Chemical Waste Management, Inc.

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

September 3, 1992

Mr. Donald R. Schregardus (P 628 379 918)
Regional Director
Ohio Environmental Protection Agency
P.O. Box 1049
1800 WaterMark Drive
Columbus, Ohio 43266-0149

Mr. Valdus Adamkus, Administrator (P 628 379 919)
U.S. Environmental Protection Agency
Region V
230 South Dearborn Street
Chicago, IL 60604

RECEIVED
SEP 09 1992
U. S. EPA REGION 5
OFFICE OF REGIONAL ADMINISTRATOR

Re: Chemical Waste Management - Vickery Facility
Groundwater Monitoring Program

Dear Mr. Schregardus and Mr. Adamkus:

The seven groundwater monitoring wells, east of the Closure Cell, adjacent to the temporary stockpile area, have been installed in accordance with paragraph H (7) of the Consent Agreement and Final Order of April 5, 1985 between the US EPA and Chemical Waste Management, Inc.

The installation of MW-17R, MW-18R, L-17, L-18, L-25, T-17, and T-18 began July 13, 1992 and was completed on August 7, 1992. Installation was done in accordance with the approved workplan entitled "Groundwater Program Workplan" (Golder Associates, Inc., 1985).

These wells will be sampled for the constituents on the CWM Vickery Initial List and the Continuing List during the semi-annual event scheduled to begin September 21, 1992.

An investigation per the L-19 Groundwater Findings and Orders was completed mid-August, 1992. The Workplan entitled "L-19 Replacement Monitoring Well Workplan" dated July 2, 1992 is included as an attachment to this letter. The investigation was conducted to determine a location for a replacement well for L-19 which would be outside the influence of contaminated fill material at a similar depth in the lacustrine zone. A location approximately 75 feet west of L-19 has been approved by the Ohio EPA. The replacement well will be called L-19A. Well L-19A should

482

be installed the second week of September. Development of the well will occur following installation and sampling for the constituents on the Initial List and the Continuing List is scheduled to take place during the September semi-annual event.

L-19 and the seven wells installed adjacent to the stockpile area are included in the July 22, 1988 TSCA Approval of the Closure Cell. CWM Vickery requests guidance from the Ohio EPA and the US EPA on three items listed below:

1. Will replacement well L-19A be considered both a TSCA regulated well and a RCRA regulated well?

2. Will well L-19 continue to be considered both a TSCA regulated and a RCRA regulated well?

   Both L-19 and L-19A will be sampled for the CWM Vickery TSCA parameters and RCRA parameters this semi-annual sampling event. It is CWM Vickery's desire to discontinue sampling well L-19 as part of the TSCA and RCRA monitoring programs and begin sampling L-19A in lieu of L-19. Well L-19 would then be kept, if needed, for future investigative purposes.

3. The stockpile material was moved into the Closure Cell from October 1990 to April 1991; therefore, quarterly sampling required by the Closure Plan for Ponds 4, 5, and 7 of the TSCA regulated wells then in place has already been completed during 1991. Is TSCA quarterly sampling also required for MW-17R, MW-18R, L-17, L-18, L-25, T-17, T-18 and L-19-A?

CWM Vickery requests a response to the above concerns as soon as possible.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Should you have any questions regarding this matter, please contact Sandy Clark at 419-547-7791.

Sincerely,

CHEMICAL WASTE MANAGEMENT, INC.

F.G. Nicar
General Manager

FGN/SLC/tr

attachments

cc w/attachments: John Connell, USEPA
Matthew Ohl, USEPA
Bill Muno, USEPA
Jeff Steers, OEPA
Katharine Little, OEPA
Tom Frazer
Doug Martin
Sandy Clark
Steve Lonneman
Jay Skabo
Greig Siedor
Agency Correspondence File

Chemical Waste Management, Inc.

FACS

July 2, 1992

Kathy Little
Division of Drinking and Groundwater
Ohio Environmental Protection Agency
Northwest District Office
347 North Dunbridge Road
P.O. Box 466
Bowling Green, OH 43402-0466

Re: L-19 Replacement Monitoring Well Workplan

Dear Kathy:

This correspondence will serve as the workplan for the installation of a replacement groundwater monitoring well for L-19. CWM-Vickery requests immediate OEPA approval to install the replacement well in conjunction with the installation of the seven groundwater monitoring wells to be installed adjacent to the stockpile area, beginning July 9, 1992.

WORKPLAN

The L-19 Replacement Monitoring Well, L19A, will be installed using the same procedures presented in the previously approved Workplan for investigation at Well L-19 dated February 1990 and Addenda dated April 30, 1990. Both documents were prepared by Golder Associates. Applicable sections are attached.

The replacement well will be located in the Lacustrine zone. The target depth will be just above the interface of the lacustrine and till zones and the well will be screened to minimize the influence of the zone of desiccation in the lacustrine zone. To determine the location for L19A, CWM Vickery will use the results detailed in the Investigation at Well L-19 Report dated July 1990, prepared by Golder Associates. The compcund, 1,2 Dichloroethane, was not detected in the groundwater analysis for boring number B-3, drilled approximately 20 feet southwest of L-19. In that general location; CWM-Vickery will perform a screen test for the replacement well location by using the QED "Hydropunch II" technique.

The "Hydropunch II" sampling equipment is designed to collect a representative one liter groundwater sample without the need for

construction of a monitoring well. A drill rig is used to advance the boring to the appropriate depth. At the depth chosen, the "Hydropunch II" sampling apparatus is driven into the soil to a depth five feet below the drilled depth. The "Hydropunch II" is then partially withdrawn for one and one-half to two feet and a groundwater sample is collected using a teflon bailer.

The groundwater sample will then be analyzed for the ~~10~~ 11 volatile organics on the Continuing List to determine if contamination is present. If contamination exists, then a new location will be determined and the same procedures will be followed.

After the screen test is completed and the location has been approved by the OEPA; the replacement well will be constructed and installed in accordance with this workplan.

Please feel free to call me or Sandy Clark at 419-547-7791 if you have any questions or require additional information concerning this project.

Sincerely,

CHEMICAL WASTE MANAGEMENT, INC.

Randy J Moser for Fred Nicar

F. G. Nicar
General Manager

FGN/slc

cc w/: Jeff Steers, OEPA
Mike Eggert, OEPA

Golder Associates Inc.
CONSULTING ENGINEERS

WORK PLAN FOR
INVESTIGATION AT WELL L-19
VICKERY FACILITY

Submitted to:

Chemical Waste Management, Inc.
3956 State Route 412
Vickery, Ohio 43464

DISTRIBUTION:

5 Copies - Chemical Waste Management, Inc.
1 Copy - Dave Coker, CWM
2 Copies - Golder Associates Inc.

February 1990

853-3026

GOLDER ASSOCIATES INC. • 3730 CHAMBLEE TUCKER ROAD • ATLANTA, GA 30341 • TELEPHONE: (404) 496-1893 • TELEX 700523 • FAX: 404-934-9476
OFFICES IN UNITED STATES • [illegible]

Golder Associates Inc.
CONSULTING ENGINEERS

February 7, 1990

853-3026.3

Chemical Waste Management, Inc.
3956 State Route 412
Vickery, Ohio 43464

Attn: Mr. Steve Lonneman

RE: INVESTIGATION AROUND WELL L-19
VICKERY FACILITY

Gentlemen:

Golder Associates Inc. is pleased to submit this Work Plan for the investigation around Well L-19. We appreciate the opportunity to be of service to CWM. If you have any questions or need additional information regarding this work plan, please call.

Very truly yours,

GOLDER ASSOCIATES INC.

Gary H. Collison

Gary H. Collison, P.E.
Principal

GHC/dah
enclosure

TABLE OF CONTENTS

Cover Letter

TABLE OF CONTENTS i

SECTION PAGE

1.0 INTRODUCTION 1

2.0 GEOLOGY AND HYDROLOGY 2
2.1 General 2
2.2 Overburden Soils 2
2.3 Hydrogeology 3

3.0 PROPOSED INVESTIGATION 4
3.1 Drilling 4
3.2 Soil and Groundwater Sampling 4
3.3 Well Installation 5
3.4 Well Development 6
3.5 Reporting 6
3.6 Timing 6

REFERENCES 7

IN ORDER FOLLOWING PAGE 7

FIGURE 1 -
FIGURE 2 -

APPENDIX A - Monitoring Well Installation Log
APPENDIX B - Health and Safety Plan
APPENDIX C - Installation Procedures for New Monitoring Wells

the presence of volatile organic compounds (VOCs), then enough additional samples will be chosen at random for analytical testing to have a minimum of ten analyzed.

In addition to soil sampling, groundwater samples will also be collected from the investigation borings. Following completion of the boreholes, the augers will be removed and the borehole covered with plastic to keep debris and precipitation from entering the holes. The day following completion, the groundwater will be removed, to the extent possible, using a PVC bailer. The PVC bailer will be decontaminated between use in different borings. Once the groundwater has been removed, each boring will be covered to allow the groundwater to refill the boring. A groundwater sample will then be collected from each boring and placed in two volatile organic analysis (VOA) vials. Samples will be collected with a stainless steel bailer which will be decontaminated between use in different borings. The groundwater samples will be sent to ETC for analysis for 1,2-DCA. Following groundwater sample collection, each boring will be backfilled with bentonite pellets or grout.

3.3 Well Installation

Based on the results of the soil and groundwater sample analyses, a location near well L-19 will be chosen for the installation of an additional monitoring well. The monitoring well will be installed using the same procedures used for installing well L-19, as described in Reference 7, and will be suitable for inclusion in the facility's groundwater monitoring program.

Generally, the well will be constructed using surface casing and temporary casing to minimize dragdown and to minimize flow of surface or near surface water into the well during drilling. Also, extensive decontamination procedures will be followed to minimize contamination from the drilling equipment. The well will be constructed of 2-inch diameter, 316 stainless steel, flush threaded joint pipe. The well screen will be number 6 slot size and will

be installed to the same depth and length as well L-19 (Appendix A). Details of the well drilling, decontamination and construction procedures are included in Appendix C.

3.4 Well Development

The well will be developed following installation by successive purging of the well water. Based on previous experience with shallow overburden wells at the site, a period of 3 days may be required for a well to recover after purging. Purging will continue until reasonably stable pH and specific conductance values are obtained. The well will be purged once before or at the completion of the installation program after several feet of water have accumulated in the well and at least one other time before sampling. Additional purging for development may be required. Development and pumping water will be collected for on-site disposal.

3.5 Reporting

At the completion of this sampling and well installation program, a report on the program will be provided. This report will include a description of the soil drilling and sampling, field sample analyses results, well installation details, sampling and analytical protocol, analytical results, and an evaluation of the results.

3.6 Timing

This evaluation program for well L-19 will be initiated within 30 days after approval of the plan by the OEPA. The final report will be submitted within 30 days after receiving the final laboratory analytical reports for the proposed soil and water sampling.

GOLDER ASSOCIATES INC.

Wendy D. Morris
Project Engineer

Gary H. Collison, P.E.
Principal

WDM/GHC:maa

Chemical Waste Management
3956 State Rt 412
Vienna, Ohio 43464
419-547-7791

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 976 680 722

May 4, 1990

Mr. Jeff Steers
Ohio Environmental Protection Agency
Northwest District Office
1035 Devlac Grove Drive
Bowling Green, Ohio 43402-4598

RE: L-19 Investigation/P & A of Holes

Dear Mr. Steers:

In response to your letter of April 4, 1990, please find the attached addenda prepared by Golder Associates Inc. for the above referenced activities. Upon confirmation from you that these addenda satisfy the comments expressed in your April 4th letter, I will instruct Golder to mobilize and proceed with this work.

If you have any questions, please call me at 419-547-7791.

Sincerely yours,

CHEMICAL WASTE MANAGEMENT, INC.

Stephen C. Lonneman
Senior Environmental Engineer
Eastern Region

SCL/tr

Attachments

cc w/attachments: Fred Nicar
Bob Heitman
~~Agency Correspondence File~~

Golder Associates Inc.
CONSULTING ENGINEERS

April 30, 1990

853-3027

Chemical Waste Management
3956 State Route 412
Vickery, Ohio 43464

Attention: Mr. Steve Lonneman

RE: OEPA COMMENTS ON WORK PLAN
FOR THE INVESTIGATION AT WELL L-19

Gentlemen:

This addendum to the February 1990 work plan for the investigation at Well L-19 at the Vickery Facility addresses the OEPA's March 29, 1990, comments to said work plan. Following are the responses to those comments, which are attached to this addendum.

1. The drill rig and downhole equipment will be decontaminated prior to drilling each borehole. Decontamination procedures are described in Appendix C of the work plan.

2. The split spoon sampler will be decontaminated between samplings. Decontamination procedures are those described in Appendix C of the work plan.

3. All bailers will be decontaminated using those procedures described in Appendix C of the work plan.

4. Groundwater sampling procedures will be in accordance with the facility's sampling and analysis procedures.

5. When bentonite pellets are used to backfill the borehole they will be tamped to avoid bridging. When bentonite grout is used to backfill a borehole it will be installed via tremie pipe. The bentonite will be checked for settling and more will be added as necessary. The top of the plug will be covered with soil to allow for vegetative growth.

6. The location of the new monitoring well will be approved by the OEPA.

7. The new monitoring well will be surveyed to the nearest 0.01 vertical foot.

8. Well purging will be performed using a bailer. The bailer

will be decontaminated using those procedures described in Appendix C of the work plan.

9. The analyses results will be included in the report.

10. The bentonite will be checked for settling and more will be added as necessary.

11. Decontamination will be conducted in the on-site truck wash and all decontamination wastes will be handled according to the facility's standard procedures for handling such wastes.

If you have any questions concerning these responses, please call. Golder Associates appreciates the opportunity to be of service to Chemical Waste Management at the Vickery facility.

Very truly yours,

GOLDER ASSOCIATES INC.

James F. Durrett
Project Hydrogeologist

JFD/hw

Attachment

Golder Associates Inc.
CONSULTING ENGINEERS

REPORT ON

INVESTIGATION AT HOLE SS-10

VICKERY, OHIO FACILITY

1989

Submitted to:

Chemical Waste Management, Inc.
3956 State Route 412
Vickery, Ohio 43464

DISTRIBUTION:

12 Copies - Chemical Waste Management, Inc.
2 Copies - Golder Associates Inc.

January 1989 853-3022

Golder Associates Inc.
CONSULTING ENGINEERS

January 17, 1989 853-3022

Chemical Waste Management, Inc.
1135 Balmer Road
Model City, New York 14107

Attention: Mr. David M. Coker

RE: INVESTIGATION AT HOLE SS-10
VICKERY, OHIO

Gentlemen:

Golder Associates Inc. is pleased to submit this report on the Investigation at Hole SS-10, Vickery, Ohio. The specific purpose of the investigation was to determine the reason for the presence of organic compounds detected in groundwater removed from hole SS-10 during the Single Sample Program in 1984. This report presents a brief site history, details of the investigation, data collected, and an assessment of the results of the investigation.

Golder Associates appreciates the opportunity to have been of service to Chemical Waste Management on this project. Should there be any questions regarding this investigation, please call.

Very truly yours,

GOLDER ASSOCIATES INC.

Gary H. Collison

Gary H. Collison, P.E.
Principal

GHC:jfd

TABLE OF CONTENTS

Cover Letter

Table of Contents i

SECTION PAGE

1.0 INTRODUCTION 1

2.0 GEOLOGY AND HYDROLOGY 3
2.1 General Geology 3
2.2 Overburden Soils 3
2.3 Hydrogeology 4

3.0 SINGLE SAMPLE PROGRAM 6
3.1 Program Description and Results 6
3.2 Potential Sources of VOCs at Hole SS-10 7

4.0 SS-10 INVESTIGATION 8
4.1 General 8
4.2 Drilling and Soil Sampling 8
4.3 Shallow Borehole Water Sampling 9
4.4 Well Installation, Development and Sampling .. 10
4.5 Cleaning Procedures 12
4.6 Quality Assurance (QA) Sampling 13
4.7 Chain-of-Custody Procedures 13

5.0 ANALYTICAL RESULTS AND EVALUATION 15
5.1 Soil Samples 15
5.2 Groundwater Samples 16
5.3 QA Samples 17

6.0 CONCLUSIONS 19

REFERENCES 21

In Order Following Page 21

FIGURE 1 - Site Location Plan
FIGURE 2 - Hole SS-10 Investigation Well Location Plan

APPENDIX A - Boring and Well Logs
APPENDIX B - Sampling Forms, Chain-of-Custody Form, and Analytical Results

1.0 INTRODUCTION

Chemical Waste Management, Inc. (CWM) owns and operates a hazardous waste disposal facility in northern Ohio, near the town of Vickery, known as the Vickery Facility. The site is located on State Route 412 near the intersection of State Route 510, about twenty miles southwest of Sandusky, Ohio (Figure 1).

The Facility presently disposes of hazardous waste by underground injection through four deep wells. Three other deep injection wells previously used at the site have been plugged and abandoned. Past operations at the Facility also included the use of various ponds for the treatment and/or separation of oil residues and liquid waste for reclamation and disposal. In accordance with the Consent Decree of May 22, 1984 between CWM and the Ohio Environmental Protection Agency (OEPA), CWM agreed to install eighteen temporary overburden groundwater sampling holes (SS-Series holes). These holes, plus one existing monitoring well, were involved in a single sampling event to sample shallow overburden groundwater. The Consent Decree specified the open interval for the SS-Series holes at 15 feet to 20 feet beneath the original ground surface. Also specified were the locations for each SS-hole. Following the installation of the SS-series holes and the single sample event, levels of organic compounds exceeding concentrations specified in the Consent Decree were reported from the sampling of hole SS-10. Section IX, paragraph 18(D) of the Consent Decree specified the installation of a groundwater monitoring well(s) at hole locations where groundwater sampling results exceed concentrations specified in the Consent Decree, and the sampling of the well(s) for the parameters exceeding those concentrations.

This report briefly describes the geology and hydrogeology of the site, describes the single sample event and results for SS-10, describes the additional investigation including installation of a monitoring well near hole SS-10, and presents the results of the investigation. This investigation and report satisfy the requirements as set forth in Section IX, paragraph 18(D) of the Consent Decree.

2.0 GEOLOGY AND HYDROLOGY

2.1 General Geology

The site geology and hydrogeology have been extensively evaluated and summarized in References 1 through 7. The site is underlain by approximately 33 feet to 52 feet of glacial overburden materials, consisting of lacustrine clay and glacial till, overlying dolomite bedrock. The dolomite bedrock, which comprises the uppermost aquifer underlying the site, is about 500 feet thick. The dolomite bedrock is underlain by a sequence of sedimentary rocks comprising shale, sandstone, limestone, and dolomite. Precambrian granite bedrock ("basement rock") is encountered about 2,900 feet beneath the ground surface.

2.2 Overburden Soils

The overburden soils at the site are the primary soils of concern in this investigation. The overburden soils consist of deposits of glacial and lacustrine silty clays and clays, approximately 50 feet thick. The upper 5 feet to 10 feet of the overburden have been desiccated during the geologic past resulting in fractures which may be open, although none were observed during any of the field sampling programs.

The lacustrine soils extend from the ground surface to depths of 0 feet to 25 feet beneath the ground surface, with a typical thickness of about 15 feet. Sand partings and horizontal laminations 1/4-inch to 1-inch thick have been observed in the lacustrine materials.

Glacial till deposits underlie the lacustrine materials down to bedrock. These till deposits are also comprised of silty clays and clays, with some sand and gravel in the matrix. In some areas of the site, where the lacustrine deposits are thin or absent, the till deposits are at or near the ground surface.

The depth of desiccation can be delineated by lower moisture contents and stiffer consistency than those found deeper in the overburden. Below the limit of desiccation the lacustrine and till soils are typically soft, have a relatively high moisture content, and are near normally consolidated. These soft soil conditions posed particular installation problems for the SS-series holes because the clays would squeeze the hole closed, unless casing was used to support the hole.

2.3 Hydrogeology

The primary aquifer underlying the site is the fractured and solutioned dolomite bedrock. Site water level data indicate on-site pumping from the aquifer can affect the overall groundwater gradients. Furthermore, an on-site pump test, along with past water level data, has clearly demonstrated that local lateral flow in the aquifer can be maintained toward the facility. Regional lateral flow in the aquifer is north toward Lake Erie.

Water levels in the bedrock aquifer, within the area of this study, are approximately at an elevation of 595 feet, about 15 feet to 20 feet beneath the original ground surface. Water levels in the overburden materials have been observed to be within 5 feet of the original ground surface. Therefore, there is a component of flow from the overburden material toward the bedrock aquifer. The vertical and lateral flow velocities in the overburden are estimated using the equation for average linear groundwater velocity,

$$V = \frac{ki}{n_e}$$

where V = velocity
k = hydraulic conductivity
i = hydraulic gradient
n_e = effective porosity

The vertical hydraulic conductivity (k) of the overburden materials has been estimated to be 2×10^{-8} cm/s (2×10^{-2} ft/yr) (Reference 3). Using a nominal thickness of 50 feet for the overburden and a groundwater head difference of 10 feet between the overburden and the bedrock (Reference 3), the vertical hydraulic gradient (i) is calculated as 0.2 ft/ft. The effective porosity (n_e) of the overburden materials is taken as 0.1 (Reference 3). The vertical flow velocity is, therefore, estimated to be on the order of 0.04 ft/yr.

The lateral hydraulic conductivity (k) of the lacustrine soils has been estimated to be 1×10^{-7} cm/s (1×10^{-1} ft/yr) (Reference 3). Using a lateral hydraulic gradient (i) within the lacustrine materials of 1×10^{-4} ft/ft, calculated from groundwater elevations measured January 14, 1986, between lacustrine monitoring wells L-15 and L-23, and an effective porosity (n_e) of 0.1, the lateral flow velocity is estimated to be on the order 0.0001 ft/yr, generally to the northwest. Vertical flow, therefore, dominates lateral flow, as vertical flow rates are two orders of magnitude greater than lateral flow rates.

3.0 SINGLE SAMPLE PROGRAM

3.1 Program Description and Results

The details for placement, installation and sampling of the holes for the single sample program were approved by OEPA prior to commencement of the program. Several modifications were required in the field, which were also approved by OEPA prior to their implementation. Hollow stem augering was required by OEPA to drill dry holes for the SS-Series program. The holes for the single sample event were installed between June 20 and July 13, 1984, and sampled between June 29 and August 15, 1984. Hole SS-10 was installed on July 10, 1984 (see Appendix A) and sampled on August 14, 1984. The program procedures developed with the OEPA are presented in Reference 5 and the results are presented in Reference 6.

The groundwater testing program included several major ions and volatile organic compounds (VOCs) as indicator parameters. The analytical results, discussed in detail in Reference 6, indicated unacceptable constituent levels at hole SS-10. VOCs were reported for the groundwater sample from this hole and oily material was observed in the soils during the installation of the hole (as indicated on the installation log in Appendix A). The VOC data reported for hole SS-10 groundwater included the following compounds with concentrations exceeding the levels stipulated in the Consent Decree:

VOC	Concentration (ug/L)
Benzene	18
Chlorobenzene	14
Chloroform	106
Ethylbenzene	10
Toluene	105
1,1,1 Trichloroethane	13
Trichloroethylene	30

3.2 Potential Sources of VOCs at Hole SS-10

Hole SS-10 is located in the previous oil reclamation tank truck loading/unloading area (see Figure 2). The hole was in the middle of the gravel roadway which was once used by oil tank trucks serving the previous oil reclamation business. SS-10 was constructed with a cap flush with the road surface to avoid being hit by truck traffic.

Minor spills or leaks during past loading and unloading activities near SS-10 are the likely source for the VOCs detected in SS-10. Other potential sources could include the waste oil reclamation and pipe transport system (see Figure 2). The gravel road would allow the surface spills to migrate downward to the underlying soil surface. The observation of oily material at the base of the 3-foot thick gravel layer in the SS-10 borehole (see boring logs SS-10 and SS-10W in Appendix A) indicates past spillage/leaks have settled at the soil surface beneath the gravel roadway.

Installation procedures for the SS-Series program did not include surface casing to seal the final sampling interval from liquids encountered at the base of the road gravel and some of these fluids may have entered the sampled interval. This water was not permitted by OEPA to be flushed from the hole prior to development or sampling, and may have been included in the sample which was taken. These procedures were not conducive to the construction of a clean sampling hole through potentially contaminated soils, and obtaining a representative groundwater sample was, therefore, not possible.

4.0 SS-10 INVESTIGATION

4.1 General

A subsequent investigation was performed around hole SS-10 to verify the compounds detected, to establish the depth of their occurrence, and to identify the medium (soil or water) in which they occurred. This investigation included drilling four boreholes within 10 feet of hole SS-10 (see Figure 2), chemical analysis of soil samples taken from those boreholes, and chemical analysis of water collected from the boreholes. Three of the boreholes, designated SS-10N, SS-10S and SS-10E, were drilled to 4.5 feet below the ground surface in order to completely penetrate the gravel fill and the upper portion of the lacustrine deposit. SS-10N was located 9 feet north of SS-10, SS-10S was located 9.5 feet south of SS-10, and SS-10E was located 8.5 feet east of SS-10. The fourth borehole, designated SS-10W, was located 9.5 feet west of SS-10 and was drilled to 21.7 feet below the ground surface. A monitoring well was then installed in the SS-10W borehole with approximately the some screened interval as SS-10.

4.2 Drilling and Soil Sampling

After hole SS-10 was completed and sampled in 1984, the roadbed was raised as part of other site re-grading. Prior to drilling the boreholes for this SS-10 area investigation, the gravel roadbed in the vicinity of hole SS-10 was removed to the ground surface level which existed when SS-10 was installed. Hollow-stem augers (nominally 6-inches O.D.) were then used to drill the three shallow boreholes and the first 12 feet of the deeper borehole, SS-10W.

Borehole SS-10W was completed using multiple casings to minimize drag-down in the hole. After the first 12 feet were drilled using the 6-inch O.D. augers, the hole was reamed to a 10-inch diameter with larger augers. The augers were removed and the hole was filled with Volclay bentonite grout.

A 6.75-inch O.D. steel surface casing was placed in the hole and hammered 2 feet into the underlying natural clay, to a depth of 14 feet. The grout was flushed from the casing using water from the drillers' water truck. Water was supplied by R & R Water Hauling. The water was then bailed from the casing using a 3-inch diameter PVC bailer. The remaining 9.7 feet of the borehole were advanced by driving and washing 4-inch O.D. steel casing.

Each borehole was continuously sampled using a clean split-spoon for each sample. Cleaning procedures are described in Section 4.5. Two Volatile Organic Analysis (VOA) vials were filled, minimizing headspace, from each split-spoon soil sample. Clean, non-powdered, latex gloves were worn when handling any soil sample. The VOA vials were then placed in a shuttle with ice packs. The remaining sample was placed in a 500 ml jar, the jar opening was covered with aluminum foil, and the lid was screwed on. The sample was then shaken and set aside. Approximately 15 minutes later organic vapors within the jar were measured by puncturing the aluminum foil with an HNU PI-101 probe and recording the relative total organic vapor concentration. These measurements were used to determine which soil samples would be further analyzed in a laboratory for the VOCs listed in Section 3.1. The measurements, along with soil descriptions and boring procedure details, are included on the soil boring logs in Appendix A. Ten soil samples were shipped to ETC Laboratory for analysis.

4.3 Shallow Borehole Water Sampling

Following the completion of the three shallow boreholes, SS-10N, SS-10S, and SS-10E, the augers were removed and the boreholes were left open and covered with plastic to keep debris and precipitation from entering the holes. By the next day, groundwater had collected within the holes to a depth of

approximately 1.7 feet below the ground surface. Approximately 2 gallons to 3 gallons of water were bailed from each borehole using a clean, 3-inch diameter, PVC bailer. The bailer was decontaminated between holes. Decontamination procedures are described in Section 4.5. Approximately 6 inches of water remained in each borehole following bailing. The holes were re-covered with plastic and left for several hours to allow the water to refill the holes. The water recovered to within 0.5 foot of original groundwater level in each borehole.

Groundwater sampling was performed by removing sufficient water from the hole to fill two VOA vials per hole. A clean, stainless steel bailer was used to collect the samples, and the bailer was decontaminated between boreholes. The VOA vials were placed in a shuttle with ice packs and shipped to ETC Laboratory for analysis for the VOCs listed in Section 3.1. Each borehole was then backfilled with 5 gallons of bentonite pellets to approximately 2 feet below the ground surface, followed by soil, removed from the borehole, to the ground surface.

4.4 Well Installation, Development and Sampling

A monitoring well was installed in borehole SS-10W after the borehole drilling was completed. The well was constructed inside the 4-inch steel casing using 2-inch diameter Schedule 40 PVC. Water was bailed from the casing so that only a few inches of water remained at the bottom of the casing. Fine silica sand was slowly poured down the casing to a depth of approximately 21 feet below the ground surface. This located the well screen at the same depth as the screen for hole SS-10. The well was set on top of this sand and the casing was withdrawn a few inches until the top of the sand was just inside the bottom of the casing. More sand was added as a

filter pack in approximately 0.5-foot increments as the casing was withdrawn, always keeping the top of the sand inside of the casing. The sand was added to just over 0.6 foot above the top of the screen. A 2.75-foot bentonite seal was placed above the sandpack by slowly pouring bentonite pellets through the casing as the casing was withdrawn. Thick bentonite grout was then tremied to within 2.5 feet of the ground surface while the 4-inch casing was withdrawn. Concrete was then poured to the ground surface. A vented well cap was placed on the well riser. A locking protective casing was threaded onto the surface casing and coarse sand was poured inside the casing to a few inches below the top of the well pipe. The protective casing had weep holes drilled at its base. The annulus around the surface casing was widened with a shovel to a depth of approximately 1.5 feet and concrete was poured in the annulus. Finally, the concrete was mounded about the casing at the surface.

Well development was performed by Bowser-Morner approximately one week after installation of the well. CWM provided a stainless steel bailer and cable to be dedicated to that well. The bailer was cleaned following the procedure described in Section 4.5. At the well site, the water level in the well was measured from the top of the well pipe. The bailer was then lowered into the well and the well was evacuated. Water removed from the well was placed into a calibrated bucket. Specific conductivity, pH and temperature measurements were made, and then the evacuated well water was collected in an adjacent 55-gallon steel drum. Clean, disposable, latex gloves were used for handling the bailer and cable at all times. At the conclusion of the bailing, the bailer was left in the well with the top of the cable looped around the top of the casing.

Additional evacuation was performed three and four days after the initial evacuation. The water level was measured prior to removing the bailer. The bailer was then removed, all available water was evacuated into a calibrated bucket, and pH and conductivity measurements were then made.

Well SS-10W was sampled on August 23, 1988. Water was poured from the bailer into two 40 ml VOA vials provided by ETC Laboratories and the vials were delivered to ETC for analysis. The evacuation volumes, pH, conductivity measurements, and temperature data that were accumulated on each of the three days, are listed below:

Date	8-19-88	8-22-88	8-23-88
Water Level (ft. below top of PVC)	10.99	21.50	21.72
Gallons removed	2.5	0.5	0.4
pH (s.u.)	7.10	7.14	7.5
Specific Conductivity (umhos/cm)	650	570	780
Temperature (^{o}C)	15	15	18

4.5 Cleaning Procedures

All drilling and sampling equipment was washed using non-phosphate detergent, rinsed using a high-pressure hot water washer, rinsed with laboratory-grade Acetone, then immediately rinsed using the hot water washer. Clean rubber or latex gloves were used when handling the equipment, and all cleaned equipment was either wrapped in plastic for later use or covered with plastic for transport to the drill rig for immediate use. Cleaning took place in the Truck Wash Building using water from the drillers' water truck. Water was supplied by R & R Water Hauling. A sample of this water, labeled XDECON, was taken for analysis (see Section 4.6).

4.6 Quality Assurance (QA) Sampling

Two drip samples from stainless steel bailers were collected during the course of the investigation. The first sample, labeled XDECON, was taken in the Truck Wash Building by pouring water used to clean equipment through a cleaned stainless steel bailer and collecting the water in the VOA vials. The second drip sample, labeled XLABORATORY, was taken in the on-site laboratory by pouring distilled, deionized water into a cleaned stainless steel bailer which was then emptied into the VOA vials.

A field blank sample, labeled WSS10, was collected during the course of the investigation. This sample was collected at the same time that the water sample from well SS-10W was taken.

4.7 Chain-of-Custody Procedures

All laboratory analyses were conducted by Environmental Testing and Certification (ETC) of Edison, New Jersey. ETC prepared all of the sample bottles in their laboratory and shipped them to the site in access-controlled, insulated, sample shuttles. Upon receiving the shuttles at the site, the seals were examined and then broken, and the shuttles were opened. Each shuttle was examined to see that the appropriate number and type of samples bottles were present and that the trip blank vials were intact and contained no air bubbles. This information was entered on the Chain-of-Custody form included in the shuttle. The sample bottles and paper work were replaced into the shuttles, which were then sealed using temporary seals supplied in the shuttles. The ice packs, included in each shuttle, were placed in a freezer.

The sample shuttles were kept in a secure area of the Vickery site office until the date of use. At that time, they were brought to the sample location and the temporary seal was

broken. The shuttles were opened, ice packs were placed in the shuttles, the Chain-of-Custody and Field Parameter forms were filled out, the sample bottles were filled, and the bottles were placed in the shuttles. The shuttles were returned to the Vickery office, more ice packs were added, the Chain-of-Custody form was completed, and the sample shuttle was sealed. The samples were shipped, via courier, for overnight delivery to the laboratory. At all times, the samples were in the possession of the sampler, sealed in the shuttles in the CWM office, or in the possession of the courier. Copies of the Chain-of-Custody and Field Parameters forms are included in Appendix B.

5.0 ANALYTICAL RESULTS AND EVALUATION

5.1 Soil Samples

The soil encountered in the borings for this investigation consisted of 3 feet of gravel fill underlain by 9 feet of lacustrine silty clay, then clay till to the base of the deepest boring (21.7 feet).

Two soil samples from boring SS-10S, one soil sample from boring SS-10E, and one soil sample from boring SS-10N were analyzed for the VOCs that exceeded the concentrations stipulated in the Consent Decree. These three borings were completed at a depth of 4.5 feet below the ground surface in order to penetrate the gravel fill and the uppermost lacustrine clay. The results are included in Appendix B and are summarized below:

	SOIL			
VOC	SS-10S 1.5-3 ft Depth Conc. (ug/kg)	SS-10S 3-4.5 ft Depth Conc. (ug/kg)	SS-10E 1.5-3 ft Depth Conc. (ug/kg)	SS-10N 0-1.5 ft Depth Conc. (ug/kg)
Benzene	591	BMDL(1)	62.9	BMDL
Chlorobenzene	1440	195	264	1760
Chloroform	944	116	174	432
Ethylbenzene	2980	117	536	3450
Toluene	10,100	422	1400	3030
1,1,1-Trichloroethane (TCA)	20	BMDL	105	ND(2)
Trichloroethylene (TCE)	3740	156	766	1580

(1) Below Method Detection Limit
(2) Not Detected

An additional six soil samples from boring SS-10W were analyzed for the same VOCs. This boring was completed at a depth of 21.7 feet below the ground surface, and the new

monitoring well was installed within this boring. The soil sample VOC results are included in Appendix B and are summarized below:

SOIL

SS-10W DEPTH (FT)

VOC	1.5-3 Conc. (ug/kg)	3-4.5 Conc. (ug/kg)	4.5-6 Conc. (ug/kg)	6-7.5 Conc. (ug/kg)	10.5-12 Conc. (ug/kg)	18-19.5 Conc. (ug/kg)
Benzene	BMDL(1)	ND(2)	47.1	ND	5.62	ND
Chlorobenzene	3870	BMDL	319	861	ND	ND
Chloroform	923	ND	881	2190	41.6	ND
Ethylbenzene	3120	ND	465	1010	ND	ND
Toluene	10,600	BMDL	1350	2570	19.1	ND
TCA	601	BMDL	30.6	ND	ND	ND
TCE	3390	4,170,000	549	ND	12.4	ND

(1) Below Method Detection Limit
(2) Not Detected

From these data, it is apparent that there are significant concentrations of VOCs in the shallow soil, even above the groundwater table. In boring SS-10W soil sample VOC concentrations diminished substantially with depth. Also, VOCs were not detected in the deepest soil sample analyzed from boring SS-10W.

5.2 Groundwater Samples

Groundwater samples were collected from the three shallow boreholes and were analyzed for VOCs. The results are included in Appendix B and are summarized below:

GROUNDWATER

VOC	SS-10S Conc. (ug/L)	SS-10E Conc. (ug/L)	SS-10N Conc. (ug/L)
Benzene	BMDL(1)	222	BMDL
Chlorobenzene	ND(2)	216	BMDL
Ethylbenzene	ND	138	ND
Toluene	BMDL	1800	748
TCA	ND	317	ND
TCE	470	876	312

(1) Below Method Detection Limit
(2) Not Detected

These results are consistent with the soil analysis results and indicate that VOCs are present in the very shallow groundwater when sampled within the contaminated soil interval.

Groundwater was also sampled from a PVC well installed in boring SS-10W and screened at the same interval as well SS-10. The results, along with the original results from well SS-10, are included in Appendix B and are summarized below:

GROUNDWATER

VOC	SS-10W Conc. (ug/L)	SS-10 Conc. (ug/L)
Benzene	ND(1)	18(3)
Chlorobenzene	ND	14
Chloroform	ND	106
Ethylbenzene	ND	10
Toluene	BMDL(2)	105
TCA	ND	13
TCE	ND	30

(1) Not Detected
(2) Below Method Detection Limit

The SS-10W results are consistent with the SS-10W soil sample results which do not indicate VOCs at depth in that hole. Note that the SS-10W results are also substantially different than the SS-10 results, even though the two wells are screened at the same interval and are less than ten feet apart.

5.3 QA Samples

The three QA samples, XDECON, XLABORATORY, and WSS10, were analyzed for the same VOCs as the other samples collected during this investigation. The results of the analyses are included in Appendix B and are summarized below:

VOC	XDECON Conc. (ug/L)	XLABORTORY Conc. (ug/L)	WSS10 Conc. (ug/L)
Benzene	ND(1)	ND	ND
Chlorobenzene	ND	ND	ND
Chloroform	11.1	ND	ND
Ethylbenzene	ND	ND	ND
Toluene	ND	ND	ND
TCA	ND	ND	ND
TCE	ND	ND	4.9

(1) Not Detected

6.0 CONCLUSIONS

The VOC results from soil and water samples from the four borings indicate that volatile organic compounds are present in the shallow soil, even above the groundwater, and in the groundwater in contact with those soils, and the compounds present in both soil and water diminish in concentration with depth. The soil sample taken at a depth of 18 to 19.5 feet below the ground surface contained none of the seven VOCs analyzed for during this investigation. At a depth of approximately 16.1 feet below the ground surface, the depth of the top of the well screen, the groundwater contains none of the seven VOCs analyzed for during this investigation.

The potential for the VOC concentrations in the SS-10 area to have originated from a source other than accumulated spills/leaks associated with truck loading/unloading appears to be negligible. There are no other potential source areas south (regionally upgradient) of the SS-10 area. The closest other potential sources were the previous oil reclamation system to the east of the SS-10 area and previously used oil transfer lines north of the SS-10 area (see Figure 2). Since lateral groundwater movement across the site in the lacustrine soil is on the order of 10^{-4} feet per year, and these other potential source areas are about 50 feet or more away from the SS-10 area, lateral migration of VOCs with groundwater through the lacustrine soils from these potential sources is not expected. Furthermore, the evidence of higher concentrations of VOCs in the soils above the groundwater clearly indicates the VOCs originated from the surface in the SS-10 area. However, the total lateral extent of VOCs from accumulated spills/leaks in the loading/unloading area has not been completely defined.

The results of this investigation indicate, as previously suspected, that the compounds detected in the groundwater sample from hole SS-10 were dragged down the hole during drilling and installation of the screen and riser pipe, and are not present in the groundwater at the depth of the well screen, approximately 17 feet below the ground surface. Therefore, those compounds which were detected in the SS-10 sample do not reflect the true groundwater quality at the 15 feet to 20 feet depth interval below the original, natural ground surface, which was the investigation interval specified in Section IX, paragraph 18 (A) of the Consent Decree. This investigation demonstrates the groundwater at the specified depth interval to be free from the organic compounds of interest. Therefore, in keeping with the intent of paragraph 18 (D) of the Consent Decree, there is no reason for a permanent well to be installed at this location as part of the CWM groundwater monitoring plan for the Vickery Facility.

GOLDER ASSOCIATES INC.

James F. Durrett
Hydrogeologist

Gary H. Collison, P.E.
Principal

JFD:GHC:rcs

REFERENCES

1. Bowser-Morner, Inc. "Hydrogeologic Assessment, Northern Ohio Treatment Facility, Vickery, Ohio," May 1983.

2. Golder Associates, "Geotechnical and Geohydrologic Data Review, Vickery, Ohio, Chemical Waste Management Facility," June 1983.

3. Golder Associates, "Summary and Characterization of Site Geohydrologic Conditions, Chemical Waste Management, Inc., Vickery, Ohio Facility," September 1983.

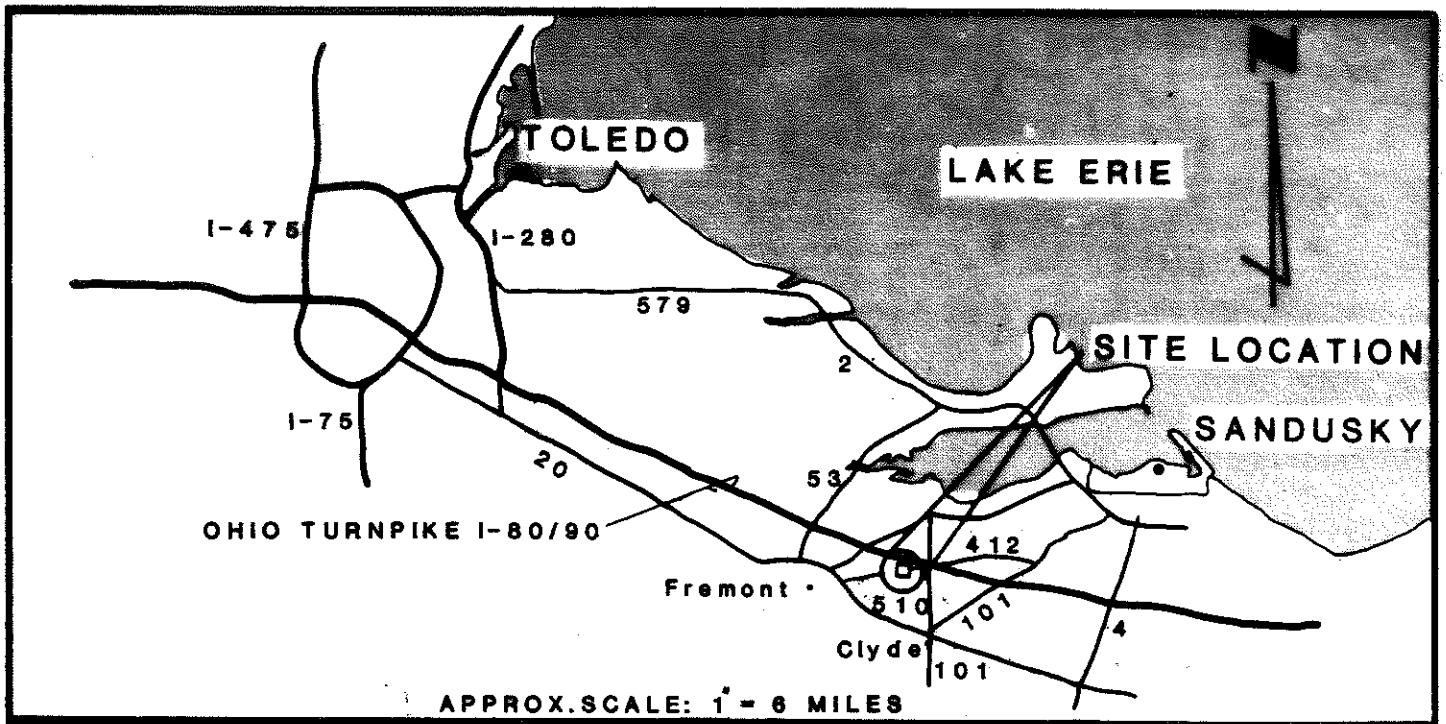
4. Golder Associates, "Groundwater Monitoring Program, CWM Northern Ohio Treatment Facility, Vickery, Ohio," April 1984.

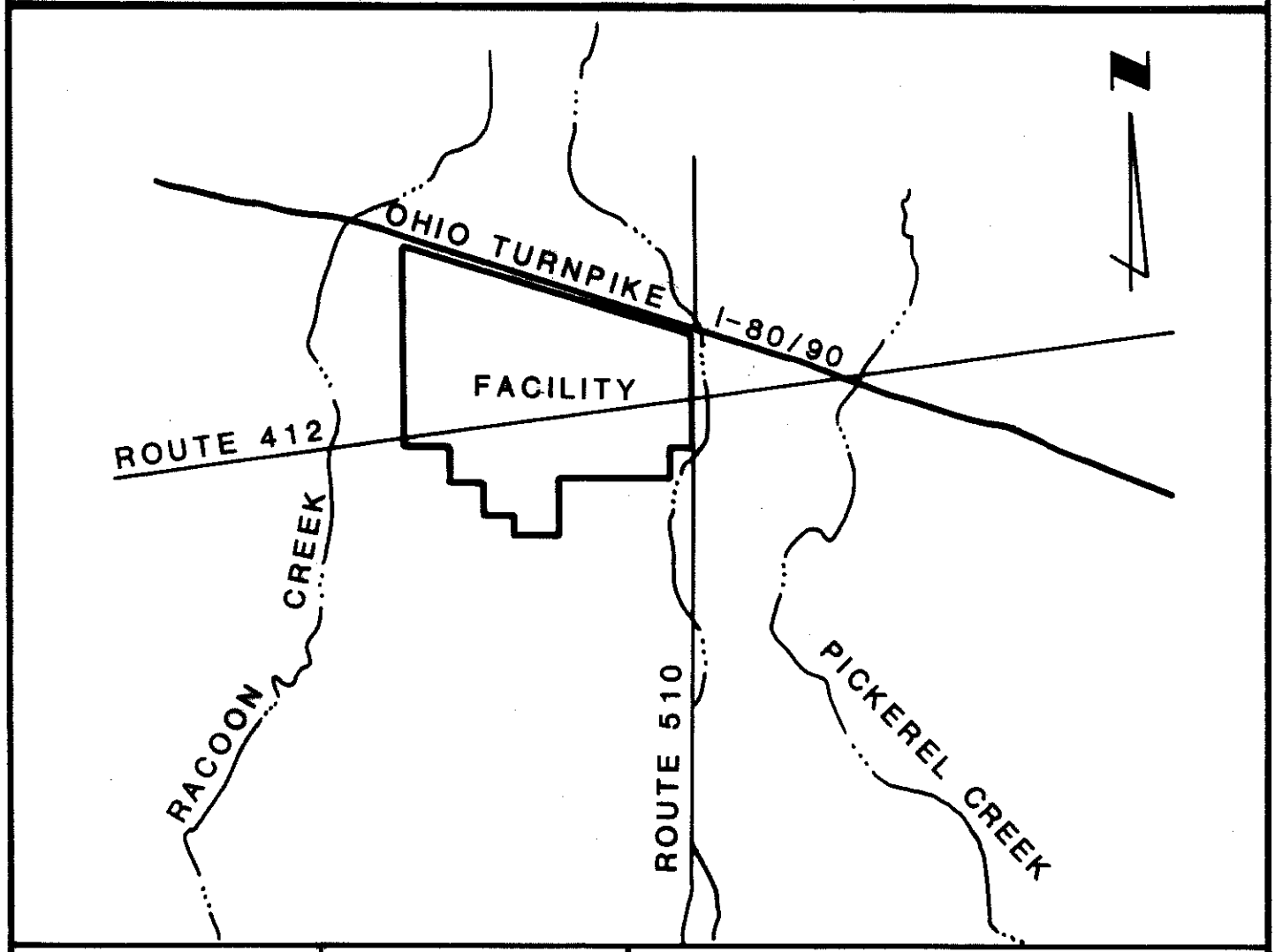
5. Golder Associates, "Overburden Groundwater Testing Program Description," June 1984 and Addendum dated July 2, 1984.

6. Golder Associates, "Overburden Groundwater Testing Program, Vickery, Ohio Facility," September 1984.

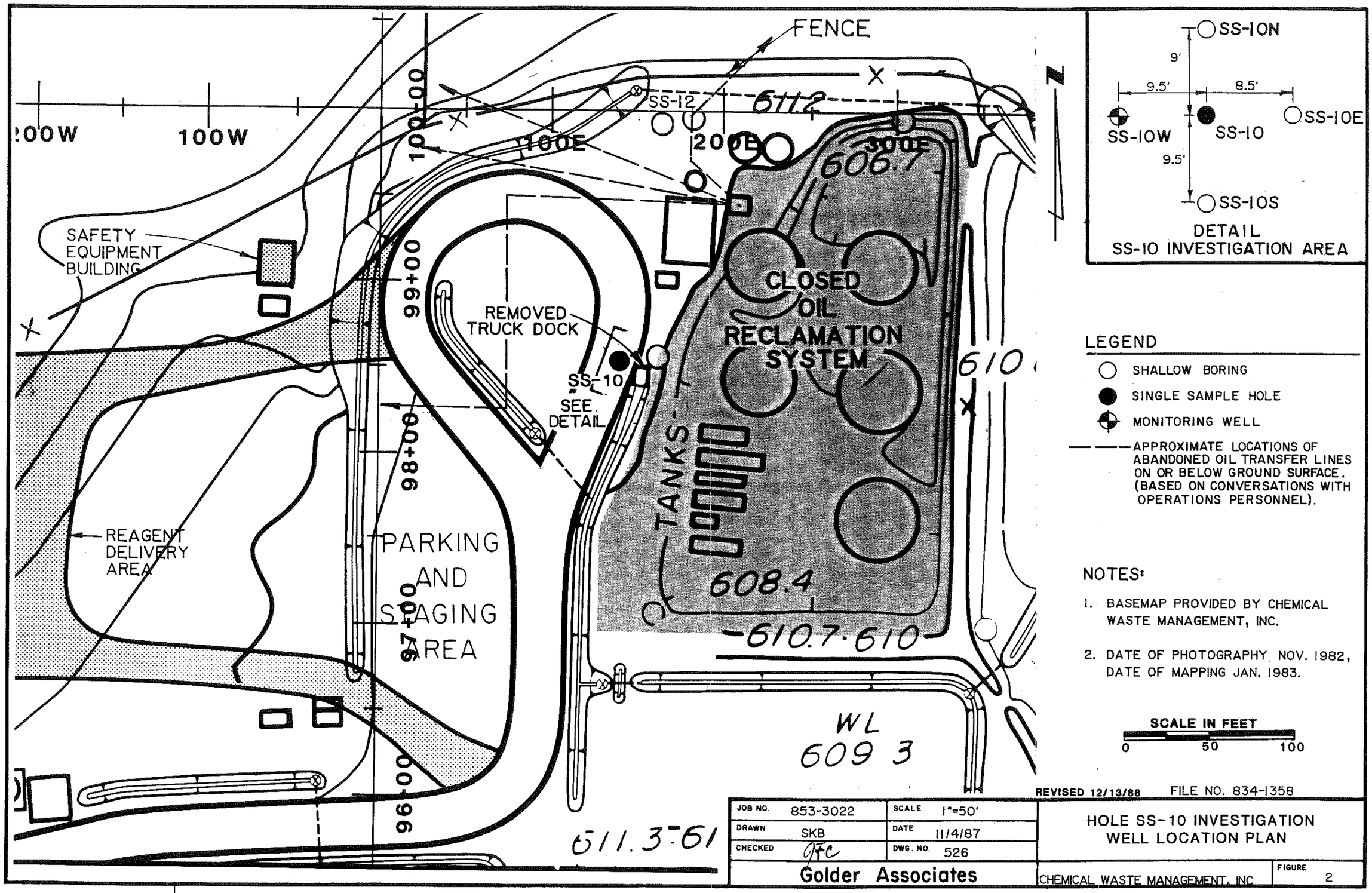
7. Golder Associates, "Monitoring Program Hydrogeologic Study, Chemical Waste Management, Inc., Vickery, Ohio Facility," July 1986.

A F 20440A-B





JOB NO. 834-1358	SCALE NO SCALE	SITE LOCATION PLAN
DRAWN JLW	DATE 3/13/86	
CHECKED WAD.	DWG. NO. 391	
Golder Associates	CHEMICAL WASTE MANAGEMENT, INC.	FIGURE 1


FENCE
200W
100W
100E
200E
300E
SS-12
611.2
606.7
SAFETY EQUIPMENT BUILDING
REMOVED TRUCK DOCK
SS-10
SEE DETAIL
CLOSED OIL RECLAMATION SYSTEM
TANKS
608.4
610
610.7-610
REAGENT DELIVERY AREA
PARKING AND STAGING AREA
100+00
99+66
98+00
97+00
96+00
WL
609 3
611.3-61
N
SS-10N
9'
9.5'
8.5'
SS-10W
SS-10
SS-10E
9.5'
SS-10S
DETAIL
SS-10 INVESTIGATION AREA
LEGEND
SHALLOW BORING
SINGLE SAMPLE HOLE
MONITORING WELL
APPROXIMATE LOCATIONS OF ABANDONED OIL TRANSFER LINES ON OR BELOW GROUND SURFACE. (BASED ON CONVERSATIONS WITH OPERATIONS PERSONNEL).
NOTES:
1. BASEMAP PROVIDED BY CHEMICAL WASTE MANAGEMENT, INC.
2. DATE OF PHOTOGRAPHY NOV. 1982, DATE OF MAPPING JAN. 1983.
SCALE IN FEET
0
50
100
REVISED 12/13/88
FILE NO. 834-1358
JOB NO. 853-3022
SCALE 1"=50'
DRAWN SKB
DATE 11/4/87
CHECKED JFC
DWG. NO. 526
Golder Associates
HOLE SS-10 INVESTIGATION
WELL LOCATION PLAN
CHEMICAL WASTE MANAGEMENT, INC.
FIGURE 2
300171

APPENDIX A

BORING AND WELL LOGS

Golder Associates, Inc.

SOIL BOREHOLE LOG

SITE NAME AND LOCATION
CWM VICKERY, OHIO FACILITY

DRILLING METHOD: 6-INCH O.D. HOLLOWSTEM AUGERS

SAMPLING METHOD: 18-INCH SPLIT-SPOON

BORING NO. SS-10N

SHEET 1 OF 1

					DRILLING START	DRILLING FINISH
WATER LEVEL					TIME	TIME
TIME					11:30	14:20
DATE					DATE	DATE
CASING DEPTH					8-8-88	8-8-88

DATUM MSL ELEVATION 610.0

DRILL RIG MOBILE B-61

SURFACE CONDITIONS: FLAT, DRY

ANGLE VERTICAL BEARING - -

SAMPLE HAMMER TORQUE 350 FT-LBS

DEPTH IN FEET	BLOWS/ 6 IN. ON SAMPLER (RECOVERY)	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIAL	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	PLASTIC INDEX	HNU RESULTS (ppm)
0.0	15-35-37 (60%)		D FILL Very dense brown and gray GRAVEL and coarse to fine sand, some clayey silt (GM)								140
2.0	9-11-7 (60%)		E	2" SS							50
4.0	9-25-27 (100%)		F LACUSTRINE DEPOSIT Very dense brown SILTY CLAY, trace fine sand (CL)								15
			END OF BORING								
6.0											
8.0											
10.0											
12.0											

DRILLING CONTR BOWSER MORNER

B. KIRKPATRICK

SL10856 C

LOGGED BY JFD

DATE 8-8-88

CHKD BY

Golder Associates, Inc.

SOIL BOREHOLE LOG

SITE NAME AND LOCATION CWM VICKERY, OHIO FACILITY	DRILLING METHOD: 6-INCH O.D. HOLLOWSTEM AUGERS	BORING NO. SS-10E
	SAMPLING METHOD: 18-INCH SPLIT-SPOON	SHEET 1 OF 1
		DRILLING START TIME 14:40 DATE 8-8-88 / FINISH TIME 16:30 DATE 8-8-88
DATUM MSL ELEVATION 610.0	WATER LEVEL / TIME / DATE / CASING DEPTH	
DRILL RIG MOBILE B-61	SURFACE CONDITIONS: FLAT, DRY	
ANGLE VERTICAL BEARING — —		
SAMPLE HAMMER TORQUE 350 FT-LBS		

DEPTH IN FEET	BLOWS/ 6 IN. ON SAMPLER (RECOVERY)	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIAL	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	PLASTIC INDEX	HNU RESULTS (ppm)
0.0	9-25-28 (70%)		G FILL Very dense brown and gray GRAVEL and coarse to fine sand, some clayey silt (GM)								40
2.0	11-9-7 (60%)		H	2" SS							110
4.0	2-3-10 (15%)		I LACUSTRINE DEPOSIT Firm black SILTY CLAY, trace fine sand (CL)								--
			END OF BORING								
6.0											
8.0											
10.0											
12.0											

DRILLING CONTR BOWSER MORNER

B. KIRKPATRICK

SL10857 C

LOGGED BY JFD

DATE 8-8-88

CHKD BY [signature]

Golder Associates, Inc.

