservative. Container size and type (500-ml glass).

16. Analysis Requested. The type of analysis requested for each sample. The column heading indicating the type.

    PCB=Polychorinated Biphenyl

    HE=High Explosive

    HSL=Hazardous Substance List

    EPTOX=Extraction Procedure Toxicity

    VOA=Volatile Organic Analysis

BNA=Base Neutral Acid

TCLD=Toxic Characterization Leach Procedure

PEST=Pesticides

MAJ=Major Cation/Anion

17. Matrix. Valid matrix codes.

18. Special Instructions. Any special instructions.

19. Items/Reason. The reason the custody is transferred for all or selected items of the shipment.

20. Relinquished By. Signature of person sending samples.

21. Received By. Person or (shipping company) who received samples.

22. Date. Date sample is sent.

23. Time. Time sample is sent.

STANDARD OPERATING PROCEDURE 1.5

GUIDE TO THE HANDLING, PACKAGING, AND SHIPPING OF SAMPLES

1. PURPOSE

To provide a general guide for packaging and shipping samples of environmental and hazardous materials to the laboratory. In addition, instructions are provided to select the correct category for packaging and shipping samples of unknown contents.

2. DISCUSSION

The Field Sampling Plan (FSP) or Work Plan (WP) provides information concerning the scope and details of a specific operation. Refer to the FSP or WP for the type of samples to be collected and the destination for the samples. This SOP describes the procedures used by the ER Program technical assistance subcontractor when handling, packaging, and shipping samples. Other procedures or requirements used by installation subcontractors must conform to this SOP. The transportation of samples must protect the integrity of the sample and prevent any detrimental effects from the potentially hazardous nature of the samples.

Samples collected at a site are classified as environmental or hazardous material samples. In general, environmental samples are collected from streams, farm ponds, small lakes, wells, and offsite soils that are not expected to be contaminated with hazardous materials. Samples of onsite soils or water and materials collected from drums, bulk storage tanks, obviously contaminated ponds, impoundments, lagoons, pools, and leachates from hazardous waste sites are considered samples of hazardous materials. A distinction must be made between the two types of samples for two reasons.

1. The appropriate Department of Transportation (DOT) or International Air Transport Association (IATA) procedures for the transportation of samples must be determined. If there is any doubt, a sample should be considered hazardous and shipped accordingly.

2. The health and safety of laboratory personnel receiving samples must be protected. Special precautions are used at laboratories when samples that are not environmental are received.

Hazardous materials defined by the transportation regulations contained in 49 CFR (Subchapter C, Part 171) or the current edition of IATA regulations for dangerous goods (Sections 3 and 4) should be shipped only by the method of transportation specified in these regulations. Overnight shipments by air (Federal Express, for example) are governed by the IATA regulations. Transportation of hazardous materials exclusively by surface route is governed by the requirements of 49 CFR. This operating practice ensures compliance with the appropriate regulations and at times requires the implementation of packaging instructions that are more conservative and stringent than those required by regulation. Employees should be aware that regulatory bodies with jurisdiction have the authority to levy substantial fines and penalties to violators. Failure on the part of any employee to follow the requirements of these procedures is cause for disciplinary action, including discharge.

This SOP provides general guidance for packaging, marking, labeling, and shipping samples of environmental and hazardous materials and should not be misconstrued as the equivalent of or replacement for the DOT or IATA regulations. When shipping any potentially hazardous samples, the DOT regulations (49 CFR 171-178) and IATA regulations must be followed. This SOP should be used in conjunction with DOT and IATA regulations and advice from the freight carrier to ensure that all regulations governing transportation are being followed.

Any questions about the instructions for shipping environmental samples or hazardous materials in this SOP should be directed to the subcontractor's health and safety officer, who provides technical assistance to the ER Program.

3. PROCEDURES

3.1. Associated Procedures

Before every operation, SOPs 1.1-1.10 must be reviewed. These SOPs contain information on the performance of field activities. They should be consulted for specific information on equipment and supplies; sample collection, preservation, packaging, and shipping; decontamination procedures; and documentation requirements. Procedures directly associated with this SOP are listed below.

SOP No.	SOP Title
1.1	General Instructions for Field Personnel
1.3	Sample Control and Documentation
1.4	Sample Containers and Preservation
1.6	General Equipment Decontamination

3.2. Preparation

3.2.1. Office

A. Review the FSP or WP and SOPs listed in Section 3.1.

B. Coordinate schedules/actions with the installation staff.

C. Obtain appropriate permission for property access.

D. Notify the analytical laboratory of sample types, the number of samples, and the approximate arrival date.

E. Contact the carrier that will transport samples to obtain information on regulations and specifications.

3.2.2. Documentation

A. Obtain a logbook from the QA officer.

B. Obtain a sufficient number of the appropriate ER Program data collection forms (see INDEX TO SOPs).

C. Consult the ER Program data administrator for a current list of information management codes, location IDs, and sample numbers used in the completion of data forms.

3.3. Operation

Procedures for shipping samples under DOT and IATA regulations are provided in Appendixes 5.1 through 5.4. The following step-by-step procedure will ensure that all applicable requirements for classifying, packing, marking, labeling, and documenting samples can be met.

A. Determine the correct technical name or composition of substances that might be in the samples. Check to see if the substance is forbidden on aircraft. Section 1 of the IATA regulations for dangerous goods contains a list of the substances that cannot be transported by air.

B. All samples must be transported by cargo aircraft or land transport. See Appendixes 5.1 through 5.4 for the appropriate DOT and IATA requirements.

C. Consult the DOT or IATA references to select the appropriate shipping container and packing material.

D. Prepare the consignment according to relevant requirements.

E. Ensure that all appropriate markings are printed on the packages and labels are attached.

F. Make any appropriate advance arrangements with the carrier and obtain current information about regulations and specifications that might affect the shipment.

G. Prepare the cargo airbill, complete, and sign the appropriate declarations for transporting dangerous goods.

H. Deliver the shipment to the local office of the freight carrier or arrange for a pickup at the site. Do not seal the container until the freight carrier is satisfied that the internal packaging meets all applicable regulations.

I. Ensure that all chain-of-custody procedures are observed. The copy of the bill of lading form will be retained as evidence of the chain-of-custody transfer.

3.4. Postoperation

3.4.1. Field

A. When transferring the samples, have the transferee sign and record the date and time on the Custody Transfer Record/Lab Work Request form (see SOP 1.3, Sample Control and Documentation). Custody transfers made to a sample custodian in the field should account for each sample, although samples may be transferred as a group. Every person who takes custody should fill in the appropriate section of the Custody Transfer Record/Lab Work Request form. Minimize the time of possession.

B. The field custodian is responsible for properly packaging and dispatching samples to the appropriate laboratory. This responsibility includes completing, dating,

and signing the appropriate portion of the Custody Transfer Record/Lab Work Request form. When samples of hazardous materials are shipped to a laboratory, provide advance notice.

C. Verify that all sample bottles have been correctly identified and labels include necessary information (for example, location, time, and date).

3.4.2. Documentation

A. Complete logbook entries, verify the accuracy of entries, and sign/initial all pages.

B. As in any other activity that may be used to support litigation, regulatory agencies must be able to provide the chain of possession and custody of any samples that are offered for evidence or that form the basis of analytical test results introduced as evidence. Written procedures must be available and followed whenever samples for evidence are collected, transferred, stored, analyzed, or destroyed. The primary objective of these procedures is to create an accurate, written record that can be used to trace the possession and handling of the sample from the moment of its collection through analysis and the introduction as evidence.

A sample is in someone's custody under any of the conditions listed below.

- It is in one's actual possession.
- It is in one's view (after being in one's physical possession).
- It is one's physical possession and then locked up so that no one can tamper with it.
- It is kept in a secured area that is restricted to only authorized personnel.

C. Send all packages to the laboratory with the Custody Transfer Record/Lab Work Request form and other pertinent forms. Retain a copy of these forms at the originating office (either carbon or photocopy). Register mailed packages with a return receipt requested. For packages sent by common carrier, retain receipts as part of the permanent chain-of-custody documentation. Pack samples to eliminate the possibility of breakage during shipment. Seal or lock the package so that any tampering can be readily detected.

D. Additional guidelines for chain of custody, a sample of the form, and instructions for completing the Custody Transfer Record/Lab Work Request form are included in SOP 1.3, Sample Control and Documentation.

3.4.3. Office

A. Deliver original forms and logbooks to the site manager for technical review. He/she will review, sign forms, and transmit to the document control officer (copies to the files) for eventual delivery to the Department of Energy.

B. Contact the analytical laboratory to ensure that samples arrived safely and instructions for sample analyses are clearly understood.

4. SOURCES

International Air Transport Association. 1988. Dangerous Goods Regulations. January 1988. Montreal, Quebec, Canada.

CFR 49. 1985. Code of Federal Regulations, Title 49, U.S. Department of Transportation, Parts 100-199. November 1, 1985. Washington, D.C.: U.S. Government Printing Office.

5. APPENDIXES

5.1 Environmental Samples

5.2 Samples of Hazardous and Radioactive Materials

5.3 Transportation of Unknown Hazardous Materials by 49 CFR

5.4 Transportation of Unknown Hazardous Materials by IATA

APPENDIX 5.1

ENVIRONMENTAL SAMPLES

A. Environmental Samples

Environmental samples may be packaged and shipped according to the following procedures.

B. Packaging

Before any samples are placed in their final shipping containers, the exterior of the sample containers should be wiped clean with a damp cloth. Environmental samples must then be packaged according to the following procedures.

1. Place sample container, properly labeled and with a chain-of-custody seal on a sealed lid, into a polyethylene bag and seal the bag.

2. Place sample in a fiberboard container approved by the Department of Transportation (DOT) or picnic cooler.

3. Pack container with enough noncombustible, absorbent cushioning material to minimize the possibility of breakage and absorb any materials that may have leaked from the sample jars. Vermiculite is recommended.

4. If there are multiple samples, be sure there is sufficient cushioning material between the sample containers (each in its individual polyethylene bag) to prevent breakage from dropping or severe shock.

5. Tape a sealed plastic bag containing the completed chain-of-custody form to the inside of the shipping container lid.

6. Seal outside container with duct tape or strapping tape.

7. On each side of the shipping container, place a signed chain-of-custody seal at the junction between the shipping container and lid.

C. Marking/Labeling

Sample containers must have a completed sample identification tag (see SOP 1.3, Sample Control and Documentation), and the outside container must be marked Environmental Sample. The appropriate side of the container must be marked This End Up, and arrow labels should be used accordingly. No DOT placards or labeling are required. Assure that all sample containers are labeled identically to labels on the shipping container.

D. Shipping Papers

No DOT or International Air Transport Association (IATA) shipping papers are required for environmental samples.

E. Transportation

There are no DOT or IATA restrictions on the mode of transportation for environmental samples. An overnight carrier is required.

F. Additional guidelines for water samples

Additional guidelines for the shipment of water samples is given in the TEGD. These include the following activities.

1. When the samples are placed in the shipping cooler, record the internal temperature of the cooler on the chain-of-custody form.

2. To determine the maximum and minimum temperature during shipment, place a thermometer that measures and records the maximum and minimum temperature range inside the shipping cooler.

3. Make sure that signed and dated chain-of-custody seals are present on the cap of each individual sample container and on the lid of the shipping cooler.

4. The internal temperature of the shipping container will be measured using a laboratory grade thermometer upon opening the cooler at the contracted laboratory.

APPENDIX 5.2

SAMPLES OF HAZARDOUS AND RADIOACTIVE MATERIALS

A. Samples of Hazardous Material

Samples that are not environmental samples or samples known or expected to contain hazardous substances must be considered samples of hazardous material and transported according to the following requirements.

If the hazardous material in the sample is known or can be accurately identified, it is packaged, marked, labeled, and shipped according to the specific instructions for that material described in the Department of Transportation Hazardous Materials Table (49 CFR 72.101) or the latest edition of the International Air Transport Association Dangerous Goods Regulations.

B. Samples of Radioactive Materials

Samples containing greater than 2,000 pCi/g of any radionuclide are considered to be radioactive materials by DOT (49 CFR 173.403v) and must be shipped following the requirements given in 49 CFR 173 for labeling and packaging. Table V.1 summarizes the shipping categories and concentration limits for several radionuclides commonly encountered during investigations. The labeling and packaging requirements for these categories are given in 49 CFR 172 subparts D and E.

TABLE V.1

RADIOACTIVE SAMPLE SHIPMENT REQUIREMENTS

Radionuclide	49 CFR Reference	Concentration	Total Quantity	DOT Class
Tritium in water				
	49 CFR 173.403(y)	<2 μCi/L	NA	Environmental
	49 CFR 173.423	2 μCi/L to 1×10^5 μCi/L	<1,000 Ci/ package	UN2910 (Limited quantity)
	49 CFR 173.403(n)	1×10^5 μCi/L to 5×10^6 μCi/L	<1,000 Ci/ package	UN2912 (LSA)
Plutonium-238 in soil or other solids				
	49 CFR 173.403(y)	0.002 μCi/g	NA	Environmental
	49 CFR 173.403 49 CFR 173.423	0.002 μCi/g to 0.1 μCi/g	<30 μCi/ package	UN2910 (Limited quantity)
	49 CFR 173.403(n) 49 CFR 173.435	0.002 μCi/g to 0.1 μCi/g	30 μCi to 3,000 μCi/ package	UN2912 (LSA)
Thorium-232 soil or other solids				
	49 CFR 173.403(y)	<0.002 μCi/g	NA	Environmental
	49 CFR 173.403 49 CFR 173.435	0.002 μCi/g to 300 μCi/g	Unlimited	UN2910 (Limited quantity)
Thorium-230 in soil or other solids				
	49 CFR 173.403(y)	<0.002 μCi/g	NA	Environmental
	49 CFR 173.403 49 CFR 173.423	0.002 μCi/g to 0.1 μCi/g	<30 μCi/ package	UN2910 (Limited quantity)
	49 CFR 173.403(n) 49 CFR 173.435	0.002 μCi/g to 0.1 μCi/g	30 μCi to 3,000 μCi/ package	UN2912 (LSA)

[a]The package refers to the shipment cooler (not the sample jars).
DOT - U.S. Department of Transportation
NA - not applicable
LSA - low-specific activity

APPENDIX 5.3

TRANSPORTATION OF UNKNOWN HAZARDOUS MATERIALS BY 49 CFR

A. Transportation of Unknown Hazardous Materials by 49 CFR

1. For samples of hazardous substances of unknown content that will be shipped by surface carrier under 49 CFR Transportation Regulations, the appropriate transportation category is selected through a process of elimination using the Department of Transportation (DOT) Hazardous Materials Classification system. While it is probable that most unknown samples of hazardous material shipped by field personnel will not contain radioactive materials or Poison A materials, it is essential for the following gradient hierarchy to be considered.

2. If radiation survey instruments demonstrate (or reasonable probability exists) that the unknown hazardous sample is radioactive, the appropriate DOT shipping regulations for radioactive material must be followed. Contact the subcontractor's health and safety officer for ER Program technical assistance for specific details.

3. If radioactive material is eliminated, the sample must then be considered to contain Poison A materials. DOT defines Poison A as an extremely dangerous, poisonous gas or a gas or liquid of the nature that a very small amount of gas (or vapor of the liquid) will be dangerous to life. Most Poison A materials are gases and would not be found in glass or drum-like containers. All samples taken from closed containers do not have to be shipped as Poison As. Based upon information available, judgment must be made as to whether a sample from a closed container is a Poison A. For specific instructions on the proper procedures for shipping Poison A, contact the subcontractor's health and safety officer for ER Program technical assistance.

4. If Poison A is eliminated as a shipment category, the next two classifications are flammable or nonflammable gases. Because an open container is not expected to contain a significant amount of gas, flammable liquid would be the next applicable category. After the categories of radioactive material, Poison A flammable gas, and nonflammable gas have been eliminated, the sample can be classified as a flammable liquid and shipped accordingly.

5. These procedures would also suffice for shipping any other samples classified below Poison A in the DOT classification table.

6. These procedures would also suffice for shipping any other samples classified below flammable liquids in the DOT classification table.

B. Shipment of Flammable Liquid by 49 CFR

The following instructions apply to the shipment of a flammable liquid by rail car, truck, or other common carrier.

1. Collect the sample in a glass or polyethylene container with a metallic, Teflon-lined screw cap. The container may be no larger than 16 fluid oz. To prevent leakage, fill the container no more than 90% full. Mark the fluid level on the outside of the sample container. If an air space in the sample container would affect sample integrity (for example, the case of a volatile organics analysis vial), place that container within a second container to meet the 90% requirement. Before any samples are placed in the final shipping container, the exterior should be wiped clean with a detergent solution.

2. Complete the sample identification tag (see SOP 1.3, Sample Control and Documentation) and attach it securely to the sample container. The sample identification tag should contain information needed to trace the sample to its point of origin and sample taker, as well as any quality assurance/quality control information.

3. Seal the container and place it in a 2-ml-thick (or thicker) polyethylene bag with one sample in each bag. Position the identification tag so that it can be read through the bag. Seal the bag.

4. Place the sealed bag inside a metal can and cushion it with enough noncombustible, absorbent material (for example, vermiculite) between the bottom and sides of the can and bag to prevent breakage and absorb leakage. Pack one bag per can. Use clips, tape, or other positive means to secure the lid onto the can.

5. Place one or more metal cans into a strong outside container (like a picnic cooler or a DOT-approved fiberboard box). Surround cans with noncombustible, absorbent cushioning material for stability during transport. Total sample volume in the picnic cooler or fiberboard box should not exceed 10 gallons. A separate air bill and shipping declaration must be processed for each container or combination of containers so that the total sample volume on any air bill will not exceed 10 gallons.

C. Shipment by Land

The following instructions apply for shipment of samples of hazardous material by car or truck (not by common carrier).

1. The above instructions for flammable liquids will apply.

2. Additionally, sample containers must be firmly secured so that they will not bounce against the sides of the vehicle during transit or in an accident.

3. Limit shipments to 1000 lbs or less. Under 1000 lbs, there are no placarding requirements under 49 CFR 172.504 (c) (1).

D. Chain of Custody

Include the Custody Transfer Record/Lab Work Request form (properly executed) in the outside container. It is also recommended to use chain-of-custody tape over each can lid.

E. Marking and Labeling Samples Classified as Flammable Liquid

1. Use abbreviations only where specified.

2. Place the information listed below on each paint can.

   - Laboratory name and address

   - Flammable Liquid, N.O.S. UN 1993. The designation N.O.S. means not otherwise specified. Use an approved DOT label.

3. Information placed on cans should also be placed on at least one side of the outside shipping containers. If labelling is placed on more than one side, it must be attached to all visible sides.

F. Shipping Papers for Samples Classified as Flammable Liquid

Shipping papers must be provided for the shipment of all samples (including those transported by rental, government, company, or personal cars).

G. Bill of Lading/Certification Statement

Complete the bill of lading and sign the certification statement. If the carrier does not provide it, use a standard industry form. Provide the information listed below in the order listed. One form may be used for more than one outside container.

- Flammable Liquid, N.O.S. UN 1993

- Limited Quantity (or Ltd. Qty.)

- Net weight or net volume (weight or volume may be abbreviated) just before or after the UN or ID number.

- Further description (like Laboratory Samples) is allowed if it does not contradict required information.

APPENDIX 5.3, Concluded

H. Transportation

1. Transport samples of unknown hazardous material that are classified as flammable liquid by rented or common carrier truck or railroad, as appropriate.

2. Do not transport by any air transport system.

APPENDIX 5.4

TRANSPORTATION OF UNKNOWN HAZARDOUS MATERIAL BY IATA

A. Transportation of Unknown Hazardous Material by International Air Transport Association (IATA)

For samples containing unknown material that will be shipped by air carrier, the most appropriate classification in the IATA regulations is the classification of other regulated substances. In order to use this designation, the categories shown below must be eliminated.

- Radioactive Materials
- Poison A Materials
- Flammable Gases
- Nonflammable Gases

B. Shipment of Other Regulated Substances

The instructions below will apply for the shipment of other regulated substances by cargo-carrying aircraft, rail car, or other common carrier.

1. Collect the sample in a glass or polyethylene container with a nonmetallic, Teflon-lined screw cap. The container may be no larger than 16 fluid oz.. To prevent leakage, fill the container no more than 90% full. If an air space in the sample container would affect sample integrity (for example, the case of a volatile organics analysis vial), place that container within a second container to meet the 90% requirement. Before any samples are placed in the final shipping container, the exterior should be wiped clean with detergent solution.

2. Complete the sample identification tag (see SOP 1.3, Sample Control and Documentation) and attach it securely to the sample container. The sample identification tag should contain information needed to trace the sample to its point of origin and sample taker, as well as any quality assurance/quality control information.

3. Seal the container and place it in a 2-ml-thick (or thicker) polyethylene bag with one sample in each bag. Position the identification tag so that it can be read through the bag. Seal the bag.

4. Place the sealed bag inside a metal can and cushion it with enough noncombustible, absorbent material (for example, vermiculite) between the bottom and sides of the can and bag to prevent breakage and absorb leakage. Pack one bag per can. Use clips, tape, or other positive means to secure the lid onto the can.

5. Place one or more metal cans into a strong outside container (like a picnic cooler or a DOT-approved fiberboard box). Surround cans with noncombustible, absorbent cushioning material for stability during transport. Total sample volume in the picnic cooler or fiberboard box should not exceed 40 liters.

C. Chain of Custody

Include the Custody Transfer Record/Lab Work Request form (properly executed) in the outside container. It is also recommended to use chain-of-custody tape over each can lid.

D. Marking and Labeling Samples Classified as Other Regulated Substances

1. Use abbreviations only where specified.

2. Place the information listed below on each paint can.

   - Laboratory name and address

   - Other regulated substances, UN8027. Hazardous Class # 9

3. Information placed on cans should also be placed on at least one side of the outside shipping containers. If labelling is placed on more than one side, it must be attached to all visible sides.

4. Cargo Aircraft Only must be printed on all outside shipping containers.

5. Print Laboratory Samples and This End Up or This Side Up clearly on top of the outside shipping container. Outside containers also must contain the statement Inside Packages to Comply with Prescribed Specifications. Put upward pointing arrows on all four sides of the container.

E. Shipping Papers for Samples Classified as Other Regulated Substances

Shipping papers must be provided for the shipment of all samples (including those transported by rental, government, company, or personal cars).

F. Bill of Lading/Certification Statement

Complete the bill of lading and sign the certification statement. If the carrier does not provide it, use a standard industry form. Provide the information listed below in the order listed. One form may be used for more than one outside container.

- Other Regulated substances, UN8027

- Class or Division # 9

- Net weight or net volume (weight or volume may be abbreviated) just before or after the UN or ID number.

- Further description (like Laboratory Samples) is allowed if it does not contradict required information.

G. Transportation

1. Transport samples of unknown hazardous material that are classified as other regulated substances by rented or common carrier truck, railroad, express overnight package services, or other appropriate means.

2. Do not transport by any passenger-carrying air transport system. Ship by air carriers that transport only cargo (for example, Federal Express).

STANDARD OPERATING PROCEDURE 1.6

GENERAL EQUIPMENT DECONTAMINATION

1. PURPOSE

To describe methods for the decontamination of field equipment potentially contaminated during sample collection.

