OVERSIZE PAGES

LOCATED AT

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DOCUMENT

300504-0604240002

CH2M HILL
Mound, Inc.
1 Mound Road
P.O. Box 3030
Miamisburg, OH
45343-3030

CH2MHILL

ER/WM-156/04
November 22, 2004

Ms. Margaret L. Marks, Director
Miamisburg Closure Project
U. S. Department of Energy
1075 Mound Road
Miamisburg, OH 45342

ATTENTION: Paul Lucas

SUBJECT: Contract No. DE-AC24-03OH20152
Statement of Work Requirement 055 - Regulator Reports
LEASING DATA PACKAGE, SANITARY SEWER SYSTEM

Dear Ms. Marks:

At the request of the City of Miamisburg, the Department of Energy has authorized the release of the following document for Public Review:

- Leasing Data Package, Sanitary Sewer System, October, 2004

The USEPA has reviewed this document and concurs that leasing this system is protective of public health and the environment (see enclosed letter, Karl to Marks, November 18, 2004).

If you or members of your staff have any questions regarding the document, or if additional support is needed, please contact me at 937-865-4203.

Sincerely,

David A. Rakel
CERCLA Lead

DAR/jg

Enclosures

cc: Tim Fischer, USEPA, w/o attachments
Brian Nickel, OEPA, w/o attachments
Ruth Vandegrift, ODH, w/o attachments
Mary Wojciechowski, Tetra Tech, w/o attach
Frank Schmaltz, DOE/MCP, w/o attachments
Lisa Rawls, MCP, w/o attachments
Randy Tormey, DOE/OH, (1) w/attachments
Frank Bullock, MMCIC, w/o attachments
Public Reading Room, (4) w/attachments
Dave Rakel, CH2M Hill, w/o attachments
Max Edington, CH2M Hill, w/o attachments
ER Records, CH2M Hill, w/o attachments

DCC (1) w/attachments
John Lehew, CH2M Hill, w/o attachments
Jeff Bradford, CH2M Hill, w/o attachments
Val Darnell, CH2M Hill, w/o attachments
file

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

NOV 18 2004

REPLY TO THE ATTENTION OF:

R-19J

Ms. Margaret Marks, Director
Miamisburg Closure Project
U.S. Department of Energy
1075 Mound Road
Miamisburg, OH 45342

RE: U.S. DOE Mound Plant
Sanitary Sewer Collection System
Request for Concurrence to Lease

Dear Ms. Marks:

Thank you for your letter dated November 3, 2004, requesting concurrence to lease the Mound Sanitary Sewer Collection System at the United States Department of Energy (U.S. DOE) Mound Plant in Miamisburg, Ohio.

The United States Environmental Protection Agency (U.S. EPA) has reviewed your request as required by Sections 3154 (e)(1) and (e)(2) of the National Defense Authorization Act (The Act), which amended Section 646 of the Department of Energy Organization Act (42 U.S.C. 7256). This amendment is commonly referred to as the "Hall Amendment". The Act requires that U.S. DOE obtain concurrence from the Administrator of the U.S. EPA with respect to leasing property on the National Priorities List. This concurrence review is required to determine whether the conditions of the property are such that leasing the property is consistent with the safety and the protection of public health and the environment.

The U.S. EPA has carefully reviewed the Leasing Data Package for the Mound Sanitary Sewer Collection System, which included, among other things, a description of the sanitary sewer system, a description of the history and past uses of the sanitary sewer system, an evaluation of potential risks that may arise during the leasing period and what measures were being taken to prevent these risks, and the base lease between U.S. DOE and the Miamisburg Mound Community Improvement Corporation (MMCIC). The Mound site was established as a research and development facility in 1947. The sewer system previously collected sanitary sewage from buildings that conducted radiological and non-radiological operations on both the north (Main Hill) and the east (SMPP Hill) hills of the site. By design, the sanitary sewer system was not intended for the removal of hazardous chemical or nuclear materials. Based upon a thorough review of all of the information associated with the Mound Sanitary Sewer Collection System, U.S. EPA hereby concurs that the leasing of the Mound Sanitary Sewer Collection System is protective of public health and the environment.

The U.S. EPA fully supports redevelopment and reuse of the structures and other property available at the Mound Plant. However, assurances must be provided that all property and building leases and transfers will be protective of public health and the environment. If you have any questions or concerns about this or future economic development issues at the site, please contact Timothy Fischer, of my staff, at (312) 886-5787.

Sincerely yours,

for Richard C. Karl, Director
Superfund Division
U.S. EPA, Region 5

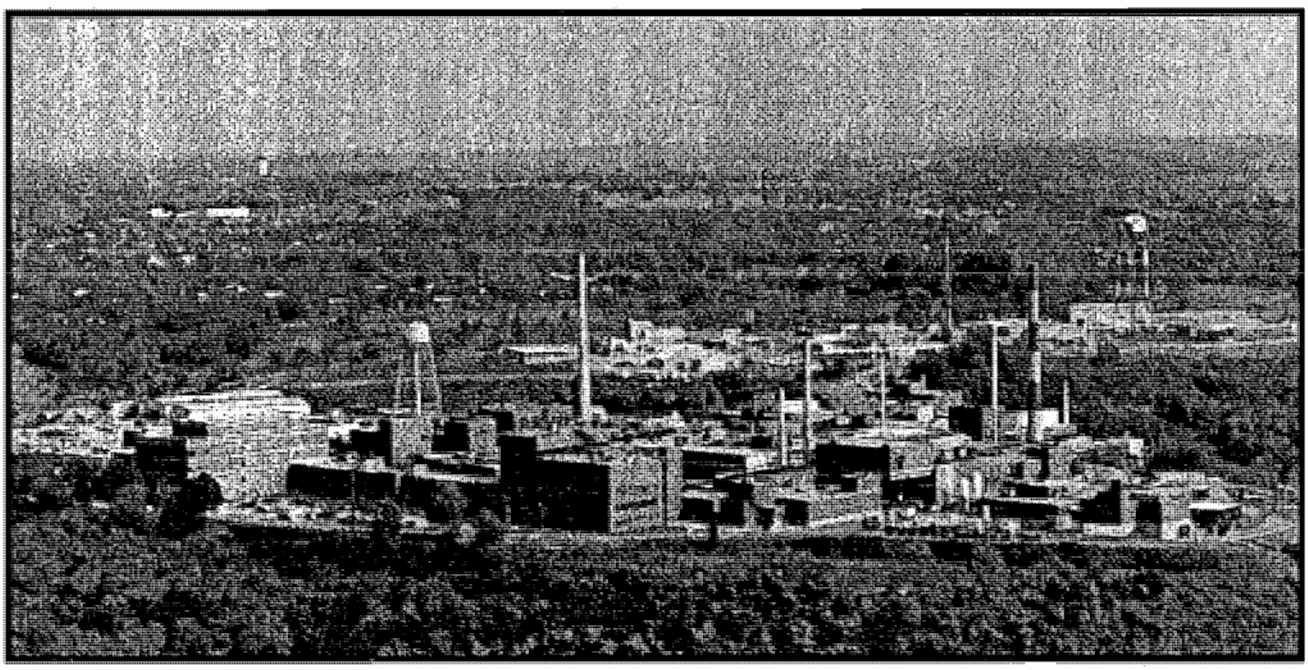
cc: Gary Schafer, SR-6J
Brian Nickel, Ohio EPA
Tim Thurlow, ORC

Environmental
Restoration
Program

Miamisburg Closure Project
LEASING DATA PACKAGE
Resubmittal

Mound Sanitary Sewer System

November 2004



Environmental
Restoration
Program

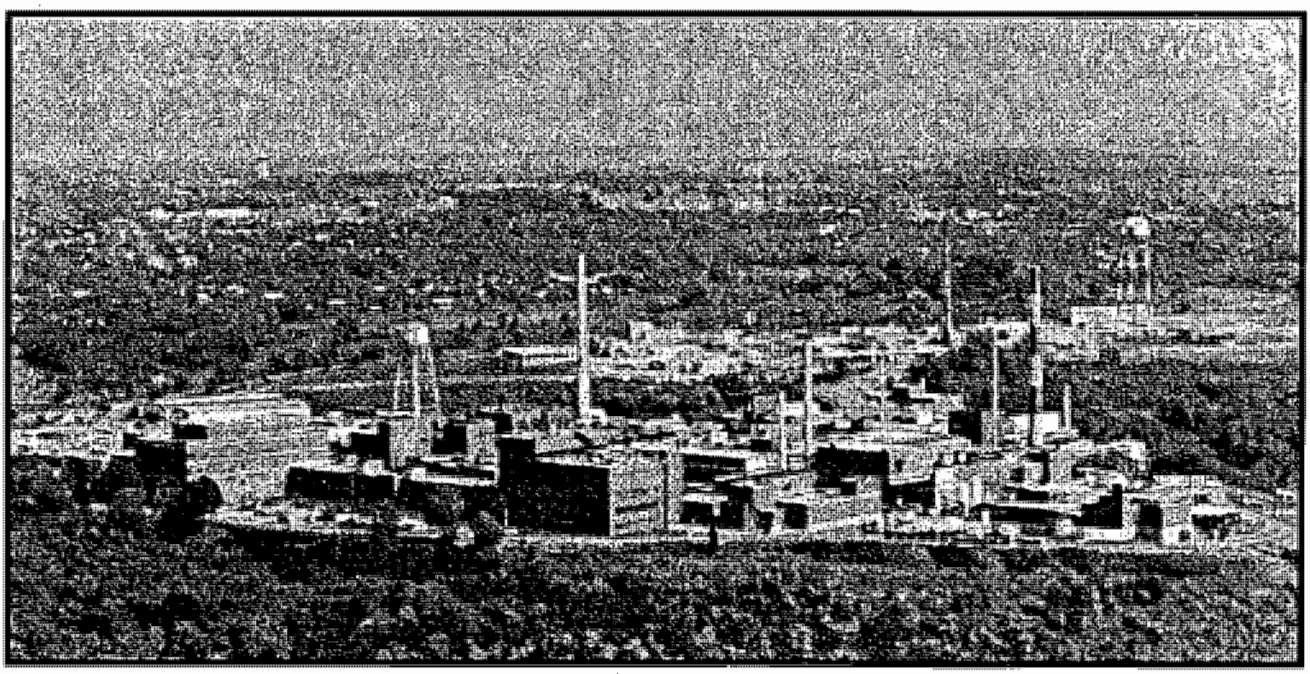
Miamisburg Closure Project

LEASING DATA PACKAGE

Resubmittal

Mound Sanitary Sewer System

November 2004



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EXHIBITS

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Exhibit 2 Map of Sanitary Sewer Lines to be Leased Relative to Former Radiological Facilities
Exhibit 3 Summary of Remedial Investigations and Activities to Date
Exhibit 4 Sketch of Suspected Pathway of Tritium
Exhibit 5 Matrix of Environmental Concerns

APPENDICES

Appendix A Draft Sewer Lease Agreement
Appendix B Information Map of Sewer Lines to be Leased
Appendix C Draft Information Package – July 2004
Appendix D Summary of 10-Week Mound Treatment Plant Sampling Program

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Appendix F	Calculations of Soil Volumes
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Appendix H	Evaluation of Contaminants of Concern near Sanitary Sewer Lines in PRSs 41, 67, 87, Bldg 22 area, and the Waste Staging Area
Appendix I	Procedure for Radiological Surveys
Appendix J	Radiological Survey Data Record of Sewer Line Repair 9/28/04
Appendix K	Videotape Report and Radiological Survey Data Record of Equipment from Videotaping of Sewer Line Segment 9/8/04
Appendix L	OEPA Letter October 25, 2004 – I/I Study of Wastewater Treatment Plant Collection System
Appendix M	DVD of Videotape of Sanitary Sewer System (Limited Inclusion)

1.0 LEASING DATA PACKAGE

1.1 General Overview

It is the intent of the Department of Energy (DOE), the Miamisburg Mound Community Improvement Corporation (MMCIC), the City of Miamisburg (City), and CH2M HILL per the Memorandum of Agreement (MOA) signed July 26, 2004 to transition the provision of sanitary sewer service from DOE to the City of Miamisburg. In order to accomplish this transition of service, a lease is being enacted whereby the sewer lines will be leased from DOE to MMCIC for the commercial development of the site. The lease is included as Appendix A and sets forth the provisions for the sewage to be treated by the City's Publicly Owned Treatment Works (POTW) and for DOE to continue performing maintenance of the leased sewer pipes until the property is conveyed via quit claim deed, from DOE to the MMCIC.

1.2 Scope

This Leasing Data Package is being submitted to the Core Team to comply with the conditions of the U.S. EPA Federal Facilities Restoration and Reuse Memorandum of June 30, 1998 entitled "Joint DOE/EPA Interim Policy Statement on Leasing Under the 'Hall Amendment' (interim policy statement). Portions of the Mound sewer system proposed for lease encounter locations that are in the process of being assessed and in the process of being cleaned up. Therefore, in accordance with the conditions of Section 5.d of the interim policy statement on the 'Hall Amendment' this leasing data package is organized in the following manner:

i. the Leasing Data Package *(Section 1.0)*;
ii. identification of pathways that need to be evaluated for the purpose of the lease (e.g., air, surface soil) *(Section 2.0)*;
iii. the assembly of all relevant sampling data for pathways of concern *(Section 3.0)*;
iv. an identification of pathways which are not a concern for the purposes of the lease and the rationale for this determination *(Section 4.0)*;
v. documentation of land and facility use restrictions needed to prevent exposure to pathways not addressed *(Section 5.0)*;
vi. documentation of restrictions relied upon to mitigate/reduce exposure and risk *(Section 6.0)*;
vii. the completed risk evaluation *(Section 7.0)*; and
viii. documentation of Federal access rights verification and documentation of suitable ingress and egress and restrictions to prevent interference with on-going remediation systems or investigation actions *(Section 8.0)*.

The intention of the lease is for the initial transition of property that will precede the actual transfer of the land parcels via quit claim deed that contain the Mound sewer system. The conditions of the lease document contain provisions that are different from a full transfer of responsibility, via deed, for the land parcel in which the sewer system lies. This is a key issue in assessing data included in this package.

The Leasing Data Package contains the following information required by the interim policy statement. The location (i.e. section number) of the information in this package is also listed below.

i. document the nature, magnitude, and extent of the environmental contamination of the property *(Sections 2.0 and 3.0)*;
ii. define environmental contamination responsibilities associated with the lease *(Sections 5.0 and 6.0)*;
iii. develop sufficient information to assess the risks to safety and the protection of public health and the environment caused by the use of the leased property *(Sections 3.0 and 7.0)*;
iv. contain the lease terms and conditions providing protective assurances and restrictions on the leased property *(Sections 5.0, 6.0, and 8.0).*

1.3 Description of Sewer System

Sewer lines to be transferred, via lease from DOE to MMCIC are the linear sections as shown on Exhibit A of the sewer lease (included as Appendix A to this document). The sewer lines are located on the Mound Closure Project site situated in the State of Ohio, county of Montgomery, in the City of Miamisburg, being a part of section 30 and fractional section 36, Town 2, Range 5, Miami Rivers Survey (M.R.S.), and being on city lot numbered 2259 lying within the corporate limits of Miamisburg, being on the tracts of land conveyed to the United States of America by instruments as recorded in Deed Book 1214 pages 12-14, Micro-Fiche 81-376A01 and Micro-Fiche 81-323A11 of the Deed Records of Montgomery County.

Appendix B is a detailed map displaying the Mound sewer system with the lines to be leased. Additionally, the sewer lines to be leased are annotated with the pipe installation dates, pipe material, and pipe diameters. A total length of approximately 11,200 linear feet is included in the lease. Installation dates for pipe segments to be leased range from 1968 to 2004 with pipe diameters ranging from 4" to 8". Pipe materials include cast iron pipe (CIP), ductile iron pipe (DIP), poly-vinyl chloride pipe (PVC), and vitrified clay pipe (VCP).

1.4 History of Sewer System

The Mound site was established as a research and development facility in 1947. The sewer system previously collected sanitary sewage from buildings that conducted radiological and non-radiological operations on both the north (Main Hill) and the east (SMPP Hill) hills of the site. By design, the sanitary sewer system was not intended for use for the removal of hazardous chemical or nuclear materials. A separate system existed for the transport of radiological waste material to the waste treatment facility specifically designed to treat radiologically contaminated wastewater from DOE weapons operations. Consequently, the entry of low levels of radiological contamination into the sanitary sewer system would have been through such avenues as employee showers and wash downs; random inappropriate acts of disposal of small amounts of radiological materials in sanitary sewer drains and building sumps; and from overflow of the radiological waste disposal system sumps and drains.

Exhibit 1 displays a list of buildings that previously had radiological operations with potential to contribute small amounts of radioactive contamination to the sanitary sewer system. These buildings are also shown on Exhibit 2 relative to the location of sanitary sewer lines to be leased.

Sewage from the Mound site has been treated at the sewage disposal plant (SD) on site. Biosolids (sludge) derived from the treatment process have been disposed of as low-level radiological waste over the years as well as currently. A change has not been made from this disposal method, even though sampling of the SD treatment plant influent recently determined that the radiological content is well below the ODH limits for sewer discharges. The biosolids are still disposed of as low-level radiological waste because the SD plant is planned for shutdown and abandonment in the very near future. Therefore going through the permitting process for a short period of time has not been practical. Also, the site ships a large amount of low-level waste off site on a regular basis. The small amount of biosolids removed from the SD plant, makes this the most efficient course of action for the closure project.

Exhibit 1- Potential Source Buildings

Building	Function
H	Laundry/showers
R	Research and production
SW	Research and production
T	Research and production
SM	Research and production
38/PP	Research and production
48	Laboratory
50	Research and production
58	R/SW HEPA filters
HH	Research
WD	Waste treatment
22	Waste storage
23	Mixed waste storage

NEW RE-ROUTES AROUND MH & GROUP 9 PRSs

NEW RE-ROUTES AROUND BD-45 & PRS66

RADIOLOGICAL DATA FROM REPAIR LOCATIONS

0 100 200 400 600 800 1000
Scale In Feet

Legend

- Structures
- Structures to Remain
- Former Radiological Buildings No Longer Connected to Sewer
- Area of Damaged Pipe Repair November 20004
- Area of Damaged Pipe Repaired September 2004
- Mound Plant boundary
- Sanitary Lines to be leased
- Sanitary Lines on MMCIC Property
- Planned Re-Route
- New Sections of Sanitary Sewer

ISS	DATE	REVISION	BY	CHKR	ENG	LP&EC	APVD	M
	11/01/04	PLAN VIEW	MR					

MOUND

Environmental Restoration Geographic Information System

SHEET	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
ISSUE																					

SHEET	1	2	3	4	5	6
ISSUE						

PART CLASSIFICATION

Mound Plant

EXHIBIT 2
SANITARY SEWER LINES TO BE LEASED BY MMCIC WITH REPAIRS LOCATED

DRAWING CLASSIFICATION: UNCLASSIFIED

SIZE

DRAWING NUMBER: lease_san&brks.dgn

JOB NUMBER

DWG TYPE: STE | PRMG: ER-GIS | CAGEC | SCALE: GRAPH | SHEET 1

STATUS: MD-REL-10/27/04 | ORIGIN: MSTATION / J

As part of DOE's ongoing site closure operations, buildings with previous radiological contamination have been isolated from the Mound sanitary sewer system prior to demolition of the contaminated buildings. At the current time, no previous radiological facilities still exist on the Mound sewer system with the exception of T Building which is undergoing the final stages of remedial activities prior to transfer to the MMCIC. T Building will remain on the sanitary sewer system to be leased. However, the source term for the building has been removed.

Two significant reroutes of sewer pipe have occurred in the past two years. A reroute of approximately 1550 linear feet around the PRS 66 area was accomplished in 2003. The reroute allowed the sewer lines to bypass around the PRS area thus allowing for the extensive excavation of soils. An additional reroute of approximately 1410 linear feet in 2004 allowed for the bypass of sewer pipe that ran through areas of the Group 9 PRSs on the Main Hill. This reroute allowed for the abandonment of sewer sections previously servicing buildings 48, 58, T, WD, R, SW, and HH.

1.5 Remedial Investigations and Activities to Date

Beginning in early 2003, the various parties with interest in the transition/leasing of the sanitary sewer system from DOE to MMCIC have met and worked to address relevant issues. U.S. EPA, Ohio EPA and ODH have been included in the transition planning. Numerous activities are in process or have taken place over the past two years to investigate and/or mitigate environmental concerns with the proposed lease. Exhibit 3 is a summary of the primary activities to-date.

1.6 Leasing Data Package Risk Evaluation Summary

The risk evaluation in Section 7.0 of this Leasing Data Package considers the three primary pathways of exposure: sewage, surrounding soils, and sewer pipe. The available data was assessed as to the protectiveness of the lease of the sanitary sewer system from DOE to MMCIC. This section is included here as a summary of the evaluation in this Leasing Data Package. The following key issues were identified:

1. The 10-week sampling event of sewage influent to the Mound sewage treatment plant and resulting study determined that radionuclides in the Mound sewage were well below ODH limits for sewer discharges and that risks were significantly below the ISCORS screening values for City of Miamisburg workers and the biosolids land application program.

2. At the highest known concentrations of radiological contaminates found in active PRSs in the vicinity of sanitary sewer lines to be leased, a soil volume in excess of even a large break in the sewer pipes would have to enter the sewer system to exceed the ISCORS screening level. As such, the risk from exposure in this manner is considered to be low.

3. The sanitary sewer pipe was jet cleaned with 1500 psi of pressure to remove any loose contamination in the pipe. The videotape of the pipe showed conclusively

that the jetting removed loose material throughout the system. Radiological surveys of the jetting and videotaping equipment that was inside the sewer pipe and records of the radiological survey of the broken sewer pipe repaired in the PRS 272/273 area of the SMPP Hill, showed that the video and jetting equipment and the broken sections of pipe all met the free release criteria.

4. The site demolition and remedial activities have progressed to a point where all source buildings on the sanitary sewer system that were a potential contributor of radiological contamination have been removed with the exception of T Building. Although future releases are possible, the risk of a significant release from the remaining source building is low.

5. To safeguard against the potential for adverse impacts to the City's POTW facilities and POTW employees, the draft lease agreement between DOE and MMCIC includes the protocol for conducting site remediation activities after the sewer lines are leased to MMCIC that mitigates exposures and risk via the sanitary sewer.

6. DOE will continue to provide maintenance of the sanitary sewer system until the property is transferred to MMCIC via the quit claim deed. Therefore, all active PRSs will be dispositioned by the Core Team prior to the City assuming maintenance of the sanitary sewer system. As such, exposure of City workers through direct contact with soils is not possible.

From the risk evaluation, the preponderance of evidence is that exposure through the sewage, surrounding soils, and sanitary sewer pipe do not pose a significant danger to safety, human health and the environment particularly under the conditions of the lease that specifically mitigate/reduce the exposure and risk.

Exhibit 3 - Summary of Remedial Investigations and Activities to Date

Date	Remedial Investigation/Activity	Leasing Data Package Location
June 2003	A reroute of 1550' of new sanitary sewer lines around PRS 66 was completed	n.a.
October 5, 2003	The Technical Assistance – Value Management Study Related to Transferring the Miamisburg Closure Project Sanitary Sewer System Piping was conducted on September 23–25, 2003 with a final draft report submitted October 5, 2003.	n.a.
January 13, 2004	The Data Review of Sewage Sludge and Waste Water Influent and Effluent Analysis for the Miamisburg Closure Project and the City of Miamisburg – Preliminary Report was issued.	Attachment 2 of Appendix C
January/February 2004	The high pressure cleaning and videotaping of the Mound sewer system was conducted. Videotapes are included in selected copies of this Leasing Data Package.	Inspection report Attachment 8 - Appendix C; Radiological survey Attachment 9 - Appendix C
March 2004	A reroute of 1410' of sanitary sewer lines from Group 9 PRSs on Main Hill was completed	n.a.
July 2004	The draft Information Package on the sanitary sewer system including a review of all MEIMS data of all sampling data within 15' of sewer lines was submitted to the Core Team.	Included as Appendix C
August 2004	A 10-week sampling of the Mound sewage disposal (SD) plant influent was completed.	Data summary included as Appendix D
October 5, 2004	Report entitled Evaluation of the Potential Impacts from Residual Radionuclide Levels in the Mound Sewage on the City of Miamisburg's Publicly Owned Treatment Works (POTW) was prepared by Lisa Stetar.	Appendix E
September 2004	The MEIMS data review of 610' of temporary sewer lines on the Main Hill was conducted.	Appendix G
September 28, 2004	Field data from the radiological scan of broken sewer pipe repaired in PRS 272/273 of the SMPP Hill was collected	Appendix I
September/October 2004	A study of PRSs 41, 67, 87, the Bldg 22 area and the waste staging area in the vicinity of sanitary sewer lines to be leased was conducted.	Appendix H
November 2004	Repair of three sections of sewer lines identified by videotaping of sanitary sewer system are to be completed in November 2004. Radiological surveys will be performed on the inside and outside of the sewer pipe that is removed.	Exhibit 2
November 2004	High pressure cleaning and videotaping of temporary sewer pipe segments on the Main Hill to be included in the lease will take place in November 2004.	n.a.

2.0 IDENTIFICATION OF PATHWAYS THAT REQUIRE EVALUATION FOR THE PURPOSE OF THE LEASE

For the purpose of the lease of the sanitary sewer system, three primary pathways of concern were identified. Those pathways are 1) exposure through the sewage received at the City of Miamisburg POTW with the resulting biosolids land applied; 2) exposure through subsurface soils surrounding the sanitary sewer pipes to be leased; and 3) exposure through loose and/or fixed contamination that may be present in the sewer pipe. The following sections describe these potential pathways. Each pathway is further investigated in Sections 3.0 and 7.0 of this package.

2.1 Exposure through Sewage

The sewage that is transported by the sewer collection system of the Mound site constitutes a potential pathway of exposure. The potential receptors of this pathway are the workers in the City's POTW, the workers involved in the land application of biosolids derived from the treatment process at the POTW, and members of the public who later reside or recreate on the land application site. An additional issue directly related to exposure from sewage is the potential economic risk to the City's infrastructure at the POTW from radiological contamination.

The risk investigation for this pathway focuses on the known contents of the sewage to be discharged from the site. Additionally, the potential for new contaminants to enter through existing breaches or breaches inadvertently caused by remedial activities in soil in the proximity of the leased sanitary sewer lines and the potential impacts for new contaminants are evaluated.

2.2 Exposure through Soils

Soils that surround sewer pipe have been identified as a potential exposure pathway to City workers performing repairs to the sewer system. Other potential receptors are the workers in the City's POTW and land application site. The risk evaluation addresses the potential for exposure to workers through the soil in the areas of active and previously remediated PRSs.

2.3 Exposure through Sewer Pipe

Sewer pipe is considered a potential exposure pathway from the possibility of both loose and fixed radiological contamination on the pipe interior. Additionally, the potential exists that sewer pipe could become contaminated from peripheral contact with contaminated soils in areas of designated PRSs. The risk is that radiologically contaminated pipe sections could potentially be removed from the Mound site as waste and placed in a sanitary landfill in the event of a sewer line break or blockage. Potential receptors are the workers conducting pipe repair operations, workers or the environment if contaminated pipe is improperly disposed, workers in the City's POTW and land application site. The risk evaluation assesses both the potential for fixed or loose radiological contamination along pipe surfaces and the potential impacts to workers and the environment.

3.0 THE ASSEMBLY OF ALL RELEVANT SAMPLING DATA FOR PATHWAYS OF CONCERN

The relevant information on the three potential pathways of concern is incorporated into this section to assess the risks to safety and the protection of public health and the environment that may be caused by the projected leasing of the designated sewer pipe on the Mound site. This section includes a summary of studies, mitigating actions, and general information that have taken place in preparation of the lease. In each case, the data is focused on the conditions of leasing the sewer system, as opposed to a more encompassing property transfer (parcel transfer via quit claim deed) scenario.

3.1 Exposure through Sewage

Data is assembled to assess the potential for exposure to workers in the City's POTW, the workers involved in the land application of the biosolids derived from the treatment process at the POTW, and members of the public who later reside or recreate on the land application site. The following are the available data for this pathway:

- Sewer Sludge Data - The Data Review of Sewage Sludge and Waste Water Influent and Effluent Analysis for the Miamisburg Closure Project and the City of Miamisburg – Preliminary Report was issued January 13, 2004. The report concluded that sludge sampled from the Mound SD plant drying beds had levels of Pu-238 above the ISCORS screening levels. The sludge sampled was an accumulation of biosolids from an undetermined period of time, inclusive of the period of 2002 and before, during which there was active weapons production at the Mound site (study included as Attachment 2 to Appendix C). This information includes data that is not representative of the current discharge from the existing buildings or conditions of the Mound site.

- SD Plant Influent Sampling - A 10-week sampling program from 6/21/04 through 8/26/04 was conducted to assess the levels of radiological content of the influent sewage of the Mound SD plant. The sampling location collected was representative of sewage coming from all components and locations of the Mound sanitary sewer system. The sampling location was downstream of the grit chamber transfer pumps that facilitate the blending of the treatment plant influent into a homogeneous flow. Split samples were collected by the Ohio EPA and CH2M HILL. The following radiological analytes were the focus of the sampling program: Pu-238/239/240, Am-241, Ac-227, Th-227/228/230/232, U-233/234/235/236/238, Cs-137, Co-60, Pb-210, and Ra-226/228. Summary tables from the ten weeks of data are included in Appendix D. One item of note was an event of elevated Thorium (Th-230/232) over a two-week period from 7/26-8/12/04 during the 10- week sampling event. Although the level of elevation was well within the acceptable ODH regulatory criteria for sewer discharges, the temporary elevation represents the potential for uncontrolled sources of radiological contamination in the sewage. It was determined that a break in the sanitary sewer line inadvertently occurred in the PRS 272/273 area during

remediation in the area. Once the sewer line break was discovered and repaired, the Thorium levels returned to normal for the 10-week sampling event.

- Sampling Data Versus Risks - A report entitled Evaluation of the Potential Impacts from Residual Radionuclide Levels in the Mound Sewage on the City of Miamisburg's Publicly Owned Treatment Works (POTW) was prepared by Lisa Stetar in concert with the 10-week sampling event to assess the data set from the sampling event relative to Ohio Department of Health's (ODH) regulatory criteria for discharges of radionuclides into public sewer systems. The study determined that radionuclides in the Mound sewage were well below ODH limits for sewer discharges. Additionally, a screening process developed by the Interagency Steering Committee on Radiation Standards (ISCORS) was applied to the data to evaluate the potential risks to workers in the City of Miamisburg POTW, to land application workers, and the public from exposure to biosolids. The study determined that the risks from exposure to biosolids are minimal and that the "worst case" doses would be less than 1 mrem/year which is the level defined as negligible by the National Council on Radiological Protection and Measurements. The study concluded "the connection of the Mound sewage system to the City of Miamisburg sewage system should not be precluded based on the low level of residual radionuclides present in the Mound sewage." The study is included in Appendix E.

- Sewer Cleaning and Videotaping - As remedial and investigative measures, high pressure cleaning and videotaping of the sewer system pipe were conducted by DOE in January and February 2004. The entire system proposed for leasing was jetted at 1500 psi with the exception of new lines in the process of installation to bypass the Group 9 PRSs on the Main Hill. All lines older than 1993 were videotaped. It was agreed between DOE/CH2M HILL, MMCIC, and the City that lines that were installed in the past 10 years do not pose a significant risk for breaks or breaches. The videotaping confirmed that the jetting thoroughly removed any loose material in the sewer system. It also confirmed that the integrity of the sewer pipes were quite good. The sewer videotapes are included as Appendix M (in selected copies of this Leasing Data Package).

- Elevated Tritium in Sewage Samples - Elevated levels of Tritium (H-3) have been observed in at least three events in SD plant influent monitoring samples over the past two months. Although this variation reached only about 35% of the daily average derived concentration guideline promulgated by DOE and less than 20% of the ODH's monthly average concentration limits for sewer discharges, it represents the potential for uncontrolled sources of radiological contamination in the sewage. The source of the H-3 has been identified as water from misting and wetting operations supporting DOE demolition activities for SW building. The resulting run-off appears to be infiltrating through the T building west stack vent and associated ductwork and reaching Sump 21 in T Building where it enters the sanitary sewer system. Exhibit 4 is a sketch depicting the pathway of the H-3. As an interim mitigation measure, the area suspected as the original source of ground level infiltration was plated and sealed. It is anticipated that the level of Tritium will remain elevated, although well below ODH monthly average

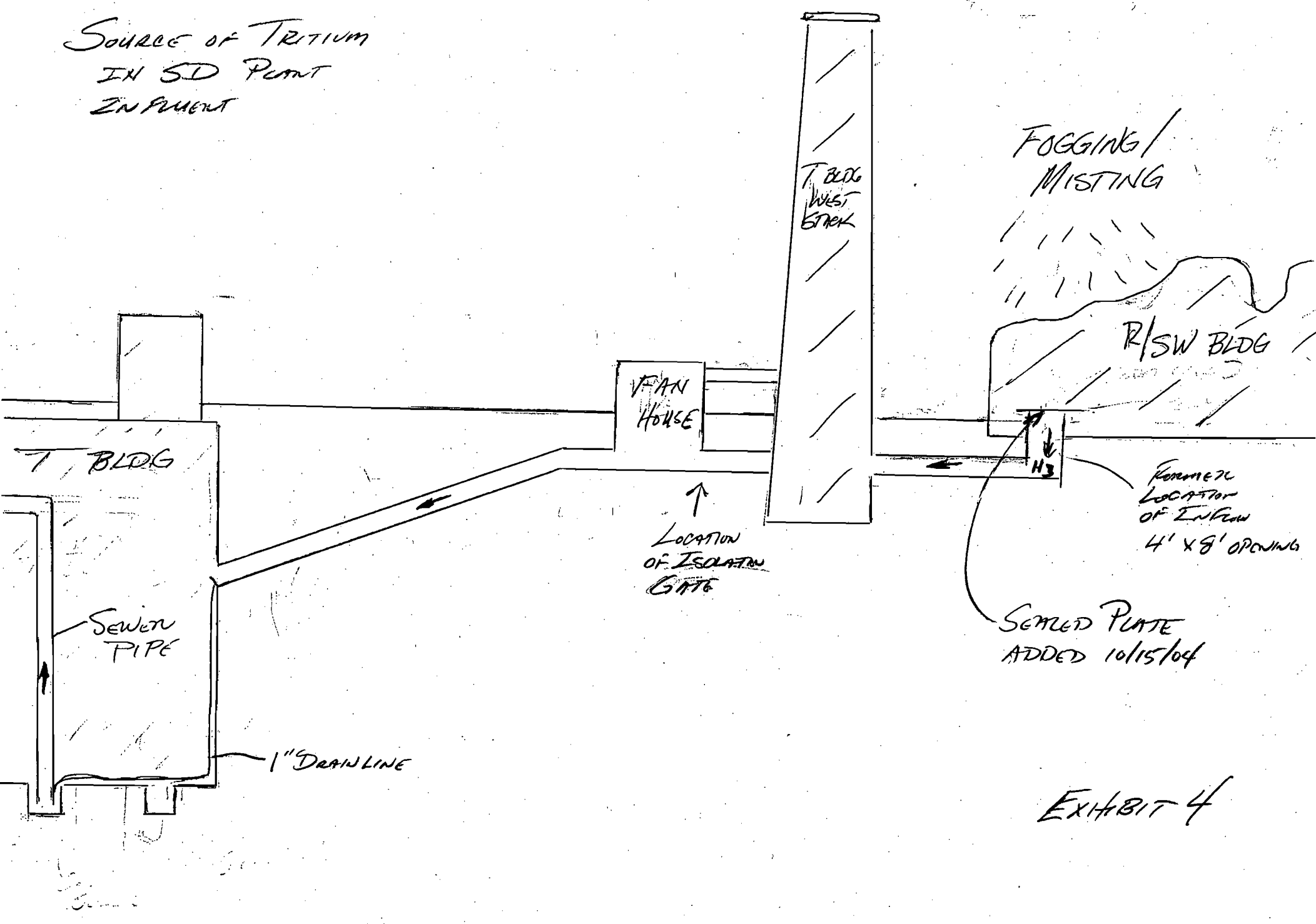

SOURCE OF TRITIUM IN SD PLANT INFLUENT
T BLDG
SEWER PIPE
1" DRAIN LINE
FAN HOUSE
LOCATION OF ISOLATION GATE
T BLDG WEST STACK
FOGGING / MISTING
R/SW BLDG
H_3
FORMER LOCATION OF INFLOW 4' X 8' OPENING
SEALED PLATE ADDED 10/15/04

EXHIBIT 4

concentration limits for sewer discharges, until the demolition of SW Building is completed in January 2004

- As an additional piece of data, a calculation was made (by Lisa Stetar) to determine the amount of contaminated soil that would have to enter the sanitary sewer system through a breach in the pipe within a one month to cause the concentrations in the Miamisburg biosolids to reach the ISCORS 1 mrem/year screening concetrations. The result is that at the highest known concentrations of Pu-238 and Th-232 in unremediated PRSs in the vicinity of sections of the sanitary sewer system to be leased, a volume of 205 kg (451 lbs) and 800 kg (1760 lbs)/month, respectively, would have to enter the sewer system before reaching the ISCORS most conservative screening levels for these radionuclides (i.e. the land application screening concentrations). It should be noted that the ISCORS 1 mrem/year screening concentrations are based on the assumption that biosolids containing these concentrations are land applied on the same site for 20 years. Therefore, land applying biosolids at concentrations above the screening concentrations for a shorter period of time would not necessarily result in doses that exceed 1 mrem. As an example, a calculation was made in which it was assumed that biosolids that contained Pu-238 and Th-232 at the highest concentrations observed in the PRS soils that encounter the sewer system were land applied for one year. The resulting maximum annual dose to a future resident on the land application site from Pu-238 and Th-232 was less than 0.5 mrem. Correspondence containing this information is included in Appendix F.

- In order to monitor and regulate the content of sewage that enters the sanitary sewer, DOE/CH2M HILL and MMCIC and their tenants have filled out City of Miamisburg wastewater survey forms for each transfer building and the facilities to stay temporarily on the sewer system (Trailer 23 and the portable boiler) after the commencement of the lease. The forms provide the City with information to identify the location of discharges of concern into the City's sewer system.

3.2 Exposure through Soils

The following list of data and activities is assembled to assess the potential for soils that surround leased portions of the sanitary sewer pipe to be potential exposure pathways to non-DOE workers performing repairs to the sewer system.

- Sewer Reroutes - New sanitary sewer lines totaling nearly 3000' were installed as reroutes around PRS 66 and the Group 9 PRSs on the site. In bypassing these PRSs that could potentially impact the sewer pipe, significant risk of exposure through contaminated soils has been averted.

- Draft Information Package - The draft Information Package on the sanitary sewer system was previously submitted to the Core Team in July 2004 and subsequently reviewed. The draft Information Package contains the evaluation of data from MEIMS relative to cleanup objectives equal to 10^{-5} Risk Based Guideline Value (RBGV) plus background and is included as Appendix C. It should be noted that the Risk Based Guideline Value is based on daily exposure

of eight hours for five years. The actual exposure period for work to repair a break in the sewer system will be only a small fraction of the risk-based period. Therefore, the exposure to workers involved in sewer line repairs will be only a small fraction of the estimated exposures upon which the cleanup guidelines are based. The Core Team's review of the draft Information Package identified several locations requiring more detailed evaluation. Specifically, these areas include PRSs 41, 67, 87, and the Building 22 area, as well as the area in the proximity of the waste staging area.

- Additional Lines - Since the development of the draft Information Package, two additional sewer lines on the Main Hill serving temporary structures have been added to the lease. A review of the sample data from MEIMS is included as Appendix G of this Leasing Data Package. The data illustrates that a single sample location was identified that exceeded the cleanup objective. The sample noted that Ra-226 was found in concentrations of 3.05 pCi/g at 4' depth. The cleanup objective is 2.93 pCi/g. CH2M HILL will conduct maintenance on this part of the system until these temporary lines are removed from service in mid-2005.

- PRSs of Concern – Appendix H is a map displaying sample information from the MEIMS database. The points displayed are those that are located within 15 feet of sanitary sewer lines proposed for lease, as well as data points within active PRSs in the primary areas shown. Samples are highlighted that exceed the hazard index or cleanup criteria. The map illustrates the primary locations of environmental concern relative to sanitary sewer pipes.

    - PRS 41 is the former drum staging location as well as the site of a former break in a process (i.e. radiological) waste line. No data points exceeding cleanup objectives are located within the 15' radius of the sewer line. It should be noted that a 301' sewer by-pass of the SD plant will be routed through this PRS area in October/November 2004. However, when the sewer pipe is installed, clean material will be used to backfill the excavation around the sewer pipe.

    - PRS 67 is the site's central storm water drainage ditch. The specific location of the data point of concern is north of Building 87 where the drainage ditch passes over the sanitary sewer line. A surface sample identified Pu-238 at a concentration of 170 pCi/g. The cleanup objective for Pu-238 is 55 pCi/g. The PRS 67 work plan was approved by the Core Team in October 2004. Removal will occur as soon as practical, but is not a condition for the lease.

    - PRS 87 is the former location of a solvent storage shed. This location is under the former Building 49 slab. Trichloroethene (TCE) was detected at depths up to 8' in concentrations of 23 mg/l. This concentration exceeds the limit for which the TCE has the potential to leach to groundwater at unacceptable levels. The concentration of TCE does not exceed the cleanup objective of 52.5 mg/l for soil. No radionuclides were detected in

this PRS. With the detected concentration of TCE, it is unlikely, even with a catastrophic failure of the sewer pipe in this PRS area, that a large enough volume of soil could enter the sewer pipe to impact the City's POTW.

- The Building 22 area is still being evaluated as to the source of radiological contamination. Pu-238, Th-230, and Am-241 were identified at concentrations of 547 pCi/g, 144 pCi/g, and 414 pCi/g, respectively, when a reroute of the sanitary sewer system was installed in this area in 2003. All three analytes exceed the cleanup objectives at depths of 8' to 15.' During the reroute, the new sanitary sewer line was backfilled with clean material in the excavation, including around the sewer pipe. (Depending on the depth, an excavation typically ranges from 3' to approximately 6' wide. Site procedures are in place for the backfilling of excavations. In order for the excavated material to be reused in the excavation, a radiological survey of the soil is conducted prior to refilling. When fill material is purchased from off-site, it must come from an approved vendor).

- Upon completion of waste shipping, the waste staging area will be evaluated to ensure contaminants do not remain at unacceptable levels. The retaining berm of the area is 8 to 20 feet from the sewer pipe to be leased.

- Regulators have also expressed concern over the status of PRSs 272/273, 286, and 288. The following is a brief status update of each:

  - PRS 272/273 – Contaminants of concern for this former location of debris disposal are Th-232 and Pu-238. The fieldwork for remediation is complete at this time on both PRSs. The verification sampling will be conducted in early November 2004 with a projected close out date by the Core Team in January 2005.

  - PRS 286 – The former septic tank leachfield was contaminated with Pu-238. This PRS was previously remediated to clean up standards in 1996, consistent with DOE Defense Program's "Decontamination and Demolition (D&D) Program." Upon further sampling, CH2M HILL was directed to remediate contaminants of concern in two separate locations in the PRS area. The fieldwork for this removal action was completed in September 2004. Verification sampling is scheduled for early November 2004. If verification sampling shows that no further remedial action is warranted, close out for this PRS by the Core Team should be in January 2005. If further remedial action is required, it is projected to occur in March 2005 with verification sampling to follow by the end of May 2005.

  - PRS 288 – This location was in the former SM process area. Contaminants of concern were Th-232 and Pu-238. The fieldwork for the remediation is complete. Verification sampling is scheduled for early

November 2004 with a projected close out by the Core Team in January 2005.

Exhibit 5 is a matrix of environmental concerns for exposure through contact with soils around the sewer pipe. This matrix was developed for the proposed lease of the sanitary sewer system, following the Core Team's review of the draft Information Package submitted July 2004 and identified in subsequent discussions. The matrix identifies the location, potential source, contaminants of concern, depth of contaminants versus the depth of the sanitary sewer, and the anticipated completion work and completion schedule for the appropriate PRSs.

Exhibit 5: Matrix of Environmental Concerns

Location	Source	Contaminants of Concern	Depth of Contaminants	Sewer Depth	Anticipated Completion (subject to change) Remediation[2]	Verification[1]
PRS 41	Th-232 drum staging & waste line break	Th-232 & Pu-238	0-16' max.	7'+	4/13/05	5/16/05 Close out 6/2005
PRS 67	Site drainage ditch, surface runoff	Pu-238	0-4'	3.5'	3/22/05	7/14/05 Close out 9/2005
PRS 87	Solvent storage shed	TCE	0-8'	4'	3/21/05	6/30/05 Closeout 8/2005
Building 22 Area	Being evaluated	Pu-238, Th-230, & Am-241	8-15'	12'+	3/31/05	6/30/05 Close out 8/2005
Waste Staging Area	Waste staging activities	Upon completion of waste shipping, this area will be evaluated to ensure contaminants do not remain at unacceptable levels				
PRS 286	Septic tank/leachfield	Pu-238	Na	9'	Complete	12/2004 Close out 2/2005
PRS 272/273	Hill-side disposal of debris	Th-232, Pu-238	Na	10'	Complete	11/9/04 Close out 1/2005
PRS 288	SM process area	Th-232, Pu-238	Na	6-8'	Complete	11/9/04 Close out 1/2005

(1) Assumes validated dataset is complete and is the end date of the Verification Data Summary Activity from the Integrated Status Schedule. Schedule is subject to change.
(2) Based on Integrated Status Schedule (ERST) run date 9/22/04. Schedule is subject to change.
TCE: Trichloroethene

3.3 Exposure through Sewer Pipe

The potential exposure pathway from loose and/OR fixed contamination on the interior and exterior of sewer pipe is being investigated. The risk is that radiologically-contaminated pipe sections could potentially be removed from the Mound site as waste and placed in a sanitary landfill in the event of a sewer line break or blockage. The following data has been collected for the assessment.

- Attachment 8 to Appendix C of this Lease Data Package contains the radiological survey data records for smears and swipes taken of the camera and equipment used in the videotaping of the Mound sewer system in January and February 2004. The procedure that CH2M HILL uses for radiological surveys is included in Appendix I. The data from both the swipes and direct measurements show that no detectable radiological contamination above background was found on the jetting and videotaping equipment, hoses, and cables used inside the sanitary sewer; indicating that no significant amount of loose contamination was present in the sewer pipe indicating that exposures from the sewer pipe would be minimal.

- Appendix J is the field data record dated September 28, 2004 of the radiological survey of the broken sewer pipe repaired in the PRS 272/273 area of the SMPP Hill. This location is identified on the map in Exhibit 1 relative to the former radiological buildings on site. The record shows that there was no detectable radioactivity and both the swipes and direct measurements met the free release criteria. The repair location is on sewer pipe downstream of former radiological Buildings 38/PP and SM.

- Repairs to three sections of sewer lines identified by videotaping of the sanitary sewer system in January/February 2004 are to be completed in November 2004. The locations of these repairs are identified relative to the former potential source buildings in Exhibit 2. Radiological surveys of the pipe sections will be performed to determine if the pipes meet free release criteria. These additional data points will be used to further assess the protectiveness of the sewer system for the lease.

- Records of repairs to the sanitary sewer pipes are archived in the DOE's Proteus maintenance management system on site. This system was not designed to identify the exact location of a sewer line repair. Instead, a general description of the location such as "Repair sewer line break on the SMPP Hill" is recorded in the database. Consequently, the Proteus system does not provide detailed information on the exact location, or nature, of sewer line repairs previously performed by DOE.

- DOE has scheduled the cleaning and videotaping in November 2004 of the 610-foot sections of temporary sanitary sewer lines on the Main Hill that have been added to the sewer lease. These lines will receive waste from only two facilities, the environmental laboratory (Trailer 23) and the portable boiler.

4.0 IDENTIFICATION OF PATHWAYS WHICH ARE NOT A CONCERN FOR THE PURPOSES OF THE LEASE

For the purpose of the lease, Section 2.0 identifies the three priority pathways of concern having potential to affect safety and human health and the environment. As such, the following media are not considered to be pathways of potential exposure.

- Air pathway – because the potential contaminants are assumed to be fixed to soil or the sewer pipe, or transported in the sanitary sewage, the air pathway is not considered relevant. However, exposure to workers from inhalation of resuspended soil particles was considered in the derivation of the risk-based soil cleanup criteria. Additionally, resuspension exposures are included in the caculation of the ISCORS screening criteria for biosolids.
- Surface water or groundwater pathways – the scenario for exposure through surface water or groundwater is considered less likely than the three priority pathways identified above. Additionally, the exposure risk for either surface or groundwater would be through contact with sewage and includes the same factors that are included in Section 7.0 (Risk Evaluation) for the potential for exposure through the sewage.

5.0 LAND AND FACILITY USE RESTRICTIONS NEEDED TO PREVENT EXPOSURE TO PATHWAYS NOT ADDRESSED

This lease is restricted to discrete portions of the DOE's sanitary sewer system. There is no access to the actual real property, granted or implied in the lease document that would further facilitate pathways for exposure. Because the lease is limited to the sanitary sewer system, it is fully regulated by the Ohio EPA to prevent exposure through various pathways. Additionally, because the sewage will be treated by the City's POTW, the City monitors and regulates the dischargers (buildings) on the sanitary sewer system. Therefore, restrictions are already in place ensure that additional pathways of exposure are not accessed.

6.0 RESTRICTIONS TO MITIGATE/REDUCE EXPOSURE AND RISK

The following items are included in the draft sewer lease (Appendix A) and its attachments that define the responsibilities regarding environmental contamination. These items constitute the primary restrictions of the lease document that mitigate or reduce exposure and risk.

- DOE, through its contractor CH2M HILL, will continue to maintain the sewer system until the property (i.e. land parcel in which the sewer pipes lie) has been remediated and transferred, via quit claim deed to MMCIC. This eliminates any hazards to City employees who might otherwise be onsite to repair/maintain the sewer pipes. As DOE's contractor, CH2M HILL has the technical expertise to safely perform work on sewer lines in the proximity of PRS locations.

- DOE has completed filling out the City's industrial waste survey forms for the site's transfer buildings in order to provide the City with information on the anticipated types of discharges to the sewer system.

- Prior to the implementation of the lease, DOE has agreed to repair three sections of sewer pipe identified in the videotaping of the sewer system where infiltration into the sewer pipe could conceivably occur.

- The draft lease agreement between DOE and MMCIC includes restrictions relied upon to mitigate/reduce exposure and risk. These restrictions, listed below, will virtually eliminate the possibility of contaminates impacting the sewer system if the sewer pipe is damaged/breached in locations near active PRSs. The restrictions/mitigation measures allow for protection of the sanitary sewer during site remediation activities that occur after the sewer lines are leased to MMCIC. Under this plan/protocol, DOE will operate and maintain the sanitary sewer collection system on all parcels of land owned by DOE. MMCIC will lease the entire sewer collection system identified for transfer on DOE property. Any damage to the collection system will be repaired by CH2M HILL in accordance with City of Miamisburg standards. Additionally, the protocol has controls for verifying that sewer pipe, if compromised, is free from contamination before being placed back into service. This plan/protocol applies to the following active PRSs or other know areas of soil contamination:

  - PRS 41 – Thorium drum storage and re-drumming area

  - PRS 67 – Plant storm water drainage ditch

  - PRS 87 – Bldg 49 solvent storage shed

  - Sewer section near Bldg 22

  - The plan also applies to any other PRS remediation activities that infringe within a 15-foot radius of the leased sections of the sanitary sewer collection system.

  <u>Protocol</u>

  1. Include this protocol in the Core Team Sanitary Sewer Information Package.

  2. Provide MMCIC a list of expected pollutants of concern for all applicable active PRSs. Update the pollutants of concern list (and provide to MMCIC) if any new pollutants of concern are discovered in the field.

  3. This protocol will be followed while performing the work plans for applicable active PRSs, following the initiation of the sewer lease.

  4. Provide a copy of the Work Plan for the applicable PRSs to MMCIC at the same time it is provided to the Core Team for review.

5. If DOE/CH2M HILL plans an excavation within 5' of an active sanitary sewer line within a contaminated area, a variance plan is required. The variance plan must be approved by CH2M HILL management and will establish limits of the depth and safeguards for the excavation with mechanical equipment. Typically, hand excavation is required from 2' above the anticipated depth of the sewer pipe. Whenever the potential exists for compromising the integrity of the sewer pipe by undermining the surrounding fill, a temporary above ground sanitary sewer bypass will be installed.

6. DOE/CH2M HILL will notify MMCIC when these procedures are activated so that MMCIC personnel can inspect and verify that these procedures are in place.

7. DOE/CH2M HILL will provide 24-hour prior notice to MMCIC for inspection purposes prior to removal and termination of any bypass installed.

8. If any damage to any component of the collection system (including piping, joints and manholes) occurs in the proximity of a contaminated area, then prior to reactivating that section of the sewer collection system, radiological surveys will be performed on the collection system that was exposed or potentially exposed. If any contamination above site free release criteria is found on the collection system, normal site radiological control procedures will be followed to return the system to acceptable levels. MMCIC will be consulted on a path forward for repair, replacement or decontamination of the affected portion of the collection system.

7.0 COMPLETED RISK EVALUATION

This section is prepared as a qualitative risk evaluation of the protectiveness of the sanitary sewer system relative to the lease. In order to assess the risks, the section is organized according to the identified potential pathways of concern.

7.1 Exposure through Sewage

a. Is the lease protective of the risk of exposure through sewage?

Section 3.1 includes a discussion of the 10-week sampling event (Appendix D) and subsequent study of the sampling data (Appendix E). The study determined that radionuclides in the Mound sewage were well below ODH limits for sewer discharges. Additionally, a screening process developed by the Interagency Steering Committee on Radiation Standards (ISCORS) was applied to the data to evaluate the potential risks to City of Miamisburg workers and the biosolids land application program. The study determined that risks were significantly below the screening values. The study concluded "the connection of the Mound sewage system to the City of Miamisburg sewage system should not be precluded based on the low level of residual radionuclides present in the Mound sewage."

b. How is the sewage safeguarded against impacts from contaminated soil when work is conducted in an active PRS?

In order to safeguard against the potential for adverse impacts to the City's POTW facilities and POTW employees, the draft lease agreement between DOE and MMCIC (Appendix A) includes the protocol described in Section 6.0 for mitigating/reducing exposures and risk. The protocol allows for protection of the sanitary sewer during site remediation activities that occur after the sewer lines are leased to MMCIC.

c. What if contaminated soil inadvertently enters the sanitary sewer system?

First and foremost, it is desirable that all pathways of contamination be eliminated to prevent the potential for contamination to enter the sewer system. However, if contaminated soils are introduced into the sanitary sewer system, it is important to identify soil volumes that constitute an acceptable risk to human health and the environment. As identified in Appendix F, the amount of contaminated soil that could enter the sanitary sewer system within a month through a breach in the pipe causing the POTW biosolids to reach the ISCORS 1 mrem/year screening calculations has been calculated. The result is that at the highest known concentrations of Pu-238 and Th-232 found in active PRSs in the vicinity of sewer lines to be leased, a soil volume of 205 kg (451 lbs) and 800 kg (1760 lbs)/month, respectively, would have to enter the sewer system to reach the ISCORS screening level. These soil volumes are excessive for even a large break in the sewer pipes. As such, the risk from exposure in this manner is considered to be low.

d. What about new releases of contaminants into the system such as the variation recently seen from Thorium and from Tritium?

<u>Thorium</u> - as identified in Section 3.1, an event of elevated Thorium (Th-230/232) over a two-week period from 7/26-8/12/04 was caused by a sewer line break in PRS 272/273. Once the sewer line break was discovered and repaired, the Thorium levels returned to normal for the 10-week sampling event (Appendix D). A protocol as described in Section 6.0 is being implemented to prevent the sanitary sewer line from being compromised during future remediation of the applicable active PRSs.

<u>Tritium</u> - elevated levels of Tritium (H-3) have been observed on at least three occasions in SD plant influent monitoring samples over the past two months. The source of the H-3 was identified as water contaminated from misting and wetting operations supporting demolition activities on SW building, infiltrating into the T building west stack duct bank (see Exhibit 4). The area originally suspected as the location of infiltration has been plated and sealed. The T west stack will soon be taken out of service and demolished in January, thereby totally eliminating this source of concern. The sampling of Mound sewage will continue for the foreseeable future after the implementation of the lease.

In neither of these cases did the release approach regulatory limits. The site demolition and remedial activities have progressed to a point where nearly all known sources of potential contamination through inflow are being eliminated. At this time, all buildings on

the sanitary sewer system that were a potential contributor of radiological contamination have been removed with the exception of T Building. Work controls and planning are focused on preventing environmental releases. Although future releases are possible, the risk of a significant release from the remaining source building is low.

e. What about the potential for long term consequences of Mound sludge combined with City sludge at the land application site?

In Item 7.1.a, a discussion of the 10-week sampling program and the corresponding report summarized that radionuclides in the Mound sewage were well below ODH limits for sewer discharges. When the ISCORS screening process was applied to the data to evaluate the potential risks of City of Miamisburg POTW workers and workers at the biosolids land application site, the risks to workers in both cases were significantly below the ISCORS screening values. Appendix F includes a discussion of calculations made to assess impacts on the City's workers at the POTW and the land application site relative to radiological contamination entering the sanitary sewer from catastrophic failure of the system. The calculations in reference present a very low potential for risk to workers over time. Additionally, with the continued progress of the site demolition and remediation activities, the potential sources of contamination diminish significantly from even the low levels of radionuclides identified in the 10-week sampling event. With the imminent completion of the remediation activities in T building, there will be no more radiological discharge concerns from buildings on site.

7.2 Exposure through Soil

a. Is the soil surrounding the sanitary sewer system contaminated?

The draft Information Package displaying the evaluation of data from the Mound Environmental Information Management System (MEIMS) relative to cleanup objectives equal to 10^{-5} Risk Based Guideline Value (RBGV) plus background, eliminated most of the sewer system from being in areas of environmental risk (Appendix C). Areas of exception are those sewer lines in PRSs 41, 67, 87, and the Building 22 area, as well as the area in the proximity of the waste soil pile at the rail spur.

A review of sampling data located within 15 feet of sanitary sewer lines in the areas of PRS 41, 67, 87, the Building 22 location, and the soils staging area was conducted in September/October 2004 (see Appendix H). Key issues regarding these areas of environmental concerns are as follows:

- For PRS 41, no sample locations where data exceeded cleanup objectives are located within a 15' radius of the sewer line.
- For PRS 67, a surface sample identified Pu-238 at concentrations that exceed cleanup objectives where the PRS crosses the sanitary sewer line. The work plan was approved by the Core Team. Remediation will begin as soon as practical, but is not a condition for the leasing of the sewer system.

- For PRS 87, Trichloroethene (TCE) was detected at depths up to 8' in concentrations that have the potential to leach to groundwater at unacceptable levels. The concentration of TCE was below the cleanup objective for soil and no radionuclides were detected in this PRS.

- For the Building 22 area, Pu-238, Th-230, and Am-241 were identified at concentrations above cleanup objectives at depths of 8' to 15'. The sanitary sewer line in this area was recently installed and was backfilled with clean material around the sewer pipe.

- Upon completion of waste shipping, the waste staging area will be evaluated to ensure contaminants do not remain at unacceptable levels. The sanitary sewer lines do not run under the waste staging area and are from 8 to 20 feet from the exterior protective berm of the area. Before closure, this area will be characterized for contamination. If contamination is identified, a work plan for remedial action will be developed and coordinated with the Core Team. These activities will take place prior to property transfer. Therefore, there should be no impact to City workers from this area.

Fieldwork is complete for the remediation of PRSs 272/273, 286, and 288 (see Attachment 4 of Appendix C). These areas are additional locations of interest relative to hazards for the sewer system transfer. At this time, verification sampling of all these PRSs is scheduled for completion in November/December 2004.

An important point of consideration is that the exposure scenario used for the risk evaluation of soils in Appendix C and in Appendix H is overly conservative (8 hours/day, 365 days/year for a 5 year period) relative to the limited period of exposure for workers performing an occasional repair of a sanitary sewer line.

b. How will City workers be protected from exposure when repairing sewer sections?

For the purposes of this assessment, the lease agreement between DOE and MMCIC (Appendix A) should be the primary focus. As described in Section 6.0, one of the key conditions of the lease is that DOE will continue to provide maintenance of the sanitary sewer system until the property (i.e. land parcel) is transferred to MMCIC via the quit claim deed. Therefore, all active PRSs will be dispositioned by the Core Team prior to the City assuming maintenance of the sanitary sewer system. As such, exposure of City workers through direct contact with soils is not possible.

c. Doesn't the potential exist for workers at the City's POTW or biosolids land application site to be exposed from soils entering the sewer system?

The draft lease agreement between DOE and MMCIC includes a protocol for mitigating/reducing exposure and risk (see Section 6.0). This protocol is a safeguard against the potential for adverse impacts to the City's POTW facilities and POTW employees. The protocol allows for thorough protection of the sanitary sewer during site remediation activities that occur after the sewer lines are leased to MMCIC.

Appendix L contains a letter from OEPA to DOE-MCP dated October 25, 2004 regarding the condition of the Mound sanitary sewer system that states that "infiltration is not significant or excessive." Additionally, if contaminated soils are introduced into the sanitary sewer system, the volume of soil that could enter the sanitary sewer system through a breach in the pipe before causing the City's biosolids to reach the ISCORS 1 mrem/year based screening criteria for land application would be more than 205 kg (451 lbs) and 800 kg (1760 lbs)/month for Pu-238 and Th-232, respectively (see Appendix F). The ISCORS screening concentrations for Pu-238 and Th-232 for workers are almost 20 times higher than the land application screening values upon which these soil volumes were calculated. Therefore, approximately 20 times more soil could enter the system before worker exposures could be expected to approach 1 mrem/year. Because these soil volumes are excessive for even a large break in the sewer, the risk from exposure in this manner is considered to be low.

7.3 Exposure through Sewer Pipe

This section considers the sewer pipe as a potential exposure pathway from both loose and fixed contamination on the interior and exterior of the pipe. The evaluation investigates the potential for contamination to be released to the environment under the lease.

a. Is the lease protective of exposure through the sewer pipe for City maintenance workers?

The lease protects workers from exposure through the sewer pipe in two major ways.

- First, the sanitary sewer pipe was jet cleaned with 1500 psi of pressure to remove any loose contamination in the pipe. The videotape of the pipe showed conclusively that the jetting removed loose material throughout the system. A copy of the videotape is included for review in Section M. Additionally, radiological surveys of the jetting and videotaping equipment that was inside the sewer pipe indicated that no radiological contamination was present on the equipment (Appendix J). Furthermore, records of the radiological survey of the broken sewer pipe repaired in the PRS 272/273 area of the SMPP Hill show that there was no detectable radioactivity and both the swipes and direct measurements met the free release criteria. These results indicate that the sewer pipes would not be a source of radiation exposure to workers. Additional, data upon which the potential for exposures from sewer pipe contamination can be assessed will be available following the three sewer line repairs scheduled for November 2004.

- A greater protection is found in the lease document itself (Appendix A) containing the condition that DOE will continue to provide maintenance of the sanitary sewer system until the property (i.e. land parcel in which the sewer pipes lie) is transferred to the MMCIC via quit claim deed (see Section 6.0). Therefore, there is no risk to exposure under the lease for non-DOE workers from performing pipe repair activities on the sanitary sewers.

b. What data is there to support that there is no loose contamination in the sewer pipes?

A thorough high pressure cleaning and videotaping of the sewer pipe was conducted in January/February 2004. A review of the videotapes confirms that jetting with 1500 psi successfully removed loose contamination from the inside of the pipes. This information is a key element of data regarding the acceptability of the pipe for the ultimate transfer of the system. Therefore, a DVD of the sewer videotaping is included in Appendix M. Also, the swipe surveys performed on the equipment used during the cleaning and videotaping of the system met the criteria for free release indicating that the potential for contamination of workers or equipment during sewer repairs is minimal.

c. What data is there to support that there is no fixed contamination in the sewer pipes?

The radiological survey of the sewer pipe removed for the repair in PRS 272/273 showed this piping met the criteria for free release (Appendix J). Additional data will be available after the upcoming sewer line repairs are completed. However, it should be noted that actual exposure to sewer pipes would be infrequent and of short duration. Therefore, the potential for exposure to fixed contamination, should it exist somewhere within the system, is minimal.

Exhibit 1 identified three locations on the SMPP Hill where sewer repairs will be made in November 2004. These repairs were identified from the videotaping of the sewer system in January/February 2004. Radiological surveys will be conducted of the pipe replaced during the repairs. The results of these surveys will be made known to the regulators at that time.

The most import aspect of this issue is that the lease document (Appendix A) contains the condition that DOE will continue to provide maintenance of the sanitary sewer system until the property (land parcel) is transferred via quit claim deed. Therefore, the risk to City workers from contact with the sewer pipe is not a factor.

d. What is the potential for fixed contamination to slough off of the sewer pipe and affect the quality of the sewage received at the City's POTW?

The sanitary sewer system is a low velocity gravity system that is not likely to have the potential for scouring of the pipes. The system was cleaned and jetted with 1500 psi of pressure in January/February 2004. It is unlikely that contamination not dislodged by the jetting would spontaneously dislodge in quantities that could potentially impact the City's POTW.

7.4 Risk Evaluation Summary

This risk evaluation has considered the 3 primary pathways of exposure: sewage, surrounding soils, and sewer pipe. The available data was assessed as to the protectiveness of the lease of the sanitary sewer system from DOE to MMCIC. The following key issues were identified:

1. The 10-week sampling event of sewage influent to the Mound sewage treatment plant and resulting study determined that radionuclides in the Mound sewage were well below ODH limits for sewer discharges and that risks were significantly below the ISCORS screening values for City of Miamisburg workers and the biosolids land application program.

2. At the highest known concentrations of radiological contaminates found in active PRSs in the vicinity of sanitary sewer lines to be leased, a soil volume in excess of even a large break in the sewer pipes would have to enter the sewer system to exceed the ISCORS screening level. As such, the risk from exposure in this manner is considered to be low.

3. The sanitary sewer pipe was jet cleaned with 1500 psi of pressure to remove any loose contamination in the pipe. The videotape of the pipe showed conclusively that the jetting removed loose material throughout the system. Radiological surveys of the jetting and videotaping equipment that were inside the sewer pipe and records of the radiological survey of the broken sewer pipe repaired in the PRS 272/273 area of the SMPP Hill, showed that the video and jetting equipment and the broken sections of pipe all met the free release criteria.

4. The site demolition and remedial activities have progressed to a point where all source buildings on the sanitary sewer system that were a potential contributor of radiological contamination have been removed with the exception of T Building. Although future releases are possible, the risk of a significant release from the remaining source building is low.

5. To safeguard against the potential for adverse impacts to the City's POTW facilities and POTW employees, the draft lease agreement between DOE and MMCIC includes the protocol for conducting site remediation activities after the sewer lines are leased to MMCIC that mitigates exposures and risk via the sanitary sewer.

6. DOE will continue to provide maintenance of the sanitary sewer system until the property is transferred to MMCIC via the quit claim deed. Therefore, all active PRSs will be dispositioned by the Core Team prior to the City assuming maintenance of the sanitary sewer system. As such, exposure of City workers through direct contact with soils is not possible.

From the risk evaluation, the preponderance of evidence is that exposure through the sewage, surrounding soils, and sanitary sewer pipe does not pose a significant risk, particularly under the conditions of the lease that specifically mitigate/reduce the exposure and risks to human health and the environment.

8.0 FEDERAL ACCESS RIGHTS VERIFICATION AND DOCUMENTATION

The lease is only for discrete sections of the sanitary sewer system. MMCIC is granted the use of the sewer system under the lease, but is granted no access that would affect Federal ingress or egress to interfere with ongoing DOE remediation systems or

investigative actions. Therefore, the lease document in Appendix A includes no provisions to limit Federal access rights.

9.0 RECOMMENDATIONS AND CONCLUSIONS

This section is left to the Core Team to complete.

U. S. DEPARTMENT OF ENERGY
AMENDMENT TO GENERAL PURPOSE LEASE

W I T N E S E T H:

The Lease, entered into on the 7th day of September, 1994, between the UNITED STATES OF AMERICA, acting by and through the Department of Energy, hereinafter referred to as the "GOVERNMENT," and the Miamisburg Mound Community Improvement Corporation, hereinafter referred to as the "Lessee," is amended this day as follows:

(a) The real property shown in Exhibit A, inclusive of the Mound sewer utility system contained therein, is hereby included within the Lease effective as of the date of this document.

(b) The Lessee hereby agrees to reliably provide a sewer collection system for the benefit of the Government and all Government contractors / subcontractors located at the Installation effective October 31, 2004 or at such other time as specifically agreed to by the parties in writing. Upon such date the parties' Interim Utility Agreement of March 3, 1999, is amended to eliminate the duty of the Government to supply sewage treatment and disposal service.

1. The parties agree that the Lessee may charge the Government for utility service provided hereunder at a rate no greater than the lowest rate under the published rate structure of the City of Miamisburg.

2. The Lessee agrees to reliably supply utility service to the Government with interruptions no longer than those experienced by any other user of such service unless excessive interruption of service to the Government is solely due to a unique situation impacting supply to the Government or causes by the Government or its contractors/subcontractors.

3. The Government will maintain the utility system within the leasehold granted hereby until all potential release sites (PRSs) within fifteen feet of the sewer collection system have been remediated and verified clean by the regulators and suitable changes to protectiveness of the worker have been resolved. This date is anticipated to be no later than July 31, 2005 or such later date as is agreed to by the parties in writing.

4. The parties agree that the exchange of responsibility for operation of the Mound sewer system shall be conducted according to the steps and conditions outlined in Exhibit B and the Special Work procedures as outlined in Exhibit C. It is anticipated that transfer of the system will occur between Lessee and the Government.

(c) The Government hereby agrees to indemnify Lessee pursuant to and to the extent of the authority granted in 42 USC § 7274q (b)(2)(B) which is or is to be codified at 50 USC §2811.

IN WITNESS WHEREOF, the parties hereto have caused this Lease amendment to be executed on their behalf by their duly authorized representative effective as of the date last executed below.

MIAMISBURG MOUND COMMUNITY
IMPROVEMENT CORPORATION

By_____

Title_____

THE UNITED STATES OF AMERICA

By_____

Title_____

STATE OF)
) ss:
COUNTY OF)

The foregoing instrument was signed before me, a Notary Public, this ___ day of _____, 2004 by Michael J. Grauwelman as President of the Miamisburg Mound Community Improvement Corporation, an Ohio non-profit corporation, on behalf of the corporation.

_____
Notary Public

STATE OF)
)ss:
COUNTY OF)

The foregoing instrument was signed before me, a Notary Public, this ___ day of _____, 2004 by Robert Warther, Manager, Ohio Field Office, U.S.

Department of Energy, of The United States of America, on behalf of the United States of America.