SOIL BOREHOLE LOG

SITE NAME AND LOCATION CWM VICKERY, OHIO FACILITY	DRILLING METHOD: 6-INCH O.D. HOLLOWSTEM AUGERS	BORING NO. SS-10S
	SAMPLING METHOD: 18-INCH SPLIT-SPOON	SHEET 1 OF 1
		DRILLING START / FINISH
	WATER LEVEL / TIME / DATE / CASING DEPTH	TIME 10:10 / TIME 11:00
		DATE 8-8-88 / DATE 8-8-88
DATUM MSL	ELEVATION 610.0	
DRILL RIG MOBILE B-61	SURFACE CONDITIONS: FLAT, DRY	
ANGLE VERTICAL	BEARING - -	
SAMPLE HAMMER TORQUE 350 FT-LBS		

DEPTH IN FEET	BLOWS/ 6 IN. ON SAMPLER (RECOVERY)	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIAL	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	PLASTIC INDEX	HNU RESULTS (ppm)
0.0	10-15-19 (70%)		A FILL Dense brown and gray GRAVEL and coarse to fine sand, some clayey silt (GM)								50
2.0	11-10-8 (30%)		B	2" SS							80
4.0	4-8-8 (100%)		C LACUSTRINE DEPOSIT Firm brown SILTY CLAY, trace fine sand (CL)								70
			END OF BORING								
6.0											
8.0											
10.0											
12.0											

DRILLING CONTR BOWSER MORNER

B. KIRKPATRICK

SL10855 C

LOGGED BY JFD

DATE 8-8-88

CHKD BY

Golder Associates, Inc.

SOIL BOREHOLE LOG

SITE NAME AND LOCATION
CWM VICKERY, OHIO FACILITY

DRILLING METHOD: 6-INCH O.D. HOLLOWSTEM AUGERS FOLLOWED BY 4-INCH DRIVEN AND WASHED CASING

SAMPLING METHOD: 18-INCH SPLIT-SPOON

BORING NO. SS-10W

SHEET 1 OF 2

					DRILLING START	DRILLING FINISH
WATER LEVEL					TIME	TIME
TIME					16:00	16:45
DATE					DATE	DATE
CASING DEPTH					8-8-88	8-10-88

DATUM MSL ELEVATION 610.0

DRILL RIG MOBILE B-61

SURFACE CONDITIONS: FLAT, DRY

ANGLE VERTICAL BEARING — —

SAMPLE HAMMER TORQUE 350 FT-LBS

DRILLING CONTR BOWSER MORNER

B. KIRKPATRICK

LOGGED BY JFD

DATE 8-10-88 CHKD BY

SL10854 C

DEPTH IN FEET	BLOWS/ 6 IN. ON SAMPLER (RECOVERY)	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIAL	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	PLASTIC INDEX	HNU RESULTS (ppm)
0.0	11-31-35 (70%)		J FILL Very dense brown and gray GRAVEL and coarse to fine sand, some clayey silt (GM)								150
	59-35-25 (30%)		K								150
	6-17-18 (100%)		L Dense black oily FINE SAND and clayey silt (SM)								120
4.0	6-11-10 (100%)		M LACUSTRINE DEPOSIT Firm to soft brown and gray laminated SILTY CLAY, some fine sand (CL)								70
	3-4-6 (70%)		N								55
8.0	2-3-4 (100%)		O								20
	3-3-5 (60%)		P								20
	2-2-3 (100%)		Q	2" SS							10
12.0	1-2-1 (0%)		R TILL Very soft gray CLAY, trace gravel (CL)								--
	2-2-3 (0%)		S								--
	1-1-2 (100%)		T								0
16.0	1-1-3 (20%)		U								0
	1-2-4 (45%)		V								0
20.0	1-2-3 (70%)		W								0
			END OF BORING								
24.0											

Golder Associates	SUBJECT Boring Procedures for SS-10W		
	Job No. 853-3022 Ref.	Made by Jim Durrett Checked WGG. Reviewed	Date 11-2-88 Sheet 2 of 2

split-spoon sampled to 12 feet BGS using 6-inch OD hollow-stem augers. Removed augers. Reamed hole to 12 feet BGS using 10-inch OD ~~#~~ solid-stem augers. Removed augers. Flushed hole using bentonite grout. Pushed 6-inch steel casing to 14 feet BGS through grout. Washed inside casing to 12 feet BGS until clean water return. Placed 4-inch casing inside 6-inch casing and continued to split-spoon sample as 4-inch casing was driven to 21.5 feet BGS. Water was bailed from casing prior to taking ~~any~~ all split-spoon samples past 12 feet BGS.

MONITORING HOLE INSTALLATION LOG

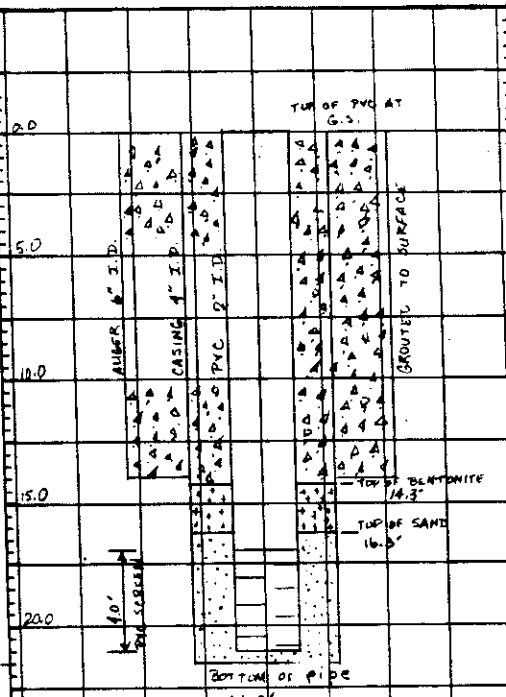
JOB NO. 314 1451.2	PROJECT CWM / OLD / OHIO	WELL NO. SS-10	SHEET 1 OF 1
GA INSP. MAS	DRILLING METHOD HOLLOW STEM AUGER / CASING	GROUND ELEV. 610.0	DEPTH WL [illegible]
WEATHER P. Cloudy	DRILLING COMPANY Bonser - Morner	COLLAR ELEV. [illegible]	DATE/TIME 6:31 / 1/10/84
TEMP. 70°F	DRILL RIG MOBILE B-61 DRILLER B. Kirkpatrick	STARTED 9:45 7/10/84 (TIME / DATE)	COMPLETED 6:40 7/10/84 (TIME / DATE)

MATERIALS INVENTORY

WELL CASING — in. dia. — l.f.	WELL SCREEN 2 in. dia. 4 l.f.	BENTONITE SEAL 2.0'
CASING TYPE —	SCREEN TYPE TIMCO	INSTALLATION METHOD SEE BELOW
JOINT TYPE —	SLOT SIZE 0.010"	FILTER PACK QTY —
GROUT QUANTITY —	CENTRALIZERS NONE	FILTER PACK TYPE MED. SAND
GROUT TYPE HURON cement and clay		INSTALLATION METHOD SEE BELOW

DEPTH/ELEV.	SOIL/ROCK DESCRIPTION
0.0 / 610.0	Ground Surface
3.0 / 607.0	Gravel, sand and brick (fill)
	Very soft, wet gray silty clay, trace fine sand. (CH)
21.5' / 588.5	Bottom of hole at 21.5'

HOLE SKETCH



INSTALLATION NOTES

Used hollow stem augers to 14.0'
Hit oily smelling, wet material at 3.0'
Hit water at 10.0'
Pushed shelby tube to clean out augers.
Drove casing to 15.5'
Pulled casing up to put clean 5' section + bit on bottom.
Drove casing to 21.5'
Used shelby tube then bucket auger to clean out casing.
Bailed out water from casing before cleaning with b. auger.
Placed sand up to 21.0' to bed pipe.
Placed sand up to 16.3', 6" at a time as casing was pulled up 6" at a time.
Placed bentonite up to 14.3'.
Grouted hole from 14.3' to surface.

PVC stickup = 0'
Water level = 2.26'
Water level after bailing = 19.98'

Note: placed 1.5' of 4" ø steel casing welded to 2.5' ø steel plate recessed into pavement to protect well

MONITORING WELL INSTALLATION LOG

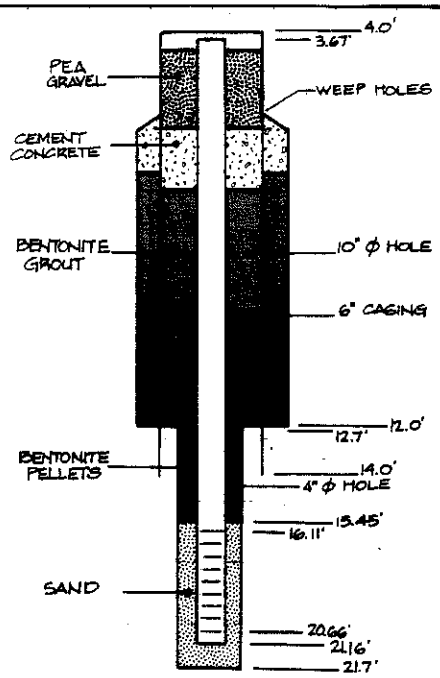
JOB NO. 853-3022.2	PROJECT CWM/OLD/OHIO		WELL NO. SS-10W	SHEET 1	OF 1
GA INSP. JFD	DRILLING METHOD 6" OD HSA/driven & washed casing		GROUND ELEV --	WATER DEPTH 10.99	
WEATHER Warm/Fair	DRILLING COMPANY Bowser Morner		COLLAR ELEV. --	DATE/TIME 8/19/88	
TEMP. 90° + F	DRILL RIG Mobile B-61	DRILLER Kirkpatrick	STARTED 8:00/ 8/11/88 (TIME / DATE)	COMPLETED 17:00/8/11/88 (TIME / DATE)	

MATERIALS INVENTORY

WELL CASING 2 in. dia. 19.78 l.f.	WELL SCREEN 2 in. dia. 4.55 l.f.	BENTONITE SEAL pellets
CASING TYPE sch. 40 PVC	SCREEN TYPE slotted PVC sch. 40	INSTALLATION METHOD poured through casing
JOINT TYPE flush threaded	SLOT SIZE No. 10	FILTER PACK QTY 50 pounds
GROUT QUANTITY 80# Volclay w/35 gal.water	CENTRALIZERS no	FILTER PACK TYPE very fine blasting sand
GROUT TYPE Volclay	DRILLING MUD TYPE none	INSTALLATION METHOD poured through casing

ELEV./DEPTH	SOIL/ROCK DESCRIPTION
	GROUND SURFACE
0.0	FILL - Very dense brown and gray GRAVEL and coarse to fine sand, some clayey silt (GM)
3'	Dense black oily FINE SAND and clayey silt (SM)
4.5' / 5.0	LACUSTRINE DEPOSIT Firm to soft brown and gray laminated SILTY CLAY, some fine sand (CL)
10.0	
12'	TILL Very soft gray CLAY, trace gravel (CL)
15.0	
20.0	
21.7'	End of Boring

WELL SKETCH



INSTALLATION NOTES

See boring log.
Bailed casing, sounded hole to 21.7 feet. Added sand to 21.0 feet by pouring down 4" casing. Sand to 20.75' BGS. Well on top of this sand. Added sand while pulling casing in approx. 1-foot increments. Sand to 15.45 BGS, 50 lbs. sand. 12 pints of bentonite pellets to 12.7 BGS. Mixed approx. 80 pounds volclay with initiator and 35 gal. water for grout. Tremied grout while pulling 4" casing. Sawed off top of PVC well pipe (stuffed plastic bag down well to catch PVC shavings) so protective cover would fit over well. Added concrete to top of boring and threaded on protective cover. Added pea gravel to inside of cover.

WELL DEVELOPMENT NOTES

8/19/88 2.5 Gal. removed by bailing
pH = 7.1
SC = 650 umhos/cm
T = 15°C

8/22/88 0.5 Gal. removed by bailing
pH = 7.1
SC = 570 umhos/cm
T = 15°C

8/23/88 0.4 Ga. removed by bailing
pH = 7.5
SC = 780 unhos/cm
T = 18°C

APPENDIX B

SAMPLING FORMS, CHAIN-OF-CUSTODY FORM, AND ANALYTICAL RESULTS

SOIL SAMPLES

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports						
BG0543	WASTE MANAGEMENT, INC.	490	SSS10B	880808	1030	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

ETC

AUG 30, 1988

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0543	WASTE MANAGEMENT, INC.	490	SSS10B	880808	1030	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
3V	Benzene	591	22	49.8	52.5	BMDL	50.0	99	ND	50.0	100
7V	Chlorobenzene	1440	30	51.0	52.3	ND	50.0	102	ND	50.0	102
11V	Chloroform	944	8.0	46.9	48.8	ND	50.0	98	ND	50.0	94
19V	Ethylbenzene	2980	36	48.0	48.5	ND	50.0	104	1.10	50.0	94
25V	Toluene	10100	30	50.6	52.1	ND	50.0	101	ND	50.0	101
27V	1,1,1-Trichloroethane	20.0	19	48.0	48.5	ND	50.0	101	ND	50.0	96
29V	Trichloroethylene	3740	9.5	53.8	55.6	ND	50.0	99	ND	50.0	108

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

Sample/extract required dilution resulting in elevated MDL's.

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0543	WASTE MANAGEMENT, INC.	490	SSS10B	88080	1030	0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	94	81	117
p-Bromofluorobenzene	.250	108	74	121
1,2-Dichloroethane-D4	.250	97	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	10	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	-	-	23	120
2-Fluorobiphenyl	-		30	115
Terphenyl-D14	-	-	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

** Advisory Limits Only

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/15/88 Time: 22:35

Lab ID: >E3229-116 Data Release Authorized By: [signature]

Spectrum No: 116-100

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	19.13	19.13	Ok
75	30-60% of mass 95	43.88	43.88	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	5.87	5.87	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	87.25	87.25	Ok
175	5-9% of mass 174	6.41	7.35	Ok
176	95-101% of mass 174	85.37	97.85	Ok
177	5-9% of mass 176	6.52	7.63	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9967VS	>E3230	8/15/88	23:02
QC9967VS	>E3231	↓	23:49
QC9967VS	>E3232	8/16/88	00:36
QC9967VS	>E3233	↓	01:22
QC9967VS	>E3234	↓	02:09

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/16/88 Time: 03:38

Lab ID: >E3236-116 Data Release Authorized By: [illegible]

Spectrum No: 116

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Statu
50	15-40% of mass 95	18.31	18.31	Ok
75	30-60% of mass 95	48.26	48.26	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.40	8.40	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	85.43	85.43	Ok
175	5-9% of mass 174	6.24	7.31	Ok
176	95-101% of mass 174	82.50	96.57	Ok
177	5-9% of mass 176	5.79	7.02	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9967V	>E3238	8/16/88	06:25
BG1721VS	>E3240		10:45
BG1721VR	>E3241		11:31
BA7464V	>E3242		12:17
BG1721V	>E3243		13:21
QC9967VS	>E3244		14:07
QC9967V	>E3245		14:54

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. _____ Contract No.: _____

Instrument ID: E Date: 08/16/88 Time: 15:37

Lab ID: >E3246-117 Data Release Authorized By: [signature]

Spectrum No: 117

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	19.27	19.27	Ok
75	30-60% of mass 95	48.63	48.63	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.79	8.79	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	75.98	75.98	Ok
175	5-9% of mass 174	6.05	7.97	Ok
176	95-101% of mass 174	74.61	98.20	Ok
177	5-9% of mass 176	5.34	7.16	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
BG0248V	>E3247	8/16/88	16:43
BG1722V	>E3248	↓	17:30
BG1723V	>E3249	↓	18:16
BG0544V	>E3255	8/17/88	01:16

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: Contractor: ETC Corp. Contract No.:

Instrument ID: E Date: 08/18/88 Time: 21:46

Lab ID: E3289-115 Data Release Authorized By: Wendy [illegible]

Spectrum No: 115-103

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	17.44	17.44	Ok
75	30-60% of mass 95	47.68	47.68	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.92	6.92	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	95.36	95.36	Ok
175	5-9% of mass 174	7.48	7.54	Ok
176	95-101% of mass 174	94.96	99.58	Ok
177	5-9% of mass 176	6.16	6.49	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9967VS	>E3290	8/18/88	04:08
QC9967VS	>E3291	↓	04:54
QC9967VS	>E3292		05:40
QC9967VS	>E3293		06:26

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/19/88 Time: 08:46

Lab ID: >E3296-116 Data Release Authorized By: Wendy [illegible]

Spectrum No: 116 enhanced

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.05	15.05	Ok
75	30-60% of mass 95	43.53	43.53	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.86	8.86	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	96.12	96.12	Ok
175	5-9% of mass 174	7.44	7.24	Ok
176	95-101% of mass 174	95.58	99.44	Ok
177	5-9% of mass 176	6.66	6.97	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9967VS	>E3297	8/19/88	~~09:46~~ 10:29 WL 8/25/88
QC9967V	>E3299	↓	14:47
BG0540V	>E3300	↓	16:40
BG0543V	>E3302	↓	18:12

Form V

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TESTING and CERTIFICATION

Seal No. 121081 ETC Job # [illegible]

CHAIN OF CUSTODY FORM (CC1)

ORIGINAL

Date Sealed [illegible] By: MC

Company: WASTE MANAGEMENT, INC Attn.: KI[illegible]LE

Facility/Site: [illegible] Phone: [illegible]

Address: 3956 STATE ROUTE 412, VICKERY, OH 43464

SAMPLE IDENTIFICATION

Facility: [illegible] Facility/Site Code — Boring SS-10A at 1.5 to 3.0 feet (Optional Sample Point Descriptions)

Sample Point: S-SS10B (Source Code (from below) / Your Sample Point ID (left justify)) — 880808 (Start Date (YY/MM/DD)) — 1030 (Start Time (2400 hr. clock)) — 0 (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)
Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify

SHUTTLE CONTENTS

BOTTLE				ANALYSIS	SAMPLER		LAB
No	Type	Size	Preserv.		Fill. (Y/N)	Observations	Observations
2	VOA	40	None	Volatiles	NA		✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) J. Durrett Date: 8888 Time: 900
Signature: Jim Durrett Seal #: 121081 Intact: yes

2. I have received these materials in good condition from the above person.
Name: J Durrett Signature: Jim Durrett
Date: 8-8-88 Time: 10:30 Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) Jim Durrett Date: 8-9-88 Time: 8:00
Signature: Jim Durrett Seal #: 121080 Intact: yes

LAB USE ONLY Opened By: C. Margett Date: 8/10/88 Time: 10:25 AM
SHUTTLE # 1405 TEMP. °C 4° SEAL # 121080 COND. Intact

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # BG 0543

Sample Point S SS1ØB
Source Code — Sample Point I.D.

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)

SAMPLING METHOD: Split spoon

Sampler Type: X — A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel — X-Other: split spoon (SPECIFY OTHER)

Sampler Material: B — A-Teflon, B-Metal, C-PVC, D-Plastic — X-Other: (SPECIFY OTHER)

Tubing Material: NA — A-Teflon, B-Tygon, C-Polyethylene, D-Silicon — X-Other: (SPECIFY OTHER)

Sample Composited: Y/N — Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl)

Depth to Ground water (ft)

Groundwater Elevation (ft msl)

Well Depth (ft)

Sample Depth (non-well) (ft)

JD 8-9-88

	ph		spec. cond.		(other parameter)	value	units
1st		(STD)		um/cm at 25°C	HNU	80	gpm
2nd		(STD)		um/cm at 25°C			
3rd		(STD)		um/cm at 25°C			
4th		(STD)		um/cm at 25°C			

Sample Temp (°C) — Turbidity NTU

FIELD COMMENTS

Sample Appearance:

Weather Conditions:

Other:

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Jim Durrett (Print) — Employer: Golder Associates

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8-8-88 (Date) — Jim Durrett (Signature)

ORIGINAL

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 880816 SHIFT
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE BHE
METHOD FILE VOAE
ID FILE IE0001
ANALYST(S) Cjeeou
B Hawkins
SUPERVISOR Doris Cordova
BATCH #'s QV9967

(PLEASE INITIAL) CE0001

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	8/16/88
WIP		BY	CD

STANDARD	CONC PPM	LOT NO.	LOT VOL.
P-BFB	25	18734	2 µl
Internal Standard	25	19220	10
Surrogate	25	19733	10
Cal II	50	3387	2,5,10,15,20
Cal II	50	3379	↓
XVOA	50	19351	↓

NAME	DATA FILE	uL INJ	ALS #	DIL	~~TAPE #~~ TIME	SPECIALS (WRITE A-TYPE)	PLUS Y/N
P-BFB	>E3229	2µl	—		22:35	OK 116-100	
QC9967VS	>E3230	5ml	4		23:02	2µl Cal I, II, XVOA	
QC9967VS	>E3231	↓	5	CBUPD	23:49	5µl Cal I, II, XVOA	
QC9967VS	>E3232	↓	6	CBCAL	00:36	10µl Cal I, II, XVOA	
QC9967VS	>E3233	↓	7	CBMEG	1:22	15µl Cal I, II, XVOA	
QC9967VS	>E3234	↓	8		2:09	20µl Cal I, II, XVOA	
QC9967V	>E3235	↓	9			NG	
P-BFB	>E3236	2µl	—		3:38	OK	
QC9967V	>E3237	5ml	9			NG	
QC9967V	>E3238	5ml	9		6:25	OK	
BG1721V	>E3239	5g	4			NG surr's out	
BG1721VS	>E3240	↓	5		10:45	OK 5µl Cal II, XVOA	
BG1721VR	>E3241	↓	6		11:31	OK 5µl Cal I, II, XVOA	
BD7464V	>E3242	↓	7		12:17	OK	
(R) BG1721V	>E3243	5g	4		13:21	OK	
QC9967VS	>E3244	↓	5	QCAL →	14:07	OK 5µl Cal I, II, XVOA	
QC9967V	>E3245	↓	6		14:54	OK	
P-BFB	>E3246	2µl	—		15:37	OK 117 Unaltered	
BG0248V	>E3247	5g	4		16:43	OK	
BG1722V	>E3248	↓	5		17:30	OK	
BG1723V	>E3249	↓	6		18:16	OK	
BG0544V	>E3250	↓	7			NG Surr high Rerun 1:10	
BG0545V	>E3251	↓	8			NG Rerun 1:100	
BG0534V	>E3252	5g	4			NG	
BG0533V	>E3253	1g	5	1:5		NG overload Rerun 1:50	

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 880817 SHIFT
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE BHE 4C9
METHOD FILE VOAE
ID FILE IE0001
ANALYST(S) JHDbell
Ellyn Curcio
SUPERVISOR Sonia Cordona
BATCH #'s QV9967

(PLEASE INITIAL) CE0001

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	L VOL.
Pg 2 see Pg 1			

	NAME	DATA FILE	uL INJ	ALS #	DIL	~~TAPE #~~ TIME	SPECIALS (WRITE A-TYPE)	PL Y
	BG0540V	>E3254	1g	6	1:5	—	NG Rerun 1:20 Possible	
(R)	BG0544V	>E3255	0.5g	7	1:10	1:16	OK	
	QC9967VS	>E3256	5ml	8		—	NG 5ul cal I, II, XVOA	
	P-BFB	>E3257	2ul	—		5:08	OK	
	QC9967VS	>E3258	5ml	6	QCAL	5:59	OK 5ul cal I, II, XVOA	
	QC9967V	>E3259	5ml	5		—	ng Position check	
	QC9967V	>E3260	5ml	5		8:08	OK Position Check	
	QC9967V	>E3261	5ml	8		—	ng	
	QC9967V	>E3262	5ml	8		12:39	OK	
(R)	BG0534V	>E3263	5g	5		—	NG rerun 1:50,000 as meant Dil	
(R)	BG0540V	>E3264	.5g	6	1:10	—	ng-rerun possible carr	
(R)	BG0543V	>E3265	1g	7	1:5	—	ng-rerun "	
(R)	BG0544V	>E3266	.5g	8	1:10	—	not run	
	QC9967V	>E3267	5ml	5		—	NG HIGH TOLUENE position blank	
	QC9967V	>E3268	↓	6		—	NG High Toluene	
	QC9967V	>E3269	↓	7		—	High Toluene	
	P-BFB	>E3270	2ul	-		—	ng	
	P-BFB	>E3271	2ul	—		—	ng	
	P-BFB	>E3272	2ul	—		21:13	OK Run before E326,	
	QC9967VS	>E3273	5ml	9		—	ng 5ul all stds	
	P-BFB	>E3274	2ul	—		9:16	OK	
	QC9967VS	>E3275	5ml	8			5ul Cal I, II, XVOA	
	QC9967V	>E3276	↓	9		—	ng	
	QC9967VS	>E3277	↓	5		not	2ul Cal I, II, XVOA	
	QC9967VS	>E3278	↓	6		run	10ul ↓	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/18/88 SHIFT
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE ECE / EEE
METHOD FILE VOAE
ID FILE IE0001
ANALYST(S) Ellyn Curcio
Kelly Zo
SUPERVISOR Sonia Cordova
BATCH #'s QV9967

(PLEASE INITIAL) CE0001

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
see page #1			
page #3			

NAME	DATA FILE	uL INJ	ALS #	DIL	~~TAPE #~~ TIME	SPECIALS (WRITE A-TYPE)	PLUS Y/N
QC9967VS	>E3279	5ml	7		not	15 ul Cal I, II, XVOA	
QC9967VS	>E3280	5ml	8		run	20 ul ↓	
QC9967V	>E3281	5ml	9		—	ng	
QC9967V	>E3282	5ml	9		—	ng	
[illegible]967VS	>E3283	5ml	5		NG	~~NG~~ 2 ul Cal I, II, XVOA	
[illegible]967VS	>E3284	↓	6		Tekmar	10 2 ul Cal I, II, XVOA	
QC9967VS	>E3285	↓	7		skipped	15 ~~10~~ ~~10~~ ul	
QC9967VS	>E3286	↓	8		Posi.	20 ~~15~~ ul	
QC9967VS	>E3287	↓	9		screwed	NG ~~20 ul~~ ↓ Blank	
QC9967V	>E3288	↓	10		up.	Blank	
P-BFB	>E3289	2 ul	—	21:46	~~9:16~~	OK Run before E3284	
QC9967VS	>E3290	5 ml	5		4:08	ok 2 ul Cal I, II, XVOA	
QC9967VS	>E3291	↓	6	CBUPD	4:54	OK 5 ul	
QC9967VS	>E3292	↓	7	CBCAL	5:40	OK 10 ul	
QC9967VS	>E3293	↓	8	CBMRG	6:26	OK 15 ul	
QC9967VS	>E3294	↓	9		—	ng 20 ul ↓	
QC9967V	>E3295	↓	10		—	ng Blank	
P-BFB	>E3296	2ul	—		8:46	OK	
QC9967VS	>E3297	5ml	9		10:29	ok 20 ul Cal. I, II, XVOA	
QC9967V	>E3298	5ml	10		—	ng blank	
QC9967V	>E3299	5ml	9		14:47	OK blank	
(R) BG0540V	>E3300	.5g	5	1:10	16:40	OK	
(R) BG0544V	>E3301	.5g	6	1:10	~~17:26~~	~~NG~~ OK ~~[illegible]~~ not used [illegible] 8/25/88	
(R) BG0543V	>E3302	1g	7	1:5	18:12	OK Rerun 1:50 for C23	
BG0529V	>E3303	5g	8			ng 1 surr out	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/20/88 SHIFT
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE ECE
METHOD FILE VOAE
ID FILE IE0002
ANALYST(S) Ellen Curcio

SUPERVISOR Paul Trant
BATCH #'s QV9980

(PLEASE INITIAL) CE0002

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
P-BFB	25	18734	2ul
INT. ST.	25	19754	10ul
SURR.	25	19734	10ul
CAL. I.	50	3387	2.5,10,15,20
CAL. II.	50	3388	↓
XVOA	50	19357	

NAME	DATA FILE	uL INJ	ALS #	DIL	~~TAPE #~~ TIME	SPECIALS (WRITE A-TYPE)	PLUS Y/N
P-BFB	>E3304	2ul	—		21:34	OK	
QC9980 VS	>E3306	5ml	10		23:17	OK 5ul Cal. I, II, XVOA	
QC9980 VS	>E3309		8	CBUPD	02:32	OK 15	
QC9980 VS	>E3310		9	CBCAL	03:18	OK 10	
QC9980 VS	>E3313		10	CBMEG	05:37	OK 20	
QC9980 VS	>E3314	↓	10		07:57	OK 2 ↓	
QC9980 V	>E3315	5ml	9	—	—	ng - high surr.	
P-BFB	>E3316	2ul	—		09:52	OK (ran before E3315)	
QC9980 V	>E3317	5ml	9	—	—	ng - surr out	
QC9980 V	>E3318	5ml	9		—	ng - surr. out	
QC9980 VS	>E3319	5ml	10		—	ng 5ul Cal I, II, XVOA	
QC9980 VS	>E3320	5ml	10			↓	
P-BFB	>E3321	2ul	—		20:34	OK. 107-95	
QC9980 VS	>E3322	5ML	9	QCAL	21:37	5ul Cal I, II, XVOA	
QC9980 V	>E3323	5ML	10			NG	
QC9980 V	>E3324	5ML	8			NG Blank	
QC9980 V	>E3325	5ML	8		Leaked	NG. Blank	
QC9980 V	>E3326	5ML	8		3:25	OK	
P-BFB	>E3327	2ul	—		4:29	OK. 109	
(R) BG0543 V	>E3328	0.02g	4	1:250	OK ~~No. The dilute~~	For QV9567 BH 8/21/88	
(R) BG0529 V	>E3329	5g	5		5:43	OK	
BG0529 VS	>E3330		6			NG	
BG0529 VR	>E3331		7		7:15	OK	
BG0535 V	>E3332		8		8:01	OK rerun 1:20 14, 16, 23, 3	
BG0536 V	>E3333	↓	9			No rerun 1:100 possible any [illegible]	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 08/31/88
PAGE: 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	490	SS10B	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		SS10B 880808 BG0543							
Priority Poll. Volatiles GC/MS									
Benzene	ug/kg	591							
Chlorobenzene	ug/kg	1440							
Chloroform	ug/kg	944							
Ethylbenzene	ug/kg	2980							
Toluene	ug/kg	10100							
1,1,1-Trichloroethane	ug/kg	20.0							
Trichloroethylene	ug/kg	3740							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

RECEIVED
SEP 19 1988

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0544	WASTE MANAGEMENT, INC.	490	SSS10C	880808	1030	

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

284 RARITAN CENTER PARKWAY • EDISON, NJ 08837 (201) 225-5600

ETC

AUG 31, 1988

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0544	WASTE MANAGEMENT, INC.	490	SSS10C	880808	1030	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
3V	Benzene	BMDL	44	49.8	52.5	BMDL	50.0	99	ND	50.0	100
7V	Chlorobenzene	195	60	51.0	52.3	ND	50.0	102	ND	50.0	102
11V	Chloroform	116	16	46.9	48.8	ND	50.0	98	ND	50.0	94
19V	Ethylbenzene	117	72	48.0	48.5	ND	50.0	104	1.10	50.0	94
25V	Toluene	422	60	50.6	52.1	ND	50.0	101	ND	50.0	101
27V	1,1,1-Trichloroethane	BMDL	38	48.0	48.5	ND	50.0	101	ND	50.0	96
29V	Trichloroethylene	156	19	53.8	55.6	ND	50.0	99	ND	50.0	108

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

Sample/extract required dilution resulting in elevated MDL's.

ETC

AUG 25, 1988

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0544	WASTE MANAGEMENT, INC.	490	SSS10C	88080	1030	0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	84	81	117
p-Bromofluorobenzene	.250	100	74	121
1,2-Dichloroethane-D4	.250	108	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	-	-	23	120
2-Fluorobiphenyl	-	-	30	115
Terphenyl-D14	-	-	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

** Advisory Limits Only

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/15/88 Time: 22:35

Lab ID: >E3229-116 Data Release Authorized By: [signature]

Spectrum No: 116-100

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	19.13	19.13	Ok
75	30-60% of mass 95	43.88	43.88	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	5.87	5.87	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	87.25	87.25	Ok
175	5-9% of mass 174	6.41	7.35	Ok
176	95-101% of mass 174	85.37	97.85	Ok
177	5-9% of mass 176	6.52	7.63	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9967VS	>E3230	8/15/88	23:02
QC9967VS	>E3231	↓	23:49
QC9967VS	>E3232	8/16/88	00:36
QC9967VS	>E3233	↓	01:22
QC9967VS	>E3234	↓	02:09

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/16/88 Time: 03:38

Lab ID: >E3236-116 Data Release Authorized By: [signature]

Spectrum No: 116

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	18.31	18.31	Ok
75	30-60% of mass 95	48.26	48.26	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.40	8.40	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	85.43	85.43	Ok
175	5-9% of mass 174	6.24	7.31	Ok
176	95-101% of mass 174	82.50	96.57	Ok
177	5-9% of mass 176	5.79	7.02	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9967V	>E3238	8/16/88	06:25
BG1721VS	>E3240	↓	10:45
BG1721VR	>E3241		11:31
BA7464V	>E3242		12:17
BG1721V	>E3243		13:21
QC9967VS	>E3244		14:07
QC9967V	>E3245		14:54

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/16/88 Time: 15:37

Lab ID: >E3246-117 Data Release Authorized By: [signature]

Spectrum No: 117

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	19.27	19.27	Ok
75	30-60% of mass 95	48.63	48.63	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.79	8.79	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	75.98	75.98	Ok
175	5-9% of mass 174	6.05	7.97	Ok
176	95-101% of mass 174	74.61	98.20	Ok
177	5-9% of mass 176	5.34	7.16	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
BGC243V	>E3247	8/16/88	16:43
BG1722V	>E3248	↓	17:30
BG1723V	>E3249	↓	18:16
BG0544V	>E3255	8/17/88	01:16

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/18/88 Time: 21:46

Lab ID: >E3289-115 Data Release Authorized By: Wendy [illegible]

Spectrum No: 115-103

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	17.44	17.44	Ok
75	30-60% of mass 95	47.68	47.68	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.92	6.92	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	95.36	95.36	Ok
175	5-9% of mass 174	7.48	7.54	Ok
176	95-101% of mass 174	94.96	99.58	Ok
177	5-9% of mass 176	6.16	6.49	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9967VS	>E3290	8/18/88	04:08
QC9967VS	>E3291	↓	04:54
QC9967VS	>E3292		05:40
QC9967VS	>E3293		06:26

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/19/88 Time: 08:46

Lab ID: >E3296-116 Data Release Authorized By: Wendy Okki

Spectrum No: 116 enhanced

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.09	15.09	Ok
75	30-60% of mass 95	43.53	43.53	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.86	8.86	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	96.12	96.12	Ok
175	5-9% of mass 174	7.44	7.24	Ok
176	95-101% of mass 174	99.58	99.44	Ok
177	5-9% of mass 176	6.66	6.97	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9967VS	>E3297	8/19/88	~~09:40~~ 10:29 WL 8/25/88
QC9967V	>E3299	↓	14:47
BG0540V	>E3300	↓	16:40
BG0543V	>E3302	↓	18:12

Form V

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

CHAIN OF CUSTODY FORM (CC1) ORIGINAL

Date Sealed _____ By: MC

Company: WASTE MANAGEMENT, INC. Attn.: KIRK STEMPLE

Facility/Site: VICKERY Phone: (419) 542 - 2291

Address: 3956 STATE ROUTE 412, VICKERY, OH 43464

SAMPLE IDENTIFICATION

Facility: 491 (Facility/Site Code) Boring SS-10A at 3.0 to 4.5 feet (Optional Sample Point Descriptions)

Sample Point: S-SS10C (Source Code (from below) / Your Sample Point ID (left justify)) 880808 (Start Date (YY/MM/DD)) 1030 (Start Time (2400 hr. clock)) 0 (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment ....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other ..... (X)
Soil ...(S) River/Stream .(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify _____

SHUTTLE CONTENTS

BOTTLE				ANALYSIS	SAMPLER		LAB
No	Type	Size	Preserv.		Filt. (Y/N)	Observations	Observations
[illegible]	[illegible]	[illegible]	None	Volatiles	NA		✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) J Durrett Date: 8888 Time: 900
Signature: Jim Durrett Seal #: 121081 Intact: Yes

2. I have received these materials in good condition from the above person.
Name: J Durrett Signature: Jim Durrett
Date: 8-8-88 Time: 1030 Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) Jim Durrett Date: 8-9-88 Time: 800
Signature: Jim Durrett Seal #: 121080 Intact: yes

LAB USE ONLY Opened By: C. Margett Date: 8/10/88 Time: 8:10:25 AM
SHUTTLE # 1405 TEMP. °C 4° SEAL # 121080 COND. intact

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # BG 0544

Sample Point S (Source Code) SS ØC (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD) | START PURGE (2400 Hr Clock) | ELAPSED HRS | WATER VOL. IN CASING (Gallons) | VOLUME PURGED (Gallons)

SAMPLING METHOD: split spoon

Sampler Type: X — A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel — X-Other: split spoon (SPECIFY OTHER)

Sampler Material: B — A-Teflon, B-Metal, C-PVC, D-Plastic — X-Other: (SPECIFY OTHER)

Tubing Material: NA — A-Teflon, B-Tygon, C-Polyethylene, D-Silicon — X-Other: (SPECIFY OTHER)

Sample Composited: Y N — Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl)

Depth to Ground water (ft)

Groundwater Elevation (ft msl)

Well Depth (ft)

Sample Depth (non-well) (ft)

	ph	(STD)	spec. cond.	um/cm at 25° C	(other parameter)	value	units
1st					HNU	68	ppm
2nd							
3rd							
4th							

Sample Temp (°C) | Turbidity NTU

FIELD COMMENTS

Sample Appearance:

Weather Conditions:

Other:

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Jim Durrett (Print) Employer: Golder Associates

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8-8-88 (Date) Jim Durrett (Signature)

ORIGINAL

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 880816 SHIFT
FRACTION ~~Fil~~ E 2PP/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE BHE
METHOD FILE VOAE
ID FILE IE0001
ANALYST(S) Cjeeou
B Hawkins
SUPERVISOR Sonia Cordova
BATCH #'s QV9967

(PLEASE INITIAL) CE0001

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	8/16/88
WIP		BY	CD

STANDARD	CONC PPM	LOT NO.	LOT VOL.
P-BFB	25	18734	2 µl
Internal Standard	25	19220	10
Surrogate	25	19733	10
Cal I	50	3387	2,5,10,15,20
Cal II	50	3379	↓
XVOA	50	19351	↓

NAME	DATA FILE	uL INJ	ALS #	DIL	~~TAPE #~~ TIME	SPECIALS (WRITE A-TYPE)	PLUS Y/N
P-BFB	>E3229	2 µl	—		22:35	OK 116-100	
QC9967VS	>E3230	5 ml	4		23:02	2 µl Cal I, II, XVOA	
QC9967VS	>E3231	↓	5	CBUPD	23:49	5 µl Cal I, II, XVOA	
QC9967VS	>E3232	↓	6	CBCAL	00:36	10 µl Cal I, II, XVOA	
QC9967VS	>E3233	↓	7	CBMEG	1:22	15 µl Cal I, II, XVOA	
QC9967VS	>E3234	↓	8		2:09	20 µl Cal I, II, XVOA	
QC9967V	>E3235	↓	9			NG	
P-BFB	>E3236	2 µl	—		3:38	OK	
QC9967V	>E3237	5 ml	9			NG	
QC9967V	>E3238	5 ml	9		6:25	OK	
BG1721V	>E3239	5g	4			NG surr's out	
BG1721VS	>E3240	↓	5		10:45	OK 5 µl Cal II, XVOA	
BG1721VR	>E3241	↓	6		11:31	OK 5 µl Cal I, II, XVOA	
BD7464V	>E3242	↓	7		12:17	OK	
(R) BG1721V	>E3243	5g	4		13:21	OK	
QC9967VS	>E3244	↓	5	QCAL →	14:07	OK 5 µl Cal I, II, XVOA	
QC9967V	>E3245	↓	6		14:54	OK	
P-BFB	>E3246	2 µl	—		15:37	OK 117 Unaltered	
BG0248V	>E3247	5g	4		16:43	OK	
BG1722V	>E3248	↓	5		17:30	OK	
BG1723V	>E3249	↓	6		18:16	OK	
BG0544V	>E3250	↓	7			NG Sur high Rem 1:10	
BG0545V	>E3251	↓	8			NG Rem 1:100	
BG0534V	>E3252	5g	4			NG	
BG0533V	>E3253	1g	5	1:5		NG overload Rem 1:50	

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 880817 SHIFT
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE BHE 4CE
METHOD FILE VOAE
ID FILE IE0001
ANALYST(S) JHPbell
Ellyn Curcio
SUPERVISOR Sonia Cordova
BATCH #'s QV9967

(PLEASE INITIAL) CE0001

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
Pg 2 see Pg 1			

NAME	DATA FILE	uL INJ	ALS #	DIL	~~TAPE #~~ TIME	SPECIALS (WRITE A-TYPE)	PLUS Y/N
BG0540V	>E3254	1g	6	1:5	—	NG Rerun 1:20 Possible	
(R) BG0544V	>E3255	0.5g	7	1:10	1:16	OK	
QC9967VS	>E3256	5ml	8		—	NG 5ul cal I, II XVOA	
P-BFB	>E3257	2ul	—		5:08	OK	
QC9967VS	>E3258	5ml	46	QCAL	5:59	OK 5ul cal I, II, XVOA	
QC9967V	>E3259	5ml	5		—	ng Position check	
QC9967V	>E3260	5ml	5		8:08	OK Position check	
QC9967V	>E3261	5ml	8		—	ng	
QC9967V	>E3262	5ml	8		12:39	ok	
(R) BG0534V	>E3263	5g	5		—	NG rerun 1:50,000 as Meatt Dilu	
(R) BG0540V	>E3264	.5g	6	1:10	—	ng-rerun possible carry[illegible]	
(R) BG0543V	>E3265	1g	7	1:5	—	ng-rerun "	"
(R) BG0544V	>E3266	.5g	8	1:10	—	not run	
QC9967V	>E3267	5ml	5		—	NG High Toluene position blank	
QC9967V	>E3268	↓	6		—	NG High Toluene	
QC9967V	>E3269	↓	7		—	[illegible]	
P-BFB	>E3270	2ul	—		—	ng	
P-BFB	>E3271	2ul	—		—	ng	
P-BFB	>E3272	2ul	—		21:13	OK Run before E3267	
QC9967VS	>E3273	5ml	9		—	ng 5ul all stds	
P-BFB	>E3274	2ul	—		9:16	OK	
QC9967VS	>E3275	5ml	8			5ul Cal II, XVOA	
QC9967V	>E3276	↓	9		—	ng	
QC9967VS	>E3277	↓	5		not run	2ul Cal I II XVOA	
QC9967VS	>E3278	↓	6			10ul ↓	

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/23/88 SHIFT
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE APETO1
SEQUENCE FILE EEE / EEE
METHOD FILE VOAE
ID FILE IEC001
ANALYST(S) EEEpnCurcio
Ve G. Zio
SUPERVISOR Ernie Cortese
BATCH #'s QV9967

(PLEASE INITIAL) CE0001

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
all page #1			
page #3			

NAME	DATA FILE	uL INJ	ALS #	DIL	~~TAPE #~~ TIME	SPECIALS (WRITE A-TYPE)	PLUS Y/N
QC9967VS	>E3279	5ml	7		not	15 ul Cal I, II, XVOA	
QC9967VS	>E3280	5ml	8		run	20ul ↓	
QC9967V	>E3281	5ml	9		—	ng	
QC9967V	>E3282	5ml	9		—	ng	
QC9967Vs	>E3283	5ml	5		NG	2ul Cal I, II, XVOA	
QC9967VS	>E3284		6		Technic	2ul Cal I, II, XVOA	
QC9967VS	>E3285		7		Skipped	10 ul	
QC9967VS	>E3286		8		Forward	20 15 ul	
QC9967VS	>E3287		9		up.	NG 20ul ↓ Blank	
QC9967V	>E3288	↓	10			Blank	
P-BFB	>E3289	2ul	—	21:46	9:16	OK Run before E3294	
QC9967VS	>E3290	5ml	5		4:08	2ul Cal I, II, XVOA	
QC9967VS	>E3291		6	CBLPD	4:54 OK	5ul	
QC9967VS	>E3292		7	CBCAL	5:40 OK	10ul	
QC9967VS	>E3293		8	CBMRG	6:26 OK	15ul	
QC9967VS	>E3294		9		—	ng 20ul	
QC9967V	>E3295	↓	10		—	ng Blank	
P-BFB	>E3296	2ul	—		8:46	OK	
QC9967VS	>E3297	5ml	9		10:29	20 ul Cal I, II, XVOA	
QC9967V	>E3298	5ml	10		—	ng blank	
QC9967V	>E3299	5ml	9		14:47	OK blank	
(R) B60540V	>E3300	.5g	5	1:10	16:40	OK	
(R) B60544V	>E3301	.5g	6	1:10	~~17:26~~	NG OK ~~Failure~~ not used	
(R) B60543V	>E3302	1g	7	1:5	18:12	OK Rerun 1:50 to C23	
B60529V	>E3303	5g	8			ng Failure out	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp
The Environmental Services Company

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 08/31/88
PAGE 1

RECEIVED SEP 19 1988

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	490	SS10C	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Sample Points, Sampling Dates, and ETC Sample No.'s

Parameters	*Units*	SS10C 880808 BG0544							
Priority Poll. Volatiles GC/MS									
Chlorobenzene	ug/kg	195							
Chloroform	ug/kg	116							
Ethylbenzene	ug/kg	117							
Toluene	ug/kg	422							
Trichloroethylene	ug/kg	156							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports						
BG0545	WASTE MANAGEMENT, INC.	490	SSS10D	880808	1130	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

ETC

SEP 12, 1988
QV9983

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0545	WASTE MANAGEMENT, INC.	490	SSS10D	880808	1130	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
3V	Benzene	BMDL	440	6380000	6460000	ND	50.0	91	ND	6250000	102
7V	Chlorobenzene	1760	600	6080000	6400000	ND	50.0	88	ND	6250000	97
11V	Chloroform	432	160	6310000	6650000	ND	50.0	91	ND	6250000	101
19V	Ethylbenzene	3450	720	15200000	14100000	ND	50.0	88	9410000	6250000	92
25V	Toluene	3030	600	6320000	6540000	ND	50.0	88	105000	6250000	99
27V	1,1,1-Trichloroethane	ND	380	6490000	6970000	ND	50.0	91	ND	6250000	104
29V	Trichloroethylene	1580	190	6300000	6640000	ND	50.0	93	ND	6250000	101

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

ETC

AUG 26 1988

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0545	WASTE MANAGEMENT, INC.	490	SS-50	88080	1130	0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	103	81	117
p-Bromofluorobenzene	.250	108	74	121
1,2-Dichloroethane-D4	.250	106	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	[illegible]
2-Fluorophenol	-	-	25	[illegible]
2,4,6-Tribromophenol	-	-	19	[illegible]
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	-	-	[illegible]	120
2-Fluorobiphenyl	-		30	115
Terphenyl-D14	-		18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-		20**	150**

** Advisory Limits Only

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

ase No.: Contractor: ETC Corp. Contract No.:

nstrument ID: "O" Date: 08/20/88 Time: 17:40

ab ID: >A1474-245 Data Release Authorized By: Kenneth Boykin

Spectrum No: 245

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	27.56	27.56	Ok
75	30-60% of mass 95	52.16	52.16	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.57	6.57	Ok
173	Less than 1% of mass 95	.47	.47	Ok
174	Greater than 50% of mass 95	75.83	75.83	Ok
175	5-9% of mass 174	5.42	7.15	Ok
176	95-101% of mass 174	73.68	97.17	Ok
177	5-9% of mass 176	4.90	6.65	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
DC 9983V	>A1475	8/20/88	18:14
DC 9983VS	>A1476	↓	18:58
DC 9983VS	>A1477		19:42

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: A Date: 08/20/88 Time: 22:04

Lab ID: >A1478-247 Data Release Authorized By: Ken Boykin

Spectrum No: 247 enh

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	24.02	24.02	Ok
75	30-60% of mass 95	44.76	44.76	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.73	6.73	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	76.97	76.97	Ok
175	5-9% of mass 174	5.54	7.20	Ok
176	95-101% of mass 174	76.76	99.72	Ok
177	5-9% of mass 176	5.05	6.58	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
BG1336V	>A1479	8/20/88	22:38
BG1336V	>A1480	8/21/88	1:30
BG1336VS	>A1481	↓	2:14
BG1336VR	>A1482		2:57
QC9983V	>A1487		7:28

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: A Date: 08/21/88 Time: 08:09

Lab ID: >A1488-242 Data Release Authorized By: Kenneth Boykin

Spectrum No: 242

m/z	Ion Abundance Criteria	% Relative Abundance: Base Peak	% Relative Abundance: Appropriate Peak	Status
50	15-40% of mass 95	25.61	25.61	Ok
75	30-60% of mass 95	45.79	45.79	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.36	6.36	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	79.37	79.37	Ok
175	5-9% of mass 174	6.12	7.71	Ok
176	95-101% of mass 174	77.05	97.07	Ok
177	5-9% of mass 176	4.94	6.41	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC99E3VS	>A1490 KB. 8/24/88	8/21/88	10:20
BG0534V	>A1491		12:38
BG1336V	>A1492		13:50
BG0533V	>A1493		14:34
BG0545V	>A1494		15:17
BG0639V	>A1495		16:04
BG1348V	>A1496		16:47
BG1349V	>A1497		17:31
BG1354V	>A1498		18:15
BG1343V	>A1499		18:59

Form V

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

ORIGINAL

Seal No. 121081 ETC Job # _____

Date Sealed _____ By: MC

Company: WASTE MANAGEMENT, INC Attn.: KIRK STEMPLE

Facility/Site: VICKERY Phone: (419) 547 - 7291

Address: 3956 STATE ROUTE 412, VICKERY, OH 43464

SAMPLE IDENTIFICATION

Facility: 490 (Facility/Site Code) Boring SS-10B at 0 to 1.5 feet (Optional Sample Point Descriptions)

Sample Point: S-SS10D (Source Code (from below); Your Sample Point ID (left justify)) 880808 (Start Date (YY/MM/DD)) 1130 (Start Time (2400 hr. clock)) 0 (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)
Soil ...(S) River/Stream..(R) Generation Point....(G) Treatment Facility.....(T) Lake/Ocean.....(L) Specify _____

SHUTTLE CONTENTS

BOTTLE				ANALYSIS	SAMPLER		LAB
No	Type	Size	Preserv.		Filt. (Y/N)	Observations	Observations
2	VOA	40	None	Volatiles	NA		✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) J Durrett Date: 8888 Time: 900
Signature: Jim Durrett Seal #: 121081 Intact: yes

2. I have received these materials in good condition from the above person.
Name: J Durrett Signature: Jim Durrett
Date: 8-8-88 Time: 1030 Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) Jim Durrett Date: 8-9-88 Time: 900
Signature: Jim Durrett Seal #: 121080 Intact: yes

LAB USE ONLY Opened By: A Margott Date: 8/10/88 Time: 10:25AM
SHUTTLE # 1405 TEMP. °C 1° SEAL # 121080 COND. intact

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # BG0545

Sample Point S (Source Code) SS11ØD (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD) | START PURGE (2400 Hr Clock) | ELAPSED HRS | WATER VOL. IN CASING (Gallons) | VOLUME PURGED (Gallons)

SAMPLING METHOD: split spoon

Sampler Type [X] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other split spoon (SPECIFY OTHER)

Sampler Material [B] A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other (SPECIFY OTHER)

Tubing Material [NA] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other (SPECIFY OTHER)

Sample Composited [Y/N] Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl)

Depth to Ground water (ft)

Groundwater Elevation (ft msl)

Well Depth (ft)

Sample Depth (non-well) (ft)

	ph		spec. cond.		(other parameter)	value	units
1st		(STD)		um/cm at 25° C	HNU	140	ppm
2nd		(STD)		um/cm at 25°C			
3rd		(STD)		um/cm at 25°C			
4th		(STD)		um/cm at 25°C			

Sample Temp (°C) | Turbidity NTU

FIELD COMMENTS

Sample Appearance:

Weather Conditions:

Other:

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Jim Durrett (Print) Employer: Golder Associates

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8-8-88 (Date) Jim Durrett (Signature)

ORIGINAL

SAMPLE NUMBER	LOG LINK	pH	CRUCIBLE WEIGHT (g)	CRUCIBLE & WET SOIL WEIGHT (g)	WET SOIL WEIGHT (g)	CRUCIBLE & DRY SOIL WEIGHT (g)	DRY SOIL WEIGHT (g)	PERCENT MOISTURE (%)
B61339	29560		11.77	16.98	5.21	16.70	4.93	5
B61341			11.12	16.44	5.32	16.22	5.10	4
B61342			11.60	16.99	5.39	16.75	5.15	4
B61343			10.76	15.41	4.65	15.15	4.39	6
B61344			11.14	16.09	4.95	15.79	4.65	6
B61345			11.09	16.09	5.00	15.91	4.82	4
B61346			11.43	16.44	5.01	16.18	4.75	5
B61347			11.50	16.53	5.03	16.18	4.68	7
B61348			11.18	16.23	5.05	15.86	4.68	7
B61351			11.30	16.34	5.04	15.99	4.69	7
B61352			11.50	16.51	5.01	16.33	4.83	4
B61353			11.55	16.53	4.98	16.09	4.54	9
B61354	↓		11.44	16.48	5.04	16.47	5.03	0
B61349	29561		12.23	17.22	4.99	16.87	4.64	7
B61350	↓		10.94	15.94	5.00	15.74	4.80	4

QC Batch # 9389

CASE #

pH AND MOISTURE DETERMINATION

DATE:

$$\% \text{ Moisture} = \frac{\text{Wet soil weight} - \text{dry soil weight}}{\text{wet soil weight}}$$

Calculate Dry Wt:

$$1 - \frac{\%\text{m}}{100} \times \text{Wet Weight} = \text{Dry Weight}$$

COMMENTS:

TECHNICIANS

pH: NA

% Moisture set-up: K Kowalik 8/18/88

% Moisture completion: K Kowalik 8/19/88

UPD/Supervisor: J Angeloni 8/19/88

SAMPLE NUMBER	LOG LINK	pH	CRUCIBLE WEIGHT (g)	CRUCIBLE & WET SOIL WEIGHT (g)	WET SOIL WEIGHT (g)	CRUCIBLE & DRY SOIL WEIGHT (g)	DRY SOIL WEIGHT (g)	PERCENT MOISTURE (%)
BG1323	~~26555~~		12.04	28.51	16.47	27.91	15.87	3.64 (4)
BG1324			11.47	15.86	4.39	15.58	4.11	6.38 (6)
BG1325			12.06	14.77	2.71	14.58	2.52	7.01 (7)
BG1329			11.67	14.76	3.09	14.63	2.96	4.21 (4)
BG1330			11.78	19.95	8.17	19.96	8.18	~~8.47~~ (1)
~~BG1331~~			~~11.52~~	~~16.35~~	~~5.83~~	~~16.04~~	~~4.52~~	~~22.47~~
BG1332			11.72	15.98	4.26	15.75	4.03	5.44 (5)
BG1333			10.82	13.38	2.56	13.27	2.45	4.30 (4)
BG1334			11.11	13.50	2.39	13.40	2.29	4.18 (4)
BG1335			11.22	15.53	4.30	15.14	3.91	9.07 (9)
BG1336			10.94	13.50	2.56	13.24	2.30	10.16 (10)
~~BG1338~~			~~11.74~~	~~17.11~~	~~6.37~~	~~16.81~~	~~5.07~~	~~20.41~~
BG1339			11.52	16.35	4.83	16.04	4.52	6
BG1338			11.74	17.11	5.37	16.81	5.07	6

QC Batch # 9_7

CASE #

pH AND MOISTURE DETERMINATION

DATE: 8/12/88

% Moisture = (Wet soil weight − dry soil weight / wet soil weight) X

Calculate Dry W.