2. DISCUSSION

The Field Sampling Plan (FSP) or Work Plan (WP) provides information about the scope and details of a given operation. The FSP or WP also contains specifications for the use of decontamination agents, areas where decontamination will be performed, and quality assurance procedures to verify the effectiveness of the decontamination procedures. Decontamination is performed as a quality assurance measure and a safety precaution. It prevents cross-contamination among samples and helps maintain a clean working environment for the safety of all field personnel.

Decontamination is mainly achieved by rinsing with liquids that include soap or detergent solutions, tap water, deionized water, and methanol. Equipment is allowed to air dry after being cleaned or wiped dry with chemical-free cloths or paper towels. It can then be reused immediately. Steam cleaning should be used whenever visible contamination exists or for large machinery/vehicles.

It is the primary responsibility of the site manager to assure that proper decontamination procedures are followed and that all waste materials produced are properly stored or disposed of. It is the responsibility of all personnel involved with sample collection or decontamination to maintain a clean working environment and ensure that contaminants are not negligently introduced into the environment.

3. PROCEDURES

3.1. Associated Procedures

Before every operation, a review of SOPs 1.1-1.10 is necessary. These SOPs contain information on the performance of field activities. They should be consulted for specific information about equipment and supplies; sample collection, preservation, packaging, and shipping; decontamination procedures; and documentation requirements. Procedures directly associated with this SOP are listed below.

SOP No.	SOP Title
1.1	General Instructions for Field Personnel
1.7	Sampling for Removable Alpha Contamination
6.4	Total Alpha Surface Contamination Measurements
6.11	Beta-Gamma Radiation Measurements Using a Geiger-Mueller Detector

3.2. Preparation

3.2.1. Office

A. Review the FSP or WP and SOPs listed in Section 3.1.

B. Coordinate schedules/actions with the installation staff.

C. Obtain appropriate permission for property access.

D. Assemble the equipment and supplies listed in Appendix 5.1.

E. Notify the analytical laboratory of the decontamination blank sample and the approximate arrival date.

F. Contact the carrier that will transport the sample to obtain information on regulations and specifications.

3.2.2. Documentation

A. Obtain a logbook from the QA officer.

B. There are no forms required to document decontamination procedures and the degree of decontamination attained.

3.2.3. Field

A. Assemble containers and equipment for decontamination.

B. Decontaminate all equipment before use.

3.3. Operation

The extent of known contamination determines the extent to which equipment must be decontaminated. If the extent of contamination cannot be readily determined, clean the equipment on the assumption that it is highly contaminated until enough data are available to allow an accurate assessment of the level of contamination.

Adequate supplies of rinsing liquids and all materials should be available. Perform decontamination in the same level of protective clothing as sampling activities unless a different level of protection is specified in the FSP or Health and Safety Plan.

The procedure for full field decontamination follows. Any deviations from this procedure for a specific project are included in the FSP or WP.

Decontamination Steps

1. The purpose of the initial step is to remove gross contamination. Remove any solid particles from the equipment or material by brushing and then rinsing with available tap water. For drilling equipment, steam cleaning is necessary.

2. Wash equipment with a nonphosphate soap or detergent solution, such as Alconox®.

3. Rinse with tap water by submerging or spraying.

4. For organic contaminants, an optional rinse with a solvent (methanol, acetone, or hexane) may be completed to dissolve and remove contaminants. However, acetone shall not be used on equipment if VOC samples are being collected. Hexane is recommended if equipment has been exposed to oils.

5. Rinse thoroughly with distilled water.

6. Air dry equipment or rinse with nanograde methanol to expedite drying.

7. If radiation screening is required by the FSP or WP, screen the equipment with a radiation detector according to SOP 1.7, Sampling for Removable Alpha Contamination; SOP 6.4, Total Alpha Surface Contamination Measurements; or SOP 6.12, Radon-222 Flux Measurements Using Charcoal Canisters. If activity above the limits for unrestricted use is detected, repeat steps 1-6.

8. Samples of drippings from the last rinse in step 5 may be collected and analyzed to verify the effectiveness of the decontamination procedure. This type of sample is called a decontamination blank. The results of these analyses are not usually available for at least one week after they arrive in the laboratory, so it is important to do a thorough decontamination from the start of the sampling activity to minimize the potential for a positive hit in the decontamination drippings.

3.4. Postoperation

3.4.1. Field

A. Decontaminate as much sampling equipment as possible and properly dispose of expendable items that cannot be decontaminated. Proper disposal may involve onsite drumming of liquids and solids in approved containers for subsequent disposal. Expensive items like machinery may require a more advanced decontamination analysis.

B. Prepare the decontamination blank sample and transport it according to SOP 1.3, Sample Control and Documentation; SOP 1.4, Sample Containers and Preservation; and SOP 1.5, Guide to Handling, Packaging, and Shipping of Samples.

C. Store containers of solutions produced during decontamination in a secure area.

D. Dispose of any soiled materials as designated in the FSP or WP.

3.4.2. Documentation

A. Record radiological measurements in the logbook before leaving the site.

B. There are no forms required to document decontamination procedures and the degree of contamination attained.

3.4.3. Office

A. Deliver original logbooks to the site manager for technical review. He/she will review and transmit to the document control officer (copies to the files) for eventual delivery to the Department of Energy.

B. Inventory equipment and supplies. Repair or replace all broken or damaged equipment. Replace expendable items. Return equipment to the equipment manager and report incidents of malfunction or damage.

C. Contact the analytical laboratory to ensure that the sample arrives safely and instructions for analyses are clearly understood.

D. After receiving the results of the laboratory analyses, arrange for the disposal of wastes generated during the investigation.

4. SOURCE

NIOSH, OSHA, USCG and EPA. 1985. "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities." prepared by the National Institute for Occupational Safety and Health (NIOSH), Occupational Safety and Health Administration (OSHA), U.S. Coast Guard (USCG), and the U.S. Environmental Protection Agency (EPA). U.S. Department of Health and Human Services, Public Health Service, Centers for Disease Control, NIOSH report, October 1985. Washington, D.C.: U.S. Government Printing Office.

5. APPENDIX

5.1. Equipment and Supplies Checklist

APPENDIX 5.1

EQUIPMENT AND SUPPLIES CHECKLIST

_____ Decontamination solutions preselected by the laboratory

_____ Cleaning liquids: soap or detergent solutions, tap water, deionized water, and methanol

_____ Chemical-free paper towels

_____ Cleaning brushes

_____ Cleaning containers: plastic buckets and galvanized steel pans

_____ Waste storage containers: drums and plastic bags

APPENDIX B

TEST RESULTS BY SAMPLE

Sample: 01A MND16-0012-0001 MS/MSD Collected: 01/29/91

Test Description	Result	D.L.	Units	Analyzed	By
TCLP Metals					
Arsenic	<0.01	0.01	mg/liter	02/08/91	JK
Barium	0.51	0.03	mg/liter	02/12/91	NR
Cadmium	<0.05	0.05	mg/liter	02/12/91	NR
Chromium	<0.01	[illegible]	mg/liter	02/[illegible]/91	JK
Lead	0.014	0.[illegible]	mg/liter	02/[illegible]/91	JK
Mercury	[illegible].000	[illegible].000	mg/liter	02/11/91	JK
Selenium	[illegible].0	0.0	mg/liter	02/08/91	JK
Silver	[illegible].05	0.05	mg/liter	02/12/91	NR
TCLP Organic					
O-cresol	<0.050	0.050	mg/liter	02/05/91	DVM
M-cresol	[illegible].050	0.050	mg/liter	02/05/91	DVM
P-cresol	<0.050	0.050	mg/liter	02/05/91	DVM
Pentachlorophenol	<0.020	0.020	mg/liter	02/05/91	DVM
2,4,5-Trichlorophenol	<0.025	0.025	mg/liter	02/05/91	DVM
2,4,6-Trichlorophenol	<0.015	0.015	mg/liter	02/05/91	DVM
2,4-Dinitrotoluene	<0.030	0.030	mg/liter	02/05/91	DVM
Hexachlorobenzene	<0.010	0.010	mg/liter	02/05/91	DVM
Hexachlorobutadiene	<0.0050	0.0050	mg/liter	02/05/91	DVM
Hexachloroethane	<0.010	0.010	mg/liter	02/05/91	DVM
Nitrobenzene	<0.010	0.010	mg/liter	02/05/91	DVM
Chlordane	<0.03	0.03	mg/liter	02/05/91	DVM
Endrin	<0.003	0.003	mg/liter	02/05/91	DVM
Heptachlor	<0.001	0.001	mg/liter	02/05/91	DVM
Lindane	<0.06	0.06	mg/liter	02/05/91	DVM
Methoxychlor	<1.4	1.4	mg/liter	02/05/91	DVM
Toxaphene	<0.07	0.07	mg/liter	02/05/91	DVM
2,4-D	<1.4	1.4	mg/liter	02/05/91	DVM
Silvex	<0.14	0.14	mg/liter	02/05/91	DVM

Example

Test Description	Result	D.L.	Units	Analyzed	By
1,4-Dichlorobenzene	<0.020	0.020	mg/liter	02/05/91	DVM
Cresol	0.15	0.15	mg/liter	02/05/91	DVM
Zero Head Space Extraction					
Benzene	<4.40	4.40	ug/liter	02/05/91	DVM
Carbon Tetrachloride	<2.80	2.80	ug/liter	02/05/91	DVM
Chlorobenzene	<6.00	6.00	ug/liter	02/05/91	DVM
Chloroform	<1.60	1.60	ug/liter	02/05/91	DVM
1,2-Dichloroethane	<2.80	2.80	ug/liter	02/05/91	DVM
1,1-Dichloroethylene	<2.80	2.80	ug/liter	02/05/91	DVM
Methylethyl Ketone	<10.0	[illegible]	ug/liter	02/05/91	DVM
Pyridine	<10.0	10.	ug/liter	02/05/91	DVM
Tetrachloroethylene	<4.10	4.10	ug/liter	02/05/91	DVM
Trichloroethylene	<1.90	1.90	ug/liter	02/05/91	DVM
Vinyl Chloride	<2.00	2.00	ug/liter	02/05/91	DVM

Sample: 02A [illegible]16-0012-00[illegible] Collected: 01/29/91

Test Description	Result	D.L.	Units	Analyzed	By
TCLP Metals					
Arsenic	<0.01	0.01	mg/liter	02/08/91	JK
Barium	0.63	0.03	mg/liter	02/12/91	NR
Cadmium	<0.05	0.05	mg/liter	02/12/91	NR
Chromium	<0.01	0.05	mg/liter	02/12/91	JK
Lead	<0.01	0.05	mg/liter	02/13/91	JK
Mercury	<0.0004	0.0004	mg/liter	02/11/91	JK
Selenium	<0.01	0.01	mg/liter	02/08/91	JK
Silver	<0.05	0.05	mg/liter	02/12/91	NR
TCLP Organics					
O-cresol	<0.050	0.050	mg/liter	02/05/91	DVM
M-cresol	<0.050	0.050	mg/liter	02/05/91	DVM
P-cresol	<0.050	0.050	mg/liter	02/05/91	DVM
Pentachlorophenol	<0.020	0.020	mg/liter	02/05/91	DVM

Example

QA/QC REPORT

PROCEDURE: TCLP PESTICIDES & HERBICIDES

Date of Analysis: _____
Analyst: _____
Matrix: _____
Number of Samples Analyzed: _____
Reference Page: _____
Date: _____
Supervisor: _____

CEP Sample Numbers On This Report

_____ _____
_____ _____
_____ _____
_____ _____
_____ _____

MATRIX SPIKE/MATRIX SPIKE DUPLICATE RESULTS

CEP Sample Number Used For MS/MSD: _____

Compound	Original Result ug/L	Spike Amount ug/L	MS Result ug/L	MS % Recov	MSD Result ug/L	MSD % Recov	RPD Relative % Diff	Interim QC Limits % Recov	Interim QC Limits RPD
Lindane								55-135	25
Heptachlor								40-131	25
Endrin								63-124	25
2,4-D								36-144	25
Silvex								13-161	25

Spike % Recovery: _____ out of _____ outside limits RPD: _____ out of _____ outside limits

INITIAL CALIBRATION DATA

Curve Type Code: L = Linear Q = Quadratic C = Cubic

Compound	Curve Type Used	Retention Time	Low Conc ug/ml	Area	Mid Conc ug/ml	Area	High Conc ug/ml	Area
Lindane	L Q C							
Heptachlor	L Q C							
Endrin	L Q C							
Methoxychlor	L Q C							
Chlordane	L Q C							
Toxaphene	L Q C							
2,4-D	L Q C							
Silvex	L Q C							

CALIBRATION CROSS CHECK OR CONTINUING CALIBRATION CHECK DATA

Compound	True Conc ug/ml	Calc Conc ug/ml	% Diff	QC Limits % Diff
Lindane				25
Heptachlor				25
Endrin				25
Methoxychlor				25
Chlordane				25
Toxaphene				25
2,4-D				25
Silvex				25

Procedure:_____ Method No.:_____ Date of Analysis:_____

Analyst:_____ Matrix:_____ Supervisor:_____

Detection Limits:_____ Number of Samples Analyzed:_____

Reference Page:_____ Date Turned in:_____

Lab # on this report:_____ _____ _____

Matrix Spike/Matrix Spike Duplicates: Standard Log #_____

CEP Number	Original Result	Spike Amount	MS Result	MS % Rec	MSD Result	MSD % Rec	Relative % Difference

Calibration Standards:

Theoretical Conc. mg/l	Calculated Conc. mg/l	Calculated Conc. mg/l	Calculated Conc. mg/l	Calculated Conc. mg/l	Calculated Conc. mg/l

Calibration Cross-Check: ILS LOG #_____

Theoretical Conc. mg/l	Calculated Conc. mg/l	Calculated Conc. mg/l	Calculated Conc. mg/l	Calculated Conc. mg/l	Calculated Conc. mg/l

Comments:_____

_____

Date:_____ QA Reviewed & Approved By:_____

WATER VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

	EPA SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 (DCE) #	OTHER	TOT OUT
01						
02						
03						
04						
05						
06						
07						
08						
09						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

		QC LIMITS
SMC1 (TOL)	= Toluene-d8	(88-110)
SMC2 (BFB)	= Bromofluorobenzene	(86-115)
SMC3 (DCE)	= 1,2-Dichloroethane-d4	(76-114)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D System Monitoring Compound diluted out

2C

WATER SEMIVOLATILE SURROGATE RECOVERY

ab Name: _____ Contract: _____

o Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

	EPA SAMPLE NO.	S1 (NBZ) #	S2 (FBP) #	S3 (TPH) #	S4 (PHL) #	S5 (2FP) #	S6 (TBP) #	S7 (2CP) #	S8 (DCB) #	TOT OU
01										
02										
03										
04										
05										
06										
07										
08										
09										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

		QC LIMITS	
S1 (NBZ)	= Nitrobenzene-d5	(35-114)	
S2 (FBP)	= 2-Fluorobiphenyl	(43-116)	
S3 (TPH)	= Terphenyl-d14	(33-141)	
S4 (PHL)	= Phenol-d5	(10-110)	
S5 (2FP)	= 2-Fluorophenol	(21-110)	
S6 (TBP)	= 2,4,6-Tribromophenol	(10-123)	
S7 (2CP)	= 2-Chlorophenol-d4	(33-110)	(advisory)
S8 (DCB)	= 1,2-Dichlorobenzene-d4	(16-110)	(advisory)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

e __ of __

3A

WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: _____ Contract: _____

Lab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: _____

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMIT REC.
1,1-Dichloroethene					61-14
Trichloroethene					71-12
Benzene					76-12
Toluene					76-12
Chlorobenzene					75-13

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene					14	61-14
Trichloroethene					14	71-12
Benzene					11	76-12
Toluene					13	76-12
Chlorobenzene					13	75-13

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: _____ out of _____ outside limits

Spike Recovery: _____ out of _____ outside limits

COMMENTS: _____

WATER SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

ab Name: _____ Contract: _____

ab Code: _____ Case No.: _____ SAS No.: _____ SDG No.: _____

Matrix Spike - EPA Sample No.: _____

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC. LIMIT. REC.
Phenol					12-11
2-Chlorophenol					27-12
1,4-Dichlorobenzene					36- 97
N-Nitroso-di-n-prop.(1)					41-116
1,2,4-Trichlorobenzene					39- 9
4-Chloro-3-methylphenol					23- 9
Acenaphthene					46-118
4-Nitrophenol					10- 8
2,4-Dinitrotoluene					24- 9
Pentachlorophenol					9-103
Pyrene					26-12

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
Phenol					42	12-110
2-Chlorophenol					40	27-123
1,4-Dichlorobenzene					28	36- 97
N-Nitroso-di-n-prop.(1)					38	41-116
1,2,4-Trichlorobenzene					28	39- 98
4-Chloro-3-methylphenol					42	23- 97
Acenaphthene					31	46-118
4-Nitrophenol					50	10- 80
2,4-Dinitrotoluene					38	24- 96
Pentachlorophenol					50	9-103
Pyrene					31	26-127

(1) N-Nitroso-di-n-propylamine

Column to be used to flag recovery and RPD values with an asterisk
Values outside of QC limits

PD: _____ out of _____ outside limits
ke Recovery: _____ out of _____ outside limits

OMMENTS: _____

APPENDIX C

QUALITY ASSURANCE PLAN

CONRAIL EXCAVATION

MIAMI-ERIE CANAL, OPERABLE UNIT 4

QUALITY ASSURANCE PLAN

for

CONRAIL EXCAVATION

MIAMI-ERIE CANAL, OPERABLE UNIT 4

Project AES No.: M76015

Issue of: May 20, 1990

Prepared by: Monte Williams

EG&G Mound Applied Technologies
Miamisburg, Ohio

Approvals:

Monte Williams — Date 5-28-91
Project Manager

Richard A. Neff — Date 5/29/91
Project Sponsor

Fred Mintz — Date 5/29/91
Loss Prevention and Environmental Control Representative

Rodney N. Rogers — Date 5/29/91
Quality Assurance Representative

Daniel G. Carfagno — Date 5/29/91
ES&H Compliance and Remedial Action Specialist

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1. Description and Scope of Project

The Conrail Company needs to do some repair work on the railroad bridge over the Miami-Erie Canal which necessitates excavation of soil. Presence of Plutonium-238 in this area of the canal has been established. Since this area is included in a CERCLA "Federal Facilities Agreement" (FFA), excavation must be controlled until the assessment phase is completed. Therefore, EG&G Mound plans to do all of the soil excavation in order to minimize spread of contamination and to retain control of the project. The contaminated soil will be prepared for shipment and burial. The additional uncontaminated soil which is required to be excavated for Conrail's repair work will also be removed and staged for use as backfill for the project. Health Physics will monitor the work as it progresses and take samples as necessary in order to control contamination. Air monitors may be used in order to assure airborne contamination above acceptable limits does not exist. Water which enters the excavation through seepage will be sampled and pumped back into the creek as long as radiation levels are not above acceptable limits. A sampling plan will be developed and approved in order to assure that any mixed waste is identified.

2. Purpose of QA Plan

The purpose of this Quality Assurance Plan (QA Plan) is to assure that the objectives of the United States Department of Energy (D.O.E.) and EG&G Mound Applied Technologies, Miamisburg, Ohio (Mound) are met for this non-weapons project relative to health and safety, protection of the environment, reliability and continuity of operations, and documentation of quality efforts. This QA Plan identifies the activities and responsibilities which are necessary in the design, procurement, fabrication, installation, and start up of this project in order to meet these objectives.

3. Applicable Documents

The D.O.E. requirements for quality assurance for projects such as this one are set forth in AL Order 5700.6B, Revision 2, dated July 7, 1989. That AL Order directs contractors such as Mound to develop non-weapons quality assurance programs through application of appropriate requirements of the consensus standard of the American Society of Mechanical Engineers (ASME) titled "Quality Assurance Program Requirements for Nuclear Facilities". That standard is designated as ASME NQA-1-1989 Edition and is commonly called "NQA-1". A set of 1989 and 1991 addenda have been issued.

The Mound non-weapons quality assurance program reflecting the D.O.E. guidance cited above is presented in Mound Technical Manual MD-10165. The implementation of that program within the Engineering Department is set forth in Mound Technical Manual MD-10241, Issue 11, titled "5700.6B Quality Plans for Engineering Department" (Manual MD-10241).

Other Documents and Forms:

Mound Manual MD-10286, titled "Safety and Hygiene Manual".

Mound Systems Manual No. 811, titled "Mound Engineering Department AES System Manual", (AES Manual) provides procedures for managing and documenting expense, capital equipment, productivity capital, and reimbursable projects.

Mound Form ML-8440, titled "Project Quality Assurance Review".

Mound Form ML-7588, titled "Engineering Review Transmittal Sheet".

Mound Form ML-8816, titled "Engineering Department Nonconformance Report".

Mound Manual MD-10019, titled "Nuclear Radiation Safety Manual"

Mound Manual MD-70204, titled "Low Level Radioactive Waste Management".

Mound Manual MD-10332, titled "Decon Manual"

Mound Manual MLM-MU-89-70-0001, titled "Maintenance and Utilities Safety Handbook"

OSHA Standard CRR Part 1926, titled "Occupational Safety and Health Standards"

NVO-325 - Nevada Test Site Defense Waste Acceptance Criteria, Certification, and Transfer Requirements.

4. Analysis of Consequence of Failure

A Project Quality Assurance Review was completed and approved on April 12, 1991. The Project Manager, together with the Sponsor, the LP&EC Representative, and the QA Representative participated in the analysis of the potential failure modes and associated consequences. The most severe QA Level as defined in Section 1.3 of Manual MD-10241, was 2. Manual MD-10241 requires a written QA Plan for any AES project assessed as QA Level 1 or 2.

The major considerations in determining the consequence of failure were the possible spread of contamination and the adverse public reaction associated with that type of occurrence. Other considerations included the possibility of an excavation cave in and injury to personnel. Using these considerations and the definitions of consequence of failure, a Quality Assurance Level 2 was assigned to the Conrail Excavation Project.

5. Quality Elements and Quality Assurance Efforts

The quality assurance efforts planned for this project are explicitly discussed in the following sections (5.1 through 5.19). The first 18 section headings are the same as those of the basic requirements, or elements, of both ASME NQA-1-1989 Edition and D.O.E. Order AL 5700.6B, Revision 2. The 19th section is for software.

5.1. Organization

Responsibility for the non-weapons quality assurance program at Mound is vested with the Director of the Quality Department. Overall administration of the program is delegated to a staff individual reporting to the Manager of Non-weapons Quality Assurance. Implementation of the program is conducted by a "matrix" organization involving Department Coordinators from the various departments.

Within the Engineering Department, the Department Coordinator manages the NWQA program. The Department Coordinator reports to the Manager of Engineering Systems and Design, who in turn reports to the Director of Engineering. A staff of Section NWQA Representatives report directly to the Department Coordinator, and implement the program in their Sections. Thus, the NWQA staff is administratively independent of all other direct supervision.

Those persons prominently associated with implementation of this QA Plan for the Conrail Excavation project are listed below together with their functional title and general responsibilities.

Project Sponsor. Richard A. Neff. - Responsible for making project budget submission, participating in development of statement of work and design criteria, providing design reviews, and obtaining project approvals from the ES&H Department,

Project Engineer. Monte A. Williams - Responsible for project management, design and specification, control of construction, administration of inspections, resolution of nonconformances, control of nonconforming items, and maintenance of QA records. Responsible for execution of this QA Plan.

Design Reviewers. Technical peer review of design.