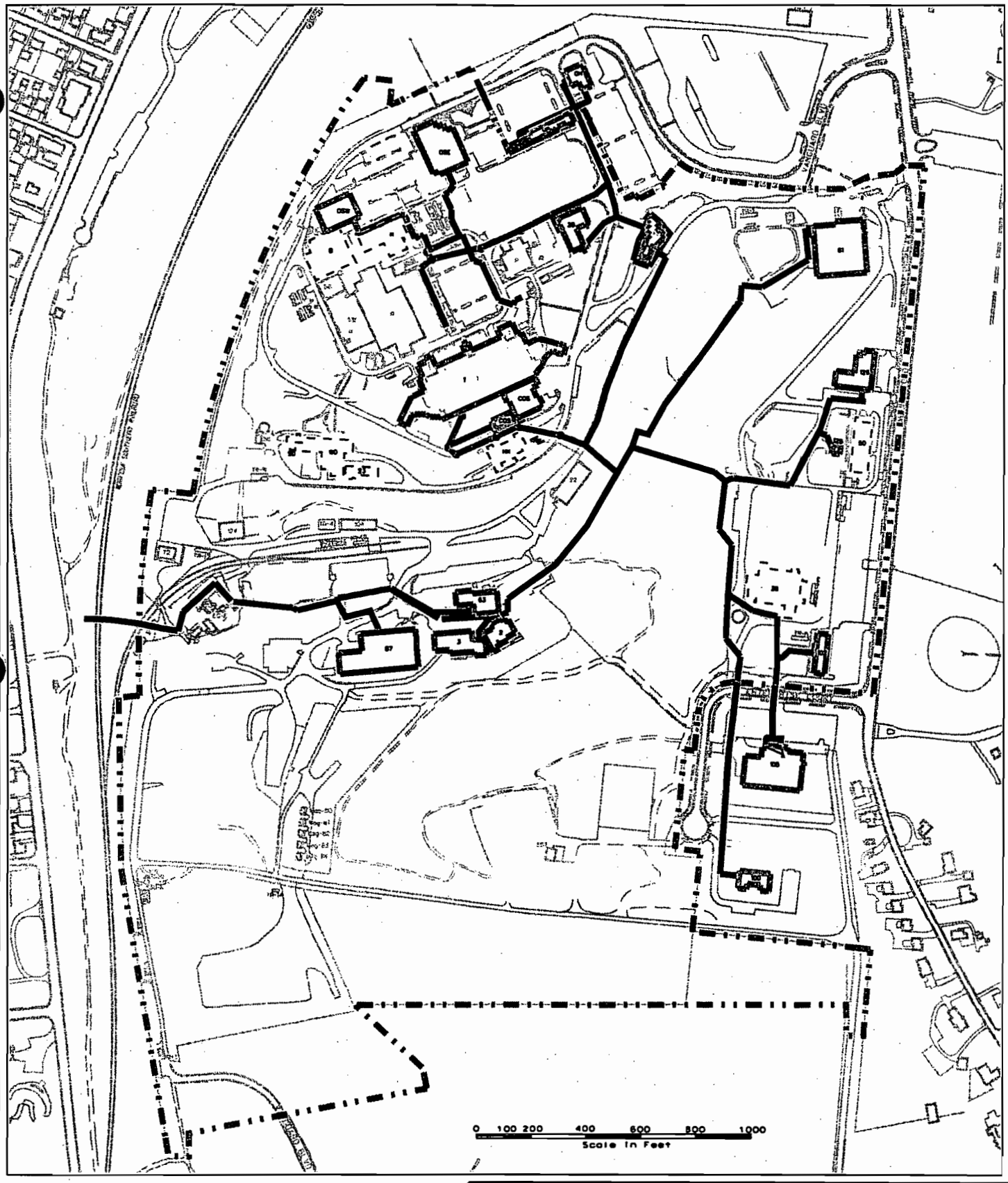
_____

Notary Public

Exhibit A

Legal Description

Highlighted linear sections of attached map of Mound Closure Project site on Parcel 'H' and Parcel '3' situated in the State of Ohio, county of Montgomery, in the City of Miamisburg, being a part of section 30 and fractional section 36, Town 2, Range 5, Miami Rivers Survey (M.R.S.), and being on city lot numbered 2259 lying within the corporate limits of Miamisburg, being on the tracts of land conveyed to the United States of America by instruments as recorded in Deed Book 1214 pages 12-14, Micro-Fiche 81-376A01 and Micro-Fiche 81-323A11 of the Deed Records of Montgomery County.



Legend

- Structures
- Structures to Remain
- Demolished Rad Structures
- Mound Plant boundary
- Sanitary Lines to be leased
- Sanitary Lines on MMCIC Property
- Planned Re-Route

ISS	DATE	REVISION	BY	CHKR	ENG	UPDCC	APVD	II
	09/29/04	PLAN VIEW	MR					

MOUND

Environmental Restoration Geographic Information System

SHEET	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
ISSUE																					
SHEET	1	2	3	4	5	6															
ISSUE																					

PART CLASSIFICATION

Mound Plant

EXHIBIT A
SANITARY SEWER LINES TO BE LEASED BY MMCIC

DRAWING CLASSIFICATION: UNCLASSIFIED

SIZE | DRAWING NUMBER: lease san.dgn | JOB NUMBER

DGN TYPE: STE | PRNG: ER-GIS | CADCC | SCALE: GRAPH | SHEET 1

STATUS: MD-REL-06/21/04 | ORIGIN: MSTATION / J

Exhibit B

1. Completed Re-route: CH2M HILL/DOE has completed the installation of piping to bypass and re-route sewer lines around and outside of PRS (potential release site) 66 and PRSs on the Main Hill. Future reroutes and repairs by CH2M HILL/DOE will be in compliance with City utility specifications and MMCIC's Reuse Plan, so long as such compliance with the Reuse Plan does not increase cost or schedule.

2. Completed Off-Site Extension: MMCIC has extended a sanitary sewer line to the site's western boundary (1999/2000) to support the transition of the sanitary sewer service to the City.

3. Sewer Re-route: A second re-route of the sanitary sewer may be necessary to by-pass PRS 273 on Parcel 7. CH2M Hill will perform the reroute if necessary and MMCIC and the City shall review and inspect the location and installation of the work.

4. Line Isolation: As part of the ongoing demolition of buildings and structures at the Mound, CH2M HILL will isolate and cap the sewer system lines where services have been removed. Capped line locations will be identified on a system map provided to the City and MMCIC.

5. Sewer Cleaning: CH2M HILL has completed the cleaning and flushing of the sanitary sewer system that will be transferred. The City and MMCIC reviewed the cleaning plans with CH2M HILL prior to the beginning of the work.

6. Sewer Videotape: CH2M HILL has completed video/TV inspections and has provided the videotapes and written reports to the City and MMCIC.

7. Condition Documentation: CH2M HILL will provide available written documentation concerning the history of sanitary sewer breaks and repairs, type and size of pipe material, as-builts, electronic files and system maps to MMCIC by July 10, 2004. Electronic maps of the sewer system will be provided to MMCIC in a format that is compatible with MMCIC's current atlas model, assuming no increase in cost or schedule.

8. System Characterization: The parties agree that the Interagency Steering Committee on Radiation Standards (ISCORS) is an appropriate radiological guidance for characterization of the acceptability of the waste stream. CH2M Hill and the Ohio Department of Health will perform risk evaluations for two exposure scenarios" 1) the resident farmer of a City land application site and 2) a City wastewater treatment plant worker.

9. Pretreatment Screening: MMCIC and CH2M HILL will fill out the City's industrial waste survey forms and submit them to the City no later than July 15, 2004. Prior to August 15, 2004 the City will have the opportunity to inspect any MMCIC or CH2M HILL operations that require further review based on the industrial waste surveys.

10. Sewer Condition: From videotape data, CH2M HILL has identified three areas of the sewer system requiring repairs. The City and MMCIC will review the videotapes and identify any additional areas requiring repairs no later than July 10, 2004. The Parties will reach agreement on the repair locations and repair methods. If the sewer system is agreed to be acceptable for transfer, CH2M HILL/DOE will be responsible for making these repairs.

11. By-Pass Installation: If the sewer system is agreed to be acceptable for transfer, CH2M HILL/DOE will install a bypass of the Mound sewage disposal (SD) plant and extend the existing SD plant discharge line from the existing manhole to connect to the existing City Sewer. MMCIC will coordinate the execution of easements and right-of-way for offsite property with DOE and the City. The connection will not be activated without OEPA concurrence. The work is scheduled for completion by October 31, 2004.

12. System Transfer: If the sewer system is agreed to be acceptable for transfer, the City will apply for the Permit to Install (PTI) with OEPA and receive approval prior to system transfer. Transfer of the system will take place no later than October 31, 2004 unless extended by CH2M HILL with mutual consent of the Parties. MMCIC will pay the appropriate application fees to OEPA for the PTI. Other costs and application fees will be borne by the City and MMCIC (i.e., change in the City NPDES permit, lease/easement recording fees, etc.). Sewer service accounts will be established for each service location and any applicable fee or sewer usage charges will be paid per the City's utility ordinances.

13. Operating Procedures: Prior to system transfer, in conjunction with the City and MMCIC, CH2M HILL will develop operating procedures to access and perform work on site in areas under lease from DOE. CH2M HILL will also provide training and orientation for the Mound site to MMCIC staff and its contractors.

14. Excavation Soils: All soils from excavation work to repair sewer mains will remain on the Mound site and be placed at the direction of CH2M HILL or MMCIC. CH2M HILL and MMCIC will work together to determine the location of the soils.

15. Inspections: CH2M HILL will enable the City and MMCIC to perform a site inspection of all sanitary sewer facilities prior to transfer.

16. Agreement Period: If the system is not deemed to be acceptable for transfer by July 31, 2004, the parties will continue to work in a cooperative manner to identify and implement the best alternative to transition the system while at all times maintaining service to the site.

17. Core Team Review: The Core Team will review the sanitary sewer collection system and the soils data on a 15-foot radius of the pipes to ensure that the system is acceptable for transfer.

18. Non-radiological pollutants: The City will review all non-radiological sampling data for pollutants that may cause issues for the transfer of the system and treatment at the City's wastewater treatment plant.

19. Successors and Assigns: This Exhibit shall be binding on the parties, their employees, agents, successors, and assigns.

Exhibit C

Special Work Procedures for Sanitary Sewer Protection During PRS Remediations

This protocol allows for protection of the sanitary sewer during site remediation activities that occur after the Mound sanitary sewer lines are leased to MMCIC. Under this plan, DOE will operate and maintain the sanitary sewer collection system on all parcels of land owned by DOE. MMCIC will lease the entire collection system identified for transfer on DOE property. Any damage to the collection system will be repaired in accordance with City of Miamisburg standards. This plan applies to the following PRSs:

PRS 41 – Thorium drum storage and re-drumming area

PRS 67 – Plant storm drainage ditch

PRS 87 – Bldg 49 solvent storage shed

Sewer section near Bldg 22 location

The plan also applies to any other PRS remediation activities that infringe within a 15-foot radius of the sanitary sewer collection system.

Protocol

1. Include this protocol in the Core Team Sanitary Sewer Information Package.

2. Provide MMCIC a list of expected pollutants of concern for all applicable PRSs. Update the pollutants of concern list (and provide to MMCIC) as often as new pollutants of concern are discovered in the field.

3. This protocol will be followed while performing the work plans for applicable PRSs following the initiation of the lease.

4. Provide a copy of the Work Plan to MMCIC at the same time it is provided to the regulators.

5. If DOE / CH2M HILL plans an excavation within 5' of an active sanitary sewer line within a contaminated area, a variance plan is required. The variance plan must be approved by CH2M HILL management and will establish limits of the depth and safeguards for the excavation with mechanical equipment. Typically, hand excavation is required from 2' above the anticipated depth of the sewer pipe. Whenever the potential exists for compromising the integrity of the sewer pipe by undermining the surrounding fill, a temporary aboveground sanitary sewer bypass will be installed.

6. DOE / CH2M HILL will notify MMCIC when these procedures are activated so that MMCIC personnel can inspect and verify that these procedures are in place.

7. DOE / CH2M HILL will provide 24 hour prior notice to MMCIC for inspection purposes prior to removal and termination of any bypass installed.

8. If any damage to any component of the collection system (including piping, joints and manholes) occurs in the proximity of a contaminated area, then prior to reactivating that section of the sewer collection system, radiological surveys will be performed on the collection system that was exposed or potentially exposed. If any contamination above site

free release criteria is found on the collection system, normal site radiological control procedures will be followed to return the system to acceptable levels. MMCIC will be consulted on a path forward for repair, replacement or decontamination of the affected portion of the collection system.

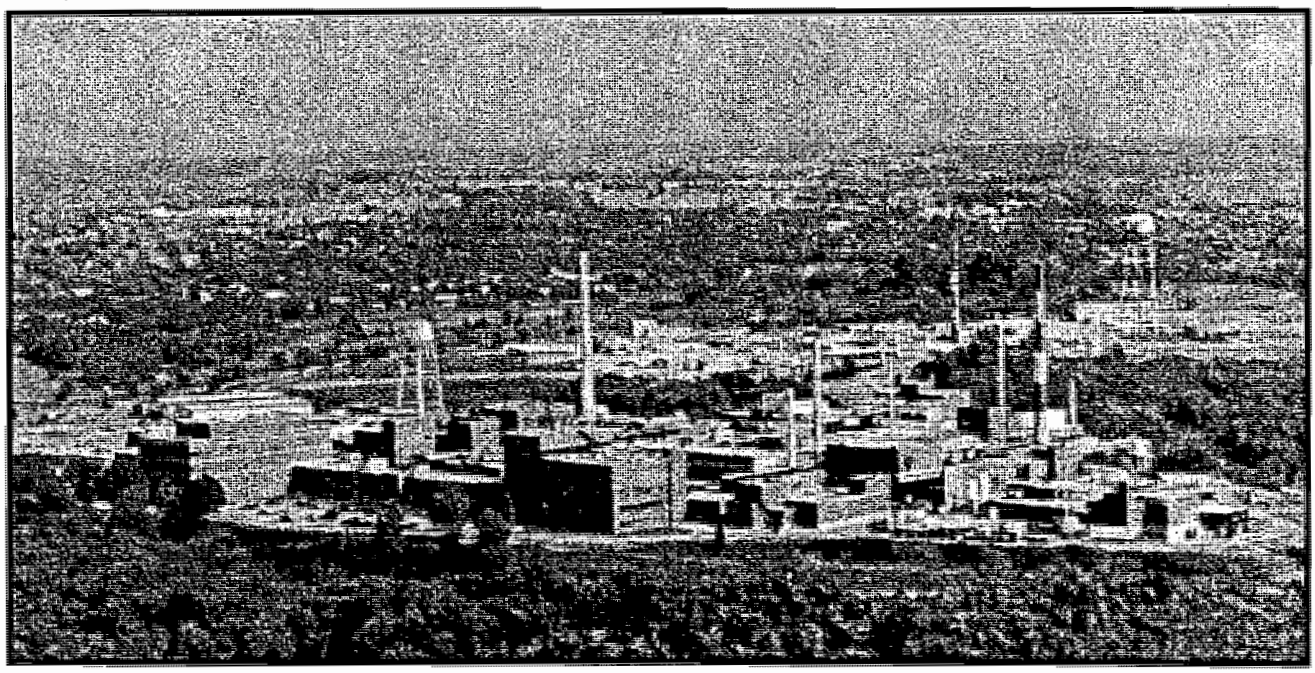
9. This Exhibit shall be binding on the parties, their employees, agents, successors, and assigns.

Environmental
Restoration
Program

Miamisburg Closure Project
INFORMATION PACKAGE

Sanitary Sewer System

Draft
July 2004



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Attachments

1. Letter of request for Core Team involvement
2. Report, "Data Review: Sewage Sludge and Waste Water Influent and Effluent Analysis for the Miamisburg Closure Project and the City of Miamisburg", Preliminary, January 13, 2004, Department of Energy, Office of Environmental Management, Office of Science and Technology
3. Map of sewer mains to be leased: "Mound Plant Sanitary Sewer Lease Plan"
4. Map of sampling locations in soil surrounding sewer mains to be leased, with results labeled that exceed Cleanup Objective (10^{-5} risk based guideline value + background)
5. CD with Excel spreadsheets containing data for relevant soils surrounding sanitary sewer lines and a residual risk calculation
6. Map of Mound sewer system illustrating pipe materials, sizes, and installation dates : "Mound Plant Sanitary Sewer Piping Information"
7. Available maintenance records
8. Sanitary sewer line video inspection report (January-February 2004) and planned corrective action table (May 2004)
9. Radiological survey data sheets (RSDSs) from coverage of sanitary sewer inspections
10. List of buildings connected to the sanitary sewer collection system to be leased

1.0 PURPOSE

Plans to transition the Department of Energy (DOE) Miamisburg Closure Project (MCP) to the Miamisburg Mound Community Improvement Corporation (MMCIC) include the lease of certain portions of the existing sanitary sewer collection system from DOE to MMCIC. The MCP sewage disposal (SD) plant will be taken off line and a by-pass will be constructed around the SD plant to facilitate connection to the City of Miamisburg's sanitary sewer collection system. After lease, the sanitary sewer system will transport sanitary wastewater from the MCP site to the City of Miamisburg water reclamation facility.

DOE is currently conducting a cleanup program of the Mound Site under the Comprehensive Environmental Response, Compensation & Liability Act (CERCLA) via the Mound 2000 process [1]. The Mound 2000 process is lead by a Core Team composed of representatives of DOE, United States Environmental Protection Agency (USEPA), and Ohio Environmental Protection Agency (OEPA). The cleanup program and transfer of site ownership are scheduled to be complete in 2006. To enable an orderly transfer of operations, MMCIC plans to take responsibility for the sanitary sewer system prior to the completion of the cleanup program and transfer of ownership of the entire Mound site.

Prior use of the land and facilities of the MCP involved radiological operations. The City of Miamisburg has asked the Core Team (Attachment 1) to assess the protectiveness for its workers and subcontractors when performing routine maintenance or making repairs to the sanitary sewer system. This document therefore presents data for the MCP soils that may be expected to require excavation during potential future maintenance or repairs to the sewer system. This document is not intended to present or evaluate data on the anticipated radiological or non-radiological content of the sewage itself that is discharged from the MCP site; see Attachment 2 .

The data and process provided here is that typically followed by the Core Team for an evaluation of a Potential Release Site (PRS) [2]. The Ohio Department of Health (ODH) and the OEPA Surface Water Division are active participants in the characterization and regulation of wastewater discharge from MCP. The evaluation in this document is focused on the purview of the CERCLA Core Team.

2.0 DESCRIPTION OF AREA TO BE LEASED

Sanitary sewer lines to be leased from DOE to the MMCIC are the highlighted linear sections as shown in the Attachment 3 map of the MCP site situated in the State of Ohio, county of Montgomery, in the City of Miamisburg, being a part of section 30 and fractional section 36, Town 2, Range 5, Miami Rivers Survey (M.R.S.), and being on city lot numbered 2259 lying within the corporate limits of Miamisburg, being on the tracts of land conveyed to the United States of America by instruments as recorded in Deed Book 1214 pages 12-14, Micro-Fiche 81-376A01 and Micro-Fiche 81-323A11 of the Deed Records of Montgomery County.

3.0 EVALUATION PROCESS DESCRIPTION

The same evaluation process used for the binning of PRSs and buildings was used for evaluation of the sanitary sewer system. From the Mound Environmental Information Management System (MEIMS) database, chemical and radiological results were tabulated for soil sampling locations that were within 15 feet (in plan view) of the sanitary sewer lines under consideration for lease. Just as it does for PRS binning decisions, the Core Team reviewed the quality of the data, its location, and previous evaluations of the data in binning or removal action closure decisions.

Soils near certain portions of the sanitary sewer system were not evaluated in detail here. These soils lie within Potential Release Site (PRS) boundaries that are associated with the current Building 38 Removal Action [3] or the Building 38 Area Verification Sampling and Analysis Plan [4] or the SM Leach Field [5] and thus are currently being remediated or are scheduled for remedial action prior to completion of MCP activities. These PRSs are:

- PRS 273
- PRS 285
- PRS 286 (SM Leach Field) [5]
- PRS 288 (Piece C) [4].

The remaining soils are called the relevant soils (with associated relevant data) for the purposes of this document.

Results in excess of Cleanup Objectives (equal to 10^{-5} Risk Based Guideline Value [RBGV] plus background) or Hazard Index (HI=1) values were flagged for further evaluation by the Core Team. The Cleanup Objective or Hazard Index values are used as thresholds for further evaluation and not predictor of risks. For the Cleanup Objective to correlate exactly with risk, a construction worker would have to be exposed to the Cleanup Objective concentration for 8 hours per day for five days per week for five years.

4.0 DATA SET EVALUATED

The locations of all soil sampling data within a radius of 15 feet from the sewer lines were identified by the Mound Environmental Restoration Geographic Information System and are shown on the Attachment 4 drawing. A MEIMS search of data at these locations found no detected chemical results that exceed Cleanup Objective or Hazard Index values. Only radiological results in excess of Cleanup Objectives were observed. Sampling locations with data that did not exceed either Cleanup Objectives or Hazard Index values are shown in gray on Attachment 4. Locations of data that lie within areas associated with PRSs 273, 285, 286, and 288 remediations (noted in section 3.0) and that exceed Cleanup Objectives are shown in blue. The location of the remaining relevant data that exceed radiological Cleanup Objectives are shown as red symbols. There are 25 relevant detected radionuclide results that exceed Cleanup Objectives, from 17 "red symbol" locations shown on Attachment 4.

The MEIMS compilation of all relevant soil data was transferred into a spreadsheet that is stored on a CD (Attachment 5). The full data set contains 13,374 chemical or radiological result records, and is given under tab "All data" within the spreadsheet. These were sorted for the cases in which radionuclides exceeded Cleanup Objectives. The 25 detected radionuclide results that exceed Cleanup Objective concentrations are given under tab "Cleanup Objective (4)". The lack of chemical results that exceed Hazard Index values is noted under the unpopulated tab "Hazard Index (8)".

5.0 DATA EVALUATION

Table 1 lists the 25 relevant sample results that exceed a Cleanup Objective (10^{-5} RBGV plus background).

Table 2 provides a further Core Team evaluation of each such occurrence. Conceptually, the evaluation process is similar to that used to evaluate a PRS for protectiveness or a building for re-use [2].

Evaluations of the sample results that exceed Cleanup Objective show that these results are described as one or more of the following:

- isolated spatially (i.e., surrounded by results below cleanup objective), or
- superceded by later data, or
- found during preliminary sampling of a legacy D&D site that was bounded by and cleaned to a larger threshold value, or
- found within PRSs that have been binned NFA, or
- found close to PRSs that have been binned NFA, or
- found within PRSs that will be removed, or
- found within collections of data that have already been evaluated in Residual Risk Evaluations (RREs) that supported transfers of land to MMCIC, or
- found within collections of data that will be evaluated in RREs that are expected to support future transfers of land to MMCIC.

The incremental risk from radiological exposures during excavation of soils surrounding the sewer lines can thus be considered near 10^{-5}.

To be more specific regarding risk, a detailed calculation of risk to the construction worker from excavation of relevant soils surrounding the sewer lines was performed according to the guidance within reference [6]. See attachment 5 for the residual risk evaluation (RRE) spreadsheet. In summary, <u>all</u> data from each radionuclide or chemical analyte that had <u>any</u> detected result exceeding 10^{-6} RBGV or 0.1 HI soil screening level values were collected and evaluated as a lognormal distribution. The RBGV and HI values used in the analysis were specific to the construction worker. The evaluation produced a value for each analyte that is the 95% upper confidence limit (95UCL) of the geometric mean of the data set distribution. The appropriate environmental background value was then subtracted from each 95UCL value, and the result was prorated against the 10^{-6} RBGV to produce the risk from the given analyte. The sum of the risks from the 12 analytes that passed the screening process is

considered the total risk. The final sum, 1.8×10^{-5}, is the lifetime excess cancer risk. Most of this risk (70%) arises from the isotope Th-228, the results from which are skewed high by poor detectability. This risk was determined for a construction worker who excavates the soils of concern for a total working time of 5 years, at 250 working days per year. Because no single construction worker is likely to spend 5 x 250 = 1250 working days excavating these Miamisburg Closure Project sewer line soils, the actual worker's risk is expected to be lower than 1.8×10^{-5}.

It may also be noted here that a similar analysis was performed using the 17,980 result records from all soils surrounding the sanitary sewer lines, not excluding the soils near the PRS 273, 285, 286, and 288 remediation areas. This evaluation identified 15 analytes and produced a residual risk of 5.3×10^{-5}. Again 70% of this risk was due to poor detectability of Th-228. Therefore the residual risk is $<10^{-4}$, regardless whether remediation soils are included or not.

6.0 ADDITIONAL INFORMATION

Additional information requested by the Core Team has been included as Attachments 6 through 10. Attachment 6 presents a map of the Mound sewer system that illustrates pipe materials, sizes, and installation dates ("Mound Plant Sanitary Sewer Piping Information"). Attachment 7 provides available maintenance records for the sanitary sewer system. Attachment 8 is a sanitary sewer line video inspection report (January-February 2004) and a planned corrective action table (May 2004). Attachment 9 is a series of Radiological Survey Data Sheets (RSDSs) from Radiological Control Technician (RCT) coverage of sanitary sewer inspections. Attachment 10 gives a list of buildings, both current and historical, that are or were connected to the sanitary sewer collection system to be leased.

7.0 RECOMMENDATIONS AND CONCLUSIONS

Risks of excavating relevant soils while maintaining the sanitary sewer lines shown on the Attachment 2 drawing are less than 10^{-4} lifetime excess cancer risk. Lease of property surrounding these lines is acceptable.

8.0 REFERENCES

[1] Work Plan for the Environmental Restoration of the DOE Mound Site, The Mound 2000 Approach, February 1999, Final.

[2] Potential Release Site Packages, Reading and Understanding, August 1996.

[3] Action Memorandum, Building 38 Removal Action, Final (Rev. 2), January 2002, and Addendum 1, Final, August 2003, Mound Plant, Miamisburg, OH.

[4] Building 38 Area Verification and Sampling Plan, Final, March 2004, Mound Plant, Miamisburg, OH. For definition of and verification sampling at Piece C of the previous D&D Dispositions, see Figure 17, "Piece C Confirmation and Verification Layout" and Figure 27, "Process Area Disposition Sampling". For excavation and verification at the SCR791 location, se Figure 29, "Detail of Isolated Disposition Sampling". For the SCR728 location, see Figure 28, "Historic Rad Samples > Cleanup Objective where No Action Required".

[5] Core Team Meeting Minutes, May 19, 2004, page 2 and Attachment 2.

[6] Mound 2000, Residual Risk Evaluation Methodology, Final, Rev. 0, Mound Plant, January 6, 1997.

Prepared by:

Max Edington, CH2MHill, Facilities Manager
John Gill, CH2MHill, ER Technical Staff
John Lyons, CH2MHill, ER Technical Staff
Steven Pawel, CH2MHill, ER Technical Staff
David Rakel, CH2MHill, ER CERCLA Team Lead
David Wier, CH2MHill, Facilities Engineer

TABLE 1. Summary of Relevant Sample Data that Exceed Cleanup Objective for Soil Surrounding the Sanitary Sewer System.

Project Id	Sample Id	Station	Analyte	Result	Unit of Measure	Clean-up Objec-tive	Hot Spot Criter-ion	Lab Qual	Data Qual	Detection Limit	Error	Date Collected	Lab Code	Matrix	Method Description	Field Sample Type	Start Sample Depth	Ending Sample Depth	Depth Units
SCRDATA	88032210	SCR80	Plutonium-238	147	PCI/G	55	165					3/19/1988	SSF	SOIL	Bicron Detector Screening, Pu & Th	GR			NA
SCRDATA	88032211	SCR80	Plutonium-238	57	PCI/G	55	165					3/19/1988	SSF	SOIL	Bicron Detector Screening, Pu & Th	GR			NA
SCRDATA	8803229	SCR250	Plutonium-238	170	PCI/G	55	165					3/19/1988	SSF	SOIL	Bicron Detector Screening, Pu & Th	GR			NA
SCRDATA	8803227	SCR250	Plutonium-238	114	PCI/G	55	165					3/19/1988	SSF	SOIL	Bicron Detector Screening, Pu & Th	GR			NA
MND17	1269-5008	MND17-1269	Radium-226	2.95	PCI/G	2.93	4.7					7/31/1995	SSF	SOIL	Gamma Spec Screen, Radioisotopes	GR	4.0	8.0	FT
04-2768	N04301	N04	Radium-226	3.3	PCI/G	2.93	4.7				0.772	6/8/1994	ECOTEK	SOIL	NDI1986, Gamma Spectrometry	GR	2.0	11.0	FT
RSS	5985	S0287	Thorium-228	3	PCI/G	2.6	4.8					7/1/1984	MRC	SOIL	PD80030-1302, Rad, Lg Soil Samples, Acid-Leach	GR			NA
PRS304V	004420	4420	Thorium-230	3.14	PCI/G	2.8	4.6			2.45		11/23/1998	SSF	SOIL	Germanium Detector Screen, Radioisotopes	GR	0.5	1.5	FT
RSS	8342	C0004	Thorium-232	4.47	PCI/G	2.06	3.5			2.00		11/1/1984	MRC	SOIL	PD80030-3605, Pu in Sm Soil Sample, Acid-Leach	GR	3.0	3.0	FT
RSS	8343	C0004	Thorium-232	2.49	PCI/G	2.06	3.5			2.00		11/1/1984	MRC	SOIL	PD80030-3605, Pu in Sm Soil Sample, Acid-Leach	GR	6.0	6.0	FT
RSS	1791	C0017	Thorium-232	2.29	PCI/G	2.06	3.5			2.00		5/1/1983	MRC	SOIL	PD80030-3605, Pu in Sm Soil Sample, Acid-Leach	GR	1.5	1.5	FT
RSS	8356	C0018	Thorium-232	4.52	PCI/G	2.06	3.5			2.00		11/1/1984	MRC	SOIL	PD80030-3605, Pu in Sm Soil Sample, Acid-Leach	GR	3.0	3.0	FT
RSS	8357	C0018	Thorium-232	2.53	PCI/G	2.06	3.5			2.00		11/1/1984	MRC	SOIL	PD80030-3605, Pu in Sm Soil Sample, Acid-Leach	GR	6.0	6.0	FT
RSS	2827	S0655	Thorium-232	2.74	PCI/G	2.06	3.5			2.00		10/1/1983	MRC	SOIL	PD80030-3605, Pu in Sm Soil Sample, Acid-Leach	GR			NA
RSS	2828	S0655	Thorium-232	2.28	PCI/G	2.06	3.5			2.00		10/1/1983	MRC	SOIL	PD80030-3605, Pu in Sm Soil Sample, Acid-Leach	GR			NA
SCRDATA	9102015-F	SCR467	Thorium-232	3.3	PCI/G	2.06	3.5					1/31/1991	SSF	SOIL	Bicron Detector Screening, Pu & Th	GR	1.0	1.0	FT
SCRDATA	93121014	SCR488	Thorium-232	2.2	PCI/G	2.06	3.5					12/8/1993	SSF	SOIL	Bicron Detector Screening, Pu & Th	GR			NA
SCRDATA	93121335-L	SCR500	Thorium-232	2.1	PCI/G	2.06	3.5					12/10/1993	SSF	SOIL	Bicron Detector Screening, Pu & Th	GR			NA
SCRDATA	90071148	6A	Thorium-232	2.8	PCI/G	2.06	3.5	NJ				7/11/1990	SSF	SOIL	Bicron Detector Screening, Pu & Th	GR	2.0	3.0	FT
RSS	2469	C0168	Thorium-232	7.11	PCI/G	2.06	3.5			2.00		8/1/1983	MRC	SOIL	PD80030-3605, Pu in Sm Soil Sample, Acid-Leach	GR	1.5	1.5	FT
RSS	5985	S0287	Thorium-232	8.94	PCI/G	2.06	3.5			2.00		7/1/1984	MRC	SOIL	PD80030-3605, Pu in Sm Soil Sample, Acid-Leach	GR			NA
RSS	5986	S0288	Thorium-232	8.09	PCI/G	2.06	3.5			2.00		7/1/1984	MRC	SOIL	PD80030-3605, Pu in Sm Soil Sample, Acid-Leach	GR			NA
RSS	10485	S0547	Thorium-232	5.3	PCI/G	2.06	3.5			2.00		8/1/1985	MRC	SOIL	PD80030-3605, Pu in Sm Soil Sample, Acid-Leach	GR			NA
SCRDATA	9402645	SCR728	Thorium-232	2.6	PCI/G	2.06	3.5					3/15/1994	SSF	SOIL	Bicron Detector Screening, Pu & Th	GR			NA
SCRDATA	9402610	SCR728	Thorium-232	2.6	PCI/G	2.06	3.5					3/15/1994	SSF	SOIL	Bicron Detector Screening, Pu & Th	GR			NA

TABLE 2. Core Team Evaluation of Relevant Sample Data that Exceed Cleanup Objective for Soil Surrounding the Sanitary Sewer System.

Project Id	Sample Id	Station	Analyte	Result	Unit of Measure	Date Collected	Lab Code	Core Team Evaluaton
SCRDATA	88032210	SCR80	Plutonium-238	147	PCI/G	3/19/1988	SSF	Samples from this location were analyzed 3 times, with an average Pu-238 of 72 pCi/g. This result has been superceded by further assessment under the PRS 41/64/417 SAP, November 2002. Samples were collected from 4 locations at and surrounding the historical location; Pu-238 concentration results were all <55 pCi/g cleanup objective (3 were non-detect).
SCRDATA	88032211	SCR80	Plutonium-238	57	PCI/G	3/19/1988	SSF	This sample has the same location, depth, and date of collection as sample ID 88032210. See evaluation above.
SCRDATA	8803229	SCR250	Plutonium-238	170	PCI/G	3/19/1988	SSF	Samples from this location were analyzed 3 times, with an average Pu-238 of 98 pCi/g. Within 100 ft there are 12 other sample locations with Pu-238 results, all of which are <55 pCi/g cleanup objective (range: 0.13 - 25 pCi/g). Consider to be isolated spot of activity, with result average that is <hot spot criterion of 165 pCi/g.
SCRDATA	8803227	SCR250	Plutonium-238	114	PCI/G	3/19/1988	SSF	This sample has the same location, depth, and date of collection as sample ID 8803229. See evaluation above.
MND17	1269-5008	MND17-1269	Radium-226	2.95	PCI/G	7/31/1995	SSF	Result exceeds cleanup objective (2.93 pCi/g) by very small margin, but is well below the 4.7 pCi/g hot spot criterion. Several other nearby samples are <cleanup objective.
04-2768	N04301	N04	Radium-226	3.3	PCI/G	6/8/1994	ECOTEK	Sample location is within PRS 4, the Miami-Erie Canal "runoff hollow". Concentration is similar to the 3.04 pCi/g evaluated in the Miami-Erie Canal Area Residual Risk Evaluation (Public Review Final, May 2004), based on sampling elsewhere in the canal area. Risks for Ra-226 were shown <1E-4 for all residential, recreational, and construction worker scenarios.
RSS	5985	S0287	Thorium-228	3	PCI/G	7/1/1984	MRC	This sample location is within PRS 235 and is superceded by 2 nearby results from 1996, both <0.9 pCi/g. PRS package also considered sample coordinates to have been transposed, and true location to be within PRS 66. PRS 235 was binned NFA on 19 Feb 1997. This location is also near the new sewer line that was installed in 2002, where the soils were removed and replaced with clean materials.
PRS304V	004420	4420	Thorium-230	3.14	PCI/G	11/23/1998	SSF	This location is in Release Block D. The result was included in the Residual Risk Evaluation - Release Block D (Final, December 1996) and the Revision Summary (Final January 1999). Furthermore, Th-230 screened out of the Release Block D risk evaluation since its exposure point concentration (95% UCL) was less than background. Also, Ra-226 in this sample was 0.89 pCi/g (<background), so that the Th-230 cleanup objective is more properly 83.8 pCi/g (independent of daughters).
RSS	8342	C0004	Thorium-232	4.47	PCI/G	11/1/1984	MRC	This sample result is above the hot spot criterion of 3.5 pCi/g, but the location is within Parcel 3. The final RRE for this parcel (Sept 2001) listed this specific result but determined the exposure point concentration (95% UCL) for 155 detections of Th-232 to be 0.75 pCi/g (below background). Th-232 in Parcel 3 soil was thus screened from further evaluation.
RSS	8343	C0004	Thorium-232	2.49	PCI/G	11/1/1984	MRC	This result was also evaluated in Parcel 3 (see C0004 entry above), and is below the hot spot criterion of 3.5 pCi/g.
RSS	1791	C0017	Thorium-232	2.29	PCI/G	5/1/1983	MRC	This sample location is within a few feet of the PRS 235 boundary. This sample result is superceded by 4 samples in nearby vicinity from 1995 and1996 sampling campaigns, all <1.4 pCi/g Th-232 (current cleanup objective is 2.06 pCi/g). PRS 235 was binned NFA on 19 Feb 1997 using legacy D&D cleanup objectives of 5 pCi/g (surface) and 15 pCi/g (subsurface). This location is also near the new sewer line that was installed in 2002, where the soils were removed and replaced with clean materials.
RSS	8356	C0018	Thorium-232	4.52	PCI/G	11/1/1984	MRC	This result exceeds the hot spot criterion of 3.5 pCi/g. However it is superceded by a 1993 borehole (BH0926) within 1' distance, from which 30 results were all <1.8 pCi/g, although depth data are lost.
RSS	8357	C0018	Thorium-232	2.53	PCI/G	11/1/1984	MRC	This result exceeds the cleanup objective (2.06 pCi/g) but not the hot spot criterion (3.5 pCi/g). See also explanation in entry immediately above.
RSS	2827	S0655	Thorium-232	2.74	PCI/G	10/1/1983	MRC	This location is in Release Block D. The result was included in the Residual Risk Evaluation - Release Block D (Final, December 1996) and the Revision Summary (Final January 1999). Th-232 screened out of the Release Block D risk evaluation since its exposure point concentration (95% UCL) was less than background.
RSS	2828	S0655	Thorium-232	2.28	PCI/G	10/1/1983	MRC	See explanation in entry immediately above.
SCRDATA	9102015-F	SCR467	Thorium-232	3.3	PCI/G	1/31/1991	SSF	This location is within the PRS 80 affected area, assigned Response Action status as of 17 June 2002 (PRS 80 Package, Final August 2002, and Addendum 1, Mound Plant, Miamisburg, OH). Expect to be removed.

SCRDATA	93121014	SCR488	Thorium-232	2.2	PCI/G	12/8/1993	SSF	This Th-232 value is only slightly above the cleanup objective (2.06 pCi/g). However it is isolated by 29 other results from the same location that are all <2.0 pCi/g.
SCRDATA	93121335-L	SCR500	Thorium-232	2.1	PCI/G	12/10/1993	SSF	This Th-232 value is only slightly above the cleanup objective (2.06 pCi/g). However it is isolated by 49 other results from the same location that are all ≤2.0 pCi/g.
SCRDATA	90071148	6A	Thorium-232	2.8	PCI/G	7/11/1990	SSF	This result was determined during initial bounding characterization of SM Leach Field, where D&D subsurface objective for Th-232 was 15 pCi/g.
RSS	2469	C0168	Thorium-232	7.11	PCI/G	8/1/1983	MRC	This location is in Release Block D. The result exceeds the hot spot criterion (4.6 pCi/g). However, this location was re-sampled as part of the PRS 304 verification data set (location 4420) in November 1998, with a result below cleanup objective. Furthermore, the original result was included in the Release block D Risk Evaluation, from which Th-232 screened out since its exposure point concentration (95% UCL) was less than background.
RSS	5985	S0287	Thorium-232	8.94	PCI/G	7/1/1984	MRC	PRS 235 package considered this sample result to be superceded by 8 results in nearby vicinity from 1995 and 1996 sampling campaigns, all <1.2 pCi/g Th-232 (below cleanup objective). Package also considered sample coordinates to have been transposed, and true location to be within PRS 66. PRS 235 was binned NFA on 19 Feb 1997. This location is also near the new sewer line that was installed in 2002, where the soils were removed and replaced with clean materials.
RSS	5986	S0288	Thorium-232	8.09	PCI/G	7/1/1984	MRC	PRS 235 package considered this sample result to be superceded by 8 results in nearby vicinity from 1995 and 1996 sampling campaigns, all <1.2 pCi/g Th-232 (below cleanup objective). Package also considered sample coordinates to have been transposed, and true location to be within PRS 66. PRS 235 was binned NFA on 19 Feb 1997.
RSS	10485	S0547	Thorium-232	5.3	PCI/G	8/1/1985	MRC	Four contemporary 1985 sample results, shown by GIS as nearby, were non-detect for Th-232 (<2.0 pCi/g). The PRS 41/64/417 SAP, November 2002, Table 5, discounted this sample result because of inability to locate (±25 ft); 3 SAP results (2002) from samples within 30 ft were all <1.6 pCi/g (below cleanup objective).
SCRDATA	9402645	SCR728	Thorium-232	2.6	PCI/G	3/15/1994	SSF	This result is adjacent to a historical D&D dig area, the grassy area north of old SM Building. The result was identified and categorized within the Building 38 Area VSAP [4], Figure 28, as "No Action Required", indicating that removal was not planned. This was consistent with VSAP (page 10) direction for soil in non-D&D areas that (a) removal would occur where results exceed hot spot criteria (3.5 pCi/g Th-232), but that (b) below the hot spot criteria and above the cleanup objective, the data would be evaluated by performing the 95% UCL and MARSSIM sign tests. Per the VSAP [4], the 95% UCL of Th-232 is to be applied against 2.1 pCi/g in verification data from (1) each Building 38 Area non-D&D sub-area (successfully, page 10) and (2) from the entire Building 38/SM process area, including D&D areas (presumably successfully, page 14). SCR728 data does not fall into either of these 2 categories, but the large amount of data in those categories is expected to cause the broader Parcel 7 risk evaluation (which would include SCR728) to determine a risk from Th-232 that is below 10^{-5}.
SCRDATA	9402610	SCR728	Thorium-232	2.6	PCI/G	3/15/1994	SSF	See explanation in entry immediately above.

Attachment 1:

Letter of request for Core Team involvement

From: "Dann Bird" <DBird@mound.com>
To: "Brian Nickel (E-mail)" <Brian.nickel@epa.state.oh.us>, "David Seely (E-mail)" <Seely.David@epamail.epa.gov>, "Paul Lucas (E-mail)" <Paul.lucas@ohio.doe.gov>
Date: 10/13/03 12:15PM
Subject: FW: Utility Questions for the Core Team

Attached are several questions from Beth Moore concerning the City's need to understand the process for determining that the various utility systems have been cleaned to an acceptable standard prior to transfer. This includes not only the systems, but also the soils around the systems. The item should be an agenda item for the Core Team to address. The key issue is what are the Core Team's expectations in terms of timing, data collectionand review, scope of work for the site contractor and coordination of cleanup and transfer of utility services.

Please advise.

Dann
-----Original Message-----
From: Beth Moore [mailto:beth.moore@cityofmiamisburg.com]
Sent: Monday, October 13, 2003 9:55 AM
To: Dann Bird
Subject: Utility Questions for the Core Team

Dan

Thanks for bringing these questions forward to the Core Team at the meeting tomorrow. I don't think we will get immediate answers tomorrow, but rather just providing food for thought. If you feel that I should be there, please just let me know. Thanks!

Beth Moore

Environmental Coordinator

City of Miamisburg

600 N. Main St.

Miamisburg, OH 45342

(937) 847-6629 phone

(937) 847-6634 fax

CC: "Dave Rakel (E-mail)" <Rakeda@doe-md.gov>, "Beth Moore (E-mail)" <Beth.Moore@cityofmiamisburg.com>, "Frank Bullock" <FBullock@mound.com>

QUESTIONS FOR THE CORE TEAM REGARDING UTILITY TRANSFERS FROM THE MOUND TO THE CITY OF MIAMISBURG

The City of Miamisburg needs to fully understand the role of the Core Team in the water, sanitary and storm utility transfers. The appropriate Core Team review / involvement in this process could increase City and public confidence that "clean" utility systems are being transferred. It would be helpful if there was consistency in the evaluation and transfer process for each utility.

Sanitary Sewer Collection System

There are basically two separate issues: 1) transfer of ownership of the physical system (sanitary sewer collection system) from DOE to the City of Miamisburg and 2) the cessation of DOE as a direct discharger to the Great Miami River and the transition of the Mound customers (including DOE) to direct dischargers to the City of Miamisburg POTW.

1. The transfer of the wastewater discharge from DOE to the City is a process that is governed by 1) the OEPA, Division of Surface Water via a PTI and NPDES permit modification from DOE and 2) the ODH due to the potential presence of radioactive material in the Mound wastewater discharge to the City that could pass through the City POTW to the effluent or the sludge. Is this correct?
2. Will the sanitary system have a Building Data Package that will be reviewed by the Core Team and put out for public comment?
3. Have any portions of the sanitary sewer collection & treatment system been binned?
4. Do all of the sanitary sewer pipes go through an evaluation process to determine that they are "clean"?
5. If portions of the sanitary sewer collection system lie in PRSs that have been determined NFA, does that mean the sanitary sewer pipes were evaluated as part of the NFA determination?
6. Could the sanitary pipes have a NFA determination independent of the PRS (clean or dirty) in which they reside?

Water Distribution System

1. Will the water distribution system have a Building Data Package that will be reviewed by the Core Team and put out for public comment?
2. Do the water pipes go through any type of evaluation process to determine that they are "clean"? Since the fire water distribution system will become the potable water distribution system it is the fire system that is of concern.
3. If portions of the water distribution system lie in PRSs that have yet to be remediated, and a temporary reroute of water services around these dirty areas is planned, and the water pipes will be reconnected to the water distribution system after the PRSs have been remediated; will these water pipes be evaluated and determined "clean" as part of the PRS remediation?
4. The process of connecting the DOE water distribution system to the City is governed by the OEPA, Division of Drinking & Ground Waters. Is this correct?

October 13, 2003

QUESTIONS FOR THE CORE TEAM REGARDING UTILITY TRANSFERS FROM THE MOUND TO THE CITY OF MIAMISBURG

Storm System

There are basically two separate issues: 1) transfer of ownership of the physical system (storm sewer system) from DOE to the City of Miamisburg and 2) the cessation of DOE as a direct discharger to the Great Miami River and the transition of the Mound storm outfalls to be included in the City MS4 NPDES permit.

1. DOE will terminate their industrial storm water NPDES permit. The OEPA and the city will no longer consider the Mound as an "industrial facility"; therefore an individual industrial storm water NPDES permit will no longer be necessary. The city will consider the Mound the same as any other industrial park with multiple individual facilities. Is this correct?
2. Will the storm system have a Building Data Package that will be reviewed by the Core Team and put out for public comment?
3. Some portions of the storm system have been designated PRSs, clarification of boundary definitions of what each of these PRS evaluations addressed is needed.
4. Will the storm system be reviewed as a whole entity? Do all of the storm sewer components (pipes, ditches...) go through an evaluation process to determine that they are "clean"?
5. If portions of the storm system lie in PRSs that have been determined NFA, does that mean the storm system component (pipe, ditch, pond...) was evaluated as part of the NFA determination?
6. Could the storm sewer component (pipe, ditch, pond...) have a NFA determination independent of the PRS (clean or dirty) in which they reside?

October 13, 2003

Attachment 2:

Report

"Data Review: Sewage Sludge and Waste Water Influent and Effluent Analysis for the Miamisburg Closure Project and the City of Miamisburg", Preliminary, January 13, 2004

by

Department of Energy, Office of Environmental Management, Office of Science and Technology

U. S. Department of Energy
Office of Environmental Management

Data Review: Sewage Sludge and Waste Water Influent and Effluent Analyses For the Miamisburg Closure Project and the City of Miamisburg

Prepared by
The Office of Science and Technology
Closure Sites Technical Assistance Program
Technical Assistance Team

January 13, 2004

Preliminary

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ATTACHMENTF – CH2MHIll Data Package – Sludge and Influent

Executive Summary

This report documents the results for the sampling, characterization and evaluation of sludge and wastewater samples taken from The Department of Energy (DOE) Miamisburg Closure Project (MCP) and the City of Miamisburg (CoM) wastewater treatment facilities in Miamisburg, Ohio. The purpose of this evaluation was to establish a baseline for radionuclides and other inorganic and organic constituents in sludge and influent for the MCP and CoM.

The sampling and characterization was conducted in preparation for transfer of the sanitary sewer system lines from the DOE MCP to the CoM. The DOE MCP contractor, CH2M HILL Mound, Inc. (CH2M HILL) proposes to connect the remaining sanitary sewer system lines to the CoM system in 2004 and demolish the on-site wastewater treatment facility. The sanitary sewer lines that will be transferred will be those that are currently connected to the remaining buildings on the Miamisburg Mound Community Improvement Corporation (MMCIC) privately-owned industry and technology park.

This sampling and characterization was recommended in a Technical Assistance / Value Management (TA/VM) study on September 23-25, 2003 that was funded by DOE Office of Science and Technology (OST). The TA/VM study included participants from the DOE, CH2M HILL, MMCIC, CoM, Ohio Environmental Protection Agency (OEPA), Ohio Department of Health (ODH) and subject matter experts from around the country. This TA/VM team reached consensus on a technically feasible path forward to evaluate existing conditions, prepare the lines for transfer and agree on end state conditions.

Following an agreed upon sampling and analysis plan, the OEPA and the CH2M HILL coordinated the sampling of sludge and wastewater for both the MCP and the CoM on October 9, 2003. The OEPA and CH2M HILL obtained single samples of the MCP sludge and influent, which were split between the two organizations. Workers also obtained single samples of the CoM sludge, effluent and influent, which were split between OEPA and CH2M HILL. The OEPA sent their samples to Eberline Services Laboratory in New Mexico, and CH2M HILL sent the their samples to General Engineering Laboratory (GEL) in Ohio for analysis. The analyses focused on ten radionuclides and their respective isotopes. These radionuclides included uranium, plutonium, thorium, tritium, americium, actinium, lead, radium, cesium and cobalt. In addition, a suite of inorganic (heavy metals) and organic analytes, important to CoM wastewater treatment permit, was analyzed.

This report compares the analytical results for the two sludges to survey levels published in a report by the Sewage Sludge Subcommittee of the Interagency Steering Committee on Radiation Standards (ISCORS). This was done to provide a more thorough understanding of the relevance of radioactivity concentrations in MCP and CoM sludges as compared to values for sludges around the country. ISCORS had surveyed 420 Publicly Owned Treatment Works (POTW) around the country and subsequently sampled and analyzed 311 sludges from these POTWs. The ISCORS report is available

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on their website at http://www.iscors.org/POTW-rec-11-2003.pdf. The following is a excerpt from that report provides a qualitative aspect to the presence of radionuclides in sewage sludge:

> *"As a result of Congressional interest, the Sewage Sludge Subcommittee of the Interagency Committee on Radiation Standards (ISCORS) conducted a survey of radioactive material in sewage sludge and ash and performed dose modeling of the survey results to address these concerns and to estimate typical levels of radioactive materials in POTWs around the country. The Subcommittee also developed this guidance document for use by POTW operators in evaluating whether the presence of radioactive materials in sewage sludge or ash could pose a threat to the health and safety of POTW workers or the general public. The levels of radioactive materials detected in sewage sludge and ash in the ISCORS survey indicate that, at most POTWs, radiation exposure to workers or to the general public, including from land application of sludge for growing food crops, is very low and consequently, is not likely to be a concern."*

The analytical results for MCP and CoM sludges indicate that plutonium is the primary isotope of concern in the MCP sludge. The concentration for both plutonium isotopes in MCP sludge is higher than the ISCORS survey values and is also higher than the plutonium concentration in the CoM sludge. This report also presents radiological results for effluent and influent samples. However, there are no applicable isotopic radiological standards that would allow comparison of this data.

CH2M HILL Mound, Inc., continues to follow the recommendations of TA/VM study and continues to work with the CoM and MMCIC to further prepare the remaining sanitary sewer lines for transfer to the city. Actions include high-pressure flushing of the remaining lines followed by a final videotaping of the interior lines. All but one of the buildings that were the probable sources of the radionuclides in the existing sludge will be demolished and removed from the system. The remaining building, T Building, will no longer be a nuclear facility, and all sumps and lines will be either removed or decontaminated.

Introduction

The Department of Energy (DOE) Miamisburg Closure Project (MCP) operates an onsite sewage disposal plant to treat domestic and process wastewater. Liquid effluent from this plant is discharged to the Great Miami River, while the solid sludge is dried and shipped offsite for disposal. The contract requires the sanitary plant to be demolished after it is no longer in service. The preferred method to remove this plant from service is to transfer some of the piping to the city for the processing of sewage. The site has limited data of radioactivity concentrations in sewer system manholes and influents to the onsite sewage disposal plant.

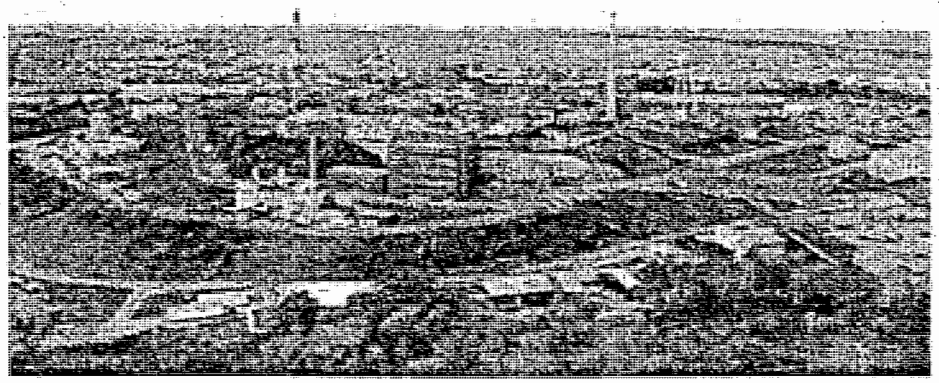

Figure 1. Overview of the Miamisburg Closure Project

The Technical Assistance / Value Management (TA/VM) study conducted September 23-25, 2003 at the MCP recommended in the final report (1) that the sludge from the MCP and the CoM be sampled and characterized. As a result, a sampling and analysis plan (Attachment A) was prepared and finalized on October 3, 2003. The data contained in this report is a product of the sampling and analysis that was performed during the October/November timeframe. To gain a better perspective on radioactivity concentrations in sludge and wastewater on a national level, this report compares the CoM and MCP values with those values derived from a recent survey of Publicly Owned Treatment Works (POTW) by the Interagency Steering Committee on Radiation Standards (ISCORS).

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ISCORS POTW Sewer Survey

From 1998 to 2000, through the ISCORS, the U.S. Nuclear Regulatory Commission (NRC) and the Environmental Protection Agency conducted a joint survey to collect information on radioactivity in sewage sludge and ash from sewage treatment plants referred to in the industry as publicly owned treatment works (POTWs). The voluntary survey had two components: a questionnaire and a program for sampling and analyzing sewage sludge and incinerator ash. Questionnaires were sent to 631 POTWs, 420 of which returned the questionnaires. The NRC and EPA selected 313 POTWs to sample their sludge. The selection emphasized POTWs with the greatest potential to receive waste from licensees and in areas with higher levels of naturally occurring radioactive material (NORM). Altogether 311 sewage sludge samples were taken.

In November 2003, ISCORS issued a final report (2) "ISCORS Assessment of Radioactivity in Sewage Sludge: Radiological Survey Results and Analysis". Table 1, taken from the report, contains the summary statistics (including median, minimum and maximum detected concentrations, 95th percentile, and frequency of detection) that were calculated for each radionuclide. The report provided the following qualifications relative to the data in Table 1:

> "Negative concentrations were treated as not detected for these calculations. In cases where there was an even number of analyses and the median fell between a nondetected (ND) and detected concentration, a range was reported. For example, the results of a set of four analyses were (ND, ND, 5, and 7), the median would be reported as "ND to 5." The minimum detectable concentration (MDC) of a radionuclide in a sample is the smallest concentration of analyte expressed in this study as pCi/g (1 pCi/g = 37 Bq/kg) of sludge or ash that produces a signal with a 95% confidence of exceeding a decision (detection) level. Finally, the number of times a radionuclide was detected relative to the total number of analyses is listed to provide for a more complete perspective for interpreting the results. These summary statistics are presented in Table 4.1. No widespread or nationwide public health concern was identified by the survey because no significant adverse condition or excessive concentrations of radioactivity were observed in sludge or ash."

This report compares the analytical results for the two sludges to survey levels published in a report by the Sewage Sludge Subcommittee of the ISCORS. This was done to provide a more thorough understanding of the relevance of radioactivity concentrations in MCP and CoM sludges as compared to values for sludges around the country.

At. 2 P6

ISCORS POTW Report Table 1: Concentration of Radionuclides in Sludge

Radionuclide	Minimum	Median	95th	Maximum	Number Detects/ Number Analyses
Alpha	nd	7	34	137	309/311
Beta	1.7	13	34	93	311/311
Am-241	nd	nd	nd	2.5	10/311
Be-7	nd	1.2	9	22	263/311
Bi-212	nd	nd	1.3	13	101/311
Bi-214	nd	0.3	2.3	16	238/311
C-14*	nd	nd	1	3	63/158
Ce-141	nd	nd	nd	0.016	1/311
Co-57	nd	nd	nd	0.26	6/311
Co-60	nd	nd	nd	5.1	13/311
Cr-51	nd	nd	nd	3.5	6/311
Cs-134	nd	nd	nd	0.04	1/311
Cs-137	nd	nd	0.11	3.6	133/311
Eu-154	nd	nd	nd	21	1/311
Fe-59	nd	nd	nd	0.4	1/311
H-3*	nd	0.3	5	8	111/158
I-125	nd	nd	nd	40	11/311
I-131	nd	1.8	51	840	11/311
In-111	nd	nd	0.04	3.6	246/311
K-40	nd	4	12	26	308/311
La-138	nd	nd	nd	0.07	1/311
Pa-234m	nd	nd	7	27	80/311
Pb-210	nd	nd	4	13	135/311
Pb-212	nd	0.44	1.9	15	303/311
Pb-214	nd	0.31	2.6	17	253/311
Pu-238	nd	0.01	0.07	0.19	75/92
Pu-239	nd	0.003	0.04	0.12	68/92
Ra-223	nd	nd	nd	0.09	2/311
Ra-224	nd	nd	0.9	12	47/311
Ra-226	nd	2	13	47	289/311
Ra-228	nd	0.82	5.1	38	271/311
Rn-219	nd	nd	nd	nd	0/311
Sm-153	nd	nd	nd	27	1/311
Sr-89	nd	0.35	20	70	68/98
Sr-90	nd	0.1	1	9.4	64/98
Th-227	nd	nd	0.1	0.5	49/207
Th-228	0.07	0.605	4.1	9	92/92
Th-230	0.09	0.34	1	1.7	92/92
Th-232	0.02	0.2	0.6	1.6	92/92
Th-234	nd	0.6	6.7	23	191/311
Tl-201	nd	nd	46	241	151/311
Tl-202	nd	nd	0.53	1.16	73/311
Tl-208	nd	0.07	0.96	4.8	180/311
U-234	0.18	1.95	17	44	92/92
U-235	nd	nd	0.45	3.1	112/311
U-238	0.18	1.4	12	26	92/92
Zn-65	nd	nd	nd	0.06	1/311

nd = non-detect

* Indicates concentrations for this radionuclide are expressed in pCi/g wet.

All concentrations are expressed in pCi/g dry, unless noted; 1pCi/g = 37 Bq/kg.

At. 2 P.7

Data Review for Radionuclides in Sludge

A sampling and analysis plan was prepared and finalized on October 3, 2003. A single sample of the MCP SD sludge and influent were subsequently taken October 9 in a combined effort by the Ohio Environmental Protection Agency (OEPA) and the site contractor, CH2M HILL. Theses samples were split between the OEPA and CH2M HILL. The OEPA sent their samples to Eberline Services Laboratory in Albuquerque, New Mexico for analysis. CH2M HILL sent their samples to General Engineering Laboratory (GEL) in Cincinnati, Ohio for analysis. Also on October 9, individual samples of the CoM sludge, effluent and influent were collected. These samples were split between OEPA and CH2M HILL and sent to their respective laboratories.

The analyses were primarily focused on ten radionuclides and their respective isotopes. These radionuclides included uranium, plutonium, thorium, tritium, americium, actinium, lead, radium, cesium and cobalt. In addition, a suite of inorganic (heavy metals) and organic analytes, important to CoM wastewater treatment permit, was analyzed.

This section of the report summarizes the analytical data on all sludge samples sent to Eberline and GEL laboratories. This section is structured to provide for each radionuclide and its isotopes a summary table, a short narrative describing the data in each table and a bargraph providing a graphical illustration of the data. The summary tables for each radionuclide contains:

1. the isotopes analyzed
2. data for the CoM and MCP sludge samples analyzed at the Eberline laboratory
3. data for the CoM and MCP sludge samples analyzed at the CH2MHILL laboratory
4. national median values among POTWs as documented by ISCORS
5. range in values among POTWs as documented by ISCORS.

The values in Tables 2 through 11 contain data extracted from Attachment B (Summary Table of All Radionuclides Analysis for Sludge). MCP samples were run in duplicate by both laboratories and are are identified as MCP/1 and MCP/2. CoM samples were not run in duplicate. The summary table in Attachment B was compiled from the Eberline data report contained in Attachment C. The ISCORS values in Tables 2-11 are taken from Table 1 as documented in recent reports (2, 3) and include the median value and the range in values. Values in Tables 2-11 that are less than (<) the Minimum Detectable Concentration (MDC) are either identified as "< MDC" or "< MDC value." ISCORS identifies "< MDC" as nondetectable concentration or "nd."

Values in Figures 2-11 are taken from Tables 2-11. For both Eberline and GEL results for MCP samples, the values in Figures 2-11 are a average of two values. In order to graph these results, all data values that were either "nd" or "< MDC" are graphed as zero "0." The ISCORS "High" and "Low" values were derived from the "Maximum" and "Minimum" values, respectively in Table 1.

At. 2 P.8

Isotopic Uranium
(U-234, U-235, U-238)

Table 2. Results of isotopic uranium analyses by alpha spectroscopy.

Radioisotope	OEPA/Eberline Laboratory			CH2MHILL/GEL Laboratory			ISCORS	ISCORS
	CoM	MCP/1	MCP/2	CoM	MCP/1	MCP/2	Median	Range
	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
U-234	1.53	1.73	1.76	1.47	1.64	1.85	1.95	.18 - 44
U-235	0.053	0.067	0.063	0.087	< 0.02	< 0.048	nd	nd - 3.1
U-238	1.37	1.13	1.25	1.16	1.15	1.21	1.4	0.18 - 26

Table 2 contains all isotopic uranium values for MCP and CoM sludges from analyses conducted at Eberline and GEL laboratories. The data are extracted from Attachment B, "Summary Table of All Analyses for Radionuclides in Sludge". Table 2 also contains ISCORS median values and the range in concentrations for uranium isotopes from the ISCORS suvey. Figure 2 shows a graphical comparison of uranium isotopes values for MCP and CoM as compared to ISCORS low and high values. Data values between the two laboratories are in agreement. Comparison of MCP and CoM data indicate that the values are well within the low range for national averages among POTWs as documented by ISCORS.

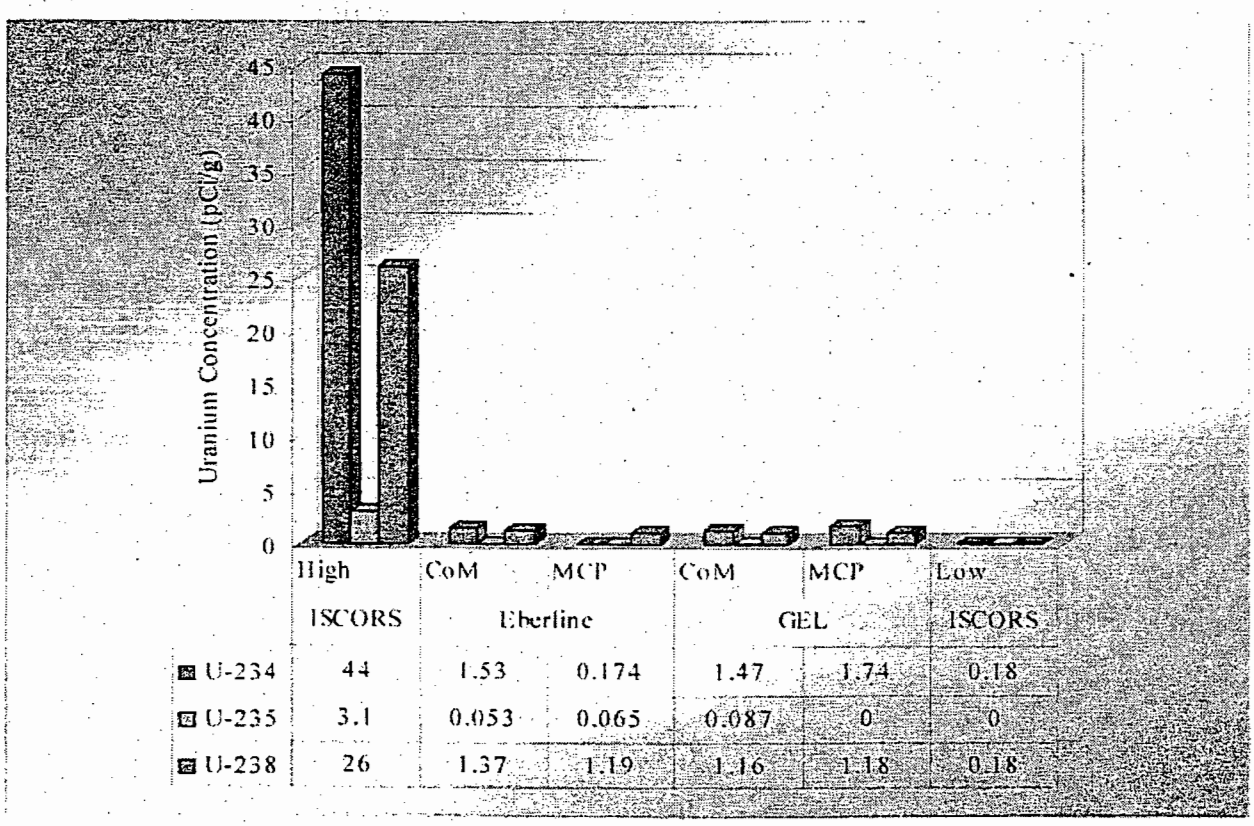

Figure 2. Graphical comparison of uranium isotopic values for MCP and CoM as compared to ISCORS low and high values.

At. 2 P. 9

Isotopic Plutonium
(Pu-238, Pu-239)

Table 3. Results of isotopic plutonium analyses by alpha spectroscopy.

Radioisotope	OEPA/Eberline Laboratory			CH2MHILL/GEL Laboratory			ISCORS	ISCORS
	CoM	MCP/1	MCP/2	CoM	MCP/1	MCP/2	Median	Range
	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Pu-238	0.009	15.4	15.6	0.04	16.5	15.1	0.01	nd - .19
Pu-239	< 0.005	0.199	0.25	0.049	0.196	0.159	0.003	nd - .12

Table 3 contains all isotopic plutonium values for MCP and CoM sludges from analyses conducted at Eberline and GEL laboratories. The data are extracted from Attachment B, "Summary Table of All Analyses for Radionuclides in Sludge". Table 3 also contains ISCORS median values and the range in concentrations for plutonium isotopes from the ISCORS suvey. Figure 3 illustrates the results for isotopic plutonium analyses. Comparison of data between the CoM and the MCP indicate a notably higher concentration of Pu-238 in MCP sludge as compared to the CoM sludge. Pu-239 in MCP sludge is also slightly higher than the ISCORS "High" value. Comparison of CoM data indicate that the values are well within the low range for national averages among POTWs as documented by ISCORS.

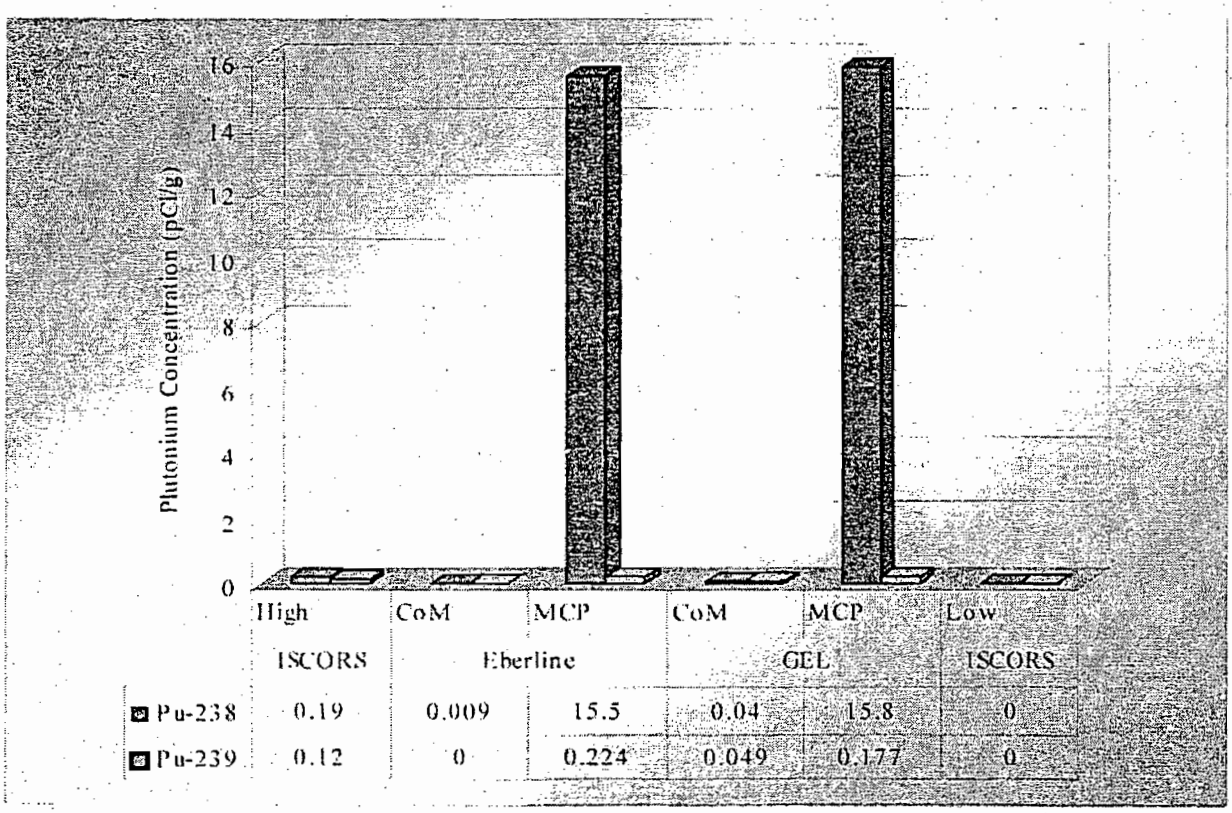

Figure 3. Graphical comparison of plutonium isotopic values for MCP and CoM as compared to ISCORS low and high values.

At.2 P.10

Isotopic Thorium
(Th-228, Th-230, Th232)

Table 4. Results of isotopic thorium analyses by alpha spectroscopy.

Radioisotope	OEPA/Eberline Laboratory			CH2MHILL/GEL Laboratory			ISCORS	ISCORS
	CoM	MCP/1	MCP/2	CoM	MCP/1	MCP/2	Median	Range
	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Th-228	0.506	1.32	1.25	0.664	1.03	1.14	0.605	.07 - 9
Th-230	0.295	0.751	0.751	0.874	1.11	1.2	0.34	.09 - 1.7
Th-232	0.127	0.644	0.607	0.119	0.622	0.699	0.2	.02 - 1.6

Table 4 contains all isotopic thorium values for MCP and CoM sludges from analyses conducted at Eberline and GEL laboratories. The data are extracted from Attachment B, "Summary Table of All Analyses for Radionuclides in Sludge". Table 4 also contains ISCORS median values and the range in concentrations for thorium isotopes from the ISCORS suvey. Figure 4 illustrates the results for isotopic thorium analyses. The data between the two laboratories are consistent with each other. The concentrations of all three thorium isotopes in MCP sludge are slightly higher than for CoM sludge; However, all thorium values are well within the low range of values on a national basis for POTWs as documented by ISCORS.

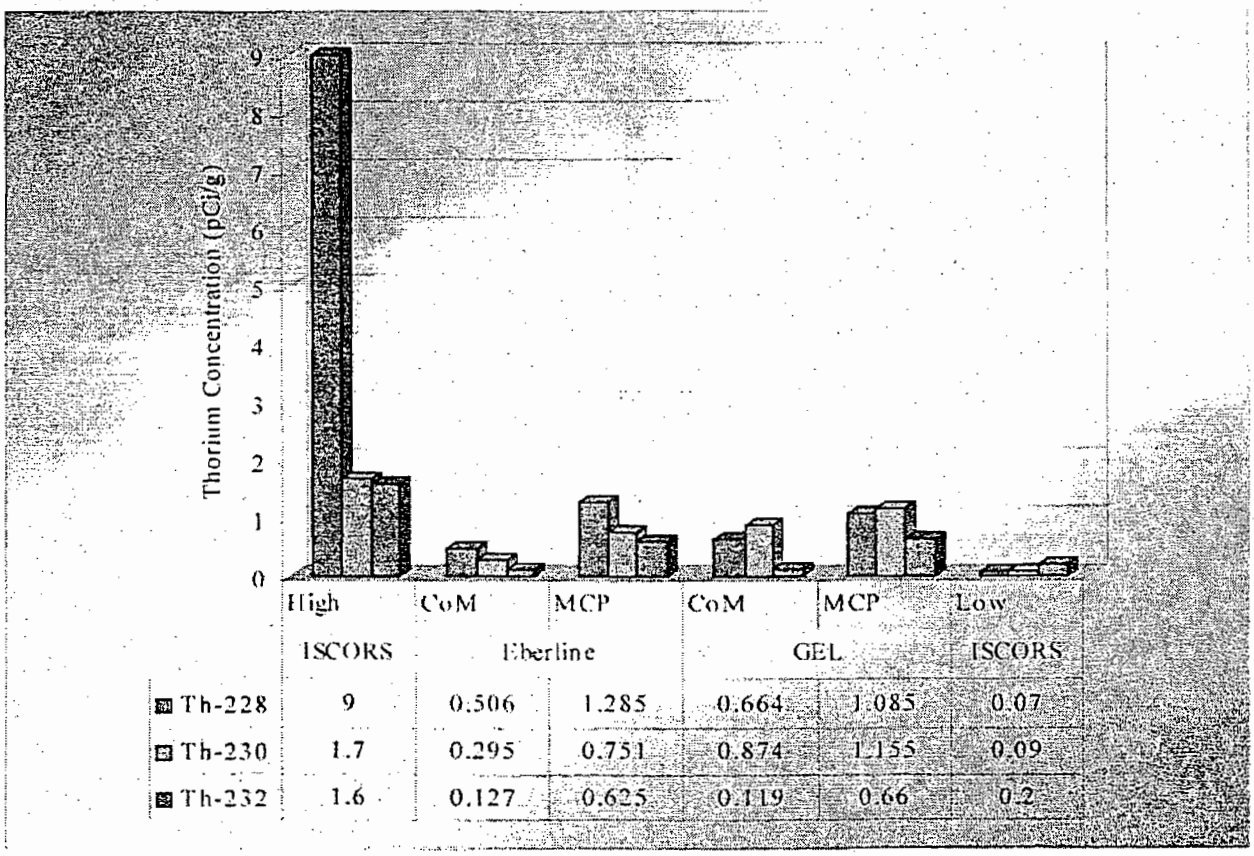

Figure 4. Graphical comparison of thorium isotopic values for MCP and CoM as compared to ISCORS low and high values.