$1 - \frac{\%m}{100} \times$ wet w

= Dry weig

COMMENTS:

TECHNICIANS

pH: N/A

% Moisture set-up: K Kowalik 8/12/88

% Moisture completion: K Kowalik 8/13/88

UPD/Supervisor: Lori Williams 8/

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/20/88 SHIFT
FRACTION pp/uoa
INSTRUMENT "O"
TUNE FILE opeio1
SEQUENCE FILE scm
METHOD FILE uoaa
ID FILE IA0008
ANALYST(S) Susan Christopher
[signature]
SUPERVISOR [signature]
BATCH #'s QV9983

CA0008

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL. uL
p-bfb	25	18734	2
internal standard	25	19220	10
surrogates	25	19733	10
calib I	50	3364	2,5,10,15,20
calib II	50	3379	2,5,10,15,20
xuoa	50	19351	2,5,10,15,20

updated for pp/uoa

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
p-bfb	>A1474	2ul			17:40	ok	
QC9983V	>A1475	5ml	5		18:14	OK	Y
QC9983VS	>A1476	↓	6		18:58	OK 5ul calib I+II+xuoa	
QC9983VS	>A1477	↓	7	QCAL →	19:42	OK 5ul calib I+II+xuoa	
P-BFB	>A1478	2ul	—		22:04	OK co 8/20	
BG1336V	>A1479	0.0004g	1	1:100	22:38	OK 1ul (~~10~~ 4g/10ml)	Y
(R) BG1336V	>A1480	0.00004g	2		1:30	OK 1ul (4g/100ml)	Y
BG1336VS	>A1481	↓	3		2:14	OK 5ul Cal I, II, XVOA	
BG1336VR	>A1482	↓	4		2:57	OK 5ul Cal I, II, XVOA	
BG1338V	>A1483	↓	5			NG Too Dilute	
(R) BG1338V	>A1484 5	0.004g co	~~6~~ 7	1:10		NG 10ul (4g/10ml) Good pure rerun str.	Y
BG0534V	>A1485	0.0001g	~~7~~ 8	1:50,000	NOT RUN	5ul (0.5g/25ml)	
QC9983VS	>A1486	5ml	~~8~~ 9			NG 5ul Cal I, II, XVOA	
QC9983V	>A1487	↓	~~9~~ 10		7:28	OK	Y
P-BFB	>A1488	2ul	—		8:09	OK 242	
QC9983VS	>A1489	5ul	1			NG 5ul Cal I [illegible]	
QC9983VS	>A1490	5ml	2	QCAL	~~QCAL~~ 10:20 JW	OK 5ul Cal I [illegible]	
BG0534V	>A1491	0.0001g	8	1:50,000	12:38	OK 5ul (0.5g/25ml)	Y
(L) BG1337V	>A1492	0.00004g	1	1:1000	13:50	OK See TIC	Y
BG0533V	>A1493	0.1g	2	1:50	14:34	OK rerun 1:100 for C35	
BG0545V	>A1494	0.05g	3	1:100	15:17	OK	
BG0639V	>A1495	0.005g	4	1:1000	16:04	OK for QV9933	
BG1348V	>A1496	0.04g	5		16:47	OK	Y
BG1349V	>A1497	0.04g	6		17:31	OK	Y
BG1351V	>A1498	0.04g	7		18:15	OK	Y

ETC FORM #102

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8-30-88 SHIFT
FRACTION [illegible]
INSTRUMENT A
TUNE FILE APE501
SEQUENCE FILE AAA
METHOD FILE 13AA
ID FILE IA0008
ANALYST(S) J. Mulero

SUPERVISOR [illegible]
BATCH #'s QV9983

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
SCO		DATE	
WP		BY	

STANDARD	CONC PPM	LOT NO	LOT VOL.
See page 1			
Page 2			

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
BG1543V	>A1499	0.04	8		18:59	OK	Y
BG1550V	>A1500	0.04	9			NOT RUN	
QC9983V	>A1501	5	11			OK pos check	
QC9983V	>A1502	↓	12			NG pos check	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 09/15/88
PAGE: 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC	490	SST0D	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		S SST0D 880808 BG0545							
Priority Poll. Volatiles GC/MS									
Chlorobenzene	ug/kg	1760							
Chloroform	ug/kg	432							
Ethylbenzene	ug/kg	3450							
Toluene	ug/kg	3030							
Trichloroethylene	ug/kg	1580							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0540	WASTE MANAGEMENT, INC.	490	SSS10H	880808	1530	

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

ETC

AUG 30, 1988

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0540	WASTE MANAGEMENT, INC.	490	SSS10H	880808	1530	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
3V	Benzene	62.9	44	49.8	52.5	BMDL	50.0	99	ND	50.0	100
7V	Chlorobenzene	264	60	51.0	52.3	ND	50.0	102	ND	50.0	102
11V	Chloroform	174	16	46.9	48.8	ND	50.0	98	ND	50.0	94
19V	Ethylbenzene	536	72	48.0	48.5	ND	50.0	104	1.10	50.0	94
25V	Toluene	1400	60	50.6	52.1	ND	50.0	101	ND	50.0	101
27V	1,1,1-Trichloroethane	105	38	48.0	48.5	ND	50.0	101	ND	50.0	96
29V	Trichloroethylene	766	19	53.8	55.6	ND	50.0	99	ND	50.0	108

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

Sample/extract required dilution resulting in elevated MDL's.

ETC

AUG 25, 1988

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0540	WASTE MANAGEMENT, INC.	490	SSS10H	88080	1530	0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	102	81	117
p-Bromofluorobenzene	.250	101	74	121
1,2-Dichloroethane-D4	.250	96	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	-	-	23	120
2-Fluorobiphenyl	-	-	30	115
Terphenyl-D14	-	-	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

** Advisory Limits Only

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/15/88 Time: 22:35

Lab ID: >E3229-116 Data Release Authorized By: [signature]

Spectrum No: 116-100

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	19.13	19.13	Ok
75	30-60% of mass 95	43.88	43.88	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	5.87	5.87	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	87.25	87.25	Ok
175	5-9% of mass 174	6.41	7.35	Ok
176	95-101% of mass 174	85.37	97.85	Ok
177	5-9% of mass 176	6.52	7.63	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9967VS	>E3230	8/15/88	23:02
QC9967VS	>E3231	↓	23:49
QC9967VS	>E3232	8/16/88	00:36
QC9967VS	>E3233	↓	01:22
QC9967VS	>E3234	↓	02:09

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/16/88 Time: 03:38

Lab ID: >E3236-116 Data Release Authorized By: Wendy [illegible]

Spectrum No: 116

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	St
50	15-40% of mass 95	18.31	18.31	Ok
75	30-60% of mass 95	48.26	48.26	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.40	8.40	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	85.43	85.43	Ok
175	5-9% of mass 174	6.24	7.31	Ok
176	95-101% of mass 174	82.50	96.57	Ok
177	5-9% of mass 176	5.79	7.02	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9967V	>E3238	8/16/88	06:25
BG1721VS	>E3240	↓	10:45
BG1721VR	>E3241		11:31
BA7464V	>E3242		12:17
BG1721V	>E3243		13:21
QC9967VS	>E3244		14:07
QC9967V	>E3245		14:54

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/16/88 Time: 15:37

Lab ID: >E3246-117 Data Release Authorized By: [signature]

Spectrum No: 117

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	19.27	19.27	Ok
75	30-60% of mass 95	48.63	48.63	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.79	8.79	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	75.98	75.98	Ok
175	5-9% of mass 174	6.05	7.97	Ok
176	95-101% of mass 174	74.61	98.20	Ok
177	5-9% of mass 176	5.34	7.16	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
BG0248V	>E3247	8/16/88	16:43
BG1722V	>E3248	↓	17:30
BG1723V	>E3249	↓	18:16
BG0544V	>E3255	8/17/88	01:16

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/18/88 Time: 21:46

Lab ID: >E3289-115 Data Release Authorized By: Wendy [illegible]

Spectrum No: 115-103

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	17.44	17.44	Ok
75	30-60% of mass 95	47.68	47.68	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.92	6.92	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	95.36	95.36	Ok
175	5-9% of mass 174	7.48	7.34	Ok
176	95-101% of mass 174	94.96	99.58	Ok
177	5-9% of mass 176	6.16	6.49	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9967VS	>E3290	8/18/88	04:08
QC9967VS	>E3291	↓	04:54
QC9967VS	>E3292		05:40
QC9967VS	>E3293		06:26

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/19/88 Time: 08:46

Lab ID: >E3296-116 Data Release Authorized By: Wendy [illegible]

Spectrum No: 116 enhanced

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.05	15.05	Ok
75	30-60% of mass 95	43.53	43.53	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.86	8.86	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% or mass 95	96.12	96.12	Ok
175	5-9% of mass 174	7.24	7.24	Ok
176	95-101% of mass 174	95.58	99.44	Ok
177	5-9% of mass 176	6.66	6.97	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9967VS	>E3297	8/19/88	~~09:40~~ 10:29 WW 8/25/88
QC9967V	>E3299	↓	14:47
BG0540V	>E3300	↓	16:40
BG0543V	>E3302	↓	18:12

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TES[illegible] CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

ORIGINAL

Seal No. 121081 ETC Job # [illegible]

Date Sealed [illegible] By: MC

Company: [illegible] MANAGEMENT, INC Attn.: KIRK STE[illegible]

Facility/Site: [illegible] Phone: (419) [illegible]

Address: [illegible] 412, VICKERY, OH 43464

SAMPLE IDENTIFICATION

Facility: [illegible] (Facility/Site Code) Boring SS-10C at 1.5 to 3.0 feet (Optional Sample Point Description)

Sample Point: S-SS10H (Source Code (from below) / Your Sample Point ID (left justify)) 880808 (Start Date (YY/MM/DD)) 1530 (Start Time (2400 hr. clock)) 0 (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall .....(O) Bottom Sediment ....(B) Surface Impoundment ....(I) Leachate Collection Sys.....(C) Other .....(X)
Soil ...(S) River/Stream ..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify

SHUTTLE CONTENTS

BOTTLE				ANALYSIS	SAMPLER		LAB
No	Type	Size	Preserv.		Filt. (Y/N)	Observations	
2	VOA	40	None	Volatiles	NA		[illegible]

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) J Durrett Date: 8888 Time: 900
Signature: Jim Durrett Seal #: 121081 Intact: yes

2. I have received these materials in good condition from the above person.
Name: J. Durrett Signature: Jim Durrett
Date: 8-8-88 Time: 1030 Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) Jim Durrett Date: 8-9-[illegible] Time: 8:00
Signature: Jim Durrett Seal #: 1210[illegible] Intact: yes

LAB USE ONLY Opened By: [illegible] Date: 8/10/88
SHUTTLE #: [illegible] TEMP. °C 4° SEAL #: 121080 C[illegible]

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # BG 0540

Sample Point S SS1ØH
Source Code — Sample Point I.D.

FIELD PROCEDURES

[illegible]	START PURGE (Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)

SAMPLING METHOD: split spoon

Sampler Type [X] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel — X-Other split spoon (SPECIFY OTHER)

Sampler Material [B] A-Teflon, B-Metal, C-PVC, D-Plastic — X-Other (SPECIFY OTHER)

Tubing Material [ ] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon — X-Other (SPECIFY OTHER)

Sample Composited [Y/N] N — Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl)

Depth to Ground water (ft)

Groundwater Elevation (ft msl)

Well Depth (ft)

Sample Depth (non-well) (ft)

JD 8-9-88

	ph	(STD)	spec. cond.	um/cm at 25°C	(other parameter)	value	units
1st					HNU	110	ft
2nd							
3rd							
4th							

Sample Temp (°C) — Turbidity NTU

FIELD COMMENTS

Sample Appearance:

Weather Conditions:

Other:

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Jim Durrett (Print) — Employer: Golder Associates

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8-8-88 (Date) — Jim Durrett (Signature)

ORIGINAL

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 880816 SHIFT
FRACTION Gl. E 2 P2/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE BHE
METHOD FILE VOAE
ID FILE IE0001
ANALYST(S) CJRCOU
B Landua
SUPERVISOR Orin Cordova
BATCH #'s QV9967

(PLEASE INITIAL) CE0001

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACO		DATE	8/16/88
WIP		BY	CD

STANDARD	CONC PPM	LOT NO.	LOT VOL.
p-BFB	25	18739	2 ul
Internal Standard	25	19220	10
Surrogate	25	19733	10
Cal I	50	3387	2, 5, 10, 15, 20
Cal II	50	3379	↓
XVOA	50	19351	↓

NAME	DATA FILE	uL INJ	ALS #	DIL	~~TAPE #~~ TIME	SPECIALS (WRITE A-TYPE)	PLUS Y/N
p-BFB	>E3229	2 ul	—		22:35	OK 116-100	
QC9967VS	>E3230	5 ul	4		23:02	2 ul Cal I, II, XVOA	
QC9967VS	>E3231	↓	5	CBVPO	23:49	5 ul Cal I, II, XVOA	
QC9967VS	>E3232		6	CBCAL	00:36	10 ul Cal I, II, XVOA	
QC9967VS	>E3233		7	CBMEG	1:22	15 ul Cal I, II, XVOA	
QC9967VS	>E3234		8		2:09	20 ul Cal I, II, XVOA	
QC9967V	>E3235	↓	9			NG	
p-BFB	>E3236	2 ul	—		3:38	OK	
QC9967V	>E3237	5 ul	9			NG	
QC9967V	>E3238	5 ul	9		6:25	OK	
BG1721V	>E3239	5g	4			NG Surr's out	
BG1721VS	>E3240	↓	5		10:45	OK 5 ul Cal II, XVOA	
BG1721VR	>E3241		6		11:31	OK 5 ul Cal I, II, XVOA	
BG0746VV	>E3242	↓	7		12:17	OK	
(R) BG1721V	>E3243	5g	4		13:21	OK	
QC9967VS	>E3244	↓	5	QCAL →	14:07	OK 5 ul Cal I, II, XVOA	
QC9967V	>E3245	↓	6		14:54	OK	
p-BFB	>E3246	2 ul	—		15:37	OK 117 Unaltered	
BG0248V	>E3247	5g	4		16:43	OK	
BG1722V	>E3248	↓	5		17:30	OK	
BG1723V	>E3249	↓	6		18:16	OK	
BG0544V	>E3250	↓	7			NG Surr high Rerun 1:10	
BG0545V	>E3251	↓	8			NG Rerun 1:100	
BG0534V	>E3252	5g	4			NG	
BG0533V	>E3253	1g	5	1:5		NG Overload Rerun 1:50	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 880817 SHIFT
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE BHE 4CE
METHOD FILE VOAE
ID FILE IE0001
ANALYST(S) JHobell
Ellyn Curcio
SUPERVISOR Sonia Cordona
BATCH #'s QV9967

(PLEASE INITIAL) CE0001

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	
Pg 2 see Pg 1			

	NAME	DATA FILE	uL INJ	ALS #	DIL	~~TAPE #~~ TIME	SPECIALS (WRITE A-TYPE)
	BG0540V	>E3254	1g	6	1:5	—	NG Rerun 1:20 Possible
R	BG0544V	>E3255	0.5g	7	1:10	1:16	OK
	QC9967VS	>E3256	5ml	8		—	NG 5ul cal I, II, XVOA
	P-BFB	>E3257	2ul	—		5:08	OK
	QC9967VS	>E3258	5ml	6	QCAL	5:59	OK 5ul cal I, II, XVOA
	QC9967V	>E3259	5ml	5		—	ng Position check
	QC9967V	>E3260	5ml	5		8:08	OK Position check
	QC9967V	>E3261	5ml	8		—	ng
	QC9967V	>E3262	5ml	8		12:39	ok
R	BG0534V	>E3263	5g	5		—	NG rerun 1:50,000 as meth D
R	BG0540V	>E3264	.5g	6	1:10	—	ng-rerun possible car
R	BG0543V	>E3265	1g	7	1:5	—	ng-rerun "
R	BG0544V	>E3266	.5g	8	1:10	—	not run
	QC9967V	>E3267	5ml	5		—	NG HIGH TOLUENE position blank
	QC9967V	>E3268	↓	6		—	NG [illegible]
	QC9967V	>E3269	↓	7		—	
	P-BFB	>E3270	2ul	—		—	ng
	P-BFB	>E3271	2ul	—		—	ng
	P-BFB	>E3272	2ul	—		21:13	OK Run before E326
	QC9967VS	>E3273	5ml	9		—	ng 5ul all stds
	P-BFB	>E3274	2ul	—		9:16	ok
	QC9967VS	>E3275	5ml	8			5ul Cal I, II, XVOA
	QC9967V	>E3276	↓	9		—	ng
	QC9967VS	>E3277	↓	5		not run	2ul Cal I, II, XVOA
	QC9967VS	>E3278	↓	6			10ul ↓

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/18/88 SHIFT
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE AREI01
SEQUENCE FILE EEE / EEE
METHOD FILE VOAE
ID FILE IE0001
ANALYST(S) Ellen Curcio
SUPERVISOR Sonia Cordova
BATCH #'s QW9967

(PLEASE INITIAL) CE0001

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
All page #1			
page #3			

NAME	DATA FILE	uL INJ	ALS #	DIL	~~TAPE #~~ TIME	SPECIALS (WRITE A-TYPE)	PLUS Y/N
QC9967VS	>E3279	5ml	7		not	15ul Cal I, II, XVOA	
QC9967VS	>E3280	5ml	8		run	20ul ↓	
QC9967V	>E3281	5ml	9		—	ng	
QC9967V	>E3282	5ml	9		—	ng	
QC9967VS	>E3283	5ml	5		NG	2ul Cal I, II, XVOA	
QC9967VS	>E3284		6		Tether	2ul Cal I, II, XVOA	
QC9967VS	>E3285		7		Skipped	10 ul	
QC9967VS	>E3286		8		Serial	15 ul	
QC9967VS	>E3287		9		up. NG	20ul ↓ blank	
QC9967V	>E3288	↓	10			blank	
P-BFB	>E3289	2ul	—	21:46	9:46	OK Run before E3299	
QC9967VS	>E3290	5ml	5		4:08	2ul Cal I, II, XVOA	
QC9967VS	>E3291		6	CBUPD	4:54	OK 5ml	
QC9967VS	>E3292		7	CBCAL	5:40	OK 10ml	
QC9967VS	>E3293		8	CBMRL	6:26	OK 15ml	
QC9967VS	>E3294		9		—	ng 20ml	
QC9967V	>E3295	↓	10		—	ng Blank	
P-BFB	>E3296	2ul	—		8:46	ok	
QC9967VS	>E3297	5ml	9		10:29	ok 20ul Cal I, II, XVOA	
QC9967V	>E3298	5ml	10		—	ng blank	
QC9967V	>E3299	5ml	9		14:47	ok blank	
® B60540V	>E3300	.5g	5	1:10	16:40	ok	
® B60544V	>E3301	.5g	6	1:10	~~17:26~~	~~NG~~ OK ~~Rerun 1:20~~ Fourth Cut	not used
® B60543V	>E3302	1g	7	1:5	18:12	OK Rerun 1:50 for C23	
B60529V	>E3303	5g	8			ng 1 cut out	

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 08/31/88
PAGE: 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	490	SS10H	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		SS10H 880808 BG0540							
Priority Poll. Volatiles GC/MS									
Benzene	ug/kg	62.9							
Chlorobenzene	ug/kg	264							
Chloroform	ug/kg	174							
Ethylbenzene	ug/kg	536							
Toluene	ug/kg	1400							
1,1,1-Trichloroethane	ug/kg	105							
Trichloroethylene	ug/kg	766							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0533	WASTE MANAGEMENT, INC.	490	SSS10K	880808	1600	

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

ETC

SEP 15, 1988

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0533	WASTE MANAGEMENT, INC.	490	SSS10K	880808	1600	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
3V	Benzene	BMDL	220	7090000	7180000	ND	50.0	91	ND	6940000	102
7V	Chlorobenzene	3870	300	6750000	7120000	ND	50.0	88	ND	6940000	97
11V	Chloroform	923	80	7010000	7390000	ND	50.0	91	ND	6940000	101
19V	Ethylbenzene	3120	360	16900000	15600000	ND	50.0	88	10500000	6940000	92
25V	Toluene	10600	300	7020000	7270000	ND	50.0	88	117000	6940000	99
27V	1,1,1-Trichloroethane	601	190	7210000	7740000	ND	50.0	91	ND	6940000	104
29V	Trichloroethylene	3390	95	7000000	7380000	ND	50.0	93	ND	6940000	101

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

ETC

AUG 26, 1988

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0533	WASTE MANAGEMENT, INC.	490	SSS10K	88080	1600	0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	100	81	117
p-Bromofluorobenzene	.250	115	74	121
1,2-Dichloroethane-D4	.250	99	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	-	-	23	120
2-Fluorobiphenyl	-	-	30	115
Terphenyl-D14	-	-	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	50**

** 40-120 Limits Only

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

ase No.: _____ Contractor: ETC Corp. Contract No.: _____

nstrument ID: "O" Date: 08/20/88 Time: 17:40

ab ID: >A1474-245 Data Release Authorized By: Kenneth Boykin

pectrum No: 245

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	27.56	27.56	Ok
75	30-60% of mass 95	52.16	52.16	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.57	6.57	Ok
173	Less than 1% of mass 95	.47	.47	Ok
174	Greater than 50% of mass 95	75.83	75.83	Ok
175	5-9% of mass 174	5.42	7.15	Ok
176	95-101% of mass 174	73.68	97.17	Ok
177	5-9% of mass 176	4.90	6.65	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9983V	>A1475	8/20/88	18:14
QC9983VS	>A1476	↓	18:58
QC9983VS	>A1477		19:42

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: A Date: 08/20/88 Time: 22:04

Lab ID: >A1478-247 Data Release Authorized By: Ken Boykin

Spectrum No: 247 enh

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	24.02	24.02	Ok
75	30-60% of mass 95	44.76	44.76	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.73	6.73	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	76.97	76.97	Ok
175	5-9% of mass 174	5.54	7.20	Ok
176	95-101% of mass 174	76.76	99.72	Ok
177	5-9% of mass 176	5.05	6.58	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
BG1336V	>A1479	8/20/88	22:38
BG1336V	>A1480	8/21/88	1:30
BG1336VS	>A1481	↓	2:14
BG1336VR	>A1482	↓	2:57
QC99B3V	>A1487	↓	7:28

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: A Date: 08/21/88 Time: 08:09

Lab ID: >A1488-242 Data Release Authorized By: Kenneth Boykin

Spectrum No: 242

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	25.61	25.61	Ok
75	30-60% of mass 95	45.79	45.79	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.36	6.36	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	79.37	79.37	Ok
175	5-9% of mass 174	6.12	7.71	Ok
176	95-101% of mass 174	77.05	97.07	Ok
177	5-9% of mass 176	4.94	6.41	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC 99G3VS	>A1490 KB. 8/24/88	8/21/88	10:20
BG0534V	>A1491		12:38
BG1336V	>A1492		13:50
BG0533V	>A1493		14:34
BG0545V	>A1494		15:17
BG0639V	>A1495		16:04
BG1348V	>A1496		16:47
BG1349V	>A1497		17:31
BG1354V	>A1498		18:15
BG1343V	>A1499		18:59

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

ORIGINAL

Seal No. 121079 ETC Job # _____

Date Sealed [illegible] By: MC

Company: WASTE MANAGEMENT, INC Attn.: KIRK STEMPLE

Facility/Site: VICKERY Phone: (419) 542 - 7791

Address: 3956 STATE ROUTE 412, VICKERY, OH 43464

SAMPLE IDENTIFICATION

Facility: 4 0 0 (Facility/Site Code) Boring SS-10(2) at 1.5 to 3.0 feet (Optional Sample Point Descriptions)

Sample Point: S-SS10K (Source Code (from below) / Your Sample Point ID (left justify)) 880808 (Start Date (YY/MM/DD)) 1600 (Start Time (2400 hr. clock)) d (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall .....(O) Bottom Sediment ....(B) Surface Impoundment ....(I) Leachate Collection Sys. ....(C) Other .....(X)
Soil ..(S) River/Stream ..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify _____

SHUTTLE CONTENTS

BOTTLE				ANALYSIS	SAMPLER		LAB
No	Type	Size	Preserv.		Filt. (Y/N)	Observations	Observations
2	VOA	40	None	Volatiles	NA		✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) J Durrett Date: 8888 Time: 930
Signature: Jim Durrett Seal #: 121079 Intact: yes

2. I have received these materials in good condition from the above person.
Name: J Durrett Signature: Jim Durrett
Date: 8-8-88 Time: 1030 Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) Jim Durrett Date: 8-9-88 Time: 800
Signature: Jim Durrett Seal #: 121080 Intact: yes

LAB USE ONLY Opened By: C Margott Date: 8/10/88 Time: 10:28 AM
SHUTTLE # 1405 TEMP. °C 4° SEAL # 121080 COND. Intact

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # BG 0533

Sample Point S (Source Code) SS1ØK (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD) | START PURGE (2400 Hr Clock) | ELAPSED HRS | WATER VOL. IN CASING (Gallons) | VOLUME PURGED (Gallons)

SAMPLING METHOD: split spoon

Sampler Type: X — A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel — X-Other split spoon (SPECIFY OTHER)

Sampler Material: B — A-Teflon, B-Metal, C-PVC, D-Plastic — X-Other (SPECIFY OTHER)

Tubing Material: NA — A-Teflon, B-Tygon, C-Polyethylene, D-Silicon — X-Other (SPECIFY OTHER)

Sample Composited: Y/N — Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) | Well Depth (ft)

Depth to Ground water (ft) | Sample Depth (non-well) (ft)

Groundwater Elevation (ft msl)

	ph	spec. cond.	um/cm at 25°C	(other parameter)	value	units
1st	(STD)	1st		HNU	150	pp
2nd	(STD)	2nd				
3rd	(STD)	3rd				
4th	(STD)	4th				

Sample Temp (°C) | Turbidity NTU

FIELD COMMENTS

Sample Appearance:

Weather Conditions:

Other:

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Jim Durrett (Print) Employer: Golder Associates

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8-8-88 (Date) Jim Durrett (Signature)

ORIGINAL

SAMPLE NUMBER	LOG LINK	pH	CRUCIBLE WEIGHT (g)	CRUCIBLE & WET SOIL WEIGHT (g)	WET SOIL WEIGHT (g)	CRUCIBLE & DRY SOIL WEIGHT (g)	DRY SOIL WEIGHT (g)	PERCENT MOISTURE (%)
BC1339	29560		11.77	16.98	5.21	16.70	4.93	5
BC1341			11.12	16.44	5.32	16.22	5.10	4
BC1342			11.60	16.99	5.39	16.75	5.15	4
BC1343			10.76	15.41	4.65	15.15	4.39	6
BC1344			11.14	16.09	4.95	15.79	4.65	6
BC1345			11.09	16.09	5.00	15.91	4.82	4
BC1346			11.43	16.44	5.01	16.18	4.75	5
BC1347			11.50	16.53	5.03	16.18	4.68	7
BC1348			11.18	16.23	5.05	15.86	4.68	7
BC1351			11.30	16.34	5.04	15.99	4.69	7
BC1352			11.50	16.51	5.01	16.33	4.83	4
BC1353			11.55	16.53	4.98	16.09	4.54	9
BC1354	↓		11.44	16.48	5.04	16.47	5.03	0
BC1349	29561		12.23	17.22	4.99	16.87	4.64	7
BC1350	↓		10.94	15.44	5.00	15.74	4.80	4

QC Batch # 9389

CASE #

pH AND MOISTURE DETERMINATION:

DATE:

% Moisture = (Wet soil weight − dry soil weight) / (wet soil weight)

Calculate Dry Wt:

$1 - \frac{\%m}{100} \times$ wet weight = Dry weight

COMMENTS:

TECHNICIANS

pH: NA

% Moisture set-up: K Kowalik 8/18/88

% Moisture completion: K Kowalik 8/18/88

UPD/Supervisor: J Bryant 8/19/88

4cm

SAMPLE NUMBER	LOG LINK	pH	CRUCIBLE WEIGHT (g)	CRUCIBLE & WET SOIL WEIGHT (g)	WET SOIL WEIGHT (g)	CRUCIBLE & DRY SOIL WEIGHT (g)	DRY SOIL WEIGHT (g)	PERCENT MOISTURE (%)
BG1323	34555		12.04	28.51	16.47	27.91	15.87	3.64 (4)
BG1324			11.47	15.86	4.39	15.52	4.11	6.38 (6)
BG1325			12.06	14.77	2.71	14.58	2.52	7.01 (7)
BG1329			11.67	14.76	3.09	14.63	2.96	4.21 (4)
BG1330			11.78	19.95	8.17	19.96	8.18	8.42 (1)
~~BG1331~~			~~11.52~~	~~16.35~~	~~5.83~~	~~16.04~~	~~4.52~~	~~22.47~~
BG1332			11.72	15.98	4.26	15.75	4.03	5.46 (5)
BG1333			10.82	13.38	2.56	13.27	2.45	4.30 (4)
BG1334			11.11	13.50	2.39	13.40	2.29	4.18 (4)
BG1335			11.22	15.53	4.30	15.14	3.91	9.07 (9)
BG1336			10.94	13.50	2.56	13.24	2.30	10.16 (10)
~~BG1338~~			~~11.94~~	~~17.11~~	~~6.37~~	~~16.81~~	~~5.07~~	~~20.41~~
BG1339			11.52	16.35	4.83	16.04	4.52	6
BG1338			11.74	17.11	5.37	16.81	5.07	6

QC Batch # 9E 7

CASE #

pH AND MOISTURE DETERMINATION

DATE: 8/12/88

% Moisture = (Wet soil weight − dry soil weight) / (wet soil weight) X 1

Calculate Dry Wt

$1 - \frac{\%om}{100} \times$ wet wt

= Dry weight

COMMENTS:

TECHNICIANS

pH: N/A

% Moisture set-up: K Kowalik 8/12/88

% Moisture completion: K Kowalik 8/13/88

UPD/Supervisor: Lori Williams 8/17

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/20/88 SHIFT
FRACTION pp1000
INSTRUMENT "a"
TUNE FILE apeia1
SEQUENCE FILE scm
METHOD FILE 1000
ID FILE IA0008
ANALYST(S) Susan Christopher
SUPERVISOR [illegible]
BATCH #'s QV9983

CA0008

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL. µl
p-bfb	25	18734	2
internal standard	25	19220	10
surrogates	25	19733	10
calib I	50	3364	2,5,10,15,20
calib II	50	3379	2,5,10,15,20
xvoo	50	19351	2,5,10,15,20

updated for pp1000

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
p-bfb	>A1474	2µl			17:40	ok	
QC9983V	>A1475	5ml	5		18:14	OK	Y
QC9983VS	>A1476	↓	6		18:58	OK 5µl calib I+II+xvoo	
QC9983VS	>A1477	↓	7	QCAL →	19:42	OK 5µl calib I+II+xvoo	
P-BFB	>A1478	2µl	—		22:04	OK co 8/20	
BG1336V	>A1479	0.0004g	1	1:100	22:38	OK 1µl (4g/10ml)	Y
(R) BG1336V	>A1480	0.00004g	2		1:30	OK 1µl (4g/100ml)	Y
BG1336VS	>A1481	↓	3		2:14	OK 5µl Cal I, II, XVOA	
BG1336VR	>A1482	↓	4		2:57	OK 5µl Cal I, II, XVOA	
BG1338V	>A1483	↓	5			NG Too Dilute	
(R) BG1338V	>A1484 5	0.004g	~~6~~ 7	1:10		NG 10µl (4g/10ml)	Y
BG0534V	>A1485	0.0001g	~~7~~ 8	1:50,000	NOT RUN	5µl (0.5g/25ml)	
QC9983VS	>A1486	5ml	~~8~~ 9			NG 5µl Cal I, II, XVOA	
QC9983V	>A1487	↓	~~9~~ 10		7:28	OK	Y
P-BFB	>A1488	2µl	—		8:09	OK 242	
QC9983VS	>A1489	5ml	1			NG 5µl Cal I [illegible]	
QC9983VS	>A1490	5ml	2	QCAL	~~QCAL~~ 10:20 JN	OK 5µl [illegible]	
BG0534V	>A1491	0.0001g	8	1:50,000	12:38	OK 5µl (0.5g/25ml)	Y
(L) BG1337V	>A1492	0.00004g	1	1:1000	13:50	OK See TIC	Y
BG0533V	>A1493	0.1g	2	1:50	14:34	OK rerun 1:100 for C35	
BG0545V	>A1494	0.05g	3	1:100	15:17	OK	
BG0639V	>A1495	0.005g	4	1:1000	16:04	OK for QV9933	
BG1345V	>A1496	0.04g	5		16:47	OK	Y
BG1344V	>A1497	0.04g	6		17:31	OK	Y
[illegible]	>A1498	0.04g	7		18:15	OK	Y

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE [illegible] SHIFT
FRACTION [illegible]
INSTRUMENT A
TUNE FILE [illegible]
SEQUENCE FILE [illegible]
METHOD FILE [illegible]
ID FILE [illegible]
ANALYST(S) [illegible]

SUPERVISOR [illegible]
BATCH #'s QV9983

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
See page 1			
Page 2			

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
[illegible]	[illegible]	[illegible]	8		18:59	OK	Y
[illegible]	[illegible]	[illegible]	9			NOT RUN	
QC9983V	[illegible]	[illegible]	[illegible]			OK pos check	
QC9983V	[illegible]	[illegible]	12			NG pos check	

A Subsidiary of Environmental Treatment and Technologies Corp

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 09/14/88
PAGE: 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	490	SS10K	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		S SS10K 880808 BG0533							
Priority Poll. Volatiles GC/MS									
Chlorobenzene	ug/kg	3870							
Chloroform	ug/kg	923							
Ethylbenzene	ug/kg	3120							
Toluene	ug/kg	10600							
1,1,1-Trichloroethane	ug/kg	601							
Trichloroethylene	ug/kg	3390							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports						
BG0534	WASTE MANAGEMENT, INC.	490	SSS10L	B80808	1600	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

284 RARITAN CENTER PARKWAY • EDISON, NJ 08837 (201) 225-5600

ETC

SEP 12, 1988
QV9983

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0534	WASTE MANAGEMENT, INC.	490	SSS10L	880808	1600	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
3V	Benzene	ND	250000	6380000	6460000	ND	50.0	91	ND	6250000	102
7V	Chlorobenzene	BMDL	250000	6080000	6400000	ND	50.0	88	ND	6250000	97
11V	Chloroform	ND	250000	6310000	6650000	ND	50.0	91	ND	6250000	101
19V	Ethylbenzene	ND	250000	15200000	14100000	ND	50.0	88	9410000	6250000	92
25V	Toluene	BMDL	250000	6320000	6540000	ND	50.0	88	105000	6250000	99
27V	1,1,1-Trichloroethane	BMDL	250000	6490000	6970000	ND	50.0	91	ND	6250000	104
29V	Trichloroethylene	4170000	250000	6300000	6640000	ND	50.0	93	ND	6250000	101

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

ETC

AUG 26, 1988

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0534	WASTE MANAGEMENT, INC.	490	SSS10L	88080	1600	0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	102	81	117
p-Bromofluorobenzene	.250	105	74	121
1,2-Dichloroethane-D4	.250	100	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	-	-	23	120
2-Fluorobiphenyl	-	-	30	115
Terphenyl-D14	-	-	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

** Advisory Limits Only

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

ase No.: _____ Contractor: ETC Corp. Contract No.: _____

nstrument ID: "O" Date: 08/20/88 Time: 17:40

ab ID: >A1474-245 Data Release Authorized By: Kenneth Boyd

Spectrum No: 245

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	27.56	27.56	Ok
75	30-60% of mass 95	52.16	52.16	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.57	6.57	Ok
173	Less than 1% of mass 95	.47	.47	Ok
174	Greater than 50% of mass 95	75.83	75.83	Ok
175	5-9% of mass 174	5.42	7.15	Ok
176	95-101% of mass 174	73.68	97.17	Ok
177	5-9% of mass 176	4.90	6.65	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9983V	>A1475	8/20/88	18:14
QC9983VS	>A1476	↓	18:58
QC9983VS	>A1477		19:42

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: A Date: 08/20/88 Time: 22:04

Lab ID: >A1478-247 Data Release Authorized By: Ken Boybin

Spectrum No: 247 enh

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	24.02	24.02	Ok
75	30-60% of mass 95	44.76	44.76	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.73	6.73	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	76.97	76.97	Ok
175	5-9% of mass 174	5.54	7.20	Ok
176	95-101% of mass 174	76.76	99.72	Ok
177	5-9% of mass 176	5.05	6.58	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
BG1336V	>A1479	8/20/88	22:38
BG1336V	>A1480	8/21/88	1:30
BG1336VS	>A1481	↓	2:14
BG1336VR	>A1482		2:57
DC9983V	>A1487		7:28

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: H Date: 08/21/88 Time: 08:09

Lab ID: >A1488-242 Data Release Authorized By: Kenneth Boykin

Spectrum No: 242

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	25.61	25.61	Ok
75	30-60% of mass 95	45.79	45.79	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.36	6.36	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	79.37	79.37	Ok
175	5-9% of mass 174	6.12	7.71	Ok
176	95-101% of mass 174	77.05	97.07	Ok
177	5-9% of mass 176	4.94	6.41	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC 99C3VS	>A1490 KB. 8/24/88	8/21/88	10:20
BG 0534V	>A1491		12:38
BG 1336V	>A1492		13:50
BG 0533V	>A1493		14:34
BG 0545V	>A1494		15:17
BG 0639V	>A1495		16:04
BG 1348V	>A1496		16:47
BG 1349V	>A1497		17:31
BG 1354V	>A1498		18:15
BG 1343V	>A1499		18:59

Form V

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

ORIGINAL

Seal No. 121079 ETC Job # _____

Date Sealed [illegible] By: MC

Company: WASTE MANAGEMENT, INC Attn.: KIRK STEMPLE

Facility/Site: VICKERY Phone: (419) 547 - 7791

Address: 3956 STATE ROUTE 412, VICKERY, OH 43464

SAMPLE IDENTIFICATION

Facility: [illegible] (Facility/Site Code) Boring SS-10(2) at 3.0 to 4.5 feet (Optional Sample Point Descriptions)

Sample Point: S-SS10Ø4 (Source Code (from below); Your Sample Point ID (left justify)) 880808 (Start Date (YY/MM/DD)) 1600 (Start Time (2400 hr. clock)) 0 (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall .....(O) Bottom Sediment ....(B) Surface Impoundment ....(I) Leachate Collection Sys. ....(C) Other ..... (X)
Soil ...(S) River/Stream ..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify _____

SHUTTLE CONTENTS

BOTTLE				ANALYSIS	SAMPLER		LAB
No	Type	Size	Preserv.		Filt. (Y/N)	Observations	Observations
2	VOA	40	None	Volatiles	NA		✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) J. Durrett Date: 8888 Time: 930
Signature: Jim Durrett Seal #: 121079 Intact: yes

2. I have received these materials in good condition from the above person.
Name: J. Durrett Signature: Jim Durrett
Date: 8-8-88 Time: 1030 Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) Jim Durrett Date: 8-9-88 Time: 800
Signature: Jim Durrett Seal #: 121080 Intact: yes

LAB USE ONLY Opened By: [illegible] Date: 8/10/88 Time: 0:25 AM
SHUTTLE # 1405 TEMP. °C 40 SEAL # 121080 COND. [illegible]

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # BG 0534

Sample Point S (Source Code) SS1Ø4 (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)

SAMPLING METHOD: split spoon

Sampler Type [X] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel — X-Other split spoon (SPECIFY OTHER)

Sampler Material [B] A-Teflon, B-Metal, C-PVC, D-Plastic — X-Other _____ (SPECIFY OTHER)

Tubing Material [NA] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon — X-Other _____ (SPECIFY OTHER)

Sample Composited [Y/N] _____ Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) ____ Well Depth (ft) ____

Depth to Ground water (ft) ____ Sample Depth (non-well) (ft) ____

Groundwater Elevation (ft msl) ____

	ph		spec. cond.		(other parameter)	value	units
1st		(STD)		um/cm at 25°C	HNU	120	ppm
2nd		(STD)		um/cm at 25°C			
3rd		(STD)		um/cm at 25°C			
4th		(STD)		um/cm at 25°C			

Sample Temp (°C) Turbidity NTU

FIELD COMMENTS

Sample Appearance: _____

Weather Conditions: _____

Other: _____

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Jim Durrett (Print) Employer: Golder Associates

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8-8-88 (Date) Jim Durrett (Signature)

ORIGINAL

SAMPLE NUMBER	LOG LINK	pH	CRUCIBLE WEIGHT (g)	CRUCIBLE & WET SOIL WEIGHT (g)	WET SOIL WEIGHT (g)	CRUCIBLE & DRY SOIL WEIGHT (g)	DRY SOIL WEIGHT (g)	PERCENT MOISTURE (%)
B61339	29560		11.77	16.98	5.21	16.70	4.93	5
B61341			11.12	16.44	5.32	16.22	5.10	4
B61342			11.60	16.99	5.39	16.75	5.15	4
B61343			10.76	15.41	4.65	15.15	4.39	6
B61344			11.14	16.09	4.95	15.79	4.65	6
B61345			11.09	16.09	5.00	15.91	4.82	4
B61346			11.43	16.44	5.01	16.18	4.75	5
B61347			11.50	16.53	5.03	16.18	4.68	7
B61348			11.18	16.23	5.05	15.86	4.68	7
B61351			11.30	16.34	5.04	15.99	4.69	7
B61352			11.50	16.51	5.01	16.33	4.83	4
B61353			11.55	16.53	4.98	16.09	4.54	9
B61354	↓		11.44	16.48	5.04	16.47	5.03	0
B61349	29561		12.23	17.22	4.99	16.87	4.64	7
B61350	↓		10.94	15.94	5.00	15.74	4.80	4

QC Batch # 9389

CASE #

pH AND MOISTURE DETERMINATION

DATE:

$$\% \text{ Moisture} = \frac{\text{Wet soil weight} - \text{dry soil weight}}{\text{wet soil weight}}$$

Calculate Dry Wt:

$$1 - \frac{\%\text{m}}{100} \times \text{Wet Weight} = \text{Dry Weight}$$

COMMENTS:

TECHNICIANS

pH: NA

% Moisture set-up: K Kowalik 8/18/88

% Moisture completion: K Kowalik 8/19/88

UPD/Supervisor: J Angeloni 8/19/88

SAMPLE NUMBER	LOG LINK	pH	CRUCIBLE WEIGHT (g)	CRUCIBLE & WET SOIL WEIGHT (g)	WET SOIL WEIGHT (g)	CRUCIBLE & DRY SOIL WEIGHT (g)	DRY SOIL WEIGHT (g)	PERCENT MOISTURE (%)
BG1323	24555		12.04	28.51	16.47	27.91	15.87	3.64 (4)
BG1324			11.47	15.86	4.39	15.58	4.11	6.38 (6)
BG1325			12.06	14.77	2.71	14.58	2.52	7.01 (7)
BG1329			11.67	14.76	3.09	14.63	2.96	4.21 (4)
BG1330			11.78	19.95	8.17	19.96	8.18	8.6 ~~0.12~~ (1)
~~BG1331~~			~~11.52~~	~~16.35~~	~~5.83~~	~~16.04~~	~~4.52~~	~~22.47~~
BG1332			11.72	15.98	4.26	15.75	4.03	5.40 (5)
BG1333			10.82	13.38	2.56	13.27	2.45	4.30 (4)
BG1334			11.11	13.50	2.39	13.40	2.29	4.18 (4)
BG1335			11.23	15.53	4.30	15.14	3.91	9.07 (9)
BG1336			10.94	13.50	2.56	13.24	2.30	10.16 (10)
~~BG1338~~			~~11.74~~	~~17.11~~	~~6.37~~	~~16.81~~	~~5.07~~	~~20.41~~
BG1331			11.52	16.35	4.83	16.04	4.52	6
BG1338			11.74	17.11	5.37	16.81	5.07	6

QC Batch # 9 7

CASE #

pH AND MOISTURE DETERMINATION

DATE: 8/12/88

% Moisture = (Wet soil weight − dry soil weight) / (wet soil weight) X

Calculate Dry W

$1 - \frac{\%m}{100} \times$ Wet W

= Dry Weig

COMMENTS:

TECHNICIANS

pH: N/A

% Moisture set-up: K Kowalik 8/12/88

% Moisture completion: K Kowalik 8/13/88

UPD/Supervisor: Lori Williams 8/1

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/20/88 SHIFT
FRACTION pp1000
INSTRUMENT "O"
TUNE FILE opci01
SEQUENCE FILE scm
METHOD FILE L000
ID FILE IA0008
ANALYST(S) Susan Christopher
SUPERVISOR
BATCH #'s QV9983

CR0008

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL. µl
p-bfb	25	18734	2
internal standard	25	19220	10
surrogates	25	19733	10
calib I	50	3344	2,5,10,15,20
calib II	50	3379	2,5,10,15,20
xl00	50	19351	2,5,10,15,20
updated for pp1000			

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
p-bfb	>A1474	2µl			17:40	ok	
QC9983V	>A1475	5ml	5		18:14	OK	Y
QC9983VS	>A1476	↓	6		18:58	OK 5µl calib I+II+xl00	
QC9983VS	>A1477	↓	7	QCAL	19:42	OK 5µl calib I+II+xl00	
p-BFB	>A1478	2µl	—		22:04	OK co 8/20	
BG1336V	>A1479	0.0004g	1	1:100	22:38	OK 1µl (1 4g/10ml)	Y
(R) BG1336V	>A1480	0.00004g	2		1:30	OK 1µl (4g/100ml)	Y
BG1336VS	>A1481	↓	3		2:14	OK 5µl Cal I,II,XVOA	
BG1336VR	>A1482	↓	4		2:57	OK 5µl Cal I,II,XVOA	
BG1338V	>A1483	↓	5			NG Too Dilute	
(R) BG1338V	>A1484	0.004g	6 7	1:10		NG 10µl (4g/10ml)	Y
BG0534V	>A1485	0.0001g	7 8	1:50,000	NOT RUN	5µl (0.5g/25ml)	
QC9983VS	>A1486	5ml	8 9			NG 5µl Cal I,II,XVOA	
QC9983V	>A1487	↓	9 10		7:28	OK	Y
p-BFB	>A1488	2µl	—		8:09	OK 242	
QC9983VS	>A1489	5ml	1			NG 5µl Cal I [illegible]	
QC9983VS	>A1490	5ml	2	QCAL	10:20 ~~QCAL~~	OK 5µl C[illegible]	
(R) BG0534V	>A1491	0.0001g	8	1:50,000	12:38	OK 5µl (0.5g/25ml)	Y
(R) BG1337V	>A1492	0.00004g	1	1:1000	13:50	OK See TIC	Y
BG0533V	>A1493	0.1g	2	1:50	14:34	OK rerun 1:100 for C35	
BG0545V	>A1494	0.05g	3	1:100	15:17	OK	
BG0639V	>A1495	0.005g	4	1:1000	16:04	OK for QV9933	
BG1345V	>A1496	0.04g	5		16:47	OK	Y
BG1349.1	>A1497	0.04g	6		17:31	OK	Y
BG1351	>A1498	0.04g	7		18:15	OK	Y

ETC FORM #122

A Subsidiary of Environmental Treatment and Technology Corp.

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE [illegible] SHIFT
FRACTION [illegible]
INSTRUMENT A
TUNE FILE [illegible]
SEQUENCE FILE [illegible]
METHOD FILE [illegible]
ID FILE IA0008
ANALYST(S) J. [illegible]

SUPERVISOR [illegible]
BATCH #'s QV9983

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
See page 1			
Page 2			

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
BG1343V	?A 400	004	8		18:59	OK	Y
BG1350V	?A 500	004	9			NOT RUN	
QC9983V	?A1501	5	11			OK pos check	
QC9983V	?A1502	↓	12			NG pos check	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp
The Environmental Services Co.

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 09/14/88
PAGE: 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below ETC Sample No.	Company	Facility	Sample Point	See Below Date
	WASTE MANAGEMENT, INC.	490	SS10L	

Parameters	Units	Sample Points, Sampling Dates, and ETC Sample No.'s							
		S SS10L 880808 BG0534							
Priority Poll. Volatiles GC/MS									
Trichloroethylene	ug/kg	4170000							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0535	WASTE MANAGEMENT, INC.	490	SSS10M	880808	1600	

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

284 RARITAN CENTER PARKWAY • EDISON, NJ 08837 (201) 225-5600

ETC

SEP 9, 1988
QV9980

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0535	WASTE MANAGEMENT, INC.	490	SSS10M	880808	1600	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
3V	Benzene	47.1	4.4	56.5	53.4	ND	50.0	219	ND	50.0	113
7V	Chlorobenzene	319	6.0	55.8	49.3	ND	50.0	113	ND	50.0	112
11V	Chloroform	881	1.6	45.5	53.0	ND	50.0	100	ND	50.0	91
19V	Ethylbenzene	465	7.2	51.2	51.3	ND	50.0	91	ND	50.0	102
25V	Toluene	1350	6.0	58.5	60.2	ND	50.0	103	ND	50.0	117
27V	1,1,1-Trichloroethane	30.6	3.8	49.2	57.6	ND	50.0	69	ND	50.0	98
29V	Trichloroethylene	549	1.9	49.3	54.4	ND	50.0	131	ND	50.0	99

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

ETC

AUG 26, 1988

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0535	WASTE MANAGEMENT, INC.	490	SSS10M	88080	1600	0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	106	81	117
p-Bromofluorobenzene	.250	105	74	121
1,2-Dichloroethane-D4	.250	111	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	[illegible]4	113
2-Fluor[illegible]enol	-		[illegible]	121
4,6-[illegible]bromop[illegible]nol	-			122
BASE NEUTR[illegible] FRAC[illegible] (GC/MS)				
Nitr[illegible]zene-[illegible]	-		[illegible]	
2-Fl[illegible]biph[illegible]l	-		30	115
Terp[illegible]yl-[illegible]		-	18	[illegible]
PESTI[illegible]DE/PCB [illegible]CTION (G[illegible]				
[illegible]utylch[illegible]rendate	-	-	[illegible]	

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/19/88 Time: 21:34

Lab ID: >E3304-115 Data Release Authorized By: J. BUERKART

Spectrum No: 115-102

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.73	15.73	Ok
75	30-60% of mass 95	43.56	43.56	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.19	6.19	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	98.30	98.30	Ok
175	5-9% of mass 174	7.53	7.66	Ok
176	95-101% of mass 174	99.16	100.88	Ok
177	5-9% of mass 176	6.80	6.86	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9980VS	>E3306	880819	23:17
QC9980VS	>E3309	880820	2:32
QC9980VS	~~>E3308~~ >E3310	880820	3:18
QC9980VS	~~>E3309~~ >E3313	880820	5:37
QC9980VS	~~>E3310~~ >E3314	880820	7:57
	J.B. 9-8-88		

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/20/88 Time: 20:34

Lab ID: >E3321-107 Data Release Authorized By: J. Burkart

Spectrum No: 107-95

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.21	15.21	Ok
75	30-60% of mass 95	42.74	42.74	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.42	6.42	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	97.94	97.94	Ok
175	5-9% of mass 174	7.11	7.26	Ok
176	95-101% of mass 174	97.87	99.93	Ok
177	5-9% of mass 176	6.60	6.74	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9980VS	> E3322	880820	21:38
QC9980V	> E3326	880821	3:25

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/21/88 Time: 04:29

Lab ID: >E3327-109 Data Release Authorized By: J. BURKART

Spectrum No: 109

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.86	15.86	Ok
75	30-60% of mass 95	43.32	43.32	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.45	7.45	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	98.17	98.17	Ok
175	5-9% of mass 174	6.75	6.88	Ok
176	95-101% of mass 174	95.36	97.14	Ok
177	5-9% of mass 176	6.70	7.03	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
BG0543V	> E3329	880821	5:43
BG0529VR	> E3331	880821	7:15
BG0535V	> E3332	880821	8:01
QC9980V	> E3334	880821	10:13
QC9980V	> E3336	880821	12:04
BG0543V	>E3328	880821	4:47

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/21/88 Time: 12:54

Lab ID: >E3337-109 Data Release Authorized By: J. Burkart

Spectrum No: 109

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.48	15.48	Ok
75	30-60% of mass 95	44.04	44.04	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.40	8.40	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	96.85	96.85	Ok
175	5-9% of mass 174	6.79	7.01	Ok
176	95-101% of mass 174	96.02	99.14	Ok
177	5-9% of mass 176	6.88	7.17	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9890VS	E3338	880821	13:15
BG0589VS	E3339	880821	15:46
BG0550V	E3340	880821	16:32
BG0535V	E3341	880821	17:18
BG0536V	E3342	880821	18:04

Form V

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

ORIGINAL

Seal No. 121079 ETC Job # _____

Date Sealed _____ By: MC

Company: WASTE MANAGEMENT, INC Attn.: KIRK STEMPLE

Facility/Site: VICKERY Phone: (419) 542 - 2791

Address: 3956 STATE ROUTE 412, VICKERY, OH 43464

SAMPLE IDENTIFICATION

Facility: [illegible] (Facility/Site Code) boring SS-10W at 4.5 - 6.0 feet (Optional Sample Point Descriptions)

Sample Point: S-SS1ØM (Source Code (from below) / Your Sample Point ID (left justify)) 880808 (Start Date (YY/MM/DD)) 1600 (Start Time (2400 hr clock)) 0 (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall .....(O) Bottom Sediment ....(B) Surface Impoundment ....(I) Leachate Collection Sys.....(C) Other .....
Soil ...(S) River/Stream ..(R) Generation Point ...(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify _____

SHUTTLE CONTENTS

BOTTLE				ANALYSIS	SAMPLER		LAB
No	Type	Size	Preserv.		Filt. (Y/N)	Observations	Observations
2	[illegible]	4[illegible]	None	Volatiles	N		✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) J Durrett Date: 8888 Time: 930
Signature: Jim Durrett Seal #: 121079 Intact: yes

2. I have received these materials in good condition from the above person.
Name: _____ Signature: _____
Date: _____ Time: _____ Remarks: _____

3. I have received these materials in good condition from the above person.
Name: _____ Signature: _____
Date: _____ Time: _____ Remarks: _____

4. Shuttle Sealed By: (print) Jim Durrett Date: 8-10-88 Time: 9:00
Signature: Jim Durrett Seal #: 121082 Intact: yes

LAB USE ONLY Opened By: [illegible] Date: 8/12/88 Time: 1:00P
SHUTTLE # 1127 TEMP/C 40 SEAL # 121082 COND. Intact

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # BG 05-35-

Sample Point S (Source Code) SS 10M (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD) | START PURGE (2400 Hr Clock) | ELAPSED HRS | WATER VOL. IN CASING (Gallons) | VOLUME PURGED (Gallons)

SAMPLING METHOD: Split spoon

Sampler Type: X — A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel — X-Other: split spoon (SPECIFY OTHER)

Sampler Material: B — A-Teflon, B-Metal, C-PVC, D-Plastic — X-Other: (SPECIFY OTHER)

Tubing Material: NA — A-Teflon, B-Tygon, C-Polyethylene, D-Silicon — X-Other: (SPECIFY OTHER)

Sample Composited: Y/N (N circled) — Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl)

Depth to Ground water (ft)

Groundwater Elevation (ft msl)

Well Depth (ft)

Sample Depth (non-well) (ft)

	ph	(STD)	spec. cond.	um/cm at 25°C	(other parameter)	value	units
1st					HNU	70	ppm
2nd							
3rd							
4th							

Sample Temp (°C) | Turbidity NTU

FIELD COMMENTS

Sample Appearance: black & brown clayey silt, some fine sand

Weather Conditions: warm, overcast, windy

Other:

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: (Print) Jim Durrett Employer: Golder Associates

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8-8-88 (Date) Jim Durrett (Signature)

ORIGINAL

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/20/88 SHIFT -
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE ECE
METHOD FILE VOAE
ID FILE IE0002
ANALYST(S) Ellyn Curcio

SUPERVISOR Pearl Trant
BATCH #'s QV9980

(PLEASE INITIAL) CE0002

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LO VOL.
P-BFB	25	18734	2ul
INT. ST.	25	19754	10ul
SURR.	25	19734	10ul
CAL. I.	50	3387	2,5,10,15,
CAL. II.	50	3388	↓
XVOA	50	19351	

P1.