Daniel G. Carfagno - ES&H Compliance and Remedial Action.

LP&EC Representative. Fred Mintz - Representative of Loss Prevention and Environmental Control (LP&EC) with review and advisory role.

QA Representative. Rodney Rogers - Representative of Nonweapon Quality Assurance. Responsible for review of this QA Plan and any internal Engineering audit of this project.

5.2. Quality Assurance Program

The non-weapons quality program plan for the Engineering Department at Mound is described in Mound Technical Manual MD-10241, Issue 11, titled "5700.6B Quality Plans for Engineering Department". (Refer to Section 3 above for a discussion of the relation of Manual MD-10241 to Manual MD-10165, to D.O.E. Order Al 5700.6B, Revision 2, and to ASME NQA-1-1989 Edition.) This QA Plan for the Conrail Excavation project describes the specific implementation for this project of the guidance in Manual MD-10241, Issue 11.

5.3. Design Control

Explicit design criteria will be developed. Design information will be documented in the form of sketches, photographs, and work packages. These documents will be used as communication tools to assure that the excavation can be accomplished according to definite design intent.

In accordance with Section 1800, titled " Project Review", of Manual 804, specifications and drawings will be circulated by the Design Engineer for review and comment. Design documents will be reviewed independently by a peer Design Reviewer to assure the technical adequacy and safety of the design. Design documents will be reviewed by the Sponsor to confirm that the design criteria are satisfied, and by the LP&EC Representative to assure the safety of the design. Reviews and comments designated by the reviewer as requiring response will be documented by completed Engineering Review Transmittal Sheets. The Design Engineer is responsible for resolving any review comments.

Changes in the design documents will be controlled as described in Section 5.6 below.

5.4. Procurement Document Control

Procurement documents will be controlled in accordance with the Contracting and Procurement Systems Manual 701. In order to verify conformance of LSA Boxes with specifications, explicit requirements for inspection and acceptance will be included in the purchase contract{s}. Purchase contract{s} for LSA Boxes will explicitly require delivery of written certifications of materials and test results. Purchase contracts for LSA Boxes will contain explicit requirements for the supplier to have a quality assurance program consistent with specific requirements of NQA-1.

5.5. Instructions, Procedures, and Drawings

Work packages will be prepared as per Procedure No. 500, titled "Guidelines for Preparation and Transmittal of AES Work Packages", of the Mound Engineering Department AES System Manual in order to authorize in-house work. In accordance with this procedure, work packages will be sufficiently complete (approved drawings, sketches, specifications, job description, MSR, material list, list of required permits, Health Physics requirements, specific known hazards or conditions, requirements for coordination, etc.) to provide the information needed for doing the work properly. Prior to submission, the suitability of work packages will be reviewed by the Design Engineer's supervisor. Approval will be indicated by the supervisor's signature on the bottom of the completed AES Work Package Check List. Work packages will be submitted in a timely manner to allow the work described therein to be scheduled.

In order to maintain control of field operations per design intent, any as-built drawings or sketches used in the field will be explicitly marked with a dated and signed note indicating approval for use by the Project Engineer and his Supervisor. A pre-job conference will be held to assure that all personnel involved are aware of all critical steps and hazards. The content of the work package will be described to the workers at this meeting

Minor "field" changes, as determined by the Project Engineer, during the execution of the work package, will be explicitly marked by the Project Engineer with a dated and signed note documenting the change within the original Work Package. The Inspector will also sign and date the change indicating review and implementation approval.

Major "field" changes, as determined by the Project Engineer, during work package execution, which have minimum cost impact, minor schedule variance, and/or pose a minor environmental, safety and health concern, will be documented by the Project Engineer in accordance with Section 1500 of Mound System Manual 804, titled "Project Change control and configuration Review". The field operations involved will immediately cease. A revised AES Work Package with the approved Change Control Bulletin will be resubmitted for approval in a timely manner to allow the work described to be rescheduled.

Significant "field" changes, as determined by the Project Engineer, which pose a major cost impact, significant schedule variance and/or serious environmental, safety and health concern, will be documented by the Project Engineer in accordance with the Change Control Bulletin Procedure. The field operations involved will immediately cease. A revised AES Work Package with the approved Change Control Bulletin will be resubmitted for approvals in a timely manner to allow the work described to be rescheduled.

5.6. Document Control

In order to allow unambiguous identification, the date of issue will appear on specifications and sketches. Drawings will be cataloged, handled, and filed by the Project Engineer in the Project File

Changes in the design documents will be controlled, documented, and incorporated at the earliest practical time into a new and distinctly labeled issue of the document. The label will facilitate easy recognition of the latest issue of the document. The Design Engineer will initiate any such changes.

5.7. Control of Purchased Items and Services

Potential suppliers of LSA Boxes have been previously approved by Mound QC. This approval has been done by examination of written documentation and by site visit and has been documented by written communication to Procurement and Contracting.

If written certifications of methods, composition of materials, inspections, or test results for purchased material or services are required by the purchase contract, then a check will be made by the project engineer to verify that such documents have been received. Any such documents will be reviewed for completeness and adequacy.

5.8. Identification and Control of Items

Purchased items will be identified by purchase order number. In order to maintain individual identity of items, serial numbers will be used on LSA boxes. Not all items used in this project require strict control. Many of the items used during the operations are off-the-shelf and require identification only because they have been used in contaminated or potentially contaminated areas.

Designated items such as radioactive waste containers shall be sufficiently identified to allow proper selection for use, completion of processing, or segregation of nonconforming items as specified in Mound Technical Manual MD-70204 "Low Level Radioactive Waste Management".

5.9. Control of Processes

Excavation will be done only by trained, designated persons using specified equipment in accordance with written procedures.

The Project Engineer will initiate a work permit and associated work requirements and give the work permit with all necessary requirements to the Safety Engineer for safety analysis review and signature approval.

The Project Engineer will conduct a pre-job conference to assure that all personnel involved are aware of all critical steps and hazards.

5.10. Inspection

In order to assure good workmanship and conformance to the design specifications and drawings, field construction in progress will be regularly inspected by the Project Engineer responsible for the work package installation or by a designated inspector. A daily construction logbook will be maintained as a diary of this inspection effort. The logbook will be used for notes on the progress of installation, notes on special inspections and tests, and documentation of concerns or items to be resolved.

The results of these and any other inspections will be documented. Departures from specified requirements will be controlled in accordance with Section 5.15 of this QA Plan.

5.11. Test Control

No testing will be done on the Conrail Excavation Project.

Any Health Physics survey will be scheduled and will be executed according to written procedures. Any survey results will be documented per approved Health Physics procedures. Such documentation will include explicit identification of the item(s) surveyed, the date of the survey, the survey setup or conditions, the survey result (quantitative if applicable), reference to the acceptance criteria, a statement of acceptance or rejection, and the signature of the person(s) performing the survey.

Procedures as specified in the Health Physics Procedures Manual (draft) will also assure that adequate instrumentation is available and used, that necessary monitoring is performed and that suitable environmental conditions are maintained.

After completion, the area will be inspected and radiologically monitored to assure that the project criteria and intent have been met. Survey results shall be documented by the Health Physics Technician.

5.12. Control of Measuring and Test Equipment

The accuracy and suitability of Health Physics Monitoring equipment used at Mound will be assured through use of the services of the Mound Standards group in accordance with the procedures in Manual MD-10096, titled "Mound Metrology Systems".

For the Conrail Excavation Project, the majority of the equipment that will require calibration is Health Physics equipment. The surveyors in charge of this equipment are to see that it is in proper working order.

5.13. Handling, Storage, and Shipping

Receiving and delivery of incoming materials will be handled through Mound's Material Control System. Delivery will be made to the location indicated on the material list and purchase order form.

The detailed procedures for the handling and shipment of radioactive waste generated from the excavation of contaminated soil are contained in Mound Technical Manual MD-70204, "Low Level Radioactive Waste Management." Quality Assurance requirements for controlling the treatment and disposal or radioactive waste are contained in MD-10245.

Special handling forklift forks and high capacity lifting equipment shall be used and controlled as necessary to ensure safe and adequate handling. Special handling tools and equipment shall be inspected and tested in accordance with procedures specified by Plant Transportation and at specified time intervals to verify that the tools and equipment are adequately maintained.

Operators of special handling and lifting equipment shall be trained as specified in the Plant Driver Training Program, or have appropriate, documented experience in the use of the equipment.

5.14. Inspection, Test, and Operating Status

In order to prevent inadvertent use of LSA boxes which have not passed receiving inspection, these items will not be accepted on-site until the inspection is passed.

5.15. Control of Nonconforming Items

In accordance with Section 1.5.15 of Manual MD-10241, instances of items or activities that are judged by the Project Engineer as departures from specified requirements (eg. drawings or specifications) will be designated by the Project Engineer as "deviations". The Project Engineer will immediately mark or physically segregate any deviating items so as to prevent inadvertent use prior to disposition. Using an Engineering Department Nonconformance Report form, the Project Engineer will provisionally classify such deviations as "major" or "minor". A major deviation will be defined as a deviation which is likely to result in an unsafe condition or prevent intended use or result. A minor deviation will be defined as a deviation which is not likely to result in an unsafe condition or to prevent intended use or result. On the Report form, the Project Engineer will also describe the deviation, state the apparent cause, and state and justify a recommended disposition. Disposition may include "scrap", "repair" or "rework", or "use as is".

The Project Engineer will then convene a Review Committee to evaluate the situation. If a major deviation is involved, then the Review Committee will consist of at least the Sponsor, the Project Engineer, the LP&EC Representative, and the QA Representative. If a minor deviation is involved, then the Review Committee will consist of at least the Project Engineer and the QA Representative. In either case, other specialists may be added to the Review Committee as required. The Project Engineer will be the chairperson of the Review Committee.

The Committee will review the provisional report and disposition recommended by the Project Engineer, making any agreed changes. For major deviations, the Committee will also determine and state on the Report form the root cause and any corrective action to be taken. For minor deviations, statement of root cause and corrective action will be optional. The Committee will reach a consensus, and each member will sign the Report form.

The Project Engineer will implement the corrective action indicated by the Committee, describe the action on the Report form, and certify on the Report form that the action was taken. The QA Representative will then review the Report form and, when satisfied, will also sign the form to "close out" the deviation. As a minimum, copies of the Report will be distributed to the project file and to the QA Representative. All deviations will be so resolved prior to closeout of the project.

5.16. Corrective Action

The Project Engineer will monitor the project for conditions adverse to quality. This will be done by noting discussions at project meetings, periodic review of the project logbook, and review of Nonconformance Reports. If adverse trends are identified or a potential exists for repetition of a major deviation, the Project Engineer will initiate corrective action. The Project Engineer will follow through to verify that the action is effective, and document any such actions and the results by use of the Engineering Department Nonconformance Report form and the procedure described in Section 5.15. The corrective action Review Committee will consist of at least the Sponsor, the Project Engineer, the LP&EC Representative, and the QA Representative. Other specialists may be added to this Committee as required.

5.17. Quality Assurance Records

Project records (see list below) will be maintained during the project execution. After editing work is completed, design sketches and controlled specifications will be stored in the project file and will be transferred to the Engineering Systems and Design section for storage after completion of the project.

I. Project management information

a. AES, statement of scope of project, AES Cost Estimate Summary, and AES Cost Estimate Detail.
b. MSRs.
c. Work package information including scope of package, special instructions, and material list.
d. Project schedule, including target schedule and revisions.
e. Completed Project Quality Assurance Review and QA Plan. Audit report if project audited.
f. Monthly progress reports and other major reports.
g. Meeting minutes, important correspondence and telecon notes.
h. Project closing information, including cost summary, and reports of any preoperational readiness review, etc.
i. Any PSAR or FSAR.
j. Any Engineering Bulletins or records of Configuration Board actions.

II. Design information

a. Specifications.
b. Completed Engineering Review Transmittal Sheets.
c. List of sketches and specifications.

III. Procurement records

a. Any supplier evaluation reports.
b. Purchase Orders, any associated specifications, important correspondence, and any bid evaluation reports.
c. Any supplier material certifications and inspection or test reports.

VI. Fabrication and installation records

a. Project logbook.
b. Inspection reports, test results, and calibration records.
c. Any nonconformance reports.

5.18. Audits

This project is subject to independent audit at any time by the Section QA Representative. The purpose of such audit would be to determine the degree of compliance with the provisions of this QA Plan and the adequacy of documentation of quality assurance efforts. In particular, the project hardware and files may be audited prior to transfer of the project to the Sponsor's organization.

In addition, this project is subject to independent audit by auditors from the Performance Assurance Group at Mound. Such audit would be in accordance with Manual MD-10181, titled "Mound Quality Audit Program". The procedures required by this Manual include audit reports to responsible management and provision for any necessary follow-up action. The purpose of such audit would be to determine both the degree of compliance with this QA Plan, and the adequacy and effectiveness of the QA Plan itself.

5.19. Software

No software will be generated by this project.

APPENDIX D

SAMPLING AND MONITORING DATA

CONRAIL EXCAVATION

MIAMI-ERIE CANAL, OPERABLE UNIT 4

CONRAIL EXCAVATION

Section 1.1

Monitoring Results of Five Conrail, Employees, Homes, Conrail Truck, and Urine Sample Results

EG&G MOUND APPLIED TECHNOLOGIES
P.O. BOX 3000 MIAMISBURG, OHIO 45343-3000 • TEL (513)865-4020

March 12, 1991

Dr. David C. Deubner
Conrail
1034 Six Penn Center
Philadelphia, PA 19103-2959

Dear Dr. Deubner:

Attached are results of the wipe tests conducted and analysis of urine samples submitted by the five employees involved. Copies of results of the wipe tests were given to the respective employees. Results of the urinalysis were given to the employees verbally and copies will be transmitted to them. The wipe samples represent 100 sq cm and were counted for gross alpha in gas flow proportional counters for 60 minutes. A total of 141 wipe samples were collected and counted both in the field with portable instruments and in our laboratory with proportional counters. The criteria for release to the public is 20 dpm alpha per 100 sq cm wipeable which is an NRC guideline. All sample results were below the release criteria of 20 dpm. All samples except five were below the lower detection limit (LDL) of the proportional counters which is listed on the results sheet. These five results ranged from 1.37 to 0.24 dpm which are well below the release criteria of 20 dpm.

Each employee submitted three 24-hour urine samples which were analyzed by Mound's Bioassay Laboratory for plutonium-238. All of these results were below the LDL for this analysis. The LDL for this analysis is 0.018 pCi.

If you need any further information, please feel free to contact me at 513-865-3931.

Very truly yours,

D. G. Carfagno

Dr. Daniel G. Carfagno
Sr. Environmental Specialist

DGC:db
Enc.

cc: Dr. J. D. Ruffner, Sr./EG&G-Mound
bc: R. A. Neff

DATE	SAMPLE NUMBER	LOCATION	AREA	SAMPLING METHOD	COUNTING METHOD	GROSS ALPHA dpm
1-18-91	1	Residence	Entry Door	Wipe	Proportional	<0.26
"	2	"	Foyer	"	"	<0.3
"	3	"	Kitchen	"	"	<0.39
"	4	"	Kitchen	"	"	<0.29
"	5	"	Laundry Room	"	"	<0.32
"	6	Vehicle	Brake Pedal	"	"	<0.30
"	7	"	Gas Pedal	"	"	<0.38
"	8	"	Left Floor	"	"	<0.2
"	9	"	Steering Wheel	"	"	<0.20
"	10	"	Seats	"	"	<0.2
"	11	"	Right Floor	"	"	<0.20
"	12	clothing	Coveralls	"	"	<0.20
"	13	Footwear	Boots #1 Right	"	"	<0.19
"	14	"	Boots #2 Left	"	"	<0.30
"	15	Residence	Study #1	"	"	<0.29
"	16	clothing	Coveralls	"	"	<0.20
	17	Truck	Back Floor	"	"	<0.3
"	18	Tools	Tool Box	"	"	<0.3
"	19	Tools	Tool Pouch	"	"	<0.29
"	20	Garage	Left Front	"	"	<0.32
"	21	"	Left Rear	"	"	<0.30
"	22	"	Right Rear	"	"	<0.38
"	23	"	Right Front	"	"	<0.22
"	24	"	Entrance to house	"	"	<0.20
"	25	Residence	Bath	"	"	<0.2
"	26	"	Study #2	"	"	<0.20

* Lower Detection Limit
Estimated Precision ±85%

Sample number	Location	Area	Sampling method	Counting method	Gross Alph dpm
1	Residence	Front Door	Wipe	Proportional	<.20*
2	"	TV Room	"	"	<.34*
3	Furniture	Couch	"	"	<.34*
4	Residence	TV Room	"	"	<.24*
5	"	TV Room	"	"	<.32*
6	"	Bed Room	"	"	<.30*
7	"	Bed Room	"	"	<.38*
8	"	Kitchen	"	"	<.22*
9	Furniture	Kitchen Table	"	"	<.20*
10	"	Chair	"	"	<.24*
11	Appliance	Sink	"	"	<.20*
12	Residence	Kitchen Floor	"	"	<.20*
13	Appliance	Dryer	"	"	<.18*
14	"	Freezer	"	"	<.30*
15	Truck	Right Front Floor Board	"	"	<.28*
16	"	Steering wheel	"	"	<.34*
17	"	Front Truck Bed	"	"	<.34*
18	"	Middle Truck Bed	"	"	<.24*
19	"	End Truck Bed	"	"	0.48
20	Car	Brake Pedal	"	"	<0.30*
21	"	Gas Pedal	"	"	<0.38*
22	"	Left Floor Board	"	"	0.24
23	Garage	Door	"	"	<0.24*
24	Residence	Bathroom	"	"	<0.20*
25	"	Kitchen Floor #1	"	"	<0.20*
26	Appliance	Washer	"	"	<0.18*
27	"	Back Door #2	"	"	<0.30*
28	"	Back Door #1	"	"	<0.28

Lower Detection Limit
Estimated precision ± 85%

DATE	SAMPLE NUMBER	LOCATION	AREA	SAMPLING METHOD	COUNTING METHOD	GROSS A/B dpm
1-19-9	1	Foot wear	Left Shoe	Wipe	Proportional	<0.20*
	2	"	Right shoe	"	"	<0.34*
	3	Residence	Bedroom Door	"	"	<0.34*
	4	"	closet	"	"	<0.24*
	5	"	Entrance Door	"	"	<0.32*
	6	"	Foyer	"	"	<0.30*
	7	"	Porch	"	"	<0.38*
	8	Truck	Brake Pedal	"	"	<0.22*
	9	"	Gas Pedal	"	"	<0.20
	10	"	Steering wheel	"	"	<0.24
	11	"	Left Seat	"	"	<0.20
	12	"	Left Front Mat	"	"	0.31
	13	"	Right Front Mat	"	"	<0.18
	14	"	Right Seat	"	"	<0.30
	15	"	Left Kick Panel + Door	"	"	<0.28
	16	"	Right kick panel	"	"	<0.20
	17	"	Bed	"	"	<0.34
	18	"	Bed	"	"	<0.34
	19	"	Tail Gate	"	"	<0.24
	20	Residence	Back Exit (1)	"	"	<0.32
	21	"	Back Exit (2)	"	"	<0.30
	22	"	Back Exit (3)	"	"	<0.38
	23	Appliances	Sweeper	"	"	<0.22
	24	"	Sweeper (2)	"	"	<0.20

* Lower detection limit
Estimated precision ± 85%

DATE	SAMPLE number	LOCATION	AREA	SAMPLING method	COUNTING method	GROSS A/B dpm
17-91	1	Tools	Pouch	wipe	proportional	<0.20
	2	"	"	"	"	<0.34
	3	Watch	Watch	"	"	<0.34
	4	Residence	Kitchen Door #1	"	"	<0.24
	5	"	" " #2	"	"	<0.32
	6	Appliance	Washer	"	"	<0.30
	7	"	Dryer	"	"	<0.38
	8	Residence	Front Door #1	"	"	<0.22
	9	"	" " #2	"	"	<0.20
	10	Footwear	Left shoe in back of pant. Barn #1	"	"	<0.24
	11	"	Right shoe in back of pant. Barn	"	"	<0.20
	12	"	#1 Boot in Taurus	"	"	<0.20
	13	"	#2 Boot in Taurus	"	"	<0.18
	14	Container	Bottom of shoe bag	"	"	<0.30
	15	Clothing	Raincoat	"	"	<0.28
	16	Garage	Door Entrance	"	"	<0.20
	17	"	" "	"	"	<0.34
	18	Ford Taurus	Driverside Floor	"	"	<0.34
	19	Ford Taurus	Gas pedal	"	"	<0.24
	20	Ford Taurus	Steering wheel	"	"	<0.32
	21	Ford Taurus	Brake Pedal	"	"	<0.30
	22	Footwear	Left Boot at mound	"	"	1.37
	23	"	Right Boot at mound	"	"	<.22
	24	Clothing	Coveralls	"	"	0.66
	25	Appliance	Lint from Dryer	Grab	"	<.26

* Lower Detection Limit
Estimated precision = ±85%

DATE	SAMPLE NUMBER	LOCATION	AREA	SAMPLING METHOD	COUNTING METHOD	GROSS Alpha dpm
1-19-91	1	Footwear	Right Boot	Wipe	proportional	<0.20 *
	2	"	Left Boot	"	"	<0.34 *
	3	Residence	Entrance Door	"	"	<.34 *
	4	Footwear	Left Shoe	"	"	<.24 *
	5	"	Right Shoe	"	"	<.32 *
	6	Residence	Entrance To Basement	"	"	<.30 *
	7	"	Carpet	"	"	<.38 *
	8	Appliance	Washer	"	"	<.22 *
	9	"	Dryer	"	"	<.20 *
	10	Residence	Basement steps	"	"	<.24 *
	11	"	" "	"	"	<.20 *
	12	Truck	Right Floor	"	"	<.20 *
	13	"	Seat	"	"	<.18 *
	14	"	Steering Wheel	"	"	<.30 *
	15	"	Bed	"	"	<.28 *
	16	"	Bed	"	"	<.20 *
	17	"	Clutch Pedal	"	"	<.34
	18	"	Brake Pedal	"	"	<.34
	19	"	Gas Pedal	"	"	<.24
	20	"	Left Floor	"	"	<.32

* Lower Detection Limit
· Estimated Precision ±85%

TE	Sample number	Location	Area	Sampling method	Counting method	Gross Alpha dpm
-91	1	Right Rear Tire	Conrail Truck	Wipe	Proportional	<0.24*
	2	Left Rear Tires	" "	"	"	<0.20*
	3	Left Front Tire	" "	"	"	<0.20*
	4	Right Front Tire	" "	"	"	<0.18*
	5	Clutch	" "	"	"	<0.30*
	6	Brake	" "	"	"	<0.28*
	7	Pedal Gas	" "	"	"	<0.24*
	8	Left Front Floor	" "	"	"	<0.20*
	9	Left Front Door	" "	"	"	<0.20
	10	Left Rear Floor	" "	"	"	<0.18
	11	Left Rear Door	" "	"	"	<0.30
	12	Right Rear Floor	" "	"	"	<0.28
	13	Rear Seat	" "	"	"	<0.20
	14	Right Rear Door	" "	"	"	<0.34
	15	Right Front Floor	" "	"	"	<0.34
	16	Front Seat	" "	"	"	<0.24
	17	Right Front Door	" "	"	"	<0.32
	18	Steering Wheel	" "	"	"	<0.30