At.2 P.11

Tritium (H-3)

Table 5. Results of tritium analyses by beta liquid scintillation counting (LSC).

Radioisotope	OEPA/Eberline Laboratory			CH2MHILL/GEL Laboratory			ISCORS	ISCORS
	CoM	MCP/1	MCP/2	CoM	MCP/1	MCP/2	Median	Range
	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
H-3	0.051	1.59	14.14	<0.010	0.254	0.24	0.3	nd - 8

Table 5 contains all tritium values for MCP and CoM sludges from analyses conducted at Eberline and GEL laboratories. The data are extracted from Attachment B, "Summary Table of All Analyses for Radionuclides in Sludge". Table 5 also contains ISCORS median values and the range in concentrations for tritium from the ISCORS suvey. Figure 5 illustrates the results for tritium analysis. All MCP and CoM values have been converted to a wet weight basis to allow for comparison to ISCORS values. The high tritium value for MCP sludge by Eberline laboratory is derived from an average of two values (1.59 and 14.14 pCi/g). The MCP/2 sample value (14.14 pCi/g) by Eberline analysis is extremely high and may well be an anomaly. All other tritium values for MCP and CoM sludge are well within the low range of values on a national basis for POTWs as documented by ISCORS.

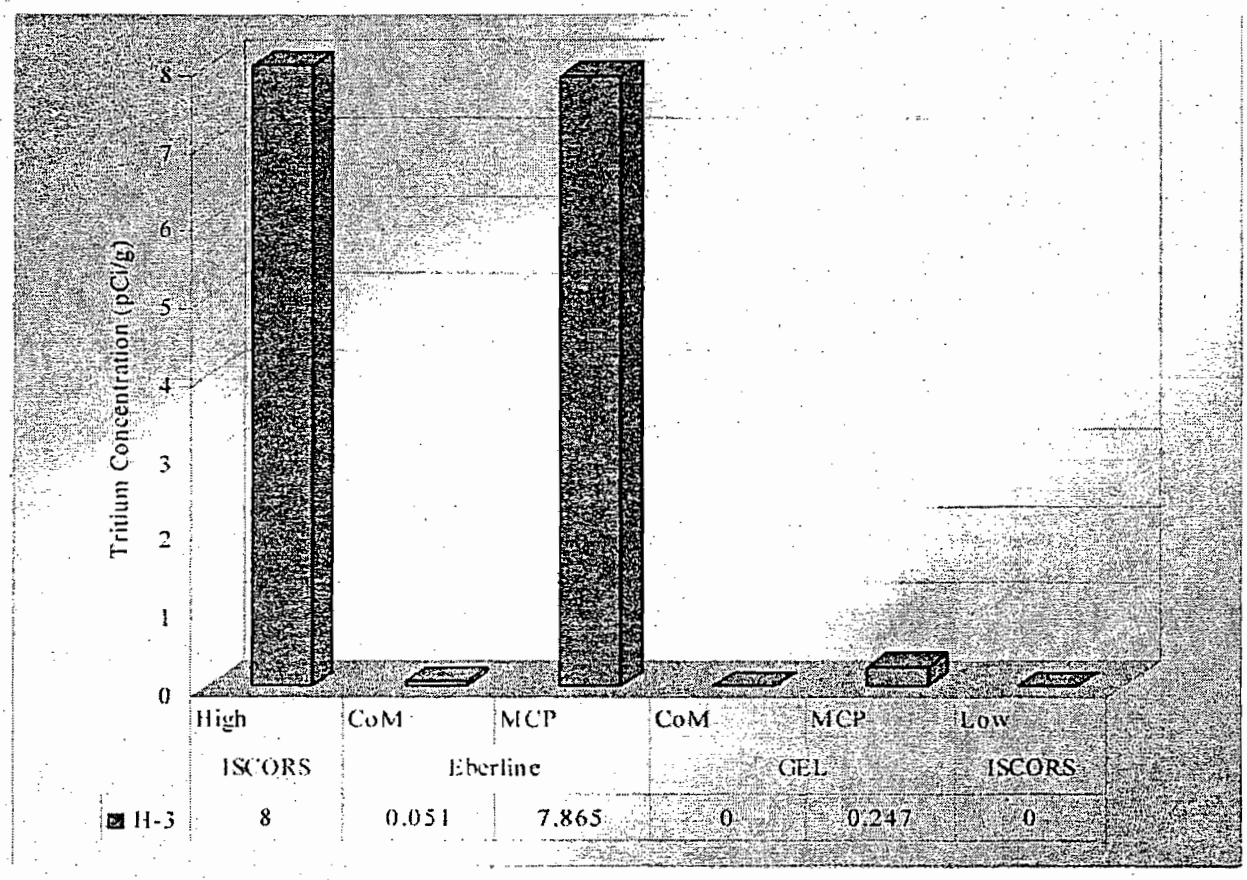

Figure 5. Graphical comparison of tritium values for MCP and CoM as compared to ISCORS low and high values.

At. 2 P-12

Americium (Am-241)

Table 6. Results of americium analyses by alpha spectroscopy.

Radioisotope	OEPA/Eberline Laboratory			CH2MHILL/GEL Laboratory			ISCORS	ISCORS
	CoM	MCP/1	MCP/2	CoM	MCP/1	MCP/2	Median	Range
	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Am-241	< 0.006	0.118	0.117	0.034	0.184	0.089	nd	nd - 2.5

Table 6 contains all americium values for MCP and CoM sludges from analyses conducted at Eberline and GEL laboratories. The data are extracted from Attachment B, "Summary Table of All Analyses for Radionuclides in Sludge". Table 6 also contains ISCORS median values and the range in concentrations for americium from the ISCORS suvey. Figure 6 illustrates the results for americium analysis. Americium values for MCP sludge are slightly higher than for the CoM sludge but fall well within the low-end range of values on a national basis for POTWs as documented by ISCORS.

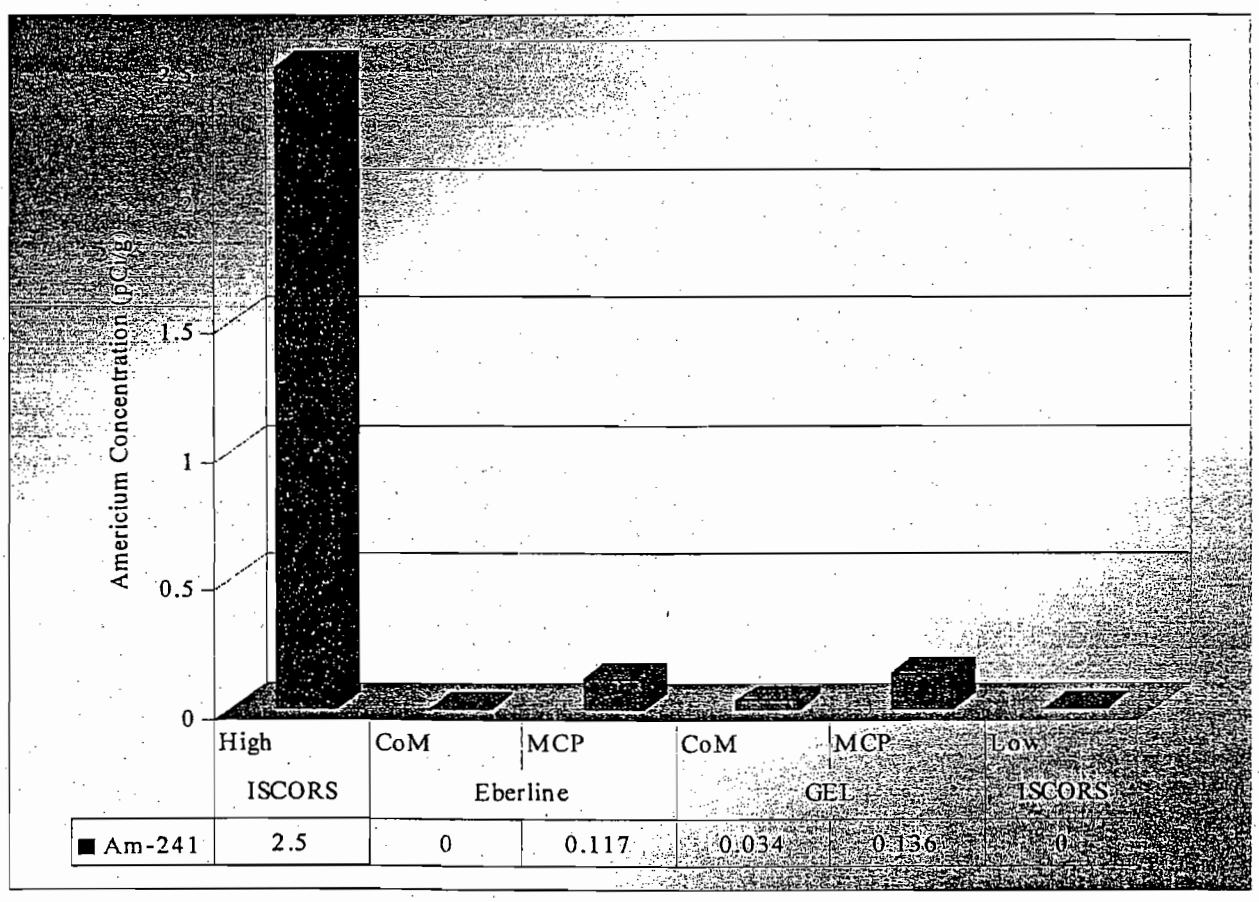

Figure 6. Graphical comparison of amercium values for MCP and CoM as compared to ISCORS low and high values.

At. 2 P. 13

Actinium (Ac-227)

Table 7. Results of actinium analyses by gamma and alpha spectroscopy.

Radioisotope	OEPA/Eberline Laboratory			CH2MHILL/GEL Laboratory			ISCORS	ISCORS
	CoM	MCP/1	MCP/2	CoM	MCP/1	MCP/2	Median	Range
	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Ac/Th-227	1.98	1.21	0.534	0.013	0.016	0.013	nd	nd - 0.5

Table 7 contains all actinium values for MCP and CoM sludges from analyses conducted at Eberline and GEL laboratories. The data are extracted from Attachment B, "Summary Table of All Analyses for Radionuclides in Sludge". Table 7 also contains ISCORS median values and the range in concentrations for actinium from the ISCORS suvey. Figure 7 illustrates Eberline analysis for Th-227 (gamma) and GEL analysis of Ac-227 (alpha). Eberline analyzed for Th-227 and reported it as Ac-227 since they are in equilibrium. Figure 7 shows higher values for EPA/Eberline analysis. However, the "counting uncertainty" and the "total propagation of uncertainty" are plus or minus approximately 60 percent of that value. It should also be noted that alpha spectroscopy used by GEL is a more accurate method of analysis. The CH2M HILL values for MCP sludge and the CoM sludge are similar and fall well within the low-end range of values on a national basis for POTWs as documented by ISCORS ISCORS values are identified in Table 1 as Th-227.

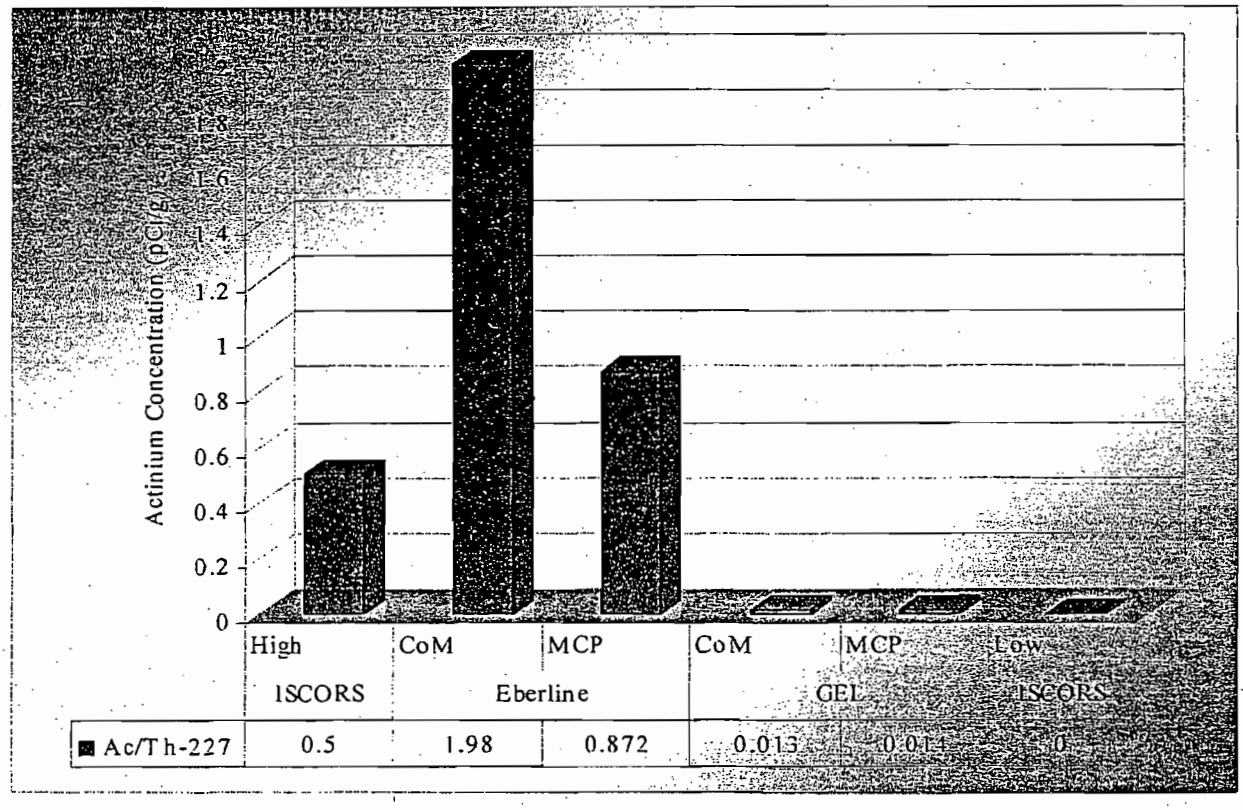

Figure 7. Graphical comparison of actinium values for MCP and CoM as compared to ISCORS low and high values.

At. 2 P. 14

Lead Isotopes
(Pb-210, Pb-212, Pb-214)

Table 8. Results of lead analyses by gamma spectroscopy.

Radioisotope	OEPA/Eberline Laboratory			CH2MHILL/GEL Laboratory			ISCORS	ISCORS
	CoM	MCP/1	MCP/2	CoM	MCP/1	MCP/2	Median	Range
	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Pb-210	na	na	na	<16.9	2.04	1.15	nd	nd - 13
Pb-212	<0.16	0.792	0.706	na	na	na	0.44	nd - 15
Pb-214	3.24	1.73	1.7	na	na	na	0.31	.06 - 17

Table 8 contains all lead isotopic values for MCP and CoM sludges from analyses conducted at Eberline and GEL laboratories. The data are extracted from Attachment B, "Summary Table of All Analyses for Radionuclides in Sludge". Table 8 also contains ISCORS median values and the range in concentrations for isotopic lead from the ISCORS suvey. EPA/Eberline analyses for Pb-210 was not available (na) at the time of this report. Figure 8 illustrates Pb-210 analysis for the MCP and the CoM by GEL and that values are well within the low range of values on a national basis for POTWs as documented by ISCORS. Figure 8 also illustrates Pb-212 and Pb-214 analysis by Eberline for the MCP and the CoM and that all values are well within the low range of values on a national basis for POTWs.

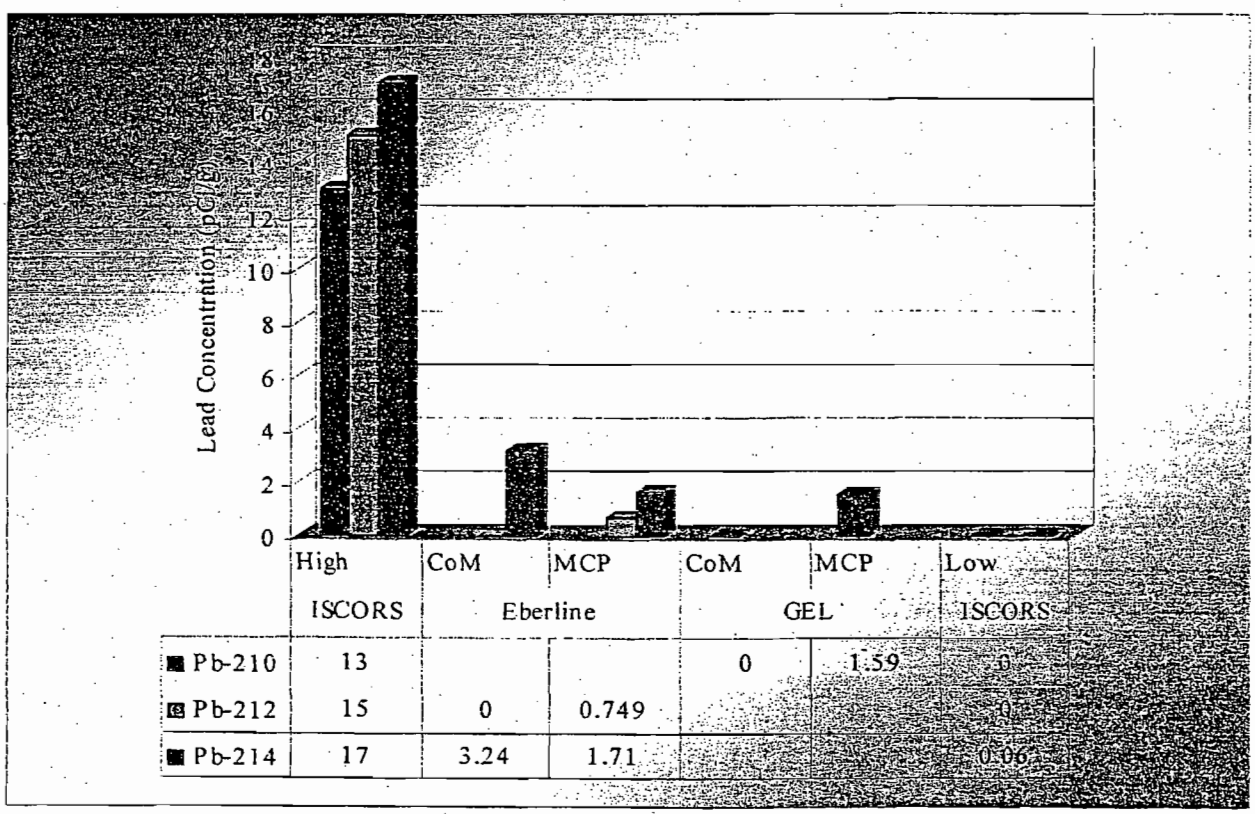

Figure 8. Graphical comparison of isotopic lead values for MCP and CoM as compared to ISCORS low and high values.

At.2 P.15

Radium Isotopes
(Ra-226, Ra-228)

Table 9. Results of isotopic radium analyses by gamma spectroscopy.

Radioisotope	OEPA/Eberline Laboratory			CH2MHILL/GEL Laboratory			ISCORS	ISCORS
	CoM	MCP/1	MCP/2	CoM	MCP/1	MCP/2	Median	Range
	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Ra-226	3.08	1.58	1.65	3.15	1.96	1.09	2	nd - 47
Ra-228	na	na	na	0.601	1.54	0.501	0.82	.14 - 38

Table 9 contains all radium isotopic values for MCP and CoM sludges from analyses conducted at Eberline and GEL laboratories. The data are extracted from Attachment B, "Summary Table of All Analyses for Radionuclides in Sludge". Table 9 also contains ISCORS median values and the range in concentrations for isotopic radium from the ISCORS suvey. EPA/Eberline Ra-228 analysis was not available (na) at the time of this report. Figure 9 illustrates radium analysis for the MCP and CoM and show that values for MCP and CoM sludges are well within the low-end range of values on a national basis for POTWs as documented by ISCORS.

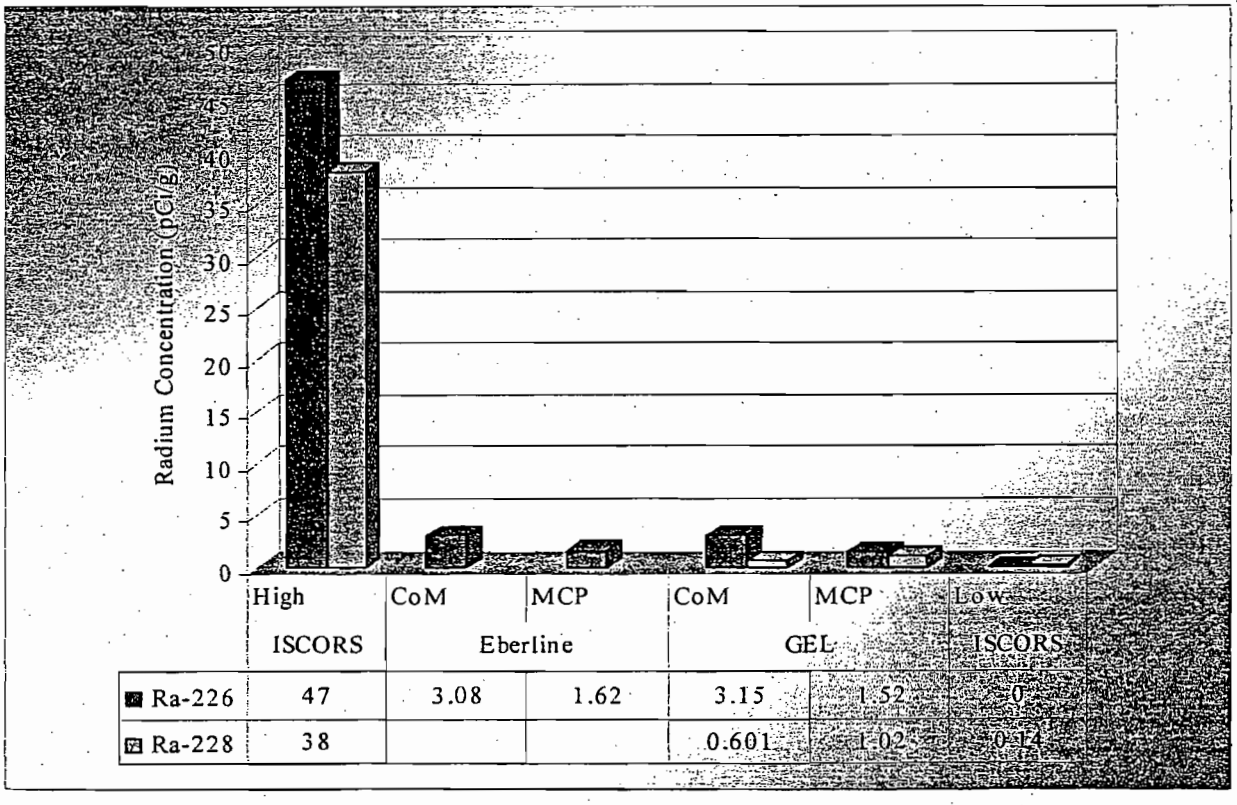

Figure 8. Graphical comparison of isotopic radium values for MCP and CoM as compared to ISCORS low and high values.

At. 2 P. 16

Cesium Isotopes (Cs-137)

Table 10. Results of cesium analyses by gamma spectroscopy.

Radioisotope	OEPA/Eberline Laboratory			CH2MHILL/GEL Laboratory			ISCORS	ISCORS
	CoM	MCP/1	MCP/2	CoM	MCP/1	MCP/2	Median	Range
	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Cs-137	<0.096	0.095	0.149	<0.058	<0.088	< MDC	nd	nd - 3.6

Table 10 contains all cesium values for MCP and CoM sludges from analyses conducted at Eberline and GEL laboratories. The data are extracted from Attachment B, "Summary Table of All Analyses for Radionuclides in Sludge". Table 10 also contains ISCORS median values and the range in concentrations for cesium from the ISCORS suvey. Figure 10 illustrates the results for cesium analysis. All cesium values for MCP and CoM sludge are well within the low-end range of values on a national basis for POTWs as documented by ISCORS.

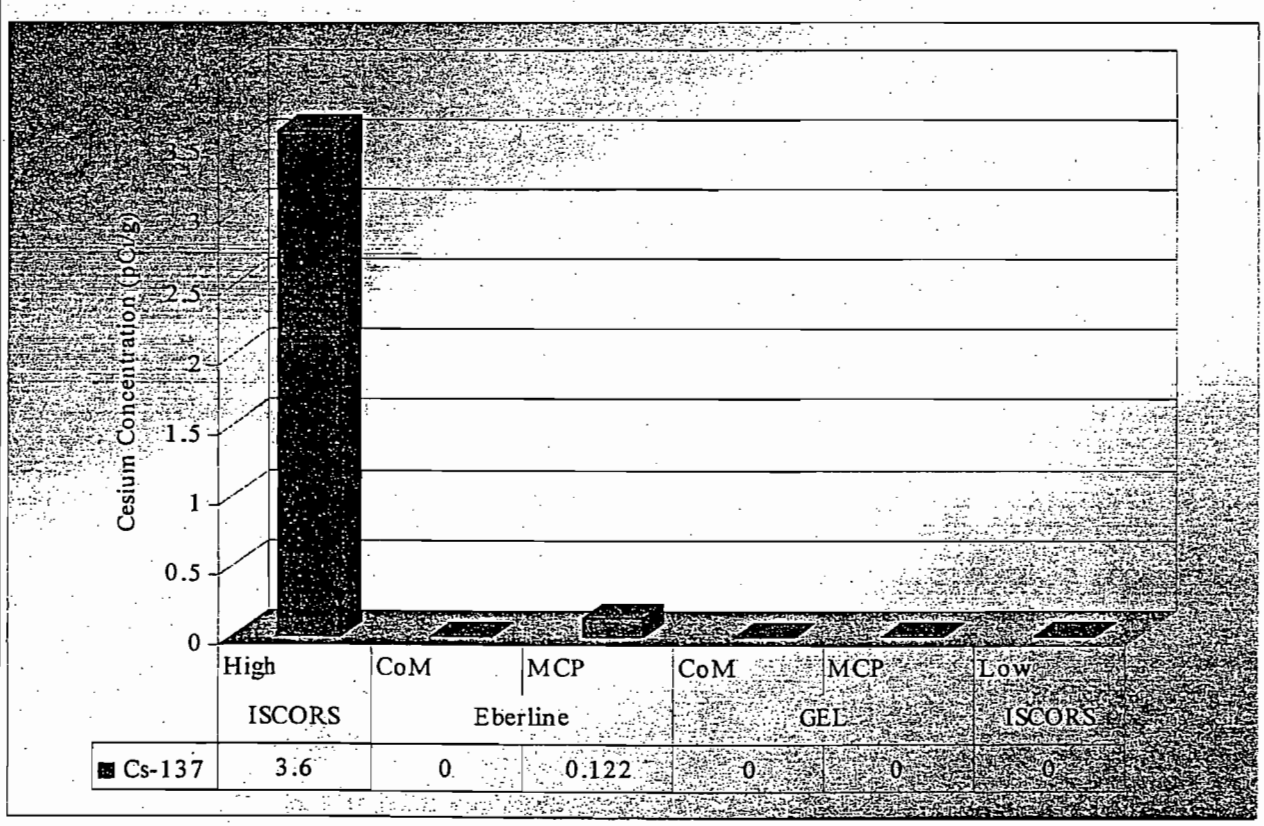

Figure 10. Graphical comparison of cesium values for MCP and CoM as compared to ISCORS low and high values.

At. 2 P.17

Cobalt Isotopes (Co-60)

Table 11. Results of cobalt analyses by gamma spectroscopy.

Radioisotope	OEPA/Eberline Laboratory			CH2MHILL/GEL Laboratory			ISCORS	ISCORS
	CoM	MCP/1	MCP/2	CoM	MCP/1	MCP/2	Median	Range
	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Co-60	< 0.115	< 0.092	< 0.099	<0.057	< 0.07	<MDC	nd	nd - 5.1

Table 11 contains all cobalt values for MCP and CoM sludges from analyses conducted at Eberline and GEL laboratories. The data are extracted from Attachment B, "Summary Table of All Analyses for Radionuclides in Sludge". Table 11 also contains ISCORS median values and the range in concentrations for cobalt from the ISCORS suvey. Figure 11 illustrates the results for cesium analysis. All cobalt values for MCP and CoM sludge are well within the low-end range of values on a national basis for POTWs as documented by ISCORS.

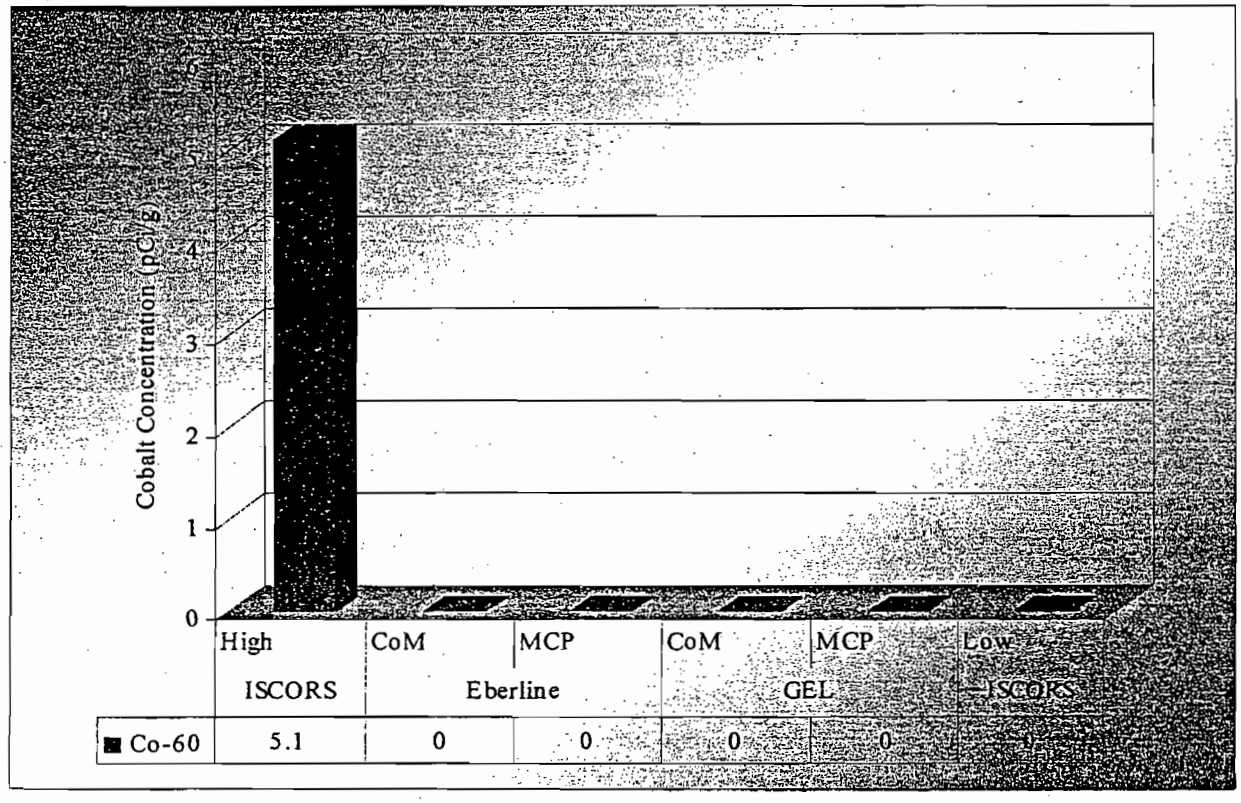

Figure 11. Graphical comparison of colbalt values for MCP and CoM as compared to ISCORS low and high values.

At.2 P.18

Data Review for Influent and Effluent Water Samples

This section of the report summarizes the radiological data for MCP influent samples and CoM influent and effluent samples sent to EPA/Eberline and /GEL laboratories. Table 12 is a compilation of the analytical data for MCP influent and CoM influent and effluent. Cells in Table 12 containing "na" indicate that no analysis was preformed. Data values showing a less than (<) sign should be interpreted as a value that is less than MDC for that analyte. Influent and effluent data in Table 12 do not lend themselves to valid statistical analysis.

Table 12. Influent and Effluent Water Analyses for the CoM and the MCP.

Analysis	Radionuclide	EPA/Eberline			CH2M HILLGEL		
		MCP	CoM		MCP	CoM	
		Influent	Influent	Effluent	Influent	Influent	Effluent
		pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L
alpha	Am-241	< 0.02	0.003	0.003	< 0.099	< 0.084	< 0.07
alpha	Ac/Th-227	< 22.6	< 35.2	< 33.3	0.025	< 0.021	0.03
gamma	Ac-228	< 23.2	< 35.4	< 33.9	na	na	na
gamma	Bi-212	< 27.9	< 41.1	< 40.8	na	na	na
gamma	Bi-214	8.38	< 16.7	< 15.5	na	na	na
gamma	Co-60	< 3.17	< 6.26	< 6.36	< 6.37	< 7.74	< 6.48
gamma	Cs-137	< 5.28	6.76	2.75	< 6.86	< 6.22	< 7.14
gamma	K-40	< 129	< 189	< 188	na	na	na
gamma	Pa-234	< 706	< 1290	< 1310	na	na	na
GPC	Pb-210	na	na	na	< 1.84	< 1.84	< 1.96
gamma	Pb-212	< 7.16	< 11.3	<11.1	na	na	na
gamma	Pb-214	< 12.2	< 18.7	< 18.5	na	na	na
gamma	Th-230	< 0.061	< 0.049	< 0.023	0.806	0.567	0.504
gamma	Th-234	0.412	0.714	0.61	0.315	0.623	0.487
gamma	Tl-208	< 5.82	< 8.34	< 8.09	na	na	na
LSC	H-3	2030	587	606	345	< 131	< 131
alpha	Po-210	< 0.476	< 0.276	< 0.146	na	na	na
alpha	Pu-238	0.079	< 0.030	< .019	0.3	< 0.100	< 0.102
alpha	Pu-239/240	< 0.021	< 0.045	< 0.02	0.123	0.191	0.248
GPC	Ra-226	< 0.221	0.438	0.429	< 0.701	< 0.724	< 1.03
GPC	Ra-228	na	na	na	< 1.01	< 1.12	< 2.26
alpha	Th-228	< 0.073	< 0.058	< 0.087	0.178	0.278	0.55
alpha	Th-230	< 0.061	0.091	0.026	0.806	0.557	0.504
alpha	Th-232	< 0.041	0.036	< 0.039	< 0.021	0.025	< 0.022
alpha	U-234	0.421	0.714	0.61	0.315	0.623	0.487
alpha	U-235	0.046	< 0.018	< 0.017	0.043	0.084	< 0.032
alpha	U-238	0.326	0.535	0.477	0.209	0.508	0.494

At.2 P.19

The ISCORS identified no national values for radionuclides in influent or effluent for POTWs. The only comparison that can be made as to whether values are high or low relative to the concentration of a radionuclide in the influent/effluent is to either compare them to EPA standards for drinking water or to NPDES permit requirements. In 1976 EPA promulgated drinking water regulations for several radionuclides. In 1991, EPA proposed revisions to the current radionuclides (i.e., beta and photon emitters, Ra-226 and Ra-228, and gross alpha radiation) and proposed regulations for uranium. The current standards are: combined radium 226/228 of 5 pCi/L; a gross alpha standard for all alphas of 15 pCi/L, not including radon and uranium; a combined standard of 4 mrem/year for beta emitters. The new MCL for uranium is 30 μg/L.

Data in Table 12 show little differences in the levels of radionuclides between MCP and CoM influent water samples. Even tritium results are well below the EPA drinking water standard of 20,000 pCi/L.

Data Review for Inorganic and Organic Analytes

Table 13 in this section of the report summarizes the inorganic (non-radiological metals) and organic analytical data for MCP and CoM sludge and influent samples sent to Eberline and GEL laboratories. In addition, Table 13 also provides some of the physical data for sludge and influent for both the MCP and CoM (e.g., total solids, suspended solids and oil/grease).

Inorganic analytical results show that only copper may be significanly higher in MCP sludge and influent than for the CoM sludge and influent. The data show that the copper level in MCP sludge is approximately 4.5 to 5 time higher than in the CoM sludge. Influent data indicates that copper is approximately 3 to 4 times higher in MCP influent that the CoM influent.

Table 13. Inorganic and Organic Analyses of MCP and CoM Sludge and Influent

Analyte	OEPA / Eberlline Laboratory				CH2M HILL / GEL Laboratory					
	Sludge		Influent		Sludge			Influent		
	MCP	CoM	MCP	CoM	MCP/1	MCP/2	CoM	MCP/1	MCP/2	CoM
	mg/kg	mg/kg	ug/L	ug/L	mg/kg	mg/kg	mg/kg	ug/L	ug/L	ug/L
Arsenic	na	na	na	na	< 5.08	< MDC	< 10.6	na	na	na
Barium	533	1140	49.6	211	na	na	na	49.5	49.9	182
Cadmium	1.9	2.5	0.29	0.26	1.87	1.95	2.66	< 0.11	< 0.11	0.22
Chromium	80	54	1.9	3.9	na	na	na	3.05	2.59	4.37
Chromium IV	na	na	< 0.01	na	na	na	na	0.0087	0.01	0.0054
Copper	4540	1180	402	125	5180	4550	982	378	382	88.7
Lead	70.8	46	5.5	4.1	78.9	65.2	46.8	6.9	6.46	10.1
Mercury	2.7	2.5	0.28	0.4	1.9	2.17	2.27	0.213	0.307	0.166
Molybdenum	na	na	na	na	14.5	11.7	33.2	na	na	na
Nickel	41.6	17.6	3.9	2.8	50.2	38.9	36.8	5.71	4.88	4.16
Selenum	na	na	na	na	10.8	7.33	13.9	na	na	na
Strontium	218	385	272	837	na	na	na	263	263	773
Zinc	850	966	116	130	951	791	837	114	118	99.2
pH	5.6	7.7	8.2	7.7	5.17	na	7.62	8.34	na	na
Gamma-BHC (Lindane)	na	na	< 0.02	< 0.03	na		na	< 0.0064	na	< 0.0065
Dieldrin	na	na	0.02	0.03	na		na	< 0.0081	0.0082	< 0.0082
	mg/kg	mg/kg	mg/L	mg/L	mg/kg		mg/kg	mg/L	mg/L	mg/L
Nitrate/Nitrite	160	520	3	0.38	na		na	13	12.5	0.558
Nitrogen, Ammonia (as N	31	3400	14.1	21	41.9		3310	14.8	14.8	24.4
Nitrogen, Total Kjeldahl	4350	25000	29	35	28100		28700	32.3	91.7	90.6
Phosphorus, Total (as P)	1300	2400	4.6	6.4	13500		26800	4.69	4.66	6.13
Total Suspended Solids	150	420	180	na	na		na	193	na	231
Total Dissolved Solids	na	na	3900	na	na		na	1020	na	1050
Oil & Grease	na	na	41	46	na		na	24.2	na	17.9

na denotes that no data is available

At-2 P.22

Conclusions

The results of the radionuclide analyses indicated that the MCP had concentrations of plutonium (specifically Pu-238) in their sludge that was in excess of the CoM sludge values. Analyses by both Eberline and GEL laboratories were in agreement with Pu-238 concentrations at 15.5 and 15.8 picocuries per gram(pCi/g), respectively. These values were also in excess of the ISCORS 'high' value of 0.19 pCi/g. The concentration of Pu-239 in MCP sludge was 0.224 pCi/g , which is also slightly higher than the CoM and ISCORS "high" values. The concentration of Pu-238 in MCP influent ranged between 0.079 and 0.3 pCi/L, while CoM influent had no detectable Pu-238.

Tritium was another radionuclide with potentially elevated concentrations in MCP sludge. It is difficult to conclude this based on the discrepancy between laboratory results. Both laboratories ran duplicates on sludge analyses. Eberline results showed 1.59 and 14.14 pCi/g, while GEL results showed 0.54 and 0.24 pCi/g. Given the difficulty in explaining the 14.14 pCi/g value without further analysis, results in the conclusion that the value may certainly be an anomaly. The other three values are in the low range for national averages among POTWs as documented by ISCORS.

Actinium was another radionuclide that showed discrepancy between the two laboratories' results. Eberline results showed actinium concentrations for both MCP (0.872 pCi/g) and CoM (1.98 pCi/g) sludges above ISCORS high value of 0.5 pCi/g. However GEL results showed MCP (0.014 pCi/g) and CoM (0.013 pCi/g) sludges at the low range for national averages among POTWs. One potential source for the discrepancy is that Eberline analyzed for Th-227 by gamma spectroscopy and reported it as Ac-227 noting that they are in equilibrium. Whereas, GEL performed Ac-227 analysis by alpha spectroscopy. It should also be noted that alpha spectroscopy is a more accurate method of analysis.

Inorganic analytical results show that only copper may be significantly higher in MCP sludge and influent as compared to the CoM sludge and influent. The data show that the copper level in MCP sludge is approximately 4.5 to 5 time higher than in the CoM sludge. Influent data indicates that copper is approximately 3 to 4 times higher in MCP influent than the CoM influent.

At. 2 P. 23

References

1. U. S. DOE, 2003. *Technical Assistance – Value Management Study Related to Transferring the Miamisburg Closure Project Sanitary Sewer Collection System and Wastewater to the City of Miamisburg.* September 23-25, 2003. Issued October 21, 2003.

2. ISCORS Technical Report 2003-02, *ISCORS Assessment of Radioactivity in Sewage sludge: Radiological Survey Results and Analysis.* NUREG-1775, EPA 832-R-03-002, DOE/EH-0669.

3. ISCORS Technical Report 2003-04, *ISCORS Assessment of Radioactivity in Sewage sludge: Recommendations on Management of Radioactive Materials in Sewage Sludge and Ash at Publicly Owned Treatment Works.* EPA 832-R-03-002B, DOE/EH-0668.

4. ISCORS Technical Report 2003-03, *ISCORS Assessment of Radioactivity in Sewage sludge: Modeling to Assess Radiation Doses.* NUREG-1783, EPA 832-R-03-002A, DOE/EH-0670.

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Attachments
A - E

Attachment A
SD Plant Sewage Characterization Sample and Analysis Plan

SD Plant Sewage Characterization Sample and Analysis Plan

INTRODUCTION

This Sample and Analysis Plan (SAP) is designed to characterize Mound's Sanitary Disposal (SD) plant's influent and solidified sludge in anticipation of turning Mound's sanitary waste system over to the city of Miamisburg.

The SD Plant performs treatment on sanitary sewage generated at Mound. After treatment the water portion is released through a NPDES licensed outfall. The solid sludge component is de-watered on an outdoor drying bed. In the past this sludge was disposed of in at Envirocare and was characterized with respect to the Resource Conservation and Recovery Act (RCRA). The current characterization is directed towards fulfilling the city of Miamisburg's discharge and sludge disposal permit. In addition samples will be collected from sanitary influent, effluent and sludge bed at Miamisburg's treatment plant.

The Sample Management Office will collect time proportional samples of Mound's influent flow. A sludge sample will be collected from the SD drying bed. Samples of the city's influent, effluent and sludge will be collected in coordination with the city's staff within the same time frame. The samples will be analyzed at a contract.

DATA QUALITY OBJECTIVES (DQOs)

Problem Statement

The purpose of this sampling is to characterize Mound's sanitary sewage to identify what if any impact it will have on the Miamisburg treatment plant process.

Time proportional composite sampling will be used to obtain a representative sample of the influent. The sludge drying bed, which contains sludge accumulated over several months, will be subdivided. Samples collected from each subdivision will be mixed and composited into one sample.

Identification of the Decision

The alternate actions that could from the result from the measured concentrations obtained by this SAP are:

1. The SD influent and sludge characteristics could indicate no significant impact on the Miamisburg treatment facility, or
2. The SD influent and sludge could exhibit characteristics requiring further treatment or modification to the Mound system before connection to the Miamisburg treatment facility.

Inputs to the Decision

The decision on whether SD influent is compatible with the Miamisburg treatment facility will be based on process knowledge together with the analytical results generated by this SAP. The analyses have been selected based upon the current requirements of Miamisburg's permit and the concerns over the possible radioactive content of Mound's influent. The following analyses will be performed on the influent and sludge.

Table 1. Influent Analyses

Analyte	Method	Matrix
Temperature	Field	Wastewater
Residue, Total Dissolved	EPA 160.1	Wastewater
Solids, Total Suspended	EPA 160.2	Wastewater
Oil & Grease	EPA 413.1	Wastewater (G)
Nitrogen, Ammonia	EPA 350.1	Wastewater
Nitrogen, Kjeldahl, Total	EPA 351.2	Wastewater
Nitrate/Nitrite	EPA 353.2	Wastewater
Phosphorus, Total	EPA 365.4	Wastewater
Cyanide, Free	SM 4500-CN	Wastewater (G)
Total Metals (Ba, Ni, Sr, Zn, Pb, Cd, Cr,Cu)	EPA 200.7 or 6010B	Wastewater
Chromium, Dissolved Hexavalent	7196A	Wastewater (G)
Mercury	EPA 245.1 or 7470A	Wastewater
Lindane and Dieldrin	EPA 608 or 8081	Wastewater
pH	Field	Wastewater
Fecal Coliform		Wastewater (G)
CBOD		Wastewater
Tritium	EPA 906.0	Wastewater
Isotopic Thorium (Ac-227, Th-230, Th-232)	Alpha Spectrometry	Wastewater
Americium-241	Alpha Spectrometry	Wastewater
Radium-226 and Daughters	Proportional Counting (EPA 903.0)	Wastewater
Radium-228	Proportional Counting	Wastewater
Isotopic Plutonium (Pu-238, Pu-239/240)	Alpha Spectrometry	Wastewater
Isotopic Uranium (U-233/234, U-235, U-238)	Alpha Spectrometry	Wastewater
Lead-210	Proportional Counting	Wastewater
Cs-137 + Daughters, Pb-210, and Co-60	Gamma Spectrometry	Wastewater

Table 2. Sludge Analyses

Analyte	Method	Matrix
pH	EPA 9045	Sludge
Ammonia (NH_3)	350.1	Sludge
Nitrogen, Kjeldahl, Total	351.2	Sludge
Phosphorus, Total	EPA 365.4 (modified)	Sludge
Total Metals (As, Cd, Cu, Pb, Ni, Zn, Se, Mo)	EPA 6010B	Sludge
Mercury	EPA 7471A	Sludge
Total Percent Solids	EPA 3550B	Sludge
Total Volatile Solids	SM 2540E	Sludge
Tritium	EPA 906.0	Sludge
Isotopic Thorium (Ac-227, Th-230, Th-232)	Alpha Spectrometry	Sludge
Americium-241	Alpha Spectrometry	Sludge
Isotopic Plutonium (Pu-238, Pu-239/240)	Alpha Spectrometry	Sludge
Isotopic Uranium (U-233/234, U-235, U-238)		Sludge
Cs-137 + Daughters, Ra-226 + Daughters, Pb-210, Ra-228, and Co-60	Gamma Spectrometry	Sludge

Study Boundaries

This SAP covers the collection of Mound SD influent and sludge expected to be collected in October 2003 prior to the flushing of the Mound sewer system.

SAMPLE COLLECTION DESIGN

A very simple sample collection design is to be employed in keeping with the characterization nature of this SAP.

A time proportional sample collector will be installed where the SD influent enters the "grit" chamber prior to any treatment process. Influent samples will be collected over approximately 24 hours of sufficient quantity to ensure that sufficient sample is composited for all samples except those marked with "(G)" for grab samples in Table 1 above. The grab samples will be collected at the end of the continuous sampling.

Sludge samples will be collected roughly proportional octants of the drying bed. Once all the samples have been collected they will be blended together into one composite.

A similar process will be used to collect samples at the city's treatment facility within the same timeframe.

OPERATIONAL DETAILS

Location of samples to be collected.

Samples are to be collected at the SD Plant. Splitting and bottling of the influent samples will take place there. Temperature and pH of the influent will be measured in the field. Blending and bottling of the sludge composite sample will also take place there. Influent, effluent, and sludge samples will also be collected at the city's treatment facility.

Mound and Miamisburg samples will be transported to GEL of Ohio for analysis except for Fecal Coliform and CBOD which will be performed at Testamerica.

Select the quantity of material to be collected for each sample

Ten, approximately 500 ml, samples will be time proportionally collected for the composite influent samples. From the composited material the following samples will be amassed.

Table 3. Influent Sample Container Size

Analyte/Characteristic	Minimum Required Sample Size[1] (ml)
Residue, Total Dissolved	****125 mL, plastic unpreserved
Solids, Total Suspended	
Oil and Grease,	1 Liter amber glass, pH <2, H2SO4
Nitrogen, Ammonia (NH_3)	*125 mL plastic, pH <2, H_2SO_4
Nitrogen, Kjeldahl, Total	
Nitrite plus Nitrate	
Phosphorus, Total	
Cyanide, Free	125 mL plastic, pH >12, NaOH
Barium, Total Recoverable	250 mL
Nickel, Total Recoverable	**250 mL plastic, pH <2, HNO_3
Strontium, Total Recoverable	
Zinc, Total Recoverable	
Cadmium, Total Recoverable	
Lead, Total Recoverable	
Chromium, Total Recoverable	
Copper, Total Recoverable	
Mercury, total (Low-Level)	
Chromium, Dissolved Hexavalent	500 mL plastic, unpreserved
Fecal Coliform	100 ml amber glass
? -BHC, Total	***1 Liter amber glass
Dieldrin, Whole Sample	
pH	100 ml amber glass
CBOD 5 day	
Tritium	1 Liter glass, unpreserved
Ac-227, Am-241, Pu, Th, and U	1 Liter plastic, pH <2, HNO_3
Cs-137 + D, Co-60, and Pb-210	1 Liter plastic, pH <2, HNO_3
Pb-210 + D	1 Liter plastic, pH <2, HNO_3
Ra-226 + D	1 Liter plastic, pH <2, HNO_3
Ra-228	1 Liter plastic, pH <2, HNO_3

Table 4. Sludge Sample Container Size

pH	8 oz glass jar
Ammonia (NH_3)	
Nitrogen, Kjeldahl, Total	
Phosphorus, Total	
Arsenic, Total	
Cadmium, Total	
Copper, Total	
Lead, Total	
Nickel, Total	
Zinc, Total	
Selenium, Total	
Mercury, Total	
Molybdenum, Total	
Sludge Solids, Percent Total	
Sludge Solids, Percent Volatile	
Tritium	4 oz. glass jar
Ac-227, Am-241, Pu, Th, U	32 oz plastic
Cs-137 + D, Co-60, Pb-210 + D, Ra-226 + D, Ra-228	

Sample Identification Protocol.

The samples will be identified as MDSD-mmddyy-N, where:

- MM is the sampling month
- DD is the sampling day
- YY is the last two digits of the sampling year
- N = "1" and "2" for the duplicate samples

SAMPLING PROCEDURES AND EQUIPMENT

Field Sampling Procedures

The following methods from the Mound Methods Compendium, MD-80045 will be used for the indicated operations.

Table 5. Standard Operating Procedures

SOP #	Title	Exceptions
S-001	General Instructions to Field Personnel	
S-020	General Equipment Decontamination	
S-028	Sample Control and Documentation	
S-029	Guide to the Handling, Packaging, and Shipping of Samples	
S-036	Soil Sampling for Disposal Characterization	Replace "Soil" references with "Sludge"
Q-002	Chain-of-Custody Procedures	
Q-003	Documentation Requirements	

Attachment B
Summary Table of All Radionuclide Analysis for Sludge

Analysis	Radioisotope	OEPA/Eberline Laboratory			CH2MHILL/Site Laboratory			ISCORS	ISCORS
		CoM	MCP/1	MCP/2	CoM	MCP/1	MCP/2	Median	Range
		pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
alpha	Am-241	< 0.006	0.118	0.117	0.034	0.184	0.089	nd	nd - 2.5
gamma	Ac/Th-227	1.98	1.21	0.534	0.013	0.016	0.013	nd	nd - 0.5
gamma	Ac-228	1.48	1.16	1.06	na	na	na		
gamma	Bi-212	0.613	0.673	0.828	na	na	na	nd	nd - 13
gamma	Bi-214	2.89	1.43	1.56	na	na	na	0.3	.04 - 16
gamma	Co-60	0.019	< 0.092	0.071	<0.057	< 0.07	<MDC	nd	nd - 5.1
gamma	Cs-137	0.051	0.095	0.149	<0.058	<0.088	< MDC	nd	nd - 3.6
gamma	K-40	-4.47	5.68	5.56	na	na	na	4	0.03 -26
gamma	Pa-234	6.4	6.24	9.95	na	na	na	nd	nd - 27
gamma	Pb-210	na	na	na	<16.9	2.04	1.15	nd	nd - 13
gamma	Pb-212	0.14	0.792	0.706	na	na	na	0.44	nd - 15
gamma	Pb-214	3.24	1.73	1.7	na	na	na	0.31	.06 - 17
gamma	Ra-226	3.08	1.58	1.65	3.15	1.96	1.09	2	nd - 47
gamma	Ra-228	na	na	na	0.601	1.54	0.501	0.82	.14 - 38
gamma	Th-227	1.98	1.21	0.534	na	na	na	nd	nd - .5
gamma	Th-228	na	na	na	0.664	1.03	1.2	0.6	.07 - 9
gamma	Th-230	-0.982	-3.08	-3.68	0.874	1.11	1.2	0.34	.09 - 1.7
gamma	Th-232	na	na	na	0.119	0.622	0.699	0.2	.02 - 1.6
gamma	Th-234	0.702	0.327	0.393	na	na	na	0.6	nd - 23
gamma	Tl-208	0.0553	0.331	0.332	na	na	na	0.07	.02 - 4.8
GPC	H-3	0.051	1.59	14.14	<0.010	0.54	0.24	0.3	nd - 8
alpha	Po-210	0.0353	1.85	1.96	na	na	na		
alpha	Pu-238	0.009	15.4	15.6	0.04	16.5	15.1	0.01	nd - .19
alpha	Pu-239	< 0.005	0.199	0.25	0.049	0.196	0.159	0.003	nd - .12
GPC	Ra-226	2.95	2.37	2.34	na	na	na	2	nd - 47
alpha	Th-228	0.506	1.32	1.25	0.664	1.03	1.14	0.605	.07 - 9
alpha	Th-230	0.295	0.751	0.751	0.874	1.11	1.2	0.34	.09 - 1.7
alpha	Th-232	0.127	0.644	0.607	0.119	0.622	0.699	0.2	.02 - 1.6
alpha	U-234	1.53	1.73	1.76	1.47	1.64	1.85	1.95	.18 - 44
alpha	U-235	0.053	0.067	0.063	0.087	< 0.02	< 0.048	nd	nd - 3.1
alpha	U-238	1.37	1.13	1.25	1.16	1.15	1.21	1.4	0.18 - 26

nd - non-detectable
na - no data available
GPC - Gas Proportional Counter

AT-2 P.34

Attachment C
Ohio EPA Data Package Final Report - Sludge

EBERLINE SERVICES

Albuquerque Laboratory
7021 Pan American Hwy. NE
Albuquerque, NM 87109
(505) 345-3461 FAX # (505) 761-5416

Ohio EPA Data Package
Final Report

CR: MOUND
PROJECT # ESW031009

SDG 0310029

Document Inventory:

Case Narrative

LIMS Report

Chain of Custody

Data Review by: Lisa Marie A. Darcie	**Date:** 12/02 /03
QC Review by: Anthony W. Toth	**Date:** 12 / 2 /03
Laboratory Manager review: Karen Schroendaller	**Date:** 12/ 2 /03

At.2 P.36

Case Narrative

Ohio EPA
Final Report
Case Narrative
Sample Delivery Group 0310029

Sample Receipt

Two sludge samples were received at the Eberline Services Albuquerque Laboratory, on 14 October 2003, for radiological analysis using standard analytical procedures.

Charges for this sample delivery group are as follows.

Analysis	Requested	Reported
Isotopic Uranium	02	02
Isotopic Plutonium	02	02
Isotopic Thorium	02	02
Tritium	02	02
Polonium 210	02	02
Americium 241	02	02
Gamma	02	02
Radium 226	02	02
Radium 228	02	00
Lead 210	02	00

Analyses for the Work Order are complete. This is Part 1 of 2 for this Chain of Custody.

Data Review

Isotopic Uranium

The blank results for U-235 and U-238 are greater than their MDCs but less than the RDL. Review of the alpha channel-by-channel data indicates there is no contamination. The spike agrees with the known value and the replicate is in agreement. The samples were counted for 1000 minutes and all MDCs are less than the required 0.1 pCi/g detection level. The reported sample data show no other anomalies.

Isotopic Plutonium

The blank results are less than their MDCs, the spike agrees with the known value, and the replicate is in agreement. The samples were counted for 1000 minutes and all MDCs are less than the required 0.1 pCi/g detection level. The reported sample data show no anomalies.

Isotopic Thorium

The blank results are below the MDCs, the spike agrees with the known value, and the replicate is in agreement. The samples were counted for 1000 minutes and all MDCs are less than the required 0.1 pCi/g detection level. The reported sample data show no anomalies.

Tritium

The samples were counted for 960 minutes to reach the required MDC of 1.0 pCi/g. Due to the extended count time, the blank result is greater than its MDC. The sample results are background corrected, not blank corrected. The spike agrees with the known value and the replicate is in agreement. The reported sample data show no other anomalies.

Polonium 210

The blank result is below the MDC, the spike agrees with the known value, and the replicate is in agreement. The samples were counted for 480 minutes and all MDCs are less than the required 0.1 pCi/g detection level. The reported sample data show no anomalies.

Americium 241

The blank result is below the MDC, the spike agrees with the known value, and the replicate is in agreement. The samples were counted for 1000 minutes and all MDCs are less than the required 0.1 pCi/g detection level. The reported sample data show no anomalies.

Gamma

Th-227 is reported for Ac-227 since they are in equilibrium. The MDC for gamma spectrometry is based on the required 0.1 pCi/g detection level for Cs137. The spike agrees with the known value and the replicate is in agreement. The MDCs for all samples were less than the required MDC for Cs137. The reported sample data show no other anomalies.

Radium 226

The blank result is below the MDC, the spike agrees with the known value, and the replicate is in agreement. The samples were counted for 50 minutes using the largest aliquot possible. The sample MDCs are less than the required 0.1 pCi/g detection level. The reported sample data show no anomalies.

Ohio EPA
Final Report
Case Narrative
Sample Delivery Group 0310029

Lead 210

No final results for Pb-210 are available. The samples are being reanalyzed due to the initial results failing the duplicate quality control acceptance criteria. Due to the long ingrowth for lead, no final results were available at this time.

Radium 228

No final results for Ra-228 are available. The gas proportional counter failed continuing calibration specifications and has been placed on "HOLD" while the cause is under investigation. Several possibilities exist: guard failure, power supply failure, pre-amp failure. Results will become available when the GPC is restored to operating status.

At. 2 P. 40

LIMS Report

At-2 P.41

EBERLINE SERVICES

Sample Data Report

Albuquerque Laboratory
7021 Pan American Fwy NE
Albuquerque, NM 87109
(505) 345-3461
www.eberlineservices.com

Client ID >>	MPOTWS MIAMISBURG		
Internal ID >>	03-10029-04		
Date Received >>	10/14/03	Sample Date >>	10/09/03 10:00
Matrix >>	Sludge		
Volume/Weight >>	1603	Eberline SDG >>	03-10029
Vol/Wt Units >>	g	Sample Type >>	TRG

Report to
Mr. Rex Brown
OHIO EPA
Ohio Epa/Swdo
401 E. Fifth St.
Dayton, OH 45402

Contract / PO Information
FED. I.D. #59-3328623
Environmental
Final Report
Rpt Level: 2

Internal Analysis Code	Analysis Technique	Analyte	Analysis Date	Result	Rpt. Units	CU	TPU	MDC	RDL	Qualifier Codes
Am241	Alpha Spectroscopy	AM-241	11/14/03	-5.25E-04	pCi/g	2.20E-03	2.20E-03	6.68E-03	1.00E-01	U
Gamma	Gamma Spectroscopy	AC-228	11/12/03	1.48E+00	pCi/g	3.75E-01	4.07E-01	3.98E-01	3.98E-01	
Gamma	Gamma Spectroscopy	BI-212	11/12/03	6.13E-01	pCi/g	5.33E-01	5.45E-01	7.90E-01	7.90E-01	U
Gamma	Gamma Spectroscopy	BI-214	11/12/03	2.89E+00	pCi/g	5.15E-01	5.78E-01	1.98E-01	1.98E-01	
Gamma	Gamma Spectroscopy	CO-60	11/12/03	1.90E-02	pCi/g	5.21E-02	5.25E-02	1.15E-01	1.00E-01	U>
Gamma	Gamma Spectroscopy	CS-137	11/12/03	5.10E-02	pCi/g	6.20E-02	6.30E-02	9.69E-02	1.00E-01	U
Gamma	Gamma Spectroscopy	K-40	11/12/03	-4.47E+00	pCi/g	1.55E+00	1.64E+00	2.39E+00	2.39E+00	U
Gamma	Gamma Spectroscopy	PA-234	11/12/03	6.40E+00	pCi/g	9.44E+00	9.57E+00	1.51E+01	1.51E+01	U
Gamma	Gamma Spectroscopy	PB-212	11/12/03	1.40E-01	pCi/g	1.08E-01	1.11E-01	1.60E-01	1.60E-01	U
Gamma	Gamma Spectroscopy	PB-214	11/12/03	3.24E+00	pCi/g	5.45E-01	6.16E-01	2.25E-01	2.25E-01	
Gamma	Gamma Spectroscopy	RA-226	11/12/03	3.08E+00	pCi/g	4.18E-01	4.87E-01	1.98E-01	1.98E-01	
Gamma	Gamma Spectroscopy	TH-227	11/12/03	1.98E+00	pCi/g	1.13E+00	1.17E+00	5.54E-01	5.54E-01	
Gamma	Gamma Spectroscopy	TH-230	11/12/03	-9.82E-01	pCi/g	6.11E+00	6.13E+00	1.04E+01	1.04E+01	U
Gamma	Gamma Spectroscopy	TH-234	11/12/03	7.02E-01	pCi/g	4.76E-01	4.90E-01	8.64E-01	8.64E-01	U
Gamma	Gamma Spectroscopy	TL-208	11/12/03	2.22E-01	pCi/g	7.97E-02	8.43E-02	8.85E-02	8.85E-02	
Gamma	Gamma Spectroscopy	U38PA234	11/12/03	5.53E-02	pCi/g	8.67E-02	8.78E-02	1.41E-01	1.41E-01	U
H0003	Beta LSC	H-3	10/21/03	3.42E-01	pCi/g	5.41E-02	5.96E-02	8.91E-02	1.00E+00	J
Po210	Alpha Spectroscopy	PO-210	10/30/03	3.53E-01	pCi/g	3.24E-02	3.44E-02	2.45E-02	1.00E-01	
PuISO	Alpha Spectroscopy	PU-238	11/12/03	9.73E-03	pCi/g	5.47E-03	5.52E-03	4.56E-03	1.00E-01	J
PuISO	Alpha Spectroscopy	PU-239	11/12/03	-1.47E-04	pCi/g	1.76E-03	1.76E-03	5.14E-03	1.00E-01	U
Ra226	Deemanation	RA-226	11/18/03	2.95E+00	pCi/g	1.21E-01	2.48E-01	2.05E-02	1.00E-01	
ThISO	Alpha Spectroscopy	TH-228	11/05/03	5.06E-01	pCi/g	3.92E-02	7.29E-02	1.34E-02	1.00E-01	
ThISO	Alpha Spectroscopy	TH-230	11/05/03	2.95E-01	pCi/g	2.93E-02	4.63E-02	8.05E-03	1.00E-01	
ThISO	Alpha Spectroscopy	TH-232	11/05/03	1.27E-01	pCi/g	1.92E-02	2.57E-02	5.49E-03	1.00E-01	
UUISO	Alpha Spectroscopy	U-234	11/05/03	1.53E+00	pCi/g	7.82E-02	1.26E-01	2.82E-03	1.00E-01	
UUISO	Alpha Spectroscopy	U-235	11/05/03	5.35E-02	pCi/g	1.48E-02	1.52E-02	2.89E-03	1.00E-01	J
UUISO	Alpha Spectroscopy	U-238	11/05/03	1.37E+00	pCi/g	7.41E-02	1.15E-01	2.82E-03	1.00E-01	

Explanation of Qualifier Codes

U The result is less than the MDC
J The result is less than RDL and no U qualifier is assigned
> The MDC is greater than the RDL

Abbreviations

CU= Counting Uncertainty; TPU=Total Propagation of Uncertainty; MDC=Minimum Detectable Concentration; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original; MS=Matrix Spike; MSO=Matrix Spike Original; MSD=MS Duplicate; DMSO = Dup MS Orig, LCSD=LCS Dup

At. 2 P. 42

EBERLINE SERVICES

Sample Data Report

Albuquerque Laboratory
7021 Pan American Fwy NE
Albuquerque, NM 87109
(505) 345-3461
www.eberlineservices.com

Client ID >>	MDSDS MOUND		
Internal ID >>	03-10029-05		

Report to	Contract / PO Information				
Mr. Rex Brown OHIO EPA Ohio Epa/Swdo 401 E. Fifth St. Dayton, OH 45402	FED. I.D. #59-3328623	Date Received >>	10/14/03	Sample Date >>	10/09/03 11:00
	Environmental	Matrix >>	Sludge		
	Final Report	Volume/Weight >>	1263	Eberline SDG >>	03-10029
	Rpt Level: 2	Vol/Wt Units >>	g	Sample Type >>	DO

Internal Analysis Code	Analysis Technique	Analyte	Analysis Date	Result	Rpt. Units	CU	TPU	MDC	RDL	Qualifier Codes
Am241	Alpha Spectroscopy	AM-241	11/14/03	1.18E-01	pCi/g	2.34E-02	2.49E-02	1.13E-02	1.00E-01	
Gamma	Gamma Spectroscopy	AC-228	11/13/03	1.16E+00	pCi/g	2.97E-01	3.21E-01	3.17E-01	3.17E-01	
Gamma	Gamma Spectroscopy	BI-212	11/13/03	6.73E-01	pCi/g	4.78E-01	4.91E-01	6.76E-01	6.76E-01	U
Gamma	Gamma Spectroscopy	BI-214	11/13/03	1.43E+00	pCi/g	2.93E-01	3.24E-01	1.60E-01	1.60E-01	
Gamma	Gamma Spectroscopy	CO-60	11/13/03	0.00E+00	pCi/g	0.00E+00	0.00E+00	9.26E-02	1.00E-01	U
Gamma	Gamma Spectroscopy	CS-137	11/13/03	9.59E-02	pCi/g	5.77E-02	5.97E-02	7.82E-02	1.00E-01	J
Gamma	Gamma Spectroscopy	K-40	11/13/03	5.68E+00	pCi/g	1.86E+00	1.98E+00	2.04E+00	2.04E+00	
Gamma	Gamma Spectroscopy	PA-234	11/13/03	6.24E+00	pCi/g	7.95E+00	8.08E+00	1.32E+01	1.32E+01	U
Gamma	Gamma Spectroscopy	PB-212	11/13/03	7.92E-01	pCi/g	1.72E-01	1.89E-01	1.31E-01	1.31E-01	
Gamma	Gamma Spectroscopy	PB-214	11/13/03	1.73E+00	pCi/g	3.27E-01	3.64E-01	1.80E-01	1.80E-01	
Gamma	Gamma Spectroscopy	RA-226	11/13/03	1.58E+00	pCi/g	2.45E-01	2.80E-01	1.60E-01	1.60E-01	
Gamma	Gamma Spectroscopy	TH-227	11/13/03	1.21E+00	pCi/g	9.61E-01	9.85E-01	7.60E-01	7.60E-01	
Gamma	Gamma Spectroscopy	TH-230	11/13/03	-3.08E+00	pCi/g	5.32E+00	5.38E+00	8.84E+00	8.84E+00	U
Gamma	Gamma Spectroscopy	TH-234	11/13/03	3.27E-01	pCi/g	3.82E-01	3.89E-01	7.35E-01	7.35E-01	U
Gamma	Gamma Spectroscopy	TL-208	11/13/03	3.31E-01	pCi/g	9.05E-02	9.75E-02	8.20E-02	8.20E-02	
Gamma	Gamma Spectroscopy	U38PA234	11/13/03	1.32E-01	pCi/g	4.11E-01	4.14E-01	1.22E-01	1.22E-01	
H0003	Beta LSC	H-3	10/22/03	4.53E+00	pCi/g	7.67E-02	3.41E-01	8.69E-02	1.00E+00	
Po210	Alpha Spectroscopy	PO-210	10/30/03	1.85E+00	pCi/g	8.91E-02	1.06E-01	2.80E-02	1.00E-01	
PuISO	Alpha Spectroscopy	PU-238	11/12/03	1.54E+01	pCi/g	2.81E-01	1.23E+00	9.29E-03	1.00E-01	
PuISO	Alpha Spectroscopy	PU-239	11/12/03	1.99E-01	pCi/g	3.23E-02	3.59E-02	1.16E-02	1.00E-01	
Ra226	Deemanation	RA-226	11/18/03	2.37E+00	pCi/g	1.81E-01	2.51E-01	4.98E-02	1.00E-01	
ThISO	Alpha Spectroscopy	TH-228	11/05/03	1.32E+00	pCi/g	7.29E-02	1.63E-01	1.79E-02	1.00E-01	
ThISO	Alpha Spectroscopy	TH-230	11/05/03	7.51E-01	pCi/g	5.39E-02	9.90E-02	7.39E-03	1.00E-01	
ThISO	Alpha Spectroscopy	TH-232	11/05/03	6.44E-01	pCi/g	4.99E-02	9.48E-02	7.37E-03	1.00E-01	
UUISO	Alpha Spectroscopy	U-234	11/05/03	1.73E+00	pCi/g	8.52E-02	1.25E-01	2.96E-03	1.00E-01	
UUISO	Alpha Spectroscopy	U-235	11/05/03	6.76E-02	pCi/g	1.71E-02	1.75E-02	3.05E-03	1.00E-01	J
UUISO	Alpha Spectroscopy	U-238	11/05/03	1.13E+00	pCi/g	6.89E-02	9.13E-02	2.96E-03	1.00E-01	

Explanation of Qualifier Codes

U The result is less than the MDC
J The result is less than RDL and no U qualifier is assigned
> The MDC is greater than the RDL

Abbreviations

CU= Counting Uncertainty; TPU=Total Propagation of Uncertainty; MDC=Minimum Detectable Concentration; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; OO=Duplicate Original; MS=Matrix Spike; MSO=Matrix Spike Original; MSD=MS Duplicate; DMSO = Dup MS Orig; LCSD=LCS Dup

Att. 2 P. 43

EBERLINE SERVICES

Lab Control Sample

Albuquerque Laboratory
7021 Pan American Fwy NE
Albuquerque, NM 87109
(505) 345-3461
www.eberlineservices.com

Client ID >>	LCS		
Internal ID >>	03-10029-01		
Date Received >>	10/14/03		
		SDG >>	03-10029
Matrix >>	Sludge	Smpl Type >>	LCS

Report to

Mr. Rex Brown
OHIO EPA
Ohio Epa/Swdo
401 E. Fifth St.
Dayton, OH 45402

Contract / PO Information

FED. I.D. #59-3328623

Environmental
Final Report
Rpt Level: 2

LCS Analyte	LCS Result	LCS TPU	LCS MDC	Rpt Units	LCS Known	Std Cert 3σ ERR	Total 3σ Limits	Protocol Limits	LCS Recovery %	Qualifier Codes
AM-241	1.80E+00	1.94E-01	2.37E-02	pCi/g	1.96E+00	6.48E-02	91-109	80-120	**91.4**	
AM-241	4.19E+02	7.19E+01	1.99E+00	pCi/g	4.54E+02	0.00E+00	89-120	80-120	**92.3**	
CO-60	2.71E+02	3.80E+01	3.98E+00	pCi/g	3.22E+02	0.00E+00	87-117	80-120	**84.2**	
CS-137	2.05E+02	3.10E+01	1.55E+00	pCi/g	2.09E+02	0.00E+00	92-114	80-120	**98.0**	
H-3	4.29E+01	3.26E+00	9.73E-01	pCi/g	4.06E+01	2.92E-01	93-112	80-120	**106**	
PO-210	9.96E+00	4.26E-01	5.25E-02	pCi/g	1.01E+01	7.18E-01	90-107	80-120	**98.5**	
PU-239	2.40E+00	2.45E-01	2.15E-02	pCi/g	2.40E+00	1.83E-02	90-116	80-120	**100**	
RA-226	4.19E+00	4.31E-01	1.41E-01	pCi/g	5.04E+00	1.56E-01	74-129	80-120	**83.2**	
TH-230	2.97E+00	4.50E-01	2.52E-02	pCi/g	2.48E+00	7.19E-02	77-124	80-120	**120**	
U-238	4.68E+00	4.79E-01	1.53E-02	pCi/g	4.77E+00	1.19E-01	90-113	80-120	**98.0**	