NAME	DATA FILE	uL INJ	ALS #	DIL	~~TAPE #~~ TIME	SPECIALS (WRITE A-TYPE)	PLU Y/N
P-BFB	>E3304	2ul	—		21:34	OK	
QC9980 VS	>E3306	5ml	10		23:17	OK 5ul Cal. I, II, XVOA	
QC9980 VS	>E3309	↓	8	CBUPD	02:32	OK 15	
QC9980 VS	>E3310		9	CBCAL	03:18	OK 10	
QC9980 VS	>E3313		10	CBMRG	05:37	OK 20	
QC9980 VS	>E3314	↓	10		07:57	OK 2 ↓	
QC9980 V	>E3315	5ml	9	—	—	ng - high surr.	
P-BFB	>E3316	2ul	—		09:52	OK (ran before E3315)	
QC9980 V	>E3317	5ml	9	—	—	ng - surr out	
QC9980 V	>E3318	5ml	9		—	ng - surr. out	
QC9980 VS	>E3319	5ml	10		—	ng 5ul. Cal I, II, XVOA	
QC9980 VS	>E3320	5ml	10			↓	
P-BFB	>E3321	2ul	—		20:34	OK. 107-95	
QC9980 Vs	>E3322	5ML	9	QCAL	21:38	5ul Cal I, II, XVOA	
QC9980 V	>E3323	5ML	10			NG	
QC9980 V	>E3324	5ML	8			NG Blank	
QC9980 V	>E3325	5ML	8		Leaked	NG Blank	
QC9980 V	>E3326	5ML	8		3:25	OK	
P-BFB	>E3327	2ul	—		4:29	OK. 109	
(R) BG0543 V	>E3328	0.02g	4	1:250	OK ~~No. Too dilute~~	For QV9967 BH 8/21	
(R) BG0529 V	>E3329	5g	5		5:43	OK	
BG0529 VS	>E3330	↓	6			NG	
BG0529 VR	>E3331		7		7:15	OK	
BG0535 V	>E3332		8		8:01	OK rerun 1:20 14, 16, 2	
BG0536 V	>E3333	↓	9			Not rerun 1:100 possible carry	

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/21/88 SHIFT
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE EEE
METHOD FILE VOAE
ID FILE IE0002
ANALYST(S) B Hawkins

SUPERVISOR Pearl Trant.
BATCH #'s QV9980

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
See pg #1			

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
QC9980V	>E3334	5ml	8		10:13	OK	
QC9980V	>E3335	↓	9		10:59	~~OK~~ NG BH 8/21/88	
QC9980V	>E3336	↓	9		12:04	OK	
p-BFB	>E3337	2µl	–		12:54	OK	
QC9980VS	>E3338	5grms	9	QCAL→	13:15	5µl stds	
(e) BG0529VS	>E3339	↓	4		15:46	OK ↓	
BG0550V	>E3340	↓	5		16:32	OK	
(e) BG0535V	>E3341	.05g	6	1:100	17:18	OK	
(e) BG0536V	>E3342	↓	7	1:100	18:04	OK	

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 09/12/88
PAGE: 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	490	SS10M	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Sample Points, Sampling Dates, and ETC Sample No.'s

Parameters	*Units*	SS10M 880808 BG0535							
Priority Poll. Volatiles GC/MS									
Benzene	ug/kg	47.1							
Chlorobenzene	ug/kg	319							
Chloroform	ug/kg	881							
Ethylbenzene	ug/kg	465							
Toluene	ug/kg	1350							
1,1,1-Trichloroethane	ug/kg	30.6							
Trichloroethylene	ug/kg	549							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports						
BG0536	WASTE MANAGEMENT, INC.	490	SSS10N	880808	1600	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

ETC

AUG 25, 1988
QV9980

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0536	WASTE MANAGEMENT, INC.	490	SSS10N	880808	1600	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
3V	Benzene	ND	440	56.5	53.4	ND	50.0	219	ND	50.0	113
7V	Chlorobenzene	861	600	55.8	49.3	ND	50.0	113	ND	50.0	112
11V	Chloroform	2190	160	45.5	53.0	ND	50.0	100	ND	50.0	91
19V	Ethylbenzene	1010	720	51.2	51.3	ND	50.0	91	ND	50.0	102
25V	Toluene	2570	600	58.5	60.2	ND	50.0	103	ND	50.0	117
27V	1,1,1-Trichloroethane	ND	380	49.2	57.6	ND	50.0	69	ND	50.0	98
29V	Trichloroethylene	ND	190	49.3	54.4	ND	50.0	131	ND	50.0	99

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

ETC

AUG [illegible] 1988

TA[illegible]E 2: METHOD PERFORMANCE DA[illegible]
[illegible]rro[illegible]te Recovery Soil – GC/M[illegible] Data (G[illegible]20)

Chain c[illegible]stody Data Required [illegible] TC Data Manageme[illegible] [illegible]mary Re[illegible]rts						
BG0536	WASTE [illegible]AGEMENT, INC.	490	[illegible]	[illegible]80	1600	0
ET[illegible] Sample No.	Company	Facility	[illegible] Point	[illegible]	Time	Elapse Hour

Compound	Amount added ug	% Re[illegible]ery	[illegible] EPA Control Limits	
			Lower	Upper
[illegible]LATILE FRACTION (GC/[illegible]				
Toluene-D8	.250	[illegible]7	81	11[illegible]
p-B[illegible]omofluorobenze[illegible]	.250	[illegible]2	[illegible]	1[illegible]
1,2-Dichloroethane-D4	.250	79	[illegible]	12[illegible]
ACID FRACTION (GC/MS)				
Phenol-D5	-		24	113
2-Fluorophenol	-		25	121
2,[illegible]6-Tribromophenol	-		[illegible]	122
BASE/N[illegible]UTRAL [illegible]CTION (GC/MS)				
Nitroben[illegible]-D5	-		[illegible]	12[illegible]
[illegible]-Fluorobiphenyl		-	30	11[illegible]
Terphe[illegible]l-D14	-		18	13[illegible]
P[illegible]TICID[illegible] [illegible]CB FRACTION (GC)				
Dibutylchlorendate			[illegible]	15[illegible]

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/19/88 Time: 21:34

Lab ID: >E3304-115 Data Release Authorized By: J. BURKART

Spectrum No: 115-102

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.73	15.73	Ok
75	30-60% of mass 95	43.56	43.56	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.19	6.19	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	98.30	98.30	Ok
175	5-9% of mass 174	7.53	7.66	Ok
176	95-101% of mass 174	99.16	100.88	Ok
177	5-9% of mass 176	6.80	6.86	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9980VS	>E3306	880819	23:17
QC9980VS	>E3309	880820	2:32
QC9980VS	~~>E3308~~ >E3310	880820	3:18
QC9980VS	~~>E3309~~ >E3313	880820	5:37
QC9980VS	~~>E3310~~ >E3314	880820	7:57
	J.B. 9-8-88		

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: Contractor: ETC Corp. Contract No.:

Instrument ID: E Date: 08/20/88 Time: 20:34

Lab ID: >E3321-107 Data Release Authorized By: J. BUCKLAND

Spectrum No: 107-95

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.21	15.21	Ok
75	30-60% of mass 95	42.74	42.74	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.42	6.42	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	97.94	97.94	Ok
175	5-9% of mass 174	7.11	7.26	Ok
176	95-101% of mass 174	97.87	99.93	Ok
177	5-9% of mass 176	6.60	6.74	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9980VS	> E3322	880820	21:38
QC9980V	> E3326	880821	3:25

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

ase No.: _____ Contractor: ETC Corp. Contract No.: _____

nstrument ID: E Date: 08/21/88 Time: 04:29

ab ID: >E3327-109 Data Release Authorized By: J. BURKART

pectrum No: 109

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.86	15.86	Ok
75	30-60% of mass 95	43.32	43.32	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.45	7.45	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	98.17	98.17	Ok
175	5-9% of mass 174	6.75	6.88	Ok
176	95-101% of mass 174	95.36	97.14	Ok
177	5-9% of mass 176	6.70	7.03	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
BG0543V	> E3329	880821	5:43
BG0529VR	> E3331	880821	7:15
BG0535V	> E3332	880821	8:01
QC9980V	> E3334	880831	10:13
QC9980V	> E3336	880831	12:04
BG0543V	>E3328	880821	4:47

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/21/88 Time: 12:54

Lab ID: >E3337-109 Data Release Authorized By: J. BURKART

Spectrum No: 109

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.48	15.48	Ok
75	30-60% of mass 95	44.04	44.04	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.40	8.40	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	96.85	96.85	Ok
175	5-9% of mass 174	6.79	7.01	Ok
176	95-101% of mass 174	96.02	99.14	Ok
177	5-9% of mass 176	6.88	7.17	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9890VS	E3338	880821	13:15
BG0529VS	E3339	880821	15:46
BG0550V	E3340	880821	16:32
BG0535V	E3341	880821	17:18
BG0536V	E3342	880821	18:04

Form V

ETC

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

ORIGINAL

Seal No. 121079 ETC Job # [illegible]

Date Sealed [illegible] By: MC

Company: WASTE MANAGEMENT, INC. Attn.: KIRK STEMPLE

Facility/Site: VICKERY Phone: (419) 542-2291

Address: 3956 STATE ROUTE 412, VICKERY, OH 43464

SAMPLE IDENTIFICATION

Facility: [illegible] (Facility/Site Code) Boring SS-10W at 6 to 7.5 feet (Optional Sample Point Descriptions)

Sample Point: S-SS10N (Source Code (from below) / Your Sample Point ID (left justify)) 880808 (Start Date (YY/MM/DD)) 1600 (Start Time (2400 hr. clock)) 0 (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other ..
Soil ...(S) River/Stream..(R) Generation Point....(G) Treatment Facility.....(T) Lake/Ocean.....(L) Specify

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	SAMPLER Observations	LAB Observation
2	[illegible]	All	None	Volatiles	NA		✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) J Durrett Date: 8888 Time: 930
Signature: Jim Durrett Seal #: 121079 Intact: yes

2. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) Jim Durrett Date: 8-10-88 Time: 9:00
Signature: Jim Durrett Seal #: 121082 Intact: yes

LAB USE ONLY Opened By: A. Stensler Date: 8/12/88 Time: 1:00 P.
SHUTTLE # 1127 TEMP. °C 40 SEAL # 121082 COND. Intact

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # BG 0536

Sample Point S SS1 ON
Source Code / Sample Point I D

FIELD PROCEDURES

PURGE DATE (YY MM DD) | START PURGE (2400 Hr Clock) | ELAPSED HRS | WATER VOL. IN CASING (Gallons) | VOLUME PURGED (Gallons)

SAMPLING METHOD: split spoon

Sampler Type X — A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel — X-Other split spoon (SPECIFY OTHER)

Sampler Material B — A-Teflon, B-Metal, C-PVC, D-Plastic — X-Other (SPECIFY OTHER)

Tubing Material NA — A-Teflon, B-Tygon, C-Polyethylene, D-Silicon — X-Other (SPECIFY OTHER)

Sample Composited Y/N (P) Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) | Well Depth (ft)

Depth to Ground water (ft) | Sample Depth (non-well) (ft)

Groundwater Elevation (ft msl)

	ph	(STD)	spec. cond.	um/cm at 25° C	(other parameter)	value	units
1st					HNU	55	ppm
2nd							
3rd							
4th							

Sample Temp (°C) | Turbidity NTU

FIELD COMMENTS

Sample Appearance: laminated black and brown clayey silt, some sand

Weather Conditions: warm, windy, overcast

Other:

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Jim Durrett (Print) Employer: Golder Associates

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8-8-88 (Date) Jim Durrett (Signature)

ORIGINAL

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/20/88 SHIFT
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE ECE
METHOD FILE VOAE
ID FILE IE0002
ANALYST(S) Ellen Curcio

SUPERVISOR Paul Trent
BATCH #'s QV9980

(PLEASE INITIAL) CE0002

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LC VO.
P-BFB	25	18734	2ul
INT. ST.	25	19754	10ul
SURR.	25	19734	10ul
CAL. I.	50	3387	25,10,15
CAL. II.	50	3388	↓
XVOA	50	19357	

NAME	DATA FILE	uL INJ	ALS #	DIL	~~TAPE #~~ TIME	SPECIALS (WRITE A-TYPE)	PLU Y/N
P-BFB	>E3304	2ul	—		21:34	OK	
QC9980 VS	>E3306	5ml	10		23:17	OK 5ul Cal. I, II, XVOA	
QC9980 VS	>E3309	↓	8	CBUPD	02:32	OK 15	
QC9980 VS	>E3310	↓	9	CBCAL	03:18	OK 10	
QC9980 VS	>E3313	↓	10	CBMBG	05:37	OK 20	
QC9980 VS	>E3314	↓	10		07:57	OK 2	
QC9980 V	>E3315	5ml	9	—	—	ng - high surr.	
P-BFB	>E3316	2ul	—		09:52	OK (ran before E3315)	
QC9980 V	>E3317	5ml	9	—	—	ng - surr out	
QC9980 V	>E3318	5ml	9		—	ng - surr. out	
QC9980 VS	>E3319	5ml	10		—	ng 5ul. Cal I, II, XVOA	
QC9980 VS	>E3320	5ml	10			↓	
P-BFB	>E3321	2ul	—		20:34	OK. 107-95	
QC9980 VS	>E3322	5ML	9	QCAL	21:38	5ul Cal I, II, XVOA	
QC9980 V	>E3323	5ML	10			NG	
QC9980 V	>E3324	5ML	8			NG Blank	
QC9980 V	>E3325	5ML	8		Leaked	NG. Blank	
QC9980 V	>E3326	5ML	8		3:25	OK	
P-BFB	>E3327	2ul	—		4:29	OK. 109	
(R) BG0543 V	>E3328	0.02g	4	1:250	~~No. The dilute~~ OK	For QV9967 BH 8/21/8	
(R) BG0529 V	>E3329	5g	5		5:43	OK	
BG0529 VS	>E3330	↓	6			NG	
BG0529 VR	>E3331	↓	7		7:15	OK	
BG0535 V	>E3332	↓	8		8:01	OK rerun 1:20 14, 16, 4	
BG0536 V	>E3333	↓	9			Neg rerun 1:100 possible carry	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/21/88 SHIFT
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE EEE
METHOD FILE VOAE
ID FILE IE0002
ANALYST(S) B Hawkins

SUPERVISOR Carl Trent.
BATCH #'s QV9980

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
See pg #1			

	NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
	QC9980V	>E3334	5ml	8		10:13	OK	
	QC9980V	>E3335	↓	9		10:59	OK NG BH 8/21/88	
	QC9980V	>E3336	↓	9		12:04	OK	
	p-BFB	>E3337	2ul	–		12:54	OK	
	QC9980VS	>E3338	5gms	9	QXAL→	13:15	5ul stds	
(e)	BG0529VS	>E3339	↓	4		15:46	OK ↓	
	BG0550V	>E3340	↓	5		16:32	OK	
(e)	BG0535V	>E3341	.05g	6	1:100	17:18	OK	
(e)	BG0536V	>E3342	↓	7	1:100	18:04	OK	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 09/12/88
PAGE: 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	490	SS10N	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		S SS10N 880808 BG0536							
Priority Poll. Volatiles GC/MS									
Chlorobenzene	ug/kg	861							
Chloroform	ug/kg	2190							
Ethylbenzene	ug/kg	1010							
Toluene	ug/kg	2570							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports						
BG0550	WASTE MANAGEMENT, INC.	490	SSS10Q	B80809	0900	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Swep T. Davis

President

This Technical Report is an INSITE™ service generated by LODESTAR™ Data Management Software.

284 RARITAN CENTER PARKWAY • EDISON, NJ 08837 (201) 225-5600

ETC

SEP 8, 1988
QV9980

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0550	WASTE MANAGEMENT, INC.	490	SSS10Q	880809	0900	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
3V	Benzene	5.62	4.4	56.5	53.4	ND	50.0	219	ND	50.0	113
7V	Chlorobenzene	ND	6.0	55.8	49.3	ND	50.0	113	ND	50.0	112
11V	Chloroform	41.6	1.6	45.5	53.0	ND	50.0	100	ND	50.0	91
19V	Ethylbenzene	ND	7.2	51.2	51.3	ND	50.0	91	ND	50.0	102
25V	Toluene	19.1	6.0	58.5	60.2	ND	50.0	103	ND	50.0	117
27V	1,1,1-Trichloroethane	ND	3.8	49.2	57.6	ND	50.0	69	ND	50.0	98
29V	Trichloroethylene	12.4	1.9	49.3	54.4	ND	50.0	131	ND	50.0	99

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

ETC

SEP 8, 1988

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil – GC/MS Data (QC20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0550	WASTE MANAGEMENT, INC.	490	SSS10Q	88080	0900	0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits Lower	IFB EPA Control Limits Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	107	81	117
p-Bromofluorobenzene	.250	90	74	121
1,2-Dichloroethane-D4	.250	70	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	-	-	23	120
2-Fluorobiphenyl	-	-	30	115
Terphenyl-D14	-	-	18	137
PESTICIDE/PCB FRACTION (GC)				
Tetrachlorodibutylchlorendate	-	-	20**	150**

** Advisory Limits Only

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

ase No.: _____ Contractor: ETC Corp. Contract No.: _____

nstrument ID: E Date: 08/19/88 Time: 21:34

ab ID: >E3304-115 Data Release Authorized By: J. Burkart

pectrum No: 115-102

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.73	15.73	Ok
75	30-60% of mass 95	43.56	43.56	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.19	6.19	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	98.30	98.30	Ok
175	5-9% of mass 174	7.53	7.66	Ok
176	95-101% of mass 174	99.16	100.88	Ok
177	5-9% of mass 176	6.80	6.86	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9980VS	>E3306	880819	23:17
QC9980VS	>E3309	880820	2:32
QC9980VS	~~>E3308~~ >E3310	880820	3:18
QC9980VS	~~>E3309~~ >E3313	880820	5:37
QC9980VS	~~>E3310~~ >E3314	880820	7:57
	J.B. 9-8-88		

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/20/88 Time: 20:34

Lab ID: >E3321-107 Data Release Authorized By: J. BUCKART

Spectrum No: 107-95

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.21	15.21	Ok
75	30-60% of mass 95	42.74	42.74	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.42	6.42	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	97.94	97.94	Ok
175	5-9% of mass 174	7.11	7.26	Ok
176	95-101% of mass 174	97.87	99.93	Ok
177	5-9% of mass 176	6.60	6.74	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9980VS	> E3322	880820	21:38
QC9980V	> E3326	880821	3:25

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/21/88 Time: 04:29

Lab ID: >E3327-109 Data Release Authorized By: J. BURKART

Spectrum No: 109

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.86	15.86	Ok
75	30-60% of mass 95	43.32	43.32	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.45	7.45	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	98.17	98.17	Ok
175	5-9% of mass 174	6.75	6.88	Ok
176	95-101% of mass 174	95.36	97.14	Ok
177	5-9% of mass 176	6.70	7.03	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
BG0543V	> E3329	880821	5:43
BG0529VR	> E3331	880821	7:15
BG0535V	> E3332	880821	8:01
QC9980V	> E3334	880821	10:13
QC9980V	> E3336	880821	12:04
BG0543V	> E3328	880821	4:47

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/21/88 Time: 12:54

Lab ID: >E3337-109 Data Release Authorized By: J. Burkart

Spectrum No: 109

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.48	15.48	Ok
75	30-60% of mass 95	44.04	44.04	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.40	8.40	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	96.85	96.85	Ok
175	5-9% of mass 174	6.79	7.01	Ok
176	95-101% of mass 174	96.02	99.14	Ok
177	5-9% of mass 176	6.88	7.17	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9890VS	E3338	880821	13:15
BG0529VS	E3339	880821	15:46
BG0550V	E3340	880821	16:32
BG0535V	E3341	880821	17:18
BG0536V	E3342	880821	18:04

ETC

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

Seal No. 121083 ETC Job # [illegible]

Date Sealed [illegible] By: MC

Company: WASTE MANAGEMENT, INC Attn.: KIRK STEMPLE

Facility/Site: VICKERY Phone: (419) 547 - 7291

Address: 3956 STATE ROUTE 412, VICKERY, OH 43464

SAMPLE IDENTIFICATION

Facility: [illegible] (Facility/Site Code) Boring SS-10W at 10.5 to 12 Feet (Optional Sample Point Descriptions)

Sample Point: S-SS10Q (Source Code (from below) / Your Sample Point ID (left justify)) 880809 (Start Date (YY/MM/DD)) 0900 (Start Time (2400 hr clock)) 0 (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment....(I) Leachate Collection Sys....(C) Other ....
Soil ...(S) River/Stream..(R) Generation Point ...(G) Treatment Facility .....(T) Lake/Ocean ...(L) Specify

SHUTTLE CONTENTS

BOTTLE				ANALYSIS	SAMPLER		LAB
No	Type	Size	Preserv.		Filt. (Y/N)	Observations	Observatio
2	VOA	40	None	Volatiles	NA		✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) J Durrett Date: 8888 Time: 92[illegible]
Signature: Jim Durrett Seal #: 121083 Intact: yes

2. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) J Durrett Date: 8-10-88 Time: 9:00
Signature: Jim Durrett Seal #: 121082 Intact: ye

LAB USE ONLY Opened By: A. Stensler Date: 8/12/88 Time: 1:00
SHUTTLE # 1127 TEMP. °C 40 SEAL # 121082 COND. Intact

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # BG0550

Sample Point [5] SS1ØQ
Source Code — Sample Point I.D.

FIELD PROCEDURES

PURGE DATE (YY MM DD) | START PURGE (2400 Hr Clock) | ELAPSED HRS | WATER VOL. IN CASING (Gallons) | VOLUME PURGED (Gallons)

SAMPLING METHOD: split spoon

Sampler Type [X] A-Submersible Pump B-ISCO C-Bladder Pump D-Dipper/Bottle E-Bailer F-Scoop/Shovel X-Other split spoon (SPECIFY OTHER)

Sampler Material [B] A-Teflon B-Metal C-PVC D-Plastic X-Other (SPECIFY OTHER)

Tubing Material [NA] A-Teflon B-Tygon C-Polyethylene D-Silicon X-Other (SPECIFY OTHER)

Sample Composited [Y/N] Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl)
Depth to Ground water (ft)
Groundwater Elevation (ft msl)
Well Depth (ft)
Sample Depth (non-well) (ft)

	ph	(STD)	spec. cond.	um/cm at 25° C	(other parameter)	value	units
1st					HNU	10	ppm
2nd							
3rd							
4th							

Sample Temp (°C) Turbidity NTU

FIELD COMMENTS

Sample Appearance: brown and dark gray silty clay with buff medium sand lense

Weather Conditions: warm, windy, overcast

Other:

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Jim Durrett (Print) Employer: Golder Associates

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8-9-88 (Date) Jim Durrett (Signature)

ORIGINAL

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/20/88 SHIFT -
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE ECE
METHOD FILE VOAE
ID FILE IE0002
ANALYST(S) Ellyn Curcio

SUPERVISOR Pearl Trant
BATCH #'s QV9980

(PLEASE INITIAL) CE0002

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL
P-BFB	25	18734	2ul
INT. ST.	25	19754	10ul
SURR.	25	19734	10ul
CAL. I.	50	3387	2,5,10,15
CAL. II.	50	3388	↓
XVOA	50	19351	↓

P1.

NAME	DATA FILE	uL INJ	ALS #	DIL	~~TAPE #~~ TIME	SPECIALS (WRITE A-TYPE)	PLUS Y/N
P-BFB	>E3304	2ul	—		21:34	OK	
QC9980 VS	>E3306	5ml	10		23:17	OK 5ul Cal. I, II, XVOA	
QC9980 VS	>E3309	↓	8	CBUPD	02:32	OK 15	
QC9980 VS	>E3310	↓	9	CBCAL	03:18	OK 10	
QC9980 VS	>E3313	↓	10	CBMRG.	05:37	OK 20	
QC9980 VS	>E3314	↓	10		07:57	OK 2 ↓	
QC9980 V	>E3315	5ml	9	—	—	ng - high surr.	
P-BFB	>E3316	2ul	—		09:52	OK (ran before E3315)	
QC9980 V	>E3317	5ml	9	—	—	ng - surr out	
QC9980 V	>E3318	5ml	9		—	ng - surr. out	
QC9980 VS	>E3319	5ml	10		—	ng 5ul. Cal I, II, XVOA	
QC9980 VS	>E3320	5ml	10			↓	
P-BFB	>E3321	2ul	—		20:34	OK. 107-95	
QC9980 Vs	>E3322	5ML	9	QCAL	21:38	5ul Cal I, II, XVOA	
QC9980 V	>E3323	5ML	10			NG	
QC9980 V	>E3324	5ML	8			NG Blank	
QC9980 V	>E3325	5ML	8		Leaked	NG Blank	
QC9980 V	>E3326	5ML	8		3:25	OK	
P-BFB	>E3327	2ul	—		4:29	OK. 109	
(R) BG0543 V	>E3328	0.02g	4	1:250	OK ~~No. Tra dilute~~	For QV9967 BH	8/21/8
(R) BG0529 V	>E3329	5g	5		5:43	OK	
BG0529 VS	>E3330	↓	6			NG	
BG0529 VR	>E3331	↓	7		7:15	OK	
BG0535 V	>E3332	↓	8		8:01	OK rerun 1:20 14, 16,	
BG0536 V	>E3333	↓	9			No rerun 1:100 possible carry out	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC ENVIRONMENTAL TESTING and CERTIFICATION

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports						
BG0529	WASTE MANAGEMENT, INC.	490	SSS10V	880810	1530	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

334 RARITAN CENTER PARKWAY • EDISON, NJ 08837 (201) [illegible]

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/21/88 SHIFT
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE EEE
METHOD FILE VOAE
ID FILE IE0002
ANALYST(S) B Hawkins

SUPERVISOR Carl Trout.
BATCH #'s QV9980

STANDARD	CONC PPM	LOT NO.	LOT VOL.
See pg #1			

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

	NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
	QC9980V	>E3334	5ml	8		10:13	OK	
	QC9980V	>E3335	↓	9		10:59	OK NG DIL 8/21/88	
	QC9980V	>E3336	↓	9		12:04	OK	
	p-BFB	>E3337	2µl	–		12:54	OK	
	QC9980VS	>E3338	5gms	9	QXAL→	13:15	5µl stds	
(e)	BG0529VS	>E3339	↓	4		15:46	OK ↓	
	BG0550V	>E3340	↓	5		16:32	OK	
(e)	BG0535V	>E3341	.05g	6	1:100	17:18	OK	
(e)	BG0536V	>E3342	↓	7	1:100	18:04	OK	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 09/12/88
PAGE: 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	490	SS10Q	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		SS10Q 880809 BG0550							
Priority Poll. Volatiles GC/MS									
Benzene	ug/kg	5.62							
Chloroform	ug/kg	41.6							
Toluene	ug/kg	19.1							
Trichloroethylene	ug/kg	12.4							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC

AUG 25, 1988
QV9980

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0529	WASTE MANAGEMENT, INC.	490	SSS10V	880810	1530	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen. Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen. Added ug/kg	% Recov
3V	Benzene	ND	4.4	56.5	53.4	ND	50.0	219	ND	50.0	113
7V	Chlorobenzene	ND	6.0	55.8	49.3	ND	50.0	113	ND	50.0	112
11V	Chloroform	ND	1.6	45.5	53.0	ND	50.0	100	ND	50.0	91
19V	Ethylbenzene	ND	7.2	51.2	51.3	ND	50.0	91	ND	50.0	102
25V	Toluene	ND	6.0	58.5	60.2	ND	50.0	103	ND	50.0	117
27V	1,1,1-Trichloroethane	ND	3.8	49.2	57.6	ND	50.0	69	ND	50.0	98
29V	Trichloroethylene	ND	1.9	49.3	54.4	ND	50.0	131	ND	50.0	99

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

ETC

AUG 25, 1988

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0529	WASTE MANAGEMENT, INC.	490	SSS10V	88081	1530	0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	107	81	117
p-Bromofluorobenzene	.250	90	74	121
1,2-Dichloroethane-D4	.250	76	70	121
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	24	113
2-Fluorophenol	-	-	25	121
2,4,6-Tribromophenol	-	-	19	122
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	-	-	23	120
2-Fluorobiphenyl	-	-	30	115
Terphenyl-D14	-	-	18	137
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	20**	150**

** Advisory Limits Only

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/19/88 Time: 21:34

Lab ID: >E3304-115 Data Release Authorized By: J. Buckart

Spectrum No: 115-102

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.73	15.73	Ok
75	30-60% of mass 95	43.56	43.56	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.19	6.19	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	98.30	98.30	Ok
175	5-9% of mass 174	7.53	7.66	Ok
176	95-101% of mass 174	99.16	100.88	Ok
177	5-9% of mass 176	6.80	6.86	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9980VS	>E3306	880819	23:17
QC9980VS	>E3309	880820	2:32
QC9980VS	~~>E3308~~ >E3310	880820	3:18
QC9980VS	~~>E3309~~ >E3313	880820	5:37
QC9980VS	~~>E3310~~ >E3314	880820	7:57
	T.B. 9-8-88		

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/20/88 Time: 20:34

Lab ID: >E3321-107 Data Release Authorized By: J. BUCKART

Spectrum No: 107-95

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.21	15.21	Ok
75	30-60% of mass 95	42.74	42.74	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.42	6.42	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	97.94	97.94	Ok
175	5-9% of mass 174	7.11	7.26	Ok
176	95-101% of mass 174	97.87	99.93	Ok
177	5-9% of mass 176	6.60	6.74	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9980VS	>E3322	880820	21:38
QC9980V	>E3326	880821	3:35

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

ase No.: _____ Contractor: ETC Corp. Contract No.: _____

nstrument ID: E Date: 08/21/88 Time: 04:29

ab ID: >E3327-109 Data Release Authorized By: J. BURKART

pectrum No: 109

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.86	15.86	Ok
75	30-60% of mass 95	43.32	43.32	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.45	7.45	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	98.17	98.17	Ok
175	5-9% of mass 174	6.75	6.88	Ok
176	95-101% of mass 174	95.36	97.14	Ok
177	5-9% of mass 176	6.70	7.03	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
BG0543V	> E3329	880821	5:43
BG0529VR	> E3331	880821	7:15
BG0535V	> E3332	880821	8:01
QC9980V	> E3334	880821	10:13
QC9980V	> E3336	880821	12:04
BG0543V	> E3328	880821	4:47

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/21/88 Time: 12:54

Lab ID: >E3337-109 Data Release Authorized By: J. Burkart

Spectrum No: 109

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	15.48	15.48	Ok
75	30-60% of mass 95	44.04	44.04	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.40	8.40	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	96.85	96.85	Ok
175	5-9% of mass 174	6.79	7.01	Ok
176	95-101% of mass 174	96.02	99.14	Ok
177	5-9% of mass 176	6.88	7.17	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC98905	E3338	880821	13:15
BG0529VS	E3339	880821	15:46
BG0550V	E3340	880821	16:32
BG0535V	E3341	880821	17:18
BG0536V	E3342	880821	18:04

Form V

ETC

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

ORIGINAL

Seal No. 121079 ETC Job # [illegible]

Date Sealed [illegible] By: MC.

Company: WASTE MANAGEMENT, INC Attn.: KIRK STEMPLE

Facility/Site: VICKERY Phone: (419) 542 - 7291

Address: 3956 STATE ROUTE 412, VICKERY, OH 43464

SAMPLE IDENTIFICATION

Facility: 490 (Facility/Site Code) boring SS-10W at 18-19.5 feet (Optional Sample Point Descriptions)

Sample Point: S-SS10V (Source Code (from below) / Your Sample Point ID (left justify)) 880810 (Start Date (YY/MM/DD)) 1530 (Start Time (2400 hr. clock)) 0 (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other ...
Soil ..(S) River/Stream..(R) Generation Point....(G) Treatment Facility.....(T) Lake/Ocean .....(L) Specify

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	SAMPLER Observations	LAB Observation
2	VOA	40	None	Volatiles	N		✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) J Durrett Date: 8888 Time: 930
Signature: Jim Durrett Seal #: 121079 Intact: yes

2. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) Jim Durrett Date: 8-10-88 Time: 9:00 p
Signature: Jim Durrett Seal #: 121082 Intact: yes

LAB USE ONLY Opened By: [illegible] Date: 8/12/88 Time: 1:00
SHUTTLE # 1127 TEMP. °C 4° SEAL # 121082 COND. Intact

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # BG 0529

Sample Point S (Source Code) SS1ØV (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)

SAMPLING METHOD: split spoon

Sampler Type: X — A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel — X-Other: split spoon (SPECIFY OTHER)

Sampler Material: B — A-Teflon, B-Metal, C-PVC, D-Plastic — X-Other: (SPECIFY OTHER)

Tubing Material: NA — A-Teflon, B-Tygon, C-Polyethylene, D-Silicon — X-Other: (SPECIFY OTHER)

Sample Composited: Y/N (N circled) — Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) ____ Well Depth (ft) ____

Depth to Ground water (ft) ____ Sample Depth (non-well) (ft) ____

Groundwater Elevation (ft msl) ____

	ph		spec. cond.		(other parameter)	value	units
1st		(STD)		um/cm at 25° C	HNU	0	ppm
2nd		(STD)		um/cm at 25°C			
3rd		(STD)		um/cm at 25°C			
4th		(STD)		um/cm at 25°C			

Sample Temp ____ (°C) Turbidity ____ NTU

FIELD COMMENTS

Sample Appearance: gray clay

Weather Conditions: warm, sunny

Other:

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Jim Durrett (Print) Employer: Golder Associates

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8-10-88 (Date) Jim Durrett (Signature)

ORIGINAL

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/20/88 SHIFT
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE ECE
METHOD FILE VOAE
ID FILE IE0002
ANALYST(S) Ellen Curcio

SUPERVISOR Peri Trent
BATCH #'s QV9980

(PLEASE INITIAL) CE0002

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
P-BFB	25	18734	2ul
INT. ST.	25	19754	10ul
SURR.	25	19734	10ul
CAL. I.	50	3387	25,10,15,2
CAL. II.	50	3388	↓
XVOA	50	19357	↓

P1.

NAME	DATA FILE	uL INJ	ALS #	DIL	~~TAPE #~~ TIME	SPECIALS (WRITE A-TYPE)	PLUS Y/N
P-BFB	>E3304	2ul	—		21:34	OK	
QC9980 VS	>E3306	5ml	10		23:17	OK 5ul Cal. I, II, XVOA	
QC9980 VS	>E3309	↓	8	CBUPD	02:32	OK 15	
QC9980 VS	>E3310	↓	9	CBCAL	03:18	OK 10	
QC9980 VS	>E3313	↓	10	CBMEB	05:37	OK 20	
QC9980 VS	>E3314	↓	10		07:57	OK 2	
QC9980 V	>E3315	5ml	9	—	—	ng - high surr.	
P-BFB	>E3316	2ul	—		09:52	OK (ran before E3315)	
QC9980 V	>E3317	5ml	9	—	—	ng - surr out	
QC9980 V	>E3318	5ml	9		—	ng - surr. out	
QC9980 VS	>E3319	5ml	10		—	ng 5ul. Cal I, II, XVOA	
QC9980 VS	>E3320	5ml	10			↓	
P-BFB	>E3321	2ul	—		20:34	OK. 107-95	
QC9980 VS	>E3322	5ML	9	QCAL	21:38	5ul Cal I, II, XVOA	
QC9980 V	>E3323	5ML	10			NG	
QC9980 V	>E3324	5ML	8			NG Blank	
QC9980 V	>E3325	5ML	8		Leaked	NG. Blank	
QC9980 V	>E3326	5ML	8		3:25	OK	
P-BFB	>E3327	2ul	—		4:29	OK. 109	
(R) BG0543 V	>E3328	0.02g	4	1:250	OK ~~No. The dilute~~	For QV9967 BH 8/21/88	
(R) BG0529 V	>E3329	5g	5		5:43	OK	
BG0529 VS	>E3330	↓	6			NG	
BG0529 VR	>E3331	↓	7		7:15	OK	
BG0535 V	>E3332	↓	8		8:01	OK rerun 1:20 14, 16, 4	
BG0536 V	>E3333	↓	9			NG rerun 1:100 possible carry	

ETC FORM #102

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/21/88 SHIFT
FRACTION 2PP/VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE EEE
METHOD FILE VOAE
ID FILE IE0002
ANALYST(S) B Hawkins

SUPERVISOR Carl Trent.
BATCH #'s QV9980

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
See pg #1			

	NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
	QC9980V	>E3334	5ml	8		10:13	OK	
	QC9980V	>E3335	↓	9		10:59	OK NG DIL 8/21/88	
	QC9980V	>E3336	↓	9		12:04	OK	
	p-BFB	>E3337	2µl	–		12:54	OK	
	QC9980VS	>E3338	5grms	9	QXAL→	13:15	5µl stds	
(e)	BG0529VS	>E3339	↓	4		15:46	OK ↓	
	BG0550V	>E3340	↓	5		16:32	OK	
(e)	BG0535V	>E3341	.05g	6	1:100	17:18	OK	
(e)	BG0536V	>E3342	↓	7	1:100	18:04	OK	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 09/12/88
PAGE. 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	490	SS10V	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		SS10V 880810 BG0529							
NONE FOUND ABOVE METHOD DETECTION LIMIT									

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

WATER SAMPLES

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0555	WASTE MANAGEMENT, INC.	490	XSS10S	880809	1415	

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

ETC

AUG 25, 1988

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0555	WASTE MANAGEMENT, INC	490	XSS10S	880809	1415	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen. Added ug/l	% Recov
3V	Benzene	BMDL	440	528	511	ND	50.0	103	ND	500	106
7V	Chlorobenzene	ND	600	748	720	ND	50.0	102	287	500	92
11V	Chloroform	2490	160	553	544	ND	50.0	103	ND	500	111
19V	Ethylbenzene	ND	720	527	502	ND	50.0	104	ND	500	105
25V	Toluene	BMDL	600	525	510	ND	50.0	101	ND	500	105
27V	1,1,1-Trichloroethane	ND	380	527	506	ND	50.0	103	ND	500	105
29V	Trichloroethylene	470	190	520	486	ND	50.0	105	ND	500	104

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

Sample/extract required dilution resulting in elevated MDL's.

ETC

AUG 23, 1988

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Field Parameters (QR16)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0555	WASTE MANAGEMENT, INC.	490	XSS10S	880809	1415	0

Parameter	Results									
	Sample Measure Feet	MDL Feet								
Depth to Water	1.7	-								

ETC

AUG 17, 1988

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Water - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0555	WASTE MANAGEMENT, INC.	490				0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	89	88	110
p-Bromofluorobenzene	.250	95	86	115
1,2-Dichloroethane-D4	.250	98	76	114
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	10	94
2-Fluorophenol	-	-	21	100
2,4,6-Tribromophenol	-	-	10	123
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	-	-	35	114
2-Fluorobiphenyl	-	-	43	116
Terphenyl-D14	-	-	33	141
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	24**	154**

** Advisory Limits Only

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: M Date: 08/14/88 Time: 10:57

Lab ID: >M0170-185 Data Release Authorized By: David Massey

Spectrum No: 185 Ent - 172 Ent

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Statu
50	15-40% of mass 95	22.77	22.77	Ok
75	30-60% of mass 95	50.80	50.80	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.45	6.45	Ok
173	Less than 1% of mass 95	.72	.72	Ok
174	Greater than 50% of mass 95	83.54	83.54	Ok
175	5-9% of mass 174	6.31	7.56	Ok
176	95-101% of mass 174	84.26	100.87	Ok
177	5-9% of mass 176	5.99	7.11	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9961VS	>M0171	8/14/88	12:35
QC9961VS	>M0172	↓	13:18
QC9961VS	>M0173	↓	14:02
QC9961VS	>M0174	↓	15:09
QC9961VS	>M0175	↓	15:53
QC9961V	>M0176	↓	16:37

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: M Date: 08/14/88 Time: 18:03

Lab ID: >M0177-180 Data Release Authorized By: David Missy

Spectrum No: 180Eh - 167 Eh

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	22.49	22.49	Ok
75	30-60% of mass 95	50.54	50.54	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.91	6.91	Ok
173	Less than 1% of mass 95	.80	.80	Ok
174	Greater than 50% of mass 95	91.94	91.94	Ok
175	5-9% of mass 174	6.74	7.33	Ok
176	95-101% of mass 174	92.86	101.00	Ok
177	5-9% of mass 176	6.79	7.31	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
B60982V	>M0178	8/14/88	18.53
B60982VS	>M0179	↓	20:14
B60982VR	>M0180	↓	21:00
QC9961VS	>M0188	8/15/88	~~[illegible]~~ 04:01
QC9961V	>M0189	↓	04.45

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: M Date: 08/15/88 Time: 05:41

Lab ID: >M0190-181 Data Release Authorized By: David Mjissy

Spectrum No: 181-169

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Statu
50	15-40% of mass 95	21.70	21.70	Ok
75	30-60% of mass 95	49.91	49.91	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.19	7.19	Ok
173	Less than 1% of mass 95	.79	.79	Ok
174	Greater than 50% of mass 95	83.60	83.60	Ok
175	5-9% of mass 174	6.67	7.98	Ok
176	95-101% of mass 174	81.19	97.12	Ok
177	5-9% of mass 176	6.55	8.07	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
B60983V	>M0191	8/15/88	07:38
B60984V	>M0192	↓	08:21
B60987V	>M0193	↓	09:04
B60988V	>M0194	↓	09:48
B60559V	>M0195	↓	10:32
B60985V	>M0196	↓	11:16
B60917V	>M0197	↓	12:13
B60818V	>M0198	↓	12:58
BE9217V	>M0199	↓	13:41

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: M Date: 08/15/88 Time: 16:36

Lab ID: >M0202-185 Data Release Authorized By: David Mizzy

Spectrum No: 185 ENH - 1:0

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	22.87	22.87	Ok
75	30-60% of mass 95	49.23	49.23	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.38	8.38	Ok
173	Less than 1% of mass 95	.68	.68	Ok
174	Greater than 50% of mass 95	73.81	73.81	Ok
175	5-9% of mass 174	5.70	7.73	Ok
176	95-101% of mass 174	73.81	100.00	Ok
177	5-9% of mass 176	5.85	7.92	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9961VS	>M0203	8/15/88	16:59
QC9961V	>M0204	↓	17:02
BE2734V	>M0205	↓	19:47
BE9217V	>M0206	↓	20:29
BG0925V	>M0212	8/16/88	00:52

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: Contractor: ETC Corp. Contract No.:

Instrument ID: M Date: 08/16/88 Time: 01:50

Lab ID: >M0213-187 Data Release Authorized By: David Yuzy

Spectrum No: 187-170

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	23.54	23.54	Ok
75	30-60% of mass 95	50.10	50.10	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.37	7.37	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	77.59	77.59	Ok
175	5-9% of mass 174	5.53	7.13	Ok
176	95-101% of mass 174	76.13	98.12	Ok
177	5-9% of mass 176	6.63	8.71	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9961VS	>M0214	8/16/88	02:40
QC9961V	>M0219	↓	10:38
B60989V	>M0220	↓	11:56
B60555V	>M0222	↓	13:23

Form V

ETC

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TESTING and CERTIFICATION

Seal No. 121087 ETC Job # _____

CHAIN OF CUSTODY FORM (CC1) ORIGINAL

Date Sealed _____ By: MC

Company: WASTE MANAGEMENT INC Attn.: [illegible]

Facility/Site: WICKERY Phone: [illegible]

Address: 3954 STATE ROUTE 412 WICKERY OH 43442

SAMPLE IDENTIFICATION

Facility: EPI (Facility/Site Code) Water from boring SS-10S (Optional Sample Point Description)

Sample Point: W-SS10S (Source Code (from below) / Your Sample Point ID (left justify)) 880809 (Start Date (YY/MM/DD)) 1415 (Start Time (2400 hr clock)) 10 (Elapsed Hours (composite))

Source Codes: X per 4x14

Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment....(I) Leachate Collection Sys....(C) Other .

Soil ...(S) River/Stream...(R) Generation Point....(G) Treatment Facility.....(T) Lake/Ocean.....(L) Specify _____

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	Observations	LAB Observatio...
[illegible]	[illegible]	[illegible]	None	Volatiles	N		✓
[illegible]	[illegible]	[illegible]	[illegible]	TPH [illegible]		intact - no bubbles	✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) J Dorrett Date: 8-9-88 Time: 1315
   Signature: Jim Dorrett Seal #: 121087 Intact: ✓

2. I have received these materials in good condition from the above person.
   Name: J Dorrett Signature: Jim Dorrett
   Date: 8-9-88 Time: 1315 Remarks: _____

3. I have received these materials in good condition from the above person.
   Name: _____ Signature: _____
   Date: _____ Time: _____ Remarks: _____

4. Shuttle Sealed By: (print) Jim Dorrett Date: 8-10-88 Time: 64
   Signature: Jim Dorrett Seal #: 121088 Intact: Y

LAB USE ONLY Opened By: D. [illegible] Date: 8-11-88 Time: 11 [illegible]

SHUTTLE # 764 TEMP. °C 6 SEAL # 121088 COND. intact

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # BG 0555

Sample Point [ ] Source Code [ ] Sample Point I.D.

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL IN CASING (Gallons)	VOLUME PURGED (Gallons)
8 8 0 8 0 9	1 2 0 0	0	3.5	2

SAMPLING METHOD: bailer (stainless steel) directly from borehole

Sampler Type [E] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other _____ (SPECIFY OTHER)

Sampler Material [B] A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other _____ (SPECIFY OTHER)

Tubing Material [NA] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other _____ (SPECIFY OTHER)

Sample Composited [Y/N] _____ Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) [ ] Well Depth (ft) [4.5]

Depth to Ground water (ft) [1.7] Sample Depth (non-well) (ft) [ ]

Groundwater Elevation (ft msl) [ ]

	ph	(STD)	spec. cond.	um/cm at 25°C	(other parameter)	value	units
1st		1st					
2nd		2nd					
3rd		3rd					
4th		4th					

Sample Temp [ ] (°C) Turbidity [ ] NTU

FIELD COMMENTS

Sample Appearance: cloudy

Weather Conditions: warm, overcast, windy

Other: depth to water approximately 2.2 feet. Poured water directly from bailer into 2 VOA bottles. Water appeared to have an oily sheen on it.

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Jim Durrett (Print) Employer: Golder Associates

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8-9-88 (Date) Jim Durrett (Signature)

ORIGINAL

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8-14-88 SHIFT
FRACTION VOA
INSTRUMENT M
TUNE FILE AP9IC2
SEQUENCE FILE MMM.MOZ
METHOD FILE VOAM
ID FILE IMCC22
ANALYST(S) G Mazurek
SUPERVISOR
BATCH #'s QU9961
CMCC22

STANDARD	CONC PPM	LOT NO.	L
P-BFB	25	18734	2ul
INT Std	25	19220	10ul
Surr	25	19218	10ul
CAL I	50	3364	2,5,10,15
CAL II		3379	
XVOA		14351	
MIAK		14167	

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLU YIN
P-BFB	>M0170	2ul	—		10:57	OK 185EUA - 172EUA	
QC9961US	>M0171	5ml	5		12:35	20ul CAL 1+2+XVOA+MIAK	
QC9961US	>M0172		6	CBOPd	13:18	15ul	
QC9961US	>M0173		7	CBCA1	14:02	10ul	
QC9961US	>M0174		8	CBARG	15:09	5ul	
QC9961US	>M0175		9		15:53	2ul	
QC9961U	>M0176		10		16:37	OK BLANK	
P-BFB	>M0177	2ul	—		18:03	OK 190EUA - 167EUA	
BG0982U	>M0178	.5	10	1:10	18:53	OK	
BG0982US	>M0179		10	1:10	20:14	OK 5ul CAL I+II + XVOA + MIAK	
BG0982UR	>M0180		11		21:00	OK 5ul "	"
BG0983U	>M0181		12			NG Rerun str	
BG0984U	>M0182		13			NG Rerun str	
BG0985U	>M0183		14			NG Rerun NG 1:20	
BG0987U	>M0184		15			NG Rerun str	
BG0988U	>M0185		16			NG Rerun str	
BG0989U	>M0186		1			NG Rerun str	
BG0559U	>M0187		2			NG Rerun str.	
QC9961VS	>M0188	5ml	1	QCAL	4:01	OK	
QC9961V	>M0189	5ml	2	QCAL	4:45	OK	
P-BFB	>M0190	2ul	—		5:41	OK	
BG0983V	>M0191	5ml	5		7:38	OK	
BG0984V	>M0192	5ml	6		8:21	OK	
BG0987V	>M0193	5ml	7		9:04	OK	
BG0988V	>M0194	5ml	8		9:48	OK	

ETC FORM #102

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8-15-88 SHIFT
FRACTION PP / VOA
INSTRUMENT M
TUNE FILE APEI02
SEQUENCE FILE MMM
METHOD FILE VOAM
ID FILE TM0022
ANALYST(S) J Doll, [illegible]
SUPERVISOR [illegible]
BATCH #'s QV9961

STANDARD	CONC PPM	LOT NO.	LOT VOL.
Pg 2			
See pg 1			

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

	NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
	BG0559V	>M0195	5ml	9		10:32	OK	
	BG0985V	>M0196	0.25ml	10	1:20	11:16	OK	
R	BG0917V	>M0197	0.5ml	5	1:10	12:13	OK	
	BG0818V	>M0198	5ml	6		12:58	OK	
BE 07/9/88	BG9217V	>M0199	0.5ml	7	1:10	13:41	OK rerun 1:50 for Cmpd #35	
	BG2734V	>M0200	0.5ml	8	1:10		NG 3RD Surr Low	
	BG0925V	>M0201	0.5ml	9	1:10		NG rerun Str	
	D-BFB	>M0202	2ul	—		16:36	OK ENH185, -1:0	
	QC9961VS	>M0203	5ml	1	QCAL	16:59	OK 5ul Cal I, II, XVOA	MIAK STD NOT ADD
	QC9961V	>M0204	5ml	2		19:02	OK BLANK	
R	BE2734V	>M0205	0.5ml	9	1:10	19:47	OK	
R	BE9217V	>M0206	0.1ml	10	1:50	20:29	OK	
R	BG1482V	>M0207	0.05ml	11	1:1000		NG Rerun 1:500 1:100	
	BG0555V	>M0208	5ml	12			NG Overload Rerun 1:100	
	BG0556V	>M0209	5ml	13			NG Possible wrong Rerun	
	BG0557V	>M0210	5ml	14			NG Overload Rerun 1:100	
	BG0989V	>M0211	5ml	15			NG Needs MIAK (NOT ADDED IN CA	
	BG0925V	>M0212	5ml	16		00:52	OK	
	D-BFB	>M0213	2ul	—		1:50	OK	
	QC9961VS	>M0214	5ml	1	QCAL	2:40	OK 5ul cal I, II, MIAKSTD	
	QC9961V	>M0215	5ml	2			NG BLANK	
	QC9961V	>M0216	5ml	12			NG Position check	
	QC9961V	>M0217	5ml	12			NG Position check Cmpd #4	
	QC9961V	>M0218	5ml	~~12~~ 14			NG Position Check Cmpd #16	
	QC9961V	>M0219	5ml	1		10:38	OK BLANK ~~(can before 7th 8th)~~	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/16/88 SHIFT
FRACTION PP/VOA
INSTRUMENT M
TUNE FILE APET02
SEQUENCE FILE MMM
METHOD FILE VIAM
ID FILE IM0022
ANALYST(S) [illegible]

SUPERVISOR [illegible]
BATCH #'s QV9961

(PLEASE INITIAL) CM0022

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
PS 3			
All PS	1		

	NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
R	BG0989V	IM0220	5ml	5		11:56	OK	
R	BG1482V	IM0221	0.05ml	6	1:100	12:41	OK NG Run 1:10	
R	BG0555V	IM0222	0.05ml	7	1:100	13:23	OK	

ETC FORM #102

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 08/26/88
PAGE: 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	490	SS10S	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		X SS10S 880809 BG0555							
Priority Poll. Volatiles GC/MS									
Chloroform	ug/l	2490							
Trichloroethylene	ug/l	470							
Field Parameters									
Depth to Water	Feet	1.7							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports						
BG0556	WASTE MANAGEMENT, INC.	490	XSS10E	880809	1440	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

ETC

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

ORIGINAL

Seal No. _____ ETC Job # _____

Date Sealed _____ By: MC

Company: WASTE MANAGEMENT, INC. Attn.: KIRK SIEMPLE

Facility/Site: VICKERY Phone: (419) 542 - 2791

Address: 3956 STATE ROUTE 412, VICKERY, OH 43464

SAMPLE IDENTIFICATION

Facility: [illegible] (Facility/Site Code) water from boring SS-10E (Optional Sample Point Descriptions)

Sample Point: W-SS10E (Source Code (from below) / Your Sample Point ID (left justify)) 880809 (Start Date (YY/MM/DD)) 1440 (Start Time (2400 hr clock)) 0 (Elapsed Hours (composite))

Source Codes: X 8/2/88

Well ..(W) Outfall .....(O) Bottom Sediment ....(B) Surface Impoundment ....(I) Leachate Collection Sys ..(C) Other

Soil ...(S) River/Stream ..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify _____

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	Observations	LAB Observatio
2	VOA	[illegible]	None	Volatiles	N		Recr. on Broken

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) J Durrett Date: 8-9-88 Time: 1315
   Signature: Jim Durrett Seal #: 121087 Intact: yes

2. I have received these materials in good condition from the above person.
   Name: _____ Signature: _____
   Date: _____ Time: _____ Remarks: _____

3. I have received these materials in good condition from the above person.
   Name: _____ Signature: _____
   Date: _____ Time: _____ Remarks: _____

4. Shuttle Sealed By: (print) Jim Durrett Date: 8-10-88 Time: 64
   Signature: Jim Durrett Seal #: 121088 Intact: yes

LAB USE ONLY Opened By: _____ Date: 8-11-88 Time: 11 AM

SHUTTLE # 764 TEMP. °C 6 SEAL # 121088 COND. intact

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # BG0556

Sample Point W (Source Code) 5511ØE (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)
8 8 0 8 0 9	1 2 1 5	1 0	1 3.5	1 2

SAMPLING METHOD: bailer (stainless steel) directly from borehole

Sampler Type: E — A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other _____ (SPECIFY OTHER)

Sampler Material: B — A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other _____ (SPECIFY OTHER)

Tubing Material: NA — A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other _____ (SPECIFY OTHER)

Sample Composited: Y/N (N circled) _____ Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) _____

Depth to Ground water (ft) 1.7

Groundwater Elevation (ft msl) _____

Well Depth (ft) 4.5

Sample Depth (non-well) (ft) _____

	ph	(STD)		spec. cond.	um/cm at 25°C	(other parameter)	value	units
1st			1st					
2nd			2nd					
3rd			3rd					
4th			4th					

Sample Temp (°C) _____ Turbidity _____ NTU

FIELD COMMENTS

Sample Appearance: turbid

Weather Conditions: warm, overcast, windy

Other: depth to water approximately 2.2 feet. Water appeared to have oily sheen on it.

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Jim Durrett (Print) Employer: Golder Associates

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8-9-88 (Date) Jim Durrett (Signature)

ORIGINAL

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 880816 SHIFT
FRACTION VOA
INSTRUMENT C
TUNE FILE APEI01
SEQUENCE FILE PHC
METHOD FILE VOAC
ID FILE IC0004
ANALYST(S) Cjeeoll
Blackburn
SUPERVISOR Sara Cicilina
BATCH #'s QV9968

(PLEASE INITIAL) CC0004

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	I V.
p-BFB	25	18734	2ul
Internal Standard	25	19220	10
Surrogate	25	19733	10
Cal I	50	3387	2.5, 10
Cal II	50	3379	↓
XVOA	50	19351	↓

NAME	DATA FILE	uL INJ.	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PL Y
p-BFB	>C1648	2ul	—		4:53	OK	
QC9968VS	>C1649	5ml	1	QCAL →	6:07	OK 5ul Cal I, II, XVOA	
QC9968VS	>C1650	↓	2		6:54	OK 5ul Cal I, II, XVOA	
QC9968V	>C1651	↓	3		7:41	OK	Y
p-BFB	>C1652	2ul	—		8:49	OK	
BG1436V	>C1653	5ml	1		9:18	OK	Y
BG1436VS	>C1654		2		10:05	OK 5ul Cal I, II, XVOA	
BG1436VR	>C1655		3		10:52	OK 5ul Cal I, II, XVOA	
BG1434V	>C1656		4		11:39	OK	Y
BG1435V	>C1657		5		12:26	OK re-run 1:10	Y
BG1433V	>C1658	↓	6		13:13	OK	Y
(R) BG1435V	>C1659	.5	10	1:10	15:19	OK	
BG0556V	>C1660	↓	7	1:10	16:07	OK	
BG0557V	>C1661	.05	8	1:100	16:55	OK	
BG0806V	>C1662	.5	9	1:10		NG, To dilute run 5ml	
BG0920V	>C1663	↓	9	1:10		NG to dilute run 5ml	
QC9968V	>C1664	5ml	5		19:22	OK	
QC9968VS	>C1665	↓	6			NG	
p-BFB	>C1666	2ul	—		20:55	OK 209	
QC9968VS	>C1667	5ML	7	QCAL	21:53	5ml Cal I, II, XVOA	
(R) BG0806V	>C1668	5ML	1		0:03	OK	
(R) BG0920V	>C1669	↓	2		0:50	OK	
(R) BG0923V	>C1670	0.5ML	3	1:10		NG. Rerun 1:5 for QV9965	
BG0931V (Sm)	>C1671	5ML	4			NG. Surr low. Rerun Std	
BG0921V	>C1672	5ML	5	Possible	Overload	NG. MS Error	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

AUG 24, 1988

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0556	WASTE MANAGEMENT, INC.	490	XSS10E	880809	1440	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen. Added ug/l	% Recov
3V	Benzene	222	44	52.5	51.1	ND	50.0	104	ND	50.0	105
7V	Chlorobenzene	216	60	52.6	51.7	ND	50.0	104	ND	50.0	105
11V	Chloroform	1630	16	55.9	52.6	ND	50.0	107	ND	50.0	112
19V	Ethylbenzene	138	72	53.3	52.2	ND	50.0	104	ND	50.0	107
25V	Toluene	1800	60	53.5	52.7	ND	50.0	105	ND	50.0	107
27V	1,1,1-Trichloroethane	317	38	52.7	50.3	ND	50.0	103	ND	50.0	105
29V	Trichloroethylene	876	19	52.5	51.4	ND	50.0	103	ND	50.0	105

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

Sample/extract required dilution resulting in elevated MDL's.