* Lower Detection Limit
Estimated Precision ± 85%

CONRAIL EXCAVATION

Section 1.2

Air Sample Results

PLUTONIUM-238 AIR SAMPLES CANAL AREA 7/2/91
(BACKGROUND SAMPLES)

DATE	LOCATION	RESULT (pCi)	BLANK (pCi)	FLOW (CFM)	SAMPLING TIME (MINUTES)	PU-238 CONC. (uCi/ML)
6/12/91	NORTH	0.0573	0.0049	35	320	1.7E-16
6/12/91	SOUTH	0.0104	0.0049	35	315	1.8E-17
6/12/91	SOUTHWEST	0.0772	0.0049	35	330	2.2E-16
6/13/91	NORTH	0.0581	0.0049	35	502	1.1E-16
6/13/91	SOUTH	0.0402	0.0049	35	500	7.1E-17
6/13/91	SOUTHWEST	0.0446	0.0049	35	505	7.9E-17
6/18/91	NORTH	0.0623	0.0049	35	480	1.2E-16
6/18/91	SOUTH	0.0465	0.0049	35	480	8.7E-17
6/18/91	SOUTHWEST	0.0122	0.0049	35	480	1.5E-17
	STANDARD (0.98 pCi)	0.9169				

PLUTONIUM-238 AIR SAMPLES CANAL AREA 7/8/91
(WORK STARTED)

DATE	LOCATION	RESULT (pCi)	BLANK (pCi)	FLOW (CFM)	SAMPLING TIME (MINUTES)	PU-238 CONC. (uCi/ML)
6/24/91	NORTH	0.1233	0.0068	35	390	3.0E-16
6/24/91	SOUTH	0.0932	0.0068	35	390	2.2E-16
6/24/91	SOUTHWEST	0.0903	0.0068	35	390	2.2E-16
6/25/91	NORTH	0.1742	0.0068	35	420	4.0E-16
6/25/91	SOUTH	0.1305	0.0068	35	420	3.0E-16
6/25/91	SOUTHWEST	0.1053	0.0068	35	420	2.4E-16
6/26/91	NORTH	0.1305	0.0068	35	420	3.0E-16
6/26/91	SOUTH	0.085	0.0068	35	420	1.9E-16
6/26/91	SOUTHWEST	0.0856	0.0068	35	420	1.9E-16
	STANDARD (0.98 pCi)	1.0021				

PLUTONIUM-238 AIR SAMPLES CANAL AREA 7/16/91
(WORK STARTED)

DATE	LOCATION	RESULT (pCi)	BLANK (pCi)	FLOW (CFM)	SAMPLING TIME (MINUTES)	PU-238 CONC. (uCi/ML)
6/27/91	NORTH	0.2005	-0.0035	35	420	4.9E-16
6/27/91	SOUTH	0.0673	-0.0035	35	420	1.7E-16
6/27/91	SOUTHWEST	0.0676	-0.0035	35	420	1.7E-16
7/1/91	NORTH	0.1878	-0.0035	35	430	4.5E-16
7/1/91	SOUTH	0.1731	-0.0035	35	430	4.1E-16
7/1/91	SOUTHWEST	0.1342	-0.0035	35	430	3.2E-16

STANDARD 0.9607
(0.98 pCi)

PLUTONIUM-238 AIR SAMPLES CANAL AREA 7/16/91
(WORK STARTED)

DATE	LOCATION	RESULT (pCi)	BLANK (pCi)	FLOW (CFM)	SAMPLING TIME (MINUTES)	PU-238 CONC. (uCi/ML)
7/2/91	NORTH	0.2701	0.0077	35	425	6.2E-16
7/2/91	SOUTH	0.4183	0.0077	35	425	9.7E-16
7/2/91	SOUTHWEST	0.2105	0.0077	35	425	4.8E-16
7/3/91	NORTH	1.1051	0.0077	35	420	2.6E-15
7/3/91	SOUTH	0.4682	0.0077	35	420	1.1E-15
7/3/91	SOUTHWEST	0.0521	0.0077	35	420	1.1E-16

STANDARD 1.0252
(0.98 pCi)

PLUTONIUM-238 AIR SAMPLES CANAL AREA 7/23/91
(WORK STARTED)

DATE	LOCATION	RESULT (pCi)	BLANK (pCi)	FLOW (CFM)	SAMPLING TIME (MINUTES)	PU-238 CONC. (uCi/ML)
7/9/91	NORTH	0.0697	0.0114	35	435	1.4E-16
7/9/91	SOUTH	0.1076	0.0114	35	435	2.2E-16
7/9/91	SOUTHWEST	0.0278	0.0114	35	435	3.8E-17
7/11/91	NORTH	0.1312	0.0114	35	300	4.0E-16
7/11/91	SOUTH	0.0741	0.0114	35	300	2.1E-16
7/11/91	SOUTHWEST	0.0735	0.0114	35	300	2.1E-16

STANDARD 1.0635
(0.98 pCi)

ML-2123

ENVIRONMENTAL MONITORING DATA SHEET

TYPE SAMPLE: Hi Vol Air Canal Rail Road Bridge Project

PERIOD OR DATES OF SAMPLES: 7-9 & 7-11-91

TRACER USED & LEVEL: Pu242 (Isotope) — 5.47 d/m (Level)

COUNTING TIME: 1000 Min (Requested) — Min (Actual)

ANALYSES BY: Larry (Technician) — (Completion Date)

PHA & CALCULATIONS BY: (Technician) — (Completion Date)

SAMPLE CODE #	SAMPLE LOCATION	SAMPLE VOL. - (C.C.)	GROSS α c/m	TRACER INFORMATION			Pu^{238}		Pu^{239}	
				Cts	TOTAL	REC.	Cts.	μCi/cc	Cts.	μCi/cc
9106170	North	1 Filter	Date: 7-9-91							
9106171	South	↓	↓							
9106172	Southwest	↓	↓							
9106173	North	↓	Date: 7-11-91							
9106174	South	↓	↓							
9106175	Southwest	↓	↓							
9106176	Standard	Pu238 0.98 Picocuries								
9106177	Blank	Reagent								

AIR SAMPLING -- FIELD SHEET

SAMPLE LOCATION NORTH

	DATE	TIME ON	TIME OFF	WT. ON	WT. OFF	COMMENTS
1.	07-09	0800	1515	4.24	4.35	
2.	07-11	0945	1445	4.34	4.39	
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						

SAMPLE COLLECTOR : _____

DATE : _____

AIR SAMPLING -- FIELD SHEET

SAMPLE LOCATION SOUTH

	DATE	TIME ON	TIME OFF	WT. ON	WT. OFF	COMMENTS
1.	07-09	0800	1515	4.40	4.50	
2.	07-10	0945	1445	4.32	4.35	
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						

SAMPLE COLLECTOR : _____

DATE : _____

AIR SAMPLING -- FIELD SHEET

SAMPLE LOCATION SOUTHWEST

	DATE	TIME ON	TIME OFF	WT. ON	WT. OFF	COMMENTS
1.	07-09	0800	1515	4.32	4.41	
2.	07-10	0945	1445	4.23	4.26	
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						

SAMPLE COLLECTOR : _____

DATE : _____

HELLO VIRGIL SENDING 6 NEW RESULTS AND TWO RECOUNTS

DATE: 7 /19 /91
SAMPLE ID: 9106170 North 9-9-91
DETECTOR NUMBER: 7
DPM OF THE TRACER: 5.47
LENGTH OF COUNT: 1000 MINUTES
DETECTOR EFFICIENCY: .2904

TRACER COUNT RATE (PU-242): 1.273 CPM
PU-238 COUNT RATE: .036 CPM
PU-239 COUNT RATE: 4.00000E-03 CPM

TRACER RECOVERY EFFICIENCY: .801391 +OR- .0449221

PICOCURIES OF PU-238: .06968 +OR- .0232267

PICOCURIES OF PU-239: 7.74222E-03 +OR- 7.74222E-03

DATE: 7 /19 /91
SAMPLE ID: 9106171 South 9-9-91
DETECTOR NUMBER: 8
DPM OF THE TRACER: 5.47
LENGTH OF COUNT: 1000 MINUTES
DETECTOR EFFICIENCY: .2846

TRACER COUNT RATE (PU-242): 1.236 CPM
PU-238 COUNT RATE: .054 CPM
PU-239 COUNT RATE: 2.00000E-03 CPM

TRACER RECOVERY EFFICIENCY: .793956 +OR- .0451666

PICOCURIES OF PU-238: .107649 +OR- .0292983

PICOCURIES OF PU-239: 3.98699E-03 +OR- 5.63846E-03

DATE: 7 /19 /91
SAMPLE ID: 9106172 Southwest 9-9-91
DETECTOR NUMBER: 9
DPM OF THE TRACER: 5.47
LENGTH OF COUNT: 1000 MINUTES
DETECTOR EFFICIENCY: .2788

TRACER COUNT RATE (PU-242): 1.243 CPM
PU-238 COUNT RATE: .014 CPM
PU-239 COUNT RATE: 2.00000E-03 CPM

TRACER RECOVERY EFFICIENCY: .815063 +OR- .0462366

PICOCURIES OF PU-238: .0277518 +OR- .0148339

PICOCURIES OF PU-239: 3.96454E-03 +OR- 5.60671E-03

DATE: 7 /19 /91
SAMPLE ID: 9106173
DETECTOR NUMBER: 10
DPM OF THE TRACER: 5.47
LENGTH OF COUNT: 1000 MINUTES
DETECTOR EFFICIENCY: .2672

North 9-11-91

TRACER COUNT RATE (PU-242): .751 CPM
PU-238 COUNT RATE: .04 CPM
PU-239 COUNT RATE: 9.00000E-03 CPM

TRACER RECOVERY EFFICIENCY: .513826 +OR- .0374996

PICOCURIES OF PU-238: .131236 +OR- .0415006

PICOCURIES OF PU-239: .0295282 +OR- .0196854

DATE: 7 /19 /91
SAMPLE ID: 9106174
DETECTOR NUMBER: 11
DPM OF THE TRACER: 5.47
LENGTH OF COUNT: 1000 MINUTES
DETECTOR EFFICIENCY: .2824

South 9-11-91

TRACER COUNT RATE (PU-242): 1.097 CPM
PU-238 COUNT RATE: .033 CPM
PU-239 COUNT RATE: 3.00000E-03 CPM

TRACER RECOVERY EFFICIENCY: .710157 +OR- .0428826

PICOCURIES OF PU-238: .074121 +OR- .0258056

PICOCURIES OF PU-239: 6.73827E-03 +OR- 7.78069E-03

DATE: 7 /19 /91
SAMPLE ID: 9106175
DETECTOR NUMBER: 12
DPM OF THE TRACER: 5.47
LENGTH OF COUNT: 1000 MINUTES
DETECTOR EFFICIENCY: .2896

Southwest 9-11-91

TRACER COUNT RATE (PU-242): 1.107 CPM
PU-238 COUNT RATE: .033 CPM
PU-239 COUNT RATE: 5.00000E-03 CPM

TRACER RECOVERY EFFICIENCY: .698814 +OR- .0420066

PICOCURIES OF PU-238: .0734514 +OR- .0255725

PICOCURIES OF PU-239: .011129 +OR- 9.95408E-03

DATE: 7 /19 /91
SAMPLE ID: 9106176
DETECTOR NUMBER: 13 standard
DPM OF THE TRACER: 5.47
LENGTH OF COUNT: 1000 MINUTES
DETECTOR EFFICIENCY: .2963

TRACER COUNT RATE (PU-242): 1.353 CPM
PU-238 COUNT RATE: .584 CPM
PU-239 COUNT RATE: 6.00000E-03 CPM

TRACER RECOVERY EFFICIENCY: .834793 +OR- .04539

PICOCURIES OF PU-238: 1.06353 +OR- .0860182

PICOCURIES OF PU-239: .0145689 +OR- .0103018

DATE: 7 /19 /91
SAMPLE ID: 9106177
DETECTOR NUMBER: 14 blank
DPM OF THE TRACER: 5.47
LENGTH OF COUNT: 1000 MINUTES
DETECTOR EFFICIENCY: .3027

TRACER COUNT RATE (PU-242): 1.302 CPM
PU-238 COUNT RATE: 6.00000E-03 CPM
PU-239 COUNT RATE: 3.00000E-03 CPM

TRACER RECOVERY EFFICIENCY: .786342 +OR- .0435849

PICOCURIES OF PU-238: .0113547 +OR- 9.27104E-03

PICOCURIES OF PU-239: 5.67733E-03 +OR- 6.55562E-03

CONRAIL EXCAVATION

Section 1.3

Soil Monitoring (FIDLER)

HEALTH PHYSICS DATA SHEET

NAME: Roy Mowen

HP NO.: [redacted]

DATE	*DESCRIPTION	AREA	INSTRUMENT USED	INST. OP. INITIALS	COUNT RESULTS (cpm dpm)
6-24-91	Boxing general Fidler Readings in Dig Area	R/R	Fidler 3400-3539	RLM	Channel One 0 to 100 cpm most places
6-25-91	Boxing general Fidler Readings in Dig Area	R/R	Fidler 3400 - 3539	RLM	Highest Channel One East of Bridge Area 800 cpm over background
6-25-91	Boxing general Fidler Readings in Dig Area	R/R	Fidler 3400 - 3539	RLM	Channel One 0 to 100 cpm most places
6-26-91	Boxing general Fidler Readings in Dig Area	R/R	Fidler 3400 - 3539	RLM	Channel One 0 to 100 cpm
6-27-91	Boxing general Fidler Readings in Dig Area	R/R	Fidler 3400 - 3539	RLM	Channel One 0 to 100 cpm
6-27-91	Boxing general Fidler Readings in Dig Area	R/R	Fidler 3400-3539	RLM	Channel One 2/3 way back wall - to north 950 cpm - small area
7-1-91	Boxing general Fidler Readings in Dig Area	R/R	Fidler 3400-3539	RLM	Channel One 0-80 cpm
7-2-91	Boxing general Fidler Readings in Dig Area	R/R	Fidler 3400-3539	RLM	Channel One 0-45 cpm
7-3-91	Boxing general Fidler Readings in Dig Area	R/R	Fidler 3400-3539	RLM	Channel One 0-30 cpm (soil samples area all below 25 pci/g)
7-9-91	No Boxing - Trenching general Fidler Readings in Dig Area	R/R	Fidler 3400 - 3539	Ray Moss	Channel One 0 cpm soil samples below 25 pci/g
7-11-91	No Boxing - Trenching general Fidler Readings in Dig Area	R/R	Fidler 3400 - 3539	Ray Moss	Channel One 0 cpm soil samples below 25 pci/g

*COULD BE PERSONNEL, ITEMS, CAL-CAN, TOOLS, EQUIPMENT, ETC.

REVIEWED BY: _____ HP: _____ DATE: _____

COMMENTS: _____

ML-8834

CONRAIL EXCAVATION

Section 1.4

Soil Sampling, Personnel, and Equipment

Monitoring and Analysis

EXCAVATION/DIGGING PERMIT

Permit # _____

1) Project: CONRAIL EXCAVATION

2) Location of Excavation/Digging Work: SOUTH MOUND PROPERTY WEST THRU WOODS TO R/R TRESSLE + AROUND R/R TRESSLE AT OCD RT 25

3) Contractor/Trades: MOUND H.D.M.

PREPARATIONS TO BE MADE PRIOR TO STARTING WORK

	Completed By
4) Determine location of underground utilities/service lines/contaminated areas:	
a) Review of Utility Drawing No. SET OF 82	REL
Date Drawings revised —	
b) Review of Site Plan Drawing (Location of Contaminated Areas)	R.E.L.
Date Drawings revised —	
c) Field Check-Inspect Work Site	REL.
d) Field Check with Electric Cable Locator Instrument	
e) Field Check with Pipe Locator Instrument	
f) Mark Utility Locations with Paint, Ribbon or Stakes	

5) Notifications:

a) Notifications to Health Physics (Health Physics must be notified on all excavation/digging in plant)
Name of Person Notified Ray Mowen REL 6-3-91

b) Notifications to Utility Operations (When underground lines are involved)
Name of Person Notified [illegible] 6/3/91

c) Notifications to Security (If excavation requires closing roadway)
Name of Person Notified Greg Francemont REL 6-3-91

PRECAUTIONS TO BE TAKEN DURING EXCAVATION/DIGGING WORK

6) Protective Equipment Requirements	Yes	No	Obtained By
a) Electrically Insulated Shoes/Boots	☐	☑	
b) Electrically Insulated Gloves/Gauntlets	☐	☑	
c) Respiratory Equipment	☐	☑	
d) Radioactive Control Area Clothing	☐	☑	
e) Eye Protection as Noted: Goggles ☐ Face Shield ☐	☑	☐	
f) Shoring Needed	☑	☐	
g) Barricades Needed	☑	☐	
h) Warning Lights Needed	☐	☐	
i) Provide for Erosion Control	☑	☐	
j) Other _____	☐	☐	
7) Field Measurements for Revising Location Drawings: Measurements and/or photo shown/attached on back of permit.	☐	☐	
8) Special Precautions: _____	☐	☐	

9)

DATE	ISSUED BY:	HEALTH PHYSICS APPROVAL
6-4-91	Ray Lee	[illegible]

NOTE: Permit valid for up to one week. Health Physics approval must be obtained for each additional week.

ML-7844 (2-89)

SOIL SCREENIG FACILITY
Data Management System

CONT Sample's, taken by B. BRUMLEY [redacted]
DAILY REPORT FOR June 4,1991

SAMPLE NUMBER	DATE SCREEN	SAMPLER	SAMPLE TYPE	TH 232 pCi/g	PU 238 pCi/g	GRID & SAMPLE LOCATION	WELL ID
91060420	06/04/91	B. BRUMLEY [redacted]	CONT	0.4	5	W5200 X 4100 SS #1 @ SURFACE	B
91060421	06/04/91	B. BRUMLEY [redacted]	CONT	0.6	0	W5200 X 4100 SS #2 @ SURFACE	B
91060422	06/04/91	B. BRUMLEY [redacted]	CONT	0.5	1	W5200 X 4100 SS #3 @ SURFACE	C
91060423	06/04/91	B. BRUMLEY [redacted]	CONT	0.9	2	W5200 X 4100 SS #4 @ SURFACE	C
91060424	06/04/91	B. BRUMLEY [redacted]	CONT	0.6	3	W5200 X 4100 SS #5 @ SURFACE	C
91060425	06/04/91	B. BRUMLEY [redacted]	CONT	0.5	1	W5200 X 4100 SS #6 @ SURFACE	B
91060426	06/04/91	B. BRUMLEY [redacted]	CONT	0.5	3	W5200 X 4100 SS #7 @ SURFACE	B
91060427	06/04/91	B. BRUMLEY [redacted]	CONT	0.9	0	W5200 X 4100 SS #8 @ SURFACE	C
91060428	06/04/91	B. BRUMLEY [redacted]	CONT	0.6	0	W5200 X 34100 SS #9 @ SURFACE	B
91060429	06/04/91	B. BRUMLEY [redacted]	CONT	0.5	5	W5200 X 34100 SS #10 @ SURFACE	C

PREPARED BY : TROY J. PEARSON III

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIFIED IN

SOIL SCREENIG FACILITY
Data Management System

CONT Sample's, taken by B. BRUMLEY [redacted]
DAILY REPORT FOR June 5,1991

SAMPLE NUMBER	DATE SCREEN	SAMPLER	SAMPLE TYPE	TH 232 pCi/g	PU 238 pCi/g	GRID & SAMPLE LOCATION	WELL ID
1 9106051	06/05/91	B. BRUMLEY [redacted]	CONT	0.4	9	W5200 X S4100 SS #11 @ SURFACE	B
2 9106052	06/05/91	B. BRUMLEY [redacted]	CONT	0.7	0	W5200 X S4100 SS #12 @ SURFACE	C

PREPARED BY : TROY J. PEARSON III

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIFIED IN

SOIL SCREENIG FACILITY
Data Management System

CONT Sample's, taken by B. BRUMLEY [redacted]
DAILY REPORT FOR June 6,1991

SAMPLE NUMBER	DATE SCREEN	SAMPLER	SAMPLE TYPE	TH 232 pCi/g	PU 238 pCi/g	GRID & SAMPLE LOCATION	WELL ID
9106061	06/06/91	B. BRUMLEY [redacted]	CONT	0.8	0	W5200 X 4100 SS #13 @ SURFACE	C
9106062	06/06/91	B. BRUMLEY	CONT	0.6	4	W5200 X 4100 SS #14 @ SURFACE	C
9106063	06/06/91	B. BRUMLEY	CONT	0.5	4	W5200 X 4100 SS #15 @ SURFACE	C
9106064	06/06/91	B. BRUMLEY	CONT	0.5	1	W5200 X 4100 SS #16 @ SURFACE	C
9106065	06/06/91	B. BRUMLEY	CONT	0.8	1	W5200 X 4100 SS #17 @ SURFACE	C
9106066	06/06/91	B. BRUMLEY	CONT	0.2	8	W5200 X 4100 SS #18 @ SURFACE	C
9106067	06/06/91	B. BRUMLEY	CONT	1.1	111	W5200 X 4100 SS #19 @ SURFACE	C
9106068	06/06/91	B. BRUMLEY	CONT	0.9	22	W5200 X 4100 SS #20 @ SURFACE	C
9106069	06/06/91	B. BRUMLEY	CONT	1.0	103	W5200 X 4100 SS #21 @ SURFACE	C
9106070	06/06/91	B. BRUMLEY	CONT	1.5	648	W5200 X 4100 SS #22 @ SURFACE	C

SAMPLE # 19, 21, & 22 ARE FROM MOUND OF DIRT UNDER TRESTLE - Beyond WHERE HEAVY Duty STOPED The gravel Road.