Explanation of Qualifier Codes

L = LCS with low recovery, H = LCS with high recovery, R = Rerun

Explanation of Sample Types

CU= Counting Uncertainty; TPU=Total Propagation of Uncertainty; MDC=Minimum Detectable Concentration; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original; MS=Matrix Spike; MSO=Matrix Spike Original; MSD=MS Duplicate; DMSO = Dup MS Orig; LCSD=LCS Dup

EBERLINE SERVICES

Method Blank Report

Albuquerque Laboratory
7021 Pan American Fwy NE
Albuquerque, NM 87109
(505) 345-3461
www.eberlineservices.com

Client ID >>	BLANK
Internal ID >>	03-10029-02
Date Received >>	10/14/03

Report to

Mr. Rex Brown
OHIO EPA
Ohio Epa/Swdo
401 E. Fifth St.
Dayton, OH 45402

Contract / PO Information

FED. I.D. #59-3328623

Environmental
Final Report
Rpt Level: 2

SDG >> 03-10029
Matrix >> Sludge
Smpl Type >> MBL

Internal Analysis Code	MBL Analyte	Analysis Technique	MBL Result	MBL CU	MBL TPU	MBL MDC	Rpt Units	Qualifier Codes
Am241	AM-241	Alpha Spectroscopy	1.93E-03	7.46E-03	7.46E-03	1.69E-02	pCi/g	U
Gamma	AC-228	Gamma Spectroscopy	9.00E-02	1.14E-01	1.16E-01	2.47E-01	pCi/g	U
Gamma	AM-241	Gamma Spectroscopy	-4.04E-02	3.56E-02	3.64E-02	5.99E-02	pCi/g	U
Gamma	BI-212	Gamma Spectroscopy	4.84E-02	3.18E-01	3.18E-01	5.55E-01	pCi/g	U
Gamma	BI-214	Gamma Spectroscopy	2.44E-02	7.30E-02	7.35E-02	1.24E-01	pCi/g	U
Gamma	CO-60	Gamma Spectroscopy	1.73E-02	4.01E-02	4.04E-02	6.83E-02	pCi/g	U
Gamma	CS-137	Gamma Spectroscopy	2.84E-02	4.02E-02	4.07E-02	6.40E-02	pCi/g	U
Gamma	K-40	Gamma Spectroscopy	-2.72E+00	1.08E+00	1.13E+00	1.76E+00	pCi/g	U
Gamma	PA-234	Gamma Spectroscopy	2.96E+00	5.85E+00	5.91E+00	1.07E+01	pCi/g	U
Gamma	PB-212	Gamma Spectroscopy	-7.13E-03	4.71E-02	4.73E-02	8.18E-02	pCi/g	U
Gamma	PB-214	Gamma Spectroscopy	2.09E-02	1.86E-02	1.90E-02	1.37E-01	pCi/g	U
Gamma	RA-226	Gamma Spectroscopy	1.82E-02	4.17E-02	4.21E-02	1.24E-01	pCi/g	U
Gamma	TH-227	Gamma Spectroscopy	5.98E-01	4.48E-01	4.60E-01	2.70E-01	pCi/g	B
Gamma	TH-230	Gamma Spectroscopy	-2.77E-01	2.98E+00	2.98E+00	5.19E+00	pCi/g	U
Gamma	TL-208	Gamma Spectroscopy	2.84E-02	3.70E-02	3.75E-02	5.92E-02	pCi/g	U
Gamma	U38PA234	Gamma Spectroscopy	1.03E-02	4.76E-02	4.78E-02	8.42E-02	pCi/g	U
H0003	H-3	Beta LSC	3.71E+00	6.00E-01	6.59E-01	9.71E-01	pCi/g	B
Po210	PO-210	Alpha Spectroscopy	-1.28E-02	2.14E-02	2.14E-02	6.65E-02	pCi/g	U
PuISO	PU-238	Alpha Spectroscopy	-2.41E-03	1.01E-02	1.01E-02	3.06E-02	pCi/g	U
PuISO	PU-239	Alpha Spectroscopy	2.41E-03	8.47E-03	8.47E-03	2.07E-02	pCi/g	U
Ra226	RA-226	Deemanation	6.99E-02	5.87E-02	5.89E-02	8.98E-02	pCi/g	U
ThISO	TH-228	Alpha Spectroscopy	-1.26E-02	2.15E-02	2.15E-02	5.01E-02	pCi/g	U
ThISO	TH-230	Alpha Spectroscopy	6.24E-03	8.65E-03	8.69E-03	8.44E-03	pCi/g	U
ThISO	TH-232	Alpha Spectroscopy	9.34E-03	1.37E-02	1.37E-02	2.29E-02	pCi/g	U
UUISO	U-234	Alpha Spectroscopy	8.90E-03	1.23E-02	1.24E-02	1.20E-02	pCi/g	U
UUISO	U-235	Alpha Spectroscopy	1.37E-02	1.55E-02	1.56E-02	1.24E-02	pCi/g	B
UUISO	U-238	Alpha Spectroscopy	1.34E-02	1.51E-02	1.51E-02	1.20E-02	pCi/g	B

Explanation of Qualifier Codes

U = The result is less than the MDC. B = The METHOD BLANK result is greater than the METHOD BLANK MDC. R = Rerun

Explanation of Sample Types

CU= Counting Uncertainty; TPU=Total Propagation of Uncertainty; MDC=Minimum Detectable Concentration; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DD=Duplicate Original; MS=Matrix Spike; MSO=Matrix Spike Original; MSD=MS Duplicate, DMSO = Dup MS Orig; LCSD=LCS Dup

Att. 2 p. 45

EBERLINE SERVICES

Duplicate Report

Albuquerque Laboratory
7021 Pan American Fwy NE
Albuquerque, NM 87109
(505) 345-3461
www.eberlineservices.com

Client ID >> DUPLICATE

SDG >> 03-10029

Report to
Mr. Rex Brown
OHIO EPA
Ohio Epa/Swdo
401 E. Fifth St.
Dayton, OH 45402

Contract / PO Information
FED. I.D. #59-3328623
Environmental
Final Report
Rpt Level: 2

Date Received >> 10/14/03

Analyte	Rpt Units	Dup Result	Dup TPU	Original Result	Original TPU	RPD %	RER σ
AM-241	pCi/g	1.17E-01	2.26E-02	1.18E-01	2.49E-02	0.18	0.01
CO-60	pCi/g	7.15E-02	7.81E-02	0.00E+00	0.00E+00	NC	1.79
CS-137	pCi/g	1.49E-01	6.64E-02	9.59E-02	5.97E-02	NC	1.16
H-3	pCi/g	4.04E+01	3.08E+00	4.29E+01	3.26E+00	6.02	1.10
PB-212	pCi/g	7.06E-01	1.79E-01	7.92E-01	1.89E-01	11.5	0.65
PO-210	pCi/g	1.96E+00	1.19E-01	1.85E+00	1.06E-01	5.35	1.25
PU-238	pCi/g	1.56E+01	1.17E+00	1.54E+01	1.23E+00	1.50	0.27
PU-239	pCi/g	2.50E-01	3.80E-02	1.99E-01	3.59E-02	22.5	1.89
RA-226	pCi/g	2.34E+00	2.30E-01	2.37E+00	2.51E-01	1.60	0.22
TH-228	pCi/g	1.25E+00	1.56E-01	1.32E+00	1.63E-01	5.41	0.60
TH-230	pCi/g	7.51E-01	9.95E-02	7.51E-01	9.90E-02	0.04	0.00
TH-232	pCi/g	6.07E-01	9.03E-02	6.44E-01	9.48E-02	6.04	0.57
U-234	pCi/g	1.76E+00	1.34E-01	1.73E+00	1.25E-01	1.35	0.25
U-235	pCi/g	6.32E-02	1.79E-02	6.76E-02	1.75E-02	6.63	0.34
U-238	pCi/g	1.25E+00	1.04E-01	1.13E+00	9.13E-02	10.0	1.69

Abbreviations

TPU=Total Propagation of Uncertainty; RPD=Relative Percent Difference; RER=Relative Error Ratio

At .2 P.46

EBERLINE SERVICES

Sample Data Report

Albuquerque Laboratory
7021 Pan American Fwy NE
Albuquerque, NM 87109
(505) 345-3461
www.eberlineservices.com

Client ID >>	MDSDS MOUND (Am-241,Gamma, Po-210, PuISO,Ra226,ThISO, UUISO) LCS (H3)		
Internal ID >>	03-10029-03		

Report to	Contract / PO Information				
Mr. Rex Brown OHIO EPA Ohio Epa/Swdo 401 E. Fifth St. Dayton, OH 45402	FED. I.D. #59-3328623	Date Received >>	10/14/03	Sample Date >>	10/09/03 11:00
	Environmental	Matrix >>	Sludge		
	Final Report	Volume/Weight >>		Eberline SDG >>	03-10029
	Rpt Level: 2	Vol/Wt Units >>		Sample Type >>	DUP

Internal Analysis Code	Analysis Technique	Analyte	Analysis Date	Result	Rpt. Units	CU	TPU	MDC	RDL	Qualifier Codes
Am241	Alpha Spectroscopy	AM-241	11/14/03	1.17E-01	pCi/g	2.14E-02	2.26E-02	1.11E-02	1.00E-01	
Gamma	Gamma Spectroscopy	AC-228	11/13/03	1.06E+00	pCi/g	2.86E-01	3.08E-01	3.26E-01	3.26E-01	
Gamma	Gamma Spectroscopy	BI-212	11/13/03	8.28E-01	pCi/g	4.85E-01	5.02E-01	6.49E-01	6.49E-01	
Gamma	Gamma Spectroscopy	BI-214	11/13/03	1.56E+00	pCi/g	3.10E-01	3.43E-01	1.53E-01	1.53E-01	
Gamma	Gamma Spectroscopy	CO-60	11/13/03	7.15E-02	pCi/g	7.67E-02	7.81E-02	9.93E-02	1.00E-01	U
Gamma	Gamma Spectroscopy	CS-137	11/13/03	1.49E-01	pCi/g	6.33E-02	6.64E-02	7.45E-02	1.00E-01	
Gamma	Gamma Spectroscopy	K-40	11/13/03	5.56E+00	pCi/g	1.86E+00	1.97E+00	2.06E+00	2.06E+00	
Gamma	Gamma Spectroscopy	PA-234	11/13/03	9.95E+00	pCi/g	9.14E+00	9.34E+00	1.36E+01	1.36E+01	U
Gamma	Gamma Spectroscopy	PB-212	11/13/03	7.06E-01	pCi/g	1.64E-01	1.79E-01	1.38E-01	1.38E-01	
Gamma	Gamma Spectroscopy	PB-214	11/13/03	1.70E+00	pCi/g	2.80E-01	3.18E-01	1.84E-01	1.84E-01	
Gamma	Gamma Spectroscopy	RA-226	11/13/03	1.65E+00	pCi/g	2.36E-01	2.73E-01	1.53E-01	1.53E-01	
Gamma	Gamma Spectroscopy	TH-227	11/13/03	5.34E-01	pCi/g	5.10E-01	5.20E-01	7.52E-01	7.52E-01	U
Gamma	Gamma Spectroscopy	TH-230	11/13/03	-3.68E+00	pCi/g	5.47E+00	5.54E+00	9.02E+00	9.02E+00	U
Gamma	Gamma Spectroscopy	TH-234	11/13/03	3.93E-01	pCi/g	3.88E-01	3.96E-01	7.38E-01	7.38E-01	U
Gamma	Gamma Spectroscopy	TL-208	11/13/03	3.32E-01	pCi/g	8.89E-02	9.59E-02	7.70E-02	7.70E-02	
Gamma	Gamma Spectroscopy	U38PA234	11/13/03	7.56E-02	pCi/g	7.69E-02	7.84E-02	1.22E-01	1.22E-01	U
H0003	Beta LSC	H-3	10/21/03	4.04E+01	pCi/g	8.31E-01	3.08E+00	9.74E-01	1.00E+00	
Po210	Alpha Spectroscopy	PO-210	10/30/03	1.96E+00	pCi/g	9.99E-02	1.19E-01	3.79E-02	1.00E-01	
PuISO	Alpha Spectroscopy	PU-238	11/12/03	1.56E+01	pCi/g	2.64E-01	1.17E+00	1.05E-02	1.00E-01	
PuISO	Alpha Spectroscopy	PU-239	11/12/03	2.50E-01	pCi/g	3.34E-02	3.80E-02	9.98E-03	1.00E-01	
Ra226	Deemanation	RA-226	11/18/03	2.34E+00	pCi/g	1.53E-01	2.30E-01	5.52E-02	1.00E-01	
ThISO	Alpha Spectroscopy	TH-228	11/05/03	1.25E+00	pCi/g	7.12E-02	1.56E-01	1.81E-02	1.00E-01	
ThISO	Alpha Spectroscopy	TH-230	11/05/03	7.51E-01	pCi/g	5.41E-02	9.95E-02	7.46E-03	1.00E-01	
ThISO	Alpha Spectroscopy	TH-232	11/05/03	6.07E-01	pCi/g	4.86E-02	9.03E-02	7.45E-03	1.00E-01	
UUISO	Alpha Spectroscopy	U-234	11/04/03	1.76E+00	pCi/g	9.12E-02	1.34E-01	3.33E-03	1.00E-01	
UUISO	Alpha Spectroscopy	U-235	11/04/03	6.32E-02	pCi/g	1.75E-02	1.79E-02	3.42E-03	1.00E-01	J
UUISO	Alpha Spectroscopy	U-238	11/04/03	1.25E+00	pCi/g	7.69E-02	1.04E-01	3.33E-03	1.00E-01	

Explanation of Qualifier Codes

U The result is less than the MDC
J The result is less than RDL and no U qualifier is assigned
> The MDC is greater than the RDL

Abbreviations

CU= Counting Uncertainty; TPU=Total Propagation of Uncertainty; MDC=Minimum Detectable Concentration; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original; MS=Matrix Spike; MSO=Matrix Spike Original; MSD=MS Duplicate; DMSO = Dup MS Orig; LCSD=LCS Dup

At. 2 P. 4T

Chain of Custody

At. 2 P. 48

EBERLINE SERVICES

Albuquerque Laboratory 7021 Pan American Frwy.,NE Albuquerque, NM 87109 Voice (505) 345-3461 Fax (505) 761-5416

Discrepancy Sample Receiving Report

Discrepancy Originator: MHarmon	Date: 10/14/03
Resolved by: MHarmon	Date: 10/15/03

Work Order Number:0310030

Customer: OHIOEPA_E	Telephone number: 937-285-6453
Client contact: Donna Bohannon	Date Received: 10/14/03

Sample Matrix: Sludge	Discrepancy Index Number: 7

Sample Control Supervisor notified: MHarmon

Problem: analysis for Ra226, Ra228 AND Po210 not listed on Chain of Custody. Chain of Custody listed Pb210 by gamma analysis and Ac227 by Alpha Spec. All analysis mentioned on accompanying email printout. Needed clarification on drying sludge prior to analysis and method of Ra226 analysis.

Resolution: Contacted Ms. Bohannon who indicated referencing the printed email to resolve all questions on analysis required. Pb210 to be done by Alpha Spec. Ac227 to be done by Gamma Spec. Both Ra226 and Ra228 along with Po210 to be done as stated on email printout. Ms. Kathy Lee Fox called and indicated using a dry sludge analysis.

Discrepancy Index

1	Sample screening shows elevated reading (enter reading)
2	Sample container damaged in transit (specify)
3	Client custody seals broken (specify)
4	Inner packing media insufficient (specify)
5	Sample I.D. missing/or unreadable (specify)
6	Insufficient sample volume provided (specify)
7	COC papers not in order/provided (specify)
8	Analysis not specified
9	Sample quantity does not match COC (specify)
10	Other (please specify)

Note: Make 2 copies. Original-client Copy 1 – Data Packet Copy 2 – Sample Control

At-2 P.49

EBERLINE SERVICES

Sample And Shipment Receiving Report

Work Order 0310030 Customer OHIOEPA_E Date Received: 10/14/03 Carrier: FedEx Number of containers: 1	Recorded by: Mharmon Date: 10/14/03 Sample matrix: Water Analysis Requested: IsoPu,IsoU,IsoTh,Am241,Pb210,Gamma Number of Samples: 3

Shipment Integrity	N/A	Present	Absent	OK	Problems* or notations
Carrier Tracking Numbers				X	
Shipping Container Custody Seals				X	
Container Integrity				X	
Label Legibility				X	
Preservation				X	
Sample Custody Records				X	
Sample Container Custody Seals				X	
Other (specify)					

*List problems

NOTE: MAKE 3 COPIES, 1 COPY TO CLIENT, 1 COPY FOR LOGIN TECH FILES, 1 COPY TO DATA REVIEW FOLDER

Att-2 P.50

EBERLINE SERVICES

7021 Pan American Hwy. N.E.
Albuquerque, NM 87109
Telephone (505) 345-3461
Fax (505) 761-5416

TELEPHONE CALL LOG

Name____Karen Schoendaller_____10/15/2003
Contact_____Donna Bohannen_____Service_____
Company_____OHIO EPA_____Call was: _____ Initiated x
City, State____ _____ _____ Received
Telephone No._____

Conversation: Although the Po-210 was not listed on the COCs for the water and sludge, Donna said to analyze for them and she would assume responsibility.

Actions Required:_____

CC:_____

_Karen S. Schoendaller_____
Signed

At. 2 P. 51

Mail Message

Novell.

Close Next Delete From This Mailbox Delete From All Mailboxes Forward Reply to Sender Reply All Move Delete Read Later Properties

From: Kathy Fox
To: dgarcia@eberlineservices.com, kschoendaller@eberlineservices.com
CC: Becky Hegyi, Brian Nickel, Donna Bohannon
Date: Tuesday - October 7, 2003 8:36 AM
Subject: Ohio EPA sampling on 10/9/03

10/7/03
Hello. I realize that Donna Bohannon is the contact person from our office, but she is out today and I need verification on exactly what I need to do as per sampling and shipping and COC on a very HIGH PROFILE (publicity) sampling event to be conducted this Thursday, October 10.

I will be sampling influent and sludge from one location; influent, effluent, and sludge from an additional location. A total of three (3) liquids and two (2) solids. The sludge is very flaky, not like soil. None of these samples will be radiologically hot.

ITEM 1
The following analytical reporting is needed/required:
(1) Tritium: detection limit 500 pCi/L for liquid, 1.0 pCi/g for sludge
(2) Radium-228 (detection limit as low as possible with chemistry - 0.1 pCi/g and pCi/L if possible; counterpart is using EPA Method 204.0)
(3) Ac-227+D, Am-241, isotopic Pu (Pu-238,Pu-239/240), isotopic Th (Th-228, Th-230+D, Th-232+D), isotopic U (U-233/234, U-235, U-238+D): all by alpha spec with detection limit of 0.1 pCi/g and 0.1 pCi/L
(4) Co-60, Pb-210+D, Cs-137+D: all by gamma spec with detection limit of 0.1 pCi/g and pCi/L.

ITEM 2
Any specific instructions on how to fill out the COC with the above detection limits, etc.?

ITEM 3
We need reported results within 45 days, therefore, RUSH. Is writing "RUSH - 45 days" sufficient on the COC?

ITEM 4
What FedEx shipping priority should I use?

MOST IMPORTANT - ITEM 5
I was told two (1) Liter wide mouth plastic bottles for liquid with 5 ml nitric acid. I was told two (1) Liter wide mouth plastic jar for sludge. Tritium liquid requires a minimum of 125 mL in amber bottle; tritium in sludge will be taken from 500 g wide mouth plastic jar. Are these containers and volumes still correct? Other than the nitric acid, what preservation is required (just ice for the tritium?)

Please respond to this email today if possible. I will be calling your lab this afternoon (EST) and will try to verify that you've received this email and answer any further questions. This is extremely important, and we really need to do this correctly. I am also receiving lists from my counterpart at the DOE Mound/CH2M Hill, and if all else fails, I will duplicate exactly his efforts, i.e., volumes, container types, etc.

Thank you very much, and I hope to be receiving a response back from you today.

Thank You!
Really appreciate your effort of accomodating this event
Kathy Lee

At-2 P. 52

CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD

Control#: KLF028

Ohio EPA/SWDO
Office of Federal Facilities Oversight
401 East Fifth Street Dayton, Ohio 45402-2911
Sampler Contact: Kathy Lee Fox
Phone: (937) 2856441

Page 1 of 1

Eberline Services
7021 Pan American Highway, NE
Albuquerque, NM 87109-3874
505-345-3461
Attn: Debbie Garcia

Purchase Order # : E93132
Project # : ESW 031009
Lab Contact: Debbie Garcia

CR: DOE MOUND

SAMPLE INFORMATION					REQUESTED ANALYSIS									METHOD						
Sample Identification	Description	Media	Collection Date/Time	Container	Isotopic Plutonium	Isotopic Uranium	Isotopic Thorium	Ac-227+D	Am-241	Cs-137+D gamma spec	Co-60 gamma spec	Pb-210+D gamma spec	Pb-210	Tritium	Preservative, nitric acid	Preservative, ice		Notes: isotopic analyses	Required Detection Limit	Condition on Receipt (Lab)
MPOTWS	MIAMIS BLDG	SL	10-9-03 1600	2-1L	X	X	X	X	X	X	X	X	X		X			Isotopes needed:	*	
MPOTWS	MIAMIS BLDG	SL	10-9-03 1600	1-125 mL										X				Pu-238, Pu-239/240;	SGE	
MPOTWE	MIAMIS BLDG	EFF	10-9-03 0930	5-1L	X	X	X	X	X	X	X	X	X		X			Ra-226+D;	ATTACHED	
MPOTWE	MIAMIS BLDG	EFF	10-9-03 0950	1-125 mL										X				U-233/234, U-235,		
MPOTWI	MIAMIS BLDG	INF	10-9-03 0915	5-1L	X	X	X	X	X	X	X	X	X		X			U-238+D;		
MPOTWI	MIAMIS BLDG	INF	10-9-03 0915	1-125 mL										X				Th-228, Th-230+D,		
MDSDI	MOUND	INF	10-9-03 1100	5-1L	X	X	X	X	X	X	X	X	X		X			Th-232+D		
MDSDI	MOUND	INF	10-9-03 1100	1-125 mL										X						
MDSDS	MOUND	SL	10-9-03 1125	2-1L	X	X	X	X	X	X	X	X	X							
MDSDS	MOUND	SL	10-9-03 1125	1-125 mL										X						

1. Relinquished by: Signature/Affiliation: Kathy Lee Fox OEPA	Date/Time 10/9/03 1645	1. Received by: Signature/Affiliation: ESM	Date/Time 101403 1430
2. Relinquished by: Signature/Affiliation	Date/Time	2. Received by: Signature/Affiliation	Date/Time

MEDIA CODES:
INF-INFLUENT
EFF-EFFLUENT
SL-SLUDGE

Possible Hazard Identification:
- [X] Non Hazard
- [ ] Flammable
- [ ] Skin Irritant
- [ ] Other

Sample Disposal:
- [ ] Return to Client
- [X] Disposal by Lab
- [ ] Archive 12 (months)

Turn-around Time Required:
- [ ] Normal
- [X] Rush - 45 days

ALL SAMPLES RAD SCREENED
DATE 101403 INIT. MDM

Bill to:
Ohio Environmental Protection Agency
Southwest District Office
Office of Federal Facilities Oversight
401 E. Fifth Street
Dayton, Ohio 45402
Attn: Becky Hegyi (937) 285-6462

Report to:
Ohio Environmental Protection Agency
Southwest District Office
401 E. Fifth Street
Dayton, Ohio 45402
Attn: Donna Bohannon
Phone: 937-285-6453

Not required per IATA activity <0.002 uCi/g
COC sealed in cooler
Return Cooler to: Kathy Lee Fox, above address
Phone Number: (937) 285-6441

SAMPLES SHIPPED VIA: FEDERAL EXPRESS
TRACKING NUMBER: 8435 3625 6497

At. 2 p. 53

Attachment D
Ohio EPA Data Package Final Report - Influent

EBERLINE SERVICES

Albuquerque Laboratory
7021 Pan American Hwy. NE
Albuquerque, NM 87109
(505) 345-3461 FAX # (505) 761-5416

Ohio EPA Data Package
Final Report

CR: MOUND
PROJECT # ESW031009

SDG 0310030

Document Inventory:

Case Narrative

LIMS Report

Chain of Custody

Data Review by: Gabriel A. Garcia	Date: 12/02/03
QC Review by: Anthony W. Toth	Date: 12/2/03
Laboratory Manager review: Kevin Schendallen	Date: 12/2/03

At.2 P.55

Case Narrative

At. 2 P.56

Ohio EPA
Final Report
Case Narrative
Sample Delivery Group 0310030

Sample Receipt

Three water samples were received at the Eberline Services Albuquerque Laboratory, on 14 October 2003, for radiological analysis using standard analytical procedures.

Charges for this sample delivery group are as follows.

Analysis	Requested	Reported
Isotopic Uranium	03	03
Isotopic Plutonium	03	03
Isotopic Thorium	03	03
Tritium	03	03
Polonium 210	03	03
Americium 241	03	03
Gamma	03	03
Radium 226	03	03
Radium 228	03	00
Lead 210	03	00

Analyses for the Work Order are complete. This is Part 2 of 2 for this Chain of Custody.

Data Review

Isotopic Uranium

The blank results for U-234 and U-238 are greater than their MDCs but less than the RDL. Review of the alpha channel-by-channel data indicates there is no contamination. The spike agrees with the known value and the replicate is in agreement. The samples were counted for 1000 minutes and all MDCs are less than the required 0.1 pCi/g detection level. The reported sample data show no other anomalies.

Isotopic Plutonium

The blank result is below the MDC, the spike agrees with the known value, and the replicate is in agreement. The samples were counted for 1000 minutes and all MDCs are less than the required 0.1 pCi/g detection level. The reported sample data show no anomalies.

Ohio EPA
Final Report
Case Narrative
Sample Delivery Group 0310030

Isotopic Thorium

The blank result for Th-230 is less than the RDL, but greater than the MDC. Review of the alpha channel-by-channel data indicates there is no contamination. The samples were counted for 1000 minutes and all MDCs are less than the required 0.1 pCi/L detection level. The reported sample data show no other anomalies.

Tritium

The blank result is below the MDC, the spike agrees with the known value, and the replicate is in agreement. The sample MDCs are all less than the required detection level of 500 pCi/L. The reported sample data show no anomalies.

Polonium 210

The blank result for Po-210 is less than the RDL, but greater than the MDC. Review of the alpha channel-by-channel data indicates there is no contamination. The spike agrees with the known value, and the replicate is in agreement. The MDCs for all of the samples in the batch are greater than the RDL of 0.1 pCi/L, but are of the same magnitude. The samples were counted for 480 minutes using the largest volumes possible. The reported sample data show no other anomalies.

Americium 241

The blank result is below the MDC, the spike agrees with the known value, and the replicate is in agreement. The samples were counted for 1000 minutes and all MDCs are less than the required 0.1 pCi/L detection level. The reported sample data show no anomalies.

Gamma

Th-227 is reported for Ac-227 since they are in equilibrium. The MDC for gamma spectrometry is based on the detection level for Cs137. The RDL for Cs137 of 0.1 pCi/L was not achievable due to the limited sample volumes of < 1 liter. The best achievable MDC for Cs137 using a 25 hour count time was ~5-6 pCi/L. In comparison, the blank of 3 liters was counted for the same time and an MDC of only 1.61 pCi/L was achieved. The spike agrees with the known value and the replicate is in agreement. The reported sample data show no other anomalies.

Ohio EPA
Final Report
Case Narrative
Sample Delivery Group 0310030

Radium 226

The blank result is below the MDC, the spike agrees with the known value, and the replicate is in agreement. The MDCs for all of the samples in the batch are greater than the RDL of 0.1 pCi/L. The samples were counted for 50 minutes and 300 minutes using the largest volumes possible. Even after 300 minutes, only one sample's MDC fell below the RDL. All the QC passed acceptance criteria at 50 minutes and those results are reported. The reported sample data show no other anomalies.

Lead 210

No final results for Pb-210 are available. The samples are being reanalyzed due to the initial results failing the quality control acceptance criteria for duplicates and the LCS. Due to the long ingrowth for lead, no final results were available at this time.

Radium 228

No final results for Ra-228 are available. The gas proportional counter failed continuing calibration specifications and has been placed on "HOLD" while the cause is under investigation. Several possibilities exist: guard failure, power supply failure, pre-amp failure. Results will become available when the GPC is restored to operating status.

LIMS Report

At. 2 P. 60

EBERLINE SERVICES

Sample Data Report

Albuquerque Laboratory
7021 Pan American Fwy NE
Albuquerque, NM 87109
(505) 345-3461
www.eberlineservices.com

Client ID >>	MPOTWE MIAMISBURG		
Internal ID >>	03-10030-04		

Report to	Contract / PO Information				
Mr. Rex Brown OHIO EPA Ohio Epa/Swdo 401 E. Fifth St. Dayton, OH 45402	FED. I.D. #59-3328623	Date Received >>	10/14/03	Sample Date >>	10/09/03 09:30
	Environmental	Matrix >>	Water		
	Final Report	Volume/Weight >>	4965	Eberline SDG >>	03-10030
	Rpt Level: 2	Vol/Wt Units >>	ml	Sample Type >>	TRG

Internal Analysis Code	Analysis Technique	Analyte	Analysis Date	Result	Rpt. Units	CU	TPU	MDC	RDL	Qualifier Codes
Am241	Alpha Spectroscopy	AM-241	11/14/03	3.98E-03	pCi/l	1.52E-02	1.52E-02	3.27E-02	1.00E-01	U
Gamma	Gamma Spectroscopy	AC-228	11/18/03	1.73E+01	pCi/l	1.86E+01	1.89E+01	3.39E+01	3.39E+01	U
Gamma	Gamma Spectroscopy	BI-212	11/18/03	2.17E+01	pCi/l	2.61E+01	2.65E+01	4.08E+01	4.08E+01	U
Gamma	Gamma Spectroscopy	BI-214	11/18/03	1.08E+01	pCi/l	1.02E+01	1.04E+01	1.55E+01	1.55E+01	U
Gamma	Gamma Spectroscopy	CO-60	11/18/03	2.38E-01	pCi/l	3.70E+00	3.70E+00	6.36E+00	1.00E-01	U>
Gamma	Gamma Spectroscopy	CS-137	11/18/03	2.75E+00	pCi/l	3.37E+00	3.42E+00	5.28E+00	1.00E-01	U>
Gamma	Gamma Spectroscopy	K-40	11/18/03	-1.59E+02	pCi/l	1.21E+02	1.25E+02	1.88E+02	1.88E+02	U
Gamma	Gamma Spectroscopy	PA-234	11/18/03	0.00E+00	pCi/l	0.00E+00	0.00E+00	1.31E+03	1.31E+03	U
Gamma	Gamma Spectroscopy	PB-212	11/18/03	-6.46E+00	pCi/l	7.00E+00	7.13E+00	1.11E+01	1.11E+01	U
Gamma	Gamma Spectroscopy	PB-214	11/18/03	1.60E+00	pCi/l	1.16E+01	1.17E+01	1.85E+01	1.85E+01	U
Gamma	Gamma Spectroscopy	TH-227	11/18/03	8.72E+00	pCi/l	2.85E+01	2.86E+01	3.33E+01	3.33E+01	U
Gamma	Gamma Spectroscopy	TH-230	11/18/03	-1.25E+03	pCi/l	1.16E+03	1.19E+03	1.80E+03	1.80E+03	U
Gamma	Gamma Spectroscopy	TH-234	11/18/03	6.12E+01	pCi/l	5.09E+01	5.22E+01	8.45E+01	8.45E+01	U
Gamma	Gamma Spectroscopy	TL-208	11/18/03	4.85E-01	pCi/l	4.71E+00	4.72E+00	8.09E+00	8.09E+00	U
H0003	Beta LSC	H-3	10/17/03	6.06E+02	pCi/l	2.51E+02	2.54E+02	4.04E+02	5.00E+02	
Po210	Alpha Spectroscopy	PO-210	11/06/03	4.17E-01	pCi/l	2.40E-01	2.41E-01	4.76E-01	1.00E-01	U>
PuISO	Alpha Spectroscopy	PU-238	11/12/03	-3.41E-03	pCi/l	3.86E-03	3.87E-03	1.98E-02	1.00E-01	U
PuISO	Alpha Spectroscopy	PU-239	11/12/03	-5.68E-04	pCi/l	6.77E-03	6.77E-03	1.98E-02	1.00E-01	U
Ra226	Deemanation	RA-226	11/18/03	4.29E-01	pCi/l	1.64E-01	1.67E-01	2.02E-01	1.00E-01	>
ThISO	Alpha Spectroscopy	TH-228	11/06/03	-5.47E-03	pCi/l	4.15E-02	4.15E-02	8.68E-02	1.00E-01	U
ThISO	Alpha Spectroscopy	TH-230	11/06/03	2.66E-02	pCi/l	2.33E-02	2.35E-02	1.44E-02	1.00E-01	J
ThISO	Alpha Spectroscopy	TH-232	11/06/03	1.60E-02	pCi/l	2.33E-02	2.34E-02	3.91E-02	1.00E-01	U
UUISO	Alpha Spectroscopy	U-234	11/05/03	6.10E-01	pCi/l	1.19E-01	1.24E-01	1.63E-02	1.00E-01	
UUISO	Alpha Spectroscopy	U-235	11/05/03	1.24E-02	pCi/l	1.72E-02	1.72E-02	1.68E-02	1.00E-01	U
UUISO	Alpha Spectroscopy	U-238	11/05/03	4.77E-01	pCi/l	1.05E-01	1.08E-01	1.63E-02	1.00E-01	

Explanation of Qualifier Codes

U The result is less than the MDC
J The result is less than RDL and no U qualifier is assigned
> The MDC is greater than the RDL

Abbreviations

CU= Counting Uncertainty; TPU=Total Propagation of Uncertainty; MDC=Minimum Detectable Concentration; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original; MS=Matrix Spike; MSO=Matrix Spike Original; MSD=MS Duplicate; DMSO = Dup MS Orig; LCSD=LCS Dup

At-2 P.61

EBERLINE SERVICES

Sample Data Report

Albuquerque Laboratory
7021 Pan American Fwy NE
Albuquerque, NM 87109
(505) 345-3461
www.eberlineservices.com

Client ID >>	MPOTWI MIAMISBURG		
Internal ID >>	03-10030-05		
Date Received >>	10/14/03	Sample Date >>	10/09/03 09:15
Matrix >>	Water		
Volume/Weight >>	4763	Eberline SDG >>	03-10030
Vol/Wt Units >>	ml	Sample Type >>	TRG

Report to
Mr. Rex Brown
OHIO EPA
Ohio Epa/Swdo
401 E. Fifth St.
Dayton, OH 45402

Contract / PO Information
FED. I.D. #59-3328623
Environmental
Final Report
Rpt Level: 2

Internal Analysis Code	Analysis Technique	Analyte	Analysis Date	Result	Rpt. Units	CU	TPU	MDC	RDL	Qualifier Codes
Am241	Alpha Spectroscopy	AM-241	11/14/03	3.33E-03	pCi/l	1.27E-02	1.27E-02	2.74E-02	1.00E-01	U
Gamma	Gamma Spectroscopy	AC-228	11/19/03	2.85E+01	pCi/l	2.02E+01	2.07E+01	3.54E+01	3.54E+01	U
Gamma	Gamma Spectroscopy	BI-212	11/19/03	2.55E+01	pCi/l	2.67E+01	2.72E+01	4.11E+01	4.11E+01	U
Gamma	Gamma Spectroscopy	BI-214	11/19/03	9.50E+00	pCi/l	1.07E+01	1.09E+01	1.67E+01	1.67E+01	U
Gamma	Gamma Spectroscopy	CO-60	11/19/03	0.00E+00	pCi/l	0.00E+00	0.00E+00	6.26E+00	1.00E-01	U>
Gamma	Gamma Spectroscopy	CS-137	11/19/03	6.76E+00	pCi/l	3.88E+00	4.02E+00	5.40E+00	1.00E-01	>
Gamma	Gamma Spectroscopy	K-40	11/19/03	-1.02E+02	pCi/l	1.18E+02	1.20E+02	1.89E+02	1.89E+02	U
Gamma	Gamma Spectroscopy	PA-234	11/19/03	8.28E+02	pCi/l	7.44E+02	7.61E+02	1.29E+03	1.29E+03	U
Gamma	Gamma Spectroscopy	PB-212	11/19/03	1.07E+00	pCi/l	6.78E+00	6.80E+00	1.13E+01	1.13E+01	U
Gamma	Gamma Spectroscopy	PB-214	11/19/03	1.72E+01	pCi/l	9.68E+00	1.00E+01	1.87E+01	1.87E+01	U
Gamma	Gamma Spectroscopy	TH-227	11/19/03	5.69E+00	pCi/l	3.00E+01	3.01E+01	3.52E+01	3.52E+01	U
Gamma	Gamma Spectroscopy	TH-230	11/19/03	-3.86E+02	pCi/l	1.11E+03	1.12E+03	1.83E+03	1.83E+03	U
Gamma	Gamma Spectroscopy	TH-234	11/19/03	4.78E+01	pCi/l	5.06E+01	5.16E+01	8.58E+01	8.58E+01	U
Gamma	Gamma Spectroscopy	TL-208	11/19/03	6.87E+00	pCi/l	2.57E+01	2.59E+01	8.34E+00	8.34E+00	U
H0003	Beta LSC	H-3	10/17/03	5.87E+02	pCi/l	2.49E+02	2.52E+02	4.00E+02	5.00E+02	
Po210	Alpha Spectroscopy	PO-210	11/06/03	1.95E+00	pCi/l	2.56E-01	2.63E-01	2.76E-01	1.00E-01	>
PuISO	Alpha Spectroscopy	PU-238	11/12/03	-8.87E-04	pCi/l	1.06E-02	1.06E-02	3.09E-02	1.00E-01	U
PuISO	Alpha Spectroscopy	PU-239	11/12/03	-1.15E-02	pCi/l	1.36E-02	1.36E-02	4.47E-02	1.00E-01	U
Ra226	Deemanation	RA-226	11/18/03	4.38E-01	pCi/l	1.72E-01	1.75E-01	2.19E-01	1.00E-01	>
ThISO	Alpha Spectroscopy	TH-228	11/06/03	3.75E-02	pCi/l	3.88E-02	3.90E-02	5.81E-02	1.00E-01	U
ThISO	Alpha Spectroscopy	TH-230	11/06/03	9.14E-02	pCi/l	4.92E-02	5.04E-02	4.48E-02	1.00E-01	J
ThISO	Alpha Spectroscopy	TH-232	11/06/03	3.65E-02	pCi/l	2.92E-02	2.96E-02	1.65E-02	1.00E-01	J
UUISO	Alpha Spectroscopy	U-234	11/05/03	7.14E-01	pCi/l	1.35E-01	1.41E-01	1.79E-02	1.00E-01	
UUISO	Alpha Spectroscopy	U-235	11/05/03	1.36E-02	pCi/l	1.88E-02	1.88E-02	1.84E-02	1.00E-01	U
UUISO	Alpha Spectroscopy	U-238	11/05/03	5.35E-01	pCi/l	1.17E-01	1.21E-01	1.79E-02	1.00E-01	

Explanation of Qualifier Codes

U The result is less than the MDC
J The result is less than RDL and no U qualifier is assigned
> The MDC is greater than the RDL

Abbreviations

CU= Counting Uncertainty; TPU=Total Propagation of Uncertainty; MDC=Minimum Detectable Concentration; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original; MS=Matrix Spike; MSO=Matrix Spike Original; MSD=MS Duplicate; DMSO = Dup MS Orig; LCSD=LCS Dup

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EBERLINE SERVICES

Sample Data Report

Albuquerque Laboratory
7021 Pan American Fwy NE
Albuquerque, NM 87109
(505) 345-3461
www.eberlineservices.com

Client ID >>	MDSDI MOUND		
Internal ID >>	03-10030-06		
Date Received >>	10/14/03	Sample Date >>	10/09/03 11:00
Matrix >>	Water		
Volume/Weight >>	4829	Eberline SDG >>	03-10030
Vol/Wt Units >>	ml	Sample Type >>	TRG

Report to

Mr. Rex Brown
OHIO EPA
Ohio Epa/Swdo
401 E. Fifth St.
Dayton, OH 45402

Contract / PO Information

FED. I.D. #59-3328623

Environmental
Final Report
Rpt Level: 2

Internal Analysis Code	Analysis Technique	Analyte	Analysis Date	Result	Rpt. Units	CU	TPU	MDC	RDL	Qualifier Codes
Am241	Alpha Spectroscopy	AM-241	11/14/03	-3.71E-03	pCi/l	4.20E-03	4.21E-03	2.16E-02	1.00E-01	U
Gamma	Gamma Spectroscopy	AC-228	11/20/03	1.07E+01	pCi/l	1.23E+01	1.26E+01	2.32E+01	2.32E+01	U
Gamma	Gamma Spectroscopy	BI-212	11/20/03	2.54E+01	pCi/l	1.90E+01	1.96E+01	2.79E+01	2.79E+01	U
Gamma	Gamma Spectroscopy	BI-214	11/20/03	2.06E+01	pCi/l	8.38E+00	8.80E+00	1.07E+01	1.07E+01	
Gamma	Gamma Spectroscopy	CO-60	11/20/03	1.34E+00	pCi/l	1.98E+00	2.01E+00	3.17E+00	1.00E-01	U>
Gamma	Gamma Spectroscopy	CS-137	11/20/03	3.74E+00	pCi/l	2.56E+00	2.63E+00	3.70E+00	1.00E-01	>
Gamma	Gamma Spectroscopy	K-40	11/20/03	-2.49E+01	pCi/l	7.75E+01	7.80E+01	1.29E+02	1.29E+02	U
Gamma	Gamma Spectroscopy	PA-234	11/20/03	1.84E+02	pCi/l	3.98E+02	4.02E+02	7.06E+02	7.06E+02	U
Gamma	Gamma Spectroscopy	PB-212	11/20/03	4.58E+00	pCi/l	4.64E+00	4.74E+00	7.16E+00	7.16E+00	U
Gamma	Gamma Spectroscopy	PB-214	11/20/03	1.15E+01	pCi/l	6.36E+00	6.59E+00	1.22E+01	1.22E+01	U
Gamma	Gamma Spectroscopy	TH-227	11/20/03	0.00E+00	pCi/l	0.00E+00	0.00E+00	2.26E+01	2.26E+01	U
Gamma	Gamma Spectroscopy	TH-230	11/20/03	-8.67E+01	pCi/l	6.75E+02	6.77E+02	1.13E+03	1.13E+03	U
Gamma	Gamma Spectroscopy	TH-234	11/20/03	1.48E+01	pCi/l	3.05E+01	3.08E+01	5.40E+01	5.40E+01	U
Gamma	Gamma Spectroscopy	TL-208	11/20/03	1.98E+00	pCi/l	3.53E+00	3.57E+00	5.82E+00	5.82E+00	U
H0003	Beta LSC	H-3	10/17/03	2.03E+03	pCi/l	2.89E+02	3.25E+02	4.04E+02	5.00E+02	
Po210	Alpha Spectroscopy	PO-210	11/06/03	1.09E-01	pCi/l	6.88E-02	6.89E-02	1.46E-01	1.00E-01	U>
PuISO	Alpha Spectroscopy	PU-238	11/12/03	7.95E-02	pCi/l	3.44E-02	3.49E-02	2.84E-02	1.00E-01	J
PuISO	Alpha Spectroscopy	PU-239	11/12/03	4.15E-03	pCi/l	1.03E-02	1.03E-02	2.14E-02	1.00E-01	U
Ra226	Deemanation	RA-226	11/18/03	1.59E-01	pCi/l	1.38E-01	1.39E-01	2.21E-01	1.00E-01	U>
ThISO	Alpha Spectroscopy	TH-228	11/06/03	2.69E-02	pCi/l	4.17E-02	4.19E-02	7.25E-02	1.00E-01	U
ThISO	Alpha Spectroscopy	TH-230	11/06/03	5.24E-02	pCi/l	4.45E-02	4.50E-02	8.09E-02	1.00E-01	U
ThISO	Alpha Spectroscopy	TH-232	11/06/03	1.96E-02	pCi/l	2.87E-02	2.88E-02	4.82E-02	1.00E-01	U
UUISO	Alpha Spectroscopy	U-234	11/05/03	4.21E-01	pCi/l	9.54E-02	9.81E-02	1.52E-02	1.00E-01	
UUISO	Alpha Spectroscopy	U-235	11/05/03	4.62E-02	pCi/l	3.20E-02	3.21E-02	1.56E-02	1.00E-01	J
UUISO	Alpha Spectroscopy	U-238	11/05/03	3.26E-01	pCi/l	8.39E-02	8.57E-02	1.52E-02	1.00E-01	

Explanation of Qualifier Codes

U The result is less than the MDC
J The result is less than RDL and no U qualifier is assigned
> The MDC is greater than the RDL

Abbreviations

CU= Counting Uncertainty; TPU=Total Propagation of Uncertainty; MDC=Minimum Detectable Concentration; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original; MS=Matrix Spike; MSO=Matrix Spike Original; MSD=MS Duplicate; DMSO = Dup MS Orig; LCSD=LCS Dup

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EBERLINE SERVICES

Albuquerque Laboratory
7021 Pan American Fwy NE
Albuquerque, NM 87109
(505) 345-3461
www.eberlineservices.com

Lab Control Sample

		Client ID >>	LCS		
		Internal ID >>	03-10030-01		
Report to	Contract / PO Information				
Mr. Rex Brown OHIO EPA Ohio Epa/Swdo 401 E. Fifth St. Dayton, OH 45402	FED. I.D. #59-3328623	Date Received >>	10/14/03		
	Environmental				
	Final Report			SDG >>	03-10030
	Rpt Level: 2	Matrix >>	Water	Smpl Type >>	LCS

LCS Analyte	LCS Result	LCS TPU	LCS MDC	Rpt Units	LCS Known	Std Cert — 3σ ERR	Total 3σ Limits	Protocol Limits	LCS Recovery %	Qualifier Codes
AM-241	2.10E+00	1.79E-01	1.54E-02	pCi/l	1.96E+00	6.48E-02	88-121	80-120	107	
AM-241	1.48E+05	2.61E+04	1.55E+03	pCi/l	1.55E+05	0.00E+00	85-119	80-120	95.4	
CO-60	9.34E+04	1.28E+04	4.97E+02	pCi/l	9.68E+04	0.00E+00	88-109	80-120	96.5	
CS-137	6.01E+04	8.98E+03	4.57E+02	pCi/l	6.42E+04	0.00E+00	90-113	80-120	93.5	
H-3	4.17E+01	4.56E+00	4.02E+00	pCi/l	4.06E+01	2.92E-01	81-121	80-120	103	
PO-210	9.70E+00	3.91E-01	5.56E-02	pCi/l	1.01E+01	7.18E-01	80-116	80-120	95.9	
PU-239	2.58E+00	2.14E-01	1.89E-02	pCi/l	2.40E+00	1.83E-02	90-117	80-120	107	
RA-226	4.33E+00	4.44E-01	9.86E-02	pCi/l	5.04E+00	1.56E-01	78-116	80-120	85.8	
TH-230	2.86E+00	3.96E-01	3.58E-02	pCi/l	2.48E+00	7.19E-02	69-130	80-120	115	
U-238	5.07E+00	3.35E-01	5.64E-03	pCi/l	4.77E+00	1.19E-01	79-134	80-120	106	

Explanation of Qualifier Codes

L = LCS with low recovery, H = LCS with high recovery, R = Rerun

Explanation of Sample Types

CU= Counting Uncertainty; TPU=Total Propagation of Uncertainty; MDC=Minimum Detectable Concentration; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original; MS=Matrix Spike; MSO=Matrix Spike Original; MSD=MS Duplicate; DMSO = Dup MS Orig; LCSD=LCS Dup

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EBERLINE SERVICES

Method Blank Report

Albuquerque Laboratory
7021 Pan American Fwy NE
Albuquerque, NM 87109
(505) 345-3461
www.eberlineservices.com

Client ID >>	BLANK		
Internal ID >>	03-10030-02		
Date Received >>	10/14/03		
		SDG >>	03-10030
Matrix >>	Water	Smpl Type >>	MBL

Report to

Mr. Rex Brown
OHIO EPA
Ohio Epa/Swdo
401 E. Fifth St.
Dayton, OH 45402

Contract / PO Information

FED. I.D. #59-3328623

Environmental
Final Report
Rpt Level: 2

Internal Analysis Code	MBL Analyte	Analysis Technique	MBL Result	MBL CU	MBL TPU	MBL MDC	Rpt. Units	Qualifier Codes
Am241	AM-241	Alpha Spectroscopy	9.69E-04	3.41E-03	3.41E-03	8.34E-03	pCi/l	U
Gamma	AC-228	Gamma Spectroscopy	8.91E+00	6.07E+00	6.25E+00	1.05E+01	pCi/l	U
Gamma	BI-212	Gamma Spectroscopy	7.16E+00	7.96E+00	8.10E+00	1.23E+01	pCi/l	U
Gamma	BI-214	Gamma Spectroscopy	-9.22E-01	2.95E+00	2.96E+00	4.92E+00	pCi/l	U
Gamma	CO-60	Gamma Spectroscopy	0.00E+00	0.00E+00	0.00E+00	1.87E+00	pCi/l	U
Gamma	CS-137	Gamma Spectroscopy	1.30E+00	1.08E+00	1.11E+00	1.62E+00	pCi/l	U
Gamma	K-40	Gamma Spectroscopy	-3.84E+01	3.61E+01	3.69E+01	5.71E+01	pCi/l	U
Gamma	PA-234	Gamma Spectroscopy	5.17E+01	2.05E+02	2.06E+02	3.85E+02	pCi/l	U
Gamma	PB-212	Gamma Spectroscopy	4.87E-01	2.02E+00	2.03E+00	3.35E+00	pCi/l	U
Gamma	PB-214	Gamma Spectroscopy	5.29E+00	3.84E+00	3.95E+00	5.63E+00	pCi/l	U
Gamma	TH-227	Gamma Spectroscopy	1.03E+01	3.50E+01	3.52E+01	1.04E+01	pCi/l	U
Gamma	TH-230	Gamma Spectroscopy	-6.65E+01	3.23E+02	3.24E+02	5.38E+02	pCi/l	U
Gamma	TH-234	Gamma Spectroscopy	9.89E+00	1.48E+01	1.50E+01	2.57E+01	pCi/l	U
Gamma	TL-208	Gamma Spectroscopy	4.55E+00	8.22E+00	8.31E+00	2.49E+00	pCi/l	B
H0003	H-3	Beta LSC	3.23E+00	2.41E+00	2.42E+00	4.00E+00	pCi/l	U
Po210	PO-210	Alpha Spectroscopy	5.38E-02	2.18E-02	2.18E-02	3.56E-02	pCi/l	B
PuISO	PU-238	Alpha Spectroscopy	8.76E-03	1.88E-02	1.88E-02	3.60E-02	pCi/l	U
PuISO	PU-239	Alpha Spectroscopy	7.01E-03	1.26E-02	1.26E-02	2.26E-02	pCi/l	U
Ra226	RA-226	Deemanation	6.42E-02	7.56E-02	7.57E-02	1.28E-01	pCi/l	U
ThISO	TH-228	Alpha Spectroscopy	7.05E-03	1.22E-02	1.22E-02	2.18E-02	pCi/l	U
ThISO	TH-230	Alpha Spectroscopy	9.30E-03	9.11E-03	9.18E-03	8.29E-03	pCi/l	B
ThISO	TH-232	Alpha Spectroscopy	1.16E-02	1.20E-02	1.21E-02	1.71E-02	pCi/l	U
UUISO	U-234	Alpha Spectroscopy	5.42E-03	6.13E-03	6.14E-03	4.89E-03	pCi/l	B
UUISO	U-235	Alpha Spectroscopy	3.71E-03	5.15E-03	5.15E-03	5.02E-03	pCi/l	U
UUISO	U-238	Alpha Spectroscopy	5.42E-03	6.13E-03	6.14E-03	4.89E-03	pCi/l	B

Explanation of Qualifier Codes

U = The result is less than the MDC, B = The METHOD BLANK result is greater than the METHOD BLANK MDC, R = Rerun

Explanation of Sample Types

CU= Counting Uncertainty; TPU=Total Propagation of Uncertainty; MDC=Minimum Detectable Concentration; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original; MS=Matrix Spike; MSO=Matrix Spike Original; MSD=MS Duplicate; DMSO = Dup MS Orig; LCSD=LCS Dup

At.2 P.65

EBERLINE SERVICES

Duplicate Report

Albuquerque Laboratory
7021 Pan American Fwy NE
Albuquerque, NM 87109
(505) 345-3461
www.eberlineservices.com

Client ID >> DUPLICATE

SDG >> 03-10030

Report to

Mr. Rex Brown
OHIO EPA
Ohio Epa/Swdo
401 E. Fifth St.
Dayton, OH 45402

Contract / PO Information

FED. I.D. #59-3328623

Environmental
Final Report
Rpt Level: 2

Date Received >> 10/14/03

Analyte	Rpt Units	Dup Result	Dup TPU	Original Result	Original TPU	RPD %	RER σ
AM-241	pCi/l	1.93E+00	1.61E-01	2.10E+00	1.79E-01	8.83	1.45
CO-60	pCi/l	2.97E+00	3.85E+00	1.34E+00	2.01E+00	NC	0.73
CS-137	pCi/l	5.30E+00	3.70E+00	3.74E+00	2.63E+00	NC	0.67
H-3	pCi/l	3.61E+02	2.44E+02	6.06E+02	2.54E+02	NC	1.36
PB-214	pCi/l	1.84E+01	1.31E+01	1.15E+01	6.59E+00	NC	0.93
PO-210	pCi/l	1.05E+01	4.41E-01	9.70E+00	3.91E-01	7.51	2.51
PU-238	pCi/l	2.32E-02	1.38E-02	1.68E-02	1.19E-02	NC	0.68
PU-239	pCi/l	2.84E+00	2.34E-01	2.58E+00	2.14E-01	9.93	1.67
RA-226	pCi/l	4.55E+00	4.52E-01	4.33E+00	4.44E-01	4.92	0.68
TH-228	pCi/l	-8.65E-03	1.47E-02	4.48E-08	8.78E-08	NC	1.15
TH-230	pCi/l	2.52E+00	3.25E-01	2.86E+00	3.96E-01	12.6	1.30
TH-232	pCi/l	3.41E-02	1.73E-02	5.72E-02	2.57E-02	NC	1.46
U-234	pCi/l	5.18E+00	3.45E-01	4.93E+00	3.27E-01	4.83	1.01
U-235	pCi/l	2.63E-01	4.92E-02	2.87E-01	5.09E-02	8.80	0.67
U-238	pCi/l	5.35E+00	3.54E-01	5.07E+00	3.35E-01	5.30	1.11

Abbreviations

TPU=Total Propagation of Uncertainty; RPD=Relative Percent Difference; RER=Relative Error Ratio

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EBERLINE SERVICES

Sample Data Report

Albuquerque Laboratory
7021 Pan American Fwy NE
Albuquerque, NM 87109
(505) 345-3461
www.eberlineservices.com

Client ID >>	LCS (Po-210, Ra226,PuISO,ThISO,Am241,UUISO) MPOTWE MIAMISBURG (H3) MDSDI MOUND (Gamma)
Internal ID >>	03-10030-03

Report to	Contract / PO Information				
Mr. Rex Brown	FED. I.D. #59-3328623	Date Received >>	10/14/03	Sample Date >>	10/14/2003 12:00 AM 10/09/2003 09:30 AM 10/09/2003 11:00 AM
OHIO EPA	Environmental	Matrix >>	Water		
Ohio Epa/Swdo	Final Report	Volume/Weight >>		Eberline SDG >>	03-10030
401 E. Fifth St.	Rpt Level: 2	Vol/Wt Units >>		Sample Type >>	LCSD
Dayton, OH 45402					

Internal Analysis Code	Analysis Technique	Analyte	Analysis Date	Result	Rpt. Units	CU	TPU	MDC	RDL	Qualifier Codes
Am241	Alpha Spectroscopy	AM-241	11/14/03	1.93E+00	pCi/l	1.09E-01	1.61E-01	1.63E-02	1.00E-01	
Gamma	Gamma Spectroscopy	AC-228	11/21/03	1.83E+01	pCi/l	1.53E+01	1.57E+01	3.39E+01	3.39E+01	U
Gamma	Gamma Spectroscopy	BI-212	11/21/03	6.00E+00	pCi/l	2.47E+01	2.48E+01	4.14E+01	4.14E+01	U
Gamma	Gamma Spectroscopy	BI-214	11/21/03	6.43E+00	pCi/l	9.93E+00	1.01E+01	1.58E+01	1.58E+01	U
Gamma	Gamma Spectroscopy	CO-60	11/21/03	2.97E+00	pCi/l	3.80E+00	3.85E+00	5.98E+00	1.00E-01	U>
Gamma	Gamma Spectroscopy	CS-137	11/21/03	5.30E+00	pCi/l	3.59E+00	3.70E+00	5.18E+00	1.00E-01	>
Gamma	Gamma Spectroscopy	K-40	11/21/03	-1.16E+02	pCi/l	1.17E+02	1.20E+02	1.87E+02	1.87E+02	U
Gamma	Gamma Spectroscopy	PA-234	11/21/03	4.81E+02	pCi/l	6.95E+02	7.04E+02	1.23E+03	1.23E+03	U
Gamma	Gamma Spectroscopy	PB-212	11/21/03	-1.48E+00	pCi/l	6.67E+00	6.69E+00	1.11E+01	1.11E+01	U
Gamma	Gamma Spectroscopy	PB-214	11/21/03	1.84E+01	pCi/l	1.27E+01	1.31E+01	1.84E+01	1.84E+01	
Gamma	Gamma Spectroscopy	TH-227	11/21/03	4.09E+00	pCi/l	1.16E+02	1.16E+02	3.39E+01	3.39E+01	U
Gamma	Gamma Spectroscopy	TH-230	11/21/03	-9.08E+02	pCi/l	1.12E+03	1.14E+03	1.78E+03	1.78E+03	U
Gamma	Gamma Spectroscopy	TH-234	11/21/03	2.24E+01	pCi/l	4.75E+01	4.79E+01	8.43E+01	8.43E+01	U
Gamma	Gamma Spectroscopy	TL-208	11/21/03	1.31E+01	pCi/l	2.69E+01	2.72E+01	8.27E+00	8.27E+00	
H0003	Beta LSC	H-3	10/17/03	3.61E+02	pCi/l	2.42E+02	2.44E+02	4.01E+02	5.00E+02	U
Po210	Alpha Spectroscopy	PO-210	11/06/03	1.05E+01	pCi/l	2.94E-01	4.41E-01	5.47E-02	1.00E-01	
PuISO	Alpha Spectroscopy	PU-239	11/12/03	2.84E+00	pCi/l	1.37E-01	2.34E-01	2.03E-02	1.00E-01	
Ra226	Deemanation	RA-226	11/18/03	4.55E+00	pCi/l	3.05E-01	4.52E-01	7.43E-02	1.00E-01	
ThISO	Alpha Spectroscopy	TH-230	11/06/03	2.52E+00	pCi/l	1.44E-01	3.25E-01	1.57E-02	1.00E-01	
UUISO	Alpha Spectroscopy	U-238	11/05/03	5.35E+00	pCi/l	2.10E-01	3.54E-01	5.81E-03	1.00E-01	

Explanation of Qualifier Codes

U The result is less than the MDC
J The result is less than RDL and no U qualifier is assigned
> The MDC is greater than the RDL

Abbreviations

CU= Counting Uncertainty; TPU=Total Propagation of Uncertainty; MDC=Minimum Detectable Concentration; LCS=Laboratory Control Sample; MBL=Blank; DUP=Duplicate; TRG=Normal Sample; DO=Duplicate Original; MS=Matrix Spike; MSO=Matrix Spike Original; MSD=MS Duplicate; DMSO = Dup MS Orig; LCSD=LCS Dup

At. 2 P. 67

Chain of Custody

At.2 P.68

EBERLINE SERVICES

Sample And Shipment Receiving Report

Work Order 0310029 Customer OHIOEPA_E Date Received: 10/14/03 Carrier: FedEx Number of containers: 1	Recorded by: Mharmon Date: 10/14/03 Sample matrix: Sludge Analysis Requested: IsoPu,IsoU,IsoTh,Am241,Pb210,Gamma Number of Samples: 2

Shipment Integrity	N/A	Present	Absent	OK	Problems* or notations
Carrier Tracking Numbers				X	
Shipping Container Custody Seals				X	
Container Integrity				X	
Label Legibility				X	
Preservation	X				
Sample Custody Records				X	
Sample Container Custody Seals				X	
Other (specify)					

*List problems

NOTE: MAKE 3 COPIES, 1 COPY TO CLIENT, 1 COPY FOR LOGIN TECH FILES, 1 COPY TO DATA REVIEW FOLDER

At. 2 P. 69

EBERLINE SERVICES

Albuquerque Laboratory 7021 Pan American Frwy.,NE Albuquerque, NM 87109 Voice (505) 345-3461 Fax (505) 761-5416

Discrepancy Sample Receiving Report

Discrepancy Originator: MHarmon	Date: 10/14/03
Resolved by: MHarmon	Date: 10/15/03

Work Order Number:0310029

Customer: OHIOEPA_E	Telephone number: 937-285-6453
Client contact: Donna Bohannon	Date Received: 10/14/03

Sample Matrix: Sludge	Discrepancy Index Number: 7

Sample Control Supervisor notified: MHarmon

Problem: analysis for Ra226, Ra228 AND Po210 not listed on Chain of Custody. Chain of Custody listed Pb210 by gamma analysis and Ac227 by Alpha Spec. All analysis mentioned on accompanying email printout. Needed clarification on drying sludge prior to analysis and method of Ra226 analysis.

Resolution: Contacted Ms. Bohannon who indicated referencing the printed email to resolve all questions on analysis required. Pb210 to be done by Alpha Spec. Ac227 to be done by Gamma Spec. Both Ra226 and Ra228 along with Po210 to be done as stated on email printout. Ms. Kathy Lee Fox called and indicated using a dry sludge analysis.

Discrepancy Index

1	Sample screening shows elevated reading (enter reading)
2	Sample container damaged in transit (specify)
3	Client custody seals broken (specify)
4	Inner packing media insufficient (specify)
5	Sample I.D. missing/or unreadable (specify)
6	Insufficient sample volume provided (specify)
7	COC papers not in order/provided (specify)
8	Analysis not specified
9	Sample quantity does not match COC (specify)
10	Other (please specify)

Note: Make 2 copies. Original-client Copy 1 – Data Packet Copy 2 – Sample Control

At. 2 P. 70

EBERLINE SERVICES

7021 Pan American Hwy. N.E.
Albuquerque, NM 87109
Telephone (505) 345-3461
Fax (505) 761-5416

TELEPHONE CALL LOG

Name____Karen Schoendaller_____10/15/2003
Contact_____Donna Bohannen_____Service_____
Company_____OHIO EPA_____Call was: _____ Initiated x
City, State_____ _____ _____ Received
Telephone No._____

Conversation: Although the Po-210 was not listed on the COCs for the water and sludge, Donna said to analyze for them and she would assume responsibility.