ETC

AUG 23, 1988

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Field Parameters (QR16)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0556	WASTE MANAGEMENT, INC.	490	XSS10E	880809	1440	0

Parameter	Results									
	Sample Measure Feet	MDL Feet								
Depth to Water	1.7	-								

ETC

AUG 18, 1988

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Water - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0556	WASTE MANAGEMENT, INC.	490				0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	102	88	110
p-Bromofluorobenzene	.250	101	86	115
1,2-Dichloroethane-D4	.250	105	76	114
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	10	94
2-Fluorophenol	-	-	21	100
2,4,6-Tribromophenol	-	-	10	123
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	-	-	35	114
2-Fluorobiphenyl	-	-	43	116
Terphenyl-D14	-	-	33	141
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	24**	154**

** Advisory Limits Only

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: C Date: 08/16/88 Time: 04:53

Lab ID: >C1648-204 Data Release Authorized By: David Mieszy

Spectrum No: 204

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Sta
50	15-40% of mass 95	23.88	23.88	Ok
75	30-60% of mass 95	54.25	54.25	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.15	7.15	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	78.82	78.82	Ok
175	5-9% of mass 174	6.42	8.14	Ok
176	95-101% of mass 174	77.87	98.80	Ok
177	5-9% of mass 176	5.72	7.35	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9968VS	>C 1649	8/16/88	06:07
QC9968VS	>C 1650	↓	06:54
QC 9968 V	>C 1651	↓	07:41

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: C Date: 08/16/88 Time: 08:49

Lab ID: >C1652-206 Data Release Authorized By: David Hiney

Spectrum No: 206

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	24.93	24.93	Ok
75	30-60% of mass 95	55.08	55.08	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.16	7.16	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	82.30	82.30	Ok
175	5-9% of mass 174	6.69	8.13	Ok
176	95-101% of mass 174	80.12	97.35	Ok
177	5-9% of mass 176	5.10	6.36	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
B61436V	>C 1653	8/16/88	09:18
B61436VS	>C 1654		10:05
B61436VR	>C 1655		10:52
B61434V	>C 1656		11:39
B61435V	>C 1657		12:26
B61437V	>C 1658		13:13
B61435V	>C 1659		15:19
B60556V	>C 1660		16:07
B60557V	>C 1661		16:55
QC9968V	>C 1664		17:22
~~QC9968VS~~	~~>C 1665~~ DJ 8/16/88		

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: C Date: 08/16/88 Time: 20:55

Lab ID: >C1666-209 Data Release Authorized By: David Yeung

Spectrum No: 209

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	26.28	26.28	Ok
75	30-60% of mass 95	56.13	56.13	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.52	6.52	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	28.54	28.54	Ok
175	5-9% of mass 174	6.09	7.75	Ok
176	95-101% of mass 174	77.11	98.19	Ok
177	5-9% of mass 176	5.34	6.92	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9965US	>C1667	8/16/88	2153
B60806U	>C1668	8/17/88	00:03
B60920U	>C1669	↓	00:50

Form V

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8-17-88 SHIFT
FRACTION VOA
INSTRUMENT C
TUNE FILE APE101
SEQUENCE FILE BHC
METHOD FILE VOAC
ID FILE IC000A
ANALYST(S) Yab-Wu
SUPERVISOR [illegible]
BATCH #'s QV9968

(PLEASE INITIAL) CC0004

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
See page 1			
P. of Page 2			

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
BG1720V	>C1673	5ML	6	Compd #36	Overload.	NG. MS Error	
QC9968 V	>C1674	5ML	1			NG System Check	
QC9968 V	>C1675	5ML	1			System Check	
P-BFB	>C1676	2uL	—			NOT NEEDED	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp
The Environmental Services Company

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 08/26/88
PAGE 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	490	SS10E	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		K SS10E 880809 BG0556							
Priority Poll. Volatiles GC/MS									
Benzene	ug/l	222							
Chlorobenzene	ug/l	216							
Chloroform	ug/l	1630							
Ethylbenzene	ug/l	138							
Toluene	ug/l	1800							
1,1,1-Trichloroethane	ug/l	317							
Trichloroethylene	ug/l	876							
Field Parameters									
Depth to Water	Feet	1.7							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0557	WASTE MANAGEMENT, INC.	490	XSS10N	880809	1500	

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: C Date: 08/16/88 Time: 08:49

Lab ID: >C1652-206 Data Release Authorized By: David Mieny

Spectrum No: 206

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	24.93	24.93	Ok
75	30-60% of mass 95	55.08	55.08	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.16	7.16	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	82.30	82.30	Ok
175	5-9% of mass 174	6.69	8.13	Ok
176	95-101% of mass 174	80.12	97.35	Ok
177	5-9% of mass 176	5.10	6.36	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
B61436V	>C 1653	8/16/88	09:18
B61436VS	>C 1654		10 05
B61436VR	>C 1655		10 52
B61434V	>C 1656		11:39
B61435V	>C 1657		12:26
B61433V	>C 1658		13:13
B61435V	>C 1659		15 19
B60556V	>C 1660		16 07
B60557V	>C 1661		16:55
QC9968V	>C 1664		19 22
~~QC9968VS~~	~~>C 1665~~	8/18/88	

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETI Corp. _____ Contract No.: _____

Instrument ID: C Date: 08/16/88 Time: 21:55

Lab ID: >C1666-209 Data Release Authorized By: David Yeung

Spectrum No: 209

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
50	15-40% of mass 95	26.28	26.28	OK
75	30-60% of mass 95	56.13	56.13	OK
95	Base peak, 100% relative abundance	100.00	100.00	OK
96	5-9% of mass 95	6.52	6.52	OK
173	Less than 1% of mass 174	0.00	0.00	OK
174	Greater than 50% of mass 95	98.54	98.54	OK
175	5-9% of mass 174	6.09	7.25	OK
176	95-101% of mass 174	97.11	99.19	OK
177	5-9% of mass 176	5.34	6.97	OK

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9968US	>C 1667	8/16/88	2153
B60806U	>C 1668	8/17/88	00:03
B60920U	>C 1669	↓	00:50

ETC

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1) ORIGINAL

Seal No. 12 1087 ETC Job # ______

Date Sealed [illegible] By: MC

Company: WASTE MANAGEMENT INC Attn.: KIRK STEMPLE

Facility/Site: WICKERY Phone: (419) 547 - 779[illegible]

Address: 3956 STATE ROUTE 412 WICKERY OH 43464

SAMPLE IDENTIFICATION

Facility: A P [illegible] (Facility/Site Code) water from boring SS-10N (Optional Sample Point Descriptions)

Sample Point: ~~W~~ - SS10N (Source Code (from below) X MW 8/24/88; Your Sample Point ID (left justify)) 880809 (Start Date (YY/MM/DD)) 1500 (Start Time (2400 hr clock)) 0 (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall ......(O) Bottom Sediment ....(B) Surface Impoundment ....(I) Leachate Collection Sys. ...(C) Other
Soil ....(S) River/Stream ..(R) Generation Point ....(G) Treatment Facility ......(T) Lake/Ocean ....(L) Specify ______

SHUTTLE CONTENTS

BOTTLE				ANALYSIS	SAMPLER		LAB
No	Type	Size	Preserv.		Filt. (Y/N)	Observations	Observations
[illegible]	[illegible]	[illegible]	[illegible]	Volatiles	N		✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) J Durrett Date: 8 9 88 Time: 1315
Signature: Jim Durrett Seal #: 121087 Intact: yes

2. I have received these materials in good condition from the above person.
Name: ______ Signature: ______
Date: ______ Time: ______ Remarks: ______

3. I have received these materials in good condition from the above person.
Name: ______ Signature: ______
Date: ______ Time: ______ Remarks: ______

4. Shuttle Sealed By: (print) Jim Durrett Date: 8-10-88 Time: 645
Signature: Jim Durrett Seal #: 121088 Intact: y

LAB USE ONLY Opened By: [signature] Date: 8-11-88 Time: 11 AM
SHUTTLE # 764 TEMP. °C 6 SEAL # 121088 COND. [illegible]

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # BG 0557

Sample Point W (Source Code) SS11ØN (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)
8 8 0 8 0 9	1 2 3 0	0	3.5	2.5

SAMPLING METHOD: bailer (stainless steel) directly from borehole

Sampler Type [E] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other _____ (SPECIFY OTHER)

Sampler Material [B] A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other _____ (SPECIFY OTHER)

Tubing Material [N/A] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other _____ (SPECIFY OTHER)

Sample Composited [Y/N] _____ Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) _____

Depth to Ground water (ft) 1.7

Groundwater Elevation (ft msl) _____

Well Depth (ft) 4.5

Sample Depth (non-well) (ft) _____

	ph	(STD)	spec. cond.	um/cm at 25°C	(other parameter)	value	units
1st		1st					
2nd		2nd					
3rd		3rd					
		4th					

Sample Temp (°C) _____ Turbidity _____ NTU

FIELD COMMENTS

Sample Appearance: slightly cloudy.

Weather Conditions: warm, overcast, windy

Other: depth to water approximately 2.0 feet. Water slightly cloudy.

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Jim Durrett (Print) Employer: Golder Associates

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8-9-88 (Date) Jim Durrett (Signature)

ORIGINAL

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 880816 SHIFT
FRACTION VOA
INSTRUMENT C
TUNE FILE APEI01
SEQUENCE FILE RHC
METHOD FILE VOAC
ID FILE TC0004
ANALYST(S) CJ Reed
B Buckner
SUPERVISOR Sara Lindstrom
BATCH #'s QV9968

(PLEASE INITIAL) CC0004

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL
P-BFB	25	18734	2ml
Internal Standard	25	19220	10
Surrogate	25	19733	10
Cal I	50	3387	2.5/10.5
Cal II	50	3379	
XVOA	50	19351	

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLOTS Y/
P-BFB	>C1648	2ml	—		4:53	OK	
QC9968VS	>C1649	5ml	1	QCAL →	6:07	OK 5ml Cal I, II, XVOA	
QC9968VS	>C1650	↓	2		6:54	OK 5ml Cal I, II, XVOA	
QC9968V	>C1651	↓	3		7:41	OK	Y
P-BFB	>C1652	2ml	—		8:49	OK	
BG1436V	>C1653	5ml	1		9:18	OK	Y
BG1436VS	>C1654		2		10:05	OK 5ml [illegible] XVOA	
BG1436VR	>C1655		3		10:52	OK 5ml [illegible] XVOA	
BG1434V	>C1656		4		11:39	OK	Y
BG1435V	>C1657		5		12:26	OK no-run 1:10	Y
BG1433V	>C1658	↓	6		13:13	OK	Y
(R) BG1435V	>C1659	.5	10	1:10	15:19	OK	
BG0556V	>C1660	↓	2	1:10	16:07	OK	
BG0557V	>C1661	.05	3	1:100	16:55	OK	
BG0806V	>C1662	.5	3	1:10		NG. To dilute run 5ml	
BG0920V	>C1663	↓	4	1:10		NG to dilute run 5ml	
QC9968V	>C1664	5ml	5		19:22	OK	
QC9968VS	>C1665	↓	6			NG	
P-BFB	>C1666	2ml	—		20:55	OK 20	
QC9968VS	>C1667	5ML	7	QCAL	21:53	5ml Cal I...	
(R) BG0806V	>C1668	5ML	1		0:03	OK	
(R) BG0920V	>C1669	↓	2		0:50	OK	
(R) BG0923V	>C1670	0.5ML	3	1:10		NG. Rerun 1:5 for QV990	
BG0931V (9m)	>C1671	5ML	4			NG. Surr low. Rerun 5ml	
BG0921V	>C1672	5ML	5	Possible	Overload.	NG. MS Error	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

AUG 24, 1988

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0557	WASTE MANAGEMENT, INC	490	XSS10N	880809	1500	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen. Added ug/l	% Recov
3V	Benzene	BMDL	440	52.5	51.1	ND	50.0	104	ND	50.0	105
7V	Chlorobenzene	BMDL	600	52.6	51.7	ND	50.0	104	ND	50.0	105
11V	Chloroform	711	160	55.9	52.6	ND	50.0	107	ND	50.0	112
19V	Ethylbenzene	ND	720	53.3	52.2	ND	50.0	104	ND	50.0	107
25V	Toluene	748	600	53.5	52.7	ND	50.0	105	ND	50.0	107
27V	1,1,1-Trichloroethane	ND	380	52.7	50.3	ND	50.0	103	ND	50.0	105
29V	Trichloroethylene	312	190	52.5	51.4	ND	50.0	103	ND	50.0	105

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

Sample/extract required dilution resulting in elevated MDL's.

ETC

AUG 23, 1988

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Field Parameters (QR16)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0557	WASTE MANAGEMENT, INC.	490	XSS10N	880809	1500	0

Parameter	Results									
	Sample Measure Feet	MDL Feet								
Depth to Water	1.7	-								

ETC

AUG 18, 1988

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Water - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0557	WASTE MANAGEMENT, INC.	490				0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	101	88	110
p-Bromofluorobenzene	.250	97	86	115
1,2-Dichloroethane-D4	.250	100	76	114
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	10	94
2-Fluorophenol	-	-	21	100
2,4,6-Tribromophenol	-	-	10	123
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	-	-	35	114
2-Fluorobiphenyl	-	-	43	116
Terphenyl-D14	-	-	33	141
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	24**	154**

** Advisory Limits Only

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: C Date: 08/16/88 Time: 04:53

Lab ID: >C1648-204 Data Release Authorized By: David Massey

Spectrum No: 204

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Stat
50	15-40% of mass 95	23.88	23.88	Ok
75	30-60% of mass 95	54.25	54.25	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.15	7.15	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	78.82	78.82	Ok
175	5-9% of mass 174	6.42	8.14	Ok
176	95-101% of mass 174	77.87	98.80	Ok
177	5-9% of mass 176	5.72	7.35	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9968 VS	2C 1649	8/16/88	06:07
QC9968 VS	2C 1650	↓	06:54
QC 9968 V	2C 1651	↓	07:41

Form U

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8-17-88 SHIFT
FRACTION VOA
INSTRUMENT C
TUNE FILE ADE101
SEQUENCE FILE BHC
METHOD FILE VOAC
ID FILE IC000A
ANALYST(S) Yah-Wu
SUPERVISOR [illegible]
BATCH #'s QV9968

(PLEASE INITIAL) CC0004

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
See page 1			
P. of Page 2			

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
BG1720V	>C1673	5ML	6	Compd #36	Overload.	NG. MS Error	
QC9968V	>C1674	5ML	1			NG System Check	
QC9968V	>C1675	5ML	1			System Check	
P-BFB	>C1676	2uL	—			NOT NEEDED	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 08/26/88
PAGE: 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	490	SS10N	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		K SS10N 880809 BG0557							
Priority Poll. Volatiles GC/MS									
Chloroform	ug/l	711							
Toluene	ug/l	748							
Trichloroethylene	ug/l	312							
Field Parameters									
Depth to Water	Feet	1.7							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

RECEIVED
OCT 6 1988

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports						
BG3949	WASTE MANAGEMENT, INC.	490	WSS10	880823	1250	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

284 RARITAN CENTER PARKWAY • EDISON, NJ 08837 (201) 225-5600

ETC

SEP 20, 1988

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG3949	WASTE MANAGEMENT, INC.	490	WSS10	880823	1250	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen. Added ug/l	% Recov
3V	Benzene	ND	4.4	55.2	56.3	ND	50.0	100	ND	50.0	1[illegible]
7V	Chlorobenzene	ND	6.0	53.8	57.9	ND	50.0	99	ND	50.0	109
11V	Chloroform	ND	1.6	53.2	54.7	ND	50.0	98	ND	50.0	1[illegible]
19V	Ethylbenzene	ND	7.2	54.3	57.7	ND	50.0	99	ND	50.0	109
25V	Toluene	BMDL	6.0	54.7	56.3	ND	50.0	101	ND	50.0	109
27V	1,1,1-Trichloroethane	ND	3.8	53.2	54.7	ND	50.0	102	ND	50.0	106
29V	Trichloroethylene	ND	1.9	56.9	57.1	ND	50.0	105	ND	50.0	114

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

ETC

SEP 6, 1988

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Water - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG3949	WASTE MANAGEMENT, INC.	490				0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	110	88	110
p-Bromofluorobenzene	.250	87	86	115
1,2-Dichloroethane-D4	.250	108	76	114
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	10	94
2-Fluorophenol	-	-	21	100
2,4,6-Tribromophenol	-	-	10	123
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	-	-	35	114
2-Fluorobiphenyl	-	-	43	116
Terphenyl-D14	-	-	33	141
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	24**	154**

** Advisory Limits Only

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: 4 Date: 08/29/88 Time: 22:35

Lab ID: >A1688-248 Date Release Authorized By: Val. Ru

Spectrum No: 248

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	1%-40% of mass 95	21.67	21.67	Ok
75	30-60% of mass 95	41.56	41.56	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.06	7.06	Ok
173	Less than 1% of mass 95	.77	.77	Ok
174	Greater than 50% of mass 95	86.55	86.55	Ok
175	5-9% of mass 174	5.64	6.52	Ok
176	95-101% of mass 174	83.51	96.48	Ok
177	5-9% of mass 176	6.23	7.45	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC1802?VS	>A1692	8-29-88	02:04
QC1802?VS	>A1693		02:48
QC1802?VS	>A1694		03:35
QC1802?VS	>A1695		04:23
QC1802?VS	[illegible]		05:11

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: A Date: 08/30/88 Time: 06:45

Lab ID: >A1698-248 Data Release Authorized By: [illegible]

Spectrum No: 248

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	19.28	19.28	OK
75	30-60% of mass 95	39.23	39.23	OK
95	Base peak, 100% relative abundance	100.00	100.00	OK
96	5-9% of mass 95	6.98	6.98	OK
173	Less than 1% of mass 95	.71	.71	OK
174	Greater than 50% of mass 95	89.74	89.74	OK
175	5-9% of mass 174	6.75	7.52	OK
176	95-101% of mass 174	89.84	100.11	OK
177	5-9% of mass 176	6.41	7.13	OK

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC10028 V	>A1700	8-29-88	11:23
QC10028 VS	>A1701	8-29-88	12:47

Form 5

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: A Date: 08/30/88 Time: 15:05

Lab ID: >A1703-248 Data Release Authorized By: [illegible]

Spectrum No: 248

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
50	15-40% of mass 95	18.42	18.42	Ok
75	30-60% of mass 95	41.63	41.63	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.57	7.57	Ok
173	Less than 1% of mass 95	.97	.97	Ok
174	Greater than 50% of mass 95	97.88	97.88	Ok
175	5-9% of mass 174	7.42	7.58	Ok
176	95-101% of mass 174	94.87	96.93	Ok
177	5-9% of mass 176	5.32	5.61	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
BF0525VS	>A1705	8-29-88	17:23
BF0526 VR	>A1706		18:11
BF0530 V	>A1707		19:58
[illegible]	[illegible]		[illegible]
BF0537V	>A1709		20:35
BF0538V	>A1710		21:22
BF0540V	>A1711		21:10
BF0546V	>A1712		22:58

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: A Date: 08/31/88 Time: 00:54

Lab ID: >A1714-252 Data Release Authorized By: [illegible]

Spectrum No: 252

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	18.17	18.17	Ok
75	30-60% of mass 95	41.56	41.56	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.11	7.11	Ok
173	Less than 1% of mass 95	.76	.76	Ok
174	Greater than 50% of mass 95	96.75	96.75	Ok
175	5-9% of mass 174	6.84	7.07	Ok
176	95-101% of mass 174	94.84	98.02	Ok
177	5-9% of mass 176	6.11	6.45	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC16028VS	>A1718	8-30-88	04:38
QC16027VS	>A1719	↓	05:25
QC16[illegible]	>A1720		06:13
QC16[illegible]	[illegible]		7:00

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: A Date: 08/31/88 Time: 08:33

Lab ID: >A1723-249 Data Release Authorized By: [signature]

Spectrum No: 249

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	19.58	19.58	Ok
75	30-60% of mass 95	43.42	43.42	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.31	7.31	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	93.33	93.33	Ok
175	5-9% of mass 174	6.96	7.45	Ok
176	95-101% of mass 174	93.92	100.63	Ok
177	5-9% of mass 176	6.10	6.50	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC10828VS	>A1724	8-30-88	09:21
BF0548V	>A1725	"	16:07
BF0829V	>A1727		16:53
BF0832V	>A1728 9-6-88		17:39
[illegible]	>A1729		18:25
[illegible]	[illegible]		19:10
BF0522V	>A1731		17:56
QC15629V	>A1736		14:33

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: A Date: 08/31/88 Time: 20:48

Lab ID: >A1737-248 Data Release Authorized By: [signature]

Spectrum No: 248 unaltered

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	18.08	18.08	Ok
75	30-60% of mass 95	41.72	41.72	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.66	6.66	Ok
173	Less than 1% of mass 95	.69	.69	Ok
174	Greater than 50% of mass 95	99.51	99.51	Ok
175	5-9% of mass 174	6.66	6.69	Ok
176	95-101% of mass 174	98.16	98.64	Ok
177	5-9% of mass 176	6.30	6.41	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
BF05Q15V 5-6-88	>A1734	8-31-88	02:13
BG1949V	>A1735	8-31-88	02:59
QC10028VS	>A1738	8-30-88	22:31
QC10028V	>A1739	8-31-88	00:12
[illegible]	[illegible]	↓	05:13
BG3741V	>A1742	↓	06:45
BG3736V	>A1743	↓	07:31
BG1049V	>A1744	↓	08:17

Form V

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1) ORIGINAL

Seal No. 0131243 ETC Job # [illegible]

Date Sealed 88/08/18 By: JN

Company: WASTE MANAGEMENT, INC. Attn.: KIRK STEMPLE

Facility/Site: VICKERY Phone: (419) 547 - 7791

Address: 3956 STATE ROUTE 412, VICKERY, OH 43464

SAMPLE IDENTIFICATION

Facility: 490 (Facility/Site Code) (Optional Sample Point Descriptions)

Sample Point: W-SS1Ø (Source Code (from below) / Your Sample Point ID (left justify)) 88Ø823 (Start Date (YY/MM/DD)) 125Ø (Start Time (2400 hr. clock)) Ø.1 (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other ..... (X)
Soil ...(S) River/Stream ..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	SAMPLER Observations	LAB Observations
2	VOA	40	NONE	VOLATILES	N ✓		✓
1	TB	40	GC/MS	TRIP BLANK		pea sized bubble	✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) Steven Williamson Date: 8/23/88 Time: 1ØØØ
Signature: Steve Williamson Seal #: Ø131243 Intact: yes

2. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) Steve Williamson Date: 8/23/88 Time: 1315
Signature: Steve Williamson Seal #: 0131242 Intact: yes

LAB USE ONLY Opened By: C. Margett Date: 8/24/88 Time: 230pm

SHUTTLE # 2123 TEMP. °C 2° SEAL # 131211[illegible] [illegible]

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # B63949

Sample Point W (Source Code) SS10 (Sample Point I.D.)

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)
850822				

SAMPLING METHOD:

Sampler Type: E — A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other ____ (SPECIFY OTHER)

Sampler Material: B — A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other STAINLESS STEEL (SPECIFY OTHER)

Tubing Material: NA — A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other ____ (SPECIFY OTHER)

Sample Composited: Y/N — N — Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl): *

Well Depth (ft): ~250 * (from TOC)

Depth to Ground water (ft): 21.72

Sample Depth (non-well) (ft):

Groundwater Elevation (ft msl): *

	ph		spec. cond.		(other parameter)	value	units
1st	7.50 (STD)	1st	780	um/cm at 25° C			
2nd	7.51 (STD)	2nd	780	um/cm at 25°C			
3rd	7.50 (STD)	3rd	780	um/cm at 25°C			
4th	7.50 (STD)	4th	780	um/cm at 25°C			

Sample Temp: 18.0 (°C)

Turbidity: ____ NTU

FIELD COMMENTS

Sample Appearance: SLIGHTLY TURBID to TURBID

Weather Conditions: CLOUDY, 5-10 MPH WIND, ~75°F

Other: Bowser-Morner developed & purged SS10;

* not known

** pH & SCOND measured by Bowser-Morner YSI Model 33 used for SCOND CORNING pH meter 30 used

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Steve Williamson (Print) Employer: IEP, Inc.

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8/23/88 (Date) Steven Williamson (Signature)

ORIGINAL

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 880829 SHIFT
FRACTION VOA
INSTRUMENT A
TUNE FILE APEI01
SEQUENCE FILE
METHOD FILE VOAA
ID FILE IA0014
ANALYST(S) C/Ceoll
SUPERVISOR [illegible]
BATCH #'s QV10028

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	880830
WIP		BY	CO

STANDARD	CONC PPM	LOT NO.	LOT VOL.
P-BFB	25	18734	2µl
Internal Standard	25	19754	10
Surrogate	25	19734	10
Cal I	50	3393	2,5,10,15,20
Cal II	50	3388	↓
XVOA	50	19351	↓

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
P-BFB	>A1688	2µl	—		22:35	OK	
QC10028V	>A1689	5ml	1			NG	
QC10028VS	>A1690	↓	2			NG 5µl Cal I, II, XVOA	
QC10028VS	>A1691	↓	3			NG 5µl Cal I, II, XVOA	
QC10028VS	>A1692	5ml	1		2:04	2µl Cal I, II, XVOA	
QC10028VS	>A1693	↓	2	CBUPD	2:48	5µl Cal I, II, XVOA	
QC10028VS	>A1694	↓	3	CBCAL	3:35	10µl Cal I, II, XVOA	
QC10028VS	>A1695	↓	5	CBMRG	4:23	15µl Cal I, II, XVOA	
QC10028VS	>A1696	↓	6		5:11	20µl Cal I, II, XVOA	
QC10028V	>A1697	↓	7			NG	
P-BFB	>A1698	[illegible]	—		6:45	OK 2[illegible]	
QC10028V	>A1699	5ml	7			NG	
QC10028V	>A1700	5ml	7		11:23	~~NG~~ OK JM 8/30/88 ~~low succ~~	
QC10028VS	>A1701	5ml	9	QCAL	12:47	OK 5µl Cal I, II, XVOA	
QC10028V	>A1702	↓	10			Not needed	
P-BFB	>A1703	2µl	—		15:05	OK 248	
BF0525V	>A1704	5ml	5			NG last succ out	
BF0525VS	>A1705	↓	6		17:23	OK 5µl Cal I, II, XVOA	
BF0525VR	>A1706	↓	7		18:11	OK 5µl	
BF0530V	>A1707	↓	8		18:58	OK	
BF0533V	>A1708	↓	9		19:46	OK	
BF0537V	>A1709	↓	10		20:35	OK	
BF0538V	>A1710	↓	11		21:22	OK	
BF0540V	>A1711	↓	15		22:10	OK	
BF0546V	>A1712	5ml	16		22:58	OK	

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/30/88 SHIFT
FRACTION BF/VOA
INSTRUMENT A
TUNE FILE APEI01
SEQUENCE FILE
METHOD FILE VOAA
ID FILE IA0014
ANALYST(S) J. Mulero
SUPERVISOR [illegible]
BATCH #'s QV10028

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL
See page 1			
page 2			

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
BF0548V	?A1713	5ml	1			NG leaked	
P-BFB	?A1714	2ul	—		00:54	OK	
QC10028VS	?A1715	5ml	1			NG 5ul Cal I, II, XVOA	
QC10028V	?A1716	↓	2			Not Run	
QC10028VS	?A1717	5ml	1			5ul Cal I, II, XVOA	
QC10028VS	?A1718	5ml	2	CBUPD	4.38	2ul Cal I II, XVOA	
QC10028VS	?A1719		3	CBCAL	5:25	10ul Cal I, II, XVOA	
QC10028VS	?A1720		~~4~~ 5	CO CBRA	6.13	15ul Cal I, II, XVOA	
QC10028VS	?A1721		~~5~~ 6	8/31	7:00	20ul Cal I, II, XVOA	
QC10028V	?A1722	↓	~~6~~ 7			NG	
P-BFB	?A1723	2ul	—		8:33	OK 2[illegible]	
QC10028VS	?A1724	5ml	8		9:21	5ul Cal I [illegible]	
(R) BF0525V	?A1725		5			NG	
(R) BF0548V	?A1726		6		16.07	OK	
BF0928V	?A1727		7		16:53	OK	
BF0932V	?A1728		8		17:39	OK	
BF0933V	?A1729		9		18.25	OK	
BF0967V	?A1730		10		19:10	OK	
BF0522	?A1731	↓	11		19:56	OK	
QC10028V	?A1732	5ml	12		—	NG Pos. Check	
BG3742V	?A1733	0.05ml	15	1.100	—	NG Re run straight	
BF0515V	?A1734	5ml	16		2:13	OK	
BG1949V	?A1735	5ml	1		2:59	OK	
QC10028V	?A1736	5ml	3		14:33	OK ran before ?A1725	
PBFB	A1737	2ul	—		20:48	OK	

ETC FORM #02

A Subsidiary of Environmental Treatment and Technologies Corp
The Environmental Services Company

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/31/88 SHIFT
FRACTION PPI-SA
INSTRUMENT A
TUNE FILE APG IC1
SEQUENCE FILE PAA
METHOD FILE VOAA
ID FILE IA0014
ANALYST(S) [illegible]
SUPERVISOR [illegible]
BATCH #'s QV 10028

(PLEASE INITIAL CA 0014

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO	LOT VOL

page 3

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
QC10028VS	A1738	5mL	11	GCAL	22:31	5ulcal [illegible]	
QC10028V	A1739	5mL	12		00:12	OK 2 [illegible]	
BF0525V	A1740	5mL	5		5:13	OK	
BG3742V	A1741	5mL	6		—	Ny RERUN 1:5	
BG3949V	A1742	5mL	7		6:45	OK	
BG3736V	A1743	1mL	8	1:5	7:31	OK	
BG1049V	A1744	0.1mL	9	1:50	8:17	OK	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp
The Environmental Services Company

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Points

DATE: 09/19/88
PAGE 7 [illegible]

RECEIVED OCT 6 1988

Chain of Custody Data Required for ETC Data Management Summary Report

See Below ETC Sample No.	Company	Facility	Sample Point	See Below Date
	CLEAN WATER, INC.	490	SS10	

Parameters	Units	W SS10 840814 E6523	W SS10 880823 BG3949						
Priority Poll. Volatiles GC/MS									
Benzene	ug/l	18	< 4.4						
Chlorobenzene	ug/l	14	< 6.0						
Chloroform	ug/l	106	< 1.6						
Ethylbenzene	ug/l	10	< 7.2						
Toluene	ug/l	105	< 6.0						
1,1,1-Trichloroethane	ug/l	13	< 3.8						
Trichloroethylene	ug/l	30	< 1.9						
Groundwater Conventionals									
Chloride	mg/l	61	-						
Sulfate as SO4	mg/l	590	-						
Cyanide, Total	mg/l	.040	-						
Total Organic Halides (TOX)	ug/l	370	-						
Total Organic Halides (TOX)	ug/l	290	-						
Total Organic Carbon	mg/l	76	-						
Total Organic Carbon	mg/l	71	-						
Specific Conductance	um/cm	1250	-						
Specific Conductance	um/cm	1250	-						
pH	std	8.1	-						
pH	std	8.1	-						
Metals Analysis Data									
Arsenic	ug/l	6	-						
Barium	ug/l	15	-						
Calcium	ug/l	21000	-						
Magnesium	ug/l	38000	-						
Sodium	ug/l	170000	-						
Miscellaneous Parameters									
Carbonate Alkalinity as CaCO3	mg/l	150	-						
meta-Xylene	ug/l	21	-						

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 09/19/88
PAGE: 2

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	CLEAN WATER, INC.	490	SS10	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

		Sample Points, Sampling Dates, and ETC Sample No.'s							
Parameters	*Units*	W SS10 840814 E6523	W SS10 880823 8G3949						
ortho- and para-Xylenes	ug/l	26	-						

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

QA/QC SAMPLES

ETC ENVIRONMENTAL TESTING and CERTIFICATION

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports						
BG0559	WASTE MANAGEMENT, INC.	490	XDECON	880809	1530	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

284 RARITAN CENTER PARKWAY • EDISON, NJ 08837 (201) 225-5600

ETC

AUG 27, 1988

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0559	WASTE MANAGEMENT, INC	490	XDECON	880809	1530	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen. Added ug/l	% Recov
3V	Benzene	ND	4.4	528	511	ND	50.0	103	ND	500	106
7V	Chlorobenzene	ND	6.0	748	720	ND	50.0	102	287	500	92
11V	Chloroform	11.1	1.6	553	544	ND	50.0	103	ND	500	111
19V	Ethylbenzene	ND	7.2	527	502	ND	50.0	104	ND	500	105
25V	Toluene	ND	6.0	525	510	ND	50.0	101	ND	500	105
27V	1,1,1-Trichloroethane	ND	3.8	527	506	ND	50.0	103	ND	500	105
29V	Trichloroethylene	ND	1.9	520	486	ND	50.0	105	ND	500	104

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

Sample/extract required dilution resulting in elevated MDL's.

ETC

AUG 17, 1988

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Water - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG0559	WASTE MANAGEMENT, INC.	490				0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	101	88	110
p-Bromofluorobenzene	.250	94	86	115
1,2-Dichloroethane-D4	.250	102	76	114
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	10	94
2-Fluorophenol	-	-	21	100
2,4,6-Tribromophenol	-	-	10	123
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	-	-	35	114
2-Fluorobiphenyl	-	-	43	116
Terphenyl-D14	-	-	33	141
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	24**	154**

** Advisory Limits Only

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: M Date: 08/14/88 Time: 10:57

Lab ID: >M0170-185 Data Release Authorized By: David Massey

Spectrum No: 185 Ext - 172 Ext

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	22.77	22.77	Ok
75	30-60% of mass 95	50.80	50.80	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.45	6.45	Ok
173	Less than 1% of mass 95	.72	.72	Ok
174	Greater than 50% of mass 95	83.54	83.54	Ok
175	5-9% of mass 174	6.31	7.56	Ok
176	95-101% of mass 174	84.26	100.87	Ok
177	5-9% of mass 176	5.99	7.11	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9961VS	>M0171	8/14/88	12:35
QC9961VS	>M0172	↓	13:18
QC9961VS	>M0173		14:02
QC9961VS	>M0174		15:09
QC9961VS	>M0175		15:53
QC9961V	>M0176		16:37

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: M Date: 08/14/88 Time: 18:03

Lab ID: >M0177-180 Data Release Authorized By: David Missy

Spectrum No: 180Eh - 167 Eh

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	22.49	22.49	Ok
75	30-60% of mass 95	50.54	50.54	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	6.91	6.91	Ok
173	Less than 1% of mass 95	.80	.80	Ok
174	Greater than 50% of mass 95	91.94	91.94	Ok
175	5-9% of mass 174	6.74	7.33	Ok
176	95-101% of mass 174	92.86	101.00	Ok
177	5-9% of mass 176	6.79	7.31	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
B60982V	>M0178	8/14/88	18:53
B60982VS	>M0179	↓	20:14
B60982VR	>M0180	↓	21:00
QC9961VS	>M0188	8/15/88	~~00:45~~ DJ 04:01
QC9961V	>M0189	↓	04.45

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: M Date: 08/15/88 Time: 05:41

Lab ID: >M0190-181 Data Release Authorized By: David Mjissy

Spectrum No: 181-169

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	21.70	21.70	Ok
75	30-60% of mass 95	49.91	49.91	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.19	7.19	Ok
173	Less than 1% of mass 95	.79	.79	Ok
174	Greater than 50% of mass 95	83.60	83.60	Ok
175	5-9% of mass 174	6.67	7.98	Ok
176	95-101% of mass 174	81.19	97.12	Ok
177	5-9% of mass 176	6.55	8.07	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
B60983V	>M0191	8/15/88	07:38
B60984V	>M0192	↓	08:21
B60987V	>M0193	↓	09:04
B60988V	>M0194	↓	09:48
B60559V	>M0195	↓	10:32
B60985V	>M0196	↓	11:16
B60917V	>M0197	↓	12:13
B60818V	>M0198	↓	12:58
BE9217V	>M0199	↓	13.41

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: M Date: 08/15/88 Time: 16:36

Lab ID: >M0202-185 Data Release Authorized By: David Massey

Spectrum No: 185 ENH, - 1:0

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	Appropriate Peak	Status
50	15-40% of mass 95	22.87	22.87	Ok
75	30-60% of mass 95	49.23	49.23	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.38	8.38	Ok
173	Less than 1% of mass 95	.68	.68	Ok
174	Greater than 50% of mass 95	73.81	73.81	Ok
175	5-9% of mass 174	5.70	7.73	Ok
176	95-101% of mass 174	73.81	100.00	Ok
177	5-9% of mass 176	5.85	7.92	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9961US	>M0203	8/15/88	16:59
QC9961V	>M0204	↓	19:02
BE2734V	>M0205		19:47
BE9217V	>M0206		20:19
BG0925V	>M0212	8/16/88	00:52

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: M Date: 08/16/88 Time: 01:50

Lab ID: >M0213-187 Data Release Authorized By: David Yeary

Spectrum No: 187-170

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	23.54	23.54	Ok
75	30-60% of mass 95	50.10	50.10	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.37	7.37	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	77.59	77.59	Ok
175	5-9% of mass 174	5.53	7.13	Ok
176	95-101% of mass 174	76.13	98.12	Ok
177	5-9% of mass 176	6.63	8.71	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC9961VS	>M0214	8/16/88	02:40
QC9961V	>M0219	↓	10:38
BB0989V	>M0220		11:56
BB0555V	>M0222		13:23

Form V

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TESTING and CERTIFICATION

Seal No. 121087 ETC Job # [illegible]

CHAIN OF CUSTODY FORM (CC1) ORIGINAL

Date Sealed [illegible] By: MC

Company: WASTE MANAGEMENT INC Attn.: KIRK STEMPLE

Facility/Site: VICKERY Phone: (419) 547 - 7791

Address: 3956 STATE ROUTE 412 VICKERY OH 43464

SAMPLE IDENTIFICATION

Facility: [illegible] (Facility/Site Code) decon water sample (Optional Sample Point Descriptions)

Sample Point: X-DECON (Source Code (from below) / Your Sample Point ID (left justify)) 880809 (Start Date (YY/MM/DD)) 1530 (Start Time (2400 hr. clock)) 0 (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment ....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)
Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify

SHUTTLE CONTENTS

BOTTLE				ANALYSIS	SAMPLER		LAB
No	Type	Size	Preserv.		Filt. (Y/N)	Observations	Observations
1	FR	40	[illegible]	[illegible]	N	1 field blank vial not intact	Rec - 2 715 Full
2	VOA	40	None	Volatiles	N		✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) J Durrett Date: 8-9-88 Time: 1315
Signature: Jim Durrett Seal #: 121087 Intact: yes

2. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) Jim Durrett Date: 8-10-88 Time: 645
Signature: Jim Durrett Seal #: 121088 Intact: yes

LAB USE ONLY Opened By: [illegible] Date: 8-11-88 Time: 11 am

SHUTTLE # 768 TEMP. °C 4 SEAL # 121088 COND. intact

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # BG 0559

Sample Point [X] DECON
Source Code — Sample Point I.D.

FIELD PROCEDURES

PURGE DATE (YY MM DD) | START PURGE (2400 Hr Clock) | ELAPSED HRS | WATER VOL. IN CASING (Gallons) | VOLUME PURGED (Gallons)

SAMPLING METHOD: poured water from water truck ~~through~~ and steam cleaner through a cleaned S.S. bailer

Sampler Type [N/A] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel — X-Other _____ (SPECIFY OTHER)

Sampler Material [N/A] A-Teflon, B-Metal, C-PVC, D-Plastic — X-Other _____ (SPECIFY OTHER)

Tubing Material [N/A] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon — X-Other _____ (SPECIFY OTHER)

Sample Composited [Y/N] _____ Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) | Well Depth (ft)

Depth to Ground water (ft) | Sample Depth (non-well) (ft)

Groundwater Elevation (ft msl)

	ph	(STD)	spec. cond.	um/cm at 25°C	(other parameter)	value	units
1st							
2nd							
3rd							
4th							

Sample Temp (°C) | Turbidity NTU

FIELD COMMENTS

Sample Appearance: clear

Weather Conditions: warm, overcast, windy

Other: field blank taken at SS-10 by opening the two VOA vials and exposing the water to the air. Vials were "topped off" with "type I" water from CWM's laboratory.

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Jim Durrett (Print) Employer: Golder Associates

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8-9-88 (Date) Jim Durrett (Signature)

ORIGINAL

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8-14-88 SHIFT
FRACTION VOA
INSTRUMENT M
TUNE FILE APEIC2
SEQUENCE FILE MMM.MOZ
METHOD FILE VOAM
ID FILE IMC022
ANALYST(S) G Mazurek
SUPERVISOR Pearl Trank
BATCH #'s QU9961
CMC022

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
P-BFB	25	18734	2ul
INT Std	25	19220	10ul
Surr	25	19218	10ul
CAL I	50	3364	2,5,10,15,20
CAL II	↓	3379	↓
XVOA	↓	19351	↓
MIAK	↓	19167	↓

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
P-BFB	>M0170	2ul	—		10:57	OK 185ENh - 172ENh	
QC9961US	>M0171	5ml	5		12:35	20ul CAl 1+2+XVOA+MIAK	
QC9961US	>M0172	↓	6	CBUPd	13:18	15ul ↓	
QC9961US	>M0173	↓	7	CBCAl	14:02	10ul ↓	
QC9961US	>M0174	↓	8	CBMRG	15:09	5ul ↓	
QC9961US	>M0175	↓	9		15:53	2ul ↓	
QC9961U	>M0176	↓	10		16:37	OK BLANK	
P-BFB	>M0177	2ul	—		18:03	OK 180ENh - 167ENh	
BG0982U	>M0178	.5	10	1:10	18:53	OK	
BG0982US	>M0179	↓	10	1:10	20:14	OK 5ul CAl I+II + XVOA + MIAK	
BG0982UR	>M0180	↓	11	↓	21:00	OK 5ul "	"
BG0983U	>M0181	↓	12	↓		NG Renn str	
BG0984U	>M0182	↓	13	↓		NG Renn str	
BG0985U	>M0183	↓	14	↓		NG Renn NG 1:20	
BG0987U	>M0184	↓	15	↓		NG Renn str	
BG0988U	>M0185	↓	16	↓		NG Renn str	
BG0989U	>M0186	↓	1	↓		NG Renn str	
BG0559U	>M0187	↓	2	↓		NG Renn str.	
QC9961VS	>M0188	5ml	1	QCAL	4:01	OK	
QC9961V	>M0189	5ml	2	JBU ~~QCAL~~	4:45	OK	
P-BFB	>M0190	2ul	—		5:41	OK	
BG0983V	>M0191	5ml	5		7:38	OK	
BG0984V	>M0192	5ml	6		8:21	OK	
BG0987V	>M0193	5ml	7		9:04	OK	
BG0988V	>M0194	5ml	8		9:48	OK	

ETC FORM #102

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8-15-88 SHIFT
FRACTION PP / VOA
INSTRUMENT M
TUNE FILE APEIO 2
SEQUENCE FILE MMM
METHOD FILE VOAM
ID FILE TM0022
ANALYST(S) J. Obell, [illegible]

SUPERVISOR [illegible]
BATCH #'s QV9961

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VI
Pg 2			
See pg 1			

	NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
	BG0559V	>M0195	5ml	9		10:32	OK	
	BG0985V	>M0196	0.25ml	10	1:20	11:16	OK	
R	BG0917V	>M0197	0.5ml	5	1:10	12:13	OK	
	BG0818V	>M0198	5ml	6		12:58	OK	
BE [illegible]	~~BG9217V~~	>M0199	0.5ml	7	1:10	13:41	OK rerun 1:50 for Cmpd #35	
	BG2734V	>M0200	0.5ml	8	1:10		NG 3RD Surr Low	
	BG0925V	>M0201	0.5ml	9	1:10		NG rerun Str	
	p-BFB	>M0202	2ul	–		16:36	OK [illegible]	
	QC9961VS	>M0203	5ml	1	QCAL	16:59	~~OK NG~~ 5ul Ca[illegible]	M/A NO
	QC9961V	>M0204	5ml	2		19:02	JHO OK BLANK	
R	BE2734V	>M0205	0.5ml	9	1:10	19:47	OK	
R	BE9217V	>M0206	0.1ml	10	1:50	20:29	OK	
R	BG1482V	>M0207	0.005ml	11	1:1000		NG Rerun ~~1:500~~ JHO 1:100	
	BG0555V	>M0208	5ml	12			NG Overload Rerun 1:100	
	BG0556V	>M0209	5ml	13			NG Possible Carryover [illegible]	
	BG0557V	>M0210	5ml	14			NG Overload Rerun 1:100	
	BG0989V	>M0211	5ml	15			NG Needs Miak (NOT ADDE	
	BG0925V	>M0212	5ml	16		00:52	OK	
	p-BFB	>M0213	2ul	–		1:50	OK	
	QC9961VS	>M0214	5ml	1	QCAL	2:40	OK 5ul cal I, II MIAK ST	
	QC9961V	>M0215	5ml	2			NG BLANK	
	QC9961V	>M0216	5ml	12			NG Position check	
	QC9961V	>M0217	5ml	12			NG Position check Cmpd #4	
	QC9961V	>M0218	5ml	~~12~~ 14			NG Position check Cmpd #16	
	QC9961V	>M0219	5ml	1		10:38	OK BLANK ~~[illegible]~~	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/16/88 SHIFT
FRACTION PP/VOA
INSTRUMENT M
TUNE FILE APET002
SEQUENCE FILE MMM
METHOD FILE VOAM
ID FILE IM0022
ANALYST(S) [illegible]

SUPERVISOR [illegible]
BATCH #'s QV9961

(PLEASE INITIAL) CM0022

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIR		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
PS 3			
DCL PS	1		

	NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
(B)	BG0989V	>M0220	5ml	5		11:56	OK	
(S)	BG1482V	>M0221	0.05ml	6	1:100	12:41	OK NG Run 1:10	
(C)	BG0555V	>M0222	0.05ml	7	1:100	13:23	OK	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 08/24/88
PAGE: 1

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	490	DECON	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Parameters	*Units*	*Sample Points, Sampling Dates, and ETC Sample No.'s*							
		X DECON 880809 BG0559							
Priority Poll. Volatiles GC/MS									
Chloroform	ug/l	11.1							

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

RECEIVED

SEP 2 9 1988

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports						
BG3950	WASTE MANAGEMENT, INC.	490	WSS10	880823	1300	
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

284 RARITAN CENTER PARKWAY • EDISON, NJ 08837 (201) 225-5600

ETC

SEP 19, 1988
QV10030

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds – GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG3950	WASTE MANAGEMENT, INC	490	WSS10	880823	1300	0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Bla			QC Matrix Spike		
		Sample Concen. ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen. Added ug/l	% Recov
3V	Benzene	ND	4.4	49.6	49.2	BMDL	50.0	98	ND	50.0	99
7V	Chlorobenzene	ND	6.0	48.8	49.2	ND	50.0	99	ND	50.0	98
11V	Chloroform	ND	1.6	49.1	48.1	BMDL	50.0	97	ND	50.0	98
19V	Ethylbenzene	ND	7.2	50.5	50.3	ND	50.0	101	ND	50.0	101
25V	Toluene	ND	6.0	49.4	49.6	ND	50.0	99	.676	50.0	98
27V	1,1,1-Trichloroethane	ND	3.8	50.7	49.6	ND	50.0	102	ND	50.0	101
29V	Trichloroethylene	4.09	1.9	61.8	50.5	ND	50.0	111	7.24	50.0	109

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Water - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG3950	WASTE MANAGEMENT, INC.	490				0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	103	88	110
p-Bromofluorobenzene	.250	99	86	115
1,2-Dichloroethane-D4	.250	97	76	114
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	10	94
2-Fluorophenol	-	-	21	100
2,4,6-Tribromophenol	-	-	10	123
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	-	-	35	114
2-Fluorobiphenyl	-	-	43	116
Terphenyl-D14	-	-	33	141
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	24**	154**

** Advisory Limits Only

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: E Date: 08/30/88 Time: 03:33

Lab ID: >E3518-140 Data Release Authorized By: BHartins

Spectrum No: 140 Sub.

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	21.53	21.53	Ok
75	30-60% of mass 95	48.39	48.39	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.04	7.04	Ok
173	Less than 1% of mass 95	.38	.38	Ok
174	Greater than 50% of mass 95	62.36	62.36	Ok
175	5-9% of mass 174	4.67	7.48	Ok
176	95-101% of mass 174	62.31	99.91	Ok
177	5-9% of mass 176	4.67	7.49	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC10030VS	>E3519	8/30/88	03 56
QC10030V	>E3520		04:43
QC10030VS	>E3521		05:44
BG1660V	>E3522		06:31
BG1660VS	>E3523		07:19
BG1660VR	>E3524		08:06
BG1658V	34 9/1/88 ~~>E3525~~ E3525		08:53
BG1654V	>E3526		09:41
BE9220V	>E3528		11:15
BE9501V	>E3529		12:52
BG3950V	>E3530		13:37

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: Contractor: ETC Corp. Contract No.:

Instrument ID: E Date: 08/30/88 Time: 15:52

Lab ID: >E3533-142 Data Release Authorized By: B Hankins

Spectrum No:

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	21.52	21.52	Ok
75	30-60% of mass 95	49.39	49.39	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.43	7.43	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	63.92	63.92	Ok
175	5-9% of mass 174	4.86	7.60	Ok
176	95-101% of mass 174	64.48	100.88	Ok
177	5-9% of mass 176	4.56	7.07	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC10030U5	>E 3534	8/30/88	16:14
QC10030V	>E3536		18:17
BG4249V	>E3537		19:33
BG3735V	>E3538		20:18
BF0528V	>E3539		21:02
BF0529V	> E3540		21:46
BF0532V	>E3541		22:30
BF0534V	>E3542		23:14
BF0543V	>E3543		23:59
BG2187V	> E3544	8/31/88	00:43
BG2188V	>E3545		01:27
BF0516V	>E3546		02:11

Form V

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

ORIGINAL

Seal No. 013/243 ETC Job # [illegible]

Date Sealed [illegible] By: Jas

Company: WASTE MANAGEMENT, INC. Attn.: KIRK STEMPLE

Facility/Site: VICKERY Phone: (419) 547 - 7291

Address: 3956 STATE ROUTE 412, VICKERY, OH 43464

SAMPLE IDENTIFICATION

Facility: 490 (Facility/Site Code) (Optional Sample Point Descriptions)

Sample Point: W-SS10 (Source Code (from below); Your Sample Point ID (left justify)) 880823 (Start Date (YY/MM/DD)) 1300 (Start Time (2400 hr. clock)) 0.1 (Elapsed Hours (composite))

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)
Soil ...(S) River/Stream..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER FILL (Y/N)	SAMPLER Observations	LAB Observations
2	VOA	40	NONE	VOLATILES	N.	✓	not rec'd
3	FB	40	GC/MS	FIELD BLK H2O		✓	

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) Steven Williamson Date: 8/23/88 Time: 1000
Signature: Steven Williamson Seal #: 013243 Intact: yes

2. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) Steve Williamson Date: 8/23/88 Time: 1315
Signature: Steven Williamson Seal #: 013242 Intact: yes

LAB USE ONLY Opened By: C. Margett Date: 8/24/88 Time: 230pm
SHUTTLE # 2123 TEMP. °C 2° SEAL # 13242 COND. intact

E·VIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # B63950

Sample Point [ ] Source Code [ ] Sample Point I.D.

FIELD PROCEDURES

PURGE DATE (YY MM DD) | START PURGE (2400 Hr Clock) | ELAPSED HRS | WATER VOL. IN CASING (Gallons) | VOLUME PURGED (Gallons)

SAMPLING METHOD:

Sampler Type [ ] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Baller, F-Scoop/Shovel, X-Other ____ (SPECIFY OTHER)

Sampler Material [ ] A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other ____ (SPECIFY OTHER)

Tubing Material [ ] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other ____ (SPECIFY OTHER)

Sample Composited [Y/N] ____ Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl)

Depth to Ground water (ft)

Groundwater Elevation (ft msl)

Well Depth (ft)

Sample Depth (non-well) (ft)

1st	ph (STD)	1st	spec. cond. um/cm at 25° C	(other parameter)	value	units
2nd	ph (STD)	2nd	spec. cond. um/cm at 25°C	(other parameter)	value	units
3rd	ph (STD)	3rd	spec. cond. um/cm at 25°C	(other parameter)	value	units
4th	ph (STD)	4th	spec. cond. um/cm at 25°C	(other parameter)	value	units

Sample Temp (°C) | Turbidity NTU

FIELD COMMENTS

Sample Appearance:

Weather Conditions:

Other: FIELD BLANK COLLECTED AT SS 10

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Steven Williamson (Print) Employer: IEP, Inc.

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8/23/88 (Date) Steven Williamson (Signature)

ORIGINAL

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8-30-88 SHIFT
FRACTION VOA
INSTRUMENT E
TUNE FILE APEI01
SEQUENCE FILE
METHOD FILE VOAE
ID FILE IE0007
ANALYST(S) [illegible]
SUPERVISOR [illegible]
BATCH #'s QV10030

(PLEASE INITIAL) CE0007

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL. (ul)
P-BFB	25	18734	2
Int. Std	25	19754	10
Surr. Std	25	19734	10
Cal I	50	3393	2,5,10,15,20
Cal II	50	3388	↓
XVOA	50	19351	↓

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
P-BFB	>E3518	2ul	—		3:33	OK 140 Emb.	
QC10030VS	>E3519	5ML	9	QCAL	3:56	5ul Cal I, II, XVOA	
QC10030V	>E3520	5ML	10		4:43	OK Blank	
QC10030VS	>E3521	5ML	1		5:44	OK 5ul Cal I, II, XVOA	
BG1660V	>E3522	↓	2		6:31	OK	
BG1660VS	>E3523	↓	3		7:19	OK 5ul Cal I, II, XVOA	
BG1660VR	>E3524	↓	4		8:06	OK 5ul ↓	
BG1658V	>E3525	↓	5		8:53	OK	
BG1654V	>E3526	0.5ML	6	1:10	9:41	OK	
BE9501V	>E3527	0.05ML	7	1:100		NG re-run 1:10	
BE9220V	>E3528	0.05ML	8	1:100	11:15	OK	
(R) BE9501V	>E3529	0.5ml	1	1:10	12:52	OK	
BG3950V	>E3530	5ml	2		13:37	OK	
BG4249V	>E3531	0.1ml	3	1:50		re-run 1:10 to dilute	
KB 8/30 ~~BG~~ BG3735V	>E3532	0.05ml	4	1:100		re-run 1:10 " "	
P-BFB	>E3533	2ul	—		15:57	OK	
QC10030VS	>E3534	5ml	1	QCAL →	16:14	OK	
QC10030V	>E3535	↓	2			~~OK~~ NG ~~BH~~ 8/30/88	
QC10030V	>E3536	5ml	2		18:17	OK	
(F) BG4249V	>E3537	.5	1	1:10	19:33	OK	
(F) BG3735V	>E3538	↓	2	1:10	20:18 OK	~~NG~~ ~~Rerun Str~~ 8-31-88. See	TIC
BFC528V	>E3539	5ml	3		21:02	OK	
BFC529V	>E3540	↓	4		21:46	OK	
BFC532V	>E3541	↓	5		22:30	OK	
BFC534V	>E3542	↓	6		23:14	OK	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/30/88 SHIFT
FRACTION VOA
INSTRUMENT E
TUNE FILE APED1
SEQUENCE FILE BHE
METHOD FILE WAE
ID FILE IE0007
ANALYST(S) [illegible]

SUPERVISOR [illegible]
BATCH #'s GV10030

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.

#1

See pg

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
BFC543V	?E3543	5ml	7		23:59	OK	
BG2187V	?E3544	↓	8		0:43	OK	
BG2188V	?E3545	↓	9		1:27	OK	
BFC516V	?E3546	↓	10		2:11	OK	
BG4250V	>E3547	0.05ML	1	1:100	2:55	~~OK. See TIC~~ 8-31-88 NG. Rerun 1:10	
BG4142V	>E3548	0.05ML	2	1:100		NG. Rerun 1:1000	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp
The Environmental Services Company

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

DATE: 09/20/88
PAGE: 1

RECEIVED SEP 29 1988

Chain of Custody Data Required for ETC Data Management Summary Report

See Below ETC Sample No.	Company	Facility	Sample Point	See Below Date
	CLEAN WATER, INC.	490	SS10	

Sample Points, Sampling Dates, and ETC Sample No.'s

Parameters	Units	W SS10 840814 E6523	W SS10 880823 BG3950						
Priority Poll. Volatiles GC/MS									
Benzene	ug/l	18	< 4.4						
Chlorobenzene	ug/l	14	< 6.0						
Chloroform	ug/l	106	< 1.6						
Ethylbenzene	ug/l	10	< 7.2						
Toluene	ug/l	105	< 6.0						
1,1,1-Trichloroethane	ug/l	13	< 3.8						
Trichloroethylene	ug/l	30	4.09						
Groundwater Conventionals									
Chloride	mg/l	61	-						
Sulfate as S04	mg/l	590	-						
Cyanide, Total	mg/l	.040	-						
Total Organic Halides (TOX)	ug/l	370	-						
Total Organic Halides (TOX)	ug/l	290	-						
Total Organic Carbon	mg/l	76	-						
Total Organic Carbon	mg/l	71	-						
Specific Conductance	um/cm	1250	-						
Specific Conductance	um/cm	1250	-						
pH	std	8.1	-						
pH	std	8.1	-						
Metals Analysis Data									
Arsenic	ug/l	6	-						
Barium	ug/l	15	-						
Calcium	ug/l	21000	-						
Magnesium	ug/l	38000	-						
Sodium	ug/l	170000	-						
Miscellaneous Parameters									
Carbonate Alkalinity as CaC03	mg/l	150	-						
meta-Xylene	ug/l	21	-						

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	CLEAN WATER, INC.	490	SS10	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

		Sample Points, Sampling Dates, and ETC Sample No.'s							
Parameters	*Units*	W SS10 840814 E6523	W SS10 880823 BG3950						
ortho- and para-Xylenes	ug/l	26	-						

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

ETC ENVIRONMENTAL TESTING and CERTIFICATION

RECEIVED
OCT 13 1988

Technical Report

for

WASTE MANAGEMENT, INC.