PREPARED BY : TROY J. PEARSON III

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIFIED IN THIS REPORT . [ANY QUESTION CALL EXT.4408]

Requested by Brian Brumbly Mail Station Bldg 30 Phone

Product Code or Project No. Q.C. No. Requested Completion Date

Type of Sample (or Service) Soil

Requestor Sample ID's W5200 X S4100 #21 @ Surface

Sample Disposition ☐ Discard ☑ Return

If request is for product/material quality control, enter the specification drawing number. If not, enter none:

Analysis Desired, Comments Gamma

CONRAIL AREA -

Anal. Sample ID's 591 - 1132

Results:

Nuclide	Pci/g Concentration ± 1 sigma
Pb 210	0.94 ± 0.09
U 234	9.96 ± 1.0
Am 241	1.47 ± 0.15
Th 234	0.94 ± 0.09
Ra 226	1.11 ± 1.1
Ra 223	0.22 ± 0.02
Pa 234M	0.10 ± 0.01
Pb 212	0.97 ± 0.10
Pb 214	0.34 ± 0.03
Ac 228	0.86 ± 0.09
Bi 214	0.30 ± 0.03
Cs 137	0.26 ± 0.03
Co 60	0.03 ± 0.003
K 40	7.7 ± 0.77

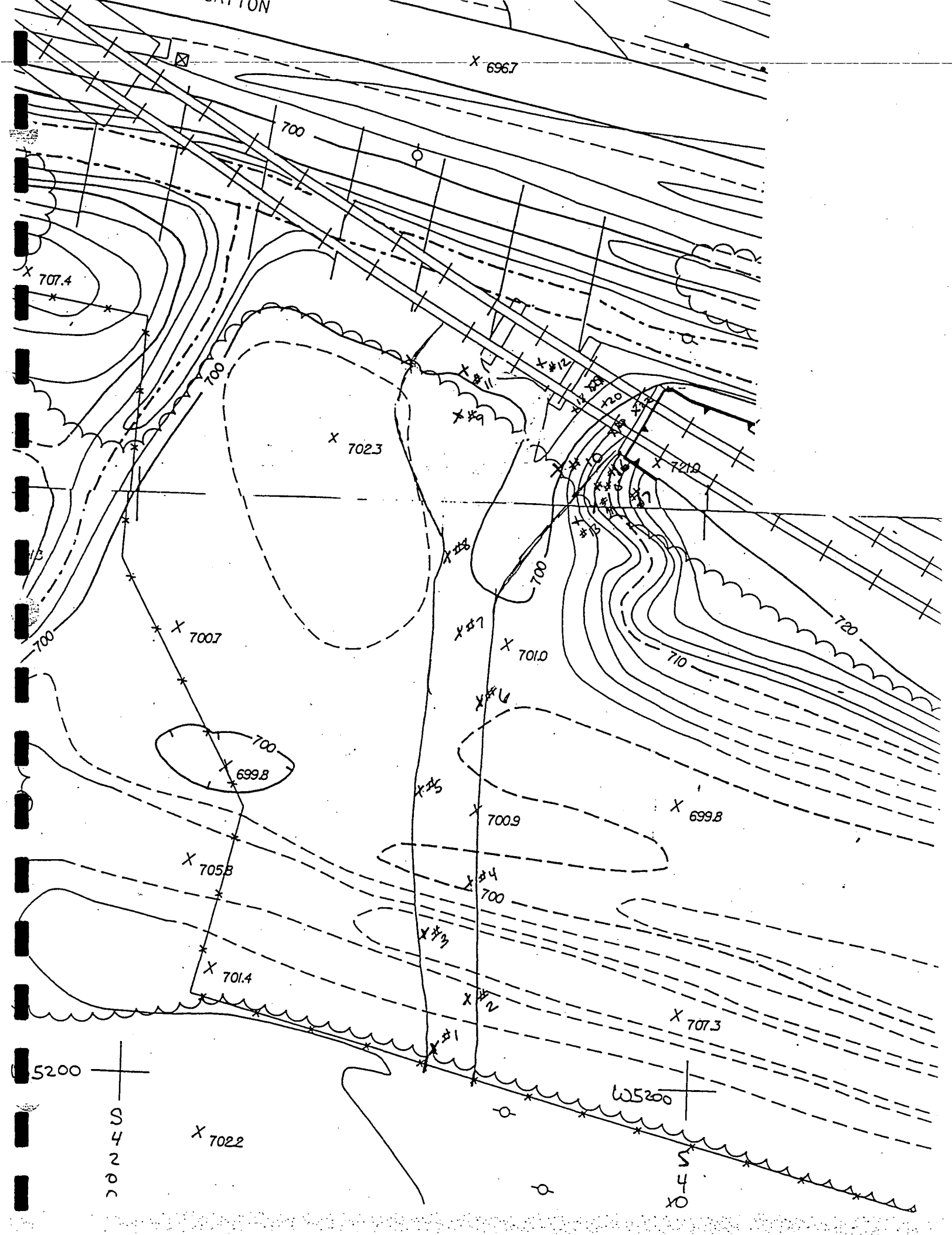
DISTRIBUTION:

WHITE COPY - REQUESTOR
YELLOW COPY - DATA PROCESSING — GR. LEADER
PINK COPY - ANALYTICAL LOG BOOK
GOLDENROD COPY - REQUESTOR'S RECEIPT

Received by

Analyzed by Jack G Jarvis 6/10/91

ML-1527 (7-82)
17-1394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SOIL SCREENIG FACILITY
Data Management System

CONT Sample's, taken by R. MOWEN [redacted]
DAILY REPORT FOR June 24,1991

SAMPLE NUMBER	DATE SCREEN	SAMPLER	SAMPLE TYPE	TH 232 pCi/g	PU 238 pCi/g	GRID & SAMPLE LOCATION	WELL ID
1 91062410	06/24/91	R. MOWE[redacted]	CONT	1.6	58	RR TRESTLE SS #1 NEW SURFACE	B
2 91062411	06/24/91	R. MOWE[redacted]	CONT	1.1	27	RR TRESTLE SS #2 NEW SURFACE	A
3 91062412	06/24/91	R. MOWE[redacted]	CONT	1.1	29	RR TRESTLE SS #3 NEW SURFACE	C
4 91062413	06/24/91	R. MOWE[redacted]	CONT	1.2	80	RR TRESTLE SS #4 NEW SURFACE	B
5 91062414	06/24/91	R. MOWE[redacted]	CONT	1.1	149	RR TRESTLE SS #5 NEW SURFACE	A
6 91062415	06/24/91	R. MOWE[redacted]	CONT	1.3	90	RR TRESTLE SS #6 NEW SURFACE	B
7 91062416	06/24/91	R. MOWE[redacted]	CONT	1.1	162	RR TRESTLE SS #7 NEW SURFACE	A
8 91062417	06/24/91	R. MOWE[redacted]	CONT	1.1	17	RR TRESTLE SS #8 NEW SURFACE	C

First eight samples from trestle job - after contaminated top dirt taken off -

Roy Mowen
[redacted]

RAY MOSS
[redacted]

PREPARED BY : TROY J. FEARSON III

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIFIED IN THIS REPORT . [ANY QUESTION CALL EXT 4408]

SOIL SCREENIG FACILITY
Data Management System

CONT Sample's, taken by R. MOWEN [redacted]
DAILY REPORT FOR June 25,1991

	SAMPLE NUMBER	DATE SCREEN	SAMPLER	SAMPLE TYPE	TH 232 pCi/g	PU 238 pCi/g	GRID & SAMPLE LOCATION	WELL ID
	9106253	06/25/91	R. MOWEN [redacted]	CONT	1.0	14	RR TRESTLE SS #9 NEW SURFACE	B
	9106254	06/25/91	R. MOWEN [redacted]	CONT	1.7	181	RR TRESTLE SS #10 NEW SURFACE	B
	9106255	06/25/91	R. MOWEN [redacted]	CONT	0.9	107	RR TRESTLE SS #11 NEW SURFACE	C
	9106256	06/25/91	R. MOWEN [redacted]	CONT	1.1	131	RR TRESTLE SS #12 NEW SURFACE	A
	9106257	06/25/91	R. MOWEN [redacted]	CONT	1.0	71	RR TRESTLE SS #13 NEW SURFACE	A
	9106258	06/25/91	R. MOWEN [redacted]	CONT	1.3	42	RR TRESTLE SS #14 NEW SURFACE	C
	9106259	06/25/91	R. MOWEN [redacted]	CONT	1.2	88	RR TRESTLE SS #15 NEW SURFACE	B
	91062510	06/25/91	R. MOWEN [redacted]	CONT	0.6	95	RR TRESTLE SS #16 NEW SURFACE	A
	91062511	06/25/91	R. MOWEN [redacted]	CONT	0.8	32	RR TRESTLE SS #17 NEW SURFACE	B
	91062512	06/25/91	R. MOWEN [redacted]	CONT	3.3	174	RR TRESTLE SS #18 NEW SURFACE	C
	91062513	06/25/91	R. MOWEN [redacted]	CONT	0.5	71	RR TRESTLE SS #19 NEW SURFACE	B
	91062560	06/25/91	R. MOWEN [redacted]	CONT	0.5	6	RR TRESTLE SS #20 NEW SURFACE	B
	91062561	06/25/91	R. MOWEN [redacted]	CONT	[illegible]	1	RR TRESTLE SS #21 NEW SURFACE	C
	91062562	06/25/91	R. MOWEN [redacted]	CONT	1.0	16	RR TRESTLE SS #22 NEW SURFACE	B
	91062563	06/25/91	R. MOWEN [redacted]	CONT	0.7	27	RR TRESTLE SS #23 NEW SURFACE	A
	91062564	06/25/91	R. MOWEN [redacted]	CONT	0.6	37	RR TRESTLE SS #24 NEW SURFACE	A
	91062565	06/25/91	R. MOWEN [redacted]	CONT	0.8	35	RR TRESTLE RESAMPLE R1	B
	91062566	06/25/91	R. MOWEN [redacted]	CONT	0.6	24	RR TRESTLE RESAMPLE R2	A
	91062567	06/25/91	R. MOWEN [redacted]	CONT	0.8	20	RR TRESTLE RESAMPLE R3	A
	91062568	06/25/91	R. MOWEN [redacted]	CONT	1.6	158	RR TRESTLE RESAMPLE R4	C
	91062569	06/25/91	R. MOWEN [redacted]	CONT	0.8	31	RR TRESTLE RESAMPLE R5	B
	91062570	06/25/91	R. MOWEN [redacted]	CONT	0.7	474	RR TRESTLE RESAMPLE R6	C
	91062571	06/25/91	R. MOWEN [redacted]	CONT	1.0	29	RR TRESTLE RESAMPLE R7	C
	91062572	06/25/91	R. MOWEN [redacted]	CONT	0.9	23	RR TRESTLE RESAMPLE R8	B
	91062573	06/25/91	R. MOWEN [redacted]	CONT	0.5	13	RR TRESTLE RESAMPLE R9	B
	91062574	06/25/91	R. MOWEN [redacted]	CONT	0.8	45	RR TRESTLE RESAMPLE R10	A
	91062575	06/25/91	R. MOWEN [redacted]	CONT	0.8	13	RR TRESTLE RESAMPLE R11	C
	91062576	06/25/91	R. MOWEN [redacted]	CONT	0.7	3	RR TRESTLE RESAMPLE R12	C
	91062577	06/25/91	R. MOWEN [redacted]	CONT	0.6	29	RR TRESTLE RESAMPLE R13	A
	91062578	06/25/91	R. MOWEN [redacted]	CONT	1.0	215	RR TRESTLE RESAMPLE R14	A
	91062579	06/25/91	R. MOWEN [redacted]	CONT	0.7	11	RR TRESTLE RESAMPLE R15	B

SAMPLES 9 THRU 19 ARE MIDWAY OF FOOT BRIDGE GOING NORTH AFTER SOME TOP DIRT REMOVED.

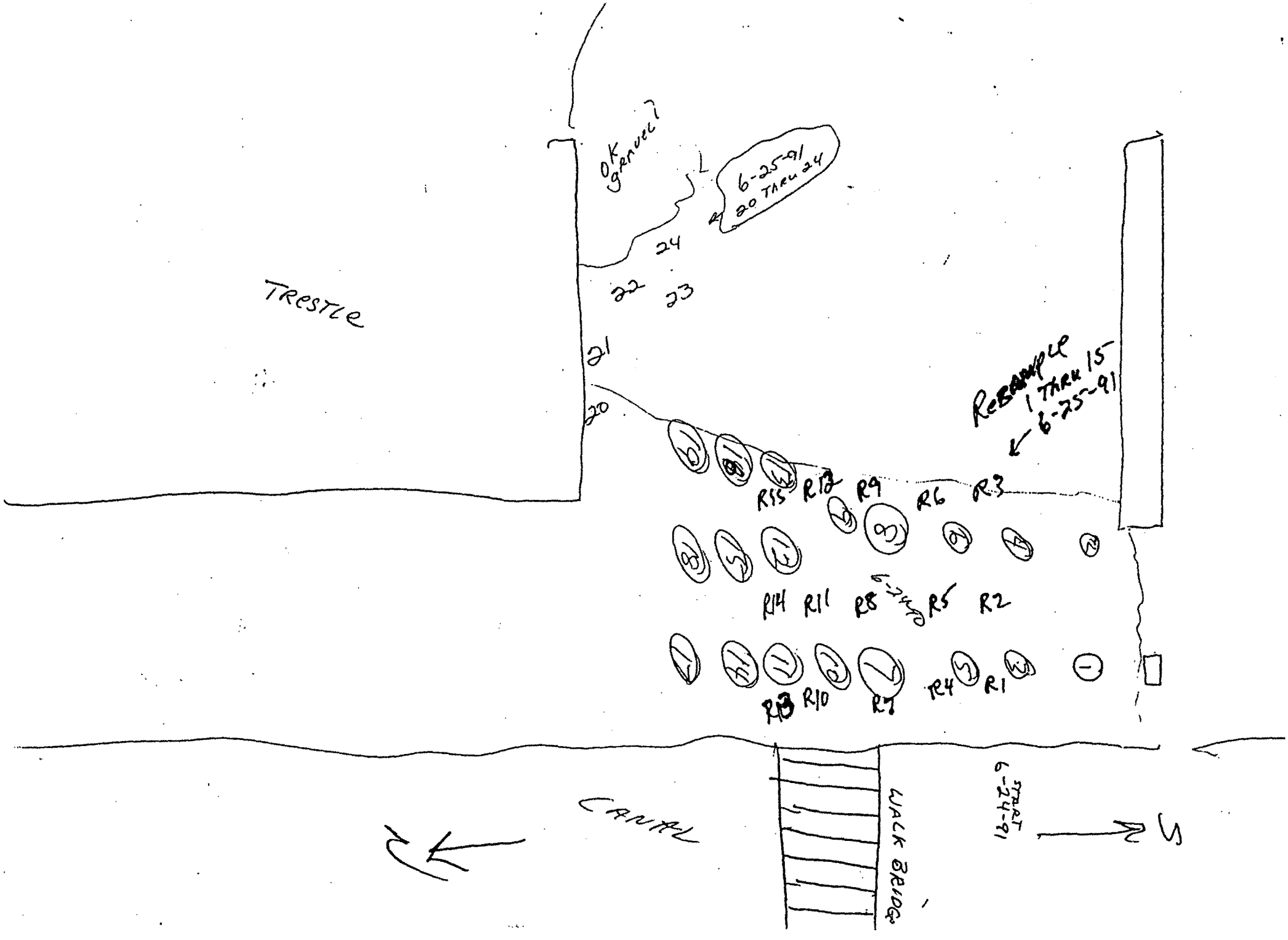
SAMPLES 20 THRU 24 ARE IN EDGE OF GRAVEL AREA AFTER SOME DIRT REMOVED FROM THE TOP.

SAMPLES R1 THRU R15 ARE TAKEN OUT FROM FOOT BRIDGE AFTER MORE DIRT TAKEN OFF THE TOP

ROY MOWEN [redacted] RAY MOSS [redacted]

PREPARED BY : TROY J. PEARSON III

ALL SOIL SAMPLE ARE [illegible] NOT [illegible]


TRESTLE
OK gravel?
6-25-91
20 THRU 24
24
22
23
21
20
REBAMPLE
1 THRU 15
6-25-91
R15
R12
R9
R6
R3
R14
R11
R8
6-24-91
R5
R2
R13
R10
R7
R4
R1
CANAL
WALK BRIDGE
START
6-24-91

SOIL SCREENIG FACILITY
Data Management System

CONT Sample's, taken by R. MOWEN [redacted]
DAILY REPORT FOR June 26,1991

SAMPLE NUMBER	DATE SCREEN	SAMPLER	SAMPLE TYPE	TH 232 pCi/g	PU 238 pCi/g	GRID & SAMPLE LOCATION	WELL ID
[redacted]62641	06/26/91	R. MOWEN [redacted]	CONT	0.7	25	RR TRESTLE G1 GRAVEL	A
[redacted]62642	06/26/91	R. MOWEN [redacted]	CONT	0.3	7	RR TRESTLE G2 GRAVEL	B
91062643	06/26/91	R. MOWEN [redacted]	CONT	0.6	10	RR TRESTLE G3 GRAVEL	C
91062644	06/26/91	R. MOWEN [redacted]	CONT	0.5	0	RR TRESTLE G4 GRAVEL	C
[redacted]62645	06/26/91	R. MOWEN [redacted]	CONT	0.4	11	RR TRESTLE R16 NEW SURFACE	A
91062646	06/26/91	R. MOWEN [redacted]	CONT	0.9	20	RR TRESTLE R17 NEW SURFACE	B
91062647	06/26/91	R. MOWEN [redacted]	CONT	0.6	63	RR TRESTLE R18 NEW SURFACE	A
[redacted]62648	06/26/91	R. MOWEN [redacted]	CONT	1.6	63	RR TRESTLE R19 NEW SURFACE	B

Sample G1, G2, G3, G4 were gravel from NORTH SIDE OF TRESTLE - ALL OK -

Samples R16, R17, R18, R19 This is from SOUTH EAST CORNER UNDER TRESTLE - WE COVERED it with NEW GRAVEL -

Fidler Readings 4 50 cpm over BACKGROUND CHANNEL ONE in THESE TWO AREAS -

Roy Mowen [redacted] TAKEN - 6-26-91

RAY MOSS [redacted]

PREPARED BY : TROY J. PEARSON III

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIFIED IN

SOIL SCREENIG FACILITY
Data Management System

CONT Sample's, taken by R. MOWEN [redacted]
DAILY REPORT FOR July 1,1991

PLE NUMBER	DATE SCREEN	SAMPLER	SAMPLE TYPE	TH 232 pCi/g	PU 238 pCi/g	GRID & SAMPLE LOCATION	WELL ID
7013	07/01/91	R. MOWEN [redacted]	CONT	2.6	677	RR TRESTLE N1 NEW SURFACE	C
7014	07/01/91	R. MOWEN [redacted]	CONT	0.4	69	RR TRESTLE N2 NEW SURFACE	A
7015	07/01/91	R. MOWEN [redacted]	CONT	2.5	231	RR TRESTLE N3 NEW SURFACE	B
7016	07/01/91	R. MOWEN [redacted]	CONT	1.6	66	RR TRESTLE N4 NEW SURFACE	C
7017	07/01/91	R. MOWEN [redacted]	CONT	1.4	223	RR TRESTLE N5 NEW SURFACE	B
7018	07/01/91	R. MOWEN [redacted]	CONT	0.4	57	RR TRESTLE N6 NEW SURFACE	A
7019	07/01/91	R. MOWEN [redacted]	CONT	1.2	139	RR TRESTLE N7 NEW SURFACE	C
0110	07/01/91	R. MOWEN [redacted]	CONT	0.8	119	RR TRESTLE N8 NEW SURFACE	A
0111	07/01/91	R. MOWEN [redacted]	CONT	0.7	44	RR TRESTLE N9 NEW SURFACE	C
0112	07/01/91	R. MOWEN [redacted]	CONT	2.6	1223	RR TRESTLE N10 NEW SURFACE	B
0113	07/01/91	R. MOWEN [redacted]	CONT	1.4	140	RR TRESTLE N11 NEW SURFACE	B
0114	07/01/91	R. MOWEN [redacted]	CONT	1.5	51	RR TRESTLE N12 NEW SURFACE	C

'en 6-27-91 AFTER TAKING CONTAMINATION OFF TOP

ONE HOT SPOT (HIGHEST SAMPLE OF ALL SAMPLES TAKEN DURING JOB).

Roy Mowen [redacted] RAY MOSS [redacted]

REPORT

SOIL SCREENIG FACILITY
Data Management System

CONT Sample's, taken by R. MOWEN[redacted]
DAILY REPORT FOR July 2,1991

	SAMPLE NUMBER	DATE SCREEN	SAMPLER	SAMPLE TYPE	TH 232 pCi/g	PU 238 pCi/g	GRID & SAMPLE LOCATION	WELL ID
1	9107024	07/02/91	R. MOWEN[redacted]	CONT	0.6	24	RR TRESTLE RN1 A	A
2	9107025	07/02/91	R. MOWEN[redacted]	CONT	1.0	12	RR TRESTLE RN1 B	B
3	9107026	07/02/91	R. MOWEN[redacted]	CONT	0.8	3	RR TRESTLE RN1 C	C
4	9107027	07/02/91	R. MOWEN[redacted]	CONT	1.0	9	RR TRESTLE RN2 A	A
5	9107028	07/02/91	R. MOWEN[redacted]	CONT	1.0	11	RR TRESTLE RN2 B	A
6	9107029	07/02/91	R. MOWEN[redacted]	CONT	1.2	16	RR TRESTLE RN2 C	B
7	91070210	07/02/91	R. MOWEN[redacted]	CONT	0.8	4	RR TRESTLE RN3 A	C
8	91070211	07/02/91	R. MOWEN[redacted]	CONT	0.9	18	RR TRESTLE RN3 B	A
9	91070212	07/02/91	R. MOWEN[redacted]	CONT	0.8	22	RR TRESTLE RN3 C	B
10	91070213	07/02/91	R. MOWEN[redacted]	CONT	1.2	8	RR TRESTLE RN4 A	A
11	91070214	07/02/91	R. MOWEN[redacted]	CONT	0.8	12	RR TRESTLE RN4 B	B
12	91070215	07/02/91	R. MOWEN[redacted]	CONT	1.0	54	RR TRESTLE RN4 C	B
13	91070216	07/02/91	R. MOWEN[redacted]	CONT	1.2	15	RR TRESTLE RN5 A	A
14	91070217	07/02/91	R. MOWEN[redacted]	CONT	1.3	8	RR TRESTLE RN5 B	B
15	91070218	07/02/91	R. MOWEN[redacted]	CONT	1.3	62	RR TRESTLE RN5 C	C
16	91070219	07/02/91	R. MOWEN[redacted]	CONT	0.9	2	RR TRESTLE RN6 A	C
17	91070220	07/02/91	R. MOWEN[redacted]	CONT	1.0	10	RR TRESTLE RN6 B	A
18	91070221	07/02/91	R. MOWEN[redacted]	CONT	1.3	108	RR TRESTLE RN6 C	B
19	91070230	07/02/91	R. MOWEN[redacted]	CONT	1.2	23	RR TRESTLE RRN4 C	A
20	91070231	07/02/91	R. MOWEN[redacted]	CONT	1.0	14	RR TRESTLE RRN5 C	B
21	91070232	07/02/91	R. MOWEN[redacted]	CONT	1.3	0	RR TRESTLE RRN6 C	C
22	91070233	07/02/91	R. MOWEN[redacted]	CONT	0.3	1	RR TRESTLE RRN7 A	A
23	91070234	07/02/91	R. MOWEN[redacted]	CONT	1.7	20	RR TRESTLE RRN7 B	B
24	91070235	07/02/91	R. MOWEN[redacted]	CONT	1.2	0	RR TRESTLE RRN7 C	C

SAMPLES 1 thru 18 TAKEN 7-1-91 AFTER Removing ≅ 3' OF CONTAMINATED SOIL OFF TOP

SAMPLES 19 THRU 24 TAKEN AFTER MORE SOIL Removed 7-2-91.