Actions Required:_____

CC:_____

_Karen S. Schoendaller_Karen S. Schoendaller
Signed

At. 2 P. 71

CUSTODY TRANSFER AND ANALYSIS REQUEST RECORD

Control#: KLF028

Ohio EPA/SWDO
Office of Federal Facilities Oversight
401 East Fifth Street Dayton, Ohio 45402-2911
Sampler Contact: Kathy Lee Fox
Phone: (937) 2856441

Page 1 of 1

Eberline Services
7021 Pan American Highway, NE
Albuquerque, NM 87109-3874
505-345-3461
Attn: Debbie Garcia

Purchase Order # : E93132
Project # : ESW 031009
Lab Contact: Debbie Garcia

CR: DOE MOUND

SAMPLE INFORMATION					REQUESTED ANALYSIS									METHOD						
Sample Identification	Description	Media	Collection Date/Time	Container	Isotopic Plutonium	Isotopic Uranium	Isotopic Thorium	Ac-227+D	Am-241	Cs-137+D gamma spec	Co-60 gamma spec	Pb-210+D gamma spec	Pb-210	Tritium	Preservative, nitric acid	Preservative, ice		Notes: isotopic analyses	Required Detection Limit	Condition on Receipt (Lab)
MPOTWS	MIAMISBURG	SL	10-9-03 1000	2-1L	X	X	X	X	X	X	X	X	X		X			Isotopes needed:	*	
MPOTWS	MIAMISBURG	SL	10-9-03 1000	1-125 mL										X				Pu-238, Pu-239/240;	SEE	
MPOTWE	MIAMISBURG	EFF	10-9-03 0930	5-1L	X	X	X	X	X	X	X	X	X		X			Ra-226+D;	ATTACHED	
MPOTWE	MIAMISBURG	EFF	10-9-03 0930	1-125 mL										X				U-233/234, U-235,		
MPOTWI	MIAMISBURG	INF	10-9-03 0915	5-1L	X	X	X	X	X	X	X	X	X		X			U-238+D;		
MPOTWI	MIAMISBURG	INF	10-9-03 0915	1-125 mL										X				Th-228, Th-230+D,		
MDSDI	MOUND	INF	10-9-03 1100	5-1L	X	X	X	X	X	X	X	X	X		X			Th-232+D		
MDSDI	MOUND	INF	10-9-03 1100	1-125 mL										X						
MDSDS	MOUND	SL	10-9-03 1120	2-1L	X	X	X	X	X	X	X	X	X							
MDSDS	MOUND	SL	10-9-03 1120	1-125 mL										X						

1. Relinquished by: Signature/Affiliation: Kathy Lee Fox OEPA — Date/Time: 10/9/03 1095	1. Received by: Signature/Affiliation: ESM — Date/Time: 101403 1430
2. Relinquished by: Signature/Affiliation — Date/Time	2. Received by: Signature/Affiliation — Date/Time

MEDIA CODES:
INF-INFLUENT
EFF-EFFLUENT
SL-SLUDGE

Possible Hazard Identification:
- [X] Non Hazard
- [ ] Flammable
- [ ] Skin Irritant
- [ ] Other

Sample Disposal:
- [ ] Return to Client
- [X] Disposal by Lab
- [ ] Archive 12 (months)

ALL SAMPLES RAD SCREENED
DATE 101403 BY MRH

Turn-around Time Required:
- [ ] Normal
- [X] Rush - 45 days

Bill to:
Ohio Environmental Protection Agency
Southwest District Office
Office of Federal Facilities Oversight
401 E. Fifth Street
Dayton, Ohio 45402
Attn: Becky Hegyi (937) 285-6462

Report to:
Ohio Environmental Protection Agency
Southwest District Office
401 E. Fifth Street
Dayton, Ohio 45402
Attn: Donna Bohannon
Phone: 937-285-6453

Not required per IATA activity <0.002 uCi/g
COC sealed in cooler
Return Cooler to: Kathy Lee Fox, above address
Phone Number: (937) 285-6441

SAMPLES SHIPPED VIA: FEDERAL EXPRESS
TRACKING NUMBER: 8435 3625 6497

03-10-29

AF.2 P. 72

Attachment E
Ohio EPA Data Package -Inorganic and Organic Analytes

Client Site Name	Client_Sample_ID	LAB_SAMPLE_NO	DATE_SAMPLE	SAMPLE_M	PARAMETERS	RESULT	QUALIFIER	UNITS	REPORTING_LIMIT_A	MDL_Ad	DILUT	Percen
GSW031009-FF	MDSDS	310070-002-008-1/1	10/09/2003	SOIL	Percent Solids	30		%	1	1	1	70.39
GSW031009-FF	MPOTWI	310070-004-018-1/1	10/09/2003	SOIL	Percent Solids	17		%	1	1	1	83.45
GSW031009-FF	MDSDI	310070-001-006-1/2	10/09/2003	WATER	pH	8.2		pH	0	0	1	
GSW031009-FF	MDSDI	310070-001-006-1/2MD	10/09/2003	WATER	pH	8.2		pH	0	0	1	
GSW031009-FF	MDSDI	310070-001-006-1/2	10/09/2003	WATER	Total dissolved solids (r	3900		mg/L	10	10	1	
GSW031009-FF	MDSDI	310070-001-006-1/2MD	10/09/2003	WATER	Total dissolved solids (r	3900		mg/L	10	10	1	
GSW031009-FF	MDSDI	310070-001-006-1/2	10/09/2003	WATER	Suspended solids (resid	180		mg/L	5	5	1	
GSW031009-FF	MDSDI	310070-001-006-1/2MD	10/09/2003	WATER	Suspended solids (resid	180		mg/L	5	5	1	
GSW031009-FF	MDSDS	310070-002-009-1/1	10/09/2003	SOIL	Total solids	150		mg/kg	0	0	1	70.39
GSW031009-FF	MDSDS	310070-002-009-1/1MD	10/09/2003	SOIL	Total solids	150		mg/kg	0	0	1	70.39
GSW031009-FF	MPOTWI	310070-004-017-1/1	10/09/2003	SOIL	Total solids	420		mg/kg	0	0	1	83.45
GSW031009-FF	MDSDI	310070-001-002-1/1	10/09/2003	WATER	Barium	49.1		ug/L	2.5	0.1	1	
GSW031009-FF	MDSDI	310070-001-002-1/1	10/09/2003	WATER	Cadmium	0.31	B	ug/L	3	0.15	1	
GSW031009-FF	MDSDI	310070-001-002-1/1	10/09/2003	WATER	Chromium	1.8	B	ug/L	2.5	0.2	1	
GSW031009-FF	MDSDI	310070-001-002-1/1	10/09/2003	WATER	Copper	390		ug/L	5	0.9	1	
GSW031009-FF	MDSDI	310070-001-002-1/1	10/09/2003	WATER	Lead	5.2		ug/L	5	0.7	1	
GSW031009-FF	MDSDI	310070-001-002-1/1	10/09/2003	WATER	Nickel	3.9	B	ug/L	5	0.5	1	
GSW031009-FF	MDSDI	310070-001-002-1/1	10/09/2003	WATER	Strontium	268		ug/L	5	5	2	
GSW031009-FF	MDSDI	310070-001-002-1/1	10/09/2003	WATER	Zinc	114		ug/L	10	1.2	1	
GSW031009-FF	MDSDI	310070-001-002-1/1D	10/09/2003	WATER	Barium	50.2		ug/L	2.5	0.1	1	
GSW031009-FF	MDSDI	310070-001-002-1/1D	10/09/2003	WATER	Cadmium	0.27	B	ug/L	3	0.15	1	
GSW031009-FF	MDSDI	310070-001-002-1/1D	10/09/2003	WATER	Chromium	2	B	ug/L	2.5	0.2	1	
GSW031009-FF	MDSDI	310070-001-002-1/1D	10/09/2003	WATER	Copper	415		ug/L	5	0.9	1	
GSW031009-FF	MDSDI	310070-001-002-1/1D	10/09/2003	WATER	Lead	5.9		ug/L	5	0.7	1	
GSW031009-FF	MDSDI	310070-001-002-1/1D	10/09/2003	WATER	Nickel	4	B	ug/L	5	0.5	1	
GSW031009-FF	MDSDI	310070-001-002-1/1D	10/09/2003	WATER	Strontium	277		ug/L	2.5	2.5	2	
GSW031009-FF	MDSDI	310070-001-002-1/1D	10/09/2003	WATER	Zinc	119		ug/L	10	1.2	1	
GSW031009-FF	MDSDI	310070-001-002-1/1S	10/09/2003	WATER	Barium	101.4		%	2.5	0.1	1	
GSW031009-FF	MDSDI	310070-001-002-1/1S	10/09/2003	WATER	Cadmium	100.6		%	3	0.15	1	
GSW031009-FF	MDSDI	310070-001-002-1/1S	10/09/2003	WATER	Chromium	95.6		%	2.5	0.2	1	
GSW031009-FF	MDSDI	310070-001-002-1/1S	10/09/2003	WATER	Copper	107.5		%	5	0.9	1	
GSW031009-FF	MDSDI	310070-001-002-1/1S	10/09/2003	WATER	Lead	102.1		%	5	0.7	1	
GSW031009-FF	MDSDI	310070-001-002-1/1S	10/09/2003	WATER	Nickel	96.4		%	5	0.5	1	
GSW031009-FF	MDSDI	310070-001-002-1/1S	10/09/2003	WATER	Strontium	108		%	2.5	2.5	2	
GSW031009-FF	MDSDI	310070-001-002-1/1S	10/09/2003	WATER	Zinc	105		%	10	1.2	1	
GSW031009-FF	MPOTWI	310070-003-013-1/1	10/09/2003	WATER	Barium	211		ug/L	2.5	0.1	1	
GSW031009-FF	MPOTWI	310070-003-013-1/1	10/09/2003	WATER	Cadmium	0.26	B	ug/L	3	0.15	1	
GSW031009-FF	MPOTWI	310070-003-013-1/1	10/09/2003	WATER	Chromium	3.9		ug/L	2.5	0.2	1	
GSW031009-FF	MPOTWI	310070-003-013-1/1	10/09/2003	WATER	Copper	125		ug/L	5	0.9	1	
GSW031009-FF	MPOTWI	310070-003-013-1/1	10/09/2003	WATER	Lead	4.1	B	ug/L	5	0.7	1	
GSW031009-FF	MPOTWI	310070-003-013-1/1	10/09/2003	WATER	Nickel	2.8	B	ug/L	5	0.5	1	
GSW031009-FF	MPOTWI	310070-003-013-1/1	10/09/2003	WATER	Strontium	837		ug/L	2.5	2.5	1	
GSW031009-FF	MPOTWI	310070-003-013-1/1	10/09/2003	WATER	Zinc	130		ug/L	10	1.2	1	
GSW031009-FF	BKS63274	BKS63274	10/09/2003	WATER	Barium	104.8		%	2.5	0.1	1	
GSW031009-FF	BKS63274	BKS63274	10/09/2003	WATER	Cadmium	106.8		%	3	0.15	1	
GSW031009-FF	BKS63274	BKS63274	10/09/2003	WATER	Chromium	98.6		%	2.5	0.2	1	
GSW031009-FF	BKS63274	BKS63274	10/09/2003	WATER	Copper	104.8		%	5	0.9	1	
GSW031009-FF	BKS63274	BKS63274	10/09/2003	WATER	Lead	103.7		%	5	0.7	1	
GSW031009-FF	BKS63274	BKS63274	10/09/2003	WATER	Nickel	100.1		%	5	0.5	1	
GSW031009-FF	BKS63274	BKS63274	10/09/2003	WATER	Strontium	110.7		%	2.5	2.5	1	
GSW031009-FF	BKS63274	BKS63274	10/09/2003	WATER	Zinc	105.5		%	10	1.2	1	
GSW031009-FF	BLK63274	BLK63274	10/09/2003	WATER	Barium	0.34	B	ug/L	2.5	0.1	1	
GSW031009-FF	BLK63274	BLK63274	10/09/2003	WATER	Cadmium	0.15	U	ug/L	3	0.15	1	

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GSW031009-FF	BLK63274	BLK63274	10/09/2003	WATER	Chromium	0.2	U	ug/L	2.5	0.2	1	
GSW031009-FF	BLK63274	BLK63274	10/09/2003	WATER	Copper	0.9	U	ug/L	5	0.9	1	
GSW031009-FF	BLK63274	BLK63274	10/09/2003	WATER	Lead	0.7	U	ug/L	5	0.7	1	
GSW031009-FF	BLK63274	BLK63274	10/09/2003	WATER	Nickel	-0.61	B	ug/L	5	0.5	1	
GSW031009-FF	BLK63274	BLK63274	10/09/2003	WATER	Strontium	2.5	U	ug/L	2.5	2.5	1	
GSW031009-FF	BLK63274	BLK63274	10/09/2003	WATER	Zinc	1.2	U	ug/L	10	1.2	1	
GSW031009-FF	MDSDI	310070-001-002-1/1	10/09/2003	WATER	Mercury	0.28		ug/L	0.2	0.1	1	
GSW031009-FF	MPOTWI	310070-003-013-1/1	10/09/2003	WATER	Mercury	0.36		ug/L	0.2	0.1	1	
GSW031009-FF	MPOTWI	310070-003-013-1/1	10/09/2003	WATER	Mercury	89.2		%	0.2	0.1	1	
GSW031009-FF	MPOTWI	310070-003-013-1/1	10/09/2003	WATER	Mercury	0.45		ug/L	0.2	0.1	1	
GSW031009-FF	BKS63378	BKS63378	10/09/2003	WATER	Mercury	98.5		%	0.2	0.1	1	
GSW031009-FF	BLK63378	BLK63378	10/09/2003	WATER	Mercury	0.1	U	ug/L	0.2	0.1	1	
GSW031009-FF	MDSDS	310070-002-010-1/1	10/09/2003	SOIL	Nitrogen, Ammonia (as	34		mg/kg	14	14	1	70.39
GSW031009-FF	MDSDS	310070-002-010-1/1MD	10/09/2003	SOIL	Nitrogen, Ammonia (as	29		mg/kg	13	13	1	70.39
GSW031009-FF	MDSDS	310070-002-010-1/1MS	10/09/2003	SOIL	Nitrogen, Ammonia (as	112.7		%	13	13	1	70.39
GSW031009-FF	MPOTWI	310070-004-019-1/1	10/09/2003	SOIL	Nitrogen, Ammonia (as	3400		mg/kg	40	40	2	83.45
GSW031009-FF	MDSDI	310070-001-001-1/1	10/09/2003	WATER	Nitrogen, Ammonia (as	14.1		mg/L	0.2	0.2	2	
GSW031009-FF	MPOTWI	310070-003-012-1/1	10/09/2003	WATER	Nitrogen, Ammonia (as	21		mg/L	0.5	0.5	5	
GSW031009-FF	MDSDI	310070-001-001-1/1	10/09/2003	WATER	Nitrogen, Total Kjeldahl	29		mg/L	0.5	0.5	5	
GSW031009-FF	MDSDS	310070-002-010-1/1	10/09/2003	SOIL	Nitrogen, Total Kjeldahl	4200		mg/kg	70	70	5	70.39
GSW031009-FF	MDSDS	310070-002-010-1/1MD	10/09/2003	SOIL	Nitrogen, Total Kjeldahl	4500		mg/kg	69	69	5	70.39
GSW031009-FF	MDSDS	310070-002-010-1/1MS	10/09/2003	SOIL	Nitrogen, Total Kjeldahl	88.9		%	69	69	5	70.39
GSW031009-FF	MPOTWI	310070-003-012-1/1	10/09/2003	WATER	Nitrogen, Total Kjeldahl	35		mg/L	0.5	0.5	5	
GSW031009-FF	MPOTWI	310070-004-019-1/1	10/09/2003	SOIL	Nitrogen, Total Kjeldahl	25000		mg/kg	260	260	10	83.45
GSW031009-FF	MDSDI	310070-001-001-1/1	10/09/2003	WATER	Nitrate/Nitrite	3		mg/L	0.15	0.15	3	
GSW031009-FF	MDSDS	310070-002-010-1/1	10/09/2003	SOIL	Nitrate/Nitrite	160		mg/kg	6.2	6.2	1	70.39
GSW031009-FF	MPOTWI	310070-003-012-1/1	10/09/2003	WATER	Nitrate/Nitrite	0.38		mg/L	0.05	0.05	1	
GSW031009-FF	MPOTWI	310070-004-019-1/1	10/09/2003	SOIL	Nitrate/Nitrite	490		mg/kg	12	12	1	83.45
GSW031009-FF	MPOTWI	310070-004-019-1/1MD	10/09/2003	SOIL	Nitrate/Nitrite	550		mg/kg	12	12	1	83.45
GSW031009-FF	MPOTWI	310070-004-019-1/1MS	10/09/2003	SOIL	Nitrate/Nitrite	91.7		%	12	12	1	83.45
GSW031009-FF	MDSDI	310070-001-006-1/2	10/09/2003	WATER	Dissolved Oxygen	1.6		mg/L	1	1	1	
GSW031009-FF	MDSDI	310070-001-006-1/2MD	10/09/2003	WATER	Dissolved Oxygen	1.6		mg/L	1	1	1	
GSW031009-FF	MDSDI	310070-001-001-1/1	10/09/2003	WATER	Phosphorus, Total (as P	4.6		mg/L	0.8	0.8	40	
GSW031009-FF	MDSDS	310070-002-011-1/1	10/09/2003	SOIL	Phosphorus, Total (as P	1300		mg/kg	110	110	40	70.39
GSW031009-FF	MPOTWI	310070-003-012-1/1	10/09/2003	WATER	Phosphorus, Total (as P	6.4		mg/L	0.8	0.8	40	
GSW031009-FF	MPOTWI	310070-004-020-1/1	10/09/2003	SOIL	Phosphorus, Total (as P	2400		mg/kg	190	190	40	83.45
GSW031009-FF	MDSDI	310070-001-006-1/2	10/09/2003	WATER	Carbonaceous Biochem	29		mg/L	2	2	1	
GSW031009-FF	MDSDI	310070-001-006-1/2MD	10/09/2003	WATER	Carbonaceous Biochem	29		mg/L	2	2	1	
GSW031009-FF	MDSDI	310070-001-005-1/1	10/09/2003	WATER	Oil & Grease, Total Rec	41		mg/L	5	5	1	
GSW031009-FF	MPOTWI	310070-003-016-1/1	10/09/2003	WATER	Oil & Grease, Total Rec	46		mg/L	5	5	1	
GSW031009-FF	MDSDI	310070-001-003-1/2	10/09/2003	WATER	Decachlorobiphenyl	74		%	1	1	1	
GSW031009-FF	MDSDI	310070-001-003-1/2	10/09/2003	WATER	Decachlorobiphenyl	54		%	1	1	1	
GSW031009-FF	MDSDI	310070-001-003-1/2	10/09/2003	WATER	Tetrachloro-m-xylene	72		%	1	1	1	
GSW031009-FF	MDSDI	310070-001-003-1/2	10/09/2003	WATER	Tetrachloro-m-xylene	61		%	1	1	1	
GSW031009-FF	MPOTWI	310070-003-014-1/2	10/09/2003	WATER	Decachlorobiphenyl	53		%	1	1	1	
GSW031009-FF	MPOTWI	310070-003-014-1/2	10/09/2003	WATER	Decachlorobiphenyl	43		%	1	1	1	
GSW031009-FF	MPOTWI	310070-003-014-1/2	10/09/2003	WATER	Tetrachloro-m-xylene	72		%	1	1	1	
GSW031009-FF	MPOTWI	310070-003-014-1/2	10/09/2003	WATER	Tetrachloro-m-xylene	39		%	1	1	1	
GSW031009-FF	MPOTWI	310070-003-014-1/2MS	10/09/2003	WATER	Decachlorobiphenyl	52		%	1	1	1	
GSW031009-FF	MPOTWI	310070-003-014-1/2MS	10/09/2003	WATER	Decachlorobiphenyl	44		%	1	1	1	
GSW031009-FF	MPOTWI	310070-003-014-1/2MS	10/09/2003	WATER	Tetrachloro-m-xylene	62		%	1	1	1	
GSW031009-FF	MPOTWI	310070-003-014-1/2MS	10/09/2003	WATER	Tetrachloro-m-xylene	37		%	1	1	1	
GSW031009-FF	BKS63165	BKS63165		WATER	Decachlorobiphenyl	110		%	1	1	1	
GSW031009-FF	BKS63165	BKS63165		WATER	Decachlorobiphenyl	89		%	1	1	1	

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GSW031009-FF	BKS63165	BKS63165		WATER	Tetrachloro-m-xylene	94		%	1	1	1	
GSW031009-FF	BKS63165	BKS63165		WATER	Tetrachloro-m-xylene	98		%	1	1	1	
GSW031009-FF	BLK63165	BLK63165		WATER	Decachlorobiphenyl	107		%	1	1	1	
GSW031009-FF	BLK63165	BLK63165		WATER	Decachlorobiphenyl	111		%	1	1	1	
GSW031009-FF	BLK63165	BLK63165		WATER	Tetrachloro-m-xylene	95		%	1	1	1	
GSW031009-FF	BLK63165	BLK63165		WATER	Tetrachloro-m-xylene	100		%	1	1	1	
GSW031009-FF	MDSDI	310070-001-003-1/2	10/09/2003	WATER	Dieldrin	0.02	U	ug/L	0.02	0.002	1	
GSW031009-FF	MDSDI	310070-001-003-1/2	10/09/2003	WATER	Gamma-BHC (Lindane)	0.02	U	ug/L	0.02	0.002	1	
GSW031009-FF	MPOTWI	310070-003-014-1/2	10/09/2003	WATER	Dieldrin	0.03	U	ug/L	0.03	0.003	1	
GSW031009-FF	MPOTWI	310070-003-014-1/2	10/09/2003	WATER	Gamma-BHC (Lindane)	0.03	U	ug/L	0.03	0.003	1	
GSW031009-FF	MPOTWI	310070-003-014-1/2MS	10/09/2003	WATER	Dieldrin	50		%	0.03	0.003	1	
GSW031009-FF	MPOTWI	310070-003-014-1/2MS	10/09/2003	WATER	Gamma-BHC (Lindane)	52		%	0.03	0.003	1	
GSW031009-FF	BKS63165	BKS63165		WATER	Dieldrin	66		%	0.02	0.002	1	
GSW031009-FF	BKS63165	BKS63165		WATER	Gamma-BHC (Lindane)	82		%	0.02	0.002	1	
GSW031009-FF	BLK63165	BLK63165		WATER	Dieldrin	0.02	U	ug/L	0.02	0.002	1	
GSW031009-FF	BLK63165	BLK63165		WATER	Gamma-BHC (Lindane)	0.02	U	ug/L	0.02	0.002	1	
GSW031009-FF	MDSDS	310070-002-008-1/1	10/09/2003	SOIL	Barium	533		mg/kg	1.3	0.11	1	70.39
GSW031009-FF	MDSDS	310070-002-008-1/1	10/09/2003	SOIL	Cadmium	1.9		mg/kg	1.6	0.053	1	70.39
GSW031009-FF	MDSDS	310070-002-008-1/1	10/09/2003	SOIL	Chromium	80		mg/kg	1.3	0.11	1	70.39
GSW031009-FF	MDSDS	310070-002-008-1/1	10/09/2003	SOIL	Copper	4540		mg/kg	5.3	0.42	2	70.39
GSW031009-FF	MDSDS	310070-002-008-1/1	10/09/2003	SOIL	Lead	70.8		mg/kg	2.6	0.45	1	70.39
GSW031009-FF	MDSDS	310070-002-008-1/1	10/09/2003	SOIL	Nickel	41.6		mg/kg	2.6	0.29	1	70.39
GSW031009-FF	MDSDS	310070-002-008-1/1	10/09/2003	SOIL	Strontium	218		mg/kg	1.3	1.3	1	70.39
GSW031009-FF	MDSDS	310070-002-008-1/1	10/09/2003	SOIL	Zinc	850		mg/kg	5.3	0.47	1	70.39
GSW031009-FF	MPOTWI	310070-004-018-1/1	10/09/2003	SOIL	Barium	1140		mg/kg	2.2	0.18	1	83.45
GSW031009-FF	MPOTWI	310070-004-018-1/1	10/09/2003	SOIL	Cadmium	2.5	B	mg/kg	2.6	0.088	1	83.45
GSW031009-FF	MPOTWI	310070-004-018-1/1	10/09/2003	SOIL	Chromium	54		mg/kg	2.2	0.18	1	83.45
GSW031009-FF	MPOTWI	310070-004-018-1/1	10/09/2003	SOIL	Copper	1180		mg/kg	4.4	0.35	1	83.45
GSW031009-FF	MPOTWI	310070-004-018-1/1	10/09/2003	SOIL	Lead	46		mg/kg	4.4	0.75	1	83.45
GSW031009-FF	MPOTWI	310070-004-018-1/1	10/09/2003	SOIL	Nickel	17.6		mg/kg	4.4	0.49	1	83.45
GSW031009-FF	MPOTWI	310070-004-018-1/1	10/09/2003	SOIL	Strontium	385		mg/kg	2.2	2.2	1	83.45
GSW031009-FF	MPOTWI	310070-004-018-1/1	10/09/2003	SOIL	Zinc	966		mg/kg	8.8	0.79	1	83.45
GSW031009-FF	BKS63210	BKS63210	10/21/2003	SOIL	Barium	100.4		%	0.5	0.04	1	
GSW031009-FF	BKS63210	BKS63210	10/21/2003	SOIL	Cadmium	102.9		%	0.6	0.02	1	
GSW031009-FF	BKS63210	BKS63210	10/21/2003	SOIL	Chromium	104.9		%	0.5	0.04	1	
GSW031009-FF	BKS63210	BKS63210	10/21/2003	SOIL	Copper	106.9		%	1	0.08	1	
GSW031009-FF	BKS63210	BKS63210	10/21/2003	SOIL	Lead	102		%	1	0.17	1	
GSW031009-FF	BKS63210	BKS63210	10/21/2003	SOIL	Nickel	101.5		%	1	0.11	1	
GSW031009-FF	BKS63210	BKS63210	10/21/2003	SOIL	Strontium	104.1		%	0.5	0.5	1	
GSW031009-FF	BKS63210	BKS63210	10/21/2003	SOIL	Zinc	102.8		%	2	0.18	1	
GSW031009-FF	BLK63210	BLK63210	10/21/2003	SOIL	Barium	0.32	B	mg/kg	0.5	0.04	1	
GSW031009-FF	BLK63210	BLK63210	10/21/2003	SOIL	Cadmium	-0.039	B	mg/kg	0.6	0.02	1	
GSW031009-FF	BLK63210	BLK63210	10/21/2003	SOIL	Chromium	0.096	B	mg/kg	0.5	0.04	1	
GSW031009-FF	BLK63210	BLK63210	10/21/2003	SOIL	Copper	0.092	B	mg/kg	1	0.08	1	
GSW031009-FF	BLK63210	BLK63210	10/21/2003	SOIL	Lead	0.2	B	mg/kg	1	0.17	1	
GSW031009-FF	BLK63210	BLK63210	10/21/2003	SOIL	Nickel	-0.37	B	mg/kg	1	0.11	1	
GSW031009-FF	BLK63210	BLK63210	10/21/2003	SOIL	Strontium	0.5	U	mg/kg	0.5	0.5	1	
GSW031009-FF	BLK63210	BLK63210	10/21/2003	SOIL	Zinc	0.18	U	mg/kg	2	0.18	1	
GSW031009-FF	MDSDI	310070-001-006-1/2	10/09/2003	WATER	Chromium, Hexavalent	0.01	U	mg/L	0.01	0.01	1	
GSW031009-FF	MDSDI	310070-001-006-1/2MD	10/09/2003	WATER	Chromium, Hexavalent	0.01	U	mg/L	0.01	0.01	1	
GSW031009-FF	MDSDI	310070-001-006-1/2MS	10/09/2003	WATER	Chromium, Hexavalent	110		%	0.01	0.01	1	
GSW031009-FF	MDSDS	310070-002-008-1/1	10/09/2003	SOIL	Mercury	2.7		mg/kg	0.091	0.046	1	70.39
GSW031009-FF	MPOTWI	310070-004-018-1/1	10/09/2003	SOIL	Mercury	2.5		mg/kg	0.16	0.081	1	83.45
GSW031009-FF	BKS63130	BKS63130	10/02/2003	SOIL	Mercury	104		%	0.033	0.017	1	

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GSW031009-FF	BLK63130	BLK63130	10/02/2003	SOIL	Mercury	0.017	U	mg/kg	0.033	0.017	1	
GSW031009-FF	MDSDS	310070-002-011-1/1	10/09/2003	SOIL	pH	5.6		pH	0	0	1	70.39
GSW031009-FF	MDSDS	310070-002-011-1/1MD	10/09/2003	SOIL	pH	5.6		pH	0	0	1	70.39
GSW031009-FF	MPOTWI	310070-004-020-1/1	10/09/2003	SOIL	pH	7.7		pH	0	0	1	83.45

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Sludge Radiological Characterization

	LSCdry	LSCwet	Alpha Spec									
	H-3	H-3	Am-241	Pu-238	Pu-239/24	Ac-227	Th-228	Th-230	Th-232	U-233/234	U235/236	U-238
	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Mound Sludge	0.725	0.254	0.184	16.5	0.196	0.0164	1.03	1.11	0.622	1.64	< 0.02	1.15
	4.53	1.59	0.118	15.4	0.199		1.32	0.751	0.644	1.73	0.067	1.13
Miamisburg Sludge	< 0.064	< 0.010	0.034	0.040	0.049	0.013	0.664	0.874	0.119	1.47	0.087	1.16
	0.342	0.051	< 0.007	0.001	< 0.005		0.506	0.295	0.127	1.53	0.054	1.37
Mound Sludge DUP	0.685	0.240	0.089	15.1	0.159	0.0131	1.14	1.20	0.699	1.85	< 0.048	1.21
Blank	< MDC	< MDC	0.035	< MDC	0.059	< MDC	0.021	< MDC	0.006	< MDC	< MDC	< MDC
LCS (% recovery)	91	91	92	N/A	96	N/A	N/A	105	N/A	83	N/A	90
Mound Sludge MS	74	74	89	N/A	99	N/A	N/A	102	N/A	98	N/A	96
	Blank cells non-reported results				Wet H-3 assumes 35% dry for Mound and 15% dry for City (see Sludge Physical)							
	RED results are from OHEPA											

	Gamma Spec														
	Cs-137	Co-60	Pb-210	Ra-226	Ra-228	Ac-228	Bi-212	Bi-214	Pa-234	Pb-212	Pb-214	Ra-226	Th-227	Th-234	Tl-208
	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
Mound Sludge	< 0.088	< 0.070	2.04	1.96	1.54										
	0.096	< 0.093		2.37		1.16	< 0.676	1.43	< 13.2	0.792	1.73	1.58	1.21	< 0.735	0.331
Miamisburg Sludge	< 0.058	< 0.057	< 16.9	3.15	0.601										
	< 0.097	< 0.115		2.95		1.48	< 0.790	2.89	< 15.1	< 0.160	3.24	3.08	1.98	< 0.864	0.222
Mound Sludge DUP	< MDC	< MDC	1.15	1.09	0.501										
Blank	< MDC	< MDC	1.01	< MDC	0.105										
LCS (% recovery)	N/A	N/A	N/A	84	N/A										
	Blank cells non-reported results														
	RED results are from OHEPA														

Influent and Effluent Radiological Characterization

	GPC			LSC	Alpha Spec									
	Alpha Total Ra-226	Liquids Ra-228	Pb-210 (GPC)	H-3	Am-241	Pu-238	Pu-239/240	Ac-227	Th-228	Th-230	Th-232	U-233/234	U235/236	U-238
	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L
Mound Influent	< 0.701	< 1.01	< 1.84	345	< 0.099	0.300	0.123	0.025	0.178	0.806	< 0.021	0.315	0.043	0.209
	< 0.221			2,030	< 0.022	0.080	< 0.021		< 0.073	< 0.061	< 0.048	0.412	0.046	0.326
Miamisburg Influent	< 0.724	< 1.12	< 1.84	< 131	< 0.084	< 0.100	0.191	< 0.021	0.278	0.557	0.025	0.623	0.084	0.508
	< 0.219			587	< 0.027	< 0.031	< 0.045		< 0.058	0.049	0.029	0.714	< 0.018	0.535
Miamisburg Effluent	< 1.03	< 2.26	< 1.96	< 131	< 0.070	< 0.102	0.248	0.030	0.550	0.504	< 0.022	0.487	< 0.032	0.494
	< 0.202			606	< 0.033	< 0.020	< 0.020		< 0.087	0.023	< 0.039	0.610	< 0.017	0.477
Blank	< MDC	< MDC	< MDC	< MDC	< MDC	< MDC	0.065	< MDC	< MDC	< MDC	< MDC	0.058	0.027	0.022
Miamisburg Effluent DUP	N/A	N/A	N/A	< MDC	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Miamisburg Effluent MS	100	90	N/A	83	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Miamisburg Influent DUP	N/A	N/A	N/A	N/A	< MDC	< MDC	0.176	< MDC	0.166	0.325	< MDC	0.480	0.0378	0.600
Miamisburg Influent MS	N/A	N/A	93	N/A	93	N/A	95	N/A	N/A	98	N/A	97	N/A	97
LCS	109	95	102	95	100	N/A	99	N/A	N/A	102	N/A	89	N/A	89
	blank cells are not reported													
	RED results are from OHEPA													

	Gamma Spec												
	Cs-137	Co-60	Pb-210	Ac-228	Bi-212	Bi-214	Pa-234	Pb-212	Pb-214	Th-227	Th-230	Th-234	Tl-208
	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L	pCi/L
Mound Influent	< 6.86	< 6.37	< 699										
	< 3.70	< 3.17		< 23.2	< 27.9	20.1	< 706	< 7.16	< 12.2	< 22.6	< 1,130	< 54.0	< 5.82
Miamisburg Influent	< 6.22	< 7.74	< 698										
	< 5.40	< 6.26		< 35.4	< 41.1	< 16.7	< 1,290	< 11.3	< 18.7	< 35.2	< 1,830	< 85.8	< 8.34
Miamisburg Effluent	< 7.14	< 6.48	< 703										
	< 5.28	< 6.36		< 33.9	< 40.8	< 15.5	< 1,310	< 11.1	< 18.5	< 33.3	< 1,800	< 84.5	< 8.09
Blank	< MDC	< MDC	< MDC										
Mound Influent DUP	< MDC	< MDC	< MDC										
LCS	109	92	102										
	blank cells are not reported												
	RED results are from OHEPA												

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Attachment F
CH2M HILL / GEL Data Package - Sludge and Influent

Sludge Physical Characterization

	Percent Solids	Total Volatile Solids	pH	
		mg/kg		
Mound Sludge	35.1	958,000	5.17	
	30		5.6	
Miamisburg Sludge	15.1	755,000	7.62	
	17		7.7	
Mound Sludge DUP	33.0			
	EPA report results		(no report of TVS)	

Influent and Effluent Physical Characterization

	Total Suspended Solids	Total Dissolved Solids	Oil & Grease	Temp °C	pH	Fecal Coliform	CBOD
	mg/L	mg/L	mg/L			/ 100ml	mg/L
Mound Influent	193	1,020	24.2	22	8.34	> 6,670	219
	180	3,900	41		8.2		29
Miamisburg Influe	231	1,050	17.9			> 6,670	114
			46		7.7		
LCS (% recovery)		97	93				
	EPA report results		(no report to city TSS, TDS, CBOD; No Temp & Fecal)				
	LCS - Labatory Control Sample						

Sludge Inorganic Characterization

	As	Cd	Cu	Pb	Mo	Nl	Se	Zn	Hg	Total Kjeldahl Nitrogen	Total P	Ammonia Nitrogen
	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
Mound Sludge	< 5.08	*1.87*	5,180	78.9	14.5	50.2	*10.8*	951	1.90	28,100	13,500	41.9
		1.9	4,540	70.8		41.6		850	2.70	4,200	1,300	31.5
Miamisburg Sludge	< 10.6	*2.66*	982	*46.8*	33.2	36.8	*13.9*	837	2.27	28,700	26,800	3,310
		< 2.5	1,180	46		17.6		966	2.5	25,000	2,400	3,400
Mound Sludge DUP	ND	*1.95*	4,550	65.2	11.7	38.9	*7.33*	791	2.17	26,600	12,600	46.5
Blank								*0.75*				
LCS (% recovery)	90	92	93	92	91	94	89	90	102	108	102	102
Mound Sludge MS	87	85	N/A	85	85	82	86	**65**	106	N/A	N/A	**70**
Mound Sludge MSD	85	84	N/A	82	84	80	86	**57**	87	N/A		
Mound Sludge PS			89					88				
	Blank cells are nondetects											
	Italics results are detects below the Practical Quantitation Level											
	Bold results are QC values outside acceptable criteria											
	LCS - Labatory Control Sample											
	MS/MSD - Matrix Spike/Matrix Spike duplicate											
	PS - Post digestion Spike											

Influent Inorganic Characterization

	Ba	Cd	Cr	Cu	Pb	Ni	Sr	Zn	Hg	Total Kjeldahl Nitrogen	Cr-VI	Free CN	Nitrate Nitrite	Total P	Ammonia Nitrogen
	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
Mound Influent	49.5	< 0.11	3.05	378	6.90	5.71	263	114	0.213	32.3	*0.0087*	*0.0026*	13.0	4.69	14.8
	49.1	*0.31*	*1.8*	390	5.20	*3.9*	268	114	0.28	29	< 0.01		3	4.6	14.1
Miamisburg Influent	182	*0.22*	4.37	88.7	10.1	4.16	773	99.2	0.166	90.6	*0.0054*	*0.0071*	0.558	6.13	24.4
	211	*0.26*	3.9	125	*4.1*	*2.8*	837	130	0.36	35			0.38	6.4	21
Mound Influent DUP	49.9	< 0.11	2.59	382	6.46	4.88	263	118	0.307	91.7	*0.0109*	*0.0043*	12.5	4.66	14.8
Method Blank						*0.32*									
LCS (% recovery)	95	96	100	101	98	98	100	100	101	102	104	86	104	108	103
Mound Influent MS	88	88	89	N/A	86	84	N/A	N/A	105	N/A	N/A	42	N/A	111	N/A
Mound Influent PS	101	92	94	85	91	90	111	103		N/A	91		N/A		N/A
Mound Influent MSD									102						

Blank cells are nondetects
Italics results are detects below the Practical Quantitation Level
Bold results are QC values outside acceptable criteria
LCS - Labatory Control Sample
MS/MSD - Matrix Spike/Matrix Spike duplicate
PS - Post digestion Spike
EPA report results (no results city influent, Cr-IV, free CN)

Attachment F
CH2M HILL / GEL Data Package - Sludge and Influent

Sludge Organic Characterization

	Dieldrin	a-BHC	b-BHC	d-BHC	g-BHC (Lindane)	4-cmx	Decachlorobiphenyl
	mg/L	mg/L	mg/L	mg/L	mg/L	%	%
Mound Influent	< 0.0081	< 0.0045	< 0.0069	< 0.0032	< 0.0064	66	**38**
	< 0.02				< 0.02		
Miamisburg Influent	< 0.0082	< 0.0046	< 0.0070	< 0.0033	< 0.0065	68	**43**
	< 0.03				< 0.03		
Method Blank						78	92
LCS (%recovery)	108	100	105	110	100	83	95
	Blank cells are nondetects						
	Italics results are detects below the Practical Quantitation Level						
	Bold results are QC values outside acceptable criteria						
	LCS - Labatory Control Sample						
	EPA report results		(no report for a-BHC, b-BHC, & d-BHC)				

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Attachment 3:

Map of sewer mains to be leased:

Mound Plant Sanitary Sewer Lease Plan

Attachment 4:

Map of sampling locations in soil surrounding sanitary sewers to be leased, with results labeled that exceed Cleanup Objective (10^{-5} risk based guideline value + background)

Attachment 5:

CD with Excel spreadsheets containing:

Data for relevant soils surrounding sanitary sewer lines (Sanitary_sewer_relevant_072104.xl)

and

Residual risk evaluation for excavation of relevant soils surrounding sanitary sewer lines by construction workers (RRE_sanitary_sewer_relevant_072104.xl)

Attachment 6:

Map of Mound sewer system, illustrating pipe materials, sizes, and installation dates (Mound Plant Sanitary Sewer Piping Information Plan)

Attachment 7:

Available maintenance records of Mound sewer system

DM HISTORICAL WORK ORDER FORM

06/01/2004

23205
REMOVE BOARD FROM SEWER

PBUILDING — P BUILDING - 12,389 SQ FT

Location	P BLDG GENERAL	Actual Down Time	0.00
Priority	03	Completion Date	12/12/200(
Work Type	BLDG REPR	Date Closed	12/13/200(
Shift	V00420		
Charge No.	GEN-43		

Maintenance Area: P — UPSHAW 5238 4894

Job No.

Building/Room

Date Issued	Requested Compl Date	Date Started
11/29/2000	12/07/2(	11/29/20(

BM Review	Description	Est. Hours	Labor Code
LOWHAZ		0.00	BM
POD=N		0.00	BM
CRAFT		0.00	BM

Part No.	Part Name	Qty Allocated	Qty. Pulled

Employee Name	Labor Code	Actual Hrs.	Completion Date
SHUSTER, CHARLES	PW	3.00	12/12/2000

Tool Description

USQ **Comments**

Description
REMOVE BOARD FROM SEWER LOCATED JUST WEST OF BLG 40 (OUTSIDE) NEAR SIDEWALK.
CONTACT ALLEN UPSHAW FOR ADDITIONAL DETAILS.

CONFINED SPACE REQUIRED ONLY IF ENTRY NECESSARY.
12/6/2000 :

Att. 7 P.1

DM HISTORICAL WORK ORDER FORM

06/01/2004

23285
CLEAN OUT MANHOLE
GENBUILDING GENERAL SITE

Location	SITE	Actual Down Time	0.00
Priority		Completion Date	12/12/200(
Work Type	PROJECT	Date Closed	12/13/200(
Shift	S00105		
Charge No.	MAINHL		

Maintenance Area GEN/SITE RANSBOTTOM 4924 4220

Job No. 12/05/2000 12/11/2(12/05/20(

Building/Room

Date Issued	Requested Compl Date	Date Started

BM Review	Description	Est. Hours	Labor Code
IH	INDUSTRIAL HYGIENE MONITORING REQ'D INCLUDE DETAILS IN WORK PKG	0.00	BM
JSHA=Y		0.00	BM
MODHAZ	THIS WORK ORDER CATEGORIZED AS MODERATE HAZARD (MUST HAVE BLDG MGR APPROVAL PRIOR TO START OF WORK)	0.00	BM
CONFIN		0.00	BM

Part No.	Part Name	Qty Allocated	Qty. Pulled

Employee Name	Labor Code	Actual Hrs.	Completion Date

Tool Description

USQ	Comments

Description
CLEAN OUT DIRT IN MANHOLE LOCATED BETWEEN M-BLDG PAD AND P-BLDG.
NEED COMPLETION BY DEC. 11. (FOR MMCIC)
ENTER MANHOLE AFTER COORDINATING WORK WITH IH FOR CONFINED SPACE.
CALL MIKE STROMBERG X3866 OR PAGER 416-8194 FOR ANY QUESTIONS.
CALLED IN BY BOB RANSBOTTOM.
12/05/2000 :
12/05/2000 :
1. Open Man Hole for 30 Minutes.
2. Indust. Hygiene take samples per confined space permit
3. When approved by IH, RCT to enter Man Hole for rad samples
4. When RCT gives permission, demotech may begin work
12/12/2000 :
Work completed, MSR can be closed; GaryW
12/13/2000 :

Att. 7 P. 2

DM HISTORICAL WORK ORDER FORM

06/01/2004

34975
REMOVE AND REPLACE SANITARY SUMP PUMPS
TBUILDING — T BUILDING - 123,618 SQ FT -

Location	T BLDG - GENERAL	Actual Down Time	0.00
Priority		Completion Date	05/28/2003
Work Type	BLDG REPR	Date Closed	05/28/2003
Shift	FB26AF		
Charge No.	T		

Maintenance Area: T-15

Job No.: MELKE JR 3799 4862

Building/Room

Date Issued	Requested Compl Date	Date Started
02/05/2003	02/05/20(	02/05/20(

BM Review	Description	Est. Hours	Labor Code
CRAFT		0.00	BM
RWP=N		0.00	BM
USQ=N		0.00	BM
LOTO		0.00	BM
RIGGER		0.00	BM
BURN		0.00	BM
IH	INDUSTRIAL HYGIENE MONITORING REQ'D INCLUDE DETAILS IN WORK PKG	0.00	BM

Part No.	Part Name	Qty Allocated	Qty. Pulled

Employee Name	Labor Code	Actual Hrs.	Completion Date

Tool Description

USQ	Comments

Description
REMOVE TWO SANITARY SUMP PUMPS LOCATED IN SUMP PIT IN T-15 AND REPLACE WITH ONE SUBMERSIBLE PUMP. BLANK UNUSED LINE NO RWP REQUIRED JACK MELKE X4862
02/05/2003 : No CORE team review required. DAL
02/11/2003 :
02/13/2003 :
02/20/2003 : Go to W-Bldg pipe shop dock for pipe. Fittings in T-315.
2/27/2003 :
3/13/2003 :
03/20/2003 :
04/29/2003 :
05/27/2003 : This work to be completed as part of the south bay unified project per Jack Melke.

At. 7 P.3

DM HISTORICAL WORK ORDER FORM

06/01/2004

37665
DISCONNECT SEWER, DOMESTIC WATER AND
ELECTRIC ALL TRAILERS

Location	TRAILER	Actual Down Time	0.00
Priority		Completion Date	09/29/2003
Work Type	PROJECT	Date Closed	09/29/2003
Shift	DC005L		
Charge No.	GEN-43		

Maintenance Area

TRLRS (2) GAULT 5296 3913

Job No.

Building/Room

Date Issued	Requested Compl Date	Date Started
09/24/2003	09/24/20(	09/24/20(

BM Review	Description	Est. Hours	Labor Code
CORE=N		0.00	BM
CRAFT		0.00	BM
POD=N		0.00	BM
JSHA=N		0.00	BM
LOTO		0.00	BM

Part No.	Part Name	Qty Allocated	Qty. Pulled

Employee Name	Labor Code	Actual Hrs.	Completion Date

Tool Description

USQ	Comments

Description
DISCONNECT SEWER, DOMESTIC WATER AND ELECTRIC FROM BATHROOM AND SHOWER TRAILER IN PREPARATION FOR WILLIAM SCOTTSMAN TO PICK UP. THIS IS A TEMPORARY DISCONNECT AS NEW TRAILERS WILL BE BROUGHT IN CONTACT DENNY GAULT X3913 IF QUESTIONS
09/25/2003 :

As per telecon with Gary Weidenbach:

Disconnect feed to, and EPA monitor feed from, the lighting panel in the SeaLand adjacent to trailers. Re-route feed to new safety switch installed on existing back board behind transformer. Re-route EPA monitor feed into safety switch, fuse and close safety switch. Re-energize EPA monitor. Terry Cantrell 09/25/03.

At. 7 p.4

DM HISTORICAL WORK ORDER FORM

06/01/2004

36202
INVESTIGATE SANITARY SEWER

PBUILDING — P BUILDING - 12,389 SQ FT

Location	P BLDG GENERAL	Actual Down Time	0.00
Priority	PROJ	Completion Date	05/21/2003
Work Type		Date Closed	05/21/2003
Shift	GD722G		
Charge No.	GEN-43		

Maintenance Area: P

Job No.: UPSHAW 5238 4894

Building/Room

Date Issued	Requested Compl Date	Date Started
05/06/2003	05/06/20	05/06/20

BM Review	Description	Est. Hours	Labor Code
CRAFT		0.00	BM
CONFIN		0.00	BM
NOTIF	NOTIFICATION REQUIRED BEFORE WORK (INCLUDE SPECIFICS , NAME, NUMBER, ETC.. IN WORK PKG)	0.00	BM
POD=N		0.00	BM

Part No.	Part Name	Qty Allocated	Qty. Pulled

Employee Name	Labor Code	Actual Hrs.	Completion Date

Tool Description

USQ	Comments

Description

INVESTIGATE SANITARY SEWER CONNECTION FOR NEW TEMPORARY BOILER AT OLD PAINT SHOP PAD.

MAY REQUIRE MANHOLE ENTRY. MANHOLE IS SHALLOW, BUT CHECK WITH JARED WILLS.

SEE BILL BRUNNER FOR VISTA MAP AND DRAIN LOCATIONS.

Att. 7 P.5

DM HISTORICAL WORK ORDER FORM

06/01/2004

38581
REPAIR MANHOLE COVER

GENBUILDING — GENERAL SITE

Location	SITE	Actual Down Time	0.00
Priority		Completion Date	01/12/2004
Work Type	YARDS/GRND	Date Closed	01/12/2004
Shift	GD721D		
Charge No.	GEN-43		

Maintenance Area: GEN/SITE

Job No.: WIER

Building/Room:

Date Issued	Requested Compl Date	Date Started
12/18/2003	12/18/2(	12/18/20(

BM Review	Description	Est. Hours	Labor Code
CORE=N		0.00	BM
CRAFT		0.00	BM

Part No.	Part Name	Qty Allocated	Qty. Pulled

Employee Name	Labor Code	Actual Hrs.	Completion Date

Tool Description

USQ	Comments

Description
~~REPAIR~~ ans reinstall MANHOLE COVER south of building 36 PER BO WIER'S INSTRUCTIONS

At. 7 P.6

06/01/2004

DM HISTORICAL WORK ORDER FORM

38627
FLUSH AND CHARACTERIZE SANITARY SUMPS
TBUILDING T BUILDING - 123,618 SQ FT -

Location	T BLDG - GENERAL	Actual Down Time	0.00
Priority		Completion Date	03/17/2004
Work Type	PROJECT	Date Closed	03/17/2004
Shift	FB26AF		
Charge No.	T		

Maintenance Area

Job No.	T	WURSTNER 4137 3392	
Building/Room	01/05/2004	01/05/20(	01/05/20(
	Date Issued	Requested Compl Date	Date Started

BM Review	Description	Est. Hours	Labor Code
RWP=N		0.00	BM
CRAFT		0.00	BM
USQ=N		0.00	BM
SURVPJ	PREJOB SURVEYS REQUIRED - INCLUDE RESULTS WITH WORK PKG (DO NOT WORK JOB UNTIL RESULTS KNOWN)	0.00	BM
SURVIP		0.00	BM
CORE=Y		0.00	BM

Part No.	Part Name	Qty Allocated	Qty. Pulled

Employee Name	Labor Code	Actual Hrs.	Completion Date

Tool Description

USQ	Comments

Description
FLUSH AND CHARACTERIZE SANITARY SUMPS PER R. WURSTNER'S INSTRUCTIONS
01/12/2004 : Pre job surveys at discretion of RCT. Face shield required. PHA completed. DAL
01/14/2004 :

At. 7 P. 7

DM HISTORICAL WORK ORDER FORM

06/01/2004

38738
REPAIR MANHOLE COVER

GENBUILDING — GENERAL SITE

Location	SITE	Actual Down Time	0.00
Priority		Completion Date	01/29/2004
Work Type	PROJECT	Date Closed	01/29/2004
Shift			
Charge No.	GEN-43		

Maintenance Area: PRS 66 WIER

Job No.

Building/Room

Date Issued	Requested Compl Date	Date Started
01/15/2004	01/15/20	01/15/20

BM Review	Description	Est. Hours	Labor Code
CORE=N		0.00	BM
CRAFT		0.00	BM

Part No.	Part Name	Qty Allocated	Qty. Pulled

Employee Name	Labor Code	Actual Hrs.	Completion Date

Tool Description

USQ	Comments

Description
REPAIR MANHOLE CONCRETE COVER ON THE HILLSIDE ABOVE PRS 66. CONTACT BO WIER X4257 IF QUESTIONS.
1/19/2004 :
1/19/2004 :
01/29/2004 : CANCEL PER S. ROMAGE. TO BE INCLUDED IN CHANGE ORDER

Att. 7 P.8

DM HISTORICAL WORK ORDER FORM

06/01/2004

38803
REMOVE DIRT FROM SANITARY SEWER LID BEHIND
BLD 102 BUILDING GENERAL SITE

Location	SITE	Actual Down Time	0.00
Priority		Completion Date	01/29/2004
Work Type	YARDS/GRND	Date Closed	01/29/2004
Shift	GD721D		
Charge No.	GEN-43		

Maintenance Area

Job No.	GEN/SITE	WIER	
Building/Room			
Date Issued	01/22/2004	Requested Compl Date 01/22/20(	Date Started 01/22/20(

BM Review	Description	Est. Hours	Labor Code
CORE=N		0.00	BM
CRAFT		0.00	BM
LIFTS	FORKLIFTS, AERIAL LIFTS OR MATERIAL HANDLING EQUIPMENT JSHA RECOMMENDED FOR LARGE/HEAVY/AWKWARD	0.00	BM

Part No.	Part Name	Qty Allocated	Qty. Pulled

Employee Name	Labor Code	Actual Hrs.	Completion Date

Tool Description

USQ	Comments

Description
REMOVE DIRT FROM SANITARY SEWER LID BEHIND BLD 102

At. 7 P. 9

MSR # : 39140 | CH2MHILL - *Maintenance Service Request* | Date Printed: 06/01/2004

Charge # : DC005L | Area assigned to: ER/WM | Awaiting action by : WILSON | Date called in 03/03/2004

Bldg/Room : TRLR 38 | Equipment # : TRAILER | RWP # : | Priority:

REINSTALL SANITARY LINE | Requestor : WILSON 27233536

Building Manager / Core Team Review Notes :

This section documents the Preliminary Hazards Analysis for work orders processed electronically using Proteus.
For each hazard identified here, it is expected that the Work Planning Details will specify appropriate mitigating control measures.

BM Review	Description
CORE=N	BLDG MGR HAS RELEASED THIS WORK PRIOR TO CORE
JSHA=N	JSHA NOT REQUIRED
CRAFT	SKILL OF THE CRAFT - SPECIFIC INSTRUCTIONS NOT
DIG	EXCAVATION/DIGGING PERMIT REQUIRED
POD=N	NOT NECESSARY TO SHOW THIS JOB ON POD
PREJOB	PREJOB REQUIRED PRIOR TO START OF WORK

Work Planning Details:

REINSTALL SANITARY LINE INTO OLD SANITARY SEWER. RAISE FALL OF THE LINE. INSTALL TWO DIVERTER VALVES FOR HOLDING TANK. CONTACT JOANNA WILSON IF QUESTIONS
03/04/2004 :

(DIG, Excavation permit only if/as required) GaryW

Tradesman notes and closeout :

1. Is this job complete and ready to closeout ? YES/NO (circle one) [If no, what work remains to be done ???]
2. Was advance planning and coordination of work activities adequate for this type job ? YES/NO (circle one) [If not, please explain]
3. Should a post-job review be done on this job ? YES/NO (circle one)
4. Do you have any suggestions for improvements ?

Att. 7 P. 10

Hours spent on this job : Name : Date :

Foreman (signature) : Date :

RETURN SIGNED PAPERWORK TO EM/PM GROUP FOR CLOSEOUT

MSR # : 39374 | CH2MHILL - *Maintenance Service Request* | Date Printed: 06/01/2004

Charge # : GD721D | Area assigned to: GEN-43 | Awaiting action by : HILL | Date called in : 03/30/2004

Bldg/Room : GEN/SITE | Equipment # : GENBUILDING | RWP # : | Priority:

REPAIR PIPE BETWEEN MANHOLE 42 AND 43 Requestor: WIER

Building Manager / Core Team Review Notes :

This section documents the Preliminary Hazards Analysis for work orders processed electronically using Proteus.
For each hazard identified here, it is expected that the Work Planning Details will specify appropriate mitigating control measures.

BM Review	Description
TRAFIC	IDENTIFY SPECIAL TRAFFIC MEASURES
POD=Y	THIS WORK MUST BE IDENTIFIED ON POD
DIG	EXCAVATION/DIGGING PERMIT REQUIRED
RWP=JS	A COMPLETED JOB SPECIFIC RWP MUST BE WITH WORK
CORE=N	BLDG MGR HAS RELEASED THIS WORK PRIOR TO CORE
CRAFT	SKILL OF THE CRAFT - SPECIFIC INSTRUCTIONS NOT

Work Planning Details:

REPAIR PIPE BETWEEN MANHOLE 42 AND 43 AS SHOWN ON SANITARY SEWER ACTION PLAN. BO WIER WILL AUPPLY A SKETCH OF LOCATION.

4/1/2004 :

5/24/2004 :

Cancelled until subcontract call crackled pipe repair BO

Tradesman notes and closeout :

1. Is this job complete and ready to closeout ? YES/NO (circle one) [If no, what work remains to be done ???]
2. Was advance planning and coordination of work activities adequate for this type job ? YES/NO (circle one) [If not, please explain]
3. Should a post-job review be done on this job ? YES/NO (circle one)
4. Do you have any suggestions for improvements ?

At-7 P.11

Hours spent on this job : Name : Date :

Foreman (signature) : Date :

RETURN SIGNED PAPERWORK TO EM/PM GROUP FOR CLOSEOUT

MSR # : 39771 CH2MHILL - *Maintenance Service Request* Date Printed: 06/01/2004

Charge # : GD722G Area assigned to: GEN-43 Awaiting action by : WIER Date called in 05/18/2004

Bldg/Room : GEN/SITE Equipment # : GENBUILDING RWP # : Priority:

REPAIR PIPE BETWEEN MANHOLES 51 AND 52 Requestor : WIER

Building Manager / Core Team Review Notes :

This section documents the Preliminary Hazards Analysis for work orders processed electronically using Proteus.
For each hazard identified here, it is expected that the Work Planning Details will specify appropriate mitigating control measures.

BM Review **Description**

Work Planning Details:

REPAIR THE PIPE BETWEEN MANHOLES 51 AND 52 BO WIER
05/18/2004 :

Same comment

Tradesman notes and closeout :

1. Is this job complete and ready to closeout ? YES/NO (circle one) [If no, what work remains to be done ???]
2. Was advance planning and coordination of work activities adequate for this type job ? YES/NO (circle one) [If not, please explain}
3. Should a post-job review be done on this job ? YES/NO (circle one)
4. Do you have any suggestions for improvements ?

Att. 7 P. 12

Hours spent on this job : Name : Date :

Foreman (signature) : Date :

RETURN SIGNED PAPERWORK TO EM/PM GROUP FOR CLOSEOUT

MSR # : 39772 CH2MHILL - *Maintenance Service Request* Date Printed: 06/01/2004

Charge # : GD722G Area assigned to: GEN-43 Awaiting action by : WIER Date called in 05/18/2004

Bldg/Room : GEN/SITE Equipment # : GENBUILDING RWP # : Priority:

REMOVE THE REBAR OBSTRUCTION IN MANHOLE 49 Requestor : WIER

Building Manager / Core Team Review Notes :

This section documents the Preliminary Hazards Analysis for work orders processed electronically using Proteus.
For each hazard identified here, it is expected that the Work Planning Details will specify appropriate mitigating control measures.

BM Review **Description**

Work Planning Details:

REMOVE THE REBAR OBSTRUCTION NOTED IN MANHOLE 49 BO WIER
05/18/2004 :
05/19/2004 :

complete

Tradesman notes and closeout :

1. Is this job complete and ready to closeout ? YES/NO (circle one) [If no, what work remains to be done ???]
2. Was advance planning and coordination of work activities adequate for this type job ? YES/NO (circle one) [If not, please explain]
3. Should a post-job review be done on this job ? YES/NO (circle one)
4. Do you have any suggestions for improvements ?

At. 7 P. 13

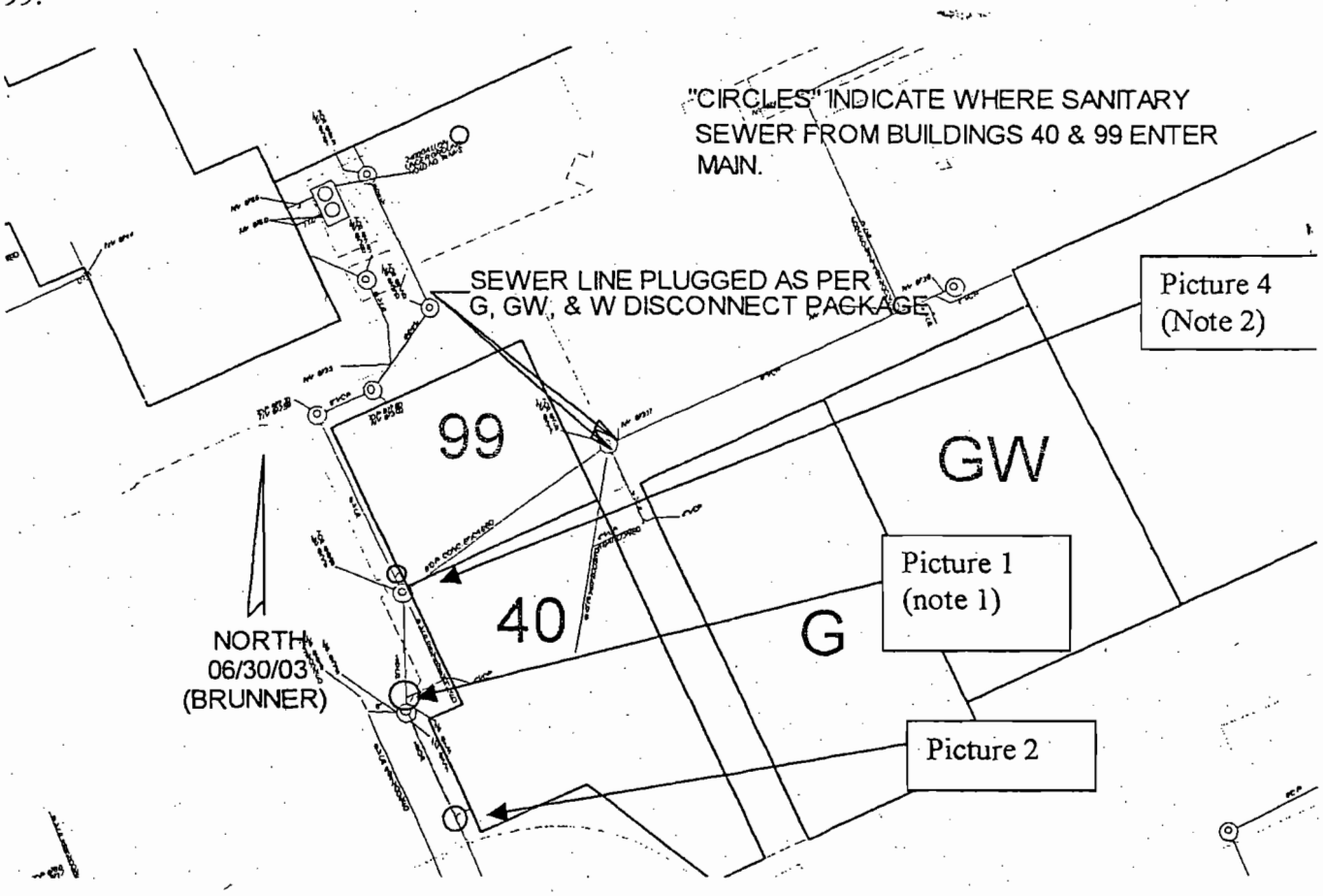
Hours spent on this job : Name : Date :

Foreman (signature) : Date :

RETURN SIGNED PAPERWORK TO EM/PM GROUP FOR CLOSEOUT

SANITARY SEWER ISOLATION:

This section provides information to isolate the sanitary sewers from Buildings 40 and 99.



SKETCH 1: SANITARY SEWER LINES FROM BLDGS 40 & 99

Predemolition Instructions:

Note that sanitary sewer lines exiting Buildings 40 & 99 do not enter the main sewer line via a manhole. Also, the main sewer line that travels north and south is extremely close to the footprint of the respective buildings. Because of the sewer lines location, seal the sewer lines after the buildings are demolished.

The depth of the lines leaving the buildings will determine how the lines are plugged. If any sewer line is deeper than 3-feet, excavate on the inside of the foundation wall and cap the lines. If the sewer lines are less than 3-feet, remove the lines as part of the foundation footer. Cap the lines on the exterior side of the removed foundation wall.

Post Demolition Notes:

Note 1: Demolition broke Tee, replaced with ductile pipe.

Note 2: Drawing is in error; sanitary sewer line did enter the manhole and was plugged in manhole

Figure 1: Replacement pipe for Tee That Tied in Building 40

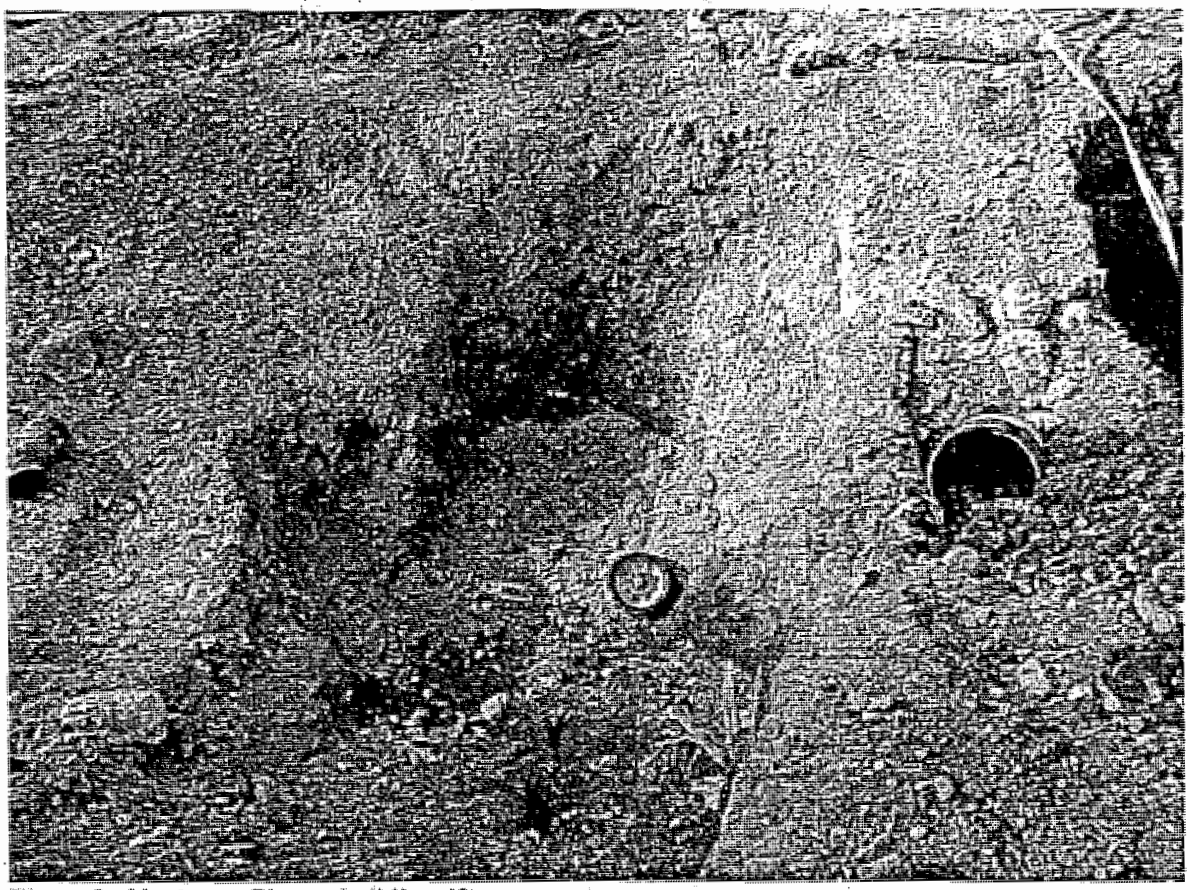


Figure 2: 6 inch san. Plug at building 40

At. 7 P. 17

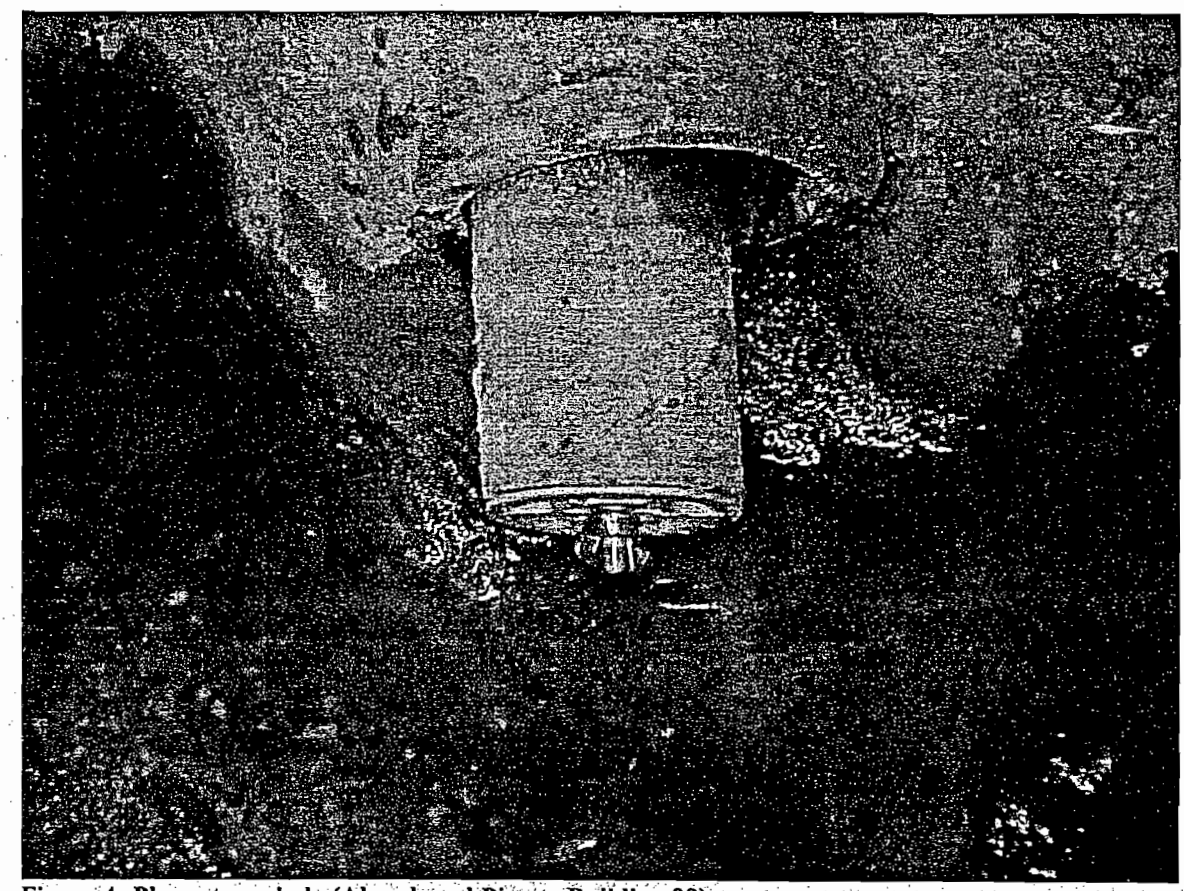


Figure 4: Plug at manhole (Abandoned Pipe to Building 99)

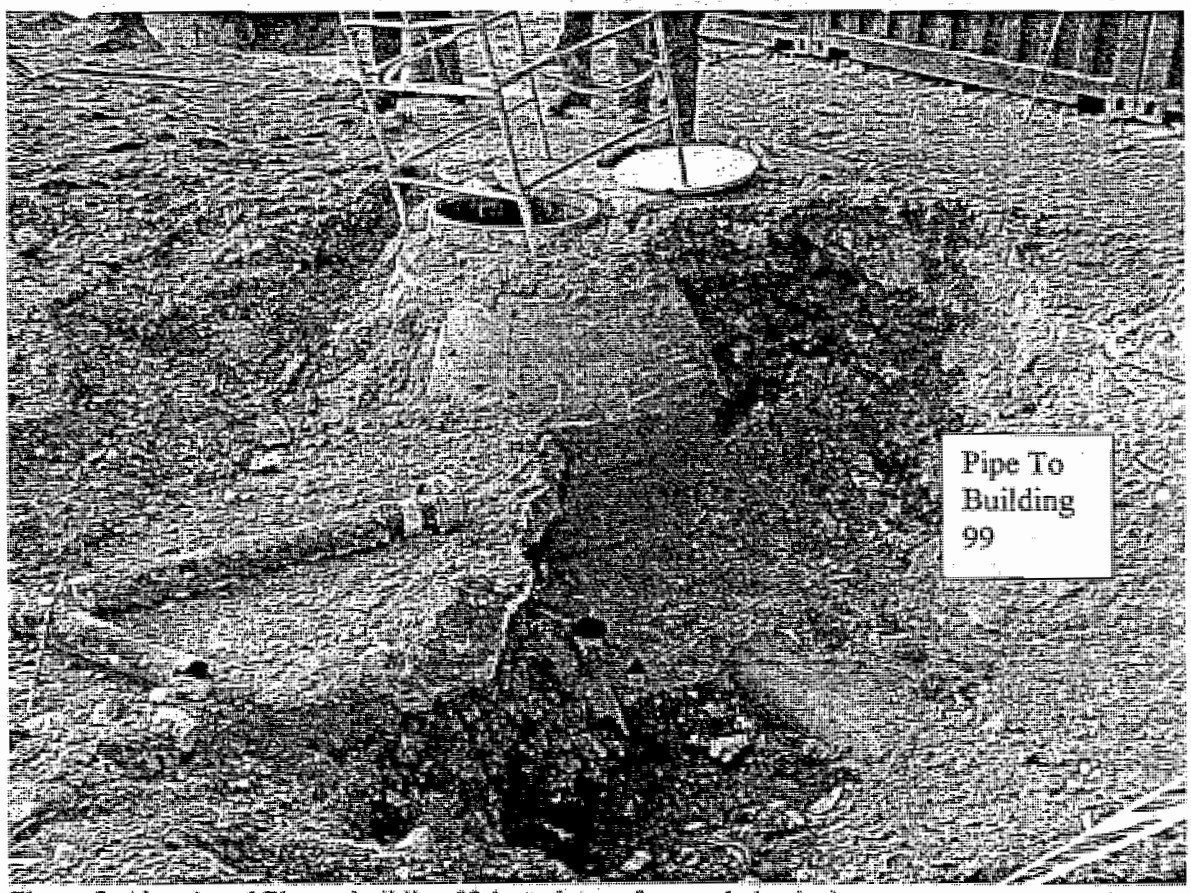


Figure 5: Abandoned Pipe to building 99 (see picture for manhole plug)

Attachment 8

Sanitary sewer line video inspection report (January-February 2004) and planned corrective action table (May 2004)

Pipe Graphic Report of PLR MH2 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/05/2004 ***Setup*** 1
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 43.3 ***Ft***	***From*** MH4 ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH2 ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/05/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
43.3	MH2 (Upstream. Depth = Ft) Tape end:	
23.8	Lateral or connection exists OK 10/oc	
22.8	Joint displaced	
18.5	Manhole/Node [MH3]	
15.4	Joint displaced	
0.0	Water level 5	
0.0	MH4 (Downstream. Depth = Ft) Tape start:0000	

At 8 P.1

Tabular Report of PLR MH2 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 01/05/2004	*Setup* 1
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 43.3 Ft	*From* MH4	*Depth* Ft
Shape Circular	*Size* 8 *by* ins	*To* MH2	*Depth* Ft
Material Vitrified clay	*Joint Spacing* Ft	*Direction* Up	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/05/2004

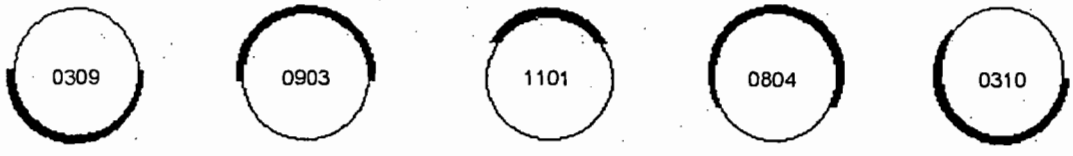
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH4
	0.0		WL Water level				5	
	15.4		JD Joint displaced	S				
	18.5		MH Manhole/Node					MH3
	22.8		JD Joint displaced	S				
	23.8		LO Lateral or connection exists OK		10			
	43.3		MH Manhole/Node					MH2
	43.3		FH Finish of Surveys					

43.3 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P.2

Pipe Graphic Report of PLR **MH1** X for **CH2MHILL**

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/05/2004 ***Setup*** 2
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 41.3 ***Ft***	***From*** MH2 ***Depth*** ***Ft***
Shape Circular	***Size*** 6 ***by*** ***ins***	***To*** MH1 ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/05/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
41.3	MH1 (Upstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH2 (Downstream. Depth = Ft) Tape start:0000	

At-8 P.3

Tabular Report of PLR MH1 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 01/05/2004	*Setup* 2
Facility	*Operator* sb	*Van Reference*	*Weather* Dry
Road Name		*Place Name*	
Location type			
Surface Concrete road			
Survey purpose Random survey of pipes and things			

Pipe Use Sanitary	*Scheduled length* 41.3 Ft	*From* MH2	*Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* MH1	*Depth* Ft
Material Vitrified clay	*Joint Spacing* Ft	*Direction* Up	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/05/2004

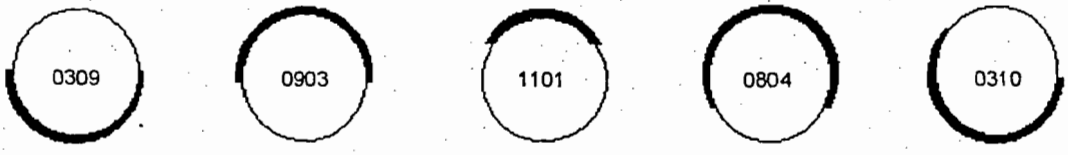
General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
0000	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					MH2
	0.0		WL	Water level				0	
	41.3		MH	Manhole/Node					MH1
	41.3		FH	Finish of Surveys					

41.3 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At .8 P.4

Pipe Graphic Report of PLR MH8 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/06/2004 ***Setup*** 3
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 299.3 ***Ft***	***From*** MH9 ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH8 ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/06/2004
General note		Structural Service Constructional
Location note		Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
299.3	MH8 (Upstream. Depth = Ft) Tape end:	
157.8	Lateral or connection exists OK 11/oc	
0.0	Water level 0	
0.0	MH9 (Downstream. Depth = Ft) Tape start:0000	

At. 8 P.5

Tabular Report of PLR MH8 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 01/06/2004	*Setup* 3
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 299.3 Ft	*From* MH9	*Depth* Ft
Shape Circular	*Size* 8 *by* ins	*To* MH8	*Depth* Ft
Material Vitrified clay	*Joint Spacing* Ft	*Direction* Up	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/06/2004

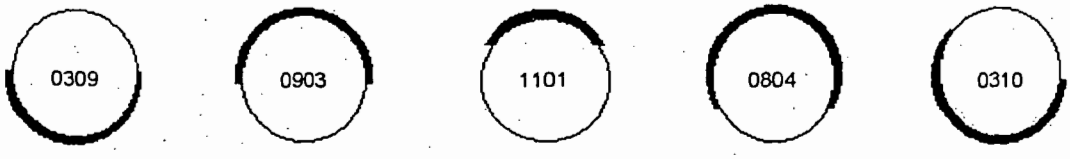
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH9
	0.0		WL Water level				0	
	157.8		LO Lateral or connection exists OK		11			
	299.3		MH Manhole/Node					MH8
	299.3		FH Finish of Surveys					

299.3 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At 8 P.6

- Pipe Graphic Report of PLR MH10 X for CH2MHILL

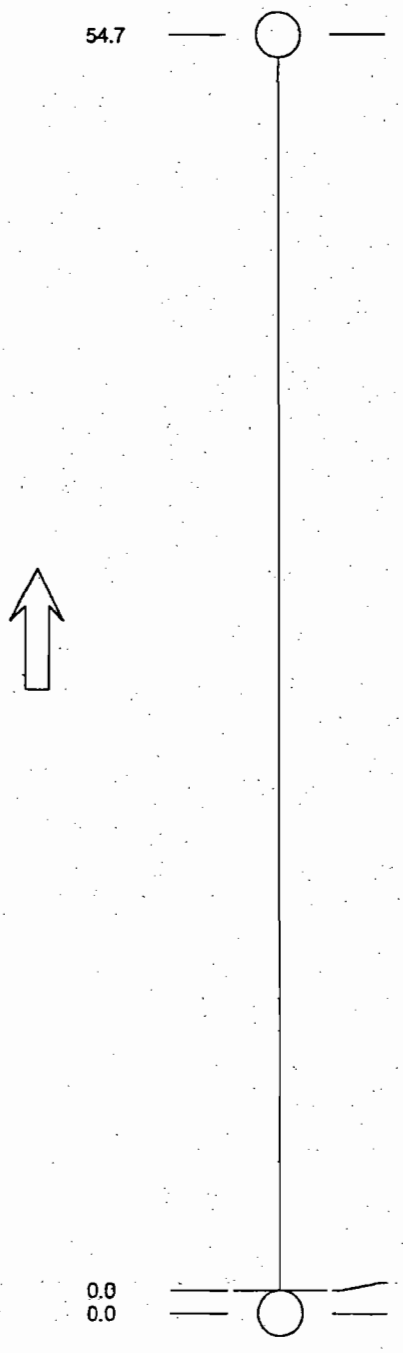
Works Order Number		***Cassette*** 1	***Surveyed On*** 01/07/2004 ***Setup*** 4
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Schedule length*** 54.7 ***Ft***	***From*** MH10 ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH9 ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/07/2004

General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
54.7	MH9 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH10 (Upstream. Depth = Ft) Tape start:0000	



At. 8 P. 7

Tabular Report of PLR MH10 X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 01/07/2004	***Setup*** 4
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***