Chain of Custody Data Required for ETC Data Management Summary Reports						
BG3951	WASTE MANAGEMENT, INC.	490	XLABORATORY 880819			
ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Swep T. Davis

President

This Technical Report is an INSITE℠ service generated by LODESTAR℠ Data Management Software.

284 RARITAN CENTER PARKWAY • EDISON, NJ 08837 (201) 225-5600

ETC

SEP 18, 1988
QV10020

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds - GC/MS Analysis Data (QR01)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG3951	WASTE MANAGEMENT, INC.	490	XLABORATORY	880819		0

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen. Added ug/l	% Recov
3V	Benzene	ND	4.4	66.2	68.9	ND	50.0	137	ND	50.0	132
7V	Chlorobenzene	ND	6.0	59.9	63.7	ND	50.0	122	ND	50.0	120
11V	Chloroform	ND	1.6	54.9	57.4	ND	50.0	118	ND	50.0	1 0
19V	Ethylbenzene	ND	7.2	60.2	62.8	ND	50.0	122	ND	50.0	120
25V	Toluene	ND	6.0	60.3	62.1	ND	50.0	122	ND	50.0	121
27V	1,1,1-Trichloroethane	ND	3.8	54.4	58.4	ND	50.0	120	ND	50.0	109
29V	Trichloroethylene	ND	1.9	60.0	61.9	ND	50.0	120	ND	50.0	120

Acrolein and Acrylonitrile values are screen only.

All zero and variable recoveries have been manually verified.

ETC

SEP 18, 1988

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Water - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
BG3951	WASTE MANAGEMENT, INC.	490	XLABORATORY	8808'		0

Compound	Amount added ug	% Recovery	IFB EPA Control Limits	
			Lower	Upper
VOLATILE FRACTION (GC/MS)				
Toluene-D8	.250	92	88	110
p-Bromofluorobenzene	.250	90	86	115
1,2-Dichloroethane-D4	.250	90	76	114
ACID FRACTION (GC/MS)				
Phenol-D5	-	-	10	94
2-Fluorophenol	-	-	21	100
2,4,6-Tribromophenol	-	-	10	123
BASE/NEUTRAL FRACTION (GC/MS)				
Nitrobenzene-D5	-	-	35	114
2-Fluorobiphenyl	-	-	43	116
Terphenyl-D14	-	-	33	141
PESTICIDE/PCB FRACTION (GC)				
Dibutylchlorendate	-	-	24**	154**

** Advisory Limits Only

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: D Date: 08/28/88 Time: 10:55

Lab ID: >D2574-166 Data Release Authorized By: David Grizzy

Spectrum No: 166

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	25.92	25.92	Ok
75	30-60% of mass 95	54.85	54.85	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	7.13	7.13	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	74.57	74.57	Ok
175	5-9% of mass 174	5.71	7.66	Ok
176	95-101% of mass 174	72.85	97.69	Ok
177	5-9% of mass 176	5.71	7.84	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC10020V	>D2575	~~11/21/88~~ ~~8/28/88~~	11:31
QC10020VS	>D2576	~~11/~~	12:13
QC10020VS	>D2577		14:56
BF0551VS	>D2579		14:48
BF0551VR	>D2586		15:31
BG3951V	>D2581		16:14
BF0512V	>D2582		16:57
BF0518V	>D2584		18:23
BF0519V	>D2585		19:06
BF0551V	>D2586		20:05
BF0517V	>D2587		20:48
BF0524V	>D2588		21:31
~~BF 09/11/88~~			

Form V

GC/MS PERFORMANCE STANDARD

Bromofluorobenzene (BFB)

Case No.: _____ Contractor: ETC Corp. Contract No.: _____

Instrument ID: D Date: 08/28/88 Time: 23:28

Lab ID: >D2589-168 Data Release Authorized By: David Yeary

Spectrum No: 168

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
50	15-40% of mass 95	27.02	27.02	Ok
75	30-60% of mass 95	59.78	59.78	Ok
95	Base peak, 100% relative abundance	100.00	100.00	Ok
96	5-9% of mass 95	8.22	8.22	Ok
173	Less than 1% of mass 95	0.00	0.00	Ok
174	Greater than 50% of mass 95	76.78	76.78	Ok
175	5-9% of mass 174	6.57	8.55	Ok
176	95-101% of mass 174	74.22	96.67	Ok
177	5-9% of mass 176	5.67	7.64	Ok

This performance tune applies to the following samples, blanks and standards:

Sample ID	Lab ID	Date of Analysis	Time of Analysis
QC10020VS	>D2590	8/29/88	00:16
QC10020V	>D2591		01:00
BF0428V	>D2592		02:25
BF0415V	>D2593		03:08
BF0581V	>D2594		04:14
BF0393V	>D2595		04:57
BF0394V	>D2596		05:41
BF0493V	>D2597		06:24
BF0417V	>D2598		07:07
BF0421V	>D2599		07:50
BF0410V	>D2600		08:33
BF0433V	>D2601		09:16

QUANT REPORT

Operator ID: JD5528 Quant Rev: 6 Quant Time: 880903 20:01
Output File: ^D2575::AQ Injected at: 880828 11:31
Data File: >D2575::U3 Dilution Factor: 1.00000
Name: VOA,8/28/88,D
Misc: QC10020V,QV10020,L,5,,

ID File: ID0011::US
Title: PP/VOA
Last Calibration: 880903 12:23

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*Bromochloromethane	10.51	242	59281	250.00	NG	92
7)	Methylene chloride	7.05	153	3610	10.41	NG	91
15)	1,2-Dichloroethane-D4 (SURR)	13.31	314	157593	230.96	NG	97
17)	*1,4-Difluorobenzene	20.92	510	238909	250.00	NG	99
31)	*Chlorobenzene-d5	25.78	635	181235	250.00	NG	65
34)	Toluene-D8 (SURR)	24.58	604	297271	234.66	NG	89
38)	p-Bromofluorobenzene (SURR)	30.08	745	193005	235.50	NG	78

M 9/16/88

* Compound is ISTD

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle.

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle.

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession.

ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY FORM (CC1)

ORIGINAL

Seal No. 0131389 ETC Job # [illegible]

Date Sealed 88/08/1[illegible] By: MTZ

Company: WASTE MANAGEMENT, INC. Attn.: KIRK STEMPLE

Facility/Site: VICKERY Phone: (419) 547 - 7791

Address: 3956 STATE ROUTE 412, VICKERY, OH 43464

SAMPLE IDENTIFICATION

Facility: 4 9 11 (Facility/Site Code) Dedicated Bailer (Optional Sample Point Descriptions)

Sample Point: X-LABORATORY 880819 (Source Code (from below) / Your Sample Point ID (left justify) / Start Date (YY/MM/DD) / Start Time (2400 hr. clock) / Elapsed Hours (composite))

MTZ 8/24/88 as per Julie Kampa 8/24/88 Kampa

Source Codes:
Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....(X)
Soil ...(S) River/Stream..(R) Generation Point....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify RINSEWATER

SHUTTLE CONTENTS

BOTTLE No	Type	Size	Preserv.	ANALYSIS	SAMPLER Filt. (Y/N)	SAMPLER Observations	LAB Observations
2	VOA	40	NONE	VOLATILES	N	TYPE I WATER RINSE	✓
1	TB	40	GC/MS	TRIP BLANK	N		✓

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) Julie Kampa Date: 8-18-88 Time: 1:30pm
Signature: Julie K Kampa Seal #: 0131389 Intact: YES

2. I have received these materials in good condition from the above person.
Name: CHARLES E. ROBERTS Signature: Charles E Roberts
Date: 8/19/88 Time: 1615 Remarks:

3. I have received these materials in good condition from the above person.
Name: Signature:
Date: Time: Remarks:

4. Shuttle Sealed By: (print) CHARLES E. ROBERTS Date: 19 AUG 88 Time: 6:40PM
Signature: Charles E. Roberts Seal #: 0131388 Intact: YES

LAB USE ONLY Opened By: [signature] Date: 8-22-88 Time: 11:15AM

SHUTTLE # 1774 TEMP. °C 10° SEAL # 131388 COND. intact

ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # BC-3951

Sample Point [X] LABORATORY
Source Code — Sample Point I.D.

FIELD PROCEDURES

PURGE DATE (YY MM DD)	START PURGE (2400 Hr Clock)	ELAPSED HRS	WATER VOL. IN CASING (Gallons)	VOLUME PURGED (Gallons)

SAMPLING METHOD: Grab

Sampler Type [E] A-Submersible Pump, B-ISCO, C-Bladder Pump, D-Dipper/Bottle, E-Bailer, F-Scoop/Shovel, X-Other _____ (SPECIFY OTHER)

Sampler Material [B] A-Teflon, B-Metal, C-PVC, D-Plastic, X-Other _____ (SPECIFY OTHER)

Tubing Material [ ] A-Teflon, B-Tygon, C-Polyethylene, D-Silicon, X-Other _____ (SPECIFY OTHER)

Sample Composited [Y/N] N _____ Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl) _____
Depth to Ground water (ft) _____
Groundwater Elevation (ft msl) _____
Well Depth (ft) _____
Sample Depth (non-well) (ft) _____

	ph	(STD)		spec. cond.	um/cm at 25°C	(other parameter)	value	units
1st			1st					
2nd			2nd					
3rd			3rd					
4th			4th					

Sample Temp _____ (°C)
Turbidity _____ NTU

FIELD COMMENTS

Sample Appearance: _____
Weather Conditions: _____
Other: This is Type I water poured inside cleaned bailer & then sampled

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: Julie K Kampa (Print) Employer: Bowser-Morner, Inc

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

8-18-88 (Date) Julie K Kampa (Signature)

ORIGINAL

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 8/28/88 SHIFT AM
FRACTION PP/VOA
INSTRUMENT D
TUNE FILE APEI02
SEQUENCE FILE KID
METHOD FILE VOAD
ID FILE ID0011
ANALYST(S) Karen [illegible]

SUPERVISOR [illegible]
BATCH #'s ~~QV1020~~ K.B. 8/30/88
QV 10020

(PLEASE INITIAL) CD0011

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
P-BFB	25	18734	2uL
INTERNAL STD	25	19754	10uL
SURROGATE	25	19734	10uL
CALIB I	50	3393	2,5,10,15,20uL
CALIB II	50	3388	2,5,10,15,20uL
XVOA	50	19351	2,5,10,15,20uL

	NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
	P-BFB	>D2574	2uL	–		10:55	OK 166	
	~~QC1020V~~ QC10020V	>D2575	5mL	8		11:31	OK BLANK	
KB. 8/30	~~QC1020VS~~ QC10020VS	>D2576	5mL	9	QCAL	12:13	OK 5uL CAL I,II,XVOA	
	~~QC1020VS~~ QC10020VS	>D2577	5mL	10			OK 5uL CAL I,II,XVOA	
	BF0551V	>D2578	5mL	8			NG SURR LOW	
	BF0551VS	>D2579	5mL	9		14:48	OK 5uL CAL I,II,XVOA	
	BF0551VR	>D2580	5mL	10		15:31	OK 5uL CAL I,II,XVOA	
	BG3951V	>D2581	5mL	1		16:14	OK	
	BF0512V	>D2582	5mL	2		16:57	OK	
	BF0517V	>D2583	5mL	3			NG 2nd SURR HIGH	
	BF0518V	>D2584	5mL	4		18:23	OK	
	BF0519V	>D2585	5mL	5		19:06	OK	
R	BF0551V	>D2586	5mL	8		20:05	OK	
R	BF0517V	>D2587	5mL	9		20:48	OK	
	BF0524V	>D2588	5mL	10		21:31	OK	
	P-BFB ~~QC10020VS~~	>D2589	2ul	–		23:28	OK	
KB. 8/30	~~QC1020VS~~	>D2590	5ml	8	QCAL →	00:16	OK 5ul Cal I,II,XVOA	
	~~QC1020V~~ QC10020V	>D2591	↓	9		1:00	OK	
	BF0428V	>D2592	5ml	1		2:25	OK	
	BF0415V	>D2593		2		3:08	OK	
	BF0381V	>D2594		8		4:14	OK	
	BF0393V	>D2595		9		4:57	OK	
	BF0394V	>D2596		10		5:41	OK	
	BF0193V	>D2597		1		6:24	OK	
	BF0417V	>D2598	↓	2		7:09	OK	

ETC

LABORATORY CHRONICLE: GC-MS Department

DATE 880829 SHIFT
FRACTION VOA
INSTRUMENT D
TUNE FILE APEI02
SEQUENCE FILE
METHOD FILE VOAD
ID FILE ID0011
ANALYST(S) C.J. Coll

SUPERVISOR [signature]
BATCH #'s ~~QV1020~~ KB. 8/30/88
QV10020

(PLEASE INITIAL)

CURRENT CS05 STATUS		STANDARDS UPDATED	
ACQ		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL.
See page 1			

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
BF0421V	>D2599	5ml	3		7:50	ok	
BF0410V	>D2600	↓	4		8:33	ok	
BF0433V	>D2601	↓	5		9:16	ok	

ETC FORM #102

A Subsidiary of Environmental Treatment and Technologies Corp.
The Environmental Services Company

ETC

DATE: 09/22/88
PAGE:

DATA MANAGEMENT SUMMARY REPORT
(DM-1H) - History of All Parameters Present, Selected Sample Point

RECEIVED
OCT 13 1988

Chain of Custody Data Required for ETC Data Management Summary Report

See Below	WASTE MANAGEMENT, INC.	490	LABORATORY	See Below
ETC Sample No.	*Company*	*Facility*	*Sample Point*	*Date*

Sample Points, Sampling Dates, and ETC Sample No.'s

Parameters	*Units*	LABORATORY 880819 BG3951							
NONE FOUND ABOVE METHOD DETECTION LIMIT									

Footnotes: BMDL=Below Method Detection Limit ND=Parameter not detected '-'=Parameter not tested

Golder Associates
CONSULTING GEOTECHNICAL AND MINING ENGINEERS

PLAN FOR

INVESTIGATION AT HOLE SS-10, VICKERY, OHIO FACILITY

1987

Submitted to:

Chemical Waste Management
3956 State Route 412
Vickery, Ohio 43464

DISTRIBUTION:

12 Copies - Chemical Waste Management
3 Copies - Golder Associates

December 1987 853-3022

Golder Associates
CONSULTING GEOTECHNICAL AND MINING ENGINEERS

December 9, 1987

853-3022
F/N 307.19

Chemical Waste Management
3956 State Route 412
Vickery, Ohio 43464

Attn: Mr. Kirk Stemple

RE: INVESTIGATION AT HOLE SS-10
VICKERY, OHIO FACILITY

Gentlemen:

As per your request, we are submitting the enclosed plan for investigating conditions at hole SS-10. We have reviewed the previously collected data from hole SS-10 and the surrounding areas and reviewed the program previously proposed by CWM to investigate the reported detection of organics in the water sample from hole SS-10. Based on our review, the program outlined by CWM is not considered appropriate for addressing the conditions which we believe caused the organics to be detected at SS-10.

The enclosed program plan provides a brief review of the SS hole program, the site geology, the situation we believe caused the organics to be detected in the SS-10 sample, and a program of additional investigation. The proposed program meets the requirements of the Consent Decree between CWM and OEPA of May 22, 1984.

Should there be any questions regarding this plan, please call.

Very truly yours,

GOLDER ASSOCIATES, INC.

John F. Clerici

John F. Clerici, P.E.
Associate

JFC:maa

TABLE OF CONTENTS

Cover Letter

Table of Contents i

SECTION	PAGE
1.0 INTRODUCTION	1
2.0 GEOLOGY AND HYDROLOGY	2
2.1 General	2
2.2 Overburden Soils	2
2.3 Hydrogeology	3
3.0 POTENTIAL SOURCES OF CONTAMINATION	5
3.1 Single Sample Program and Results	5
3.2 Potential Sources	6
4.0 PROPOSED INVESTIGATION	7
4.1 Drilling	7
4.2 Development	7
4.3 Water Sampling and Analytical Procedure	8
4.4 Report	9
4.5 Timing	9
REFERENCES	10

In Order Following Page 10

FIGURE 1 - Site Location Plan
FIGURE 2 - Well Location Plan

APPENDIX A - Monitoring Hole Installation Log
APPENDIX B - Health and Safety Plan
APPENDIX C - Boring and Well Installation Procedures
APPENDIX D - Well Sampling and Analysis Procedures

1.0 INTRODUCTION

Chemical Waste Management, Inc. (CWM) owns and operates a hazardous waste disposal facility in northern Ohio, near the town of Vickery, known as the Vickery Facility. The site is located on State Route 412 near the intersection of State Route 510, about twenty miles southwest of Sandusky, Ohio (Figure 1).

The facility presently disposes of hazardous waste by underground injection through four deep wells. Three other deep injection wells previously used at the site have been plugged and abandoned. Past operations at the facility also included the use of various ponds for the treatment and/or separation of oil residues and liquid waste for reclamation and disposal. In accordance with the Consent Decree of May 22, 1984 between CWM and the Ohio Environmental Protection Agency (OEPA), CWM agreed to install eighteen (18) temporary overburden groundwater sampling holes (SS-Series holes). These holes, plus one (1) existing monitoring well were involved in a single sampling event to sample shallow overburden groundwater. The Consent Decree specified the open interval for the SS-holes at 15 feet to 20 feet beneath the original ground surface. Also specified were the locations for each SS-hole. In addition, the Consent Decree specified the installation of a groundwater monitoring well(s) at hole locations where groundwater sampling results exceed concentrations specifed in the Consent Decree.

Following the installation of the SS-series holes and the single sample event, unacceptable levels of organic compounds were reported from the sampling of hole SS-10. This plan reviews the findings of the single sampling event and presents a plan for additional investigation and the installation of a monitoring well near hole SS-10.

2.0 GEOLOGY AND HYDROLOGY

2.1 General

The site geology and hydrogeology have been extensively evaluated and summarized in References 1 through 6. The site is underlain by approximately 33 feet to 52 feet of glacial overburden materials, consisting of lacustrine clay and glacial till, overlying dolomite bedrock. The dolomite bedrock, which comprises the uppermost aquifer underlying the site, is about 500 feet thick. The dolomite bedrock is underlain by a sequence of sedimentary rocks comprising shale, sandstone, limestone, and dolomite. Precambrian granite bedrock ("basement rock") is encountered about 2,900 feet beneath the ground surface.

2.2 Overburden Soils

The overburden soils at the site are the primary soils of concern in this investigation. The overburden soils consist of deposits of glacial and lacustrine silty clays and clays, approximately 50 feet thick.

The lacustrine soils extend from 0 feet to 25 feet beneath the ground surface, with a typical thickness of about 15 feet. Sand partings and horizontal laminations 1/4-inch to 1-inch thick have been observed in the lacustrine materials. The upper 5 feet to 10 feet of the overburden has been desiccated during the geologic past resulting in fractures which may be open, although none were observed during any of the field sampling programs.

Glacial till deposits underlie the lacustrine materials down to bedrock. These till deposits are also comprised of silty clays and clays, with some sand and gravel in the matrix. In some areas of the site, the till deposits are at or near the ground surface. In these areas, some desiccation of the near surface till soils has also occurred.

The depth of desiccation can be delineated by lower moisture contents and stiffer consistencies than those found deeper in the overburden. Below the limit of desiccation the lacustrine and till soils are typically soft, have a relatively high moisture content, and are near normally consolidated. These soft soil conditions posed particular installation problems for the SS-series holes because the clays would squeeze the hole closed, unless casing was used to support the hole.

2.3 Hydrogeology

The primary aquifer underlying the site is the fractured and solutioned dolomite bedrock. Site water level data indicates on-site pumping from the aquifer can affect the overall groundwater gradients. Furthermore, an on-site pump test, along with past water level data, has clearly demonstrated that lateral flow in the aquifer can locally be maintained toward the facility. Regional lateral flow in the aquifer is north toward Lake Erie.

Water levels in the bedrock aquifer, within the area of this study, are approximately at an elevation of 595 feet; about 15 feet to 20 feet beneath the original ground surface.

Water levels in the overburden materials have been observed to be within 5 feet of the original ground surface. Therefore, there is a component of flow from the overburden material toward the bedrock aquifer. However, the amount of flow through the overburden materials at the site is probably inconsequential compared to the amount of total bedrock aquifer recharge from off-site areas.

3.0 POTENTIAL SOURCES OF CONTAMINATION

3.1 Single Sample Program and Results

The details for placement, installation and sampling of the holes for the single sample program were approved by OEPA prior to commencement of the program. Several modifications were required in the field, which were also approved by OEPA prior to their implementation. The holes for the single sampling event were installed between June 20 and July 13, 1984, and sampled between June 29 and August 15, 1984. Hole SS-10 was installed on July 10, 1984 (see Appendix A) and sampled on August 14, 1984. The program procedures developed with the OEPA are presented in Reference 5 and the results are presented in Reference 6.

The groundwater testing program included several indicator parameters, major ions and volatile organic compounds (VOCs). The analytical results, discussed in detail in Reference 6, indicated potentially unacceptable constituent levels at hole SS-10. VOCs were reported for the groundwater sample from this hole and oily material was observed in the soils during the installation of the hole (as indicated on the installation log in Appendix A). The VOC data reported for hole SS-10 included the following:

VOC	CONCENTRATION (ug/L)
Benzene	18
Chlorobenzene	14
Chloroform	106
Ethylbenzene	10
Toluene	105
1,1,1 Trichloroethane	13
Trichloroethane	30

3.2 Potential Sources

Hole SS-10 is located directly in front of a previous tank truck unloading dock. The hole was in the middle of the gravel roadway which was once used by oil and hazardous waste tank trucks. SS-10 was constructed with a cap flush with the road surface to avoid being hit by truck traffic. The road bed has since been raised as part of other site re-grading.

Minor spills or leaks during past loading and unloading activities near SS-10 are the likely source for the VOCs detected in SS-10. Other potential sources could include the waste reclamation and pipe transport system. The gravel road would provide a preferential avenue for surface spills to migrate downward to the underlying soil surface and remain trapped at the interface of these layers. The presence of VOCs in hole SS-10 is a localized situation and not an indication of leachate migration from the site waste management facilities.

The observation of oily material at the base of the 3-foot thick gravel layer in the SS-10 borehole (see the hole log in Appendix A) strongly suggests past spillage/leaks have settled at the soil surface beneath the gravel roadway. Hollow stem augering was required by OEPA to drill dry holes. Therefore, installation procedures did not include surface casing to seal the final sampling interval from liquids encountered at the base of the road gravel. Thus, some of these fluids entered the sampled interval. This water was not permitted by OEPA to be flushed from the hole prior to development or sampling.

4.0 PROPOSED INVESTIGATION

4.1 Drilling

The proposed investigation includes the drilling of four boreholes, analysis of soil samples from the holes and the subsequent installation of one well. As per CWM's original proposal, and at OEPA's request, the holes will be drilled less than 10 feet from the location of hole SS-10 (see Figure 2). The hole to the west will be drilled to approximately the same level as SS-10 and a well will be installed with a 5-foot open interval at the same interval as SS-10. The other holes will be drilled in the top 4.5 feet of the soil overburden. A Health and Safety Plan for this program is provided in Appendix B.

Each hole will be continuously split-spoon sampled. Samples will be retained in glass jars. Well drilling and installation procedures will be similar to the methods used for the RCRA 265 well system (see Appendix C). The head space from each of the split-spoon samples will be tested for total organic concentration using an HNU PI-101 or an OVA-128. Based on these screening analyses, about ten samples from the borings will be selected, representing the worst case results, and analyzed for the constituents listed in Section 3.1. These soil samples will be immediately placed in a cooled container for shipment within 48 hours to an analytical laboratory.

4.2 Development

The well will be developed by successive purging of the well water. Based on previous experience with shallow overburden wells at the site, a period of 3 days to 7 days may be required for a well to recover after bailing. Purging will continue until reasonably stable pH and specific conductance

values are obtained. The well will be bailed once before or at the completion of the installation program after several feet of water has accumulated in the well and at least one other time before sampling. Additional purging for development may be required. Development and pumping water will be collected for on-site disposal.

4.3 Water Sampling and Analytical Procedure

Water samples for analytical testing will be obtained from the well after development using the standard site sampling procedures. Groundwater levels in the well will be measured prior to bailing and sampling. Water samples for analytical testing will be obtained with a stainless steel bailer. The bailer will be steam cleaned and rinsed with distilled water and a new polyproplyene rope will be attached before being used in each well. VOC samples will be collected and analyzed for the parameters listed in Section 3.1.

Each of the three shallow holes will be left open until sufficient water accumulates in them for sampling. Each hole will be covered to protect it from direct precipitation. Following sampling, the three shallow holes will be sealed by filling them with cement, concrete, or clay.

Approximately 240 ml of water will be required for analytical testing. Each aliquot will be collected and preserved in accordance with EPA protocols for the various analytical methods. The samples will be placed in sealed containers during shipment. Chain-of-custody will be kept for each sample. The site and WMI procedures will be followed. Sampling procedures are discussed further in Appendix D. The samples will be analyzed for field pH, field conductivity and for the compounds listed in Section 3.1 by EPA Method 624.

4.4 Report

At the completion of this well installation and sampling program, a report of the program will be provided. This report will include a description of the soil drilling and sampling, well installation details, sampling and analytical protocol, analytical results, and an evaluation of the results.

4.5 Timing

This evaluation program for hole SS-10 will be initiated within 30 days after approval of the plan by the OEPA. The final report will be submitted within 30 days after receiving the final laboratory analytical reports for the proposed soil and water sampling.

GOLDER ASSOCIATES, INC.

Jeffery J. C. Paul
Senior Hydrogeochemist

John F. Clerici, P.E.
Associate

Gary H. Collison, P.E.
Principal

JJCP/JFC/GHC:rcs

REFERENCES

1. Bowser-Morner, Inc., "Hydrogeologic Assessment, Northern Ohio Treatment Facility, Vickery, Ohio," May 1983.

2. Golder Associates, "Geotechnical and Geohydrologic Data Review, Vickery, Ohio, Chemical Waste Management Facility," June 1983.

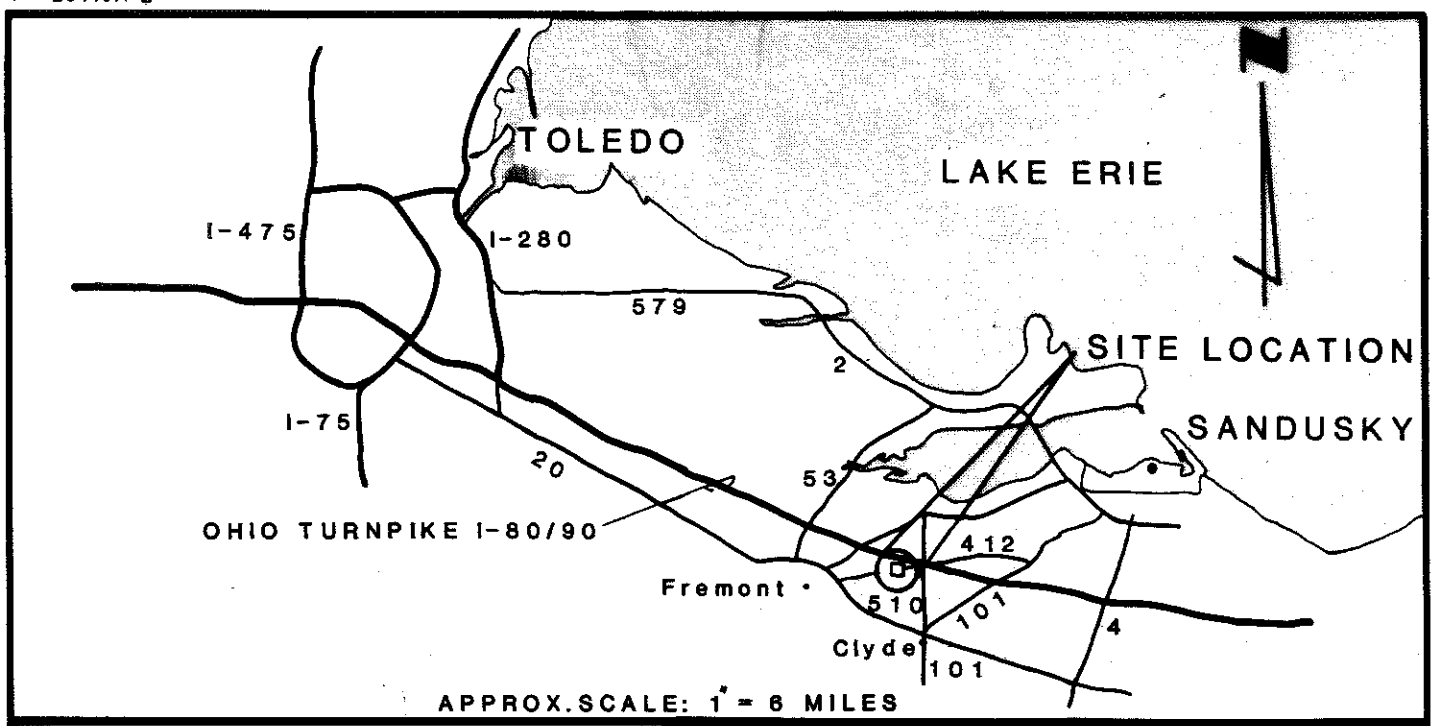
3. Golder Associates, "Summary and Characterization of Site Geohydrologic Conditions, Chemical Waste Management, Inc., Vickery, Ohio Facility," September 1983.

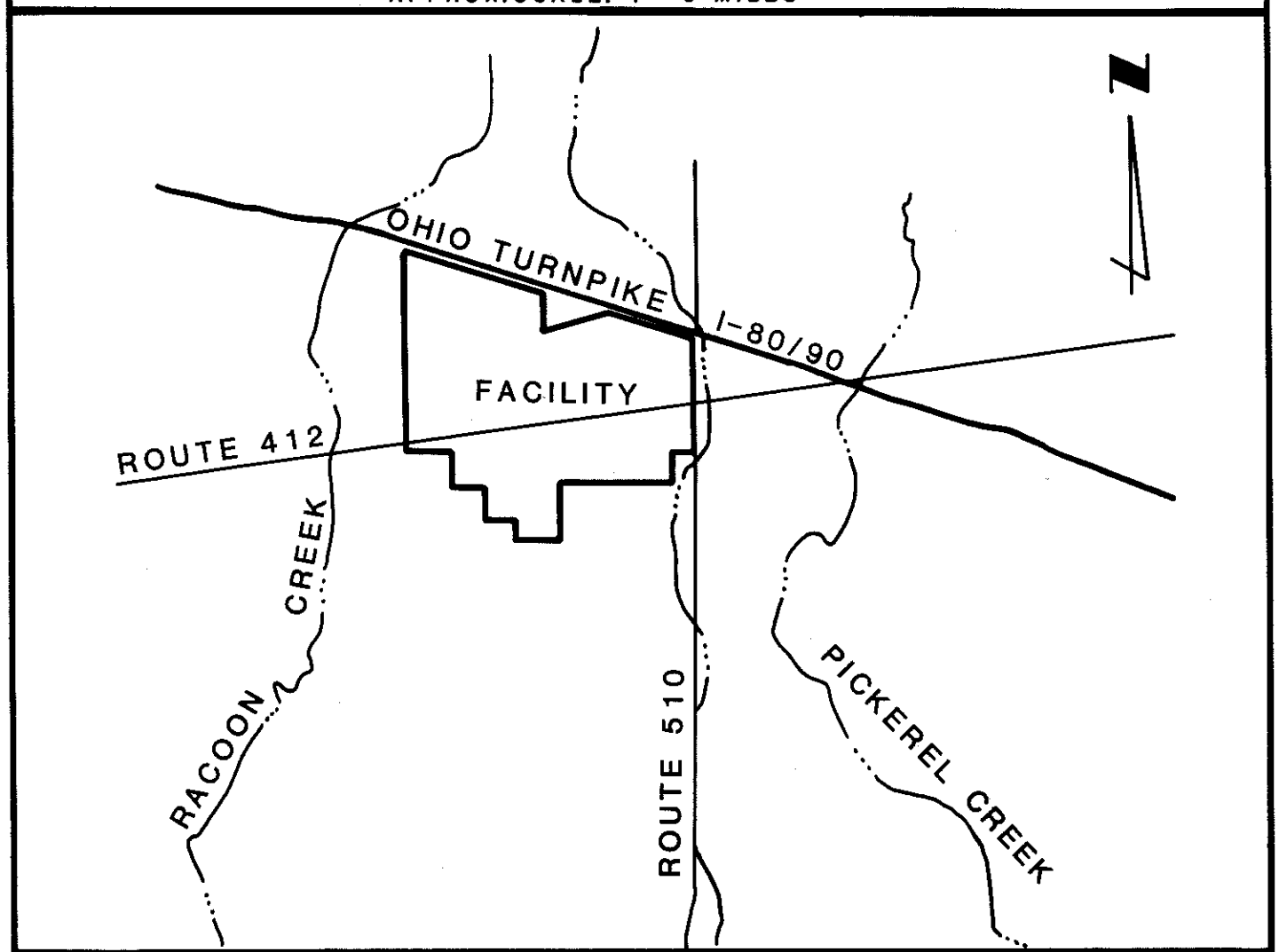
4. Golder Associates, "Groundwater Monitoring Program, CWM Northern Ohio Treatment Facility, Vickery, Ohio", April 1984.

5. Golder Associates, "Overburden Groundwater Testing Program Description" June 1984 and Addendum dated July 2, 1984.

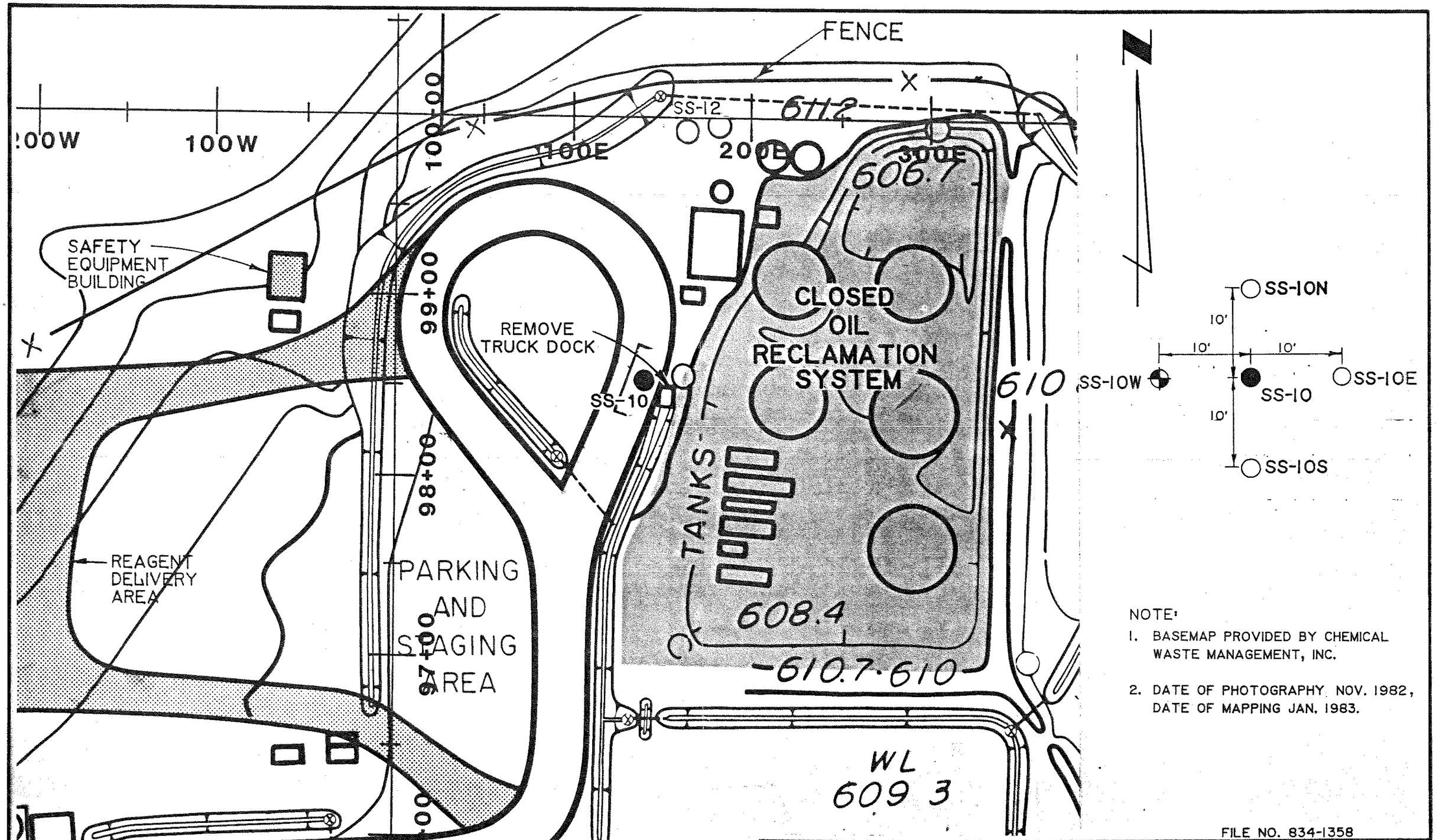
6. Golder Associates, "Overburden Groundwater Testing Program Vickery, Ohio Facility", September 1984.

AF 20440A-B





JOB NO. 834-1358	SCALE NO SCALE	SITE LOCATION PLAN
DRAWN JLW	DATE 3/13/86	
CHECKED WBD	DWG. NO. 391	
Golder Associates	CHEMICAL WASTE MANAGEMENT, INC.	FIGURE 1



NOTE:

1. BASEMAP PROVIDED BY CHEMICAL WASTE MANAGEMENT, INC.
2. DATE OF PHOTOGRAPHY NOV. 1982, DATE OF MAPPING JAN. 1983.

FILE NO. 834-1358

JOB NO. 853-3022	SCALE 1"=50'	HOLE SS-10 LOCATION WELL LOCATION PLAN	
DRAWN SKB	DATE 11/4/87		
CHECKED JFC	DWG. NO. 526		
Golder Associates		CHEMICAL WASTE MANAGEMENT, INC.	FIGURE 2

300171

APPENDIX A

MONITORING HOLE INSTALLATION LOG

MONITORING HOLE INSTALLATION LOG

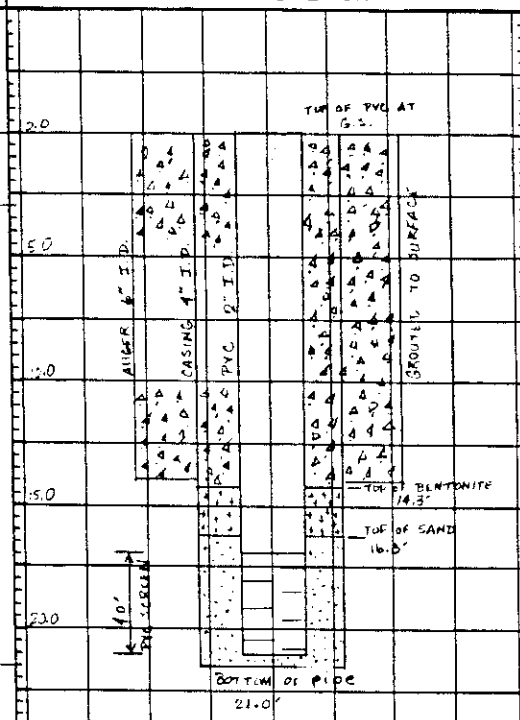
JOB NO [illegible]	PROJECT [illegible]	WELL NO. [illegible]	SHEET 1 OF 1
GA INSP. [illegible]	DRILLING METHOD HOLLOW STEM AUGER / CASING	GROUND ELEV. 610.0	DEPTH WL [illegible]
WEATHER P. Cloudy	DRILLING COMPANY [illegible]	COLLAR ELEV. [illegible]	DATE/TIME 6:31 7/10/84
TEMP. 70°F	DRILL RIG MOBILE B-61 DRILLER B. KIRKPATRICK	STARTED 9:45 7/10/84 (TIME / DATE)	COMPLETED 6:40 7/10/84 (TIME / DATE)

MATERIALS INVENTORY

WELL CASING — in. dia. — l.f.	WELL SCREEN 2 in. dia. 4 l.f.	BENTONITE SEAL 2.0'
CASING TYPE —	SCREEN TYPE TIMCO	INSTALLATION METHOD SEE BELOW
JOINT TYPE —	SLOT SIZE 0.010"	FILTER PACK QTY —
GROUT QUANTITY —	CENTRALIZERS NONE	FILTER PACK TYPE MED. SAND
GROUT TYPE HILTON cement and clay		INSTALLATION METHOD SEE BELOW

DEPTH/ELEV.	SOIL/ROCK DESCRIPTION
0.0 / 610.0	Ground Surface
3.0 / 607.0	Gravel sand and brick (Fill)
21.5' / 588.5	Very soft, wet gray silty clay, trace fine sand. (CH)
	Bottom of hole at 21.5'

HOLE SKETCH



INSTALLATION NOTES

Used hollow stem augers to 14.0'
Hit oily smelling, wet material at 3.0'
Hit water at 10.0'.
Pushed shelby tube to clean out augers.
Drove casing to 15.5'
Pulled casing up to put clean 5' section + bit on bottom.
Drove casing to 21.5'
Used shelby tube then bucket auger to clean out casing.
Bailed out water from casing before cleaning with b. auger.
Placed sand up to 21.0' to bed pipe.
Placed sand up to 16.3', 6" at a time as casing was pulled up 6" at a time.
Placed bentonite up to 14.3'.
Grouted hole from 14.3' to surface.

PVC stickup = 0'
Water level = 2.26'
Water level after bailing = 19.98'

Note: placed 1.5' of 4" ø steel casing welded to 2.5' ø steel plate recessed into pavement to protect well

APPENDIX B

HEALTH AND SAFETY PLAN

B.0 HEALTH AND SAFETY PLAN

B.1 General Safety Precautions

At the Vickery Facility, CWM maintains Safety Regulations for Outside Contractors. These regulations will be strictly enforced and will provide the minimum Health and Safety requirements for the site. The specific work activities outlined in this Investigation Plan will require additional Health and Safety precautions.

Volatile organic compounds were reportedly detected in SS-10 groundwater samples including chloroform and toluene at about 100 ppb and benzene, chlorobenzene, ethylbenzene, trichloroethane, and 1,1,1-trichloroethane at or below 30 ppb. The reported presence of these compounds necessitates the use of an instrument in the field to trigger the use of respirating protection. The following procedures will be followed.

1. CWM Safety Regulations will be followed.

2. Personnel in the working area handling drilling or sampling equipment, handling samples, or handling cuttings shall wear hard hat, gloves, tyvek suit and safety boots.

3. Upon leaving the work area, thoroughly wash face and hands.

4. A respirator, with organic vapor cartridge, shall be carried by personnel within the work area.

5. Respirtory protection will be worn when required as delineated below.

During drilling and sampling, air quality will be monitored continuously with an OVA, HNU, or Photovac TIP. The air quality detector shall be calibrated daily and the calibration documented. Air quality readings shall be recorded at a minimum of once per hour during the course of the work. Any unusual or anomalous readings shall be also be recorded on the air quality monitoring data sheet or field book along with date, time, and location. A portable wind sock or wind vane shall be established at each work station and, where possible, personnel shall stay upwind of the drilling and sampling operations.

As previously noted, it is contemplated that the assessment work will only require Level D personnel protection. However, equipment will be provided for Golder Associates and drilling contractor personnel to continue the planned work with Level C personnel protection, should such protection be necessary as determined by air quality measurements. Should air contaminant levels require Level B protection, the project will stop until such equipment can be brought to the site. The total atmospheric concentrations of vapors or gases for determining personnel protection levels are as follows:

Level D - Background to 5 ppm
Level C - 5 ppm to 50 ppm above background
Level B - 50 ppm to 500 ppm above background
Evacuate working area @ > 500 ppm

The personnel protection equipment for the different levels of protection are presented in Table B-1.

B.2 Procedures if Hazardous Materials are Encountered

Sampling of hazardous waste products or containers, or penetration of these materials is not proposed as part of this program. However, in the event that the drilling does encounter hazardous materials or the air monitoring indicates that supplied air respiratory protection to be required, the following steps will be taken:

1. Drilling and sampling work shall cease.
2. All personnel will immediately move a safe distance (at least 50 feet upwind) from the work area.
3. Air quality measurements will immediately be checked to determine a safe working area.
4. The appropriate respiratory protection level shall be determined from air quality measurements as specified in Section B.1.
5. Personnel may return to the work area with the appropriate respiratory protection and protective clothing.
6. All potentially contaminated material from the hole shall be drummed for off-site disposal.

TABLE B-1

PERSONAL PROTECTIVE EQUIPMENT
Levels D, C, B and A

LEVELS OF PROTECTION - EQUIPMENT REQUIRED

LEVEL D: - FID/PID from 0 to 5 ppm

Tyvek Coveralls
Safety Boots
Hard Hat
Safety Glasses or Goggles

LEVEL C: - FID/PID from >5 to 50 ppm

Air-purifying Respirator (MSHA/NIOSH Approved)
Safety Glasses, Goggles or Face Shield
Tyvek Coveralls
Inner Gloves - Surgical Type
Outer Gloves - Chemical Resistant
Hard Hat
Boots - Chemical Resistant

LEVEL B: - VOA/PID from >50 to 500 ppm

Full Face Positive Pressure Air Respirator (MSHA/NIOSH Approved)
Saranex Coated Tyvek Coveralls
Inner Gloves - Surgical Type
Outer Gloves - Chemical Resistant
Boots - Chemical Resistant
Hard Hat
Cloth Coveralls Inside Tyvek

LEVEL A: - VOA/PID >500 ppm

Not anticipated; Procedures will be developed, if required

Note: Ambient air quality monitoring readings are Work Zone-Guidelines Values

APPENDIX C

BORING AND WELL INSTALLATION PROCEDURES

C.0 INSTALLATION PROCEDURES FOR NEW MONITORING WELLS

C.1 General

New groundwater monitoring wells for the Vickery Facility monitoring system are designed and installed based on the subsurface stratigraphy of the area. To the degree practical, the well screen slot sizes have been selected to maximize the open interval while providing small enough openings to keep fine grained soil particles from entering the wells.

The installation procedures are tailored to minimize dragdown of potentially contaminated surface soils, to minimize potential flow of surface or near surface water into the well while drilling, and to minimize potential cross contamination between wells from the drilling equipment. The installation methods have also been selected to prevent hole collapse or squeezing, which hampered previous well and piezometer construction at the facility. To accomplish these goals, surface casings and temporary casings will be used to construct each well and extensive cleaning procedures for the drill rigs, drilling tools, casings, and well materials will be adopted.

C.2 Equipment Cleaning and Decontamination

Prior to drilling a well boring, all equipment, including the "working areas" of the drill rig, will be steam cleaned and degreased until all loose material is removed. Drilling tools such as drill rods, 6-inch steel surface casing, 4-inch temporary steel casing and drill bits will be

steam cleaned, then rinsed with laboratory grade acetone and immediately re-rinsed with steam. The second steam rinse is intended to follow the acetone application before the acetone could evaporate. A third steam rinse is generally applied as an additional precaution.

Cleaned equipment not used immediately will be wrapped with plastic to protect equipment from airborne particulate matter. The ends of all casing and drill rods will be wrapped in plastic to keep particulate matter out of the interior of the drilling equipment. Any tape used to secure plastic to the materials will be applied so that it will not contact the materials directly. Cleaned equipment and equipment at each well site will be covered with plastic until needed for well construction purposes.

All open boreholes or drill casing left in boreholes will be covered with plastic when left for extended periods of time or during precipitation events. Such covering is done to protect the inside of the well bore from airborne particulate contamination.

All water used for cleaning and well construction will be municipal water. A sample of this water, along with rinse or wash water samples (from cleaned well and drilling materials) will be tested for selected priority pollutant organics.

C.3 Drilling Procedures

All wells will be constructed in steps by installing surface casing and telescoping a borehole through the surface casing to the final well depth. This telescoping will minimize the potential for dragdown of possibly contaminated surface soil or near surface waters.

Well borings will generally begin by augering a nominal 10-inch diameter borehole with solid stem augers to within one to four feet of the proposed top of screen interval for the wells. A 6-inch diameter flush threaded steel casing will be placed into the borehole with approximately 0.5 feet of the pipe (threaded end) extended above the existing ground surface. Grout mixed for all grouting procedures will consist of a Wyoming bentonite clay and municipal water mixture at a consistency of 1.5 to 2.0 pounds of bentonite per 1.0 gallon of water.

Grout will be tremied down the annular space between the 10-inch diameter augered hole and the 6-inch diameter surface casing. The grout slurry will be mixed with either a Moyno pump, air driven bladder pump, or by hand, if applicable.

The 6-inch surface casing will be flushed and/or drilled out (reamed) by using a 5.88-inch roller bit and municipal water until the return water is clear. After flushing, the remaining water will be removed to within 6 inches of the bottom of the hole by bailing with a 3-inch diameter PVC bailer, or by pumping with either the rig pump or a contractors pump. A one-way check valve will be placed

at the intake point when a pump is used to remove water downhole. The depth of the hole and residual water will be measured with a calibrated tape after the removal of water.

Advancement of the borehole will then be performed by driving a 4-inch inside diameter flush threaded steel casing through the 6-inch diameter surface casing to the desired well depth. The interior of the 4-inch casing will be flushed and reamed thoroughly with municipal water at selected intervals. The 4-inch casing will be bailed to within 6 inches of the bottom of the hole.

Soil samples will be obtained at specified depth using a split spoon sampler. The sampler will be driven inside the casing at each interval and then hole advancement will continue.

C.4 Well Completion

After advancing the well borings to the prescribed depth with the 4-inch diameter temporary casing, the following steps will be performed to complete the installation of wells screened in the soils:

a) A 6-inch layer of fine silica sand consisting of fine silica sand with less than 5 percent passing the number 200 U.S. Standard sieve will be poured into the borehole. The 4-inch diameter steel temporary casing will then be withdrawn 6 inches to one foot.

b) The well screen and riser pipe will be placed in the borehole, resting on the 6-inch layer of filter sand. The well riser extension above ground surface will be measured to assure that a proper stickup of about 1.0 feet to 3.5 feet. Well pipe and screen will be handled while wearing clean, laboratory grade laytex gloves. The well screen and pipe will consist of schedule 40 PVC 2-inch diameter, flush threaded joint pipe. Well screens will be continuously wrapped to number 6 slot (0.006 inches) size and have total screen lengths of about 4.0 feet.

c) The 4-inch temporary casing will be pulled in about one foot increments with about one foot of fine filter sand added for each increment. The depth to the top of the sand will be measured before and after the casing is pulled to detect any collapse of the borehole.

d) Once the sand is installed to between 0.5 feet and 1.0 feet above the top of the screen, the 4-inch temporary casing will be pulled in short increments (0.3 feet to 1.0 feet) and 3/8-inch diameter bentonite pellets will be added, tamped, and measured for each increment withdrawn. About 2 feet to 3 feet of pellets will be placed in the wells.

e) The remaining annular space will be grouted with a bentonite slurry mixture to within 2.5 feet of ground surface.

f) A 6-inch diameter flush joint protective casing and cover will be threaded onto the surface casing immediately after completion of the well. The cover should be then secured with a lock.

g) A 30-inch deep hole will be hand dug around the 6-inch diameter surface casing and backfilled with concrete to about 3 inches above the base of the protective pipe. The concrete will be sloped to provide surface drainage away from the well.

h) Well caps will be installed on the top of each well pipe. All well caps will be vented by drilling a small diameter hole through the side of the caps.

i) Dedicated stainless steel bailers will be later installed inside each well.

INSTRUCTIONS FOR DOCUMENTATION OF DRILLING AND WELL CONSTRUCTION ACTIVITIES AT WMI FACILITIES

To assure uniformity and completeness, WMI has developed standard forms for logging boreholes and documenting monitor well construction details and daily drilling activities. WMI consultants MUST USE THESE FORMS to assure prompt and complete payment of invoices submitted for drilling and well construction services.

WMI requires the submittal of both field and final boring logs and final well construction details. A description of the required information and specific instructions for completing WMI forms are provided in the following sections.

D-1.0 FORMAT AND DISTRIBUTION

All WMI forms for documentation of drilling and well construction activities are printed on four-copy carbon packs. Each form will have a serial number for document control and data management purposes. The appropriate forms will be provided to the consultant by the WMI project coordinator. The consultant will be responsible for recording the serial number of all forms which are provided to them and maintaining control of these forms. Any remaining unused forms must be returned to the WMI project coordinator upon completion of the project, along with the serial numbers of any lost or discarded forms. A correlation chart indicating the serial numbers of

the forms that were used on each boring must be submitted with the final report (see Table D-1 for an example correlation chart).

The distribusion of the form copies shall be as follows:

Original (white) Copy - Master Copy of Report

Yellow Copy - Consultant's File

Green Copy - WMI Regional Office

Pink Copy - WMI-EMD

D-2.0 FIELD DOCUMENTATION OF SUBSURFACE BORINGS AND TESTING[1]

A legible, concise, and complete record of all significant information pertaining to the drilling and sampling operation within each borehole must be maintained concurrent with the advancement of the hole.

Independent logs shall be prepared by the driller and the supervising geologist/geotechnical engineer. The purpose of maintaining duplicate records is to insure that all observations of the two people most closely associated with the work are recorded and to provide a check in the event of the discovery of some apparent discrepancy after the program has been

---

1. Adapted from: Winterkorn and Fang, 1975, Foundation Engineering Handbook, Van Nostrand Reinhold Company, pp. 63-63.

Boring No.	Well I.D.	Serial Numbers: Field Soil Borehole Logs	Final Soil Borehole Logs	Field Rock Borehole Logs	Final Rock Borehole Logs	Water Pressure Test Summary	Well Construction Summary
B-01	MW-01	FS 10024 FS 10025 FS 10026	SL 11723 SL 11724 SL 11725	FR 10732 FR 10733	RL 10003 RL 10004	PT 09321	WC 00366
B-02	MW-02A MW-02B MW-02C	FS 10027 FS 10028 FS 10029 FS 10030	SL 11726 SL 11727 SL 11728 SL 11729	FR 10734 FR 10735	RL 10005 RL 10006	PT 09322	WC 00367 WC 00368 WC 00369
B-03	--	FS 10031 FS 10032	SL 11730 SL 11731	-- --	--	--	--
B-04	MW-03	FS 10033 FS 10033 FS 10034	SL 11732 SL 11733 SL 11734	FR 10736	RL 10007	PT 09323	WC 00370

completed

no circu

gist/engi

the crede

submitted

The borin

define t

water co

the dril

Among the

1. Refe

loca

tior

perm

incl

refe

meas

e.g

2. Per

the

completed. The consultant shall retain copies of both logs but under no circumstances shall drillers logs be submitted in lieu of geologist/engineer logs. To avoid misunderstandings, it is recommended that the credentials of the geologist/engineer responsible for the logging be submitted to the WMI Project Manager for approval prior to drilling.

The boring logs must contain all the information necessary to completely define the subsurface profile, geotechnical characteristics, and groundwater conditions. The log should be a complete chronological record of the drilling and sampling operations within the hole including delays. Among the information to be recorded is the following:

1. Reference information comprising the project number, title, and location; the exploration number or letter designation; the exploration location by coordinates, station and offset, or referred to permanent nearby structures; the inclination of the boring and, if inclined, the bearing or azimuth of the dip of the hole; the reference elevation, that is, the elevation from which all depth measurements are made; and the datum of the reference elevation, e.g., Mean Sea Level, etc.

2. Personnel information including the names of the drilling contractor, the driller, and the inspecting engineer or geologist.

3. Equipment data consisting of the manufacturer's name and model designation for the drill rig, motorized equipment used to excavate test pits and trenches, and seepage and pressure testing equipment.

4. Sampling and coring information consisting of the following:

   a. For all sampling and coring operations: the sample type and number; the inside diameter, outside diameter, and length of the sample tube; the depth at the start and at the completion of the sampling drive or push or coring "run;" the length of sample or core recovered; the recovery which is defined as the ratio, expressed in percent, of the length of sample or core recovered to the length of the sampling drive or push or coring "run;" and a complete visual description of each sample or core including color, type of material, density, or consistency of soil, hardness of rocks, stratification, rock structure, moisture conditions, etc. The description should be made immediately following the retrieval of the sample or core so that it represents the "as retrieved" classification. This is particularly important when sampling materials which tend to break down on exposure. Among these are air slaking shales and rocks containing expansive clay minerals.

   b. For drive samplers: the weight and height of drop of the drive hammer and the number of blows required for each six inches of penetration of the sampler.

c. For pressed or pushed samplers: the hydraulic pressure required to push the sampler into the ground and the rate of penetration.

d. For soil or rock coring: average rotational speed and downward hydraulic pressure of the core barrel and average rate of penetration.

e. For rock coring: the Rock Quality Designation (RQD) developed by Deere (1964). The RQD is the ratio, expressed as a percent, of the aggregate length of core pieces over four inches long in a run divided by the length of the run.