NOW ALL SAMPLES ALONG TRENCH LINE < 25 pci/g

Roy Mowen RAY MOSS

[redacted] [redacted]

PREPARED BY : TROY J. PEARSON III

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIFIED IN THIS REPORT. IF ANY QUESTION CALL EXT 4409]

SOIL SCREENIG FACILITY
Data Management System

CONT Sample's, taken by R. MOWEN [redacted]
DAILY REPORT FOR July 10,1991

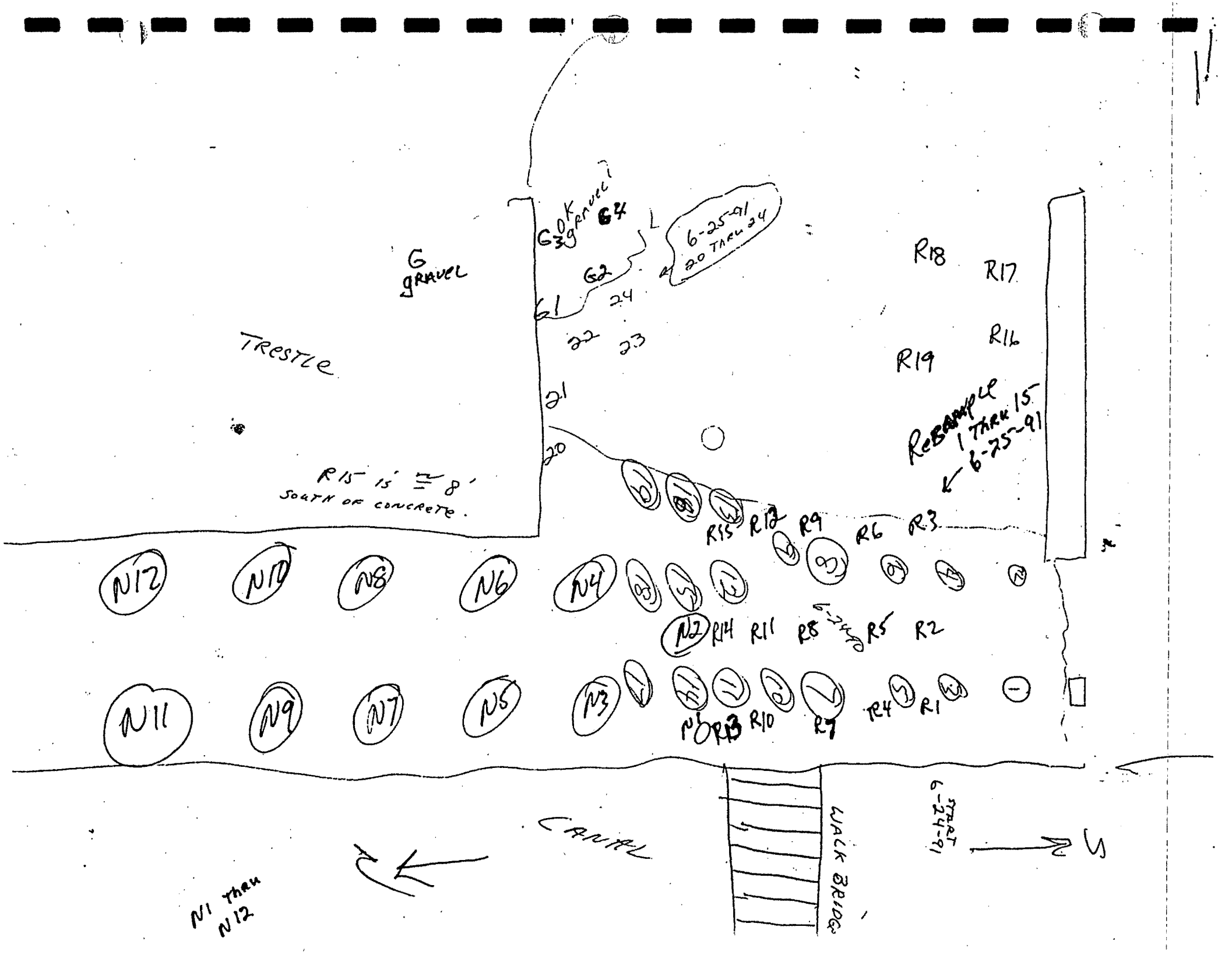
SAMPLE NUMBER	DATE SCREEN	SAMPLER	SAMPLE TYPE	TH 232 pCi/g	PU 238 pCi/g	GRID & SAMPLE LOCATION	WELL ID
9107104	07/10/91	R. MOWEN [redacted]	CONT	0.6	18	RR TRESTLE SOIL SAMPLE F-1	A
9107105	07/10/91	R. MOWEN [redacted]	CONT	1.1	21	RR TRESTLE SOIL SAMPLE F-2	B
9107106	07/10/91	R. MOWEN [redacted]	CONT	1.0	25	RR TRESTLE SOIL SAMPLE F-3	A
9107107	07/10/91	R. MOWEN [redacted]	CONT	1.2	0	RR TRESTLE SOIL SAMPLE FB-1	C

SAMPLES TAKEN BY RAY MOSS DURING ACTUAL TRENCHING OPERATION -

RAY MOSS
[redacted]

PREPARED BY : TROY J. PEARSON III

ALL SOIL SAMPLE ARE RAN FOR 400 SEC UNLESS SPECIFIED IN THIS REPORT . [ANY QUESTION CALL EXT.4408]


G gravel
TRESTLE
R15 is ≅ 8' south of concrete.
G3 K gravel
G4
G2
G1
24
22
23
21
20
6-25-91 20 thru 24
R18
R17
R19
R16
Resample 1 thru 15 6-25-91
R15 R12 R9 R6 R3
N12 N10 N8 N6 N4
N2 R14 R11 R8 6-24-91 R5 R2
N11 N9 N7 N5 N3
N1 R13 R10 R7 R4 R1
CANAL
WALK BRIDGE
START 6-24-91
N1 thru N12

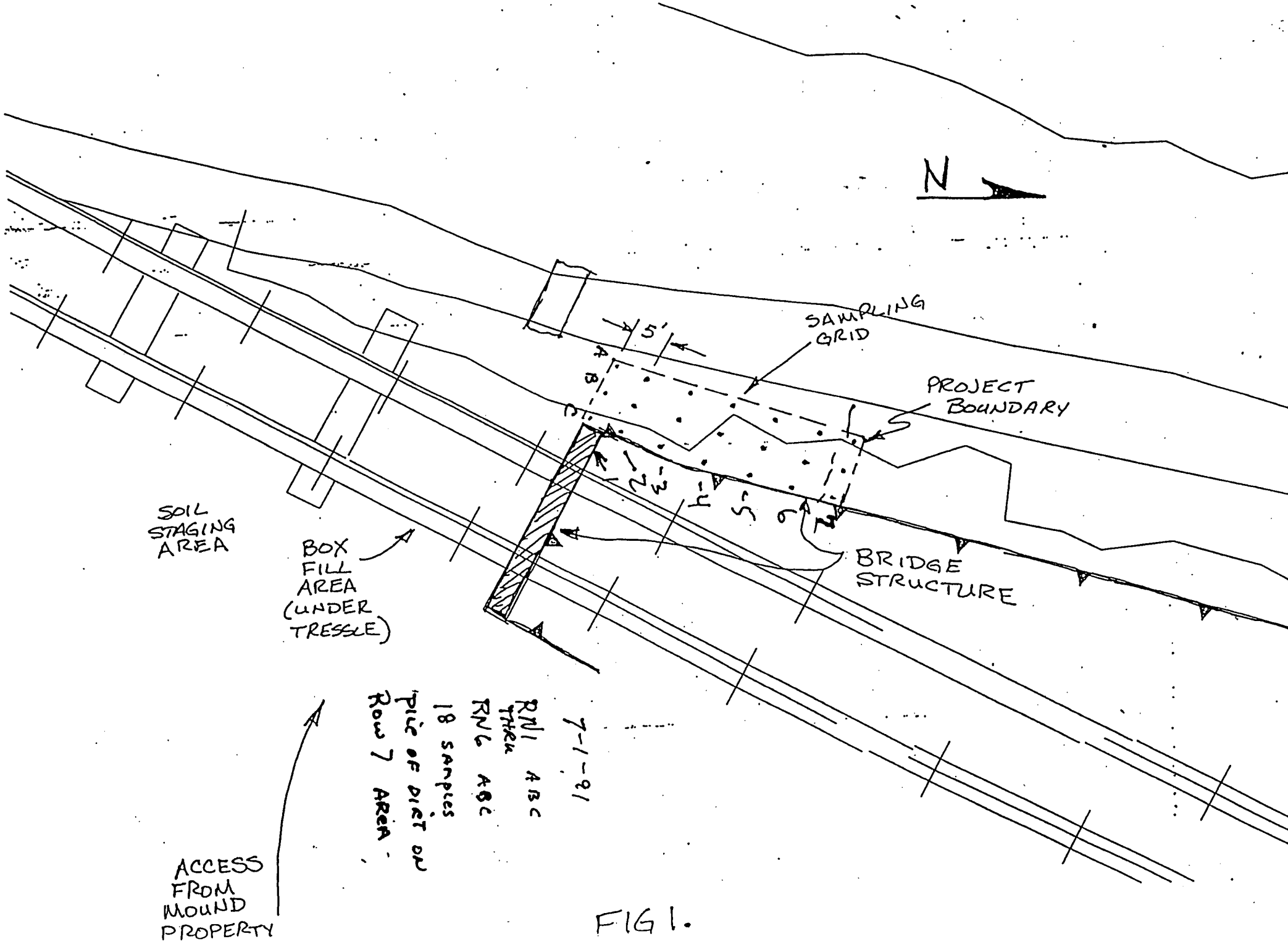

N
SAMPLING GRID
5'
A
B
C
PROJECT BOUNDARY
1
2
3
4
5
6
7
BRIDGE STRUCTURE
SOIL STAGING AREA
BOX FILL AREA (UNDER TRESSLE)
ACCESS FROM MOUND PROPERTY
7-1-91
RN1 ABC THRU RN6 ABC
18 SAMPLES
PIC OF DIRT ON ROW 7 AREA.

FIG 1.

EXCAVATION/DIGGING PERMIT

Permit # _____

1) Project: CONRAIL EXCAVATION

2) Location of Excavation/Digging Work: RAILROAD PROPERTY TRESSELL

3) Contractor/Trades:

PREPARATIONS TO BE MADE PRIOR TO STARTING WORK

4) Determine location of underground utilities/service lines/contaminated areas:	Completed By
a) Review of Utility Drawing No. N/A	
Date Drawings revised	
b) Review of Site Plan Drawing (Location of Contaminated Areas)	
Date Drawings revised N/A	
c) Field Check-Inspect Work Site	RCL
d) Field Check with Electric Cable Locator Instrument	N/A
e) Field Check with Pipe Locator Instrument	N/A
f) Mark Utility Locations with Paint, Ribbon or Stakes	N/A

5) Notifications:

a) Notifications to Health Physics (Health Physics must be notified on all excavation/digging in plant)
Name of Person Notified Roy Mowen

b) Notifications to Utility Operations (When underground lines are involved)
Name of Person Notified Harold Dean 6/20/91

c) Notifications to Security (If excavation requires closing roadway)
Name of Person Notified N/A

PRECAUTIONS TO BE TAKEN DURING EXCAVATION/DIGGING WORK

6) Protective Equipment Requirements	Yes	No	Obtained By
a) Electrically Insulated Shoes/Boots	☐	☐	
b) Electrically Insulated Gloves/Gauntlets	☐	☐	
c) Respiratory Equipment	☑	☑	RLM
d) Radioactive Control Area Clothing	☑	☐	RLM
e) Eye Protection as Noted: Goggles ☐ Face Shield ☐	☐	☐	
f) Shoring Needed	☑	☐	
g) Barricades Needed	☑	☐	
h) Warning Lights Needed	☐	☐	
i) Provide for Erosion Control	☑	☐	
j) Other SAFETY GLASSES / HARD HATS	☑	☐	
7) Field Measurements for Revising Location Drawings: Measurements and/or photo shown/attached on back of permit.	☐	☐	
8) Special Precautions: DO NOT DISTURB CANAL SEDIMENT	☑	☐	

9)

DATE	ISSUED BY:	HEALTH PHYSICS APPROVAL	
6-24-91	Ray Lee	Roy Mowen	6-24-91
		Roy Mowen	6-25-91
		Roy Mowen	6-26-91
		Roy Mowen	6-27-91
		Roy Mowen	7-1-91

NOTE: Permit valid for up to one week. Health Physics approval must be obtained for each additional week.

ML-7844 (2-89)

EXCAVATION/DIGGING PERMIT

Permit # #2

1) Project: Trench Excavation

2) Location of Excavation/Digging Work:

3) Contractor/Trades: H-D Mechanic's

PREPARATIONS TO BE MADE PRIOR TO STARTING WORK

4) Determine location of underground utilities/service lines/contaminated areas: — Completed By

a) Review of Utility Drawing No. _____
Date Drawings revised _____

b) Review of Site Plan Drawing (Location of Contaminated Areas) _____
Date Drawings revised _____

c) Field Check-Inspect Work Site

d) Field Check with Electric Cable Locator Instrument

e) Field Check with Pipe Locator Instrument

f) Mark Utility Locations with Paint, Ribbon or Stakes

5) Notifications:

a) Notifications to Health Physics (Health Physics must be notified on all excavation/digging in plant)
Name of Person Notified _____

b) Notifications to Utility Operations (When underground lines are involved)
Name of Person Notified _____

c) Notifications to Security (If excavation requires closing roadway)
Name of Person Notified _____

PRECAUTIONS TO BE TAKEN DURING EXCAVATION/DIGGING WORK

6) Protective Equipment Requirements — Yes / No / Obtained By

a) Electrically Insulated Shoes/Boots — Yes ☐ No ☑
b) Electrically Insulated Gloves/Gauntlets — Yes ☐ No ☑
c) Respiratory Equipment — Yes ☐ No ☑
d) Radioactive Control Area Clothing — Yes ☑ No ☐ — RCA Run
e) Eye Protection as Noted: Goggles ☐ Face Shield ☐ — Yes ☐ No ☐
f) Shoring Needed — Yes ☐ No ☐
g) Barricades Needed — Yes ☐ No ☐
h) Warning Lights Needed — Yes ☐ No ☐
i) Provide for Erosion Control — Yes ☑ No ☐
j) Other _____ — Yes ☐ No ☐

7) Field Measurements for Revising Location Drawings: — Yes ☐ No ☐
Measurements and/or photo shown/attached on back of permit.

8) Special Precautions: _____ — Yes ☐ No ☐

9)

DATE	ISSUED BY	HEALTH PHYSICS APPROVAL
7/2/91	[illegible]	Roy Mower 7-2-91
		Roy Mower 7-3-91
		[illegible] 7-9-91
		[illegible] 7-11-91

NOTE: Permit valid for up to one week. Health Physics approval must be obtained for each additional week.

ML-7844 (2-89)

pick-up Decon 6:35 11:35

STARTED 6-24-91 MONDAY

Employee A COMFO # LARGE

Employee B NORTH LARGE

Employee C COMFO # MED or North Med

Employee D NORTH LARGE

Employee E NORTH LARGE or MED

Employee F NORTH MED

These were the persons involved in the RR TRESTLE WORK. ALL LEFT Beginning URINE SAMPLES - Nosewipes left at SM TWO TIMES per DAY

Roy Mower

[redacted]

HEALTH PHYSICS DATA SHEET

NAME: Ray Moss HP NO.: [redacted]

DATE	*DESCRIPTION	AREA	INSTRUMENT USED	INST. OP. INITIALS	COUNT RESULTS (cpm/dpm)
06-24-91	Employee C 555/Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-24-91	Employee B /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-24-91	Employee E /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-24-91	Employee F /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-24-91	Employee D /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-24-91	Employee B /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-24-91	Employee C /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-24-91	Employee D /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-24-91	Employee F /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-24-91	Employee E /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-24-91	Employee G /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-25-91	Employee E /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-25-91	Employee F /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-25-91	Employee C /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-25-91	Employee D /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-25-91	Employee G /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-25-91	Employee B /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-25-91	Employee E sick/Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-25-91	Employee G /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-25-91	Employee B /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-25-91	Employee F /Hands Shoes	R/R	PAC 3204/3079	RLM	0
06-25-91	Employee D Hands Shoes	R/R	PAC 3204/3079	RLM	0

*COULD BE PERSONNEL, ITEMS, CAL-CAN, TOOLS, EQUIPMENT, ETC.

REVIEWED BY: _____ HP: _____ DATE: _____

COMMENTS: _____

ML-8834

HEALTH PHYSICS DATA SHEET

NAME: Ray Moss / Ray Morgan HP NO.: [redacted]

DATE	*DESCRIPTION	AREA	INSTRUMENT USED	INST. OP. INITIALS	COUNT RESULTS (cpm dpm)
06-26-91	Employee C s/shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
06-26-91	Employee B /shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
06-26-91	Employee E /shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
06-26-91	Employee F /shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
06-28-91	Employee B /s/shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
06-27-91	Employee C shoes	R/R	SRM 2852 / PAC 3204 3079	RM	3.85 / 0
06-27-91	Employee E shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
06-27-91	Employee F /shoes	R/R	SRM 2852 / PAC 3204 3079	RM	3.85 / 0
06-27-91	Employee G /shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
06-27-91	Employee D shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
06-27-91	Employee F /shoes	R/R	SRM 2852 / PAC 3204 3079	RM	3.85 / 0
06-27-91	Employee C shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
06-27-91	Employee E /shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
06-27-91	Employee B /shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
06-27-91	Employee G /shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
06-27-91	Employee D /shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
07-01-91	Employee C /shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
07-01-91	Employee D /shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
07-01-91	Employee E /shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
07-01-91	Employee F /shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
07-01-91	Employee B shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0
07-01-91	Employee G shoes	R/R	SRM 2852 / PAC 3204 3079	RM	0 / 0

*COULD BE PERSONNEL, ITEMS, CAL-CAN, TOOLS, EQUIPMENT, ETC.

REVIEWED BY: _____ HP: _____ DATE: _____

COMMENTS: _____

HEALTH PHYSICS DATA SHEET

NAME: Ray Moss HP NO.: [redacted]

DATE	*DESCRIPTION	AREA	INSTRUMENT USED	INST. OP. INITIALS	COUNT RESULTS (cpm dpm)
07-02-91	Employee C / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-02-91	Employee D / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-02-91	Employee G / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-02-91	Employee B / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-02-91	Employee E / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-02-91	Employee F / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-02-91	Employee F / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-02-91	Employee F / Shoe	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-02-91	Employee E / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-02-91	Employee D / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-02-91	Employee B / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-02-91	Employee G / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-03-91	Employee F / Shoe	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-03-91	Employee G / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-03-91	Employee D / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-03-91	Employee B / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-03-91	Employee E / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	3.85 / 0
07-03-91	Employee D / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-03-91	Employee B / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-03-91	Employee F / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-03-91	Employee E / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-03-91	Employee G / Shoes	R/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0

*COULD BE PERSONNEL, ITEMS, CAL-CAN, TOOLS, EQUIPMENT, ETC.

REVIEWED BY: _____ HP: _____ DATE: _____

COMMENTS: _____

HEALTH PHYSICS DATA SHEET

NAME: Ray Moss

HP NO.: [redacted]

DATE	*DESCRIPTION	AREA	INSTRUMENT USED	INST. OP. INITIALS	COUNT RESULTS (cpm dpm)
07-03-91	Employee D w/ Shoes	K/K	SRM 2852 / PAC 3204 3079	KRM	0 / 0
07-03-91	Employee C, Shoes	K/K	SRM 2852 / PAC 3204 3079	KRM	0 / 0
07-03-91	Front Loader / Bucket	K/K	SRM 2852 / PAC 3204 3079	KRM	0 / 0
07-03-91	Front Loader / Tires	K/K	SRM 2852 / PAC 3204 3079	KRM	0 / 0
07-03-91	Front Loader / Small Bucket	K/K	SRM 2852 / PAC 3204 3079	KRM	0 / 0
07-03-91	Funnel (Box)	K/K	SRM 2852 / PAC 3204 3079	KRM	0 / 0
07-03-91	Funnel (Box)	K/K	SRM 2852 / PAC 3204 3079	KRM	0 / 0

*COULD BE PERSONNEL, ITEMS, CAL-CAN, TOOLS, EQUIPMENT, ETC.

REVIEWED BY: _____ HP: _____ DATE: _____

COMMENTS: _____

HEALTH PHYSICS DATA SHEET

NAME: Ray Moss HP NO.: [redacted]

DATE	*DESCRIPTION	AREA	INSTRUMENT USED	INST. OP. INITIALS	COUNT RESULTS (cpm dpm)
07-03-91	Employee D / Shoes	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-03-91	Employee C / Shoes	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-03-91	Front Loader / Bucket	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-03-91	Front Loader / Tires	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-03-91	Front Loader / Small Bucket	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-03-91	Funnel (Box)	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-03-91	Funnel (Box)	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-09-91	Tonka Toy (Tires Front)	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-09-91	Tonka Toy (Tires Back)	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-09-91	Tonka Toy (Bucket)	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-11-91	Tonka Toy (Bucket)	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-11-91	Tonka Toy (Tires Front)	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-11-91	Tonka Toy (Tires Back)	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-14-91 (P.M.)	Small Track Hole (R. Track)	R/K	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-14-91	Small Track Hole (L. Track)	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-14-91	Small Track Hole (Bucket)	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-14-91	Small Track Hole (Cal.-in Floor)	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0
07-14-91	Small Track Hole (Cal.-in Floor)	K/R	SRM 2852 / PAC 3204 3079	RHM	0 / 0

*COULD BE PERSONNEL, ITEMS, CAL-CAN, TOOLS, EQUIPMENT, ETC.

REVIEWED BY: _____ HP: _____ DATE: _____

COMMENTS: _____

HEALTH PHYSICS DATA SHEET

NAME: Roy Mowen

HP NO.: [redacted]

DATE	*DESCRIPTION	AREA	INSTRUMENT USED SRM	PAC	FIDLER	INST. OP. INITIALS	BGR	COUNT RESULTS (cpm dpm) SRM Swipe dpm	PAC dpm	FIDLER -CPM
7-16-91	Rented John Deere TRACKHOE LEFTTRACK	RR	2852	2613 2614	3400 3539	RLM	N/A	dpm 0	dpm 0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" RIGHT TRACK	RR	2852	2613 2614	3400 3539	RLM	N/A	0	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" Bucket	RR	2852	2613 2614	3400 3539	RLM	N/A	3.85	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	MOUND John Deere MOD. 500 FRT. Bucket	RR	2852	2613 2614	3400 3539	RLM	N/A	0	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" TIRES	RR	2852	2613 2614	3400 3539	RLM	N/A	0	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" REAR BUCKET	RR	2852	2613 2614	3400 3539	RLM	N/A	0	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	Decon's HAND SHOVEL	RR	2852	2613 2614	3400 3539	RLM	N/A	3.85	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	Foot BRIDGE SURFACE ①	RR	2852	2613 2614	3400 3539	RLM	N/A	0	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" ②	RR	2852	2613 2614	3400 3539	RLM	N/A	0	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" ③	RR	2852	2613 2614	3400 3539	RLM	N/A	0	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" ④	RR	2852	2613 2614	3400 3539	RLM	N/A	0	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" ⑤	RR	2852	2613 2614	3400 3539	RLM	N/A	0	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	RR TRESTLE WALL STARTING NORTH END ①	RR	2852	2613 2614	3400 3539	RLM	N/A	3.85	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" ②	RR	2852	2613 2614	3400 3539	RLM	N/A	0	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" ③	RR	2852	2613 2614	3400 3539	RLM	N/A	0	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" ④	RR	2852	2613 2614	3400 3539	RLM	N/A	3.85	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" ⑤	RR	2852	2613 2614	3400 3539	RLM	N/A	0	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" ⑥	RR	2852	2613 2614	3400 3539	RLM	N/A	0	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" ⑦	RR	2852	2613 2614	3400 3539	RLM	N/A	0	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" ⑧	RR	2852	2613 2614	3400 3539	RLM	N/A	3.85	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" ⑨	RR	2852	2613 2614	3400 3539	RLM	N/A	0	0	0 OUT CHANNEL / 0 ONE CHANNEL
7-16-91	" SOUTH END ⑩	RR	2852	2613 2614	3400 3539	RLM	N/A	3.85	0	0 OUT CHANNEL / 0 ONE CHANNEL

*DESCRIBE PERSONNEL, ITEMS, CAL-CAN, TOOLS, EQUIPMENT, ETC.