Location type

Surface Concrete road

Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 54.7 Ft	***From*** MH10	***Depth*** Ft
Shape Circular	***Size*** 8 ***by*** ins	***To*** MH9	***Depth*** Ft
Material Vitrified clay	***Joint Spacing*** Ft	***Direction*** Down	
Lining	***Year laid***	***Pre-clean*** Y	***Last Cleaned*** 01/07/2004

General note

Location note

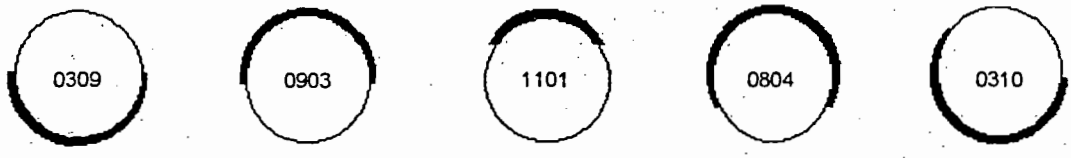
Structural Service Constructional Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH10
	0.0		WL Water level				0	
	54.7		MH Manhole/Node					MH9
	54.7		FH Finish of Surveys					

54.7 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At.8 P.8

Pipe Graphic Report of PLR MH11 X for CH2MHILL

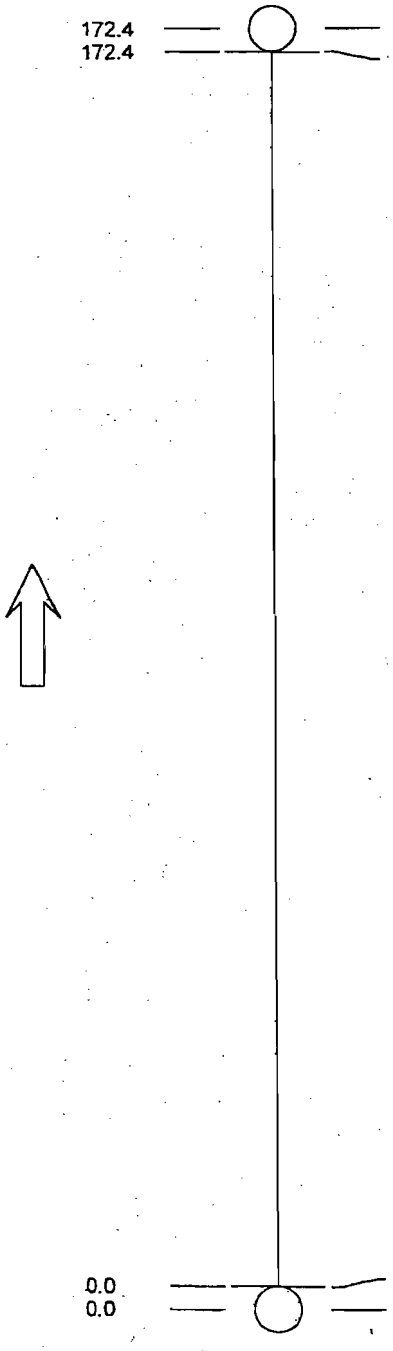
Works Order Number		***Cassette*** 1	***Surveyed On*** 01/07/2004 ***Setup*** 5
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 172.4 ***Ft***	***From*** MH11 ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH10 ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/07/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
172.4	MH10 (Downstream. Depth = Ft) Tape end:	
172.4	General Comment [LINE SPLITS TO THE MANHOLE]	
0.0	Water level 0	
0.0	MH11 (Upstream. Depth = Ft) Tape start:0000	



Att. 8 P. 9

Tabular Report of PLR MH11 X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 01/07/2004	***Setup*** 5
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 172.4 Ft	***From*** MH11	***Depth*** Ft
Shape Circular	***Size*** 8 ***by*** ins	***To*** MH10	***Depth*** Ft
Material Vitrified clay	***Joint Spacing*** Ft	***Direction*** Down	
Lining	***Year laid***	***Pre-clean*** Y	***Last Cleaned*** 01/07/2004

General note
Location note

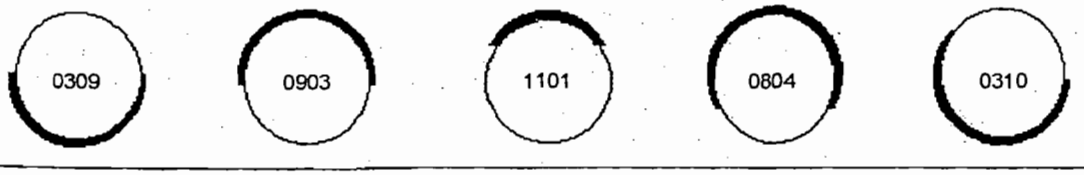
Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH11
	0.0		WL Water level				0	
	172.4		GC General Comment					LINE SPLITS TO THE MANHOLE
	172.4		MH Manhole/Node					MH10
	172.4		FH Finish of Surveys					

172.4 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At 8 P.10

Pipe Graphic Report of PLR MH9 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/08/2004 ***Setup*** 6
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 82.8 ***Ft***	***From*** MH12 ***Depth*** ***Ft***
Shape Circular	***Size*** 6 ***by*** ***ins***	***To*** MH9 ***Depth*** ***Ft***
Material Cast iron	***Joint spacing*** ***Ft***	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/08/2004
General note		Structural Service Constructional
Location note		Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
82.8	MH9 (Upstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH12 (Downstream. Depth = Ft) Tape start:0000	

At-8 P.11

Tabular Report of PLR MH9 X for CH2MHILL

Work Order Number	***Vid Cass*** 1		***Surveyed On*** 01/08/2004 ***Setup*** 6
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry
Road Name		***Place Name***	
Location type			
Surface Concrete road			
Survey purpose Random survey of pipes and things			

Pipe Use Sanitary	***Scheduled length*** 82.8 Ft	***From*** MH12 ***Depth*** Ft
Shape Circular	***Size*** 6 ***by*** ins	***To*** MH9 ***Depth*** Ft
Material Cast iron	***Joint Spacing*** Ft	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last Cleaned*** 01/08/2004

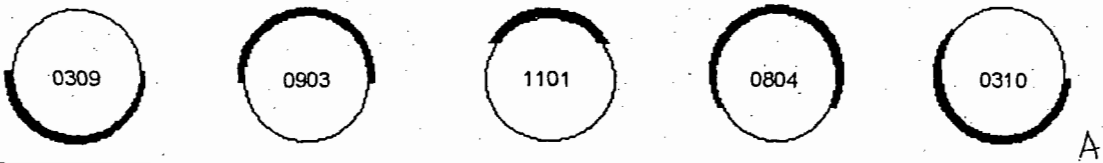
General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH12
	0.0		WL Water level				0	
	82.8		MH Manhole/Node					MH9
	82.8		FH Finish of Surveys					

82.8 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P.12

Pipe Graphic Report of PLR MH12 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/08/2004 ***Setup*** 7
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 32.3 ***Ft***	***From*** MH12 ***Depth*** ***Ft***
Shape Circular	***Size*** 6 ***by*** ***ins***	***To*** MH13 ***Depth*** ***Ft***
Material Cast iron	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/08/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
32.3	MH13 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH12 (Upstream. Depth = Ft) Tape start:0000	

A-6.8 P.13

Tabular Report of PLR MH12 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 01/08/2004	*Setup* 7
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 32.3 Ft	*From* MH12	*Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* MH13	*Depth* Ft
Material Cast iron	*Joint Spacing* Ft	*Direction* Down	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/08/2004

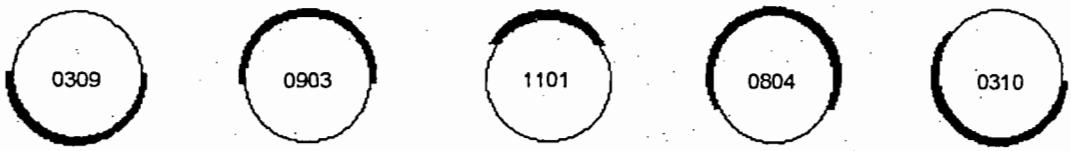
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH12
	0.0		WL Water level				0	
	32.3		MH Manhole/Node					MH13
	32.3		FH Finish of Surveys					

32.3 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At 8 P.14

Pipe Graphic Report of PLR MH15 X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 01/08/2004 *Setup* 8
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

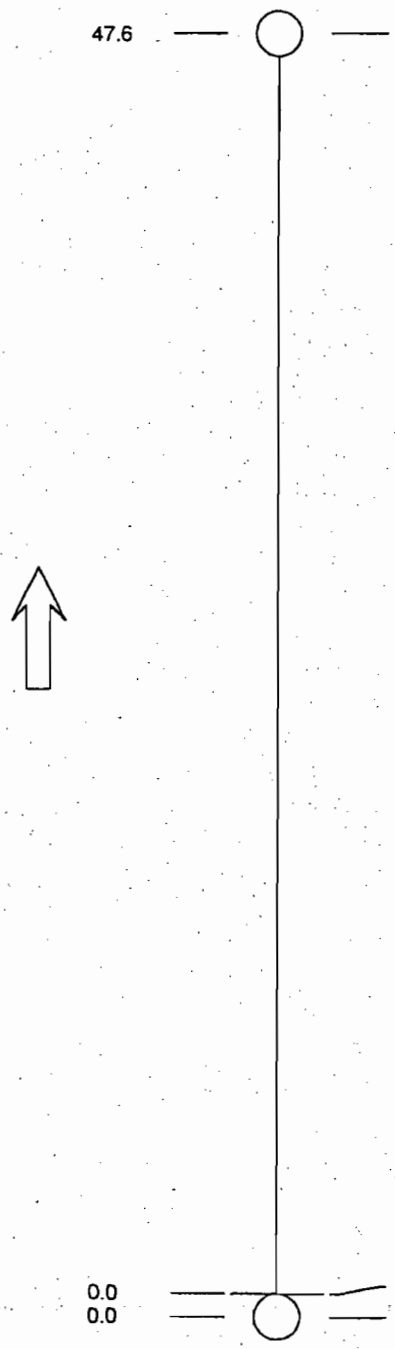
Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Schedule length* 47.6 *Ft*	*From* MH16 *Depth* *Ft*
Shape Circular	*Size* 8 *by* *ins*	*To* MH15 *Depth* *Ft*
Material Other (state in comments)	*Joint spacing* *Ft*	*Direction* Up
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 01/08/2004

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
47.6	MH15 (Upstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH16 (Downstream. Depth = Ft) Tape start:0000	



At. 8 P.15

Tabular Report of PLR MH15 X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 01/08/2004	***Setup*** 8
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***

Location type

Surface Concrete road

Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 47.6 Ft	***From*** MH16 ***Depth*** Ft
Shape Circular	***Size*** 8 ***by*** ins	***To*** MH15 ***Depth*** Ft
Material Other (state in comments)	***Joint Spacing*** Ft	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last Cleaned*** 01/08/2004

General note Structural Service Constructional

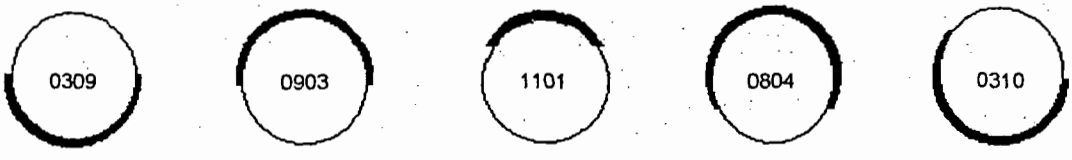
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH16
	0.0		WL Water level				0	
	47.6		MH Manhole/Node					MH15
	47.6		FH Finish of Surveys					

47.6 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P.16

Pipe Graphic Report of PLR MH16 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/08/2004 ***Setup*** 9
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Schedule length*** 73.6 ***Ft***	***From*** MH16 ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH17 ***Depth*** ***Ft***
Material Other (state in comments)	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/07/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
73.6	MH17 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH16 (Upstream. Depth = Ft) Tape start:0000	

At-8 P.17

Tabular Report of PLR MH16 X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 01/08/2004	***Setup*** 9
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 73.6 Ft	***From*** MH16	***Depth*** Ft
Shape Circular	***Size*** 8 ***by*** ins	***To*** MH17	***Depth*** Ft
Material Other (state in comments)	***Joint Spacing*** Ft	***Direction*** Down	
Lining	***Year laid***	***Pre-clean*** Y	***Last Cleaned*** 01/07/2004

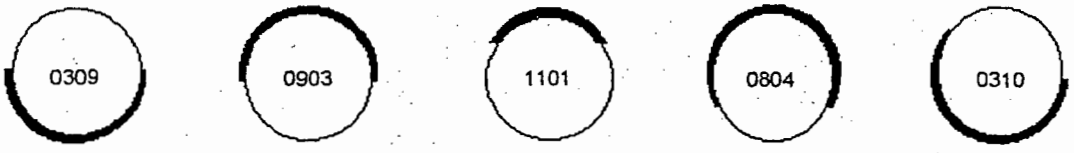
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH16
	0.0		WL Water level				0	
	73.6		MH Manhole/Node					MH17
	73.6		FH Finish of Surveys					

73.6 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



Att.8 P.18

Pipe Graphic Report of PLR MH17 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/08/2004 ***Setup*** 10
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 52.1 ***Ft***	***From*** MH17 ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH18 ***Depth*** ***Ft***
Material Other (state in comments)	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** ***Last cleaned*** 01/07/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
52.1	MH18 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH17 (Upstream. Depth = Ft) Tape start:0000	

At-8 P.19

Tabular Report of PLR MH17 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 01/08/2004	*Setup* 10
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name | *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 52.1 Ft	*From* MH17 *Depth* Ft
Shape Circular	*Size* 8 *by* ins	*To* MH18 *Depth* Ft
Material Other (state in comments)	*Joint Spacing* Ft	*Direction* Down
Lining	*Year laid*	*Pre-clean* *Last Cleaned* 01/07/2004

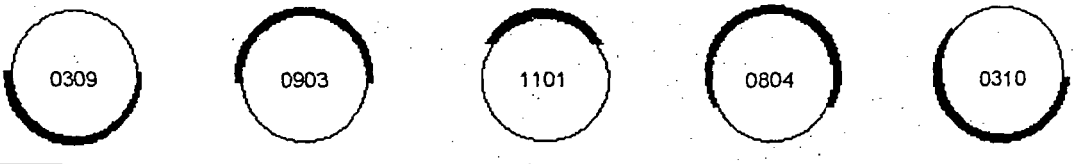
General note | Structural Service Constructional
Location note | Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH17
	0.0		WL Water level				0	
	52.1		MH Manhole/Node					MH18
	52.1		FH Finish of Surveys					

52.1 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



Att-8 P.20

Pipe Graphic Report of PLR MH18 X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 01/08/2004 *Setup* 11
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

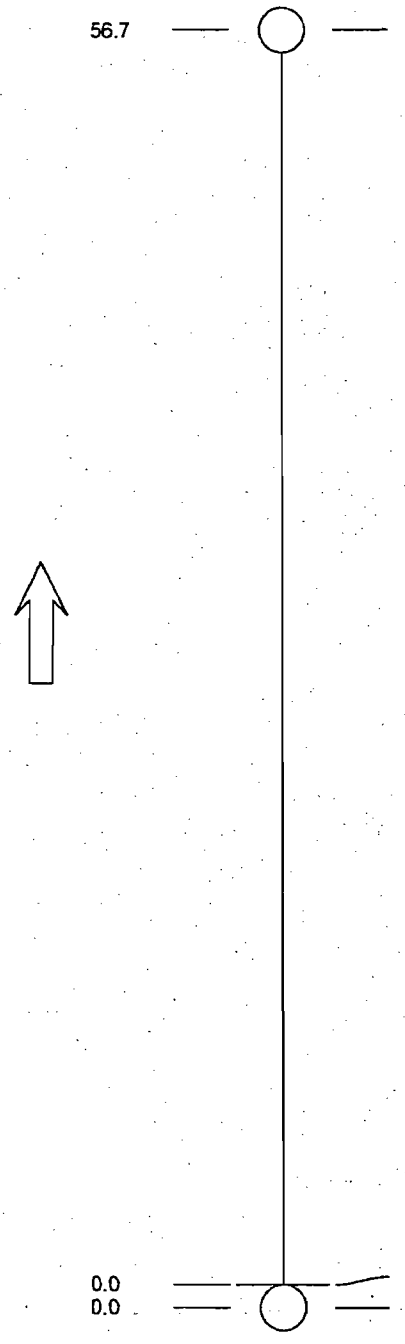
Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Schedule length* 56.7 *Ft*	*From* MH19 *Depth* *Ft*
Shape Circular	*Size* 8 *by* *ins*	*To* MH18 *Depth* *Ft*
Material Other (state in comments)	*Joint spacing* *Ft*	*Direction* Up
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 01/08/2004

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
56.7	MH18 (Upstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH19 (Downstream. Depth = Ft) Tape start:0000	



A6-8 P.21

Tabular Report of PLR MH18 X for CH2MHILL

Work Order Number		*Vid Cass* 1		*Surveyed On* 01/08/2004	*Setup* 11
Facility	*Operator* sb	*Van Reference*		*Weather* Dry	

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 56.7 Ft	*From* MH19	*Depth* Ft
Shape Circular	*Size* 8 *by* ins	*To* MH18	*Depth* Ft
Material Other (state in comments)	*Joint Spacing* Ft	*Direction* Up	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/08/2004

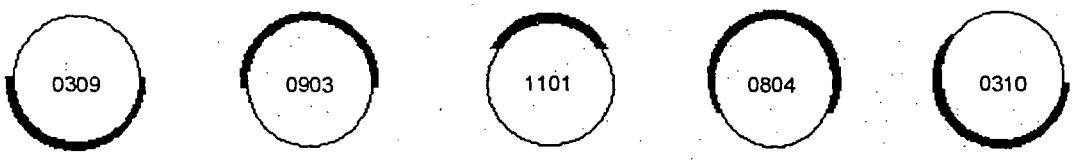
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH19
	0.0		WL Water level				0	
	56.7		MH Manhole/Node					MH18
	56.7		FH Finish of Surveys					

56.7 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At.8 P.22

Pipe Graphic Report of PLR MH20 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/08/2004 ***Setup*** 12
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 76.2 ***Ft***	***From*** MH20 ***Depth*** ***Ft***
Shape Circular	***Size*** 6 ***by*** ***ins***	***To*** MH19 ***Depth*** ***Ft***
Material Other (state in comments)	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/08/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
76.2	MH19 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH20 (Upstream. Depth = Ft) Tape start:0000	

At. 8 P. 23

Tabular Report of PLR MH20 X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 01/08/2004	***Setup*** 12
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 76.2 Ft	***From*** MH20	***Depth*** Ft
Shape Circular	***Size*** 6 ***by*** ins	***To*** MH19	***Depth*** Ft
Material Other (state in comments)	***Joint Spacing*** Ft	***Direction*** Down	
Lining	***Year laid***	***Pre-clean*** Y	***Last Cleaned*** 01/08/2004

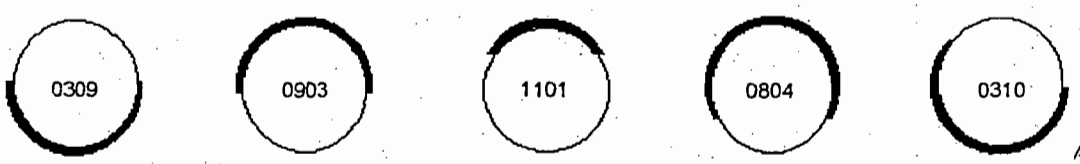
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH20
	0.0		WL Water level				0	
	76.2		MH Manhole/Node					MH19
	76.2		FH Finish of Surveys					

76.2 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



Att. 8 P.24

Pipe Graphic Report of PLR MH23 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/09/2004 ***Setup*** 13/13
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** ***Ft***	***From*** MH23. ***Depth*** ***Ft***
Shape Circular	***Size*** 6 ***by*** ***ins***	***To*** MH24 ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/09/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
13.2	MH24 (Downstream. Depth = Ft) Tape end:	
13.2	Survey abandoned [LINE HAS BEEN PLUGGED]	
0.0	Water level 0	
0.0	MH23. (Upstream. Depth = Ft) Tape start:0000	

At. 8 P. 25

Reverse Setup on MH23 X CH2MHILL

Work Order Number		*Vid Cass* 1	*Surveyed On* 01/09/2004	*Setup* 13
Facility	*Operator* sb	*Van Reference*	*Weather* Dry	*To* 0

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* Ft	*From* MH23.	*Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* MH24	*Depth* Ft
Material Vitrified clay	*Joint Spacing* Ft	*Direction* Down	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/09/2004

General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
0000	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					MH23
	0.0		WL	Water level				0	
	13.2		SA	Survey abandoned					LINE HAS BEEN PLUGGED

0.0 F

Note

At. 8 P. 26

Pipe Graphic Report of PLR MH22 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/09/2004 ***Setup*** 15
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 40.8 ***Ft***	***From*** MH23. ***Depth*** ***Ft***
Shape Circular	***Size*** 6 ***by*** ***ins***	***To*** MH22 ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/09/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
40.8	MH22 (Upstream. Depth = Ft) Tape end:	
13.3	Joint displaced	
9.2	Joint displaced	
5.2	Joint displaced	
0.0	Water level 0	
0.0	MH23. (Downstream. Depth = Ft) Tape start:0000	

At.8 P.27

Tabular Report of PLR MH22 X for CH2MHILL

Work Order Number		*Vid Cass* 1		*Surveyed On* 01/09/2004	*Setup* 15
Facility	*Operator* sb	*Van Reference*		*Weather* Dry	

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 40.8 Ft	*From* MH23.	*Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* MH22	*Depth* Ft
Material Vitrified clay	*Joint Spacing* Ft	*Direction* Up	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/09/2004

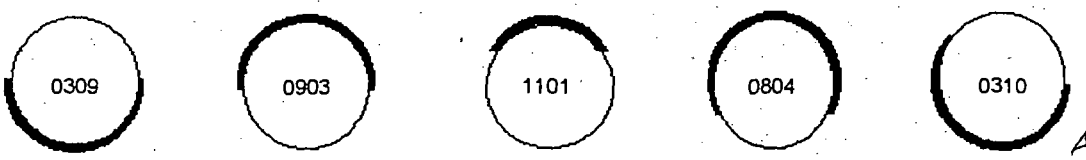
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH23
	0.0		WL Water level				0	
	5.2		JD Joint displaced	S				
	9.2		JD Joint displaced	S				
	13.3		JD Joint displaced	S				
	40.8		MH Manhole/Node					MH22
	40.8		FH Finish of Surveys					

40.8 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



Att. 8 P. 28

Pipe Graphic Report of PLR MH23. X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/09/2004 ***Setup*** 16
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** ***Ft***	***From*** MH24 ***Depth*** ***Ft***
Shape Circular	***Size*** 6 ***by*** ***ins***	***To*** MH23. ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/09/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
14.2	MH23. (Upstream. Depth = Ft) Tape end:	
14.2	Survey abandoned [ENDED AT MH 23A INSTEAD OF MH23]	
0.0	Water level 0	
0.0	MH24 (Downstream. Depth = Ft) Tape start:0000	

At. 8 P. 29

Tabular Report of PLR MH23. X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 01/09/2004	*Setup* 16
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* Ft	*From* MH24	*Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* MH23.	*Depth* Ft
Material Vitrified clay	*Joint Spacing* Ft	*Direction* Up	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/09/2004

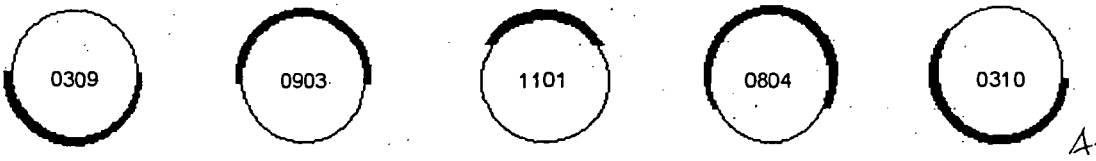
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH24
	0.0		WL Water level				0	
	14.2		MH Manhole/Node					MH23A
	14.2		SA Survey abandoned					ENDED AT MH 23A INSTEAD OF MH23

14.2 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P.30

Pipe Graphic Report of PLR MH26 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/09/2004 ***Setup*** 17
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry
Road Name		***Place Name***	
Location type			
Surface Concrete road			
Survey purpose Random survey of pipes and things			

Pipe Use Sanitary	***Schedule length*** 52.2 ***Ft***	***From*** MH25. ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH26. ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/09/2004
General note		Structural Service Constructional
Location note		Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
52.2	MH26. (Upstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH25. (Downstream. Depth = Ft) Tape start:0000	

At-8 P.31

Tabular Report of PLR MH26 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 01/09/2004	*Setup* 17
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 52.2 Ft	*From* MH25.	*Depth* Ft
Shape Circular	*Size* 8 *by* ins	*To* MH26.	*Depth* Ft
Material Vitrified clay	*Joint Spacing* Ft	*Direction* Up	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/09/2004

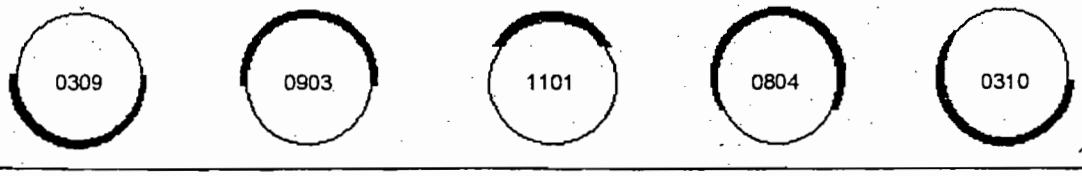
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH25
	0.0		WL Water level				0	
	52.2		MH Manhole/Node					MH26
	52.2		FH Finish of Surveys					

52.2 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At. 8 P. 32

Pipe Graphic Report of PLR MH4 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/12/2004 ***Setup*** 19
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 159.1 ***Ft***	***From*** MH4 ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH7. ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/12/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
159.1	MH7. (Downstream. Depth = Ft) Tape end:	
128.5	Lateral or connection exists OK 09/oc	
91.4	Manhole/Node [MH6]	
86.0	Lateral or connection exists OK 09/oc	
59.5	Manhole/Node [MH5]	
0.0	Water level 0	
0.0	MH4 (Upstream. Depth = Ft) Tape start:0000	

At-8 P. 33

Tabular Report of PLR MH4 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 01/12/2004	*Setup* 19
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 159.1 Ft	*From* MH4	*Depth* Ft
Shape Circular	*Size* 8 *by* ins	*To* MH7.	*Depth* Ft
Material Vitrified clay	*Joint Spacing* Ft	*Direction* Down	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/12/2004

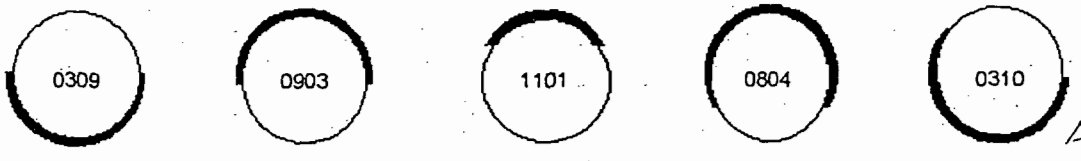
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
0000	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					MH4
	0.0		WL	Water level				0	
	59.5		MH	Manhole/Node					MH5
	86.0		LO	Lateral or connection exists OK		09			
	91.4		MH	Manhole/Node					MH6
	128.5		LO	Lateral or connection exists OK		09			
	159.1		MH	Manhole/Node					MH7
	159.1		FH	Finish of Surveys					

159.1 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P.34

Pipe Graphic Report of PLR MH7 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/12/2004 ***Setup*** 20
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 112.7 ***Ft***	***From*** MH7 ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH25 ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/12/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
112.7	MH25 (Downstream. Depth = Ft) Tape end:	
90.2	Lateral or connection exists OK 10/oc	
10.7	Manhole/Node [MH25A]	
0.0	Water level 0	
0.0	MH7 (Upstream. Depth = Ft) Tape start:0000	

A4-8 P. 35

Tabular Report of PLR MH7 X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 01/12/2004	***Setup*** 20
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 112.7 Ft	***From*** MH7	***Depth*** Ft
Shape Circular	***Size*** 8 ***by*** ins	***To*** MH25	***Depth*** Ft
Material Vitrified clay	***Joint Spacing*** Ft	***Direction*** Down	
Lining	***Year laid***	***Pre-clean*** Y	***Last Cleaned*** 01/12/2004

General note
Location note

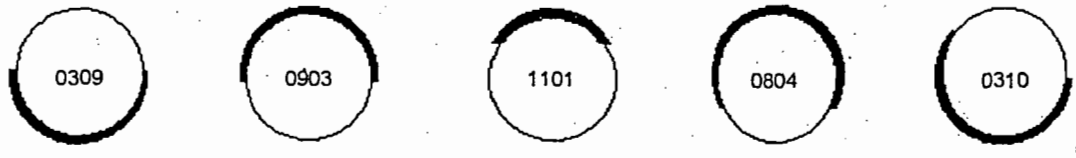
Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
0000	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					MH7
	0.0		WL	Water level				0	
	10.7		MH	Manhole/Node					MH25A
	90.2		LO	Lateral or connection exists OK		10			
	112.7		MH	Manhole/Node					MH25
	112.7		FH	Finish of Surveys					

112.7 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



Att. 8 P.36

Pipe Graphic Report of PLR MH26. X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 01/12/2004 *Setup* 21
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name	*Place Name*
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	*Schedule length* 108.2 *Ft*	*From* MH26. *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH27. *Depth* *Ft*
Material Other (state in comments)	*Joint spacing* *Ft*	*Direction* Down
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 01/12/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
108.2	MH27. (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH26. (Upstream. Depth = Ft) Tape start:0000	

At-8 P.37

Tabular Report of PLR MH26. X for CH2MHILL

Work Order Number		*Vid Cass* 1		*Surveyed On* 01/12/2004	*Setup* 21
Facility	*Operator* sb	*Van Reference*		*Weather* Dry	

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 108.2 Ft	*From* MH26.	*Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* MH27.	*Depth* Ft
Material Other (state in comments)	*Joint Spacing* Ft	*Direction* Down	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/12/2004

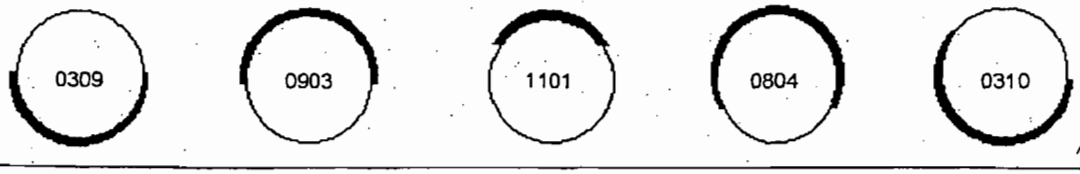
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH26.
	0.0		WL Water level				0	
	108.2		MH Manhole/Node					MH27.
	108.2		FH Finish of Surveys					

108.2 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



Att-8 P. 38

Pipe Graphic Report of PLR MH27.. X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 01/13/2004 *Setup* 23
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name	*Place Name*
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	*Schedule length* 187.5 *Ft*	*From* MH27.. *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH28. *Depth* *Ft*
Material Other (state in comments)	*Joint spacing* *Ft*	*Direction* Down
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 01/13/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
187.5	MH28. (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH27.. (Upstream. Depth = Ft) Tape start:0000	

At-8 P.39

Tabular Report of PLR MH27.. X for CH2MHILL

Work Order Number		***Vid Cass*** 1		***Surveyed On*** 01/13/2004	***Setup*** 23
Facility	***Operator*** sb	***Van Reference***		***Weather*** Dry	
Road Name		***Place Name***			
Location type					
Surface Concrete road					
Survey purpose Random survey of pipes and things					

Pipe Use Sanitary	***Scheduled length*** 187.5 Ft	***From*** MH27..	***Depth*** Ft
Shape Circular	***Size*** 6 ***by*** ins	***To*** MH28.	***Depth*** Ft
Material Other (state in comments)	***Joint Spacing*** Ft	***Direction*** Down	
Lining	***Year laid***	***Pre-clean*** Y	***Last Cleaned*** 01/13/2004

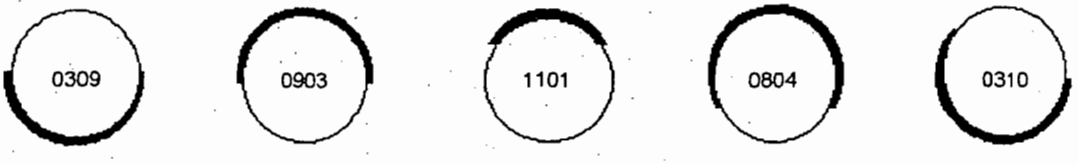
General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH27..
	0.0		WL Water level				0	
	187.5		MH Manhole/Node					MH28.
	187.5		FH Finish of Surveys					

187.5 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P.40

Pipe Graphic Report of PLR **MH41** X for **CH2MHILL**

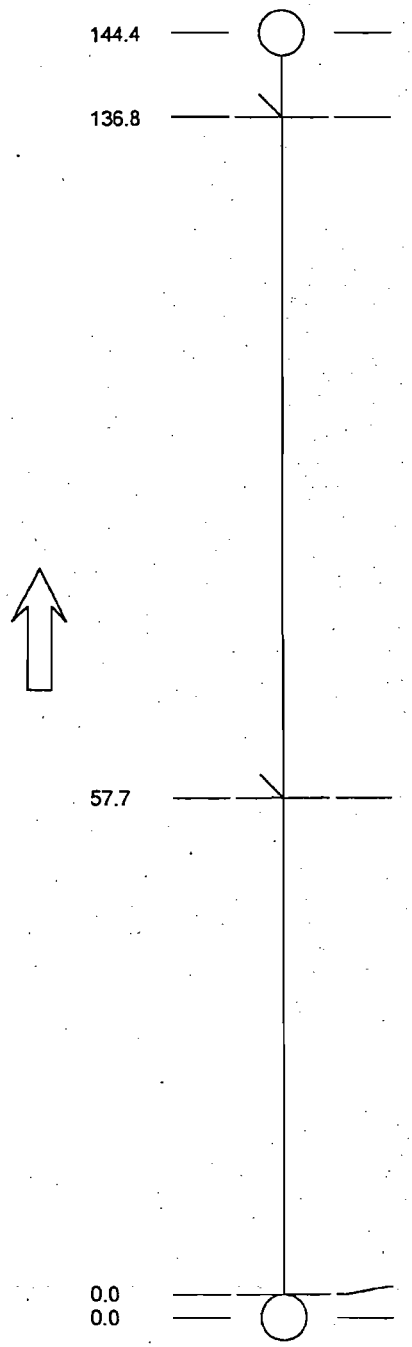
Works Order Number		***Cassette*** 1	***Surveyed On*** 01/22/2004 ***Setup*** 25
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 144.4 ***Ft***	***From*** MH42 ***Depth*** ***Ft***
Shape Circular	***Size*** 6 ***by*** ***ins***	***To*** MH41. ***Depth*** ***Ft***
Material Cast iron	***Joint spacing*** ***Ft***	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/22/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
144.4	MH41. (Upstream. Depth = Ft) Tape end:	
136.8	Lateral or connection exists OK 12/oc	
57.7	Lateral or connection exists OK 12/oc	
0.0	Water level 0	
0.0	MH42 (Downstream. Depth = Ft) Tape start:0000	



A6-8 P.41

Tabular Report of PLR MH41 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 01/22/2004	*Setup* 25
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 144.4 Ft	*From* MH42	*Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* MH41.	*Depth* Ft
Material Cast iron	*Joint Spacing* Ft	*Direction* Up	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/22/2004

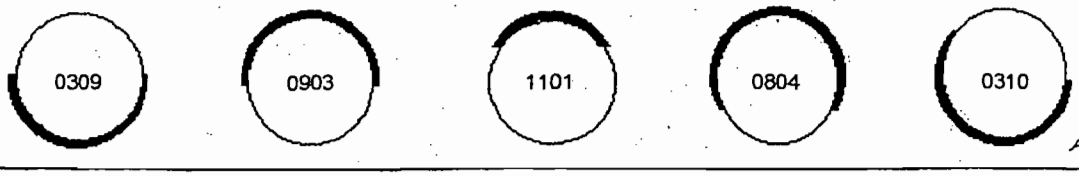
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
0000	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					MH40
	0.0		WL	Water level				0	
	57.7		LO	Lateral or connection exists OK		12			
	136.8		LO	Lateral or connection exists OK		12			
	144.4		MH	Manhole/Node					MH41
	144.4		FH	Finish of Surveys					

144.4 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



Att. 8 p. 42

Pipe Graphic Report of PLR MH41. X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 01/22/2004 *Setup* 26
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Schedule length* 85.7 *Ft*	*From* MH41. *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH42 *Depth* *Ft*
Material Cast iron	*Joint spacing* *Ft*	*Direction* Down
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 01/22/2004

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
85.7	MH42 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH41. (Upstream. Depth = Ft) Tape start:0000	

At. 8 P. 43

Tabular Report of PLR MH41. X for CH2MHILL

Work Order Number		*Vid Cass* 1		*Surveyed On* 01/22/2004	*Setup* 26
Facility	*Operator* sb	*Van Reference*		*Weather* Dry	

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 85.7 Ft	*From* MH41.	*Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* MH42	*Depth* Ft
Material Cast iron	*Joint Spacing* Ft	*Direction* Down	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/22/2004

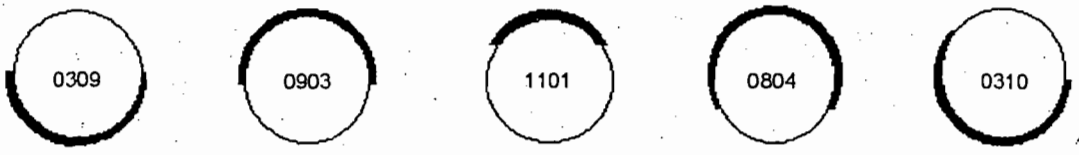
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH41.
	0.0		WL Water level				0	
	85.7		MH Manhole/Node					MH42
	85.7		FH Finish of Surveys					

85.7 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P. 44

Pipe Graphic Report of PLR MH42 X for CH2MHILL

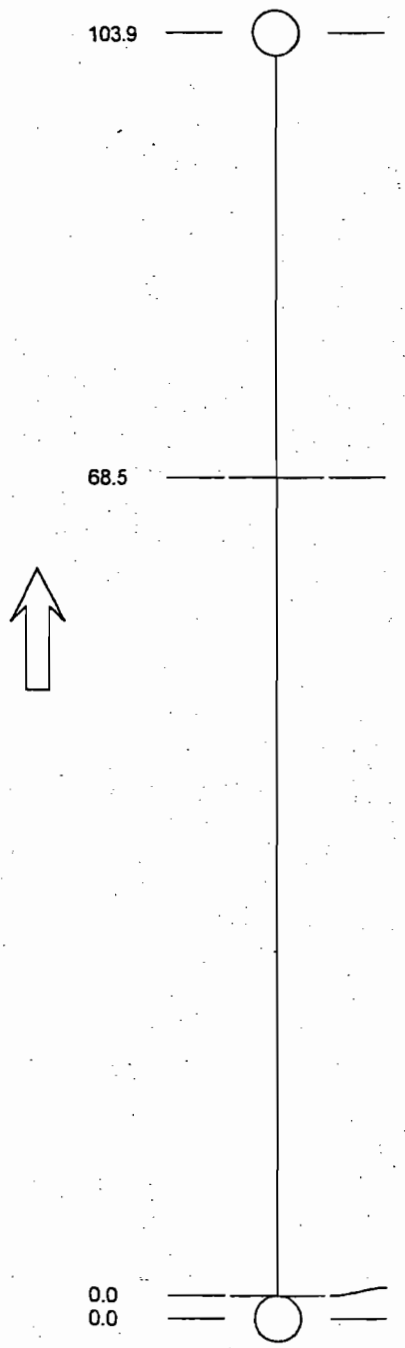
Works Order Number		*Cassette* 1	*Surveyed On* 01/27/2004 *Setup* 27
Facility	*Operator* sb	*Van Reference*	*Weather* Snow

Road Name	*Place Name*
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	*Schedule length* 103.9 *Ft*	*From* MH42 *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH43 *Depth* *Ft*
Material Cast iron	*Joint spacing* *Ft*	*Direction* Down
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 01/22/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
103.9	MH43 (Downstream. Depth = Ft) Tape end:	
68.5	Cracks multiple 02/oc	
0.0	Water level 0	
0.0	MH42 (Upstream. Depth = Ft) Tape start:0000	



At-8 P.45

Tabular Report of PLR MH42 X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 01/27/2004	***Setup*** 27
Facility	***Operator*** sb	***Van Reference***	***Weather*** Snow

Road Name ***Place Name***

Location type

Surface Concrete road

Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 103.9 Ft	***From*** MH42	***Depth*** Ft
Shape Circular	***Size*** 6 ***by*** ins	***To*** MH43	***Depth*** Ft
Material Cast iron	***Joint Spacing*** Ft	***Direction*** Down	
Lining	***Year laid***	***Pre-clean*** Y	***Last Cleaned*** 01/22/2004

General note Structural Service Constructional

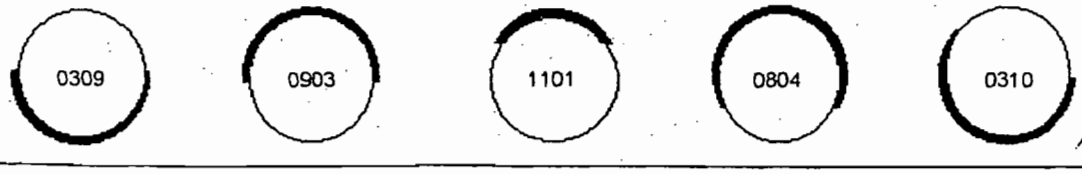
Location note Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
0000	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					MH42
	0.0		WL	Water level				0	
	68.5		CM	Cracks multiple	S	02	09		
	103.9		MH	Manhole/Node					MH43
	103.9		FH	Finish of Surveys					

103.9 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P.46

Pipe Graphic Report of PLR MH43 X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 01/27/2004 *Setup* 28
Facility	*Operator* sb	*Van Reference*	*Weather* Snow

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Schedule length* 86.1 *Ft*	*From* MH51 *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH43 *Depth* *Ft*
Material Cast iron	*Joint spacing* *Ft*	*Direction* Up
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 01/22/2004

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
86.1	MH43 (Upstream. Depth = Ft) Tape end:	
81.8	Survey abandoned [SURVEY ENDED AT MH 52]	
0.0	Water level 0	
0.0	MH51 (Downstream. Depth = Ft) Tape start:0000	

At-8 P.47

Tabular Report of PLR MH43 X for CH2MHILL

Work Order Number		*Vid Cass* 1		*Surveyed On* 01/27/2004	*Setup* 28
Facility	*Operator* sb	*Van Reference*		*Weather* Snow	

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 86.1 Ft	*From* MH51	*Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* MH43	*Depth* Ft
Material Cast iron	*Joint Spacing* Ft	*Direction* Up	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/22/2004

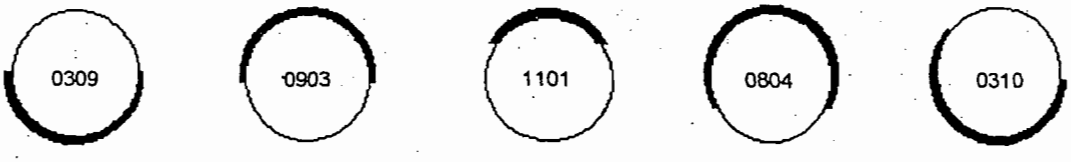
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
0000	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					MH51
	0.0		WL	Water level				0	
	81.8		SA	Survey abandoned					SURVEY ENDED AT MH 52

81.8 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



A-6.8 P.48

Pipe Graphic Report of PLR MH51 X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 01/27/2004 *Setup* 29
Facility	*Operator* sb	*Van Reference*	*Weather* Snow

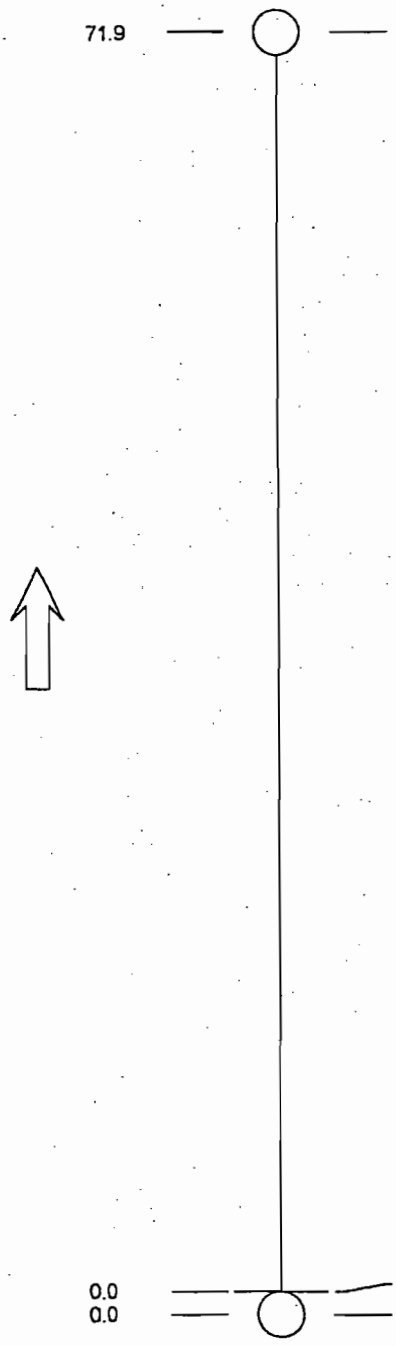
Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Schedule length* 71.9 *Ft*	*From* MH51 *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH50. *Depth* *Ft*
Material Cast iron	*Joint spacing* *Ft*	*Direction* Down
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 01/22/2004

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
71.9	MH50. (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH51 (Upstream. Depth = Ft) Tape start:0000	



At-8 P. 49

Tabular Report of PLR MH51 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 01/27/2004	*Setup* 29
Facility	*Operator* sb	*Van Reference*	*Weather* Snow

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 71.9 Ft	*From* MH51	*Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* MH50.	*Depth* Ft
Material Cast iron	*Joint Spacing* Ft	*Direction* Down	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/22/2004

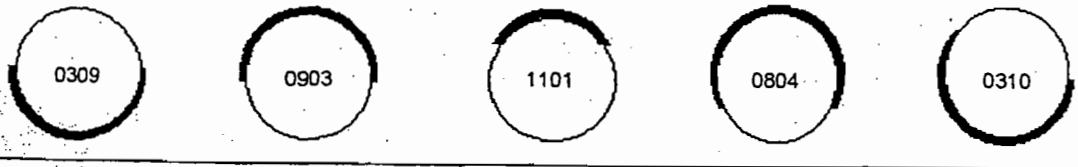
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH51
	0.0		WL Water level				0	
	71.9		MH Manhole/Node					MH50
	71.9		FH Finish of Surveys					

71.9 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



A-6.8 P.50

Pipe Graphic Report of PLR MH45 X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 01/27/2004 *Setup* 30
Facility	*Operator* sb	*Van Reference*	*Weather* Snow

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Schedule length* 144.2 *Ft*	*From* MH45 *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH47 *Depth* *Ft*
Material Reinforced plastic matrix	*Joint spacing* *Ft*	*Direction* Down
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 01/22/2004

General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
144.2	MH47 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH45 (Upstream. Depth = Ft) Tape start:0000	

At. 8 P. 51

Tabular Report of PLR MH45 X for CH2MHILL

Work Order Number		*Vid Cass* 1		*Surveyed On* 01/27/2004	*Setup* 30
Facility	*Operator* sb	*Van Reference*		*Weather* Snow	

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 144.2 Ft	*From* MH45	*Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* MH47	*Depth* Ft
Material Reinforced plastic matrix	*Joint Spacing* Ft	*Direction* Down	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/22/2004

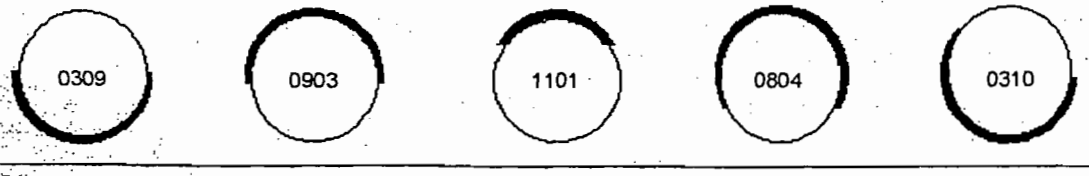
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH45
	0.0		WL Water level				0	
	144.2		MH Manhole/Node					MH47
	144.2		FH Finish of Surveys					

144.2 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At.8 P.52

Pipe Graphic Report of PLR MH47 X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 01/28/2004 *Setup* 31
Facility	*Operator* sb	*Van Reference*	*Weather* Snow

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Schedule length* 57.1 *Ft*	*From* MH47 *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH48 *Depth* *Ft*
Material Cast iron	*Joint spacing* *Ft*	*Direction* Down
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 01/28/2004

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
57.1	MH48 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH47 (Upstream. Depth = Ft) Tape start:0000	

At-8 P.53

Tabular Report of PLR MH47 X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 01/28/2004	***Setup*** 31
Facility	***Operator*** sb	***Van Reference***	***Weather*** Snow

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 57.1 Ft	***From*** MH47	***Depth*** Ft
Shape Circular	***Size*** 6 ***by*** ins	***To*** MH48	***Depth*** Ft
Material Cast iron	***Joint Spacing*** Ft	***Direction*** Down	
Lining	***Year laid***	***Pre-clean*** Y	***Last Cleaned*** 01/28/2004

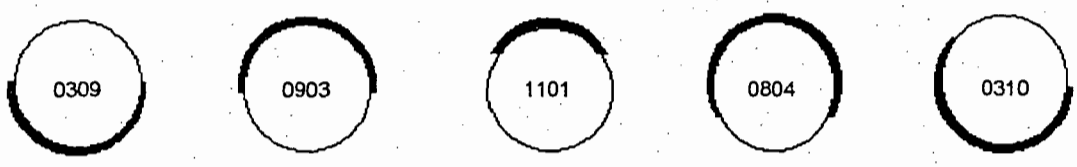
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH47
	0.0		WL Water level				0	
	57.1		MH Manhole/Node					MH48
	57.1		FH Finish of Surveys					

57.1 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At 8 P. 54

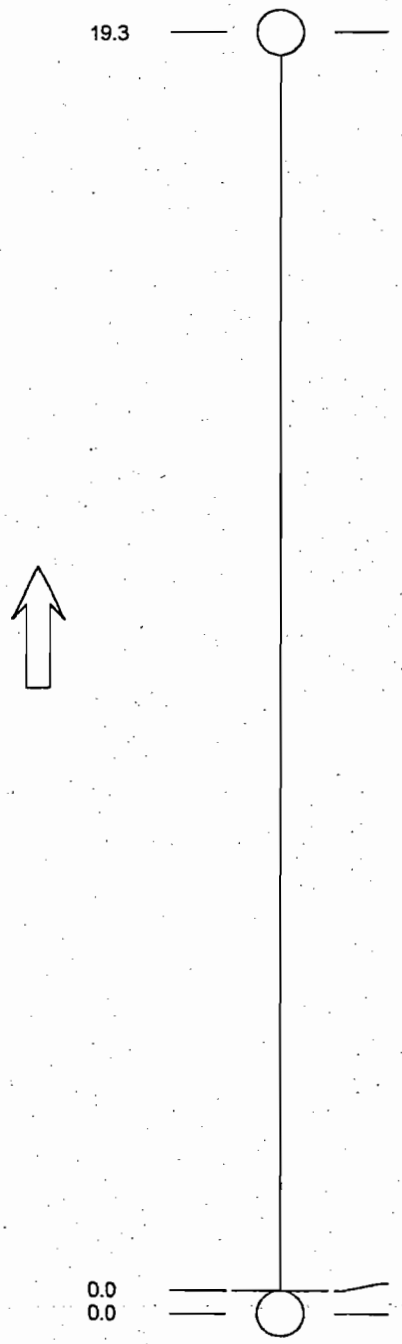
Pipe Graphic Report of PLR MH48 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/28/2004 ***Setup*** 32
Facility	***Operator*** sb	***Van Reference***	***Weather*** Snow

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 19.3 ***Ft***	***From*** MH48 ***Depth*** ***Ft***
Shape Circular	***Size*** 6 ***by*** ***ins***	***To*** MH49. ***Depth*** ***Ft***
Material Cast iron	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/28/2004
General note		Structural Service Constructional
Location note		Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
19.3	MH49. (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH48 (Upstream. Depth = Ft) Tape start:0000	



46.8 P. 55

Tabular Report of PLR MH48 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 01/28/2004	*Setup* 32
Facility	*Operator* sb	*Van Reference*	*Weather* Snow

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 19.3 Ft	*From* MH48	*Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* MH49.	*Depth* Ft
Material Cast iron	*Joint Spacing* Ft	*Direction* Down	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/28/2004

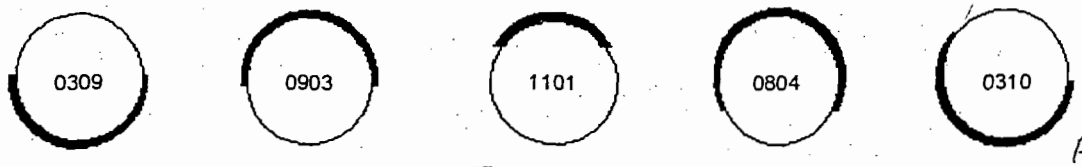
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH48
	0.0		WL Water level				0	
	19.3		MH Manhole/Node					MH49
	19.3		FH Finish of Surveys					

19.3 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At.8 P.56

Pipe Graphic Report of PLR MH50. X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 01/28/2004 *Setup* 33
Facility	*Operator* sb	*Van Reference*	*Weather* Snow

Road Name	*Place Name*
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	*Schedule length* 165.2 *Ft*	*From* MH50. *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH49. *Depth* *Ft*
Material Vitrified clay	*Joint spacing* *Ft*	*Direction* Down
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 01/28/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
165.2	MH49. (Downstream. Depth = Ft) Tape end:	
112.5	Lateral or connection exists OK 03/oc	
0.0	Water level 0	
0.0	MH50. (Upstream. Depth = Ft) Tape start:0000	

A-6.8 P.57

Tabular Report of PLR MH50. X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 01/28/2004	***Setup*** 33
Facility	***Operator*** sb	***Van Reference***	***Weather*** Snow

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 165.2 Ft	***From*** MH50. ***Depth*** Ft
Shape Circular	***Size*** 6 ***by*** ins	***To*** MH49. ***Depth*** Ft
Material Vitrified clay	***Joint Spacing*** Ft	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y. ***Last Cleaned*** 01/28/2004

General note
Location note

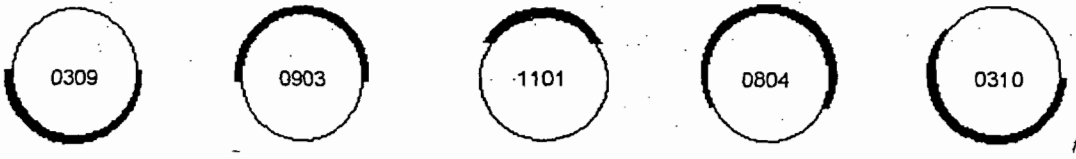
Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH50.
	0.0		WL Water level				0	
	112.5		LO Lateral or connection exists OK		03			
	165.2		MH Manhole/Node					MH49.
	165.2		FH Finish of Surveys					

165.2 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At .8 P.58

Tabular Report of PLR MH43 X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 01/29/2004	***Setup*** 35
Facility	***Operator*** sb	***Van Reference***	***Weather*** Snow

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 86.1 Ft	***From*** MH43	***Depth*** Ft
Shape Circular	***Size*** 6 ***by*** ins	***To*** MH51	***Depth*** Ft
Material Cast iron	***Joint Spacing*** Ft	***Direction*** Down	
Lining	***Year laid***	***Pre-clean***	***Last Cleaned*** 01/22/2004

General note
Location note

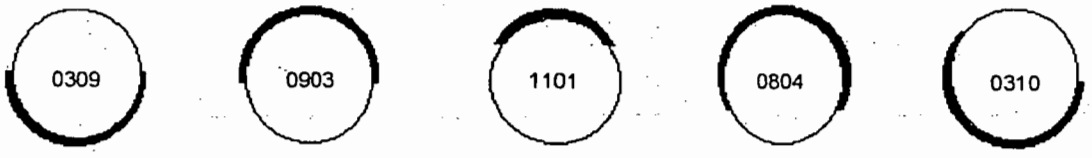
Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH43
	0.0		WL Water level				0	
	86.1		MH Manhole/Node					MH51
	86.1		FH Finish of Surveys					

86.1 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At.8 P.59

Pipe Graphic Report of PLR **MH43** X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/29/2004 ***Setup*** 35
Facility	***Operator*** sb	***Van Reference***	***Weather*** Snow

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 86.1 ***Ft***	***From*** MH43 ***Depth*** ***Ft***
Shape Circular	***Size*** 6 ***by*** ***ins***	***To*** MH51 ***Depth*** ***Ft***
Material Cast iron	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** ***Last cleaned*** 01/22/2004
General note		Structural Service Constructional
Location note		Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
86.1	MH51 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH43 (Upstream. Depth = Ft) Tape start:0000	

At. 8 P.60

Pipe Graphic Report of PLR MH53 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/29/2004 ***Setup*** 36/37
Facility	***Operator*** sb	***Van Reference***	***Weather*** Snow

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** ***Ft***	***From*** MH32.	***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH53.	***Depth*** ***Ft***
Material Cast iron	***Joint spacing*** ***Ft***	***Direction*** Up	
Lining	***Year laid***	***Pre-clean*** Y	***Last cleaned*** 01/29/2004

General note	Structural	Service	Constructional
Location note	Miscellaneous	Hydraulic	

Distance (Ft)	Description (Showing all categories)	Media
2.2	MH53. (Upstream. Depth = Ft) Tape end:	
2.2	Water level 0	
-6.9	Roots 09/oc	
-32.9	Roots 12/oc	
-66.3	Roots 12/oc	
~~-113.6~~	~~Survey abandoned [TOO MANY ROOTS IN LINE]~~	
2.2	Survey abandoned [PIPE HAS A 90 DEGREE VERTICAL]	
0.0	Water level 0	
0.0	MH32. (Downstream. Depth = Ft) Tape start:0000	

At. 8 P. 61

Reverse Setup on MH53 X CH2MHILL

Work Order Number		*Vid Cass* 1	*Surveyed On* 01/29/2004 *Setup* 36
Facility	*Operator* sb	*Van Reference*	*Weather* Snow *To* 37
Road Name		*Place Name*	
Location type			
Surface Concrete road			
Survey purpose Random survey of pipes and things			

Pipe Use Sanitary	*Scheduled length* Ft	*From* MH32. *Depth* Ft
Shape Circular	*Size* 8 *by* ins	*To* MH53. *Depth* Ft
Material Cast iron	*Joint Spacing* Ft	*Direction* Up
Lining	*Year laid*	*Pre-clean* Y *Last Cleaned* 01/29/2004

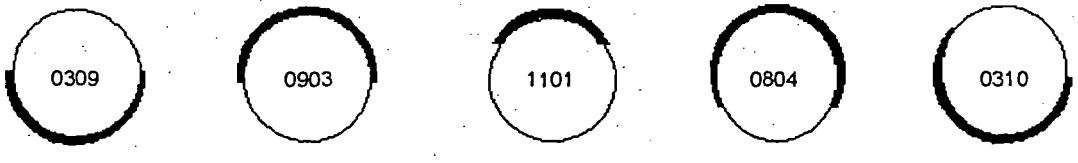
General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
0000	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					MH32
	0.0		WL	Water level				0	
	2.2		SA	Survey abandoned					PIPE HAS A 90 DEGREE VERTICAL
	2.2		SA	Survey abandoned					TOO MANY ROOTS IN LINE
	49.5		R	Roots	M	12			
	82.9		R	Roots	L	12			
	108.9		R	Roots	S	9			
	118.0		WL	Water level				0	
	118.0		MH	Manhole/Node					MH53
0000	118.0		FH	Finish of Surveys					

118.0 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At.8 P.62

Pipe Graphic Report of PLR MH53 X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 01/29/2004 *Setup* 37/36
Facility	*Operator* sb	*Van Reference*	*Weather* Snow

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Schedule length* *Ft*	*From* MH53. *Depth* *Ft*
Shape Circular	*Size* 8 *by* *ins*	*To* MH32. *Depth* *Ft*
Material Cast iron	*Joint spacing* *Ft*	*Direction* Down
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 01/29/2004

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
115.8	MH32. (Downstream. Depth = Ft) Tape end:	
115.8	Water level 0	
113.6	Survey abandoned [PIPE HAS A 90 DEGREE VERTICAL]	
115.8	Survey abandoned [TOO MANY ROOTS IN LINE]	
68.5	Roots 12/oc	
35.1	Roots 12/oc	
9.1	Roots 03/oc	
0.0	Water level 0	
0.0	MH53. (Upstream. Depth = Ft) Tape start:0000	

At. 8 p. 63

Reverse Setup on MH53 X CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 01/29/2004	*Setup* 37
Facility	*Operator* sb	*Van Reference*	*Weather* Snow	*To* 36
Road Name	*Place Name*		
Location type			
Surface Concrete road			
Survey purpose Random survey of pipes and things			

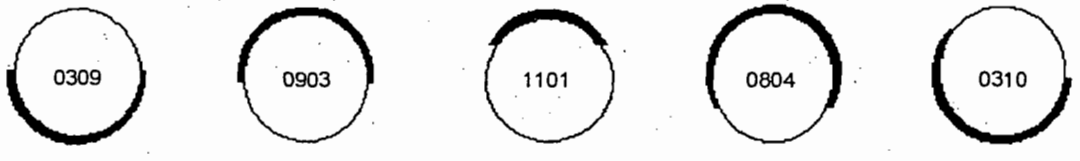
Pipe Use Sanitary	*Scheduled length* Ft	*From* MH53. *Depth* Ft.
Shape Circular	*Size* 8 *by* ins	*To* MH32. *Depth* Ft
Material Cast iron	*Joint Spacing* Ft	*Direction* Down
Lining	*Year laid*	*Pre-clean* Y *Last Cleaned* 01/29/2004
General note		Structural Service Constructional
Location note		Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
0000	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					MH53
	0.0		WL	Water level				0	
	9.1		R	Roots	S	03			
	35.1		R	Roots	L	12			
	68.5		R	Roots	M	12			
	115.8		SA	Survey abandoned					TOO MANY ROOTS IN LINE
	115.8		SA	Survey abandoned					PIPE HAS A 90 DEGREE VERTICAL
	118.0		WL	Water level				0	
	118.0		MH	Manhole/Node					MH32
0000	118.0		FH	Finish of Surveys					

118.0 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P.64

Pipe Graphic Report of PLR MH49 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 01/29/2004 ***Setup*** 38
Facility	***Operator*** sb	***Van Reference***	***Weather*** Snow

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 31.3 ***Ft***	***From*** MH53. ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH49 ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 01/28/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
31.3	MH49 (Upstream. Depth = Ft) Tape end:	
6.9	Roots 03/oc	
0.0	Water level 0	
0.0	MH53. (Downstream. Depth = Ft) Tape start:0000	

At. 8 P. 65

Tabular Report of PLR MH49 X for CH2MHILL

Work Order Number		*Vid Cass* 1		*Surveyed On* 01/29/2004	*Setup* 38
Facility	*Operator* sb	*Van Reference*		*Weather* Snow	
Road Name		*Place Name*			
Location type					
Surface Concrete road					
Survey purpose Random survey of pipes and things					

Pipe Use Sanitary	*Scheduled length* 31.3 Ft	*From* MH53.	*Depth* Ft
Shape Circular	*Size* 8 *by* ins	*To* MH49	*Depth* Ft
Material Vitrified clay	*Joint Spacing* Ft	*Direction* Up	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 01/28/2004

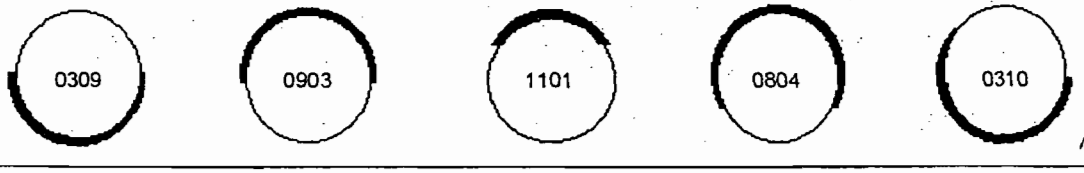
General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
0000	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					MH53
	0.0		WL	Water level				0	
	6.9		R	Roots	S	03			
	31.3		MH	Manhole/Node					MH49
	31.3		FH	Finish of Surveys					PIECE OF METAL IN LINE

31.3 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At. 8 P.66

Pipe Graphic Report of PLR MH57 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 02/03/2004 ***Setup*** 39
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 44.5 ***Ft***	***From*** MH57 ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH58 ***Depth*** ***Ft***
Material Cast iron	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 02/03/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
44.5	MH58 (Downstream. Depth = .Ft) Tape end:	
0.0	Water level 0	
0.0	MH57 (Upstream. Depth = Ft) Tape start:0000	

At-8 P.67

Tabular Report of PLR MH57 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 02/03/2004	*Setup* 39
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 44.5 Ft	*From* MH57	*Depth* Ft
Shape Circular	*Size* 8 *by* ins	*To* MH58	*Depth* Ft
Material Cast iron	*Joint Spacing* Ft	*Direction* Down	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 02/03/2004

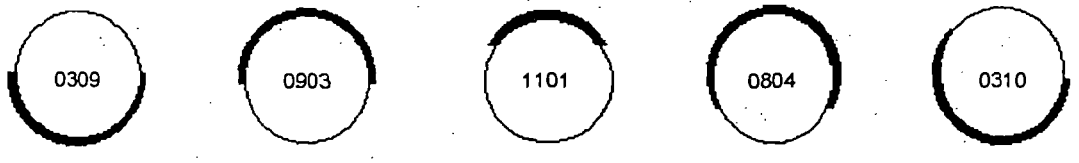
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH57
	0.0		WL Water level				0	
	44.5		MH Manhole/Node					MH58
	44.5		FH Finish of Surveys					

44.5 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P.68

Pipe Graphic Report of PLR MH58 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 02/03/2004 ***Setup*** 40
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use	***Schedule length*** 60.8 ***Ft***	***From*** MH58 ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH60. ***Depth*** ***Ft***
Material Cast iron	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 02/03/2004
General note		Structural Service Constructional
Location note		Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
60.8	MH60. (Downstream. Depth = Ft) Tape end:	
30.4	Manhole/Node [MH59]	
0.0	Water level 0	
0.0	MH58 (Upstream. Depth = Ft) Tape start:0000	

At-8 P.69

Tabular Report of PLR MH58 X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 02/03/2004	***Setup*** 40
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***

Location type

Surface Concrete road

Survey purpose Random survey of pipes and things

Pipe Use	***Scheduled length*** 60.8 Ft	***From*** MH58 ***Depth*** Ft
Shape Circular	***Size*** 8 ***by*** ins	***To*** MH60. ***Depth*** Ft
Material Cast iron	***Joint Spacing*** Ft	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last Cleaned*** 02/03/2004

General note Structural Service Constructional

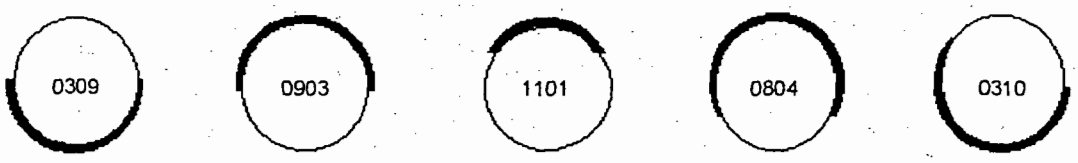
Location note Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
0000	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					MH58
	0.0		WL	Water level				0	
	30.4		MH	Manhole/Node					MH59
	60.8		MH	Manhole/Node					MH60
	60.8		FH	Finish of Surveys					

60.8 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At. 8 P.70

Pipe Graphic Report of PLR MH55. X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 02/05/2004 ***Setup*** 41
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 211.2 ***Ft***	***From*** MH57 ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH55. ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 02/04/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
211.2	MH55. (Upstream. Depth = Ft) Tape end:	
22.6	Lateral or connection exists OK 09/oc	
21.2	Lateral or connection exists OK 03/oc	
0.0	Water level 0	
0.0	MH57 (Downstream. Depth = Ft) Tape start:0000	

At-8 P.71

Tabular Report of PLR MH55. X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 02/05/2004	*Setup* 41
Facility	*Operator* sb	*Van Reference*	*Weather* Dry
Road Name		*Place Name*	
Location type			
Surface Concrete road			
Survey purpose Random survey of pipes and things			

Pipe Use Sanitary	*Scheduled length* 211.2 Ft	*From* MH57	*Depth* Ft
Shape Circular	*Size* 8 *by* ins	*To* MH55.	*Depth* Ft
Material Vitrified clay	*Joint Spacing* Ft	*Direction* Up	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 02/04/2004

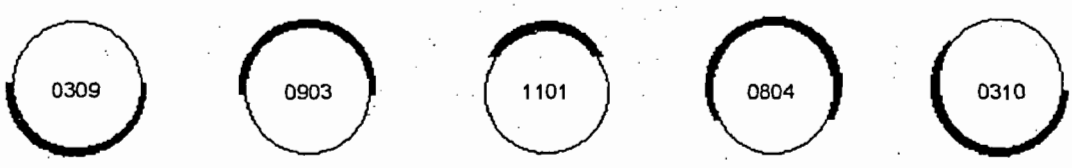
General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH57
	0.0		WL Water level				0	
	21.2		LO Lateral or connection exists OK		03			
	22.6		LO Lateral or connection exists OK		09			
	211.2		MH Manhole/Node					MH55.
	211.2		FH Finish of Surveys					

211.2 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At. 8 p. 72

Pipe Graphic Report of PLR MH33 X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 02/05/2004 *Setup* 42
Facility	*Operator* sb	*Van Reference*	*Weather*

Road Name	*Place Name*
Location type	
Surface Dense trees or bushes	
Survey purpose	

Pipe Use Sanitary	*Schedule length* 402.5 *Ft*	*From* MH33 *Depth* *Ft*
Shape Circular	*Size* 8 *by* *ins*	*To* MH55. *Depth* *Ft*
Material Vitrified clay	*Joint spacing* *Ft*	*Direction* Down
Lining	*Year laid*	*Pre-clean* *Last cleaned* 01/29/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
402.5	MH55. (Downstream. Depth = Ft) Tape end:	
221.5	Manhole/Node [MH54]	
0.0	Water level 0	
0.0	MH33 (Upstream. Depth = Ft) Tape start:0000	

At-8 P.73

Tabular Report of PLR MH33 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 02/05/2004	*Setup* 42
Facility	*Operator* sb	*Van Reference*	*Weather*
Road Name		*Place Name*	
Location type			
Surface Dense trees or bushes			
Survey purpose			

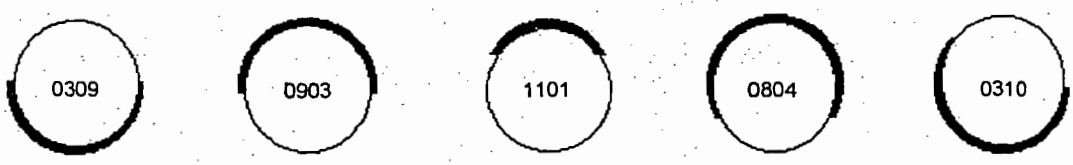
Pipe Use Sanitary	*Scheduled length* 402.5 Ft	*From* MH33 *Depth* Ft
Shape Circular	*Size* 8 *by* ins	*To* MH55. *Depth* Ft
Material Vitrified clay	*Joint Spacing* Ft	*Direction* Down
Lining	*Year laid*	*Pre-clean* *Last Cleaned* 01/29/2004
General note		Structural Service Constructional
Location note		Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH33
	0.0		WL Water level				0	
	221.5		MH Manhole/Node					MH54
	402.5		MH Manhole/Node					MH55.
	402.5		FH Finish of Surveys					

402.5 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



Att. 8 P.74

Pipe Graphic Report of PLR MH60. X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 02/05/2004 ***Setup*** 43
Facility	***Operator*** sb	***Van Reference***	***Weather*** Snow

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 179.2 ***Ft***	***From*** MH61 ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH60. ***Depth*** ***Ft***
Material Concrete	***Joint spacing*** ***Ft***	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 02/04/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
179.2	MH60. (Upstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH61 (Downstream. Depth = Ft) Tape start:0000	