5. Description of material penetrated but not sampled as determined from drilling or chopping action or changes in the color of the drill water.

6. Casing information consisting of the size of the casing; the depth at which casing was added; the length of casing added; the final depth of the bottom of the casing; the weight and height of drop of the hammer and the number of blows for each 12 inches of penetration for driven casing; and, for drilled casing, the average rotational speed and downward pressure on the casing and the average rate of penetration.

7. Seepage and pressure test information comprising the depths at which tests were performed and the time required for each test. The actual test data is recorded on forms for that purpose.

8. Groundwater information consisting of the depth to the water surface in the hole, recorded daily, at the start and close of work. These readings should be continued after completion of the hole until the water level in the hole has stabilized.

9. Artesian pressure information including the depths at which artesian pressures were encountered; the measured heads; the time at which each measurement was made; and the depth of the driven casing, if applicable.

10. Elevation of the top and bottom of the hole and the top of the rock, if encountered.

11. The date and time of all operations and delays including, but not limited to, drilling, sampling, seepage and pressure testing, artesian pressure measurement, machine breakdown, and injuries.

12. Reason for terminating the boring. Valid reasons would include auger refusal, penetration through targeted strata, loss of drilling tools down hole, encountering second aquifer or advance to targeted depth.

13. Miscellaneous information which may aid in the interpretation of subsurface conditions. This would include the depth at which drill water is lost or regained, the amount and color of the return water, and the depth at which a change in drilling action occurs. The latter would include the depth at which rod vibration starts or stops, the depth at which the rate of penetration or ease of penetration changes, etc.

14. Any additional information which the driller, engineer, or geologist considers pertinent to the interpretation of subsurface conditions.

D-2.1 WMI Field Log for Soil Borings

A special log, shown on Figure D-1, has been developed for field documentation of soil or overburden drilling and sampling. This form has been designed to provide all pertinent information on the drilling location, method, and contractor and sampling details. This form also allows for separate descriptions of the unconsolidated materials and drilling operations.

WMI requires that the material descriptions conform to the following consistent format:

1. Color;
2. Texture;
3. Moisture Content;

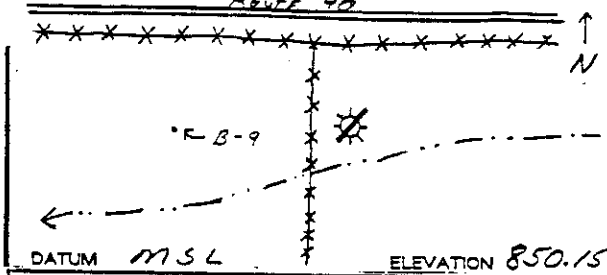
Waste Management, Inc.

FIGURE D-1

Revised 3/87

FIELD LOG - SOIL BOREHOLE

SITE NAME AND LOCATION: Farview Landfill, Lubbock, TX



DATUM MSL ELEVATION 850.15

DRILLING METHOD: Rotary drill

SAMPLING METHOD: Split spoon, 6" I.D. Denison and Diamond coring

BORING NO. B-9

SHEET 1 OF 10

WATER LEVEL	Dry	8.7'	9.2'	8.9'
TIME	1700	1055	1345	1015
DATE	4/5	4/6	4/6	4/7
CASING DEPTH	—	—	—	—

DRILLING START TIME 1400 DATE 4/5/71; FINISH TIME 1345 DATE 4/6/71

DRILL RIG Failing 1500

ANGLE vertical BEARING —

SAMPLE HAMMER TORQUE 350 FT.-LBS.

SURFACE CONDITIONS: Open prarie, 4-5% slope w/ southern aspect. Water flowing in effemeral stream 75' south of boring

DRILLING CONTR Western Water Supply T. Edwards

DEPTH IN FEET (ELEVATION)	BLOWS ON SAMPLER FOR 6 INCHES (% RECOVERY)	SOIL GRAPH	SAMPLE NUMBER AND DESCRIPTION OF MATERIAL	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	DEPTH IN FEET FROM	DEPTH IN FEET TO	DESCRIPTION OF OPERATION AND REMARKS
0	4,7,7,6 (95%)	CL	Sample No. 1 Reddish-brown f. sandy CLAY; dry, w. sorted; stiff; s. plastic; trace roots	2" SS	Uncased as of April 6				8:00 A.M. - 12:00 Set rig over hole and prepared to drill.
	(100%)			6" I.D. DEN.			0	2	2:00 P.M. - 2:30 P.M. Started hole by driving split spoon (SS) from 0 to 2'. Sample length = 1.9'.
5	(93.5%)	CL	Sample No. 2 same as above	6" I.D. DEN.			0	2	2:30 P.M. - 2:50 P.M. Cleaned hole with tricone bit.
	(91.7%)	CL/SC GC	Sample No. 3 (Upper 15") Dark reddish brown, c-m-f sandy CLAY; trace f. gravel; m. sorted; v. stiff; s. plastic	6" I.D. DEN.					2:50 P.M. - 5:00 P.M. Further work delayed due to only Denison starting barrel at site being used at second rig.
10	(95.9%)	GC		6" I.D. DT CB					7:00 A.M. - 9:00 A.M. Prepare equipment to take Denison sample using sawtooth bit.
	(83.4%)	CL	Sample No. 3 (Lower 15") Brown clayey SAND and c-m-f GRAVEL; m. sorted; dense	6" I.D. DT CB			2.0	4.5	9:00 A.M. - 9:20 A.M. Took Sample 2. Rotary speed = 120 RPM; downward pressure = 100 psi. Sample length = 30"; loss = 0.
15	(100%)	CL		6" I.D. DEN.					
	(41.7%)		Sample No. 4 Brown clayey c-m-f SAND and c-m-f GRAVEL; m. sorted; dense.	6" I.D. DTCB			4.5	7.0	9:30 A.M - 10:10 A.M Took Sample 3. 100 RPM; 110 psi. Drilling harder in lower 15"; drill water changed color at ~ 15". C = 28"; L = 2".
20			Sample No. 5 (Upper 11") Brown clayey c-m-f SAND and c-m-f GRAVEL; m. sorted stiff				7.0	9.5	10:20 A.M. - 10:40 A.M. Took Sample 4. 125 RPM; 120 psi. C = 27.5"; L = 2.5".
			Sample No. 5 (Lower 13") Brown f. sandy CLAY; very stiff				7.0	9.5	10:40 A.M. - 10:55 A.M. Cleaned hole with chopping bit with upward deflected jets.
			Sample No. 6 Brown f. sandy CLAY; v. stiff				9.5	11.5	11:00 A.M. - 11:25 A.M Took Sample 5. Bottom-discharge diamond bit; 125 RPM 120 psi. Drilling easier at 11". C = 23"; L = 1".
			Sample No. 7 same as above				11.5	13.5	11:30 A.M. - 12:00 A.M. Took Sample 6. 100 RPM; 90 psi. C = 20"; L = 4".
			Sample No. 8 Brown c-m-f gravelly, c-m-f SAND p. sorted; v. stiff				13.5	16.0	1:00 P.M. - 1:15 P.M. Took Sample 7. Sawtooth bit. 100 RPM; 95 psi. C = 30"; L = 0.
							16.0	17.0	1:15 P.M. - 1:45 P.M. Took Sample 8. Diamond bit. 130 RPM; 100 psi. Tools pulled from hole when barrel would not advance farther. Possible boulder has been encountered. C = 5"; L = 7".

LOGGED BY L. Woodsey DATE 4/14/71 CHK'D BY P. Johns

00001

4. Sorting;
5. Density;
6. Plasticity;
7. Stratification or Bedding Characteristics;
8. Sphericity/Roundness; and
9. Other Notable Features and Characteristics (i.e., fractures, biological activity, secondary alternation, nature of contacts, etc.)

A summary of soil classification descriptors is provided on Figure D-2. A detailed Unified Soil Classification System is provided on Figure D-3. Colors shall be determined in the field or, when conditions necessitate, in the lab using the Munsell color charts.

All WMI borings, regardless of their ultimate purpose, shall be initially designated as "B-" (i.e., B-101). A cross-designation, such as "P-" or "MW-" can be assigned if the boring is subsequently completed as a piezometer or monitor well.

D-2.2 WMI Field Logs for Rock Borings

When consolidated rock conditions are encountered, the form shown on Figure D-4 should be used to document the drilling and sampling operation. As with the field soil boring logs , this form provides space for a

MOISTURE CONTENT

DRY	— LITTLE/NO PERCEPTIBLE MOISTURE
DAMP	— SOME PERCEPTIBLE MOISTURE, NOT COMPACTABLE
MOIST	— COMPACTABLE
WET	— ABOVE COMPACTABLE RANGE
SATURATED	— PORES, VOIDS FILLED WITH WATER
▼	— WATER TABLE (AT TIME OF DRILLING)

SORTING ($So = P_{-3}/P_{-5}$)

	So
EXTREMELY WELL	1.0-1.1
VERY WELL	1.1-1.2
WELL	1.2-1.4
MODERATELY	1.4-2.0
POORLY	2.0-2.7
VERY POORLY	2.7-5.0

SOIL CONSISTENCY

DENSITY

SAND OR GRAVEL	SPT (BLOWS/FT)	SILT OR CLAY	SPT (BLOWS/FT)	THUMB PENETRATION
VERY LOOSE	0-4	VERY SOFT	0-2	VERY EASILY-INCHES
LOOSE	4-10	SOFT	2-4	EASILY-INCHES
MEDIUM DENSE	10-30	MEDIUM STIFF	4-8	MODERATE EFFORT-INCHES
DENSE	30-50	STIFF	8-15	INDENTED EASILY
VERY DENSE	>50	VERY STIFF	15-30	INDENTED BY NAIL
		HARD	>30	DIFFICULT BY NAIL

SPT (2" OD/1⅜" ID SPOON, 140 LB HAMMER, 30" DROP)

PLASTICITY

NONPLASTIC	— NO WIRE FORMABLE
SLIGHTLY PLASTIC	— WIRE FORMABLE BUT SOIL REMAINS EASILY DEFORMABLE
PLASTIC	— WIRE FORMABLE MODERATE PRESSURE REQUIRED
VERY PLASTIC	— WIRE FORMABLE MUCH PRESSURE REQUIRED
EXTREMELY HARD	— RESISTANT TO PRESSURE NOT BROKEN BY HANDS

CLASSIFICATION MODIFIERS

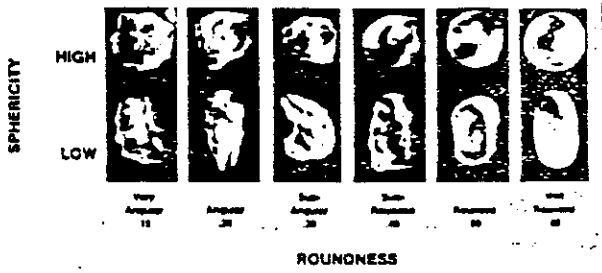
TRACE	0-10%
LITTLE	10-20%
SOME	20-35%
AND	35-50%

± MODIFIERS

STRATIFICATION

THIN LAMINA	<1/10 INCH
LAMINA	1/10-1/2 INCH
VERY THIN BED	1/2-2 INCHES
THIN BED	2-6 INCHES
MEDIUM BED	1/2 - 1-1/2 FEET
THICK BED	1-1/2 - 5 FEET
VERY THICK BED	> 5 FEET

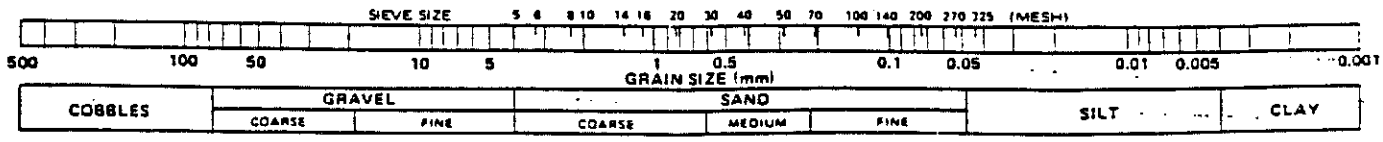
SPHERICITY/ROUNDNESS



UNIFIED SOIL CLASSIFICATION SYSTEM

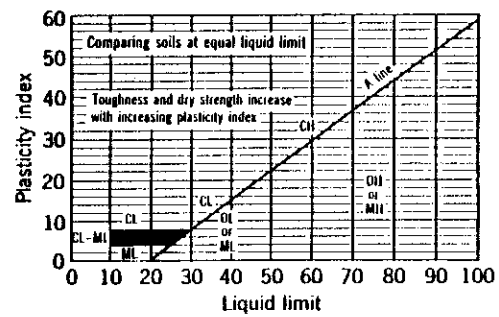
GW	GP	GM	GC	SW	SP	SM	SC	ML	CL	OL	MH	CH	OH	Pt
CLEAN GRAVELS < 5% FINES		GRAVELS WITH > 12% FINES		CLEAN SANDS < 5% FINES		SANDS WITH > 12% FINES		SILTS AND CLAYS LIQUID LIMIT< 50			SILTS AND CLAYS LIQUID LIMIT > 50			HIGHLY ORGANIC SOILS
GRAVELS > 50% COARSE FRACTION IS LARGER THAN NO. 4 SIEVE				SANDS > 50% COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE										
COARSE GRAINED SOILS (MORE THAN 50% IS LARGER THAN NO. 200 SIEVE)								FINE GRAINED SOILS (MORE THAN 50% IS SMALLER THAN NO. 200 SIEVE)						

GRAIN SIZE CLASSIFICATION



Unifie. ..il Classification

Field Identification Procedures (Excluding particles larger than 3 in. and basing fractions on estimated weights)				Group Symbols[a]	Typical Names	Information Required for Describing Soils	Laboratory Classification Criteria	
Coarse-grained soils: More than half of material is *larger* than No. 200 sieve size[b] (The No. 200 sieve size is about the smallest particle visible to naked eye)	Gravels: More than half of coarse fraction is larger than No. 7 sieve size (For visual classification, the ¼ in. size may be used as equivalent to the No. 7 sieve size)	Clean gravels (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes	*GW*	Well graded gravels, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; angularity, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbols in parentheses For undisturbed soils add information on stratification, degree of compactness, cementation, moisture conditions and drainage characteristics Example: *Silty sand*, gravelly; about 20% hard, angular gravel particles ½-in. maximum size; rounded and subangular sand grains coarse to fine, about 15% non-plastic fines with low dry strength; well compacted and moist in place; alluvial sand; (*SM*)	Use grain size curve in identifying the fractions as given under field identification Determine percentages of gravel and sand from grain size curve. Depending on percentage of fines (fraction smaller than No. 200 sieve size) coarse grained soils are classified as follows: Less than 5% *GW, GP, SW, SP*; More than 12% *GM, GC, SM, SC*; 5% to 12% *Borderline* cases requiring use of dual symbols	$C_U = \frac{D_{60}}{D_{10}}$ Greater than 4; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3
			Predominantly one size or a range of sizes with some intermediate sizes missing	*GP*	Poorly graded gravels, gravel-sand mixtures, little or no fines			Not meeting all gradation requirements for *GW*
		Gravels with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures see *ML* below)	*GM*	Silty gravels, poorly graded gravel-sand-silt mixtures			Atterberg limits below "A" line, or *PI* less than 4 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols
			Plastic fines (for identification procedures, see *CL* below)	*GC*	Clayey gravels, poorly graded gravel-sand-clay mixtures			Atterberg limits above "A" line, with *PI* greater than 7
	Sands: More than half of coarse fraction is smaller than No. 7 sieve size	Clean sands (little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes	*SW*	Well graded sands, gravelly sands, little or no fines		$C_U = \frac{D_{60}}{D_{10}}$ Greater than 6; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3	
			Predominantly one size or a range of sizes with some intermediate sizes missing	*SP*	Poorly graded sands, gravelly sands, little or no fines			Not meeting all gradation requirements for *SW*
		Sands with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures, see *ML* below)	*SM*	Silty sands, poorly graded sand-silt mixtures			Atterberg limits below "A" line or *PI* less than 5 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols
			Plastic fines (for identification procedures, see *CL* below)	*SC*	Clayey sands, poorly graded sand-clay mixtures			Atterberg limits below "A" line with *PI* greater than 7
Fine-grained soils: More than half of material is *smaller* than No. 200 sieve size (The No. 200 sieve size is about the smallest particle visible to naked eye)	Identification Procedures on Fraction Smaller than No. 40 Sieve Size							
		Dry Strength (crushing characteristics)	Dilatancy (reaction to shaking)	Toughness (consistency near plastic limit)				
	Silts and clays: liquid limit less than 50	None to slight	Quick to slow	None	*ML*	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight plasticity	Give typical name; indicate degree and character of plasticity, amount and maximum size of coarse grains; colour in wet condition, odour if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses For undisturbed soils add information on structure, stratification, consistency in undisturbed and remoulded states, moisture and drainage conditions Example: *Clayey silt*, brown; slightly plastic; small percentage of fine sand; numerous vertical root holes; firm and dry in place; loess; (*ML*)	
		Medium to high	None to very slow	Medium	*CL*	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays		
		Slight to medium	Slow	Slight	*OL*	Organic silts and organic silt-clays of low plasticity		
	Silts and clays: liquid limit greater than 50	Slight to medium	Slow to none	Slight to medium	*MH*	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		
		High to very high	None	High	*CH*	Inorganic clays of high plasticity, fat clays		
		Medium to high	None to very slow	Slight to medium	*OH*	Organic clays of medium to high plasticity		
Highly Organic Soils		Readily identified by colour, odour, spongy feel and frequently by fibrous texture			*Pt*	Peat and other highly organic soils		



Plasticity chart for laboratory classification of fine grained soils

From Wagner, 1957.

[a] *Boundary classifications*. Soils possessing characteristics of two groups are designated by combinations of group symbols. For example *GW-GC*, well graded gravel-sand mixture with clay binder.

[b] All sieve sizes on this chart are U.S. standard.

Field Identification Procedure for Fine Grained Soils or Fractions

These procedures are to be performed on the minus No. 40 sieve size particles, approximately 1/64 in. For field classification purposes, screening is not intended, simply remove by hand the coarse particles that interfere with the tests.

Dilatancy (Reaction to shaking):

After removing particles larger than No. 40 sieve size, prepare a pat of moist soil with a volume of about one-half cubic inch. Add enough water if necessary to make the soil soft but not sticky.

Place the pat in the open palm of one hand and shake horizontally, striking vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the pat which changes to a livery consistency and becomes glossy. When the sample is squeezed between the fingers, the water and gloss disappear from the surface, the pat stiffens and finally it cracks or crumbles. The rapidity of appearance of water during shaking and of its disappearance during squeezing assist in identifying the character of the fines in a soil.

Very fine clean sands give the quickest and most distinct reaction whereas a plastic clay has no reaction. Inorganic silts, such as a typical rock flour, show a moderately quick reaction.

Dry Strength (Crushing characteristics):

After removing particles larger than No. 40 sieve size, mould a pat of soil to the consistency of putty, adding water if necessary. Allow the pat to dry completely by oven, sun or air drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quantity of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity.

High dry strength is characteristic for clays of the CH group. A typical inorganic silt possesses only very slight dry strength. Silty fine sands and silts have about the same slight dry strength, but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.

Toughness (Consistency near plastic limit):

After removing particles larger than the No. 40 sieve size, a specimen of soil about one-half inch cube in size, is moulded to the consistency of putty. If too dry, water must be added and if sticky, the specimen should be spread out in a thin layer and allowed to lose some moisture by evaporation. Then the specimen is rolled out by hand on a smooth surface or between the palms into a thread about one-eight inch in diameter. The thread is then folded and re-rolled repeatedly. During this manipulation the moisture content is gradually reduced and the specimen stiffens, finally loses its plasticity, and crumbles when the plastic limit is reached.

After the thread crumbles, the pieces should be lumped together and a slight kneading action continued until the lump crumbles.

The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil. Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay of low plasticity, or materials such as kaolin-type clays and organic clays which occur below the A-line.

Highly organic clays have a very weak and spongy feel at the plastic limit.

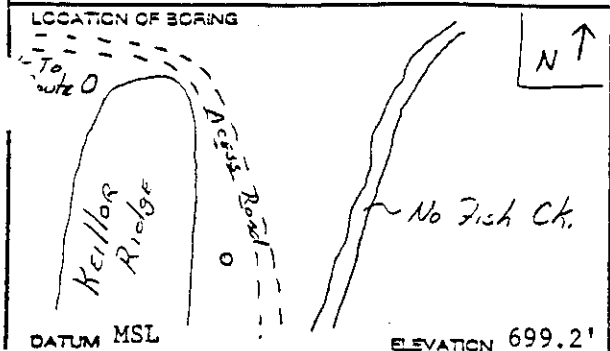
Revised 3/87

Waste Management, Inc.

Revised 3/87

ROCK BOREHOLE LOG

LOCATION OF BORING



DATUM MSL

ELEVATION 699.2'

SITE NAME AND LOCATION Wilson Road, Lake Woobegon, MN.

BORING NO. B-3

DRILLING METHOD Hollow-Stem Auger and NX Coring

SHEET 1 OF 1

					DRILLING START	DRILLING FINISH
WATER LEVEL	1.36'	1.50'	1.47'	1.46'	TIME	TIME
TIME	1710	1635	1740	1430	1020	1315
DATE	5/9/72	5/10/	5/11	5/12	DATE	DATE
CASING DEPTH	9'	9'	9'	9'	5/9/72	5/12/72

DRILL RIG CME-75

SURFACE CONDITIONS: Soft ground, thick brush, at base of an eastern aspect slope

ANGLE Vertical BEARING --------

SAMPLE HAMMER TORQUE 375 FT.-LBS.

DRILLING CONTR Subsurface Exploration, INC.

R. Arnold

00001

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER (% RECOVERY)	CORES: RUN NO.	NO. AND SIZE OF CORE PIECES	% RECOVERY	RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	ROCK STRUCTURE	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	PRESSURE TEST RESULTS: DEPTH IN FEET FROM	TO	PRESSURE PSI	LOSS, GPM	TIME, MIN.
0 ▼ (697.7) 3/8/72 (695.2)	1,1,2 (60%)					1 Gray, soft silty CLAY			2"SS	4"	1,2,4,4,13,15,18,18,20					
	2,3,5 (82%)					2 Brown, loose coarse to fine SAND										
(690.0) 10		1	2 @ 6"	80	77	DENSE BASALT, greenish gray to black, hard, slightly weathered		Closely spaced, open joints at 35°, 45°, 60° and vertical. Joints stained.	NX Size Series "N" Core Barrel with Bottom Discharge Diamond Bit	None		9.2	19.2	3	2.8	15
		2	4 @ 7"	100	100									6	4.6	15
		3	5 @ 7" 1 @ 2"	91	94									12	8.7	15
														6	4.4	15
(681.7)		4	2 @ 3" 3 @ 2"	22	0									3	2.9	15
20						VESICULAR and AMYGDALOIDAL BASALT, greenish gray, medium hard, highly weathered, many small calcite amygdules.		Closely to moderately jointed; joints clay filled; joints @ 34° and 60°, 1" clay seam at 19.2'.				19.2	29.2	6	9.2	15
		5	4 @ 6"	100	91									12	8.0	15
		6	4 @ 7"	99	94									24	1.3	15
		7	3 @ 12" 1 @ 8"	100	99									12	1.3	15
														6	0	15
(669.9) 30		8	1 @ 48" 1 @ 12"	100	100	DENSE BASALT, reddish gray to black, very hard, slightly weathered.		Moderately jointed; incipient joints 0.04" thick at 30° and 45°; also vertical joints filled with calcite.				29.2	39.2	8	0	15
														16	0	15
														32	0	15
		9	1 @ 16" 3 @ 12" 1 @ 4.4"	100	100									16	0	15
														8	0	15
40		10	1 @ 36" 1 @ 24"	100	100							39.2	49.2	10	0	15
														20	0	15
														40	0.1	15
		11	2 @ 18" 2 @ 11"	97	96									20	0	15
														10	0	15
(650.9) 50		12	1 @ 36"	100	100	VESICULAR and AMYGDALOIDAL BASALT, greenish gray, medium hard, with calcite amygdules; slightly weathered.		Moderately jointed; joints open; some filled with clay; joints at 30°, 45° and 60°.				49.2	59.2	13	3.7	15
		13	1 @ 9" 6 @ 8" 1 @ 3"	100	95									26	7.0	15
														52	11.2	15
														26	6.8	15
		14	3 @ 9" 4 @ 3"	72	50									13	3.1	15
60 (638.2)		15	2 @ 12" 2 @ 5"	100	100	DENSE BASALT, black, very hard.		Moderately jointed; joints at 30°, 45°, 70° and vertical; all joints tight. Vertical joints filled with calcite.				59.2	68.0	16	0.3	15
														32	0.5	15
														64	0.6	15
														32	0.3	15
(.2) 70		16	4 @ 6" 2 @ 9"	100	100									16	0.2	15
						Bottom of Boring										

LOGGED BY M. Steele

DATE 6/3/72 CHK'D BY M. Poe

description of drilling and sampling operations. Rock lithology descriptions should follow the following consistent format:

1. Petrologic Classification;
2. Color;
3. Degree of Weathering;
4. Hardness;
5. Description of Inclusions; and
6. Solubility in Acid.

Petrologic classification schemes are provided on Table D-2. Colors should be determined from fresh fracture surfaces using the rock color chart prepared by the Geological Society of America (1975).

Since groundwater flow in rock formations is often controlled by secondary porosity, a thorough description of rock structure is required. WMI has not established a format for the description of rock structure. However, Figure D-5 presents the features and details that the consultant is expected to document when examining rock cores.

The pace of the coring may preclude the preparation of detailed lithologic and structural logs during drilling operations. Therefore, during drilling, the logging geologist/engineer should focus on documenting recovery, the size and number of core pieces, the RQD and properly packing the core for later examination. However, the core shall not be transported

CLASSIFICATION OF IGNEOUS, SEDIMENTARY, AND METAMORPHIC ROCKS

IGNEOUS ROCKS*.

Acid (*Over 66%* SiO_2)	*Intermediate* (*55%–66%* SiO_2)	*Basic* (*Under 55%* SiO_2)

Coarse-grained plutonic rocks with individual crystallites larger than 1/20 inch. Tend to be brittle due to presence of large crystals, hence coarsest grained representatives unsuitable for road construction. Examples are:

Granite	Syenit	Gabbro
Granodiorite	Diorite	Norite

Medium-grained intrusive (hypabyssal) rocks with individual crystallites between 1/20 and 1/200 inch. Often possess intergrown structure which together with small crystal sizes produces toughness. This group includes the best road construction aggregate. Examples are:

Microgranite	Porphyry	Dolerite
Granoporphyre	Porphyrite	Diabase

Fine-grained extrusive (volcanic) rocks with individual crystallites below 1/200 inch (no longer visible with the unaided eye). Similar to medium-grained rock but tend to be glassy, brittle and splintery with increasing SiO_2 content. Examples are:

Rhyolite	Trachyte	Basalt
Felsite	Andesite	Spilite

Decreasing SiO_2 content ——————→

Increasing toughness ——————→

Increasing specific gravity ——————→

Increasing quality as an aggregate for road construction ——————→

*After *Soil Mechanics for Road Engineers*, Department of Scientific and Industrial Research, Her Majesty's Stationary Office, London, 1952 (Crown Copyright).

SEDIMENTARY ROCKS.*

Calcareous. Predominant Mineral $CaCO_3$ (Calcite).

Limestone ($CaCO_3$): Specific gravity 2.65–2.75

Dolomite ($CaMg(CO_3)_2$): Half of the $CaCO_3$ replaced by $MgCO_3$. Specific gravity 2.7–2.8.

Dolomitic Limestones: Part of the $CaCO_3$ replaced by $MgCO_3$. Softer than sound igneous rock. Tend to become slippery if used for surface dressing due to physical and chemical polishing and to form rock powder if used in stone bases subject to heavy and frequent traffic loads. This powder makes such bases frost susceptible. Become harder with increasing $MgCO_3$ content.

Siliceous. Predominant Mineral Quartz or Chalcedony (SiO_2).

Sandstone: Specific gravity 2.60–2.75. Strength depends on density and type of natural cementing substance that binds sand grains together. Usually not suitable for road construction.

Quartzite: Specific gravity 2.55–2.65, tends to be brittle.

Argillaceous. Predominant Mineral Clay.

Clay, Shale: Very fine grained and soft, unsuitable for road aggregate.

Mudstone: Very fine grained, often laminated and splintery; when metamorphosed, sometimes useful as a road aggregate.

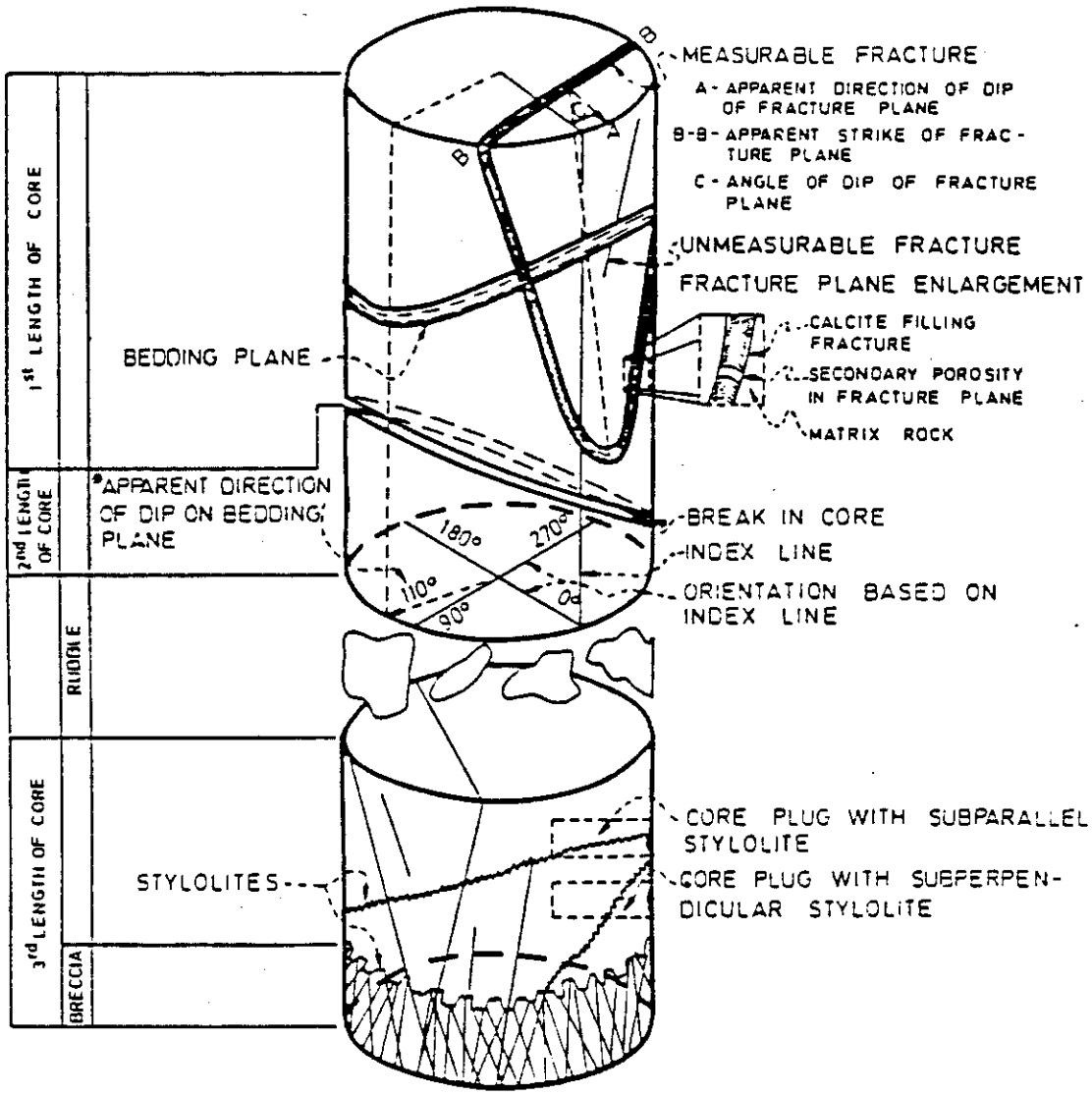
*Crown copyright.

METAMORPHIC ROCKS.

(After Farmer, 1968.)

Classification	*Rock*	*Description*	*Major Mineral Constituents*
Massive	Hornfels	Microfine grained	Quartz
	Quartzite	Fine grained	Quartz
	Marble	Fine to coarse grained	Calcite or dolomite
Foliated	Slate	Microfine grained, laminated	Clay minerals, mica
	Phyllite	Soft, laminated	Mica, clay minerals
	Schist	Altered, hypabyssal rocks, coarse grained	Feldspars, quartz, mica
	Gneiss	Altered granite	Hornblende

TYPICAL CHARACTERIZATION OF ROCK CORE



*TRUE DIRECTION OF DIP ON BEDDING PLAN FROM DIPMET IS 200°

from the drill site until the lithologic and structural descriptions are complete.

D-2.3 WMI Water Pressure Testing Summaries

WMI requires the performance of water pressure testing or packer testing of all borings penetrating bedrock. WMI recommends that this testing be performed in accordance with the U.S. Bureau of Reclamation Test Designation E-18.[2]

Readings obtained during the actual testing shall be recorded on the form shown on Figure D-6. The observer who signs each of the data sheets shall be responsible for the accuracy of the readings and ensuring that the forms are fully completed.

Poor quality, inaccurate gages, or gages which cannot be read to the required precision are the most common source of measurement error. Therefore, WMI requires the submittal of calibration certification prior to testing. This certification should also be attached to the summary forms in the final reports.

---

2. Bureau of Reclamation, 1963, Earth Manual, U.S. Dept. of Interior, Denver, Colorado, Test Designation E-18, p. 541-546.

Waste Management, Inc.

SUMMARY OF WATER PRESSURE TESTING

BORING NO. _____ DATE _____ Sheet ___ of ___

Site Name _____ Surface Elevation _____ Angle (from Vertical) _____

Location _____ Depth to Rock _____ Bearing _____

Coordinates: N _____ Depth to Groundwater _____ Date Started _____

E _____ Logged by _____ Date Completed _____

Test No.	Packer Inflation Pressure (psi)	Depth		Length of Interval Tested (feet)	Water Meter		Water Loss (1) ___ cu ft ___ gal ___ liter	Elapsed Time (min)	Rate of Loss (gpm)	Pressure					Permeability (5) cm./sec
		From	To		Start	End				Gage (psi)	Gage (ft water) (2)	Column (ft water) (3)	Friction Loss (ft water)	Net (ft water) (4)	

(1) Conversion factor: gallon X 0.1336 = cu. ft.
liter X 0.0353 = cu. ft.

(2) Gage Pressure (in psi)/0.433 = ft water

(3) Column pressure-depth to upper packet or depth to groundwater, whichever is smaller

(4) Gage + Column − Friction Loss = Net Pressure

(5) Conversion Factor: ft./min. X 0.51 = cm./sec.

For Use with U.S.B.R. Test Designation E-18

Revised 3/87

D-3.0 FINAL LOGS OF SUBSURFACE BORINGS

The final log is essentially a polished, refinement of the field log based on subsequent examination of the material samples and laboratory analysis. The final log often incorporates a limited amount of laboratory test data. The final logs should present a clear, concise, accurate picture of subsurface conditions since it is commonly the form from which site assessment interpretations and design parameters are derived. WMI REQUIRES THAT FINAL LOGS PRESENTED IN ASSESSMENT OR DESIGN REPORTS BE TYPED!

Specific information on preparing final logs for rock and soil borings are provided in the following sections.

D-3.1 WMI Final Logs for Soil Borings

The primary difference between the contents of field and final soil boring logs is that laboratory data is substituted for the description of operations and graphic symbols are substituted for the classification abbreviation in the soil graph. An example of a final soil boring log is provided on Figure D-7. A summary of standard soil patterns is provided on Figure D-8.

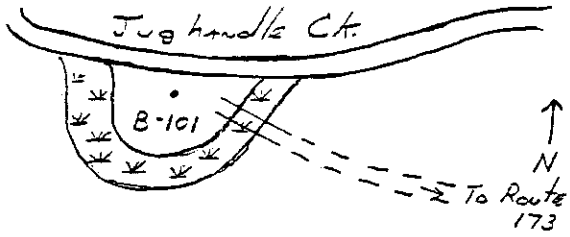
Waste Management, Inc.

FIGURE B-7

Revised 3/87

SOIL BOREHOLE LOG

SITE NAME AND LOCATION: Overlook Landfill, Lookout Mountain, TN



DATUM: MSL

ELEVATION: 1532.37

DRILLING METHOD: Hollow-Stem Auger with 4.5" x 8.5" augers

SAMPLING METHOD: Split-spoon (SS), Shelby tube (ST) and Denison (D)

BORING NO.: B-101

SHEET: 1 OF 1

					DRILLING START	DRILLING FINISH
WATER LEVEL	1.5	1.6'	23.4'	21.6'		
TIME	1010	1130	1345	1450	TIME 0915	TIME 1340
DATE	6/6/84	6/6	6/6	6/7	DATE 6/6/84	DATE 6/6/84
CASING DEPTH	1.0'	16.5'	32.0'	32.0'		

DRILL RIG: Mobile B-51

ANGLE: vertical BEARING: --------

SAMPLE HAMMER TORQUE: 375 FT.-LBS.

SURFACE CONDITIONS: Heavily wooded area between Jughandle Ck. and nearby oxbow swamp; soft ground thick underbrush.

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER (RECOVERY)	SAMPLE NUMBER AND DESCRIPTION OF MATERIAL	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPECIFIC GRAVITY	OTHER TESTS
0 (+0.5)	14,17,15 (67%)	1 Light brown (5YR 6/4) SAND and GRAVEL, trace silt; saturated at 1.5'; m. sorted; m. dense (GC)	2" SS	4"	13					
3/8/72 (-1.5)	19,15,16 (75%)	2			48					
	8,1,1 (40%)	3			56					
5	Push WOH (70%)	4 Dark brown (10YR 2/2); amorphous PEAT; saturated; v. soft (OH)	2.8" SP		30	550.2	553.2	180.1	1.84	C,T
	Push WOH (65%)	5			15					
(-6.0)					16					
10	2,1,2 (80%)	6 Yellowish gray (5Y 7/2); silty fine SAND; p. sorted; loose; thiny cross-bedded; trace shell fragments (SM)	2" SS		13					G
(-11.7)					13					
15	4,5,3 (80%)	7 Olive gray (5Y 3/2) SILT, trace fine sand; saturated; soft; s. plastic; trace shell fragments (ML)			5					
	Push 200 psi (100%)	8			7					
					9					
					8					
					6					
					6					
					8					
					10					
					12					
					15	36.5	43.2	30.1	2.70	C,T
20	Push 200 psi (95%)	9			13					
(-19.4)					12					
			2.8" SP		18					
					29					
					38					
	Push 250 psi (92%)	10 Grayish-green (5GY 7/2) mottled; silty CLAY, trace fine sand; wet; m. sorted; m. stiff; plastic; thin bedded (CL)			46	29.2	37.5	20.4	2.71	C,T
25	Push 225 psi (100%)	11			52					
					55					
					58					
					50					
(-27.0)	3,3,9 (90%)	12	2" SS		55					
30	(100%)	13 Red (5R 4/6) and pink (5R 7/4); CLAY, trace fine sand; damp; m.sorted; v. stiff plastic, lamina bedding (CH)			48					
			2.8" D		69	37.4	84.6	35.6	2.73	T
					85					
	9,12,12 (93%)	14	2" SS							
(-32.0)										
35		Bottom of Boring								

DRILLING CONTR Rehel Exploration, Inc.

F. McCoy

00001

LOGGED BY J.B. Walton

DATE 6/8/84 CHK'D BY J. Duke

SOIL PATTERNS FOR SOIL PROFILES AND CROSS-SECTIONS

TO BE COMPLETED.

D-3.2 WMI Final Logs for Rock Borings

The consultant shall submit final logs for rock borings on the 4-copy carbon pack forms provided by WMI (refer to Figure D-9 for an example of a completed form). The final rock boring logs should be a typed refinement of the field logs and should include the results of any confirmatory mineralogical or petrological testing and the orientation of joints, fractures, partings, or bedding planes. The final log also provides for separate descriptions of the rock lithology and structure. This format facilitates a more rapid visualization of the stratification and provides space for a more convenient and adequate presentation of structural features. A summary of standard lithologic patterns for stratigraphic columns and cross-sections is provided on Figure D-10.

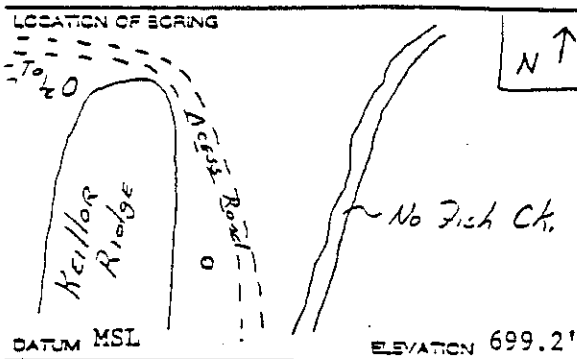
D-4.0 WELL CONSTRUCTION SUMMARIES

The proper design, construction, and documentation of monitor wells is an essential component of WMI's Groundwater Monitoring Program. To facilitate complete and uniform documentation of wells and piezometers, WMI has developed a construction summary form. A completed example well construction form is provided on Figure D-11.

Waste Management, Inc.

ROCK BOREHOLE LOG

LOCATION OF BORING



DATUM MSL ELEVATION 699.2'

SITE NAME AND LOCATION Wilson Road, Lake Woobegon, MN.

BORING NO. B-3

DRILLING METHOD Hollow-Stem Auger and NX Coring

SHEET 1 of 1

					DRILLING START	DRILLING FINISH
WATER LEVEL	1.36'	1.50'	1.47'	1.46'	TIME	TIME
TIME	1710	1635	1740	1430	1020	1315
DATE	5/9/72	5/10/	5/11	5/12	DATE	DATE
CASING DEPTH	9'	9'	9'	9'	5/9/72	5/12/72

DRILL RIG CME-75

SURFACE CONDITIONS: Soft ground, thick brush, at base of an eastern aspect slope

ANGLE Vertical BEARING --------

SAMPLE HAMMER TORQUE 375 FT.-LBS.

DEPTH IN FEET (ELEVATION)	BLOWS/6 IN. ON SAMPLER (% RECOVERY)	CORES: RUN NO.	NO. AND SIZE OF CORE PIECES	% RECOVERY	RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	ROCK STRUCTURE	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	PRESSURE TEST RESULTS: DEPTH IN FEET FROM	TO	PRESSURE PSI	LOSS, GPM	TIME, MIN.
0 (697.7) 3/8/72 (695.2)	1,1,2 (60%)					1 Gray, soft silty CLAY			2"SS	4"	1,2,4,4,12,15,18,18,20					
	2,3,5 (82%)					2 Brown, loose coarse to fine SAND										
690.0) 10		1	2 @ 6"	80	77											
		2	4 @ 7"	100	100	DENSE BASALT, greenish gray to black, hard, slightly weathered		Closely spaced, open joints at 35°, 45°, 60° and vertical. Joints stained.	NX Size Series "M" Core Barrel with Bottom Discharge Diamond Bit	None		9.2	19.2	3, 6, 12, 6, 3	2.8, 4.6, 8.7, 4.4, 2.9	15, 15, 15, 15, 15
		3	5 @ 7" 1 @ 2"	91	94											
71 20		4	2 @ 3" 3 @ 2"	22	0	VESICULAR and AMYGDALOIDAL BASALT, greenish gray, medium hard, highly weathered, many small calcite amygdules.		Closely to moderately jointed; joints clay filled; joints @ 34° and 60°. 1" clay seam at 19.2'.				19.2	29.2	6, 12, 24, 12, 6	9.2, 8.0, 1.3, 1.3, 0	15, 15, 15, 15, 15
		5	4 @ 6"	100	91											
		6	4 @ 7"	99	94											
669.9) 30		7	3 @ 12" 1 @ 8"	100	99											
		8	1 @ 48" 1 @ 12"	100	100	DENSE BASALT, reddish gray to black, very hard, slightly weathered.		Moderately jointed; incipient joints 0.04" thick at 30° and 45°; also vertical joints filled with calcite.				29.2	39.2	8, 16, 32, 16, 8	0, 0, 0, 0, 0	15, 15, 15, 15, 15
		9	1 @ 16" 3 @ 12" 1 @ 4.4"	100	100											
40		10	1 @ 36" 1 @ 24"	100	100							39.2	49.2	10, 20, 40, 20, 10	0, 0, 0.1, 0, 0	15, 15, 15, 15, 15
		11	2 @ 18" 2 @ 11"	97	96											
50.9) 50		12	1 @ 36"	100	100	VESICULAR and AMYGDALOIDAL BASALT, greenish gray, medium hard, with calcite amygdules; slightly weathered.		Moderately jointed; joints open; some filled with clay; joints at 30°, 45° and 60°.				49.2	59.2	13, 26, 52, 26, 13	3.7, 7.0, 11.2, 6.8, 3.1	15, 15, 15, 15, 15
		13	1 @ 9" 6 @ 8" 1 @ 3"	100	95											
60 (8.2)		14	3 @ 9" 4 @ 3"	72	50											
		15	2 @ 12" 2 @ 5"	100	100	DENSE BASALT, black, very hard.		Moderately jointed; joints at 30°, 45°, 70° and vertical; all joints tight. Vertical joints filled with calcite.				59.2	68.0	16, 32, 64, 32, 16	0.3, 0.5, 0.6, 0.3, 0.2	15, 15, 15, 15, 15
		16	4 @ 6" 2 @ 9"	100	100											

Bottom of Boring

DRILLING CONTR Subsurface Exploration, INC.

R. Arnold

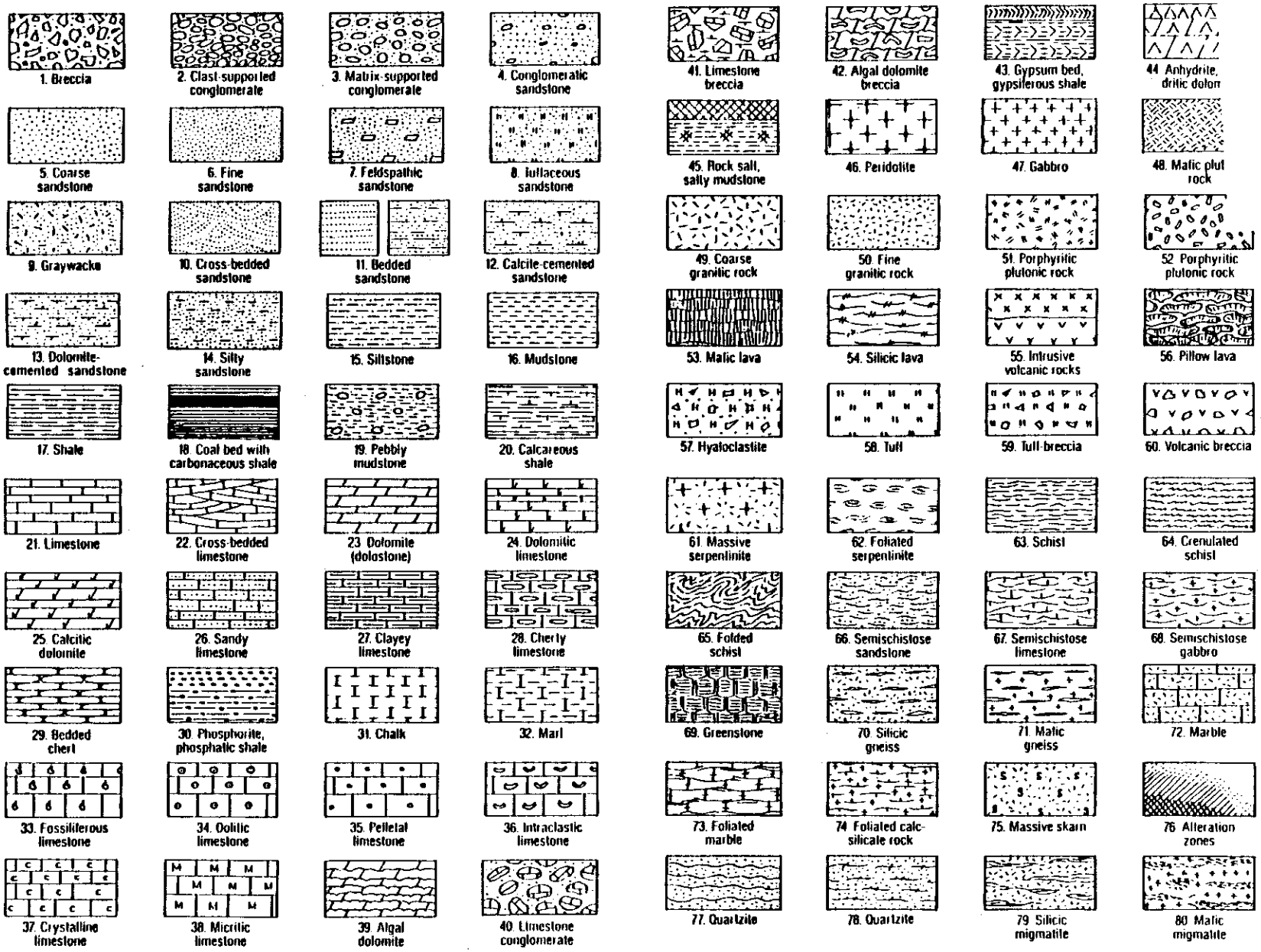
00001

LOGGED BY M. Steele

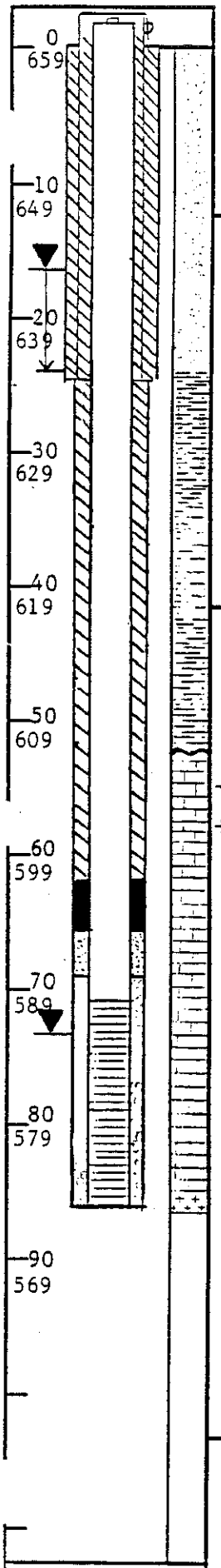
DATE 6/3/72 CHK'D BY M. Poe

LITHOLOGIC PATTERNS FOR STRATIGRAPHIC COLUMNS AND CROSS-SECTIONS

Revised 3/87



(From R.R. Compton, Geology in the Field.)



Waste Management, Inc.

Well No. MW-8B

Boring No. X-Ref: B-21

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: N2582.68, E523.45 (1)

Elevation Ground Level 659.31 Ft. MSL

Top of Casing 661.95 Ft. MSL

Drilling Summary:

Total Depth 86'

Borehole Diameter 12" x 6.5"

Casing Stick-up Height: 2.44'

Driller Exploration Technology, Inc. Madison, Wisconsin

Rig CME- 75

Bit(s) 0-24': 6.5" x 12" HSA
24-86': NX reamed w/ 6.5" tricone

Drilling Fluid 0-24': none
24-86': clean water

Protective Casing Extension of C1

Construction Time Log:

Task	Start Date (2)	Start Time	Finish Date	Finish Time
Drilling HSA	5/11	0840	5/11	1320
NX Coring(3)	5/12	1355	5/13	1035
Rotary Ream	5/13	1140	5/13	1540
Geophys.Logging:	5/13	1545	5/13	1720
Casing:				
C1	5/11	1340	5/11	1420
S1& C2	5/14	0745	5/14	0855
Filter Placement:	5/14	0905	5/14	0930
Cementing: 1st	5/11	1435	5/11	1550
Development:	5/15	0730	5/15	1340
Cementing 2nd	5/14	1000	5/14	1040
Recovery Test	5/17	1050	5/17	1215

Well Design & Specifications

Basis: Geologic Log X Geophysical Log X

Casing String (s): C = Casing S = Screen.

Depth	String(s)	Elevation
+2.44'- 24'	C1	661.9'-635.3'
+2.3' - 71'	C2	661.6'-588.3'
71' - 86'	S1	588.3'-573.3'

Casing: C1 7" dia. low carbon Steel

C2 2.0" dia. Sch. 40 PVC, Flush-Threaded

Screen: S1 2.0" dia. Sch. 40 PVC Brainard-Kilman TRI-LOCK

S2

Filter Pack: 69'-86' No. 8 pea gravel
66'-69' FRAC SAND, No. 40 silica sand

Grout Seal: +1.3-24' and +1.6-63', 6:1 HURON Type I Cement and WYO-JEL PLUS Premium Grade bentonite

Bentonite Seal: 63-66' VOLCLAY bentonite pellets

Well Development:

5/15 0730-0845 Surge Block
0850-1050 Air Lift Pumping
1140-1340 WELL WIZARD Pumping

Total Gallons Removed ~ 395

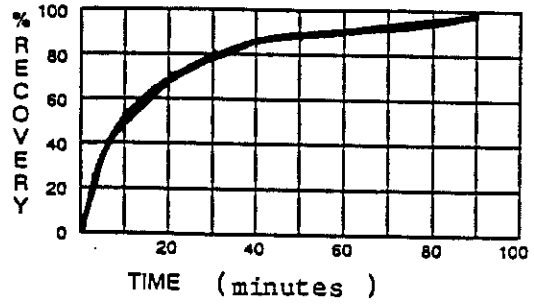
Stabilization Test Data:

All times 5/15/86

Time	pH	Spec. Cond.	Temp (°C)
0910	8.15	690	17.3
1030	7.93	580	17.2
1140	7.98	595	17.3
1300	7.85	560	17.2
1330	7.83	545	17.2

Recovery Data: (4)

Q= 395 gallons S_o= 16.3 ft.



Comments: (1) NE¼, SE¼, SE¼, Section 17, T.12N., R10W. (2) All Dates are 1986. (3) Packer tests were conducted at 10 ft. intervals concurrent with coring. (4) Recovery data was obtained with an IN-SITU SE1000 pressure transducer system.

INSPECTOR: S. Ricketts

CHECKED BY: B. Popkin

PROJECT: Antioch Municipal Landfill

LOCATION: Antioch, Illinios

WMI has adopted the following standard designation system for wells and piezometers:

Monitor Wells: MW-__

Piezometers: P-__

Pump Testing Wells: TW-__

For nested installations, a single letter suffix (i.e., A, B, C, etc.) shall be assigned to the installation. All of these designations shall be cross-referenced to a corresponding boring.

The construction summary form has been designed to provide a graphic and detailed description of the installation. The graph bar should provide a scaled representation of the lithology and well construction. The design and specifications portion of the form shall provide complete descriptions of the casing, screen, gravel and filter pack, grout, and bentonite. The casing and screen descriptions shall include interval (both depth and elevation), material type (PVC, stainless), diameter, gauge, slot or screen size, type of joint (i.e., welded, flush threaded, coupling, etc.), and brand name. Descriptions of the filter and gravel pack, bentonite, and grout shall include interval, nominal size, type and brand, volume or weight used, and mixture ratios. In addition, chemical assays of the annular materials should be attached to the construction summary, when available.

The construction time log shall correspond to the boring logs and the daily drilling summaries.

The well development portion shall describe the development method(s), duration, and provide an estimate of the total volume of water that was removed. The method of disposing or discharging the development water should be noted, particularly for wells and piezometers that are installed in aquifers with known or suspected contamination.

WMI well installation specifications requires the performance of at least one recovery test on each newly installed well or piezometer. These tests are usually conducted at the end of well development. The construction summary forms provide a graph for presentation of the recovery data. Recovery data from additional tests or data requiring an expanded scale should be attached on separate sheets.

D-5.0 DAILY DRILLING SUMMARIES

Daily drilling summary forms have been developed to track contractor performance and control costs (see Figure D-12). These forms are to be completed daily by the drilling contractor and submitted to the WMI representative for review and acceptance. This form shall be used as an itemized summary of reimbursable services, equipment, and expenses. These summaries will be used to check invoice totals and, as such, must be consistent with the invoices as well as the boring logs and well construction summaries.

Waste Management, Inc.