REVIEWED BY: _____ HP: _____ DATE: _____

COMMENTS: _____

HEALTH PHYSICS DATA SHEET

NAME: Raymond L. Moss HP NO.: [redacted]

	DATE	*DESCRIPTION Hands & Foot	AREA	INSTRUMENT USED PAC	INST. OP. INITIALS	COUNT RESULTS (cpm dpm) AM — PM
H	9-4-91	Employee H	R/R	5014/5065	RLM	0
I	9-4-91	Employee I	R/R	5014/5065	RLM	0
J	9-4-91	Employee J	R/R	5014/5065	RLM	0
K	9-4-91	Employee K	R/R	5014/5065	RLM	0
L	9-4-91	Employee L	R/R	5014/5065	RLM	0
H	9-5-91	Employee H	R/R	5014/5065	RLM	0
I	9-5-91	Employee I	R/R	5014/5065	RLM	0
J	9-5-91	Employee J	R/R	5014/5065	RLM	0
K	9-5-91	Employee K	R/R	5014/5065	RLM	0
L	9-5-91	Employee L	R/R	5014/5065	RLM	0
H	9-9-91	Employee H	R/R	5014/5065	RLM	0 / 0
L	9-9-91	Employee L	R/R	5014/5065	RLM	0 / 0
K	9-9-91	Employee K	R/R	5014/5065	RLM	0 / 0
I	9-9-91	Employee I	R/R	5014/5065	RLM	0 / 0
K	9-10-91	Employee K	R/R	5014/5065	RLM	0 / 0
I	9-10-91	Employee J	R/R	5014/5065	RLM	0 / 0
L	9-10-91	Employee L	R/R	5014/5065	RLM	0 / 0
H	9-10-91	Employee H	R/R	5014/5065	RLM	0 / 0
I	9-10-91	Employee I	R/R	5014/5065	RLM	0 / 0

*COULD BE PERSONNEL, ITEMS, CAL-CAN, TOOLS, EQUIPMENT, ETC.

REVIEWED BY: _____ HP: _____ DATE: _____

COMMENTS: _____

HEALTH PHYSICS DATA SHEET

NAME: Roy Mower HP NO.: _____

DATE	*DESCRIPTION	AREA	INSTRUMENT USED	INST. OP. INITIALS	COUNT RESULTS (cpm dpm) AM	PM
9-16-91	Employee H	R/R	5057 / 5045	RLM	0	0
9-16-91	Employee I	R/R	5057 / 5045	RLM	0	0
9-16-91	Employee J	R/R	5057 / 5045	RLM	0	0
9-16-91	Employee K	R/R	5057 / 5045	RLM	0	0
9-16-91	Employee L	R/R	5057 / 5045	RLM	0	0
~~9-16-91~~						
~~9-16-91~~						
~~9-16-91~~						
~~9-16-91~~						

MONDAY

*COULD BE PERSONNEL, ITEMS, CAL-CAN, TOOLS, EQUIPMENT, ETC.

REVIEWED BY: _____ HP: _____ DATE: _____

COMMENTS: _____

HEALTH PHYSICS DATA SHEET

NAME: Raymond Moss

HP NO.: [redacted]

DATE	*DESCRIPTION	AREA	INSTRUMENT USED	INST. OP. INITIALS	COUNT RESULTS (~~cpm~~ dpm) AM	PM
9-25-91	Employee L	K/R	5057/5045	KM	0	0
9-23-91	Employee H	K/R	5057/5045	KM	0	0
9-23-91	Employee J	K/R	5057/5045	KM	0	0
9-23-91	Employee K	K/R	5057/5045	KM	0	0
9-23-91	Employee J	K/R	5057/5045	KM	0	0
		K/R				
9-24-91	Employee L	K/R	5057/5045	KM	0	0
9-24-91	Employee H	K/R	5057/5045	KM	0	
9-24-91	Employee J	K/R	5057/5045	KM	0	0
9-24-91	Employee K	K/R	5057/5045	KM	0	0
9-24-91	Employee I	K/R	5057/5045	KM	0	0
9-25-91	Employee L	K/R	5057/5045	KM	0	0
9-25-91	Employee H	K/R	5057/5045	KM	0	0
9-25-91	Employee J	K/R	5057/5045	KM	0	0
9-25-91	Employee K	K/R	5057/5045	KM	0	0
9-25-91	Employee I	K/R	5057/5045	KM	0	0

*COULD BE PERSONNEL, ITEMS, CAL-CAN, TOOLS, EQUIPMENT, ETC.

REVIEWED BY: _____ HP: _____ DATE: _____

COMMENTS: _____

ML-8834

HEALTH PHYSICS DATA SHEET

NAME: Raymond L. Moss

HP NO.: [redacted]

	DATE	*DESCRIPTION	AREA	INSTRUMENT USED	INST. OP. INITIALS	COUNT RESULTS (cpm dpm) AM / PM
K	9-11-91	Employee K	K/R	5014/5065	KHM	0/0
J	9-11-91	Employee J	K/R	5014/5065	KHM	0/0
I	9-11-91	Employee I	K/R	5014/5065	KHM	0/0
L	9-11-91	Employee L	K/R	5014/5065	KHM	0
H	9-11-91	Employee H	K/R	5014/5065	KHM	0
	~~9-11-91~~		K/R			
	9-16-9		K/R			
			K/R			

*COULD BE PERSONNEL, ITEMS, CAL-CAN, TOOLS, EQUIPMENT, ETC.

REVIEWED BY: _____ HP: _____ DATE: _____

COMMENTS: _____

ML-8634

HEALTH PHYSICS DATA SHEET

NAME: STEVE COLLAS HP NO.: [redacted]

DATE 91	Hands + Feet *DESCRIPTION	AREA	INSTRUMENT USED PAC	INST. OP. INITIALS	COUNT RESULTS (~~cpm~~ dpm) am	pm
9-17	Employee L	RR	5057/5045	C	0	0
9-17	Employee J	RR	5057/5045	C	0	0
9-17	Employee H	RR	5057/5045	C	0	0
9-17	Employee K	RR	5057/5045	C	0	0
9-17	Employee J	RR	5057/5045	C	0	0
					AM	PM
9-18	Employee L	R/R	5057/5045	KM		0
9-18	Employee H	R/R	5057/5045	KM	0	0
9-18	Employee J	R/R	5057/5045	KM	0	0
9-18	Employee K	R/R	5057/5045	KM	0	0
9-18	Employee I	R/R	5057/5045	KM		0
9-19	Employee L	R/R	5057/5045	KM	0	0
9-19	Employee H	R/R	5057/5045	KM	0	0
9-19	Employee J	R/R	5057/5045	KM	0	0
9-19	Employee K	R/R	5057/5045	KM	0	0
9-19	Employee I	R/R	5057/5045	KM	0	0

*COULD BE PERSONNEL, ITEMS, CAL-CAN, TOOLS, EQUIPMENT, ETC.

REVIEWED BY: _____ HP: _____ DATE: _____

COMMENTS: _____

HEALTH PHYSICS DATA SHEET

NAME: Raymond K Wolf

HP NO.: [redacted]

	DATE	*DESCRIPTION* Hands Feet	AREA	INSTRUMENT USED	INST. OP. INITIALS	COUNT RESULTS (~~cpm~~ dpm) AM	PM
L	9-26-91	Employee L	K/R	5057/5045	RKW	0	0
H	9-26-91	Employee H	K/R	5057/5045	RKW	0	0
I	9-26-91	Employee J	K/R	5057/5045	RKW	0	0
K	9-26-91	Employee K	K/R	5057/5045	RKW	0	0
I	9-26-91	Employee I	K/R	5057/5045	RKW	0	0

*COULD BE PERSONNEL, ITEMS, CAL-CAN, TOOLS, EQUIPMENT, ETC.