At-8 P.75

Tabular Report of PLR MH60. X for CH2MHILL

Work Order Number	**Vid Cass** 1	**Surveyed On** 02/05/2004	**Setup** 43
Facility	**Operator** sb	**Van Reference**	**Weather** Snow
Road Name		**Place Name**	
Location type			
Surface Concrete road			
Survey purpose Random survey of pipes and things			

Pipe Use Sanitary	**Scheduled length** 179.2 Ft	**From** MH61	**Depth** Ft
Shape Circular	**Size** 8 **by** ins	**To** MH60.	**Depth** Ft
Material Concrete	**Joint Spacing** Ft	**Direction** Up	
Lining	**Year laid**	**Pre-clean** Y	**Last Cleaned** 02/04/2004

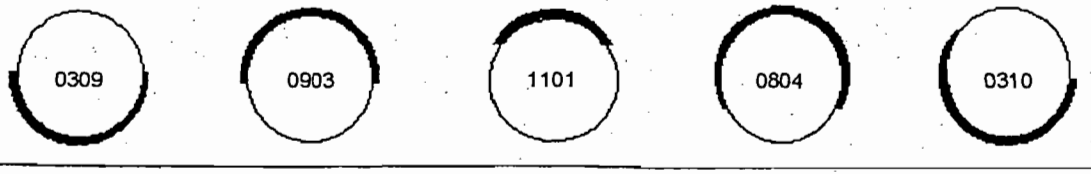
General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH61
	0.0		WL Water level				0	
	179.2		MH Manhole/Node					MH60.
	179.2		FH Finish of Surveys					

179.2 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At 8 P.76

Pipe Graphic Report of PLR MH61 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 02/06/2004 ***Setup*** 44
Facility	***Operator*** sb	***Van Reference***	***Weather*** Snow

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Schedule length*** 202.0 ***Ft***	***From*** MH61 ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH64 ***Depth*** ***Ft***
Material Cast iron	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 02/06/2004
General note		Structural Service Constructional
Location note		Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
202.0	MH64 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH61 (Upstream. Depth = Ft) Tape start:0000	

At. 8 P. 77

Tabular Report of PLR MH61 X for CH2MHILL

Work Order Number		*Vid Cass* 1		*Surveyed On* 02/06/2004	*Setup* 44
Facility	*Operator* sb	*Van Reference*		*Weather* Snow	

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 202.0 Ft	*From* MH61	*Depth* Ft		
Shape Circular	*Size* 8 *by* ins	*To* MH64	*Depth* Ft		
Material Cast iron	*Joint Spacing* Ft	*Direction* Down			
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 02/06/2004		

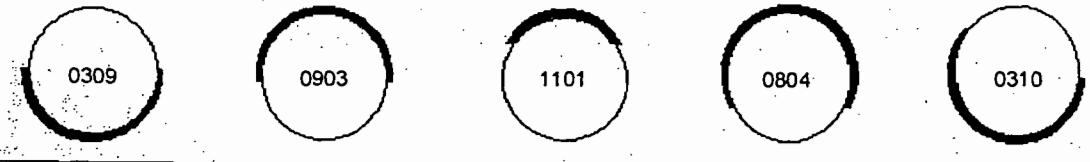
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH61
	0.0		WL Water level				0	
	202.0		MH Manhole/Node					MH64
	202.0		FH Finish of Surveys					

202.0 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P.78

Pipe Graphic Report of PLR MH69 X for CH2MHILL

Works Order Number		*Cassette*	*Surveyed On* 02/09/2004 *Setup* 45
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Schedule length* 72.0 *Ft*	*From* MH68 *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH69 *Depth* *Ft*
Material Cast iron	*Joint spacing* *Ft*	*Direction* Up
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 02/06/2004

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
72.0	MH69 (Upstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH68 (Downstream. Depth = Ft) Tape start:0000	

At. 8 P.79

Tabular Report of PLR MH69 X for CH2MHILL

Work Order Number	***Vid Cass***	***Surveyed On*** 02/09/2004	***Setup*** 45
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 72.0 Ft	***From*** MH68 ***Depth*** Ft
Shape Circular	***Size*** 6 ***by*** ins	***To*** MH69 ***Depth*** Ft
Material Cast iron	***Joint Spacing*** Ft	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last Cleaned*** 02/06/2004

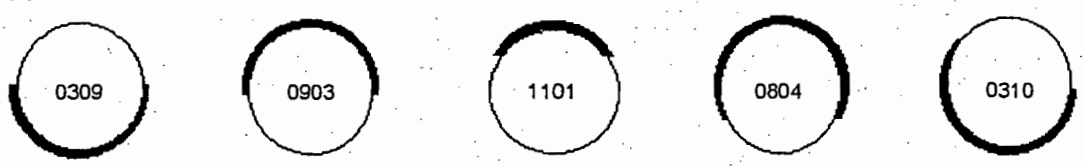
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH68
	0.0		WL Water level				0	
	72.0		MH Manhole/Node					MH69
	72.0		FH Finish of Surveys					

72.0 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P.80

Pipe Graphic Report of PLR MH68 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 02/09/2004 ***Setup*** 46
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 84.6 ***Ft***	***From*** MH68 ***Depth*** ***Ft***
Shape Circular	***Size*** 6 ***by*** ***ins***	***To*** MH67 ***Depth*** ***Ft***
Material Cast iron	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 02/06/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
84.6	MH67 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH68 (Upstream. Depth = Ft) Tape start:0000	

Att-8 P.81

Tabular Report of PLR MH68 X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 02/09/2004	***Setup*** 46
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 84.6 Ft	***From*** MH68 ***Depth*** Ft
Shape Circular	***Size*** 6 ***by*** ins	***To*** MH67 ***Depth*** Ft
Material Cast iron	***Joint Spacing*** Ft	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last Cleaned*** 02/06/2004

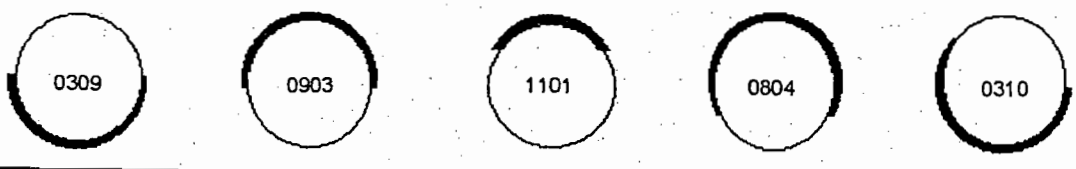
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH68
	0.0		WL Water level				0	
	84.6		MH Manhole/Node					MH67
	84.6		FH Finish of Surveys					

84.6 Ft ***Total Length Surveyed***

Note

· Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At 8 P. 82

Pipe Graphic Report of PLR MH67 X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 02/09/2004 *Setup* 47
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Schedule length* 67.2 *Ft*	*From* MH67 *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH66 *Depth* *Ft*
Material Cast iron	*Joint spacing* *Ft*	*Direction* Down
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 02/06/2004

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
67.2	MH66 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH67 (Upstream. Depth = Ft) Tape start:0000	

At-8 P.83

Tabular Report of PLR MH67 X for CH2MHILL

Work Order Number		*Vid Cass* 1		*Surveyed On* 02/09/2004	*Setup* 47
Facility	*Operator* sb	*Van Reference*		*Weather* Dry	
Road Name		*Place Name*			
Location type					
Surface Concrete road					
Survey purpose Random survey of pipes and things					

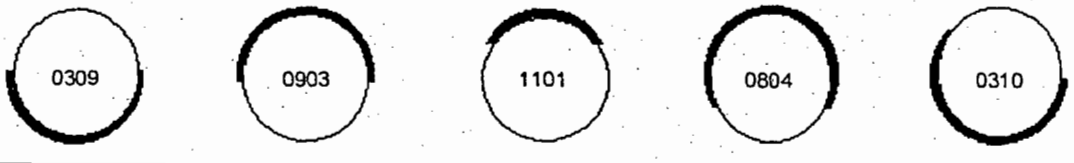
Pipe Use Sanitary	*Scheduled length* 67.2 Ft	*From* MH67	*Depth* Ft		
Shape Circular	*Size* 6 *by* ins	*To* MH66	*Depth* Ft		
Material Cast iron	*Joint Spacing* Ft	*Direction* Down			
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 02/06/2004		
General note		Structural	Service	Constructional	
Location note		Miscellaneous	Hydraulic		

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH67
	0.0		WL Water level				0	
	67.2		MH Manhole/Node					MH66
	67.2		FH Finish of Surveys					

67.2 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



Att. 8 P.84

Pipe Graphic Report of PLR MH65 X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 02/09/2004 *Setup* 48
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Schedule length* 7.2 *Ft*	*From* MH65 *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH66 *Depth* *Ft*
Material Cast iron	*Joint spacing* *Ft*	*Direction* Down
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 02/06/2004

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
7.2	MH66 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH65 (Upstream. Depth = Ft) Tape start:0000	

A6-8 P. 85

Tabular Report of PLR MH65 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 02/09/2004	*Setup* 48
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name | *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 7.2 Ft	*From* MH65 *Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* MH66 *Depth* Ft
Material Cast iron	*Joint Spacing* Ft	*Direction* Down
Lining	*Year laid*	*Pre-clean* Y *Last Cleaned* 02/06/2004

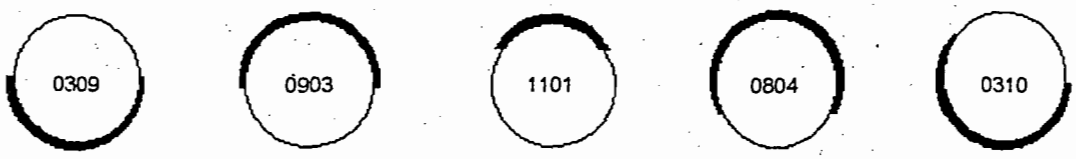
General note | Structural Service Constructional
Location note | Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH65
	0.0		WL Water level				0	
	7.2		MH Manhole/Node					MH66
	7.2		FH Finish of Surveys					

7.2 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At 8 P. 86

Pipe Graphic Report of PLR MH64 X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 02/09/2004 *Setup* 49
Facility	*Operator* sb	*Van Reference*	*Weather*

Road Name	*Place Name*
Location type	
Surface Concrete road	
Survey purpose	

Pipe Use Sanitary	*Schedule length* 189.9 *Ft*	*From* MH65 *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH64 *Depth* *Ft*
Material Cast iron	*Joint spacing* *Ft*	*Direction* Up
Lining	*Year laid*	*Pre-clean* *Last cleaned* 02/06/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
189.9	MH64 (Upstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH65 (Downstream. Depth = Ft) Tape start:0000	

At. 8 P. 87

Tabular Report of PLR MH64 X for CH2MHILL

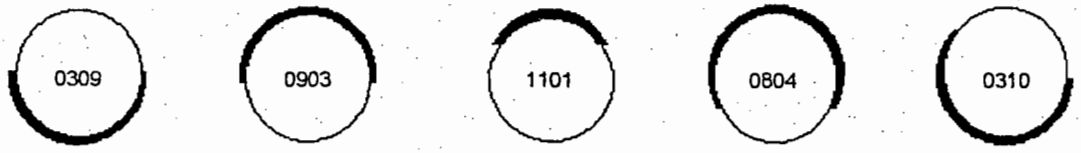
Work Order Number		*Vid Cass* 1		*Surveyed On* 02/09/2004	*Setup* 49
Facility	*Operator* sb	*Van Reference*		*Weather*	
Road Name		*Place Name*			
Location type					
Surface Concrete road					
Survey purpose					
Pipe Use Sanitary		*Scheduled length* 189.9 Ft		*From* MH65	*Depth* Ft
Shape Circular		*Size* 6 *by* ins		*To* MH64	*Depth* Ft
Material Cast iron		*Joint Spacing* Ft		*Direction* Up	
Lining		*Year laid*		*Pre-clean*	*Last Cleaned* 02/06/2004
General note				Structural Service Constructional	
Location note				Miscellaneous Hydraulic	

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH65
	0.0		WL Water level				0	
	189.9		MH Manhole/Node					MH64
	189.9		FH Finish of Surveys					

189.9 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At. 8 P. 88

Pipe Graphic Report of PLR BUILDING 104 X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 02/11/2004 *Setup* 50
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Schedule length* 295.7 *Ft*	*From* MH74 *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* BUILDING 104 *Depth* *Ft*
Material Cast iron	*Joint spacing* *Ft*	*Direction* Up
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 02/10/2004

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
295.7	BUILDING 104 (Upstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH74 (Downstream. Depth = Ft) Tape start:0000	

At. 8 P.89

Tabular Report of PLR BUILDING 104 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 02/11/2004	*Setup* 50
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 295.7 Ft	*From* MH74	*Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* BUILDING 104	*Depth* Ft
Material Cast iron	*Joint Spacing* Ft	*Direction* Up	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 02/10/2004

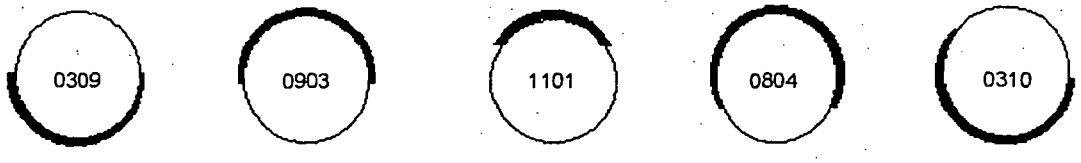
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH74
	0.0		WL Water level				0	
	295.7		MH Manhole/Node					BUILDING 104
	295.7		FH Finish of Surveys					

295.7 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P. 9c

Pipe Graphic Report of PLR MH75 X for CH2MHILL

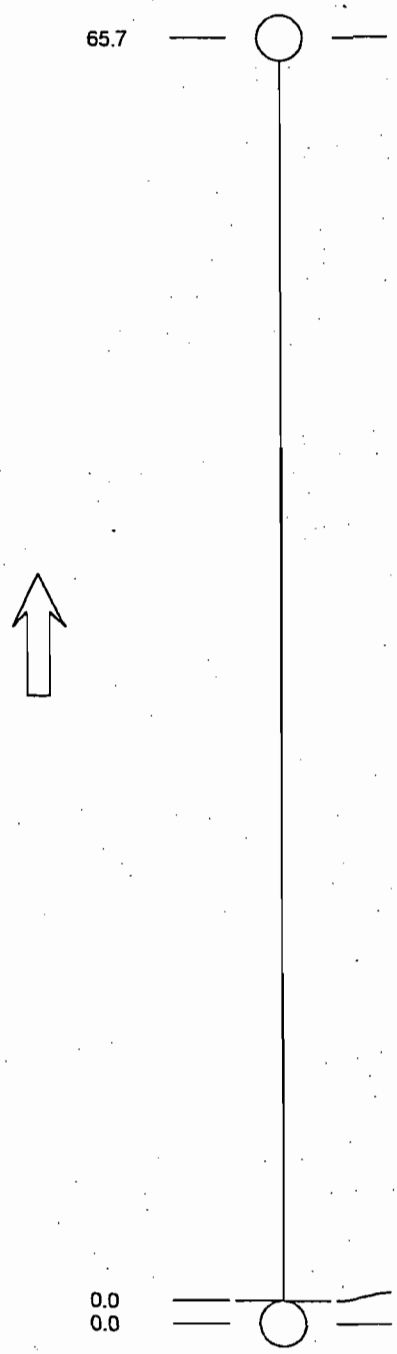
Works Order Number		*Cassette* 1	*Surveyed On* 02/11/2004 *Setup* 51
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Schedule length* 65.7 *Ft*	*From* MH75 *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH74 *Depth* *Ft*
Material Cast iron	*Joint spacing* *Ft*	*Direction* Down
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 02/10/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
65.7	MH74 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH75 (Upstream. Depth = Ft) Tape start:0000	



At. 8 P. 91

Tabular Report of PLR MH75 X for CH2MHILL

Work Order Number		***Vid Cass*** 1		***Surveyed On*** 02/11/2004	***Setup*** 51
Facility	***Operator*** sb	***Van Reference***		***Weather*** Dry	
Road Name		***Place Name***			
Location type					
Surface Concrete road					
Survey purpose Random survey of pipes and things					

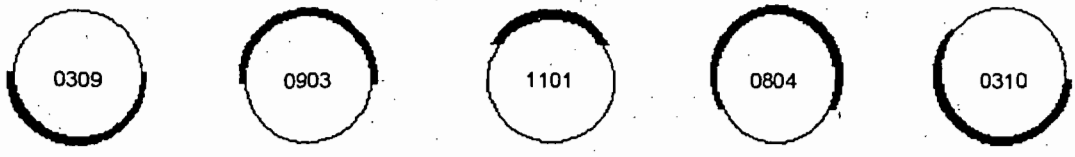
Pipe Use Sanitary	***Scheduled length*** 65.7 Ft	***From*** MH75	***Depth*** Ft		
Shape Circular	***Size*** 6 ***by*** ins	***To*** MH74	***Depth*** Ft		
Material Cast iron	***Joint Spacing*** Ft	***Direction*** Down			
Lining	***Year laid***	***Pre-clean*** Y	***Last Cleaned*** 02/10/2004		
General note		Structural	Service	Constructional	
Location note		Miscellaneous	Hydraulic		

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH75
	0.0		WL Water level				0	
	65.7		MH Manhole/Node					MH74
	65.7		FH Finish of Surveys					

65.7 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P-92

Pipe Graphic Report of PLR MH71 X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 02/12/2004 *Setup* 52
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

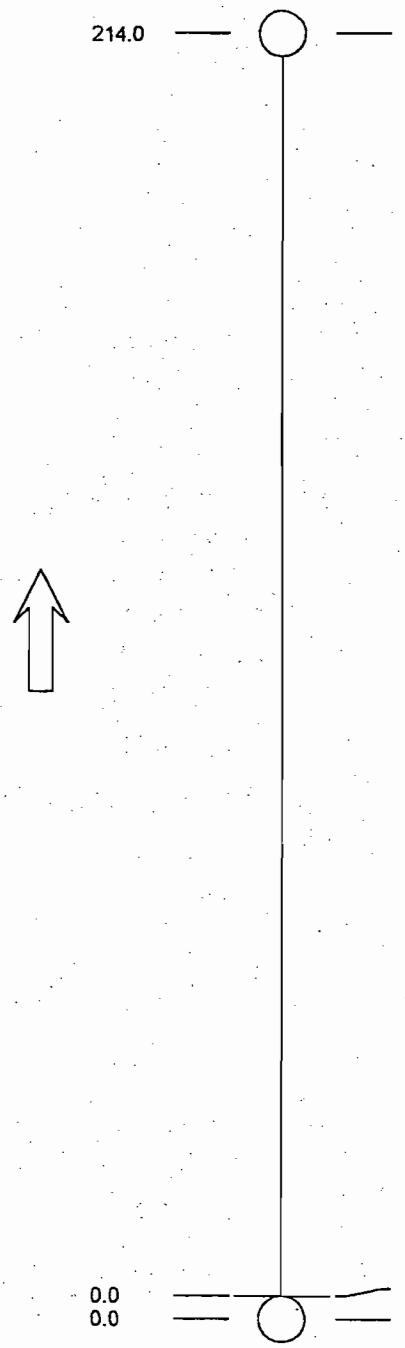
Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Schedule length* 214.0 *Ft*	*From* MH72 *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH71 *Depth* *Ft*
Material Cast iron	*Joint spacing* *Ft*	*Direction* Up
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 02/11/2004

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
214.0	MH71 (Upstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH72 (Downstream. Depth = Ft) Tape start:0000	



At-8 P.93

Tabular Report of PLR MH71 X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 02/12/2004	***Setup*** 52
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 214.0 Ft	***From*** MH72	***Depth*** Ft
Shape Circular	***Size*** 6 ***by*** ins	***To*** MH71	***Depth*** Ft
Material Cast iron	***Joint Spacing*** Ft	***Direction*** Up	
Lining	***Year laid***	***Pre-clean*** Y	***Last Cleaned*** 02/11/2004

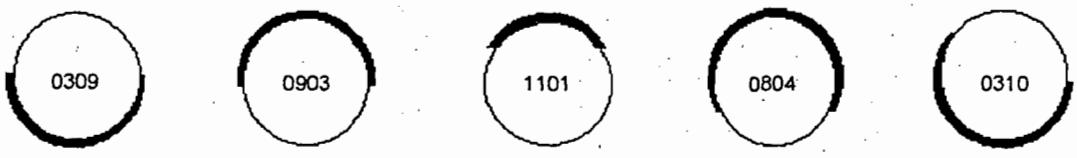
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH72
	0.0		WL Water level				0	
	214.0		MH Manhole/Node					MH71
	214.0		FH Finish of Surveys					

214.0 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P.94

Pipe Graphic Report of PLR MH73 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 02/12/2004 ***Setup*** 53
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** ***Ft***	***From*** MH72 ***Depth*** ***Ft***
Shape Circular	***Size*** 6 ***by*** ***ins***	***To*** MH73 ***Depth*** ***Ft***
Material Cast iron	***Joint spacing*** ***Ft***	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 02/11/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
53.3	MH73 (Upstream. Depth = Ft) Tape end:	
53.3	Survey abandoned [TOOMUCH WATER FLOW]	
0.0	Water level 0	
0.0	MH72 (Downstream. Depth = Ft) Tape start:0000	

At-8 P.95

Tabular Report of PLR MH73 X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 02/12/2004	***Setup*** 53
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** Ft	***From*** MH72	***Depth*** Ft
Shape Circular	***Size*** 6 ***by*** ins	***To*** MH73	***Depth*** Ft
Material Cast iron	***Joint Spacing*** Ft	***Direction*** Up	
Lining	***Year laid***	***Pre-clean*** Y	***Last Cleaned*** 02/11/2004

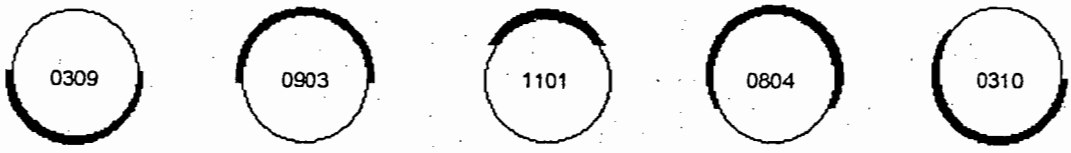
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH72
	0.0		WL Water level				0	
	53.3		SA Survey abandoned					TOOMUCH WATER FLOW

53.3 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At. 8 P. 96

Pipe Graphic Report of PLR MH70 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 02/12/2004 ***Setup*** 54
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 13.9 ***Ft***	***From*** MH70 ***Depth*** ***Ft***
Shape Circular	***Size*** 6 ***by*** ***ins***	***To*** MH71 ***Depth*** ***Ft***
Material Concrete	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 02/11/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
13.9	MH71 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH70 (Upstream. Depth = Ft) Tape start:0000	

At. 8 p. 97

Tabular Report of PLR MH70 X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 02/12/2004	***Setup*** 54
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 13.9 Ft	***From*** MH70	***Depth*** Ft
Shape Circular	***Size*** 6 ***by*** ins	***To*** MH71	***Depth*** Ft
Material Concrete	***Joint Spacing*** Ft	***Direction*** Down	
Lining	***Year laid***	***Pre-clean*** Y	***Last Cleaned*** 02/11/2004

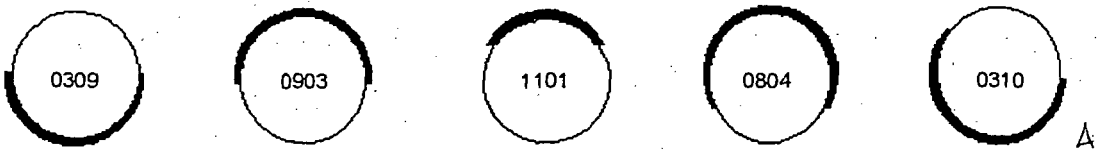
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH70
	0.0		WL Water level				0	
	13.9		MH Manhole/Node					MH71
	13.9		FH Finish of Surveys					

13.9 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



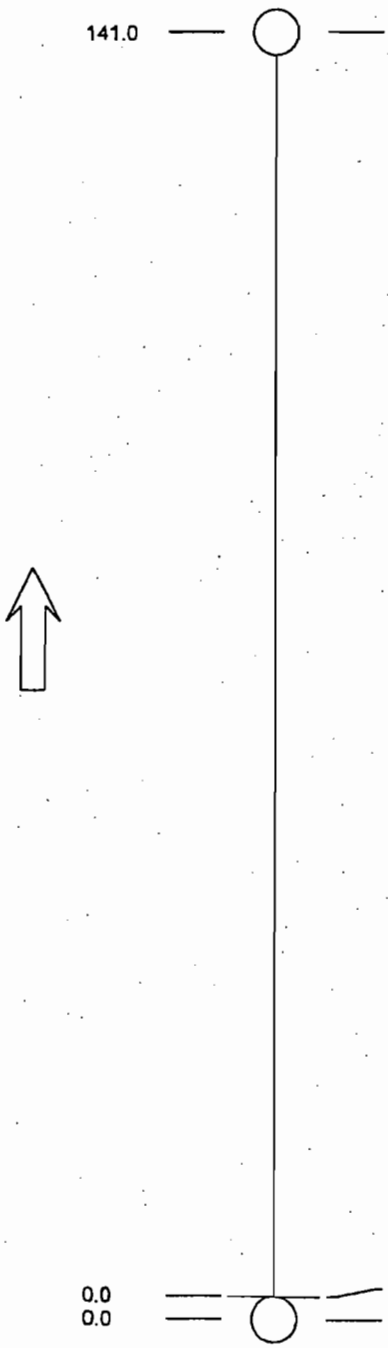
At.8 P.98

Pipe Graphic Report of PLR MH66 X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 02/12/2004 ***Setup*** 55
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry
Road Name		***Place Name***	
Location type			
Surface Concrete road			
Survey purpose Random survey of pipes and things			

Pipe Use Sanitary	***Schedule length*** 141.0 ***Ft***	***From*** MH70 ***Depth*** ***Ft***
Shape Circular	***Size*** 6 ***by*** ***ins***	***To*** MH66 ***Depth*** ***Ft***
Material Concrete	***Joint spacing*** ***Ft***	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 02/11/2004
General note		Structural Service Constructional
Location note		Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
141.0	MH66 (Upstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH70 (Downstream. Depth = Ft) Tape start:0000	



Att. 8 p. 99

Tabular Report of PLR MH66 X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 02/12/2004	***Setup*** 55
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 141.0 Ft	***From*** MH70	***Depth*** Ft
Shape Circular	***Size*** 6 ***by*** ins	***To*** MH66	***Depth*** Ft
Material Concrete	***Joint Spacing*** Ft	***Direction*** Up	
Lining	***Year laid***	***Pre-clean*** Y	***Last Cleaned*** 02/11/2004

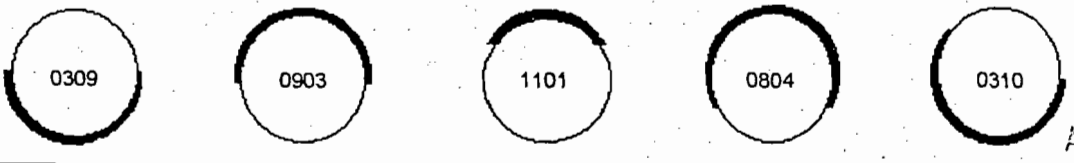
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH70
	0.0		WL Water level				0	
	141.0		MH Manhole/Node					MH66
	141.0		FH Finish of Surveys					

141.0 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At. 8 P. 100

Pipe Graphic Report of PLR MH53... X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 02/24/2004 ***Setup*** 56
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 312.3 ***Ft***	***From*** MH53... ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH32... ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 02/24/2004
General note		Structural Service Constructional
Location note		Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
312.3	MH32... (Downstream. Depth = Ft) Tape end:	
118.7	Broken pipe 06/oc [-]	
0.0	Water level 0	
0.0	MH53... (Upstream. Depth = Ft) Tape start:0000	

At. 8 P. 101

Tabular Report of PLR MH53... X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 02/24/2004	***Setup*** 56
Facility	***Operator*** sb	***Van Reference***	***Weather*** Dry

Road Name ***Place Name***
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 312.3 Ft	***From*** MH53...	***Depth*** Ft
Shape Circular	***Size*** 8 ***by*** ins	***To*** MH32...	***Depth*** Ft
Material Vitrified clay	***Joint Spacing*** Ft	***Direction*** Down	
Lining	***Year laid***	***Pre-clean*** Y	***Last Cleaned*** 02/24/2004

General note
Location note

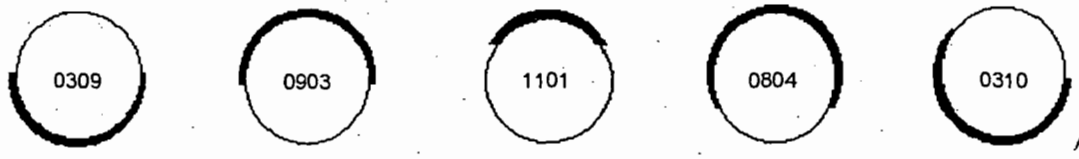
Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH53...
	0.0		WL Water level				0	
	118.7		BP Broken pipe	S	06	06		-
	312.3		MH Manhole/Node					MH32...
	312.3		FH Finish of Surveys					

312.3 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



Att. 8 P. 102

Pipe Graphic Report of PLR MH76 X for CH2MHILL

Works Order Number		*Cassette* 1	*Surveyed On* 02/24/2004 *Setup* 57
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Schedule length* 142.0 *Ft*	*From* MH76 *Depth* *Ft*
Shape Circular	*Size* 6 *by* *ins*	*To* MH77 *Depth* *Ft*
Material Vitrified clay	*Joint spacing* *Ft*	*Direction* Down
Lining	*Year laid*	*Pre-clean* Y *Last cleaned* 02/24/2004

General note
Location note

Structural Service Constructional
Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
142.0	MH77 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH76 (Upstream. Depth = Ft) Tape start:0000	

At .8 P. 103

Tabular Report of PLR MH76 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 02/24/2004	*Setup* 57
Facility	*Operator* sb	*Van Reference*	*Weather* Dry

Road Name *Place Name*
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	*Scheduled length* 142.0 Ft	*From* MH76	*Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* MH77	*Depth* Ft
Material Vitrified clay	*Joint Spacing* Ft	*Direction* Down	
Lining	*Year laid*	*Pre-clean* Y	*Last Cleaned* 02/24/2004

General note
Location note

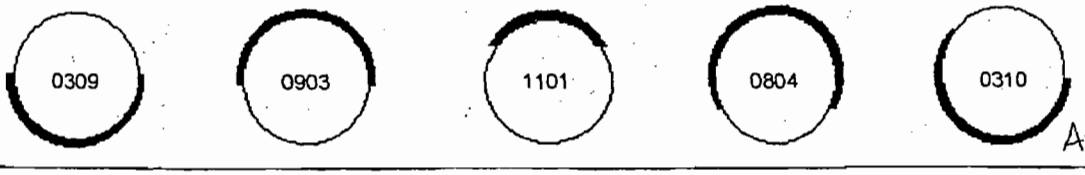
Structural Service Constructional
Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH76
	0.0		WL Water level				0	
	142.0		MH Manhole/Node					MH77
	142.0		FH Finish of Surveys					

142.0 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P.104

Pipe Graphic Report of PLR MH28 X for CH2MHILL

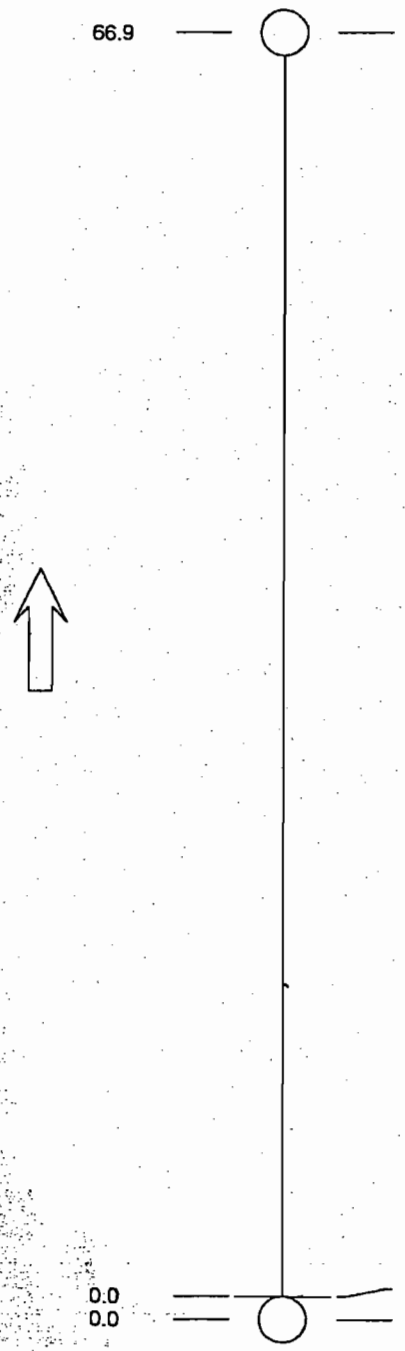
Works Order Number		***Cassette*** 1	***Surveyed On*** 02/24/2004 ***Setup*** 58
Facility	***Operator*** sb	***Van Reference***	***Weather***

Road Name	***Place Name***
Location type	
Surface Concrete road	
Survey purpose	

Pipe Use Sanitary	***Schedule length*** 66.9 ***Ft***	***From*** MH28 ***Depth*** ***Ft***
Shape Circular	***Size*** 6 ***by*** ***ins***	***To*** MH29 ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Down
Lining	***Year laid***	***Pre-clean*** ***Last cleaned*** 01/13/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
66.9	MH29 (Downstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH28 (Upstream. Depth = Ft) Tape start:0000	



A6.8 P.105

Tabular Report of PLR MH28 X for CH2MHILL

Work Order Number	*Vid Cass* 1	*Surveyed On* 02/24/2004	*Setup* 58
Facility	*Operator* sb	*Van Reference*	*Weather*
Road Name		*Place Name*	
Location type			
Surface Concrete road			
Survey purpose			

Pipe Use Sanitary	*Scheduled length* 66.9 Ft	*From* MH28	*Depth* Ft
Shape Circular	*Size* 6 *by* ins	*To* MH29	*Depth* Ft
Material Vitrified clay	*Joint Spacing* Ft	*Direction* Down	
Lining	*Year laid*	*Pre-clean*	*Last Cleaned* 01/13/2004

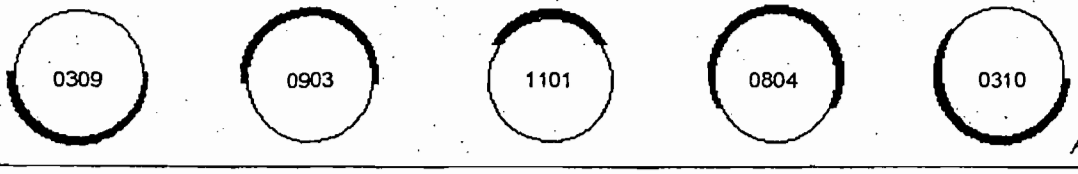
General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH28
	0.0		WL Water level				0	
	66.9		MH Manhole/Node					MH29
	66.9		FH Finish of Surveys					

66.9 Ft *Total Length Surveyed*

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



At-8 P.106

SEGMENT	COMMENTS	MANHOLES TO LOOK AT	CORRECTIONS TO BE MADE	CH2M RESPONSE
MH 4 - MH2	OK			
MH 2 - MH 1	OK			
MH 9 - MH 8	OK	MH 8 -debris		
MH 10 - MH 9	OK			
MH 11 - MH 10	OK			
MH 12 - MH 9	OK			
MH 12 - MH 13	OK			
MH 16 - MH 15	OK	MH15 - debris		
MH 16 - MH 17	OK			
MH 17 - MH 18	OK			
MH 19 - MH 18	OK	MH 19-debris, channel bottom missing		
MH 20 - MH 19	OK			
MH 23 - MH 24	OK			
MH 23 - MH 22	displaced joints			
MH 24 - MH 23A	OK	MH 23A-debris		
MH 25 - MH 25A	offset joints	MH 25-rough		
MH 25A - MH 7	offset joints			
MH 4 - MH 7	OK			
MH 7 - MH25	OK			
MH 26 - MH 27	OK			
MH 27 - MH 28	OK			
MH 40 - MH 41	OK			
MH 41 - MH 42	OK	MH 42-debris		
MH 42 - MH 43	mulitple cracks @ 69ft, possible missing pipe bottom		1. Repair/replace cracked pipe	Replace & repair damaged sections
MH 51 - MH 53	cracked pipe @ 71ft., offset joint	MH 53-debris	1. Repair/replace cracked pipe	Replace & repair damaged sections
MH 51 - MH 50	OK			
MH 45 - MH 47	belly, joint failure			
MH 47 - MH 48	OK			
MH 48 - MH 49	OK			
MH 50 - MH 49	reducer near MH 49@ 165 ft.		1. Reducer needs to be removed	No planned response
MH 43 - MH 52	OK			

AE-8 p.107

SEGMENT	COMMENTS	MANHOLES TO LOOK AT	CORRECTIONS TO BE MADE	CH2M RESPONSE
MH 32 - MH 53	roots, cracked pipe (top & bottom)		1. Repair/replace cracked pipe 2. Remove & treat roots	Replace & repair damaged sections. Roots removed but no treatment
MH 53 - MH 49	roots, cracked joint @ 6ft.	MH 49 - rebar stuck in line	1. Repair/replace cracked joint 2. Remove & treat roots 3. Remove rebar	Remove rebar only. No repairs or root actions
MH 15 - MH 13	OK	MH 13-check; MH14-check bad channel		
MH 20 - MH 21	Blg. 45 area - messy	MH 20-check; MH21-check	too many laterals from one building	
MH 57 - MH 58	pipe bottom missing just before MH58	MH 58 - check		
MH 58 - MH 60	OK			
MH 57 - MH 55	belly, pooling water	MH 55-check		
MH 33 - MH 55	channel super deep, crack @ 221 ft.		1. Repair/replace cracked pipe	No planned response
MH 61 - MH 60	OK			
MH 61 - MH 64	belly	MH 64-debris		
MH 68 - MH 69	sediment & chunk in line		1.Reclean line	No planned response
MH 68 - MH67	chunk in line		1.Reclean line	No planned response
MH 67 - MH 66	OK			
MH 65 - MH 66	radiator clamps	MH 66-check		
MH 65 - MH 64	OK	MH 64-debris		
MH 74 - BLG 104	OK		to be abandoned	
MH 75 - MH 74	debris in line		1.Reclean line	No planned response
MH 72 - MH 71	OK			
MH 72 - MH 73	OK		to be abandoned	
MH 70 - MH 71	OK			
MH 70 - MH 66	OK			
MH 40 - BLG 102	bad joints, broken pipe		1. Repair/replace cracked pipe	No planned response
MH 76 - MH 77	roots		1. Remove & treat roots	No planned response
MH 28 - MH 29	OK	MH29 - check bad channel		

At-8 P.108

Attachment 9

Radiological survey data sheets (RSDSs) from coverage of sanitary sewer inspections

Note that radiological coverage was not deemed necessary, and RSDSs were not created, in areas deemed to have low potential for radiological constituents (e.g., Main Hill office building areas, lower valley areas near end of system).

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) H-SANITARY SEWERS	SURVEY NO. 04-RPA-005
PURPOSE: JOB COVERAGE	RWP NO. N/A
	DATE: 1-9-04
	TIME: 0900

MAP / DRAWING

SEE ATTACHED

(CAMERA & HOSE)

COPY

Integrated count taken IF Audible detected. No Audible detected.

<100 DPM/100CM² α <5K DPM/100CM² β⁻

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · - = radiological boundary
△# = mrem/hr neutron
= air sample number
(#) = swipe number
(#/α) or /β = direct contamination measurement in dpm/100 cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5768/5702	8/20/04

[redacted]

HP# 5436	Date: 1-9-04
HP#	Date:
HP# 4995	Date: 1-21-04

Att. 9 P. 1

Survey No. 04-RPA-005

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1				HOSE
2	See			CAM-wheels-LEFT 1ST
3		attached		CAM-wheels-RIGHT 1ST
4				CAM-wheels-right 2ND
5				CAM-wheel-left 2ND
		N/A		

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
		N/A		

COMMENTS:

NOTES:
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If needed, mark N/A.

ML-9620A (4-98)

Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Aqua
Data file name: SMEAR009
Batch Ended: 1/12/04 10:56

Crosstalk correction performed.

JC 1-12-04 RPA

Recalibration Date: 03/18/05
Serial Number: 26966-1

Batch ID: FRANCIS 04-RP-005 [5] JC

Detector ID	Sample ID	Alpha Activity DPM	Alpha Activity σ	Alpha Activity flags	Beta Activity DPM	Beta Activity σ	Beta Activity flags
A1	1	0.00	2.00		0.00	1.25	
A2	2	0.00	2.06		0.00	1.20	
A3	3	0.00	1.95		0.00	1.21	
A4	4	0.00	1.97		0.00	1.18	
B1	5	1.53	2.00		0.00	2.02	

At-9 P.3

KRF 1-12-04

J. Collins

12 Jan 2004 13:50 ALPHA/BETA - 1.09 Page #1
Protocol #: 2 PW H3 #403727 User : 2138

Time: 2.00
Data Mode: DPM Nuclide: SMGLS02 Quench Set: SMGLS02
Background Subtract: 1st Vial

	LL	UL	LCR	2SZ	BKG
Region A:	0.5 -	18.6	0	0.0	9.43
Region B:	2.0 -	18.6	0	0.0	8.05
Region C:	40.0 -	2000	0	0.0	10.00

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FRANCIS 04-RPA-005 (5) AG
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\DATA\PROT2.DAT
Count Data Filename: C:\DATA\SDATA2.DAT

S#	TIME	CPMA	CPMB	LUM	FLAG	tSIE	DPM1	2SIGMA	CPMC
-1	10.00	9.43	8.05	13	B	641.17		0.00	10.00
0	2.00	324.76	316.29	2		468.97	739.59	80.11	4.50
1	2.00	2.07	2.95	0		668.43	3.80	9.52	0.00
2	2.00	0.00	0.00	8		594.94	0.00	0.00	0.00
3	2.00	1.57	2.42	5		594.49	3.09	10.02	0.00
4	2.00	1.54	2.32	0		474.48	3.47	11.46	0.00
5	2.00	0.00	0.00	0		512.01	0.00	0.00	1.00

Carolyn Robinson

page 4 of 4
KAR
1-12-04

At-9 P.4

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) HILLSIDE	SURVEY NO. 04-RPA-010
PURPOSE: JOB COVERAGE	RWP NO. N/A
	DATE: 1-13-04
	TIME: 1400

MAP / DRAWING

SEE ATTACHED

INTEGRATED COUNT TAKEN IF AUDIBLE DETECTED. NO AUDIBLE DETECTED.

ALL DIRECT READINGS:
<100 DPM/100CM² ALPHA
<5K DPM/100CM² BETA

COPY

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · · = radiological boundary
△# = mrem/hr neutron
= air sample number
(#) = swipe number
(#/α) or /β = direct contamination measurement in dpm/100 cm²

[redacted]

HP# 5736	Date: 1-13-04	
HP#	Date:	
ED		
HP# 9998	Date: 1-21-04	

Att. 9 P.5

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5714/5704	10/6/04
	N/A	

Survey No. 04-RPA-010

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1	SEE ATTACHED			HOSE NOZZLE
2				
		N/A		

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
		N/A		

COMMENTS:

NOTES:
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If needed, mark N/A.

ML-9620A (4-98)

Att. 9 P. 6

Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Aqua
Data file name: SMEAR001
Batch Ended: 1/14/04 6:36

Crosstalk correction performed.

Recalibration Date: 03/18/05
Serial Number: 26966-1

Batch ID: FRANCIS 04-RPA-010 [2] JC

Detector ID	Sample ID	Alpha Activity DPM	Alpha Activity σ	Alpha Activity flags	Beta Activity DPM	Beta Activity σ	Beta Activity flags
A1	1	1.64	2.00		0.00	1.25	
A2	2	0.00	2.07		0.00	1.70	

3of4
~~Page 1 of 1~~
KRP
1-14-04

J. Collins

At-9 P.7

14 Jan 2004 07:18 ALPHA/BETA - 1.09 Page #1
Protocol #: 1 PW H3 #403727 User : 5681

Time: 2.00
Data Mode: DPM Nuclide: SMGLS02 Quench Set: SMGLS02
Background Subtract: 1st Vial

	LL	UL	LCR	2SI	BKG
Region A:	0.5	18.6	0	0.0	5.76
Region B:	2.0	18.6	0	0.0	5.43
Region C:	40.0	2000	0	0.0	8.96

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FRANCES 04-RPA-010 (J1-J2) CYR
Luminescence Correction On
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\DATA\PROT1.DAT
Count Data Filename: C:\DATA\SDATA1.DAT

S#	TIME	CPMA	CPMB	CPMC	tSIE	LUM	FLAG	DPM1	2SIGMA
-1	10.00	5.76	5.43	8.96	633.16	13	B		0.00
0	2.00	395.96	384.26	4.54	474.61	1		894.73	91.85
1	2.00	1.74	2.07	0.00	629.67	0		3.31	7.98
2	2.00	1.25	1.59	2.04	668.96	0		2.30	7.49

FATAL ERROR:
LOST PIN POS

page 4 of 4
KRF
1-14-04

At. 9 P. 8

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) OUTSIDE AREA	SURVEY NO. 04-RPA-011
PURPOSE: JOB COVERAGE	RWP NO. N/A
	DATE: 1-14-04
	TIME: 1530

MAP / DRAWING

SEE ATTACHED

INTEGRATED COUNT TAKEN IF AUDIBLE DETECTED.
NO AUDIABLE.
ALL DIRECT READING
<100 DPM/100 CM2 α
<5K DPM/100 CM2 β−

COPY

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · · = radiological boundary

△# = mrem/hr neutron

(#) = swipe number

or /β = direct contamination
ement in dpm/100 cm²

[redacted]

HP# 5736	Date: 1-14-04
HP#	Date:
TACHED	
HP# 7991	Date: 1-21-04

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5768/5702	8/20/04
	N/A	

Att. 9 P. 9

Survey No. 04-RPA-011

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1	↑	↑	↑	MANHOLE-32A
2				#34
3	SEE			#35
4		ATTACHED		#36
5				#37
6				#38
7	↓	↓	↓	#39
		N/A		

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
		N/A		

COMMENTS: N/A

NOTES:
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If needed, mark N/A.

ML-9620A (4-98)

A-6-9 P.10

Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Green
Data file name: SMEAR006
Batch Ended: 1/14/04 15:39
Cal. Due Date: 5/1/05
Serial Number: 26966-3

Batch ID: 04-RPA 011 FRANCIS A/B (7) AG ✓

Detector ID	Sample ID	Alpha Activity DPM	Alpha Activity σ	Alpha Activity flags	Beta Activity DPM	Beta Activity σ	Beta Activity flags
A1	1	0.00	2.00		0.00	1.30	
A2	2	0.00	1.95		0.00	1.15	
A3	3	0.00	2.16		0.00	1.26	
A4	4	0.00	1.99		0.00	1.17	
B1	5	0.66	1.95		1.30	2.15	
B2	6	0.00	1.96		1.56	2.00	
B3	7	0.00	2.05		0.00	1.28	

✓ ✓

Albert Ribbon

3 of 4

KRF
1-15-04

At-9 P.11

KRF

14 Jan 2004 15:53 ALPHA/BETA - 1.09 ~~Page #1~~
Protocol #: 3 PW 3 403727 User : 2138

Time: 2.00
Data Mode: DPM Nuclide: SMGLS02 Quench Set: SMGLS02
Background Subtract: 1st Vial

	LL	UL	LCR	2S%	BKG
Region A:	0.5 -	18.6	0	0.0	7.06
Region B:	2.0 -	18.6	0	0.0	6.64
Region C:	40.0 -	2000	0	0.0	10.41

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FRANCIS 04-RPA-011 (7) AG
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\DATA\PROT3.dat
Count Data Filename: C:\DATA\SDATA3.DAT

S#	TIME	CPMA	CPMB	CPMC	tSIE	LUM	FLAG	DPM1	2SIGMA
-1	10.00	7.06	6.64	10.41	626.16	13	B		0.00
0	2.00	190.58	185.74	3.09	472.10	2		432.14	55.20
1	2.00	2.94	3.36	0.09	409.31	0		7.31	11.88
2	2.00	0.00	0.00	1.09	614.90	0		0.00	0.00
3	2.00	0.00	0.00	3.38	578.59	9		0.00	0.00
4	2.00	0.00	0.00	2.09	584.81	8		0.00	0.00
5	2.00	0.00	0.00	0.00	431.23	0		0.00	0.00
6	2.00	2.80	2.83	0.00	663.86	5		5.16	8.76
7	2.00	0.13	0.13	0.00	678.97	7		0.23	7.59

Carol G. Robinson

page 4 of 4
KRF
1-15-04

At-9 P. 12

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) SM / Bldg 61	SURVEY NO 04-RPA-012
PURPOSE: JOB COVERAGE	RWP NO. N/A
	DATE: 1-19-04
	TIME: 0930

MAP / DRAWING

SEE ATTACHED

INTERGRATED COUNT TAKEN IF AUDIBLE DETECTED
NO AUDIBLE DETECTED
ALL DIRECT READINGS
<100 DPM/100 CM² α
<5K DPM/100 CM² β⁻

COPY

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · · = radiological boundary

△# = mrem/hr neutron
= swipe number
= air sample number
#/α or /β = direct contamination measurement in dpm/100 cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5768/5702	8/20/04
	N/A	

[redacted]

5436	Date: 1-19-04
[redacted]	
P#	Date:
ACHED	
4998	Date: 1-21-04

Att. 9 P. 13

Survey No. 04-RPA-012

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1	SEE			HOSE-UNMARKED
2				#45 - HOSE
3	ATTACHED			CAMER. BLD 61
		N/A		

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
		N/A		

COMMENTS: N/A

NOTES:
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If needed, mark N/A.

ML-9620A (4-98)

Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Green
Data file name: SMEAR001
Batch Ended: 1/20/04 7:11
Cal. Due Date: 5/1/05
Serial Number: 26966-3

Batch ID: FRANCES 04-RPA-012 (3) CYR

Detector ID	Sample ID	Alpha Activity			Beta Activity		
		DPM	σ	flags	DPM	σ	flags
C1	1	0.00	1.98		0.00	1.24	
C2	2	0.00	1.81		0.26	1.59	
C3	3	0.00	2.08		0.00	1.27	

Carol G. Robinson

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Page ~~1 of 1~~

KRP
1-20-04

At. 9 1.15

20 Jan 2004 07:55 ALPHA/BETA - 1.09 Page #1
Protocol #: 5 Pw H3 405828 User : 2324

Time: 2.00
Data Mode: DPM Nuclide: SMGLS02 Quench Set: SMGLS02
Background Subtract: 1st Vial

	LL	UL	LCR	2S%	BKG
Region A:	0.5 -	18.6	0	0.0	7.71
Region B:	2.0 -	18.6	0	0.0	7.36
Region C:	40.0 -	2000	0	0.0	8.90

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FRANCIS 04-RPA-012 1-3 JC ✓
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: c:\data\PROT5.DAT
Count Data Filename: c:\data\SDATA5.DAT
Spectrum Data Drive & Path: c:\data

S#	TIME	CPMA	DPM1	CPMB	CPMC	SIS	tSIE	FLAG
-1	10.00	7.71		7.36	8.90	17.840	612.52	B
0	2.00	630.71	1391.37	596.31	0.00	11.967	491.35	
1	2.00	0.00	0.00	0.00	2.10	0.000	507.34	
2	2.00	0.00	0.00	0.00	0.00	0.000	576.12	
3	2.00	0.00	0.00	0.00	0.10	0.000	439.14	

✓

PAGE
4 of 4
KRF
1-20-04

Allen Gibson

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG /AREA/ROOM) SM OUTSIDE AREA	SURVEY NO. 04-RPA-013
PURPOSE: JOB COVERAGE	RWP NO. N/A
	DATE: 1-20-04
	TIME: 0800

MAP / DRAWING

SEE
ATTACHED

INTERGRATED COUNT TAKEN
IF AUDIBLE DETECTED.
NO AUDIBLE DETECTED
ALL DIRECTS
<100 DPM/100CM² α <5K DPM/100CM² β⁻

COPY

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
—·—·— = radiological boundary
△# = mrem/hr neutron
(#) = swipe number
□# = air sample number
(#/α) = or /β = direct contamination measurement in dpm/100 cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5768/5702	8/20/04
	N/A	

[redacted]

HP# 5436	Date: 1-20-04
[redacted]	
HP#	Date:
ACHED	
HP# 4998	Date: 1-21-04

Att. 9 P.17

Survey No. 04-RPA-013

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1	↑	↑	↑	MAN. #47 - HOSE
2	SEE			#43 - HOSE
3				#33 - HOSE
4		ATTACHED		#50 - HOSE
5				#51 - HOSE
6	↓	↓	↓	HOSE REEL
			N/A	

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
		N/A		

COMMENTS: WIPES TAKEN ON CAMERA & HOSE AFTER REMOVED FROM MANHOLES, ALSO DIRECTS READINGS.

NOTES:
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If needed, mark N/A.

ML-9620A (4-98)

Att. 9 P. 18

Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Green
Data file name: SMEAR005
Batch Ended: 1/21/04 8:07
Cal. Due Date: 5/1/05
Serial Number: 26966-3

Batch ID: 04-RPA-013 FRANCIS (6) AG

Detector ID	Sample ID	Alpha Activity			Beta Activity		
		DPM	σ	flags	DPM	σ	flags
A1	1	0.00	2.00		0.00	1.30	
A2	2	0.00	1.96		0.16	1.61	
A3	3	0.00	2.20		2.96	2.49	
A4	4	0.00	1.99		0.00	1.17	
B1	5	0.66	1.93		0.00	1.26	
B2	6	0.00	1.94		0.00	1.17	

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~~Page 1 of 1~~
KRF
1-21-04

J. Collins

Att. 9 P. 19

21 Jan 2004 08:54 ALPHA/BETA - 1.09 Page #1
Protocol #: 1 Pw H3 #403728 User : 2324

Time: 2.00
Data Mode: DPM Nuclide: SMGL02 Quench Set: SMGL02
Background Subtract: 1st Vial

	LL	UL	LCR	2SI	BKG
Region A:	0.5	18.6	0	0.0	5.57
Region B:	2.0	18.6	0	0.0	5.36
Region C:	40.0	2000	0	0.0	9.90

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FRANCIS 04-RPA-013 1-6 JC
Luminescence Correction On
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: c:\data\prot1.dat
Count Data Filename: c:\data\SDATA1.DAT
Spectrum Data Drive & Path: c:\data

S#	TIME	CPMA	LUM	FLAG	tSIE	DPM1	2Sigma	CPMC
-1	10.00	5.57	40	B	620.58		0.00	9.90
0	2.00	456.76	3		465.92	981	89.12	0.10
1	2.00	2.93	6		470.93	6	9.69	0.00
2	2.00	2.93	6		671.75	5	8.05	0.00
3	2.00	0.93	8		335.04	3	11.08	2.60
4	2.00	5.93	4		639.24	11	9.40	0.00
5	2.00	0.00	22		278.67	0	0.00	0.00
6	2.00	6.11	4		619.60	11	9.61	0.00

PAGE 4 OF 4
KRF 1-21-04

At-9 P.20

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) SM -	SURVEY NO. 04-RPA-017
PURPOSE: JOB COVERAGE	RWP NO. N/A
	DATE: 1-22-04
	TIME: 0900

MAP / DRAWING

SEE ATTACHED

INTEGRATED COUNT TAKEN
IF AUDIBLE DETECTED
NO AUDIBLE DETECTED

COPY

<100 DPM/100cm² → <5K DPM/100cm² β

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · — = radiological boundary
= mrem/hr neutron
= swipe number
or /β = direct contamination
[redacted]ement in dpm/100 cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5772/5713	9/17/04
	N/A	

HP# 5436	Date: 1-22-04
HP#	Date:
HP# 4998	Date: 1-29-04

At-9 P.21

Survey No. 04-RPA-017

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1		See		HOSE -41
2				CAMERA -42
3		ATTACHED		CAMERA -41
		N/A		

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
		N/A		

COMMENTS: N/A

NOTES:
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If needed, mark N/A.

ML-9620A (4-98)

At-9 P.22

Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Green
Data file name: SMEAR016
Batch Ended: 1/22/04 15:26
Cal. Due Date: 5/1/05
Serial Number: 26966-3

Batch ID: FRANCES 04-RPA-017 (3) CYR

Detector ID	Sample ID	Alpha Activity			Beta Activity		
		DPM	σ	flags	DPM	σ	flags
A1	1	0.00	2.00		0.00	1.30	
A2	2	0.00	1.96		0.16	1.61	
A3	3	0.00	2.18		1.73	2.16	

Carol L. Robinson

4-9 P.23

3 of 4
Page ~~1 of 1~~
KLF
1-29-04

KAF

Time: 2.00
Data Mode: DPM Nuclide: SMGLS02 Quench Set: SMGLS02
Background Subtract: 1st Vial

	LL	UL	LCR	2S%	BKG
Region A:	0.5 -	18.6	0	0.0	6.43
Region B:	2.0 -	18.6	0	0.0	6.47
Region C:	40.0 -	2000	0	0.0	10.49

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
04-RPA-017 FRANCES (3) AG
Luminescence Correction On
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\DATA\PROT5.dat
Count Data Filename: C:\DATA\SDATA5.DAT

S#	TIME	CPMA	CPMB	CPMC	tSIE	LUM	FLAG	DPM1	2SIGMA
-1	10.00	6.43	6.47	10.49	628.54	15	B		0.00
0	2.00	414.49	410.31	1.79	440.47	2		983.08	100.55
1	2.00	3.92	3.05	0.00	540.36	5		8.19	10.18
2	2.00	2.07	1.64	0.00	556.65	0		4.24	9.17
3	2.00	0.57	0.53	0.00	564.89	0		1.15	8.37

page 4 of 4
KAF
1/29/04

Allen Hatcher

At. 9 P. 24

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) SM - OUTSIDE	SURVEY NO. 04-RPA-018
PURPOSE: JOB COVERAGE	RWP NO. N/A
	DATE: 1-27-04
	TIME: 0900

MAP / DRAWING

SEE ATTACHED

INTERGRATED COUNT TAKEN IF AUDIBLE DETECTED

NO AUDIBLE DETECTED

ALL DIRECT READINGS:

<100 DPM/100cm² α - <5K DPM/100cm² β -

COPY

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · - = radiological boundary

= mrem/hr neutron

= swipe number

α or /β = direct contamination measurement in dpm/100 cm²

[redacted]

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5712/5713	9/17/04
	N/A	

HP# 5436	Date: 1-27-04
HP#	Date:
HP# 4998	Date: 1-29-04

Survey No. 04-RPA-018

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1	SEE ATTACHED			CAM - #42
2				HOSE - #42
3				CAM - #51
4				CAM - #50
5				CAM - #45
		N/A		

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
		N/A		

COMMENTS: N/A

NOTES:
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If needed, mark N/A.

ML-9620A (4-98)

At-9 P.26

Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Green
Data file name: SMEAR005
Batch Ended: 1/28/04 8:39
Cal. Due Date: 5/1/05
Serial Number: 26966-3

Batch ID: FRANCIS 04-RPA-018 [5] JC

Detector ID	Sample ID	Alpha Activity			Beta Activity		
		DPM	σ	flags	DPM	σ	flags
A1	1	0.00	2.00		0.00	1.30	
A2	2	0.00	1.97		1.29	1.96	
A3	3	1.77	2.18		1.58	2.16	
A4	4	1.73	2.02		1.36	1.99	
B1	5	2.56	2.71		0.00	1.76	

At-9 P.27

3 of 4

KRF
1/29/04

Time: 2.00
Data Mode: DPM Nuclide: SMGLS02 Quench Set: SMGLS02
Background Subtract: 1st Vial

	LL	UL	LCR	2S%	BKG
Region A:	0.5	- 18.6	0	0.0	6.95
Region B:	2.0	- 18.6	0	0.0	6.86
Region C:	40.0	- 2000	0	0.0	10.72

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FRANCES 04-RPA-018 (E1-E5) CYR
Luminescence Correction On
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\DATA\PROT6.DAT
Count Data Filename: C:\DATA\SDATA6.DAT
Spectrum Data Drive & Path: C:\DATA

S#	TIME	CPMA	LUM	FLAG	tSIE	DPM1	2Sigma	CPMC
-1	10.00	6.95	4	B	624.69		0.00	10.72
0	2.00	358.37	0		462.42	789.84	73.36	0.00
1	2.00	0.15	13		495.74	0.31	8.74	0.00
2	2.00	0.00	0		567.92	0.00	0.00	0.78
3	2.00	0.00	8		388.21	0.00	0.00	0.00
4	2.00	1.51	0		399.20	3.65	10.73	0.78
5	2.00	0.00	9		495.90	0.00	0.00	0.00

Carol G. Robinson

page 4 of 4
KRF
1-29-04

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) S/M-OUTSIDE	SURVEY NO. 04-RPA-019
PURPOSE: JOB COVERAGE	RWP NO. N/A
	DATE: 1/28/04
	TIME: 0900

MAP / DRAWING

SEE ATTACHED

INTERGRATED COUNT TAKEN
IF AUDIBLE DETECTED. NO AUDIBLE DETECTED
ALL DIRECT READINGS
<100 DPM/100 CM² α
<5K DPM/100 CM² β⁻

COPY

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · — = radiological boundary
= mrem/hr neutron
= swipe number
or /β = direct contamination
rement in dpm/100 cm²

[redacted]

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5704/5714	10/6/04
	N/A	

HP# 5436	Date: 1/28/04
HP#	Date:
ED	
HP# 4998	Date: 1-29-04

Att-9 P.29

Survey No. 04-RPA-019

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1	↓	↓	↓	#47 - CAM hose
2	SEE			#47 - CAM
3				#48 - CAM
4	ATTACHED			#50 - CAM
5	↓	↓	↓	102 - hose
		N/A		

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
		N/A		

COMMENTS: N/A

NOTES:
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If needed, mark N/A.

ML-9620A (4-98)

Att.9 P.30

Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Green
Data file name: SMEAR000
Batch Ended: 1/29/04 6:52
Cal. Due Date: 5/1/05
Serial Number: 26966-3

Batch ID: FRANCIS 04-RPA-019 [5] JC

Detector ID	Sample ID	Alpha Activity			Beta Activity		
		DPM	σ	flags	DPM	σ	flags
A1	1	0.00	2.00		0.00	1.30	
A2	2	0.00	1.95		0.00	1.15	
A3	3	0.00	2.16		0.00	1.26	
A4	4	0.00	2.00		0.36	1.63	
B1	5	0.00	1.94		0.23	1.76	

A4-9 P.31

3 of 4

KRF
1/29/04

J. Collins

Time: 2.00
Data Mode: DPM Nuclide: SMGLS02 Quench Set: SMGL602
Background Subtract: 1st Vial

	LL	UL	LCP	2SI	BKG
Region A:	0.5 -	18.6	0	0.0	7.00
Region B:	2.0 -	18.6	0	0.0	6.79
Region C:	40.0 -	2000	0	0.0	10.30

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FRANCIS 04-RPA-019 (5) AG
Luminescence Correction On
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\DATA\PROT1.DAT
Count Data Filename: C:\DATA\SDATA1.DAT

S#	TIME	CPMA	CPMB	CPMC	tSIE	LUM	FLAG	DPM1	2SIGMA
-1	10.00	7.00	6.79	10.30	625.72	20	B		0.00
0	2.00	405.82	395.14	2.20	473.17	1		918.85	93.89
1	2.00	2.50	1.89	0.00	676.98	11		4.57	8.67
2	2.00	0.00	0.00	0.00	547.69	40		0.00	0.00
3	2.00	0.00	0.00	0.00	557.60	27		0.00	0.00
4	2.00	2.50	1.97	0.00	581.76	5		4.99	9.46
5	2.00	4.64	3.57	1.81	528.09	8		9.83	10.96

Carol G. Robinson

Page
4 of 4
KRF
1/29/04

At-9 9.32

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) SANITARY SEWER	SURVEY NO. 04-RPA-025
PURPOSE: JOB COVERAGE	RWP NO. N/A
	DATE: 2/2/04
	TIME: 1300

MAP / DRAWING

SEE
ATTACHED
(CAMERA & HOSE)

INTERGRATED COUNT TAKEN IF AUDIBLE DETECTED
NO AUDIBLE DETECTED

COPY

<100 DPM/100 CM² α <5K DPM/100CM² β⁻

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · · = radiological boundary
= mrem/hr neutron
= swipe number
or /β = direct contamination
rement in dpm/100 cm²

[redacted]

HP#	Date:
5436	2/2/04
HP#	Date:
HP# 4998	Date: 2-4-04

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5755/5723	1/8/05
	N/A	

Survey No. 04-RPA-025

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1	SEE			#43 CAMERA
2				#52 CAMERA
3				#33 CAMERA
4	ATTACHED			#57, 55, HOSE
		N/A		

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
			N/A	

COMMENTS: N/A

NOTES:
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If needed, mark N/A.

Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Aqua
Data file name: SMEAR001
Batch Ended: 2/3/04 5:10

Crosstalk correction performed.

Recalibration Date: 03/18/05
Serial Number: 26966-1

Batch ID: FRANCIS 04-RPA-025 [4] JC

Detector ID	Sample ID	Alpha Activity DPM	Alpha Activity σ	Alpha Activity flags	Beta Activity DPM	Beta Activity σ	Beta Activity flags
A1	1	0.00	2.03		2.79	2.49	
A2	2	0.00	2.08		1.12	2.08	
A3	3	1.50	1.97		1.20	2.08	
A4	4	3.54	2.80		1.05	2.05	

Att. 9 p. 35

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~~Page 1 of 1~~
KAP
2/3/04

J. Collins

KRF

03 Feb 2004 07:08 ALPHA/BETA - 1.09 ~~Page #1~~ KRF
Protocol #: 6 PW H3 #403728 User : 5681

Time: 2.00
Data Mode: DPM Nuclide: SMGLO2 Quench Set: SMGLO2
Background Subtract: 1st Vial

	LL	UL	LCR	2S%	BKG
Region A:	0.5 -	18.6	0	0.0	9.03
Region B:	2.0 -	18.6	0	0.0	8.66
Region C:	40.0 -	2000	0	0.0	11.16

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FRANCES 04-RPA-025 (B1-B4) CYR
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: c:\data\prot1.dat
Count Data Filename: c:\data\SDATA6.DAT
Spectrum Data Drive & Path: c:\data

S#	TIME	CPMA	LUM	FLAG	tSIE	DPM1	2Sigma	CPMC	CPMB
-1	10.00	9.03	3	B	634.12		0.00	11.16	8.66
0	2.00	295.45	0		408.08	712.43	73.41	0.00	290.86
1	2.00	0.47	11		543.67	0.96	9.60	1.84	0.00
2	2.00	0.00	0		511.60	0.00	0.00	0.84	0.00
3	2.00	0.47	0		473.97	1.04	10.40	0.00	0.80
4	2.00	0.00	10		578.60	0.00	0.00	2.84	0.00

Carol Y. Robinson

PAGE
4 of 4
KRF
2/3/04

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) OUTSIDE / SEWER - SANITARY	SURVEY NO. 04-RPA-026
PURPOSE: JOB COVERAGE	RWP NO. N/A
	DATE: 2/3/04
	TIME: 0830

MAP / DRAWING

SEE
ATTACHED
(CAMERA & HOSE)

INTERGRATED COUNT TAKEN
IF AUDIBLE DETECTED. NO AUDIBLE DETECTED

<100 DPM/100CM² α
<5K DPM/100CM² β-

COPY

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · — = radiological boundary
△# = mrem/hr neutron
(#) = swipe number
= air sample number
#/α or /β = direct contamination measurement in dpm/100 cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5807/5754	9/29/04
	N/A	

[redacted]

HP# 5436	Date: 2/3/04
HP#	Date:
HP# 4998	Date: 2-3-04

Att-9 P.37

Survey No. 04-RPA-026

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1	S	E	E	hose
2				hose
3	ATT	ACH	ED	REEL
4				
5				
6				
7				
8				
9				
10				
11				
12				
13				
14				
15				
16				
17				
18				
19				
20				
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				

N/A

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments

N/A

COMMENTS: N/A

NOTES:
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If needed, mark N/A.

Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Aqua
Data file name: SMEAR003
Batch Ended: 2/4/04 6:55

Crosstalk correction performed.

Recalibration Date: 03/18/05
Serial Number: 26966-1

Batch ID: 04-RPA-026 FRANCIS A/B (3) AG

Detector ID	Sample ID	Alpha Activity			Beta Activity		
		DPM	σ	flags	DPM	σ	flags
A1	1	0.00	2.01		0.30	1.76	
A2	2	1.66	2.08		0.98	2.08	
A3	3	1.50	1.96		0.00	1.70	

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KRF
2/4/04

Att. 9 P.39

KRP

2/4/04 9:16:26 AM QuantaSmart (TM) - 1.31 - Serial# 423022 Page # 1

Protocol# 1 - Smears.lsa User: 5681

FRANCES 04-RPA-026 (D1-D3) CYR

Cycle 1 Results

S#	Count Time	CPMA	CPMB	CPMC	LUM	tSIE	DPM1	A:2S%	MESSAGES
-1	10.00	6	6	11	38	608.02	0	26.9	B
0	2.00	570	559	4	3	459.69	1203	6.1	
1	2.00	0	1	0	13	492.27	0	0.0	
2	2.00	1	2	0	15	637.95	1	746.7	
3	2.00	0	1	0	16	591.99	0	*****	

Carol G. Robinson

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KRP
2/4/04

At. 9 P. 40

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) SANITARY SEWER	SURVEY NO. 04-RPA-033
PURPOSE: CHECKS	RWP NO. N/A
	DATE: 2/10/04
	TIME: 1600

MAP / DRAWING

SEE ATTACHED (HOSE)

INTERGRATED COUNT TAKEN IF AUDIBLE DETECTED
NO AUDIBLE
<100 DPM/100CM² α
<5K DPM/100 CM² β-

COPY

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · · = radiological boundary
△# = mrem/hr neutron
(#) = swipe number
= [redacted] or /β = direct contamination [redacted]urement in dpm/100 cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5710/5787	9-8-04
	N/A	

Completed b[redacted]		HP# 5436	Date: 2/10/04
Completed b[redacted]			
Counted by: (Signature)	SEE	HP#	Date:
Counted by: (Print Name)	ATTACHED		
Reviewed/Approved by: (Signature)		HP#	Date:
Reviewed/Approved by: (Print Name)			

Survey No. 04-RPA-033

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1	SEE	ATTACHED		REEL HOSE
		N/A		

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
		N/A		

COMMENTS:

NOTES:
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If needed, mark N/A.

Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Aqua
Data file name: SMEAR001
Batch Ended: 2/11/04 7:23

Crosstalk correction performed.

Recalibration Date: 03/18/05
Serial Number: 26966-1

Batch ID: 04-RPA-0033 (1-2) DDH

Detector ID	Sample ID	Alpha Activity DPM	Alpha Activity σ	Alpha Activity flags	Beta Activity DPM	Beta Activity σ	Beta Activity flags
A1	1	0.00	2.03		2.79	2.49	
A2	2	0.00	2.06		0.00	1.20	

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Page ~~1 of 1~~

KRF 2/11/04

At. 9 P. 43

KRF

KRF

11 Feb 2004 09:56 ALPHA/BETA - 1.09 ~~Page #1~~
Protocol #: 3 PW H3 405827 User : 2324

KRF

Time: 2.00
Data Mode: DPM Nuclide: SMGL02 Quench Set: SMGL02
Background Subtract: 1st Vial

	LL	UL	LCR	2SI	BKG
Region A:	0.5 -	18.6	0	0.0	8.65
Region B:	2.0 -	18.6	0	0.0	7.08
Region C:	40.0 -	2000	0	0.0	11.20

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FRANCIS 04-RPA-033 1-2 JC
Luminescence Correction On
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\DATA\PROT1.DAT
Count Data Filename: C:\DATA\SDATA3.DAT
Spectrum Data Drive & Path: C:\DATA

S#	TIME	CPMA	CPMC	LUM	tSIE	DPM1	2Sigma
-1	10.00	8.65	11.20	40	625.11		0.00
0	2.00	760.56	0.00	9	531.14	1545.71	120.65
1	2.00	14.85	4.80	8	567.34	29.24	14.91
2	2.00	3.85	0.00	8	636.50	7.15	10.30

page
4 of 4
KRF
2/11/04

J. Cabrera

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) OUTSIDE / SANITARY SEWER	SURVEY NO. 04-RPA-035
PURPOSE: JOB COVERAGE	RWP NO. N/A
	DATE: 2/11/04
	TIME: 1600

MAP / DRAWING

SEE ATTACHED

INTERGRATED COUNT TAKEN IF AUDIBLE DETECTED

NO AUDIBLE DETECTED

<100 DPM/100 CM² α
<5K DPM/100 CM² β⁻

COPY

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · · = radiological boundary

△# = mrem/hr neutron
(#) = swipe number
= air [redacted] or /β = direct contamination [redacted] rement in dpm/100 cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5768/5792	8/20/04
	N/A	

Completed by: ([redacted]	HP# 3436	Date: 2/11/04
Complete[redacted]		
Counted by: (Signature) SEE	HP#	Date:
Counted by: (Print Name) ATTACHED		
Reviewed/Approved by: (Signature)	HP#	Date:
Reviewed/Approved by: (Print Name)		

AE-9 P.45

Survey No. 04-RPA-035

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1	↑	↑	↑	NOZZLE
2	SEE			REEL
3				HOSE
4	ATTACHED			HOSE
5				REEL
6				NOZZLE

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
		N/A		

COMMENTS: COUNT LAB DID NOT RUN ALPHA/BETA: HOWEVER CPMC REGION DOES INDICATE NO CONTAMINATION, WIPE < 20 DPM/100CM² Alpha/Beta

NOTES:
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If needed, mark N/A.