Revised 3/87

DAILY DRILLING SUMMARY

CONTRACTOR _____ DATE _____ SHIFT _____

SITE NAME _____ LOCATION _____

BOREHOLE NUMBER(S) THIS DATE _____

DRILL TIME LOG: Explain all down and standby time—who authorized—unusual circumstances, etc.

CATEGORY	TOTAL HOURS	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6
		A.M.												P.M.									A.M.			
MOB/DEMOB																										
DRILLING																										
WELL CONST.																										
MOVE/DECON																										
TESTING																										
STANDBY																										
DOWN TIME																										
OTHER																										

REMARKS

EXPENDABLES: Itemize quantity, size, etc.

ITEM	QUANTITY	PART NO.

BOREHOLE NO.	FROM FEET	TO FEET	FOOTAGE DRILLED FEET	PIPE & CASING IN HOLE SIZE	PIPE & CASING IN HOLE FEET	BITS/CASING SHOES, ETC. SIZE	NUMBER	ON	OFF	FEET

PERSONNEL TIME LOG:

POSITION	NAME	HOURS
GEOLOGIST		
DRILLER		
HELPER		

COMMENTS

GEOLOGIST	CONSULTANT REPRESENTATIVE
DRILLER	CONTRACTOR REPRESENTATIVE

Legible, hand-written, signed originals shall be submitted to the WMI Project Manager on a weekly basis during drilling operations.

Waste Management, Inc.

SOIL BOREHOLE LOG

E NAME AND LOCATION	DRILLING METHOD:					BORING NO.	
						SHEET	
	SAMPLING METHOD:					OF	
						DRILLING	
						START	FINISH
	WATER LEVEL					TIME	TIME
	TIME						
	DATE					DATE	DATE
DATUM ELEVATION	CASING DEPTH						

DRILL RIG	SURFACE CONDITIONS
ANGLE BEARING	
SAMPLE HAMMER TORQUE FT.-LBS	

DEPTH IN FEET (ELEVATION)	BLOWS/ 6 IN ON SAMPLER (RECOVERY)	SYMBOL	SAMPLE NUMBER AND DESCRIPTION OF MATERIAL	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: WATER CONTENT %	LIQUID LIMIT %	PLASTIC LIMIT %	SPCIFIC GRAVITY	OTHER TESTS

DRILLING CONTR

SL 00001

LOGGED BY

DATE

CHK'D BY

FIELD LOG – SOIL BOREHOLE

TE NAME ND LOCATION	DRILLING METHOD:					BORING NO.	
						SHEET	
	SAMPLING METHOD:					OF	
						DRILLING	
						START	FINISH
	WATER LEVEL					TIME	TIME
	TIME						
	DATE					DATE	DATE
DATUM ELEVATION	CASING DEPTH						

DRILL RIG	SURFACE CONDITIONS
ANGLE BEARING	
SAMPLE HAMMER TORQUE FT.-LBS	

DEPTH IN FEET (ELEVATION)	BLOWS/ 6 IN ON SAMPLER (RECOVERY)	SOIL GRAPH	SAMPLE NUMBER AND DESCRIPTION OF MATERIAL	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	DEPTH IN FEET FROM	DEPTH IN FEET TO	DESCRIPTION OF OPERATION AND REMARKS

DRILLING CONTR

FS C0001

LOGGED BY

DATE

CHK'D BY

FIELD LOG – ROCK BOREHOLE

ITE NAME AND LOCATION	DRILLING METHOD:					BORING NO.	
						SHEET	
	SAMPLING METHOD:					OF	
						DRILLING	
						START	FINISH
	WATER LEVEL					TIME	TIME
	TIME						
	DATE					DATE	DATE
DATUM ELEVATION	CASING DEPTH						

DRILL RIG	SURFACE CONDITIONS
ANGLE BEARING	
SAMPLE HAMMER TORQUE FT.-LBS	

DEPTH IN FEET (ELEVATION)	BLOWS/ 6 IN. ON SAMPLER (RECOVERY)	CORES				ROCK LITHOLOGY AND STRUCTURE	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	PRESSURE TEST INTERVAL AND NO	DESCRIPTION OF OPERATION AND REMARKS
		RUN NO.	NO. AND SIZE OF CORE PIECES	% RECOVERY	RQD						

DRILLING CONTR

LOGGED BY

DATE

CHK'D BY

FR 00001

Waste Management, Inc.

ROCK BOREHOLE LOG

'E NAME AND LOCATION

DRILLING METHOD:

SAMPLING METHOD:

BORING NO.

SHEET OF

DRILLING

					START	FINISH
WATER LEVEL					TIME	TIME
TIME						
DATE					DATE	DATE
CASING DEPTH						

DATUM ELEVATION

DRILL RIG

SURFACE CONDITIONS

ANGLE BEARING

SAMPLE HAMMER TORQUE FT.-LBS

DEPTH IN FEET (ELEVATION)	BLOWS/ 6 IN. ON SAMPLER (RECOVERY)	CORES: RUN NO.	CORES: NO. AND SIZE OF CORE PIECES	CORES: % RECOVERY	CORES: RQD	SOIL DESCRIPTION OR ROCK LITHOLOGY	SYMBOL	ROCK STRUCTURE	SAMPLER AND BIT	CASING TYPE	BLOWS/FOOT ON CASING	TEST RESULTS: DEPTH IN FEET: FROM	TEST RESULTS: DEPTH IN FEET: TO	TEST RESULTS: PERMEABILITY CM./SEC.

DRILLING CONTR

RL 00001

LOGGED BY

DATE

CHK'D BY

Waste Management, Inc.

Well No. _____

Boring No. X-Ref: _____

MONITOR WELL CONSTRUCTION SUMMARY

Survey Coords: _____ Elevation Ground Level _____

_____ Top of Casing _____

Drilling Summary:

Total Depth _____

Borehole Diameter _____

Casing Stick-up Height: _____

Driller _____

Rig _____

Bit(s) _____

Drilling Fluid _____

Protective Casing _____

Construction Time Log:

Task	Start Date	Start Time	Finish Date	Finish Time
Drilling				
Geophys. Logging:				
Casing:				
Filter Placement:				
Cementing:				
Development:				

Well Design & Specifications

Basis: Geologic Log ____ Geophysical Log ____

Casing String (s): C = Casing S = Screen.

Depth	String(s)	Elevation
____ - ____	____	____ - ____
____ - ____	____	____ - ____
____ - ____	____	____ - ____
____ - ____	____	____ - ____
____ - ____	____	____ - ____

Casing: C1 _____

C2 _____

Screen: S1 _____

S2 _____

Filter Pack: _____

Grout Seal: _____

Bentonite Seal: _____

Well Development:

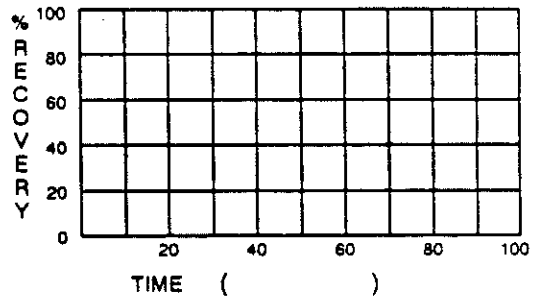
_____

Stabilization Test Data:

Time	p H	Spec. Cond.	Temp (C)

Recovery Data:

Q= S_o=



Comments:

_____

SITE NAME _____

LOCATION

WC 00001

SUPERVISED BY _____

DATE

Waste Management, Inc.

DAILY DRILLING SUMMARY

CONTRACTOR _____ DATE _____ SHIFT _____

SITE NAME _____ LOCATION _____

BOREHOLE NUMBER(S) THIS DATE _____

DRILL TIME LOG: Explain all down and standby time—who authorized—unusual circumstances, etc.

CATEGORY	TOTAL HOURS	A.M. 6	7	8	9	10	11	12	1	2	3	4	5	P.M. 6	7	8	9	10	11	12	1	2	3	4	5	A.M. 6
MOB/DEMOB																										
DRILLING																										
WELL CONST.																										
MOVE/DECON																										
TESTING																										
STANDBY																										
DOWN TIME																										
OTHER																										

REMARKS

EXPENDABLES: Itemize quantity, size, etc.

ITEM	QUANTITY	PART NO.

BOREHOLE	FROM	TO	FOOTAGE DRILLED	PIPE & CASING IN HOLE		BITS/CASING SHOES, ETC.				
NO.	FEET	FEET	FEET	SIZE	FEET	SIZE	NUMBER	ON	OFF	FEET

PERSONNEL TIME LOG:

POSITION	NAME	HOURS
GEOLOGIST		
DRILLER		
HELPER		

COMMENTS

GEOLOGIST	CONSULTANT REPRESENTATIVE
DRILLER	CONTRACTOR REPRESENTATIVE

Waste Management, Inc.

SUMMARY OF WATER PRESSURE TESTING

BORING NO. _____ DATE _____ Sheet ___ of ___

Site Name _____ Surface Elevation _____ Angle (from Vertical) _____

Location _____ Depth to Rock _____ Bearing _____

Coordinates: N _____ Depth to Groundwater _____ Date Started _____

E _____ Logged by _____ Date Completed _____

Test No.	Packer Inflation Pressure (psi)	Depth		Length of Interval Tested (feet)	Water Meter		Water Loss (1) ___ cu ft ___ gal ___ liter	Elapsed Time (min)	Rate of Loss (gpm)	Pressure					Permeability (5) cm./sec
		From	To		Start	End				Gage (psi)	Gage (ft water) (2)	Column (ft water) (3)	Friction Loss (ft water)	Net (ft water) (4)	

(1) Conversion factor: gallon X 0.1336 = cu. ft.
liter X 0.0353 = cu. ft.

(2) Gage Pressure (in psi)/0.433 = ft water

(3) Column pressure-depth to upper packet or depth to groundwater, whichever is smaller

(4) Gage + Column − Friction Losss = Net Pressure

(5) Conversion Factor: ft./min. X 0.51 = cm./sec.

For Use with U.S.B.R. Test Designation E-18

APPENDIX D

WELL SAMPLING AND ANALYSIS PROCEDURES

D.0 PROPOSED MONITORING WELL SAMPLING PROCEDURES AND ANALYSIS

D.1 Well Sampling Systems

Wells will be purged and sampled with stainless steel bailers fitted with teflon check values. The bailer cord will be new polypropylene or stainless steel.

D.2 Well Purging, Sampling and Preservation Procedures

The following purging, sampling and preservation procedures are to be used for sampling the new monitroing wells at the Vickery Facility. The purging and subsequent sampling and shipping of groundwater samples will be documented with chain of custody and field parameter sampling forms which presently are provided by the analytical laboratory, e.g. Environmental Testing and Certification (E.T.C.). Should CWM change analytical laboratories, the U.S.EPA and OEPA will be notified of such change. Well purging and acquisition of groundwater samples will be conducted using the Waste Management Sampling Manual except as specified below.

a. Measure the depth to the static water surface to the nearest 0.01 feet in all the wells prior to well purging. Water level measurements will be taken using electrical water level indicators. The following procedure will be used to measure and decontaminate an indicator when it is used to measure the depth to water in a monitoring well:

   1. Rinse the indicator probe off with deionized water. Shake off excess water and unreel the probe slowly until the light and buzzer of the indicator respond.

   2. After measuring the depth to static water, the cable is reeled back onto the spool and the end is rinsed again with deionized water. Excess water is once more shaken off.

3. Prior to water level measurements, the indicator cable should be rinsed off or cleaned with deionized water if any dirt or foreign material is present.

b. Purge a minimum of three times the volume of standing water in the well for high yield formations, such as wells screened in bedrock;

c. High yield wells should be sampled immediately after purging whereas low yield wells will be sampled for volatile organics within three hours after they are purged. Should an insufficient sample volume be obtained, the well will be reinspected every twenty-four hours until all necessary samples are obtained or until two consecutive twenty-four (24) hour sampling attempts have been made. A sample bottle cannot be composited from two different sampling periods.

d. Groundwater samples will be obtained by using stainless steel bailers. The bailer will be slowly lowered to just below the water surface and then retrieved. Care must be taken not to lay the bailer or bailer cord on the ground. When handling bailers for purging and sampling, only PVC or latex gloves without powder should be used.

e. Samples will be added to appropriately prepared and laboratory cleaned sample containers.

f. All meters used for field measurements of pH and specific conductance must be calibrated by the sampling team prior to initial sampling. The calibration of field meters should be checked every 4 hours and appropriately recalibrated during sampling.

g. Sample vials for volatile organics should be filled so that no head space remains.

h. At least one field blank sample will be obtained for each sampling event.

i. Sampling will be delayed if inclement weather, such as heavy rain, could jeopardize the integrity of the samples and field measurements.

j. Sample containers will be sealed tight and placed in a ice-packed container or shuttle. The well cap will be replaced and the protective casing locked.

k. Sample shuttles must be received at the lab (presently ETC) within 80 hours after the frozen ice packs were placed into the shuttle. Samples will be shipped to the lab by overnight courier.

D.3 Sampling Documentation

Chain of custody and sample parameter forms will be appropriately completed for each sampling point. The following information should be documented on field sampling forms or on log books:

a. Facility site code (490 for CWM Vickery), sample code, sample point ID and other identifiers;

b. Date, clock time, and time elapsed (if greater than one hour) from start to finish of sampling;

c. Depth to groundwater from the top of well pipe along with the time measured;

d. Information regarding purging of the well prior to sampling;

e. Field test results including pH, temperature and specific conductance measurements;

f. Sampling method used, i.e. bailer, (note the equipment material);

g. Type of sample and other pertinent information, e.g. sampled in conjunction with regulatory authorities;

h. Field observations and sampling conditions (e.g. weather conditions);

i. Appearance of sample, such as color, turbidity, sediment, etc.;

j. Sampler's identification and signature.

Strict chain-of-custody procedures will be adhered to for groundwater samples. From the time the sample is collected until the issuing of the analytical laboratory results, the samples will be in the custody of assigned personnel. In order to maintain custody the samples will either be:

1. In sight of the assigned custodian;
2. Locked in a tamper-proof location; or
3. Sealed with a tamper-proof seal.

A written record of the transfer of samples will be maintained.

The Chain-of-Custody Record will be attached to the sample container at the time the sample is collected. All sample bottles will be correctly labeled. When transferring the possession of samples, the transferee should sign and record the date and time on the record. The number of custodians in the chain of possession will be as few as possible.

The Chain-of-Custody Record along with the Field Survey Form will be sealed in the sample shuttle and transported to the laboratory. Upon receipt by the lab, the seal will be broken, and the condition of the samples, date, and time will be recorded on the form by the person receiving the sample.

The Field Survey Form, Chain-of-Custody Record and certification form will be included in the technical analytical report prepared by the laboratory.

ETC TESTING and CERTIFICATION Revised 9/86

CHAIN OF CUSTODY FORM (CC1)

Seal No. _____ ETC Job # _____

Date Sealed _____ By: _____

FIGURE 3.8

Company: _____ Attn.: _____

cility/Site: _____ Phone: _____

Address: _____

SAMPLE IDENTIFICATION

Facility: [ ] Facility/Site Code [ ] (Optional Sample Point Descriptions)

Sample Point: [ ]-[ ] Source Code (from below) / Your Sample Point ID (left justify) [ ] Start Date (YY/MM/DD) [ ] Start Time (2400 hr. clock) [ ] Elapsed Hours (composite)

Source Codes:

Well ..(W) Outfall.....(O) Bottom Sediment....(B) Surface Impoundment....(I) Leachate Collection Sys.....(C) Other .....

Soil ....(S) River/Stream ..(R) Generation Point ....(G) Treatment Facility .....(T) Lake/Ocean .....(L) Specify _____

SHUTTLE CONTENTS

BOTTLE				ANALYSIS	SAMPLER		LAB
No	Type	Size	Preserv.		Filt. (Y/N)	Observations	Observations

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By: (print) _____ Date: _____ Time: _____
   Signature: _____ Seal #: _____ Intact: _____

2. I have received these materials in good condition from the above person.
   Name: _____ Signature: _____
   Date: _____ Time: _____ Remarks: _____

3. I have received these materials in good condition from the above person.
   Name: _____ Signature: _____
   Date: _____ Time: _____ Remarks: _____

Shuttle Sealed By: (print) _____ Date: _____ Time: _____
Signature: _____ Seal #: _____ Intact: _____

LAB USE ONLY Opened By: _____ Date: _____ Time: _____

SHUTTLE # _____ TEMP. °C _____ SEAL # _____ COND. _____

ETC ENVIRONMENTAL TESTING and CERTIFICATION

FIELD PARAMETER FORM (CC2)

ETC JOB # _____

Sample Point [ ] Source Code [ ] Sample Point I.D.

FIELD PROCEDURES

PURGE DATE (YY MM DD) | START PURGE (2400 Hr Clock) | ELAPSED HRS | WATER VOL IN CASING (Gallons) | VOLUME PURGED (Gallons)

SAMPLING METHOD: _____

Sampler Type	[ ]	A-Submersible Pump B-ISCO C-Bladder Pump	D-Dipper/Bottle E-Bailer F-Scoop/Shovel	X-Other _____ (SPECIFY OTHER)
Sampler Material	[ ]	A-Teflon B-Metal	C-PVC D-Plastic	X-Other _____ (SPECIFY OTHER)
Tubing Material	[ ]	A-Teflon B-Tygon	C-Polyethylene D-Silicon	X-Other _____ (SPECIFY OTHER)

Sample Composited [Y/N] _____ Procedure/Proportions

FIELD MEASUREMENTS

Well Elevation (ft/msl): _____

Depth to Ground water (ft) _____

Groundwater Elevation (ft msl) _____

Well Depth (ft) _____

Sample Depth (non-well) (ft) _____

	ph		spec. cond		(other parameter)	value	units
1st	(STD)	1st	um/cm at 25 °C				
2nd	(STD)	2nd	um/cm at 25 °C				
3rd	(STD)	3rd	um/cm at 25 °C				
4th	(STD)	4th	um/cm at 25 °C				

Sample Temp (°C) | Turbidity NTU

FIELD COMMENTS

Sample Appearance: _____

Weather Conditions: _____

Other: _____

FILTERING: Use Chain of Custody (CC1) to indicate which bottles were filtered

Sampler: _____ (Print) Employer: _____

I certify that sampling procedures were in accordance with applicable EPA state and corporate protocols.

_____ (Date) (Signature)

USEPA - WMB copy

Chemical Waste Management, Inc.
3956 State Rt. 412
Vickery, Ohio 43464
419/547-7791

February 13, 1984

Mr. Michael Walker, Regional Counsel
United States Environmental Protection Agency
230 S. Dearborn Street
Chicago, Illinois 60604

RE: Chemical Waste Management, Inc.
Proposed Landfill and Borrow Investigation

Dear Mr. Walker:

At the conclusion of a meeting on January 26 1984 between representatives of Chemical Waste Management Inc. and USEPA it was mentioned that the Agency would request a written proposal from CWM on a landfill and borrow investigation should we wish to pursue the development of a separate cell for sludge disposal at our Vivery site. Attached you will find this proposal as prepared by Golder Associates of Atlanta, Georgia.

Once again, we trust this proposal will meet the requirements of the Agency's interest in reviewing this prior to its initiation. Chemical Waste Management will not pursue this work until the Agency can provide positive acknowledgement. Should you have any questions please contact myself or Kathy Trent at 419-547-7791.

Sincerely,

Chemical Waste Management Inc.

Lee Archambeau

Lee Archambeau
General Manager

c.c. Rick Karl,USEPA
Rich Shank, OEPA
Ben Pfefferle, OEPA
George Vander Velde
Jeff Miller

Golder Associates
CONSULTING GEOTECHNICAL AND MINING ENGINEERS

January 31, 1984

834-1358.14
F/N 102

Chemical Waste Management, Inc.
3956 State Route 412
Vickery, Ohio 43464

Attn: Mrs. Kathryn A. Trent, Regional Environmentalist

RE: LANDFILL AND BORROW AREA INVESTIGATION
CWM NORTHERN OHIO TREATMENT FACILITY
VICKERY, OHIO

Gentlemen:

Golder Associates is pleased to submit this letter describing the subsurface investigation for the proposed landfill area and borrow pits. The area presently proposed for the landfill is in the northwest corner of the site; bounded by the Ohio Turnpike, C.R. 244, Meyer's Ditch, and the railroad right-of-way. It is our estimate that the landfill proposed for the remedial program could be up to 25 acres in size.

Golder Associates understands that CWM plans to use on-site soils as borrow. It is proposed to investigate two potential borrow pits at this time. The first is bounded by C.R. 244, the railroad right-of-way, Meyer's Ditch, and S.R. 412. The other area is on the opposite (south) side of S.R. 412 from the first area.

Golder Associates has previously completed subsurface investigations in and near the areas to be investigated by this proposal. These previous investigations indicate the general suitability of these areas as locations for a landfill and borrow pit. Additional borings and samples are needed to obtain detailed information concerning soil stratigraphy in the proposed landfill area and soil properties in both the proposed landfill and borrow areas. The detailed information provided by this investigation will be required for final engineering design should the proposed landfill be adopted.

The proposed field investigation consists of borings and test pits at the proposed landfill site and both potential borrow areas. A proposed layout of borings and test pits is shown in Figure 1. It is suggested that four continuously sampled borings be made in the landfill area. Two of these borings should penetrate about 10 ft. into rock. Because these borings will be continuously sampled with split spoon samplers, four additional auger borings are proposed for the purpose of obtaining undisturbed tube samples. This sampling program will detail the subsurface conditions in the landfill area and clearly indicate whether any sand lenses are present at this site.

It is proposed that piezometers, consisting of 2 in. PVC threaded screen and standpipe, be installed in each hole drilled into rock. The details of installing and sealing each rock piezometer are shown in Figure 2. Similar piezometers will be installed in the four auger borings. Typical installation details are shown in Figure 3. With these piezometers, the groundwater levels can be measured in the overburden and the bedrock.

Finally, Golder Associates proposes that two shallow borings (about 7 ft. deep) and two test pits be made at the landfill site. The shallow borings will be drilled in the landfill area in order to perform in situ permeability tests. They will be backfilled with bentonite after these tests are completed. The two test pits will be used to obtain bulk samples for testing in the event that it is feasible to obtain borrow near the landfill or that recompaction of surficial soils is required.

In the proposed borrow areas a total of four borings and four test pits are planned. Test pits will be used to obtain bulk samples of soils within 10 ft. of the surface. The borings will be used to obtain soil samples from depths greater than 10 ft. Bulk samples will be obtained by taking continuous tube samples below depths of 10 ft. No piezometers are proposed in the borrow areas.

Laboratory testing on samples obtained in the landfill area will include classification, consolidation, permeability, and compaction testing. Proposed classification tests include liquid and plastic limits, grain-size analysis, specific gravity, unit weight, and natural moisture content. These tests will be done in accordance with the accepted testing procedures formulated by the American Society for Testing and Materials (ASTM). These classification tests will indicate the basic soil properties of the strata at the landfill site.

Consolidation tests will be conducted on undisturbed tube samples to determine the compressibility of soils beneath the proposed landfill. Samples from boreholes will be carefully examined for sand lenses and other physical features which could suggest continuous zones of material more permeable than the low permeability silty clays expected at this site. Permeability tests on undisturbed tube samples will be done to confirm low soil permeabilities in the landfill area. Compaction tests on bulk samples obtained from the test pits will be used to determine the properties of remolded surficial soils in the landfill area. Consolidation and compaction tests will be done according to ASTM standards. Permeability tests will be run in accordance with standard engineering practice since no ASTM procedures exist for testing the permeability of fine-grained soils. A detailed list of proposed laboratory tests on samples from the landfill area is included in Table 1, attached.

Laboratory testing of samples obtained in the proposed borrow areas will consist of classification, compaction, and permeability testing. The classification testing will be used to define the variability of potential borrow materials. The compaction and permeability tests will be used to characterize these materials for use in landfill construction. The permeability tests will be conducted on remolded samples. A consolidation test on a remolded sample is also planned to confirm the expected small compressibility of remolded, compacted soils. A detailed list of these proposed laboratory tests is also included in Table 1, attached.

The proposed field and laboratory investigation will provide the soils information needed to design a landfill in the proposed area. It is expected that a draft report on subsurface conditions can be completed within about 8 weeks from the beginning of field work.

Golder Associates appreciates this opportunity to continue working with Chemical Waste Management. If there are any questions or if you need additional information, please call.

Very truly yours,

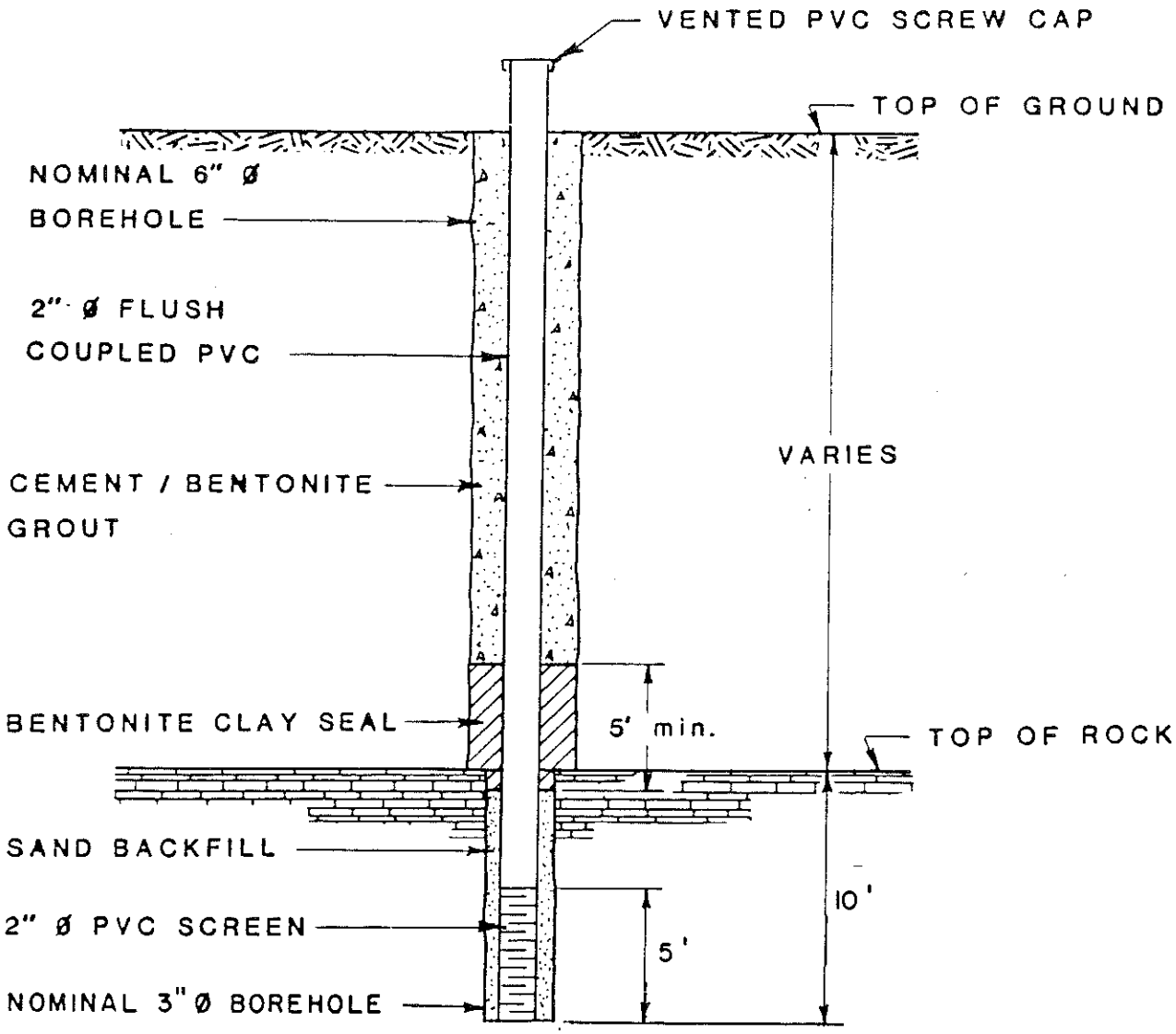
GOLDER ASSOCIATES

Michael T. Feeney

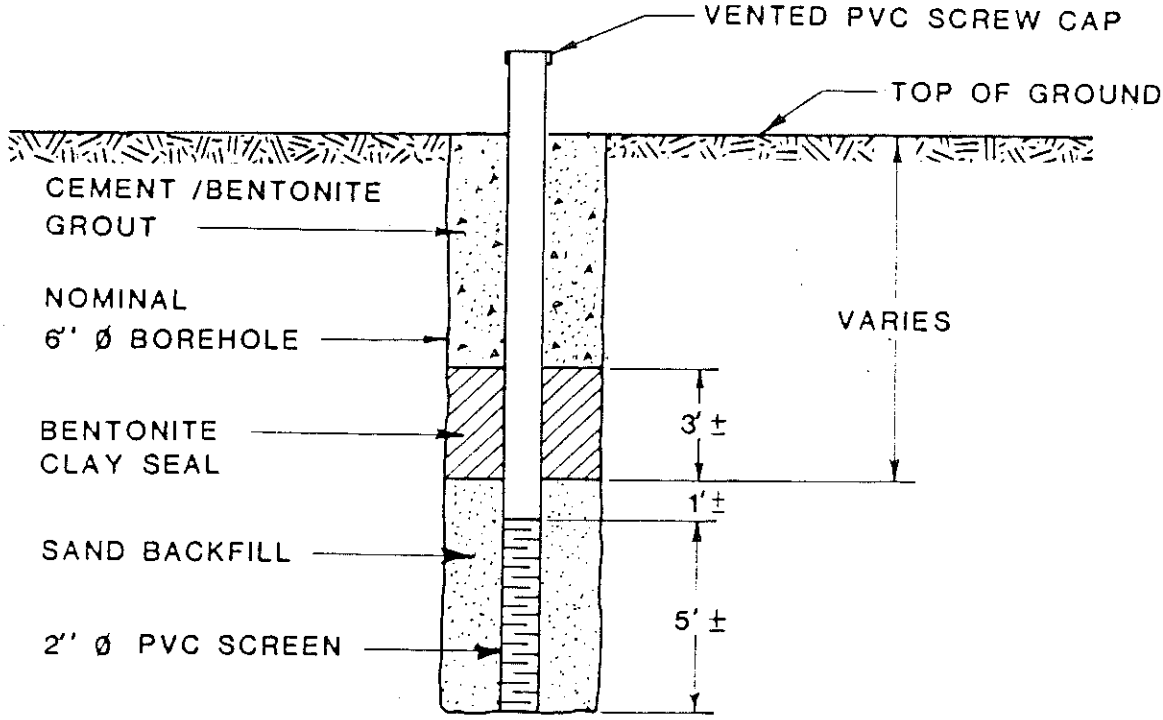
Michael T. Feeney
Project Engineer

Gary H. Collison

Gary H. Collison, P.E.
Principal



JOB NO. 834-1358.14	SCALE NOT TO SCALE	ROCK AQUIFER PIEZOMETER INSTALLATION DETAILS	
DRAWN SKB	DATE 1-31-84		
CHECKED MTF	DWG. NO. 102		
Golder Associates		CHEMICAL WASTE MANAGEMENT, INC.	FIGURE 2



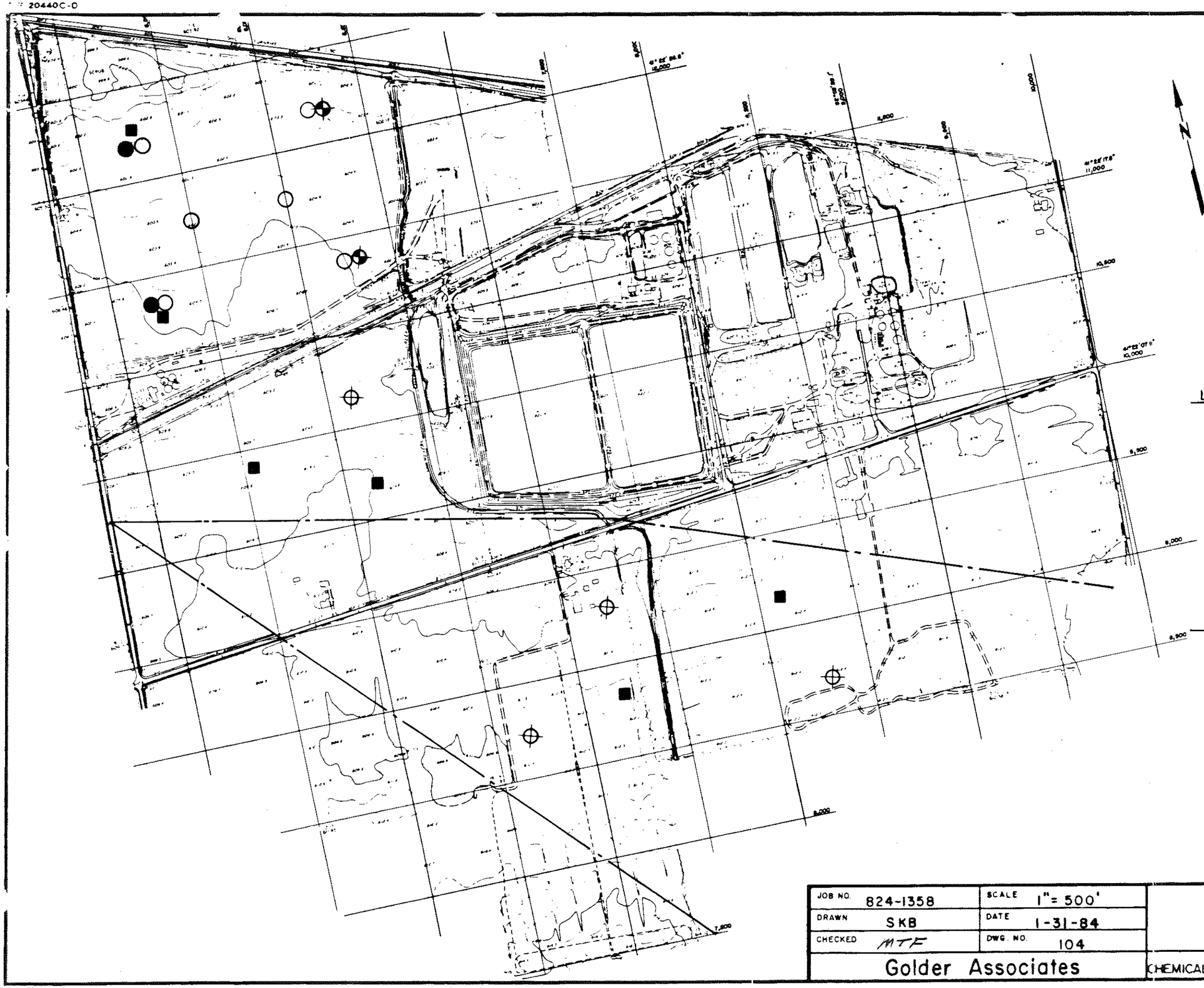
JOB NO. 834-1358.14	SCALE NOT TO SCALE	OVERBURDEN PIEZOMETER INSTALLATION DETAILS
DRAWN SKB	DATE 1-31-84	
CHECKED MTF	DWG. NO. 103	
Golder Associates	CHEMICAL WASTE MANAGEMENT, INC.	FIGURE 3

TABLE 1

LANDFILL AND BORROW PIT EXPLORATION
LABORATORY TESTING

Laboratory Test	Landfill Area Quantity	Borrow Pits Quantity
Natural Moisture Content	28	50
Specific Gravity	4	0
Wet Sieve Analysis	8	4
Hydrometer Analysis	8	4
Liquid and Plastic Limits	14	8
Standard Proctor	1	4
Permeability in Proctor Mold	1	4
Permeability in Triaxial Cell	3	4
Consolidation with extra unload cycle	3	1
Preparation of remolded sample	1	8
Unit weight and moisture from tube sample	4	4
% Passing #200 sieve	9	8

20440C-D



JOB NO. 824-1358	SCALE 1" = 500'	PROPOSED BORING AND TEST PIT LOCATION PLAN	
DRAWN SKB	DATE 1-31-84		
CHECKED MTF	DWG. NO. 104		
Golder Associates		CHEMICAL WASTE MANAGEMENT, INC.	FIGURE 1

rec'd 2/13/84
USEPA - WMB copy

Chemical Waste Management Inc.

POND 12

SLUDGE PCB

ANALYSIS

Total No. of Samples: 12
No. of Sludge: 0
No. of Clay: 12
No. of Sectors: 12
Average Depth of Sludge: 2"
Total Amount of Sludge: 2940 yd^3

E.T.C. CodeI	1242 mg/kg	1254 mg/kg	1260 mg/kg
BL12-1-1	Less Than 25 (ND)	Less Than 5	Less Than 5
2-1	Less Than 5	Less Than 5	Less Than 5
3-1	*Less Than 25	Less Than 5	Less Than 5
4-1	Less Than 5	Less Than 5	Less Than 5
5-1	Less Than 50 (ND)	Less Than 5	Less Than 5
6-1	Less Than 25 (ND)	Less Than 5	Less Than 5
7-1	Less Than 25 (ND)	Less Than 5	Less Than 5
8-1	Less Than 12.5	Less Than 5	Less Than 5
9-1	Less Than 25 (ND)	Less Than 5	Less Than 5
10-1	Less Than 12	Less Than 5	Less Than 5
11-1	Less Than 50 (ND)	Less Than 5 (ND)	Less Than 5 (ND)
12-1	Less Than 50 (ND)	Less Than 5	Less Than 5

Additional Analysis: E.P. Toxicity: BL12-3-1; BL12-8-1

All results completed by Environmental Testing and Certification Corporation of Edison, New Jersey.

*Insufficient Sample Remaining for Re-Analysis

GC/MS/SIM: BL12-11-1 (D8378) ND at .180 mg/kg
BL12-9-1 (D8379) ND at .183 mg/kg
BL12-7-1 (D8380) ND at .147 mg/kg
BL12-12-1 (D8381) ND at .065 mg/kg
BL12-5-1 (D8383) ND at .245 mg/kg
BL12-6-1 (D8384) ND at .245 mg/kg
BL12-1-1 (D8385) ND at .200 mg/kg

POND 11

SLUDGE PCB

ANALYSIS

Total No. of Samples: 8
No. of Sludge Samples: 0
No. of Clay Cores: 8
No. of Sectors: 8
Average Depth of Sludge: 6"
Total Volume of Sludge: 7,326 yd^3

E.T.C. Code	1242 mg/kg	1254 mg/kg	1260 mg/kg
BL11-1-1	Less Than 5	Less Than 5	Less Than 5
2-1	Less Than 5	Less Than 5	Less Than 5
3-1	Less Than 5	Less Than 5	Less Than 5
4-1	Less Than 5	Less Than 5	Less Than 5
5-1	Less Than 5	6.53	Less Than 5
6-1	*Less Than 12.5	Less Than 5	Less Than 5
7-1	Less Than 50	Less Than 5	Less Than 5
8-1	Less Than 5	Less Than 5	Less Than 5

Additional Analysis: E.P. Toxicity: BL11-6-1; BL11-1-1

All results completed by Environmental Testing and Certification Corporation of Edison, New Jersey.

*Insufficient Sample Remaining for Re-Analysis

GC/MS/SIM: BL11-7-1 (D8382) ND at .100 mg/kg.

POND 7

SLUDGE PCB

ANALYSIS

Total No. of Samples: 13
No. of Sludge: 5
No. of Clay Cores: 8
No. of Sectors: 4
Average Depth of Sludge: 2.8'
Total Volume of Sludge: 13,400 yd^3

E.T.C. Code	1242 mg/kg	1254 mg/kg	1260 mg/kg
BL7-1-1 Sludge	Less Than 250*	42.3	Less Than 10
1-2 Sludge	Less Than 50	29	Less Than 10
1-3 Top Clay	Less Than 5	Less Than 5	Less Than 5
1-3 Bottom Clay	Less Than 5	Less Than 5	Less Than 5
7-2-1 Sludge	Less Than 50	Less Than 10	Less Than 10
2-2 Top Clay	Less Than 5	Less Than 5	Less Than 5
2-2 Bottom Clay	Less Than 5	Less Than 5	Less Than 5
7-3-1 Sludge	Less Than 125*	Less Than 5	Less Than 5
3-2 Top Clay	Less Than 50	Less Than 5	Less Than 5
3-2 Bottom Clay	Less Than 50	Less Than 5	Less Than 5
7-4-1 Sludge	Less Than 100*	11	Less Than 10
4-2 Clay	Less Than 25	Less Than 5	Less Than 5

Additional Analysis: E.P. Toxicity: BL7-2-1; BL7-4-1
Dioxin: none
*GC/MS for Arochlor 1242 on BL7-1-1, BL7-3-1, BL7-4-1 was not detected at a detection limit of 5000 ug/l

All results completed by Environmental Testing and Certification Corporation of Edison, New Jersey

Chemical Waste Management, Inc.
Technical Center
150 W. 137th Street
Riverdale, Illinois 60627
312/841-8360

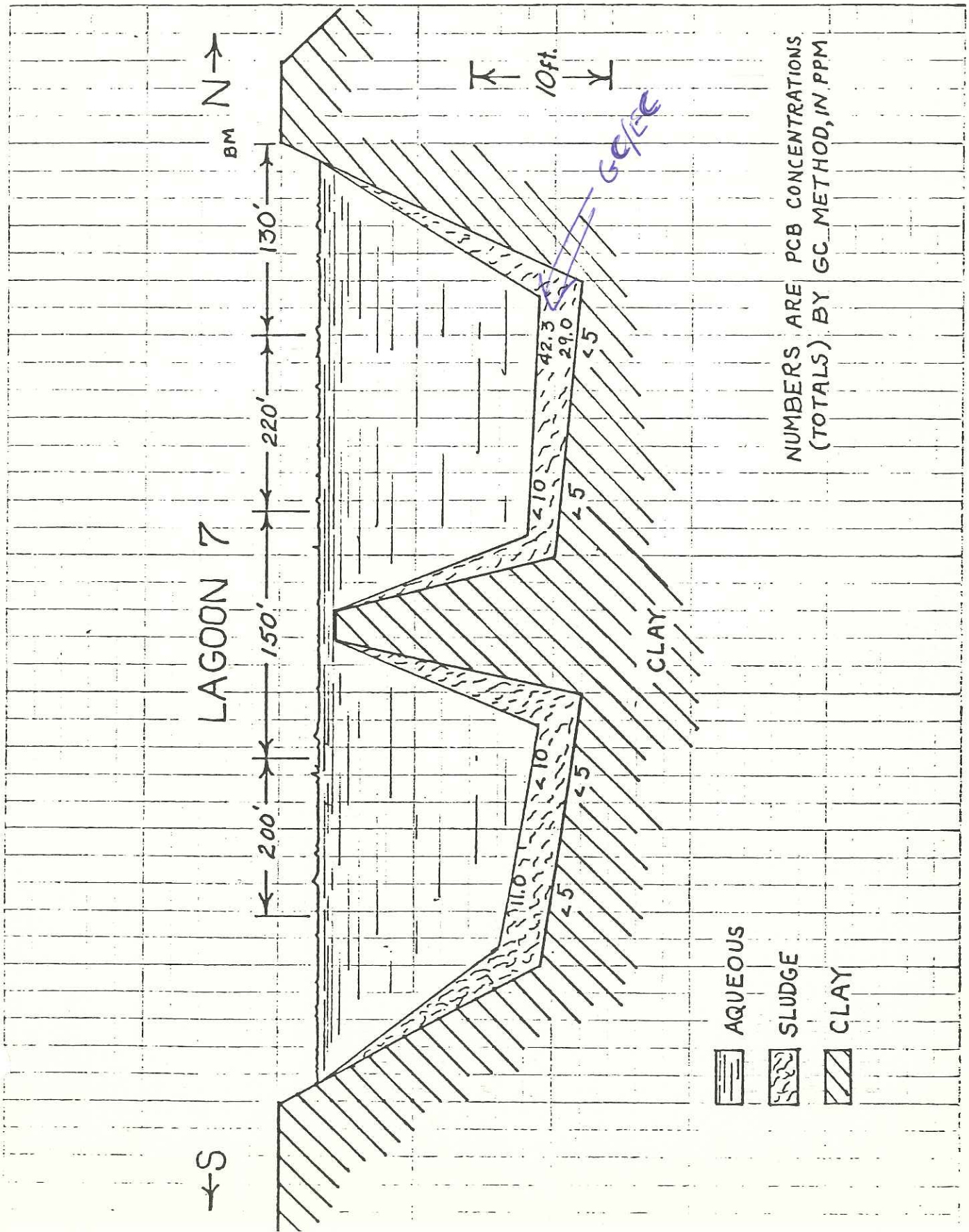
JOB SLUDGE & PCB LEVELS

SHEET NO. 3 OF 3

CALCULATED BY W. ABEL DATE 6-7-83

CHECKED BY _____ DATE _____

SCALE AS INDICATED



POND 5

PCB SLUDGE

ANALYSIS

Total No. of Samples: 11
No. of Sludge: 7
No. of Clay Cores: 4
No. of Sectors: 4
Average Depth of Sludge: 5.14'
Total Volume of Sludge: 15,040 yd^3

E.T.C. Code	1242 Mg/kg	1254 mg/kg	1260 mg/kg
BL5-1-1 Sludge	Less Than 250	100	23
1-2 Sludge	Less Than 50	Less Than 10	Less Than 10
1-3 Clay	Less Than 5	Less Than 5	Less Than 5
5-2-1 Sludge	Less Than 250	81	17
2-2 Sludge	Less Than 50	Less Than 5	Less Than 5
2-3 Clay	Less Than 5	Less Than 5	Less Than 5
5-3-1 Sludge	Less Than 250	98	19.8
3-2 Clay	Less Than 5	Less Than 5	Less Than 5
5-4-1 Sludge	Less Than 250	195	28.5
4-2 Sludge	Less Than 250*	28	Less Than 10
4-3 Clay	Less Than 5	Less Than 5	Less Than 5

Additional Analysis: E.P. Toxicity: BL5-1-1; BL5-4-1
Dioxin: BL5-4-1
*GC/MS: BL5-4-2 for Arochlor 1242 was not detected at a detection limit of 5000 ug/l

All results completed by Environmental Testing and Certification Corporation of Edison, New Jersey

Chemical Waste Management, Inc.
Technical Center
150 W. 137th Street
Riverdale, Illinois 60627
312/841-8360

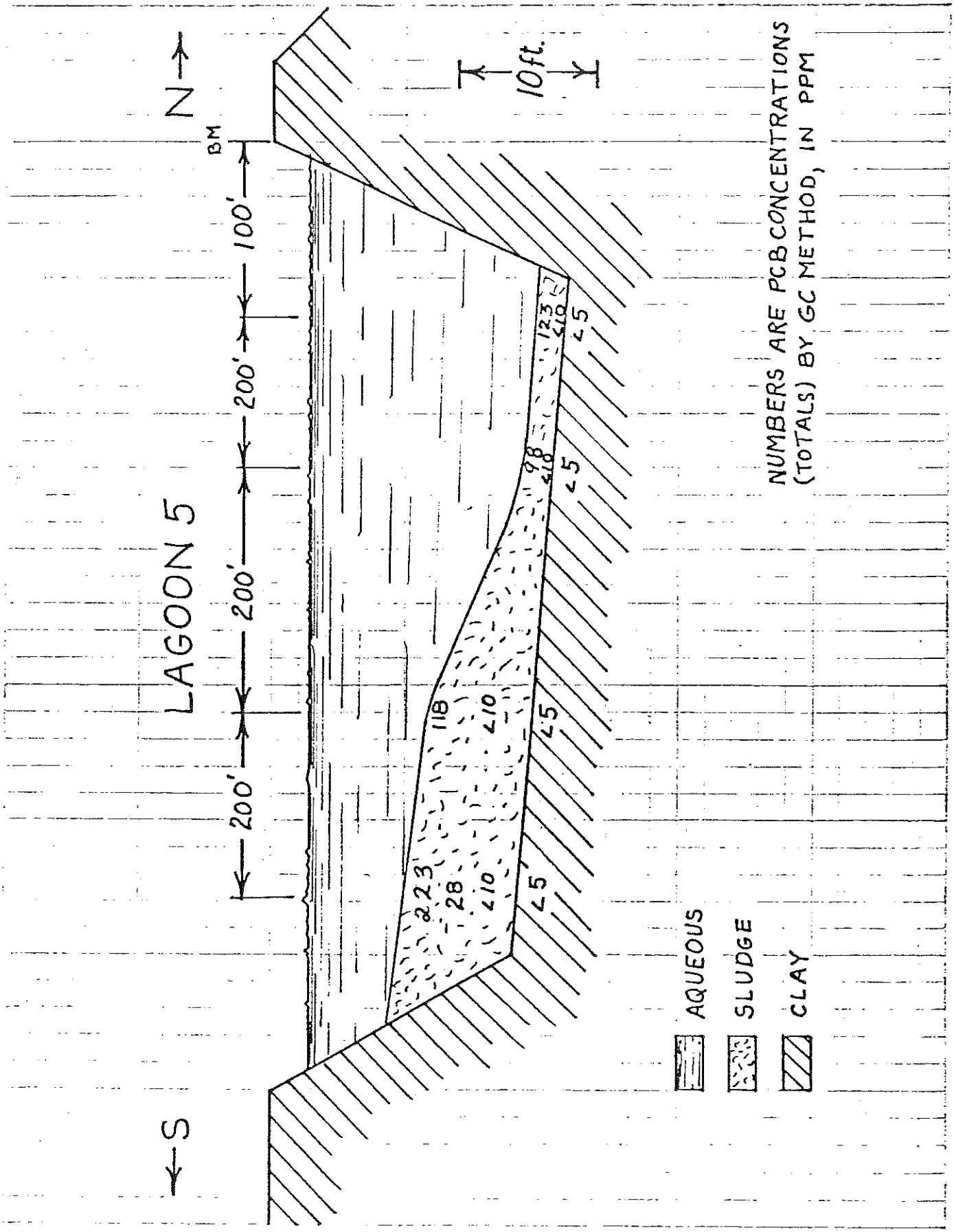
JOB SLUDGE & PCB LEVELS

SHEET NO. 2 OF 3

CALCULATED BY W. ABEL DATE 6-7-83

CHECKED BY _____ DATE _____

SCALE AS INDICATED



OPEN POND 4

SLUDGE PCB

ANALYSIS

Total No. of Samples: 16
No. of Sludge: 13
No. of Clay Cores: 3
No. of Sectors: 3
Average Depth of Sludge: 12'
Total Volume of Sludge: 38,890 yd^3

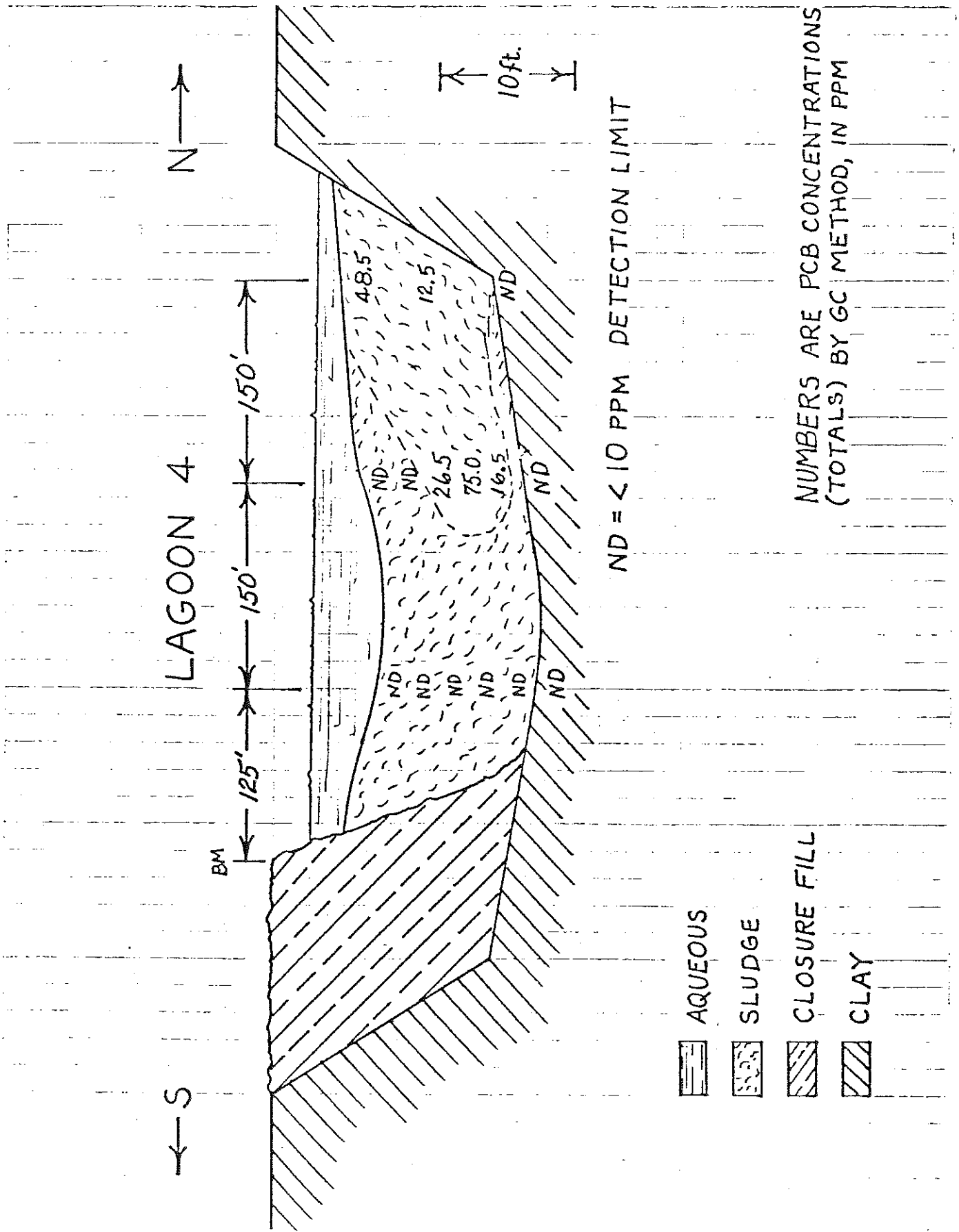
E.T.C. Code	1242 mg/kg	1254 mg/kg	1260 mg/kg
BL4-1-1 Sludge	Less Than 250	48.5	Less Than 10
1-2 Sludge	Less Than 250	12.5	Less Than 10
1-3 Clay	Less Than 5	Less Than 5	Less Than 5
4-2-1 Sludge	Less Than 10	Less Than 10	Less Than 10
2-2 Sludge	Less Than 10	Less Than 10	Less Than 10
2-3 Sludge	Less Than 50	26.5	Less Than 10
2-4 Sludge	Less Than 250	75	Less Than 10
2-5 Sludge	Less Than 100	16.5	Less Than 10
2-6 Clay	Less Than 5	Less Than 5	Less Than 5
4-3-1 Sludge	Less Than 50	Less Than 10	Less Than 10
3-2 Sludge	Less Than 100	Less Than 10	Less Than 10
3-3 Sludge	Less Than 250	Less Than 10	Less Than 10
3-4 Sludge	Less Than 250	Less Than 10	Less Than 10
3-5 Sludge	Less Than 100	Less Than 10	Less Than 10
3-6 Sludge	Less Than 50	Less Than 5	Less Than 5
3-7 Clay	Less Than 5	Less Than 5	Less Than 5

Additional Analysis: E.P. Toxicity: BL4-2-5; BL4-3-3
Dioxin: BL4-2-2

All results completed by Environmental Testing and Certification Corporation of Edison, New Jersey

Chemical Waste Management, Inc.
Technical Center
150 W. 137th Street
Riverdale, Illinois 60627
312/841-8360

JOB SLUDGE, PCB LEVELS
SHEET NO. 1 OF 3
CALCULATED BY W. ABEL DATE 6-7-83
CHECKED BY _____ DATE _____
SCALE AS INDICATED



RIP RAP

OPEN PONDS

PCB ANALYSIS

E.T.C. Code	1242 mg/kg	1254 mg/kg	1260 mg/kg
Pond 4 (Rip-4)	Less than 50	Less than 5	13.7
Pond 5 (Rip-5)	Less than 50	183	28.7
Pond 7 (Rip-7)	Less than 50	Less than 5	42
Pond 11 (Rip-11)	Less than 125	436	140

All results completed by Environmental Testing and Certification Corporation of Edison, New Jersey

USEPA - WMB
copy

2/13/84

OEPA - U.S. EPA - Chemical Waste MGT

1.	Mike Walker	USEPA	312-886-6662
2.	Steve Willey	US DOJ	(202) 633-5415
3.	Ben Chambers	OEPA-Boul Grn	419-352-8461
4	Dan Banaszek	USEPA	312-886-3712
5	Rich Shank	OEPA	614 462 6733
6	Ed Kitchen	OEPA	"
7.	Jack Van Kley	OAG	614 466-2766
8.	Geo Vander Velde	CWM	312-654-8800
9.	Ben Pfefferle	OEPA	614 466-3491
10	Tom Carlisle	OEPA	614 462-8975
11.	Kathy Trent	CWM	614-766-1100
12	Virginia Aveni	OEPA	
13.	Robert Maynard	OEPA	
14.	Lee Archambeau	CWM -	419-547-7791