REVIEWED BY: _____ HP: _____ DATE: _____

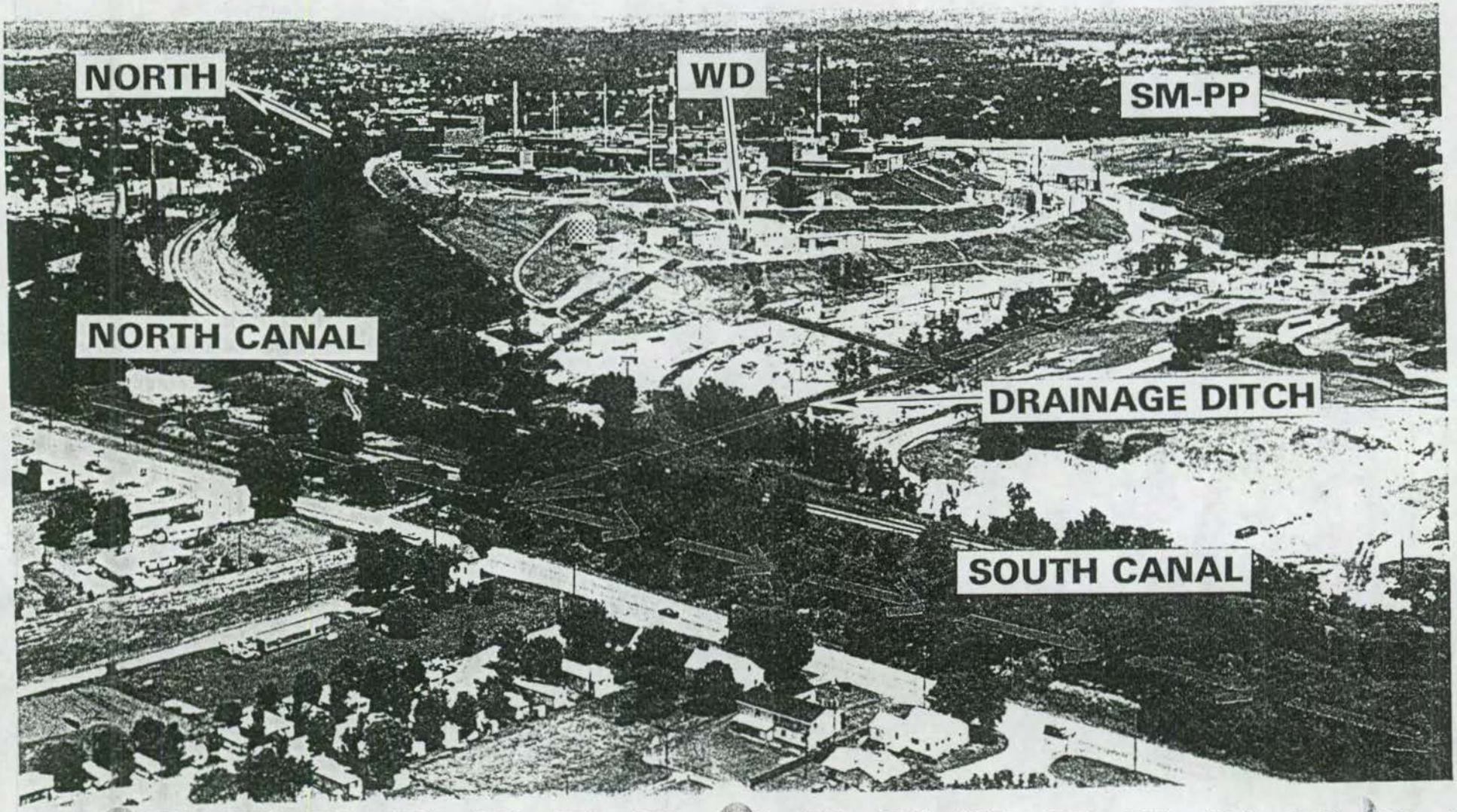
COMMENTS: _____

APPENDIX E

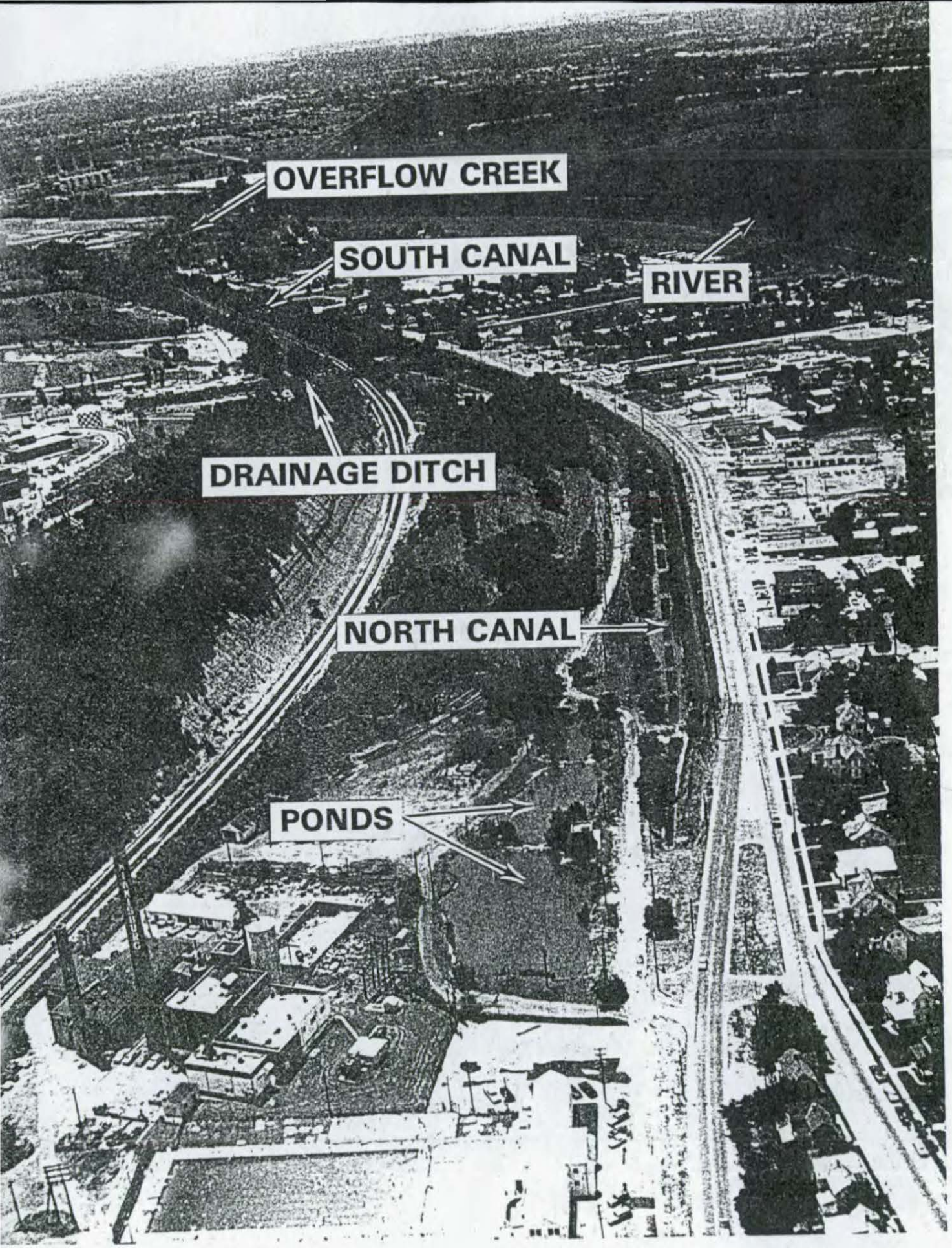
PHOTOGRAPHS

CONRAIL EXCAVATION

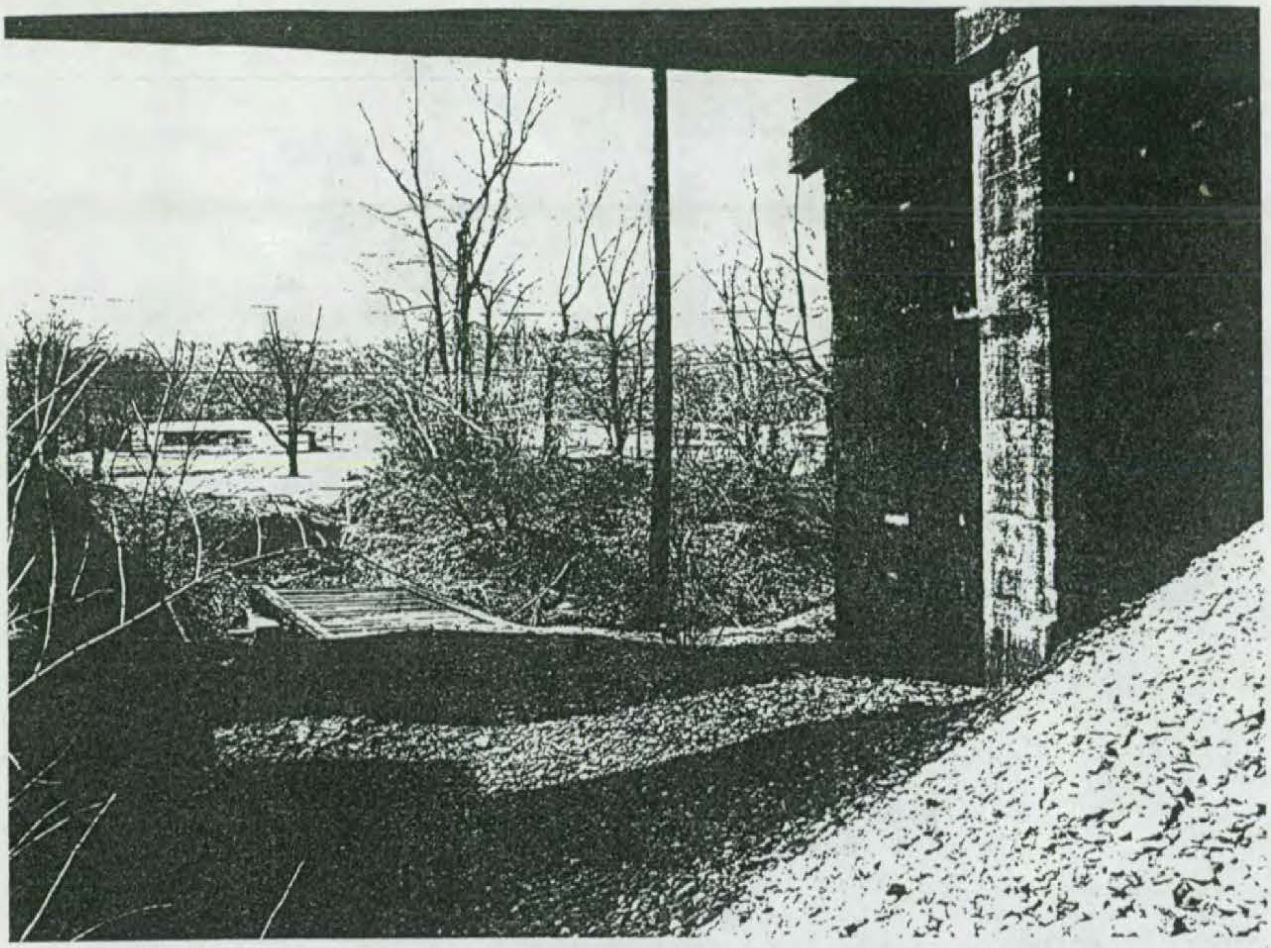
MIAMI-ERIE CANAL, OPERABLE UNIT 4

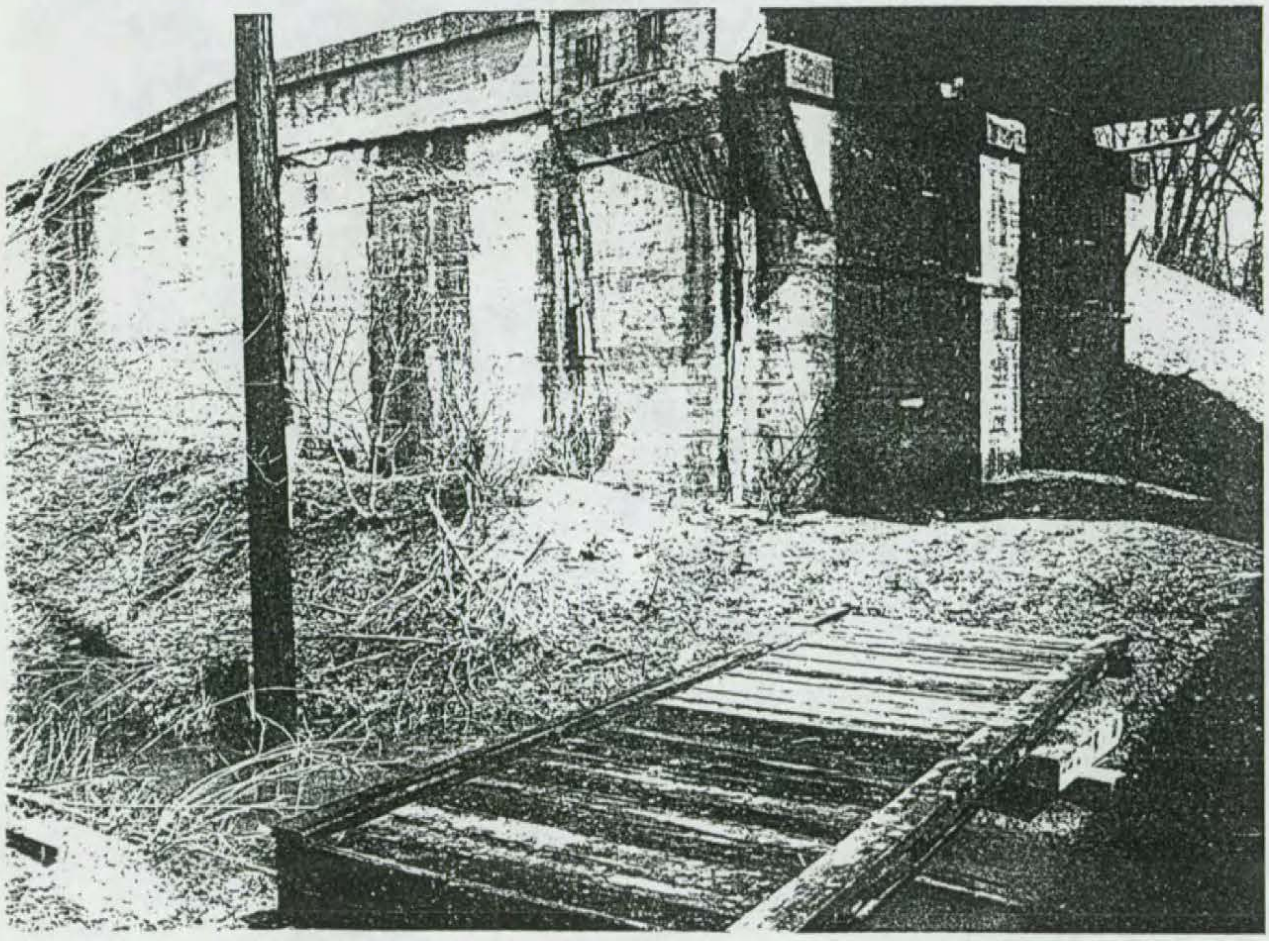


1.1 Mound Photograph

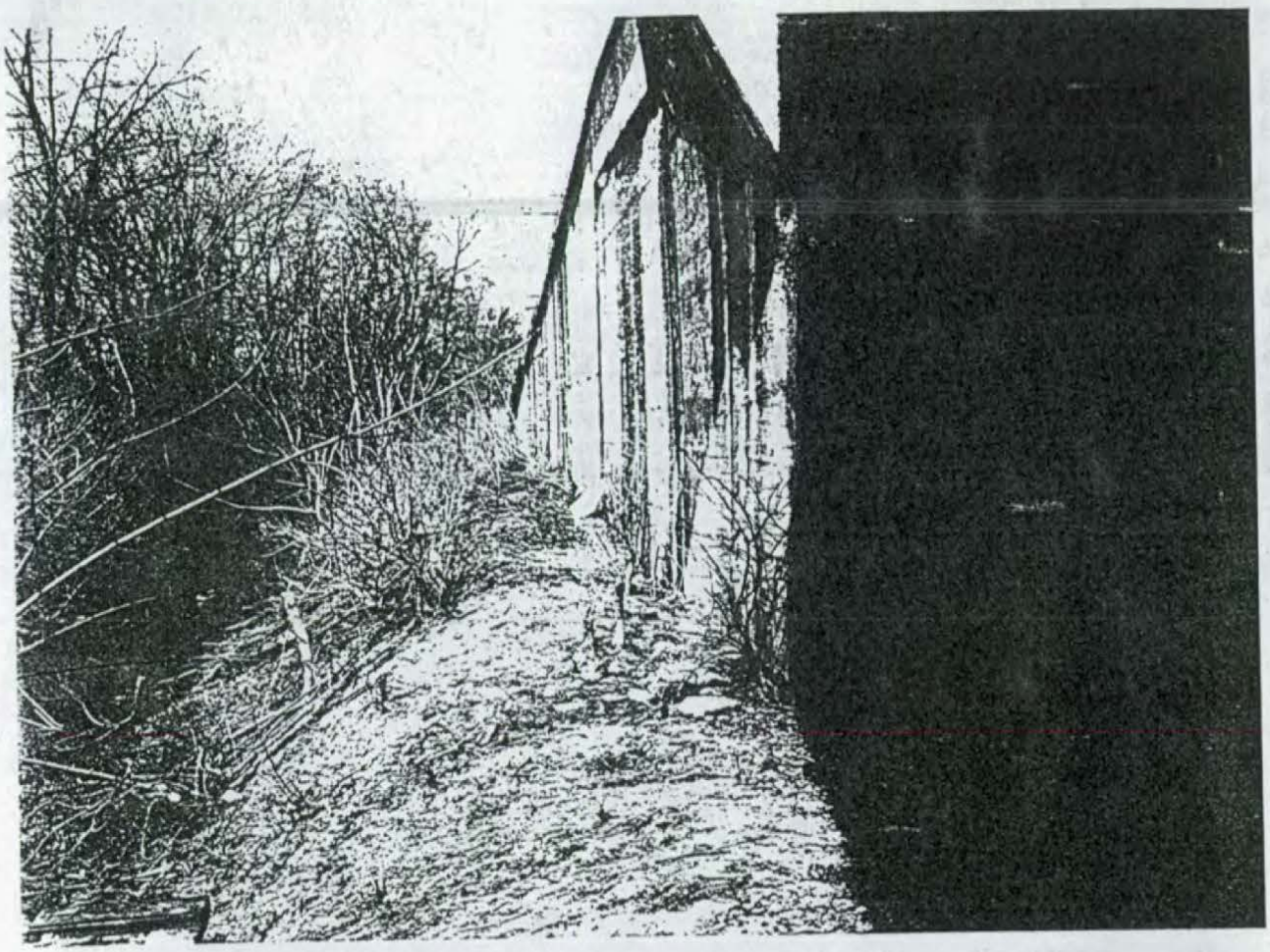


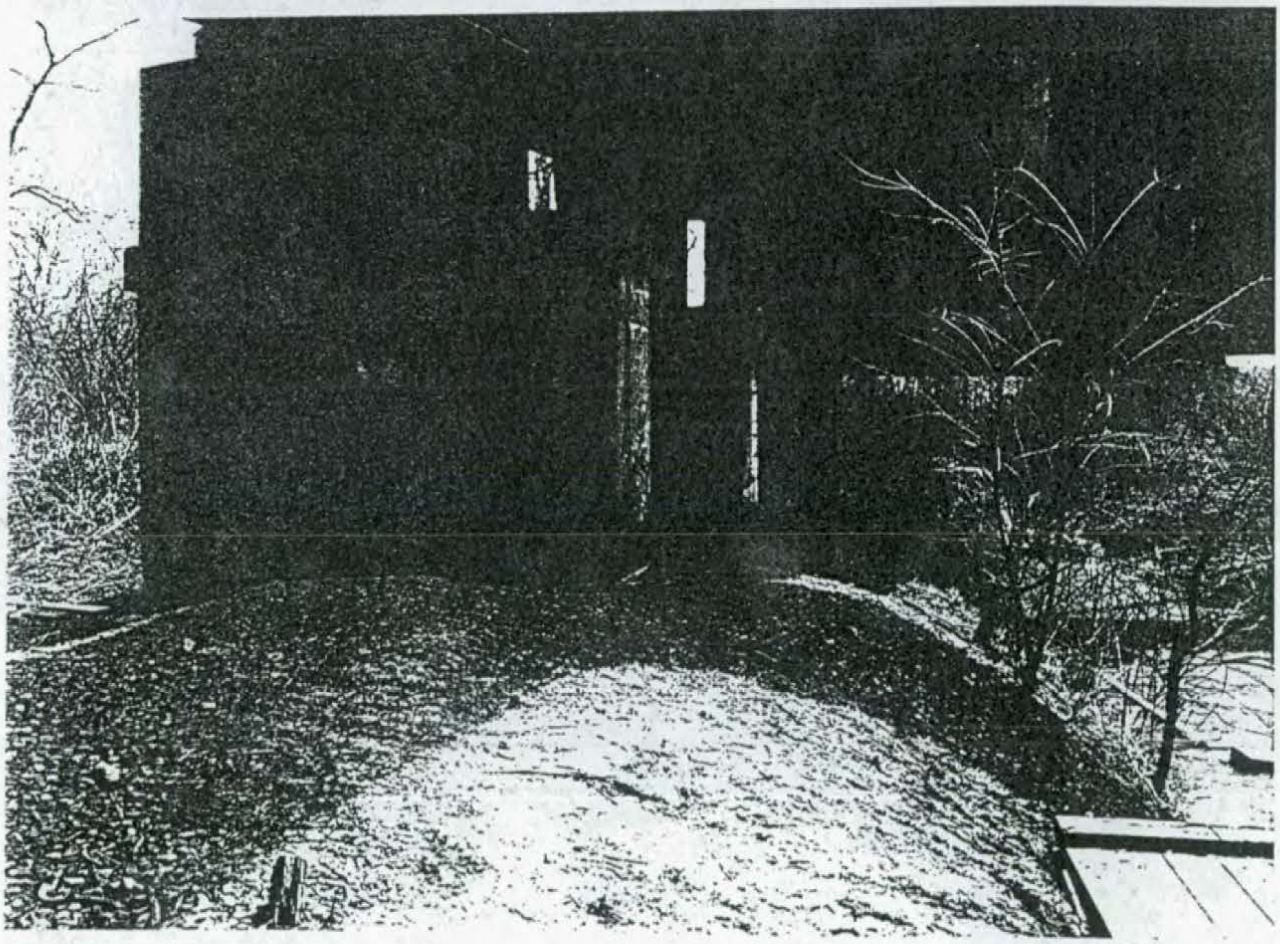
1.2 Mound Photograph, Miami-Erie Canal



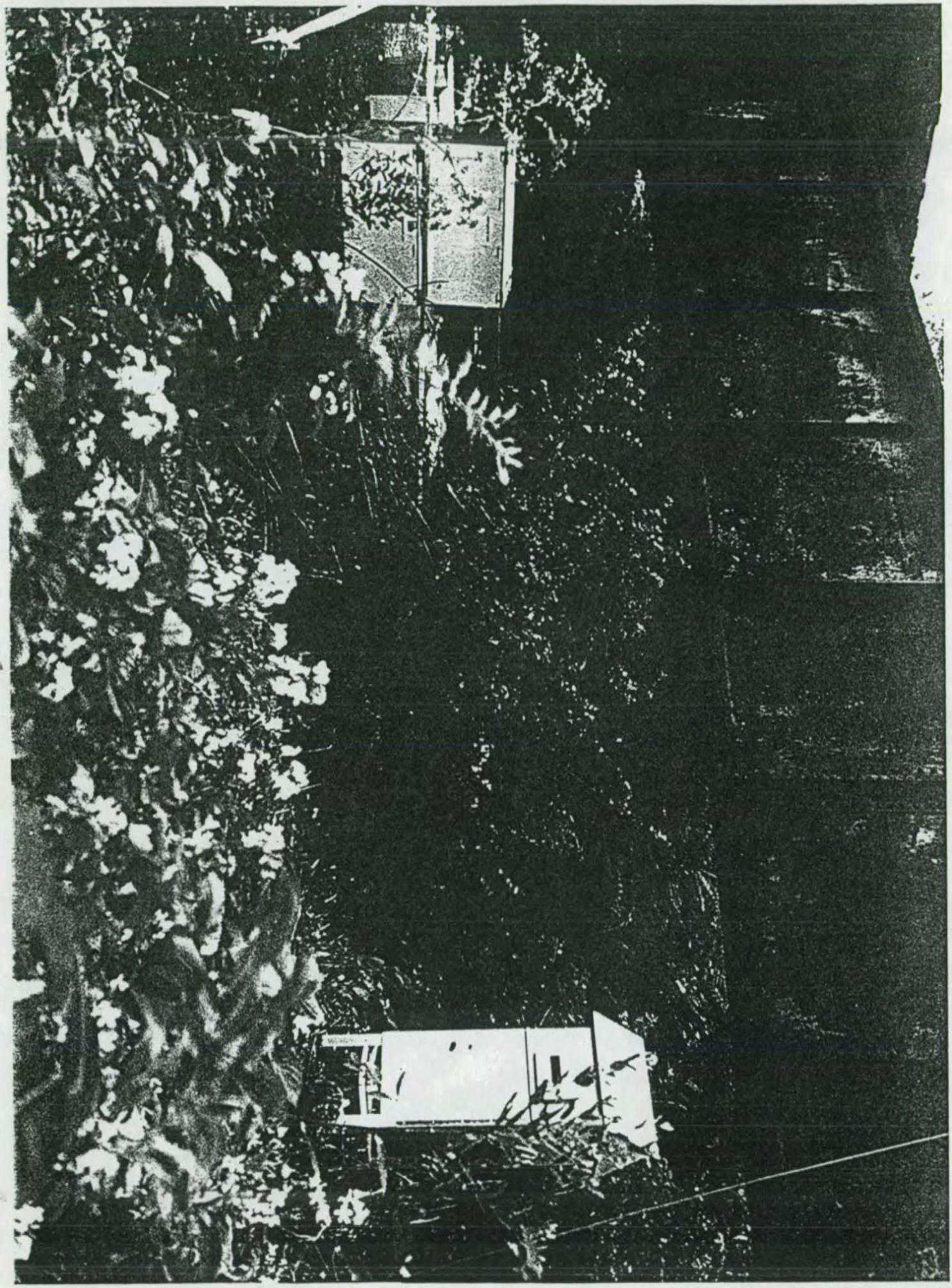


1.3 Photograph, Conrail Prefabricated Bridge



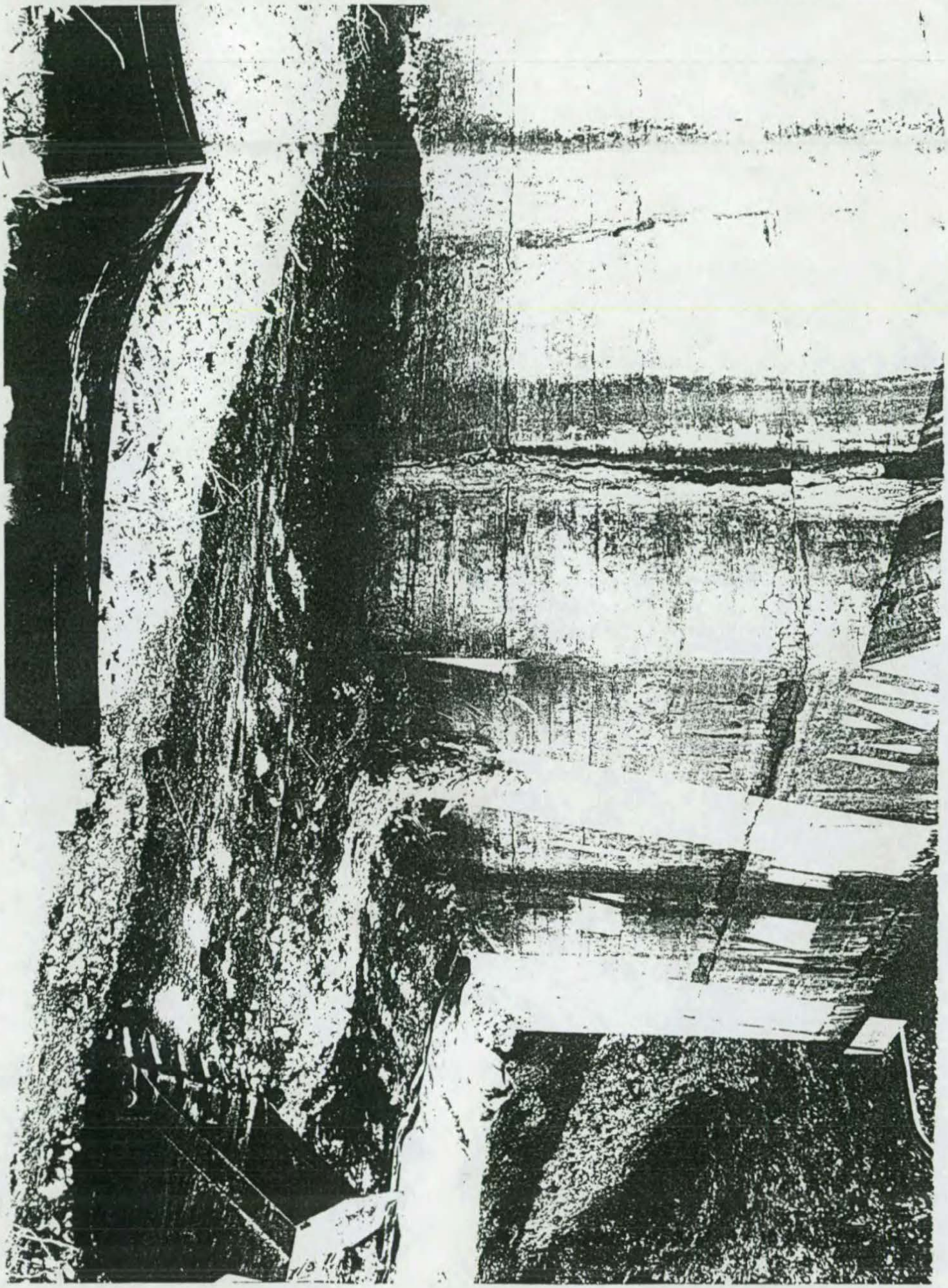


1.4 Photograph, Prior to Excavation
of Contaminated Soil

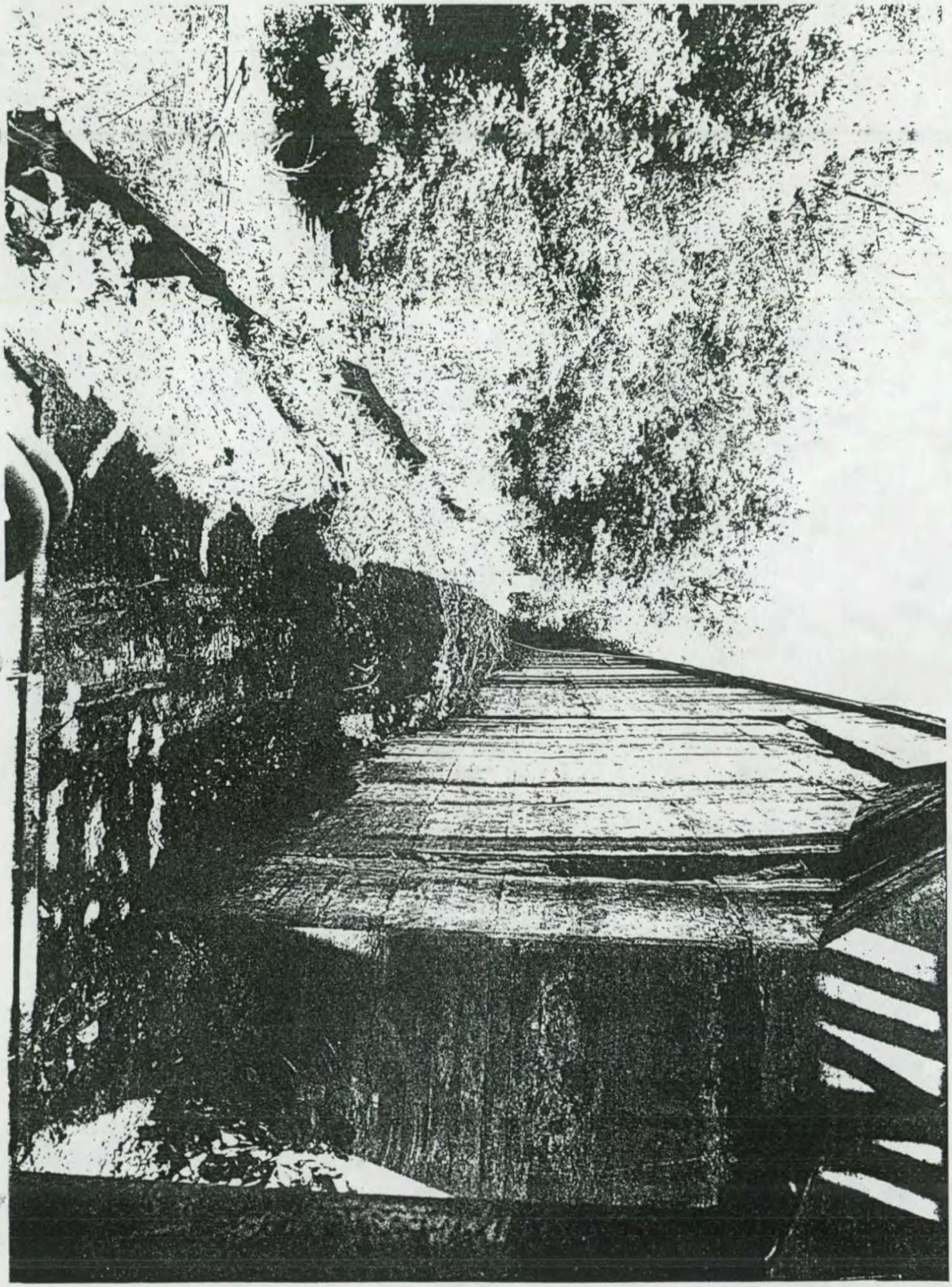


1.5 Photograph, Air Sampler

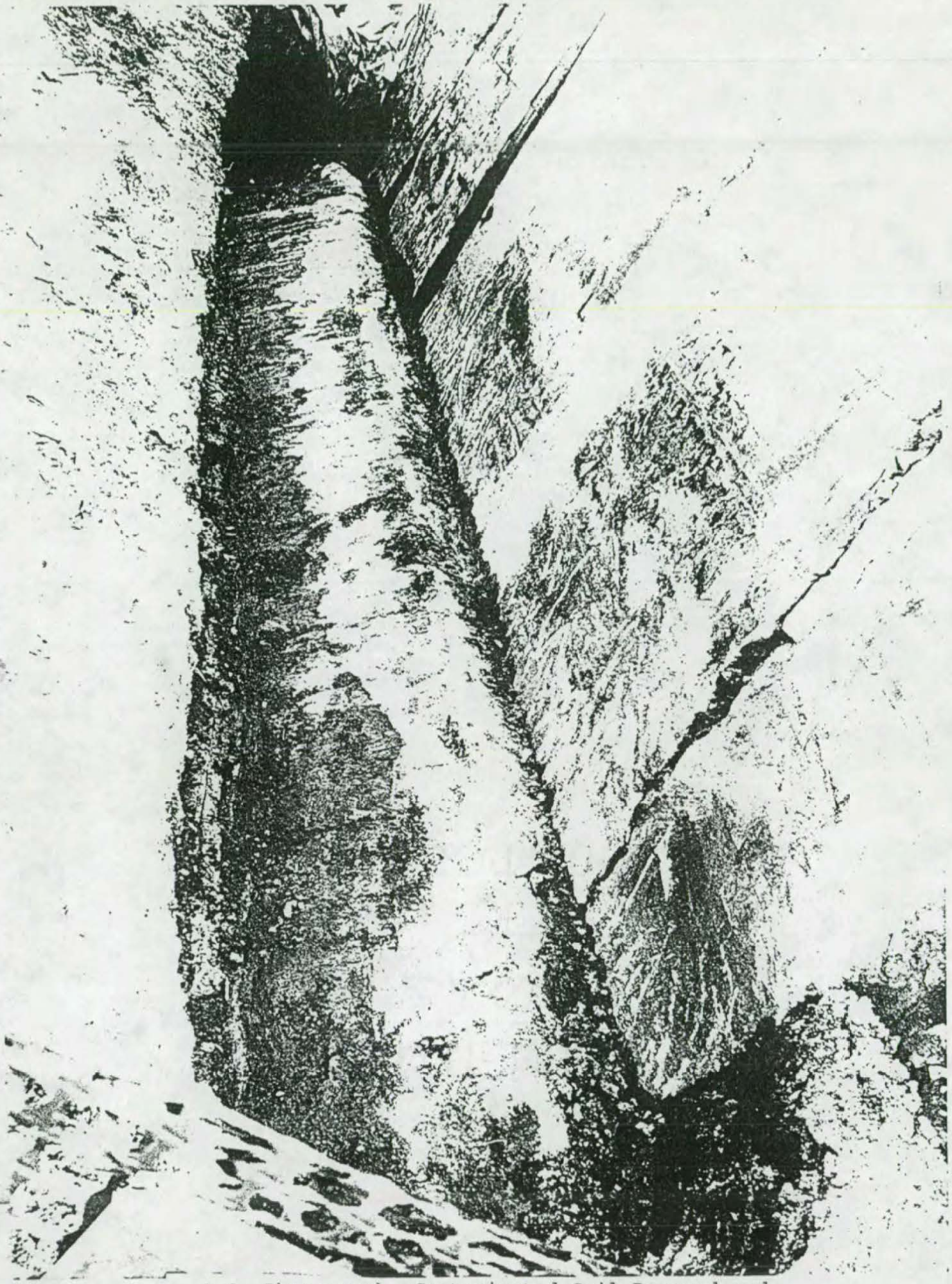
1.6 Photograph, Monitoring with FIDLER Instrument



1.7 Photograph, Removing Contaminated Soil



1.8 Photograph, Removing Contaminated Soil



1.9 Photograph, Contaminated Soil Removed and Ready to Reinforce Abutment

1.10 Photograph, Placing Contaminated Soil in LSA Waste Box