KAF

12 Feb 2004 09:30 ALPHA/BETA - 1.09 ~~Page #1~~
Protocol #: 4 PW H3 #403727 User : 2324

Time: 2.00
Data Mode: DPM Nuclide: SMGLS02 Quench Set: SMGLS02
Background Subtract: 1st Vial

	LL	UL	LCR	2S%	BKG
Region A:	0.5 -	18.6	0	0.0	6.43
Region B:	2.0 -	18.6	0	0.0	6.03
Region C:	40.0 -	2000	0	0.0	10.30

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FRANCIS 04-RPA-035 1-6 JC
Luminescence Correction On
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\DATA\PROT4.dat
Count Data Filename: C:\DATA\SDATA4.DAT

S#	TIME	CPMA	CPMB	CPMC	tSIE	LUM	FLAG	DPM1	2SIGMA
-1	10.00	6.43	6.03	10.30	628.33	9	B		0.00
0	2.00	948.77	905.22	0.00	694.04	0		1726.26	149.33
1	2.00	0.00	0.00	0.00	615.72	22		0.00	0.00
2	2.00	0.00	0.00	1.70	438.89	8		0.00	0.00
3	2.00	3.07	1.98	0.00	630.36	11		5.84	8.88
4	2.00	1.25	1.28	1.70	649.01	0		2.33	7.94
5	2.00	0.57	0.97	0.00	499.41	0		1.25	8.95
6	2.00	0.00	0.00	0.79	639.25	0		0.00	0.00

page 3 of 3
KAF
2/12/04

J. Collins

At-9 P.47

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG./AREA/ROOM) SANITARY SEWER	SURVEY NO. 04-RPA-036
PURPOSE: Job Coverage	RWP NO. N/A
	DATE: 2/12/04
	TIME: 1600

MAP / DRAWING

SEE ATTACHED

INTERGRATED COUNTS TAKEN. IF AUDIBLE DETECTED

NO AUDIBLE DETECTED

<100 DPM/100cm² <5K DPM/100cm² β

COPY

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · — = radiological boundary
△# = mrem/hr neutron
(#) = swipe number
= air s[redacted]
or /β = direct contamination
[redacted]ement in dpm/100 cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5716/5808	10-1-04
	N/A	

Completed by: (S[redacted]	HP# 3436	Date: 2/12/04
Completed by: (P[redacted]		
Counted by: (Sig[redacted] SEE	HP#	Date:
Counted by: (Print Name) ATTACHED		
Reviewed/Approved by: (Signature)	HP#	Date:
Reviewed/Approved by: (Print Name)		

At. 9 P. 48

Survey No. 04-RPA-0363

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments
1				HOSE #70
2	SEE			EQUIP #70
3				CAMERA #70
4	ATTACHED			PUSH CAM 40#

Removable Contamination Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	Tritium	Comments

N/A

COMMENTS:

NOTES:

1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If needed, mark N/A.

ML-9620A (4-98)

At-9 P.49

Smear Analysis

Unit Type: LB4100/W
Counting Unit ID: Aqua
Data file name: SMEAR013
Batch Ended: 2/12/04 14:30

Crosstalk correction performed.

Recalibration Date: 03/18/05
Serial Number: 26966-1

Batch ID: FRANCIS 04-RPA-036 [4] JC

Detector ID	Sample ID	Alpha Activity DPM	Alpha Activity σ	Alpha Activity flags	Beta Activity DPM	Beta Activity σ	Beta Activity flags
A1	1	0.00	2.02		1.55	2.16	
A2	2	0.00	2.08		1.12	2.08	
A3	3	0.00	1.97		1.35	2.08	
A4	4	0.00	1.99		1.32	2.05	

Ac-9 p.50

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Page 1 of ~~1~~
RLF
2/16/04

J. Coleman

Time: 2.00
Data Mode: DPM Nuclide: SMGLS02 Quench Set: SMGLS02
Background Subtract: 1st Vial

	LL	UL	LCR	2S%	BKG
Region A:	0.5	- 18.6	0	0.0	8.79
Region B:	2.0	- 18.6	0	0.0	7.95
Region C:	40.0	- 2000	0	0.0	11.30

Quench Indicator: tSIE/AEC
Ext Std Terminator: Count
FRANCIS 04-RPA-036 1-4 JC
Coincidence Time(ns): 18
Delay Before Burst(ns): Normal
Protocol Data Filename: C:\DATA\PROT2.DAT
Count Data Filename: C:\DATA\SDATA2.DAT

S#	TIME	CPMA	CPMB	LUM	FLAG	tSIE	DPM1	2SIGMA	CPMC
-1	10.00	8.79	7.95	15	B	635.20		0.00	11.30
0	2.00	892.13	849.70	0		691.88	1624.59	141.88	0.00
1	2.00	0.02	0.00	0		537.90	0.04	9.63	0.70
2	2.00	0.00	0.00	0		580.93	0.00	0.00	0.00
3	2.00	0.00	0.00	7		592.27	0.00	0.00	0.00
4	2.00	0.21	0.40	11		628.57	0.40	8.84	0.70

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KRF 2/16/04

J. Colonno

At. 9 p. 51

Attachment 10:

List of buildings connected to the sanitary sewer collection system to be leased.

Current	Historical
OSW	A, C
OSE	B, H
GP-1	E, E Annex
GH	G, GW, W
28	I, 92
45	M, PS
T	40, 99, 91
COS	47, 60, 65, 46
61	DS, HH
126	WD, SD, 23, 48
128	29, 98, 51
100	49, 35, 43
102	27, 42, 67, 85
105	55, 94
2	SM, PP (38)
3	30, 33, 44
63	36, 37, 50, 88
87	

Mound Sanitary Sewage
Radiological Analytical Results
Sampled 6/21-24/04

	Alpha Spec									
pCi/g	Pu-238	Pu-239/240	Am-241	Ac-227	Th-228	Th-230	Th-232	U-233/234	U235/236	U-238
Mound Influent 6/21-24/04	6.75	0.128		< 0.121	1.24	0.816	0.298	0.672	0.058	0.632
			0.099		0.717	0.770	0.452			
Mound Influent 6/28-7/1/04	1.51	0.120		< 0.056	0.177	1.09	0.195	0.460	0.042	0.308
	3.43	0.026	< 0.019		2.75	4.06	2.03	0.483	0.029	0.438
Mound Influent 7/6-7/04	2.02	0.100		< 0.030	0.213	0.622	0.205			
Mound Influent 7/12-15/04	2.57	0.132		0.081	0.379	1.31	0.249			
Mound Influent 7/19-22/04	2.82	0.236		0.113	0.354	0.986	0.251			
Mound Influent 7/26-29/04	2.35	0.183		0.058	0.545	3.54	2.21			
Mound Influent 8/2-5/04	2.02	< 0.095		0.066	0.432	3.10	1.62			
Mound Influent 8/8-12/04	0.948	0.035		0.110	0.281	4.50	1.39			
Mound Influent 8/16-19/04	2.34	0.179		0.072	0.324	2.63	1.69			
Mound Influent 8/23-26/04	2.84	< 0.242		0.062	0.524	2.93	1.51			
	Gamma Spec							Beta GPC		
pCi/g	Am-241	Cs-137	Co-60	Pb-210	Ra-226	Ra-228	Th-227	Pb-210		
Mound Influent 6/21-24/04	< 0.326	< 0.084	< 0.080	< 8.98	< 2.35	0.651				
		< 0.105	< 0.108				< 0.637	0.242		
Mound Influent 6/28-7/1/04	< 0.503	< 0.336	< 0.349	< 4.93	< 6.26	< 1.25				
			< 0.399		< 6.0		< 1.65	< 0.068		
	OHEPA Results		Th-227 = Ac-227							
	QC difficulties were encountered in the Pu & Th analyses; being reanalyzed									

Mound Sewage
Radiological Analytical Results
Sampled 6/21-24/04

	GPC		LSC
	Ra-226	**Ra-228**	**H-3**
Sample ID	pCi/L	pCi/L	pCi/L
Mound Influent 6/21-24/04	< 0.386	< 1.63	17,300
	< 0.275		15,693
	0.424		15,604
Mound Influent 6/21-24/04 DUP			17,900
Mound Influent 6/28-7/1/04	< 0.091	< 0.940	3,660
	0.253		2,580
	OHEPA Results		
	LSC - Liquid Scintillation Counter		
	GPC - Gas Proportional Counter		

Mound Sewage
Total Suspended Solids
Sampled 6/21-24/04

	TSS
Sample ID	mg/L
SD 6/12 AM	52.0
SD 6/21 PM	86.0
SD 6/22 AM	48.0
SD 6/22 PM	107
SD 6/23 AM	111
SD 6/23 PM	270
SD 6/28 AM	379
SD 6/28 PM	265
Average	165

EVALUATION OF THE POTENTIAL IMPACTS FROM RESIDUAL RADIONUCLIDE LEVELS IN THE MOUND SEWAGE ON THE CITY OF MIAMISBURG'S PUBLICLY OWNED TREATMENT WORKS (POTW)

Lisa Stetar, CHP
October 5, 2004

Evaluation of the Potential Impacts from Residual Radionuclide Levels in the Mound Sewage on the City of Miamisburg's Publicly Owned Treatment Works (POTW)

The following tables summarize the analyses that were performed to evaluate the potential impacts associated with the proposed discharge of Mound sewage which contains low levels of residual radionuclides into the City of Miamisburg's municipal sewage collection system. The data used in this analysis are from weekly composite samples of Mound sewage that were collected between 6/21 and 8/26/04. Samples were sent to a contract laboratory for analysis. In addition, for the weeks of 6/21 and 6/28 samples were split with the Ohio EPA for independent analysis. For this report the maximum concentrations measured over the course of the sampling campaign by either the Mound contract laboratory or the Ohio EPA's laboratory were used. In the event that only less than values were reported for a given radionuclide, the maximum less than value was used in the calculations. The average daily flow of Mound sewage was assumed to be 38,750 gallons based on flow measurements made during the week of 6/21 to 6/28. For comparison, the average flow measured from 6/21 through 7/9 was 31,360 gallons per day.

As a starting point, the maximum radionuclide concentrations present in the Mound sewage were compared to the Ohio Department of Health's (ODH) regulatory criteria for discharges of radionuclides into public sewer systems. The results of this comparison are provided in Table 1 and indicate that the maximum concentrations of radionuclides in the Mound sewage are orders of magnitude below the ODH limits for monthly average concentrations of radionuclides discharged to sewers. The Mound concentrations are also significantly below the ODH's more restrictive concentration limits for radionuclides in effluents to unrestricted areas.

A conservative screening process was used to evaluate the potential impacts of the radionuclides present in the Mound sewage on the City of Miamisburg POTW workers and land application program. For this screening assessment, the screening concentrations for radionuclides in sewage sludge developed by the Interagency Steering Committee on Radiation Standards were used (ISCORS 2003a, ISCORS 2003b). The ISCORS screening concentrations are based on a 1 mrem/year dose limit which is considered the Negligible Individual Dose Level by the National Council on Radiological Protection and Measurements (NCRP 1993). ISCORS states that if no radionuclide concentration in the POTW sludge exceeds its corresponding screening value "no further action is warranted."

For comparison to the ISCORS screening concentrations, upper bound estimates were made of the concentrations of Mound residual radionuclides that could be present in the Miamisburg sludge. The upper bound estimates were based on the following:

- the calculated maximum, total activity (pCi) of each radionuclide present in the Mound sewage that would enter the Miamisburg POTW each year
- the bounding assumption that all of the radionuclides, except tritium, would be removed from the wastewater during treatment and become incorporated in the POTW sludge, and
- the total mass of solids generated by the Miamisburg POTW each year.

Tritium was excluded from this assessment because this radionuclide would be associated with the liquid phase of the wastewater and would not be removed by the wastewater treatment process. Even for those radionuclides that are associated with the solids in the wastewater, the assumption of 100% removal during treatment is conservative.

The upper bound concentrations and the comparison of these concentrations to the ISCORS screening levels are provided in Table 2 (POTW worker screening values) and Table 3 (land application screening values). The upper bound concentrations are significantly below the ISCORS screening values.

To evaluate the potential impact of the Mound sewage on the Miamisburg POTW's liquid effluent, the bounding assumption that all the Mound discharged radionuclides would remain within the wastewater during treatment was made. Based on this assumption and the daily volume of wastewater treated in the Miamisburg POTW, upper bound radionuclide concentrations for the Miamisburg effluent were calculated. The concentrations were then compared to ODH's regulatory limits for discharges of radionuclides in effluents to unrestricted areas. The upper bound concentrations and the comparison to ODH limits are provided in Table 4. The upper bound concentrations for all radionuclides were orders of magnitude below the ODH limits.

Conclusions

Based on the results of the conservative assessments described above, the levels of radionuclides present in the Mound sewage are well below the ODH's sewer discharge limits. Furthermore, the residual levels of radionuclides in the Mound sewage would not result in radionuclide concentrations in the Miamisburg sludge that exceed the ISCORS screening concentrations for radionuclides in sewage sludge. Also, the radionuclides present in the Mound sewage would not adversely impact the POTW's liquid effluent. Therefore, the connection of the Mound sewage system to the City of Miamisburg sewage collection system should not be precluded based on the presence of low levels of residual radionuclides present in the Mound sewage.

References

ISCORS 2003a. Assessment of Radioactivity in Sewage Sludge: Modeling to Assess Radiation Doses. Interagency Steering Committee on Radiation Standards. NUREG-1783, ISCORS-2003-03, EPA 832-R-03-002A, DOE/EH-0670.

ISCORS 2003b. ISCORS Assessment of Radioactivity in Sewage Sludge: Recommendations on Management of Radioactive Materials in Sewage Sludge and Ash at Publicly Owned Treatment Works. Draft Final Report. DOE/EH-668, EPA 832-R-03-002B.

NCRP 1993. Limitation of Exposure to Ionizing Radiation. National Council on Radiological Protection and Measurements. NCRP Report No. 116. Bethesda, Maryland.

Table 1. Comparison of Radionuclide Concentrations in Mound Sewage Effluent to Ohio Department of Health Criteria for Releases to Sewers (3701:1-38-12 Appendix C, Table III)			
Radionuclides	Concentration in Mound Sewage (pCi/L)	ODH Table III Concentrations (pCi/L)	Ratio of Mound Concentration to ODH Table III Conc.
H-3	17,900	10,000,000	0.001790
Am-241	0.0163	200	0.000082
Pu-238	1.1138	200	0.005569
Pu-239/240	0.0389	200	0.000195
Ac-227	0.0200	50	0.000400
Th-228	0.2046	2,000	0.000102
Th-230	0.7245	1,000	0.000725
Th-232	0.3647	300	0.001216
U-233/234	0.1109	3,000	0.000037
U-235/U236	0.0096	3,000	0.000003
U-238	0.1043	3,000	0.000035
Cs-137	< 0.0554	10,000	0.000006
Co-60	< 0.0658	30,000	0.000002
Ra-226	1.4569	600	0.002428
Ra-228	1.7374	600	0.002896
Pb-210	0.0399	100	0.000399
		Sum of Ratios	**0.015883**

Table 2. Upper Bound Estimate of Maximum Radionuclide Concentrations in Miamisburg Sludge Resulting from Mound Effluent Sewage and Comparison to ISCORS 1 mrem Based Screening Concentrations for POTW Workers Scenarios

(Bounding Assumption: 100% of Mound Radionuclides are removed from the wastewater during treatment at the Miamisburg POTW and become incorporated in the treatment plant sludge)

Radionuclide	Upper Bound Concentration in Miamisburg Sludge (pCi/g dry wt.)	ISCORS Screening Concentration (pCi/g dry wt.)	Ratio of Concentration in Miamisburg Sludge to ISCORS
Am-241	0.0026	21.3	0.00012
Pu-238	0.1778	27.8	0.00640
Pu-239/240	0.0062	21	0.00030
Ac-227	0.0032	1.23	0.00259
Th-228	0.0327	1.1	0.02969
Th-230	0.1185	29.9	0.00396
Th-232	0.0582	5.99	0.00972
U-233/234	0.0177	81.3	0.00022
U-235/U236	0.00153	13.6	0.00011
U-238	0.01665	44.3	0.00038
Cs-137	< 0.0089	3.42	0.00259
Co-60	< 0.0105	0.71	0.01480
Ra-226	0.2326	1.03	0.22581
Ra-228	0.2774	1.92	0.14371
Pb-210	0.0064	376	0.00002

Table 3. Upper Bound Estimate of Radionuclide Concentrations in Miamisburg Sludge Resulting from Mound Effluent Sewage and Comparison to ISCORS 1 mrem Based Screening Concentrations for Land Application Scenarios

(Bounding Assumption: 100% of Mound Radionuclides are removed from the wastewater during treatment at the Miamisburg POTW and become incorporated in the treatment plant sludge)

Radionuclide	Upper Bound Concentration in Miamisburg Sludge (pCi/g dry wt.)	ISCORS Screening Concentration (pCi/g dry wt.)	Ratio of Concentration in Miamisburg Sludge to ISCORS
Am-241	0.0026	1.25	0.0021
Pu-238	0.1778	1.42	0.1252
Pu-239/240	0.0062	1.29	0.0048
Ac-227	0.0032	0.08	0.0398
Th-228	0.0327	1.91	0.0171
Th-230	0.1185	0.8	0.1482
Th-232	0.0582	0.34	0.1712
U-233/234	0.0177	4.22	0.0042
U-235/U236	0.00153	4.5	0.0003
U-238	0.01665	4.72	0.0035
Cs-137	< 0.0089	4.81	0.0018
Co-60	< 0.0105	3.86	0.0027
Ra-226	0.2326	1.02	0.2280
Ra-228	0.2774	2.43	0.1141
Pb-210	0.0064	3.41	0.0019

Table 4. Upper Bound Estimate of Maximum Radionuclide Concentrations in Miamisburg POTW Effluent Resulting from Mound Effluent Sewage

(Bounding Assumption: 100% of Mound Radionuclides remain in the wastewater during treatment at the Miamisburg POTW and are discharged with the POTW effluent)

Radionuclide	Upper Bound Concentration in Miamisburg Effluent (pCi/L)	ODH Limits for Effluents to Surface Water* (pCi/L)	Ratio of Concentration in Miamisburg Effluent to ODH Effluent Criteria
H-3	224	1,000,000	0.0002240
Am-241	0.0002	20	0.0000102
Pu-238	0.0139	20	0.0006961
Pu-239/240	0.0005	20	0.0000243
Ac-227	0.0002	5	0.0000499
Th-228	0.0026	200	0.0000128
Th-230	0.0093	100	0.0000928
Th-232	0.0046	30	0.0001519
U-233/234	0.0014	300	0.0000046
U-235/U236	0.0001	300	0.0000004
U-238	0.0013	300	0.0000043
Cs-137	< 0.0007	1,000	0.0000007
Co-60	< 0.0008	3,000	0.0000003
Ra-226	0.0182	60	0.0003035
Ra-228	0.0217	60	0.0003620
Pb-210	0.0005	10	0.0000499
		Sum of the Ratios	0.0019878

From: "lstetar" <lstetar@prodigy.net>
To: "Max Edington" <EDINML@doe-md.gov>
Date: 10/28/04 3:02PM
Subject: summary of calculations

Max,

The purpose of this email is to summarize the calculations I have performed relative to the potential impacts of contaminated soil along the sewer line entering the system through a breach. Please note, that my previous email in which I reported the results of my calculations to determine the amount of soil that would have to enter the sewer system in a month to reach the ISCORS screening values contained some errors. The corrected results are provided below. Also, I have not included Ra-226 in this summary because the PRS soil concentrations are virtually the same as the Ra-226 levels currently present in the Miamisburg sludge so soil released into the sewer system would not change the current levels.

Calculation 1.

I calculated the amount of soil that would have to enter the system to reach the ISCORS land application screening criteria in the Miamisburg sludge (taking into consideration the concentrations currently present in the Miamisburg sludge and the maximum concentraitons that would be contributed from Mound based on the 10 week sampling data). Itshould be noted that because there was a line break during the 10 week sampling program, the Mound "normal" contribution of Th-232 to the Miamisburg sludge is overestimated resulting in conservative result (underestimate) for the amount of soil could enter the system. The results of this calculation are as follows:

a. Soil masses based on highest concentrations of Pu-238 and Th-232 are 170 kg and 1050 kg, respectively.

b. Soil masses based on the average data for Pu-238 and Th-232 are 450 kg and 3500 kg, respectively.

Note: The screening concentrations upon which I calculated the amount of soil per month (above) are based on a 1 mrem/year dose limit and the assumption that the sludge is land applied on the same site for 20 years. The screening concentrations represent the average concentrations that are applied over the 20 year period. So, higher concentrations for relatively short periods of time won't cause harm to the land application site.

Calculation 2.

Using the ISCORS 95th percentile dose-source-ratios (mrem/year per pCi/g) for land application, I evaluated the impact of land applying sludge that contains Pu-238 and Th-232 at the maximum concentrations observed in soils along the sewer line. If the sludge (or the PRS soil) was land applied at a rate of 4.5 dry tons per acre per year for an entire year, the maximum annual dose rate to someone who then moves onto the land application site would be less than 0.5 mrem/year. If applied for five years the maximum annual dose rate would be about 2.4 mrem/year. At the average concentrations the 1-year application dose rate would be about 0.16 mrem/year and the 5-year application dose would be about 0.8 mrem/year. Therefore, it can be concluded that a line break that went undiscovered for a very long time would not result in "unacceptable levels" in the land application site soils.

Calculation 3

The land application screening concentrations for Pu-238 and Th-232 are approximatley 20 times lower thant he worker values. Therefore, approximatley 20 time the amount of soil calculated above could enter the system before the worker doses would approach 1 mrem.

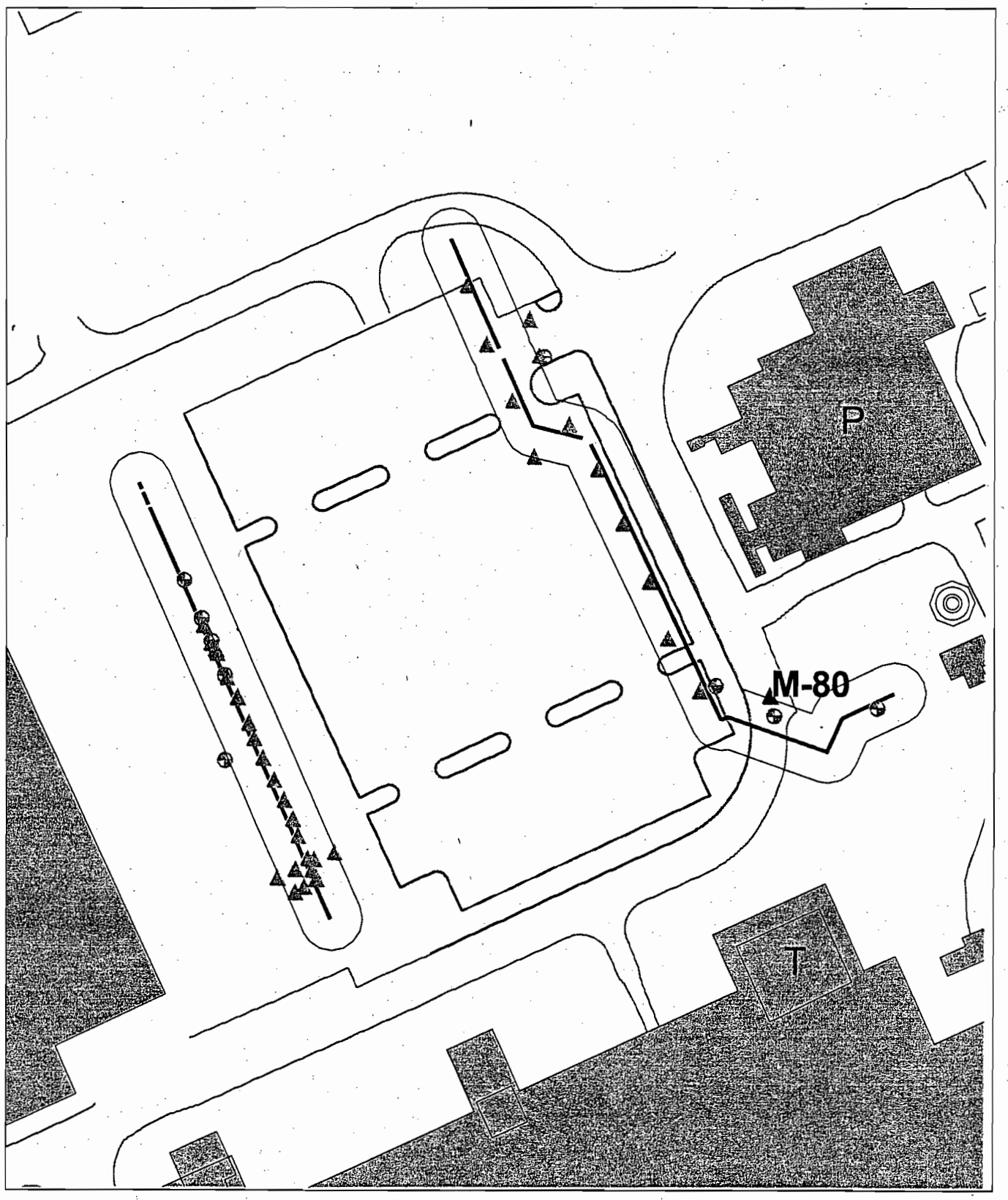
Using the ISCORS, peak dose source ratios for a belt-press worker in the POTW (assumed to be the maximally exposed POTW worker at the Miamisburg POTW), I calculated the dose to a worker if the biosolids concentrations were at the highest soil concentrations (170 pCi/g for Pu-238 and 5.3 pCi/g for Th-232). The resulting doses were small fractions of a mrem.

Please let me know if you have any questions or need further information.

Lisa Stetar
Certified Health Physicist

CC: "David Wier" <WIERDD@doe-md.gov>

Historic Sample Locations within 15 Feet of Select Sanitary Lines



30 0 30 60 90 120 150 Feet

N
W E
S

MOUND
Environmental Restoration Geographic Information System

Sample > Cleanup Criteria
Other Sample
Sanitary Line

09/22/04

[redacted]

These are the only records in the sample locations shown on map san091504.apr that exceed cleanup objective criteria

Actual result

Use for Calculations

Project Id	Sample Id	Station	CAS Number	CAS Description	Result	Adjust	Adjusted Unit of Measure	Cleanup Objec-tive	Lab Qual	Data Qual	Detection Limit	Error	Date Collected	Lab Code	Result Type	Matrix	Analysis Description	Method Description	Field Sample Type	Start Sample Depth	Ending Sample Depth	Depth Units	X Coord	Y Coord	Field Serial	Lab Serial	Spatial Serial	Analysis Type	Media
MBLDGD DC	000126	M-80	13982-63-3	Radium-226	3.05	3.05	PCI/G	2.93			2.1		3/2/2000	SSF	SCR	SOIL	Radiological	Germanium Detector Screen, Radioisotopes	GR		4.0	FT	1465269.722	599034.926	78916	172106	16731	RAD	Soil

comparison

Survey Technique for Removable Contamination MD-80036 Op 10002 "Radiological Surveys"

The following steps are required to perform a removable contamination survey:

Step 1. IF the surface area is greater than 100 cm2, THEN swipe the collection medium over the surface, using moderate pressure, such that an area of approximately 100 cm2 is swiped.
Step 2. IF the surface area is less than 100 cm2, THEN swipe the collection medium over the entire surface.
Step 3. IF the potential exists for contamination of inaccessible surfaces, THEN collect samples from likely entrance points, such as pipe or ventilation openings, or arrange for disassembly of the item, as necessary to adequately assess the radiological status of the item.
Step 4. IF contamination at levels exceeding PP-1059F, Table 2-2 levels is suspected, THEN place the collection media in appropriate containers (e.g., coin envelopes) prior to transport and contact the Radiological Point of Contact (RPOC).
Step 5. IF swipes for alpha and/or beta-gamma (i.e., analyses other than tritium) contamination measurements are wet, THEN dry the collection media before counting.
Step 6. IF field analyses of the collection media are needed, THEN perform measurements as specified in the applicable instrument procedure in the lowest acceptable background area available.
Step 7. Record the data on the Radiological Survey Data Sheet (RSDS)

Survey Technique For Total Contamination MD-80036 Op 10002 "Radiological Surveys"

The following steps are required to perform a total (Fixed + Removable contamination) contamination survey:

Step 1. IF it is necessary to transport an item to obtain a lower background, THEN take appropriate steps to prevent the possible spread of contamination.
Step 2. IF the surface is wet, such that partial shielding of the emitted radiation is likely, THEN allow the surface to dry or make appropriate corrections to the detected count rate.
Step 3. Position the detector in accordance with the type of survey and instrument being used.
Step 4. Observe closely for increases in the audible signal and/or on the display.
Step 5. IF activity is detected, THEN quantify the activity as appropriate for the instrument being used.
Step 6. IF total contamination at levels exceeding PP-1059F, Table 2-2 levels is suspected, contact the Radiological Point of Contact (RPOC).
Step 7. Record the data on the Radiological Survey Data Sheet (RSDS)

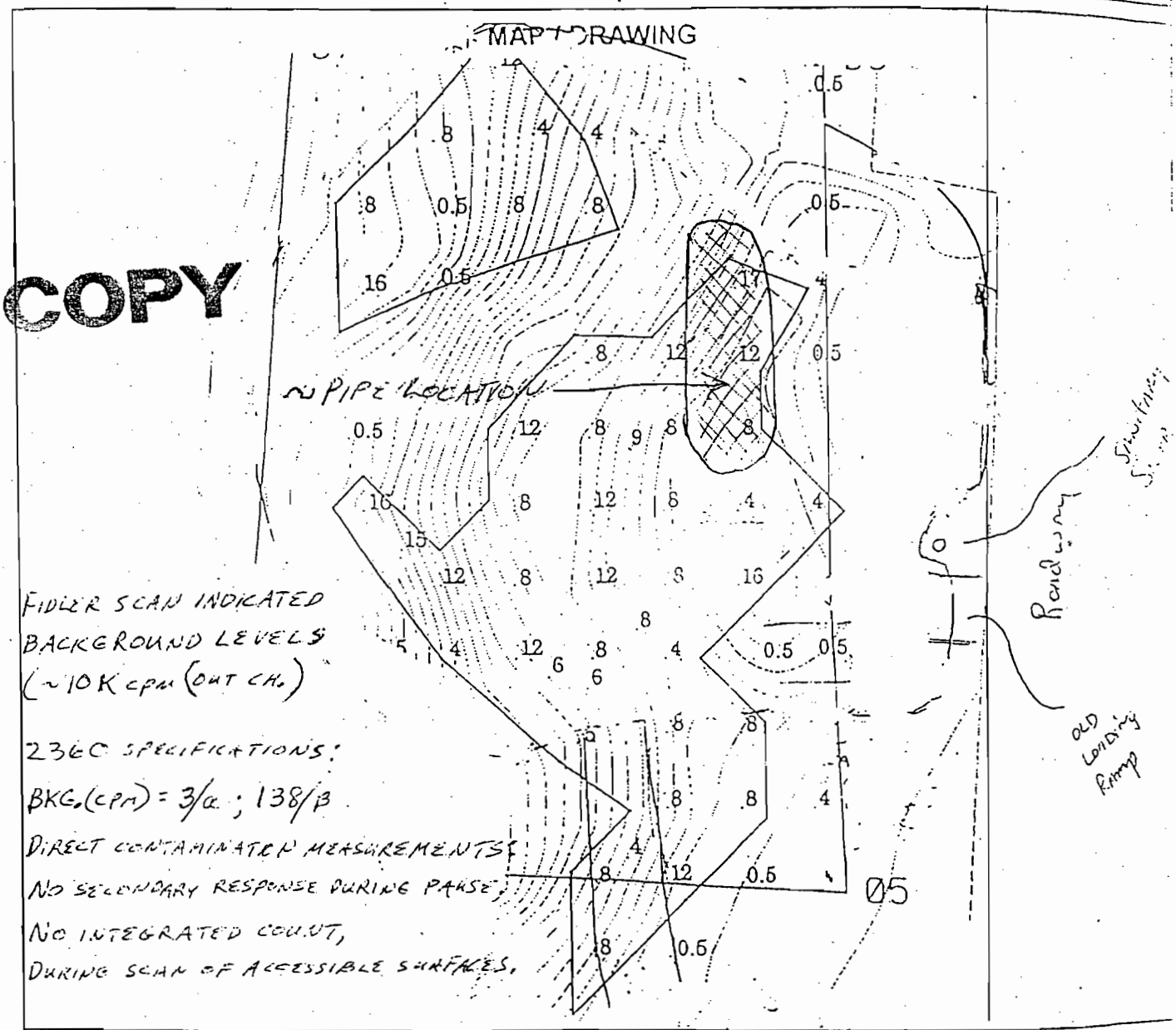
Table 2-2 - Summary of Contamination Values; in DPM/100 cm2

NUCLIDE	REMOVABLE dpm/100cm2	TOTAL(FIXED + REMOVABLE) dpm/100cm2
U-natural, U-2339, U-235, U-238 and associated decay products	1,000	5,000
Transuranics, Ra-226, Ra-228, Th-230, Th-228, Pa-231, Ac-227, I-125, I-129	20	500
Th-nat, Th-232, Sr-90, Ra-223, Ra-224, U-232, I-126, I-131, I-133	200	1000
Beta-gamma emitters (nuclides with decay modes other than alpha emission or spontaneous fission) except Sr-90 and others. Includes mixed fission products containing Sr-90.	1000	5000
Tritium organic compounds, surfaces contaminated by HT, HTO, tritiated particulates, and organically bound tritium6,7	10000	NA

RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG. / ROOM / AREA) PRS 273/272	SURVEY NO. 04-ER-528
PURPOSE: EVALUATE CLAY PIPE (SANITARY SEWER) FOR RELEASE	RWP NO. 1501
	DATE: 09 28 04
	TIME: 1530

MAP / DRAWING



FIDLER SCAN INDICATED BACKGROUND LEVELS (~10K cpm (OUT CH.)

2360 SPECIFICATIONS:

BKG. (CPM) = 3/α ; 138/β

DIRECT CONTAMINATED MEASUREMENTS

NO SECONDARY RESPONSE DURING PAUSE

NO INTEGRATED COUNT,

DURING SCAN OF ACCESSIBLE SURFACES.

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · — = radiological boundary
= mrem/hr neutron
= air sample number
= swipe number
α or β = direct contamination measurement in dpm/100 cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
2360	5779/5727	03 24 05
3030	5827	01 24 04
FIDLER	3855/3967	03 31 05
	N/A	

Completed by: (Sig[redacted]	[redacted]4992	Date: 09 28 04
Completed by: (Pri[redacted]		
Counted by: (Signa[redacted]	[redacted]4992	Date: 09 28 04
Counted by: (Print [redacted]		
Reviewed/Approved[redacted]	[redacted]9248	Date: 10/4/04
Reviewed/Approved[redacted]		

 RSDS# 04-ER-528

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm2)				
Sample#	β/γ	Alpha		Comments
1	< DL	0	BROKEN PIPE	0/5
2	< DL	0		0/5
3	< DL	0		1/5
4	< DL	0		1/5
5	< DL	0		0/5
6	< DL	0		0/5
7	< DL	0		0/5
8	< DL	0		1/5
9	< DL	0		1/5
10	< DL	0		0/5
11	< DL	0		0/5
12	< DL	0		1/5
13	< DL	0		0/5
14	< DL	0		1/5
15	< DL	0		0/5
16	< DL	0		0/5
17	< DL	0		0/5
18	< DL	0		1/5
19	< DL	0		0/5
20	< DL	0	BROKEN PIPE	1/5
21				
22				
23				
24				
25				
26				
27				
28				
29				
30				
31				
32				
33				
34				
35				

Removable Contamination				
Swipes (dpm/100cm2)				
Sample#	β/γ	Alpha		Comments
36				
37				
38				
39				
40				
41				
42				
43				
44				
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46				
47				
48				
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50				
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COPY

N/A

COMMENTS: 3030 # 5827	alpha	Bkg 0.0	Ct 0.5	DL 0.0	MDA 14.3
	Beta	Bkg 33.6	Ct 0.5	DL 48.7	MDA 114.1

NOTES:

1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO count Room analysis for β/γ ,alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached , write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If not needed, mark N/A.

ML-9620 (2/98)

Tabular Report of PLR MH32A X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 09/08/2004	***Setup*** 59
Facility	***Operator*** sb	***Van Reference***	***Weather*** Light rainfall

Road Name ***Place Name***
Location type
Surface Grass paddock / reserve
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 102.4 Ft	***From*** MH33 ***Depth*** Ft
Shape Circular	***Size*** 8 ***by*** ins	***To*** MH32A ***Depth*** Ft
Material Vitrified clay	***Joint Spacing*** Ft	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last Cleaned*** 09/08/2004

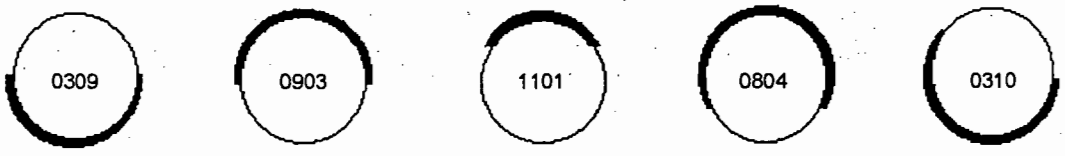
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code		Sev	Fr	To	Value	Remarks
0000	0.0		ST	Start of Survey					
	0.0		MH	Manhole/Node					MH33
	0.0		WL	Water level				0	
	102.4		MH	Manhole/Node					MH32A
	102.4		FH	Finish of Surveys					

102.4 Ft ***Total Length Surveyed***

Note

Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



Pipe Graphic Report of PLR MH32A X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 09/08/2004 ***Setup*** 59
Facility	***Operator*** sb	***Van Reference***	***Weather*** Light rainfall

Road Name	***Place Name***
Location type	
Surface Grass paddock / reserve	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 102.4 ***Ft***	***From*** MH33 ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***ins***	***To*** MH32A ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 09/08/2004

General note	Structural Service Constructional
Location note	Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
102.4	MH32A (Upstream. Depth = Ft) Tape end:	
0.0	Water level 0	
0.0	MH33 (Downstream. Depth = Ft) Tape start:0000	

Pipe Graphic Report of PLR MH32B X for CH2MHILL

Works Order Number		***Cassette*** 1	***Surveyed On*** 09/08/2004 ***Setup*** 60
Facility	***Operator***	***Van Reference***	***Weather*** Light rainfall

Road Name	***Place Name*** ch2mhill
Location type	
Surface Concrete road	
Survey purpose Random survey of pipes and things	

Pipe Use Sanitary	***Schedule length*** 58.4 ***Ft***	***From*** MH32 ***Depth*** ***Ft***
Shape Circular	***Size*** 8 ***by*** ***Ins***	***To*** MH32B ***Depth*** ***Ft***
Material Vitrified clay	***Joint spacing*** ***Ft***	***Direction*** Up
Lining	***Year laid***	***Pre-clean*** Y ***Last cleaned*** 09/08/2004
General note		Structural Service Constructional
Location note		Miscellaneous Hydraulic

Distance (Ft)	Description (Showing all categories)	Media
58.4	MH32B (Upstream. Depth = Ft) Tape end:	
58.4	Manhole/Node [MH32B]	
0.0	Water level 0	
0.0	MH32 (Downstream. Depth = Ft) Tape start:0000	

Tabular Report of PLR MH32B X for CH2MHILL

Work Order Number	***Vid Cass*** 1	***Surveyed On*** 09/08/2004	***Setup*** 60
Facility	***Operator***	***Van Reference***	***Weather*** Light rainfall

Road Name ***Place Name*** ch2mhill
Location type
Surface Concrete road
Survey purpose Random survey of pipes and things

Pipe Use Sanitary	***Scheduled length*** 58.4 Ft	***From*** MH32	***Depth*** Ft
Shape Circular	***Size*** 8 ***by*** ins	***To*** MH32B	***Depth*** Ft
Material Vitrified clay	***Joint Spacing*** Ft	***Direction*** Up	
Lining	***Year laid***	***Pre-clean*** Y	***Last Cleaned*** 09/08/2004

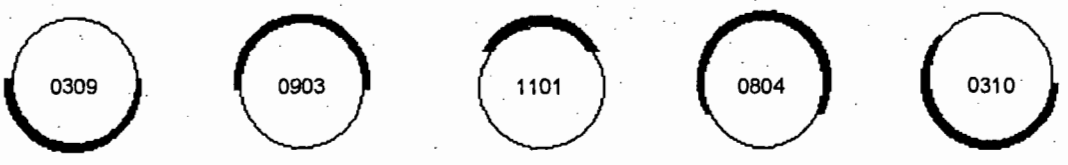
General note Structural Service Constructional
Location note Miscellaneous Hydraulic

Video	Count	CD	Code	Sev	Fr	To	Value	Remarks
			FH Finish of Surveys					
0000	0.0		ST Start of Survey					
	0.0		MH Manhole/Node					MH32
	0.0		WL Water level				0	
	58.4		MH Manhole/Node					MH32B
	58.4		FH Finish of Surveys					

58.4 Ft ***Total Length Surveyed***

Note

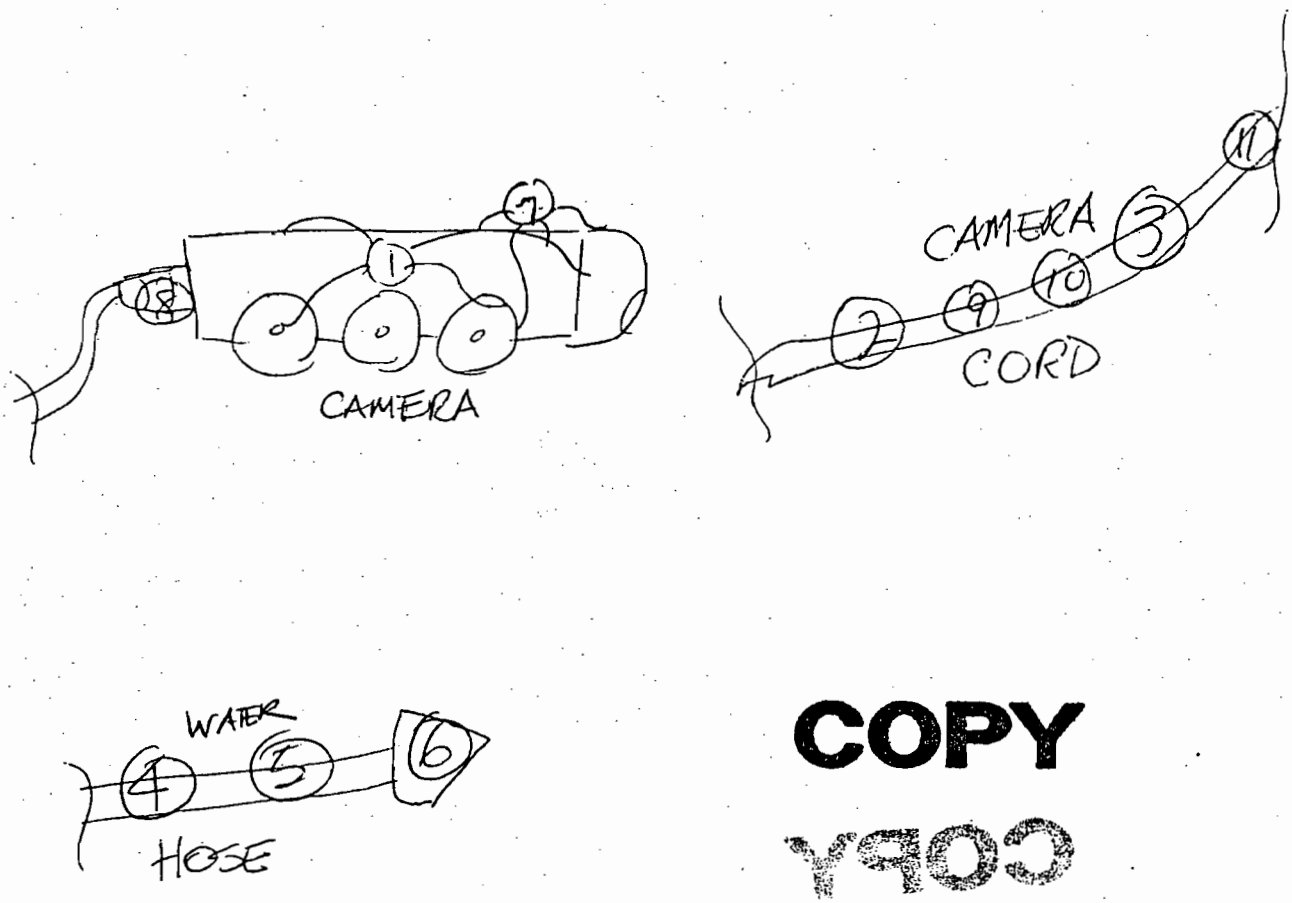
Clock references: Clock references are given clockwise ie from 10 o'clock to 2 o'clock = 1002. The upper part of a pipe is 0903 and the lower half is 0309. See Illustration below



RADIOLOGICAL SURVEY DATA SHEET

LOCATION: (BLDG. / ROOM / AREA) PRS-286 AREA	SURVEY NO. 04-ER-481
PURPOSE: JOB COVERAGE SANITARY LINE INSPECTION	RWP NO. N/A
	DATE: 9/8/04
	TIME: 1100

MAP / DRAWING



COPY

INTERGRATED COUNT TAKEN IF AUDIBLE DETECTED. NO AUDIBLE DETECTED. ALL DIRECTS: <100dpm/100cm² Alpha
<5000dpm/100cm² Beta

LEGEND:
= mrem/hr (γ) whole body
#E = mrem/hr (β+η+γ) extremity on contact
K = factor of 1000
— · — · · = radiological boundary
△# = mrem/hr neutron
(#) = swipe number
[redacted] direct contamination rement in dpm/100 cm²

INSTRUMENTS USED

Instrument	Serial Number	Cal. Due Date
3030	5823	5/25/05
3030	5746	5/25/05
2360	5704/5714	10/6/04
	N/A	

Complete[redacted]		HP# 5436	Date: 9/8/04
Complete[redacted]			
Counted[redacted]		HP# 5436	Date: 9/8/04
Counted[redacted]			
Reviewe[redacted]		HP#	Date:
Reviewed/Approved by: (Print Name)			

Survey No. 04-ER-481

RADIOLOGICAL SURVEY DATA SHEET (cont.)

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha	N/A	Comments
1	17	0		CAMERA
2	0	2		CAM-CORD
3	0	0		" "
4	14	0		HOSE
5	0	2		HOSE
6	2	2		HOSE-END
7	0	0		CAMERA
8	8	0		CAMERA
9	28	0		CAM-CORD
10	29	2		CAM CORD
11	8	0		CAM-CORD

Removable Contamination				
Swipes (dpm/100cm²)				
Sample #	β/γ	Alpha		Comments

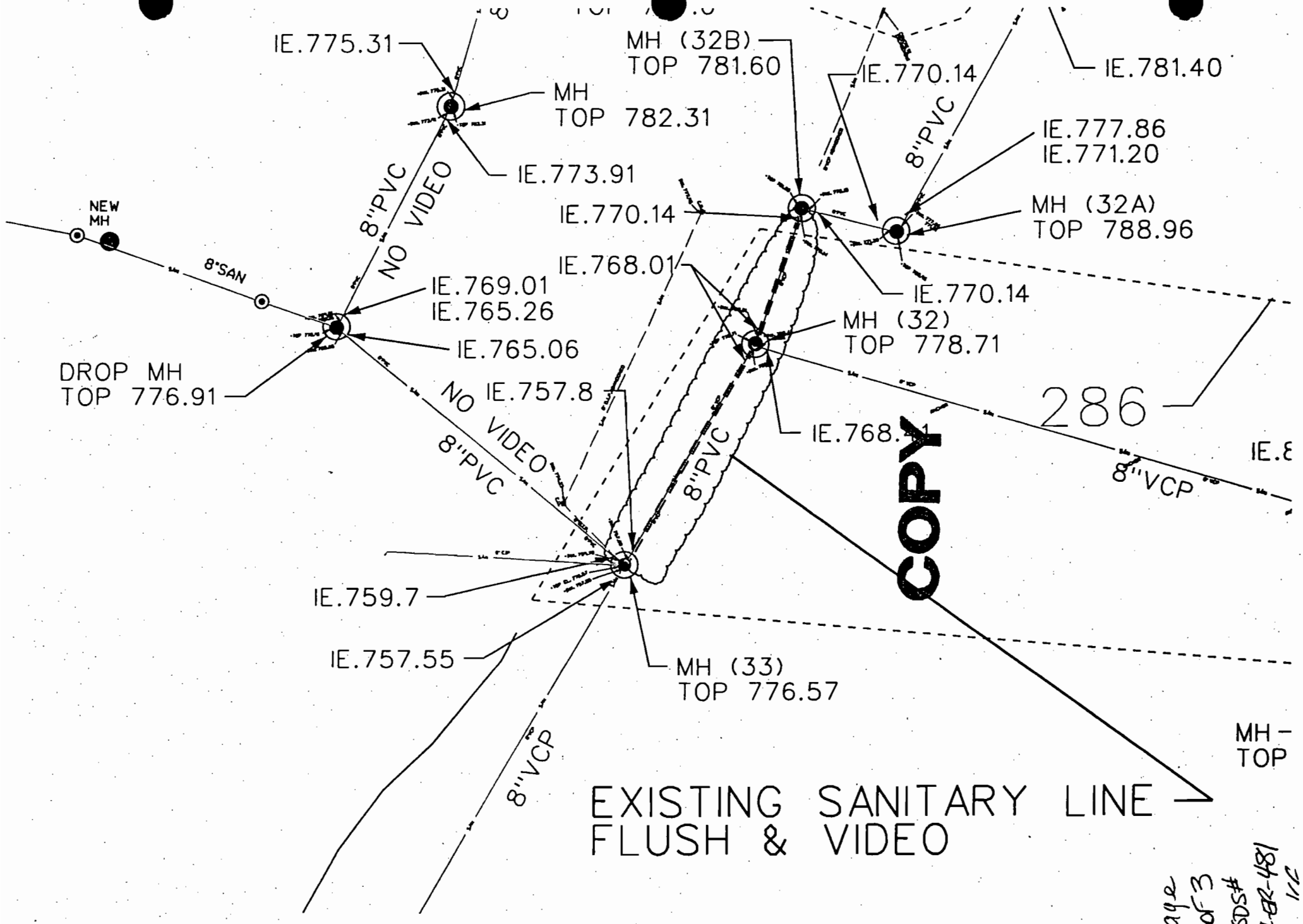
N/A

N/A

WEBCAS COPY

COMMENTS: SEE ATTACHED MAP FOR LOCATION WHERE CAMERA HAS TRAVELED.

NOTES:
1. See MD-80036 10002 for calculations of WB, extremity and skin dose rates.
2. To request RO Count Room analysis for β/γ, alpha or tritium, leave column blank. Mark column N/A if not needed. If count room printout of results are attached, write "see attached" in column.
3. Annotate special sample type (e.g., soil, water), special identifiers or otherwise in Comments. If needed, mark N/A.



page 3 of 3
RSDS#
04-ER-481
1/2

mm
LR

Ohio EPA

State of Ohio Environmental Protection Agency
Southwest District

401 East Fifth Street
Dayton, Ohio 45402-2911

TELE: (937) 285-6357
FAX: (937) 285-6249

MIAMISBURG
LOG 1-000088
CODE 5472.3

10-26-04 P01:00 IN

October 25, 2004

Ms. Margaret L. Marks
Director
Miamisburg Closure Project
1075 Mound Road
Miamisburg, OH 45342

RE: I/I STUDY OF WASTEWATER TREATMENT PLANT COLLECTION SYSTEM

Dear Ms. Marks:

I have received and reviewed the Infiltration/Inflow Study required by NPDES permit 1IO00005*ID which became effective on August 1, 2003. The requirements of the NPDES were that Miamisburg Closure Project was to submit a plan of study within 4 months of the effective date, and complete the I/I analysis within 1 year of the effective date. The I/I study was submitted to our office on July 30, 2004.

The conclusion of the study confirms infiltration does exist in the collection system, which is typical of any sewer collection system. The data collected and reviewed suggests this infiltration is not significant or excessive and additional study or system upgrades are not warranted.

The Mound sanitary collection system has been surveyed through out the time it has been in operation and subsequent upgrades based on these surveys. This is validated by the video survey completed as part of this I/I study. Only minor repairs have been identified to be completed as part of the I/I study. Diligence will be continued through the transition of the collection system to MMCIC and ultimately the City of Miamisburg to maintain the system integrity during the remaining system disconnections and modifications.

The available effluent data suggests rain events generate infiltration rates in range maximized at 20,000 gallons per day. This has proven to be well with in the capacity of the existing Mound WWTP. There have not been any effluent NPDES discharge violations related to exceeding plant flow capacity rates since modifications made in the early 1990's. The estimated 0.7% influent impact on the City of Miamisburg is well within this plants capacity also.

The Ohio EPA-DSW/SWDO approves this plan.

Sincerely,

John P. Spitler

John P. Spitler
Division of Surface Water
Mid Lower Great Miami River Basin Group

JPS/ca

MISC-001/05

From: Max Edington
To: Gunckle, Kathy
Date: 1/25/05 8:23AM
Subject: Public Reading Room - Sewer Leasing Data Pkg

Kathy,

The Leasing Data Package for the Mound Sanitary Sewer System was placed in the public reading room on or about 11/17/04 following a letter of recommendation for the lease by the Region V USEPA Adminstrator. On 1/21/05, the Core Team also signed a letter of recommendation for the lease. As we discussed, please add the following items today as provided by Judy Frizzell, to the copies of Leasing Data Package (believed to be 4 in number) in the public reading room.

- Replace the cover with new cover with January 2005 date
- Add the Core Team review signature page - on top of OEPA comments
- Add the OEPA comments and the responses - on top of inside cover
- Replace inside cover with new cover with January 2005 date

Please call me at 608-8287 with any questions. Thanks.

Max

CC: Frizzell, Judith; Long, Beverly; Lucas, Paul; Rakel, David

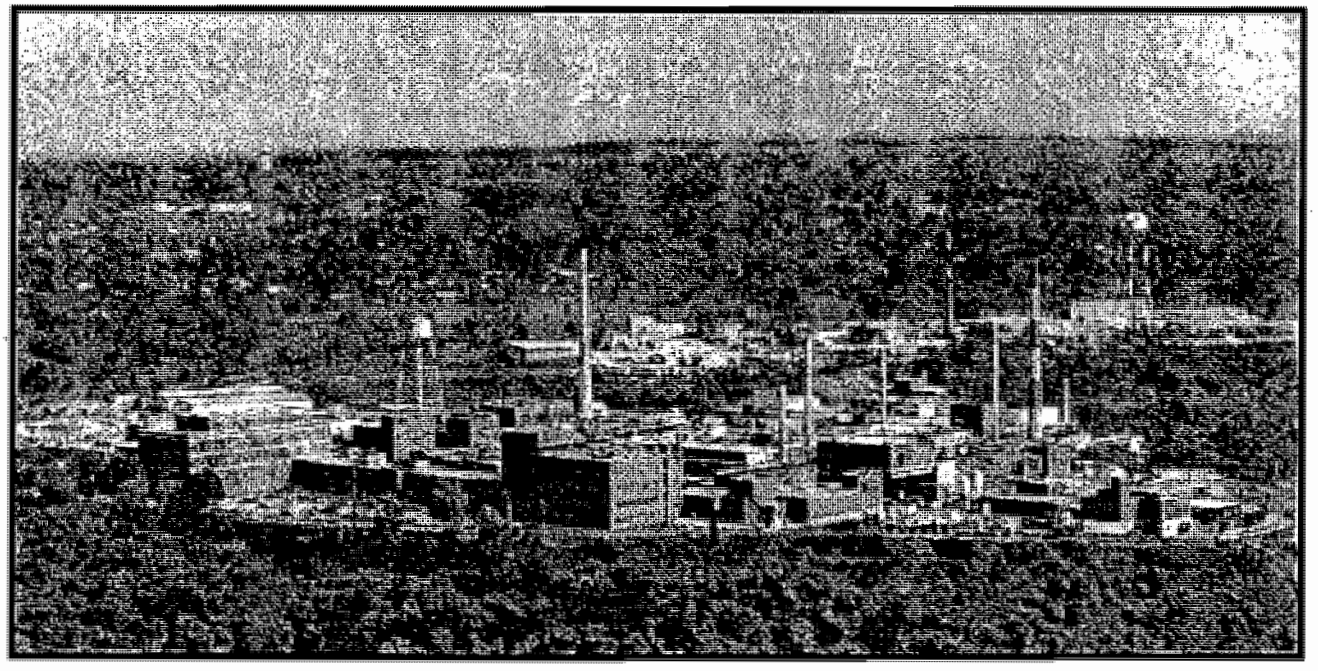
These are change pages.

Environmental
Restoration
Program

Miamisburg Closure Project
LEASING DATA PACKAGE
Resubmittal

Mound Sanitary Sewer System

Final Edited Submittal January 2005



The Mound Core Team
1075 Mound Road
Miamisburg, Ohio 45342

John Weithofer
City of Miamisburg
Miamisburg, Ohio

Dear Mr. Weithofer,

In response to a request from Beth Moore of your staff, and under CERCLA authority as implemented through the Mound 2000 approach, the Mound Core Team has conducted a review of the soils within 15 feet surrounding the Mound Plant sanitary sewer pipes to be tied into the City of Miamisburg's water reclamation facility. This review is based on the Leasing Data Package, which includes Ohio EPA comments and comment responses, dated January 2005. After thorough review and evaluation of Mound Plant operational history and soils data within 15 feet of the Mound Plant sanitary sewer pipes, the Core Team has identified six active potential release sites (PRS's) through which the subject sanitary sewer pipes traverse. Within these six active PRS's, 5 soil locations exceeding the current site screening standards were identified within 15 feet of the sanitary sewer lines. Since all soils and sanitary sewer pipeline work within the leased areas will be conducted by qualified Mound Plant personnel through the documented completion of remediation activities, any potential adverse health risk due to exposure to site soils and/or piping to current or future municipal workers is deemed to be adequately mitigated.

Also relevant to the City of Miamisburg's request, find enclosed, under the authority of the Hall Amendment, the U.S. EPA Administrator letter of concurrence for the lease of the Mound Sanitary Sewer Collection System to the City of Miamisburg dated November 18, 2004.

Evaluation of the effluent from the sanitary sewer lines was not included as part of this review. The effluent is being evaluated separately since it is not within the authority of the Mound Core Team.

Sincerely,

DOE/MEMP: Paul C. Lucas 1/21/05
Paul C. Lucas, Remedial Project Manager

USEPA: Timothy J. Fischer 1/21/05
Timothy J. Fischer, Remedial Project Manager

OEPA: Brian K. Nickel 1/21/05
Brian K. Nickel, Project Manager

Leasing Data Package

OEPA Inquiries and Clarifications

January 19, 2005

In accordance with the Hall Amendment, the Leasing Data Package for the Mound Sanitary Sewer System was approved by the USEPA Region V Administrator on November 22, 2004. The following are clarifications to OEPA's inquiries on the package. The Leasing Data Package will not be revised. These clarifications to the inquiries will be added as an appendix to the package. Also, the draft of the lease included as Appendix A in the Leasing Data Package has been revised since the Leasing Data Package was submitted in November 2004. The revised lease is included with these clarifications to OEPA's inquiries on the package and supercedes the un-revised draft of the lease included as Appendix A in the Leasing Data Package.

1. General. Ohio EPA believes it can move forward with the lease of the identified sanitary pipes as concurred with by USEPA under the Hall Amendment, but the sanitary sewer system needs to be surveyed/characterized and verified that any contamination is less than the Mound 2000 clean up criteria or other acceptable criteria. If this is not adequately addressed prior to the lease, it needs to be addressed prior to transferring any property that had radiological processing, research, laundry, production, rad waste treatment, storage, etc. or had sanitary lines down stream of any of these facilities. The need for this information was discussed during the April 2004 Core Team meeting.

This issue was discussed in April 2004 but not agreed upon by all members of the Core Team. A path forward will be determined prior to the transfer of the sanitary sewer system.

2. General. Although separate from the lease, numerous sanitary lines have been capped and abandoned in place without providing any verification that the lines are radiologically clean. These lines need to be evaluated and verified that they meet Mound 2000 clean up standards or other acceptable criteria as agreed. This is property transfer issue and not a lease issue. No change is being requested for the Leasing Package.

This issue was discussed but not agreed upon by all members of the Core Team. A path forward will be determined prior to the transfer of the sanitary sewer system.

3. Page 4, Section 1.4, bottom. Please provide more information and specific references regarding the "low levels of radiologic contamination into the sanitary sewer system." Are there specific sections of documents that can be referenced and included in the appendices?

The various methods of entry are described in the referenced section (Section 1.4) incidents of high levels of radiological contamination in this manner have rarely been reported. With the consideration that there was a separate system for

the transport of radiological waste and considering the dilution and flushing of the sanitary system from normal activities plus the fact that much of the sanitary sewer system that served the major radiological buildings has been abandoned, "low levels" is a reasonable description for this situation.

One occurrence of significant levels of contamination of polonium and potentially cobalt is noted in the Site Scoping Report, Vol. 7 p. 4-43. In this account, a waste line broke in the vicinity west of DS Building. The radiological waste was able to inflow into a manhole of the sanitary system. It is important understand that this section of sewer pipe was isolated from the sanitary sewer system in February 2004 and will not be part of the lease.

4. Page 6, Section 1.4, 1st paragraph. Please specify what the "source term" was within T Buildings that has been removed.

The original source term was from Tritium processing and earlier Polonium processing in T Building. The building is currently in the final stages of remediation of Tritium residue held up in the former processing system and residual from the original Polonium processing system (for more information on the source term, please look at the VSAP for T Building). Relative to the sanitary sewer system, there is no actual source term from the remediation activities in this building. The sumps and drains for the sanitary sewer system within T Building are isolated from the remediation activities in the building. For more information, please see response to OEPA inquiry #6.

5. Page 6, Section 1.4, 2nd paragraph. The text states that the sanitary reroute for Group 9 PRSs on the Main Hill allowed for the abandonment of sewer sections previously servicing radiological research, production, laboratories and waste treatment. As indicated above, these abandoned lines need to be surveyed and verified that radiological contaminants do not remain above clean up objectives. This is property transfer issue and not a lease issue. No change is being requested for the Leasing Package.

This issue was discussed but not agreed upon by all members of the Core Team. A path forward will be determined prior to the transfer of the sanitary sewer system.

6. Page 7, Section 1.6, 4th issue. The document needs to clearly explain what the potential sources are within T Building. As we have learned, one sump is currently contributing to tritium levels in the sanitary lines. We have also been informed that other sumps remain connected to the sanitary lines. Are these sumps or the material flowing into or out contaminated? What data is available? What is the purpose of the other sumps? Are there any other potential sources in the T Building than can make it into the sanitary sewer?

There are six sanitary sumps in T Building that collect sanitary sewage and function as individual lift stations, by pumping sewage up to the main sewer header in the building where it discharges to the sanitary sewer system. These sanitary sumps are isolated from the remediation activities in the building. As a

note: with the installation of the new sewer line to T Building, the sumps were flushed and jetted with high-pressure water in March 2004.

OEPA's inquiry references sump 21 as contributing Tritium to the sanitary sewer system. There is no indication that the other five sanitary sumps in T Building are contaminated with Tritium or other isotopes although verification sampling for T Building is currently in progress. Although sump 21 is recognized as transferring Tritium to the sanitary sewer system, it is important to understand that the Tritium transported does not originate in T Building. Instead, the Tritium originated from the demolition activities for SW Building. In order to suppress air emissions during the demolition of SW Building, the material from the demolition of the building was kept wet. Therefore, large volumes (approximately 500,000 gallons/day) of water were sprayed on the building materials during demolition. The resulting run off and shallow groundwater infiltrated the T Building ventilation shaft at the base of the west stack (see Exhibit 4 of the Leasing Data Package). The ventilation shaft drains into T Building sump 21 which discharges into the sanitary sewer system. The physical demolition of SW Building is nearly complete with the "old cave" and slab removal still to follow.

Prior to the completion of the demolition, Tritium levels declined significantly from the short period of elevated concentrations (see Exhibit 1). Slab removal and the removal of underground waste lines will follow the demolition. These activities will require considerably less water for completion. As such, significant concentrations of Tritium are not anticipated.

7. Page 9, Section 2.0. Regarding the soil exposure pathway, surface as well as subsurface needs to be listed. Change the text to state "2) exposure through surface and subsurface soils surrounding the sanitary . . . "

Both surface and subsurface soil data were evaluated as potential pathways of concern in the Information Package for the Sanitary Sewer System in Appendix C of the Leasing Data Package. Therefore, the text should state "<u>2) exposure through surface and subsurface soils surrounding the sanitary sewer pipes to be leased....</u>"

8. Page 9, Section 2.1, 1st paragraph. Is the "member of the public who later resides on the land application site" consistent with the resident farmer scenario? If so, please state resident farmer in the text. The member of the public who later resides on the land application site is consistent with the resident farmer scenario.

9. Page 10, Section 3.1, 1st paragraph. Again, is this resident farmer scenario?

Please see response to OEPA inquiry # 8.

10. Page 13, PRS 67 Bullet. Additional sampling has occurred and additional contamination has been found along PRS 67. Are there any additional sample results greater than the clean up objectives in the vicinity of the sanitary sewer line? I am not aware of any, but if there are, the package/map needs to be updated. Please verify.

Additional sampling has been performed as part of the PRS 67 fieldwork effort. In the areas where PRS 67 encounters the sanitary sewer lines, no levels of contamination were found that exceeded the previous surface sample where Pu-238 was identified at a concentration of 170 pCi/g. Active remediation is now complete in this area; however, verification sampling is still to take place.

11. Page 14. Middle. The description of the waste staging area needs to be expanded to include the volume of soil, capacity, types of contaminants and engineering designs to ensure contaminated soil and debris do not breach or are released from the staging area. This text needs to describe the current situation as well as the future plans.

The waste staging area has capacity for approximately 1.2 Million cubic feet of soil and debris waste. Contaminants include but are not limited to Pu, Th, and Tritium. VOC's are not permitted in the staging area. The staging area is bermed to prevent run on and run off. Water from dust suppression or precipitation is collected in a retention basin and sampled prior to release. The staging area currently contains approximately 900,000 cubic feet of soil and debris. Waste receipt and shipping will continue until Mound field closure activities are complete. At the completion of shipping operations, the staging area will be remediated and verified clean.

12. Page 14, PRS 272/273 update. Th-230 was also a contaminant found in this PRS and needs to be listed for accuracy.

Th-230 is also a contaminant of concern in PRS 272/273 and was deleted in error from the description in the text. The text should be edited to read the following: "Contaminants of concern for this former location of debris disposal are Th-230, Th-232, and Pu-238."

13. Page 19, Section 6. Need to discuss? What is the current status of the Protocol agreement between the city and CH2MHILL?

The parties of the lease (DOE and MMCIC) have agreed in principle to include a protocol for performing remediation work on PRSs near a sanitary sewer line. When not included in CH2M HILL's work plan, the protocol calls for MMCIC to provide for an above ground bypass of the section of sewer line affected when PRS remediation activities are within 15 feet of a leased sewer line. The protocol is Exhibit C to the attached lease.

14. Page 19, Section 6, 3rd bullet. Please reference a figure with sewer system to be leased.

A reference to Appendix H of the Leasing Data Package should have been included in the section. Appendix H is a display showing active PRSs near the sanitary sewer system.

15. Page 19, Section 6. 8th bullet. Delete "PRS" so that the plan applies to any remediation activities, not just PRS activities.

"PRS" has been deleted and replaced by the word "subsurface." This language adequately applies the intent of the protocol while not subjecting the requirement to insignificant "remediation" activities such as removal of power poles or fencing. The language has been changed in the maintenance protocol that is Exhibit C of the attached draft lease agreement.

16. Page 20, Number 5. Five feet appears to be too close and within potential sewer location error. Numerous utilities have been compromised buy remediation activities over the past years. Also considering the types of heavy equipment being utilized, Ohio EPA suggests 10 to 15 feet.

The parties of the lease (DOE and MMCIC) have agreed in principle to include a protocol whereby MMCIC will provide for an above ground bypass of the section of sewer line affected when PRS remediation activities are within 15 feet of a leased sewer line and a bypass is not included in CH2M HILL's work plan. The protocol is Exhibit C to the attached lease.

17. Page 20, Number 6. Include regulators in the notification. State "DOE/CH2M Hill will notify MMCIC and regulators (USEPA, Ohio EPA and ODH) when these . . . "

Field supervision will be diligent to ensure that the protocol is in place whenever remediation activities are in the proximity of the sanitary sewer lines. Communications will be made to keep regulators informed of field activities.

18. Page 20, Number 8. Please explain "normal site radiological control procedures will be followed to return the system to acceptable levels." It would be clearer if it stated that if the pipe could not be decontaminated to meet free release levels, the pipe would be removed and replaced. Also, specify or reference Mound 2000 levels for fixed and removable contamination on the sanitary pipes.

As stated on page 20, number 8, normal site radiological control procedures will be followed to return the system to acceptable levels. There is no existing driver to remove and replace functioning sanitary sewer pipe that has isolated locations that do not meet free release criteria. Hydro-lazing or other remedial activities may be employed to remove contamination from pipe. Section 7.3 of the Leasing Data Package discusses that sewer pipe with contamination that exceeds free release criteria if left in place does not pose significant risk to the sewage treatment plant worker or to workers in the land application site. Applying a risk-based approach has been the standard application applied to soils in around the sewer pipes. DOE will share data obtained in investigative activities and communicate with regulators regarding planned remedial activities. The free release criteria is identified in DOE Order 5400.5 and the Mound 2000 work plan.

19. Page 21, Section 7.1, d, Tritium. The text indicates "The area originally suspected as the location of infiltration has been plated and sealed" thus

suggesting the migration pathway for tritium has been eliminated. Verbal information indicates tritium remains high. Please include more recent sampling data and an explanation for the tritium levels.

The ventilation shaft opening in SW Building was plated and sealed as the expected pathway of Tritium into T Building. However, this did not solve the problem as Tritium concentrations above normal were identified even following the plating and sealing of the shaft opening.

With the completion of demolition of SW Building, Tritium levels have declined. However, Tritium fluctuations may be observed until the removal of the building's slab and excavation of the waste lines under the building are complete in spring 2005. The T-Building West stack is scheduled for demolition in late January/February 2005. Attached to the responses to these responses to OEPA's inquiries is Exhibit 1 that displays Tritium levels in the effluent of the Mound sewage disposal (SD) plant over the past 7 months.

20. Page 21, Section 7.1, d, Tritium. A sampling frequency, analytes and reporting needs to be agreed upon for effluent monitoring. Please provide a written proposal for our concurrence.

CH2M HILL is conducting monthly sampling of the site sanitary sewer discharge that will continue past the planned implementation of the lease. The ongoing plan will be coordinated with the appropriate regulatory agencies.

21. Page 21, Section 7.1, d, Tritium. What future releases are possible. Please describe the release mechanisms, contaminant, potential levels, and controls.

For the discussion of Tritium, please see clarifications to OEPA inquiries # 6, 19, and 20.

22. Page 23, 2nd bullet. Records provided by Mound indicated other contaminants were detected above clean up objectives at the "Building 22 area." For example, Pu 239/240 was detected at levels up to 44,680 pCi/g. Please provide a complete list of known contaminants detected above clean up objectives in this area.

The second bullet on page 23 displays contaminants that had multiple occurrences in soil excavated during the installation of sanitary sewer pipe. Pu239/240 had only one occurrence; therefore, although the single reading was quite elevated, it was not included in the list. Systematic characterization prior to the remediation of the Building 22 area is yet to take place. These activities are scheduled to take place after the lease is executed. All historic information will be presented in a more systematic approach to characterization in the work planning documents.

23. Appendix A, U.S. Department of Energy Amendment to General Purpose Lease, #3. This language needs to be written to be consistent with earlier text and indicated that the "Government" will maintain the utility system until the property is transferred via a quick claim deed.

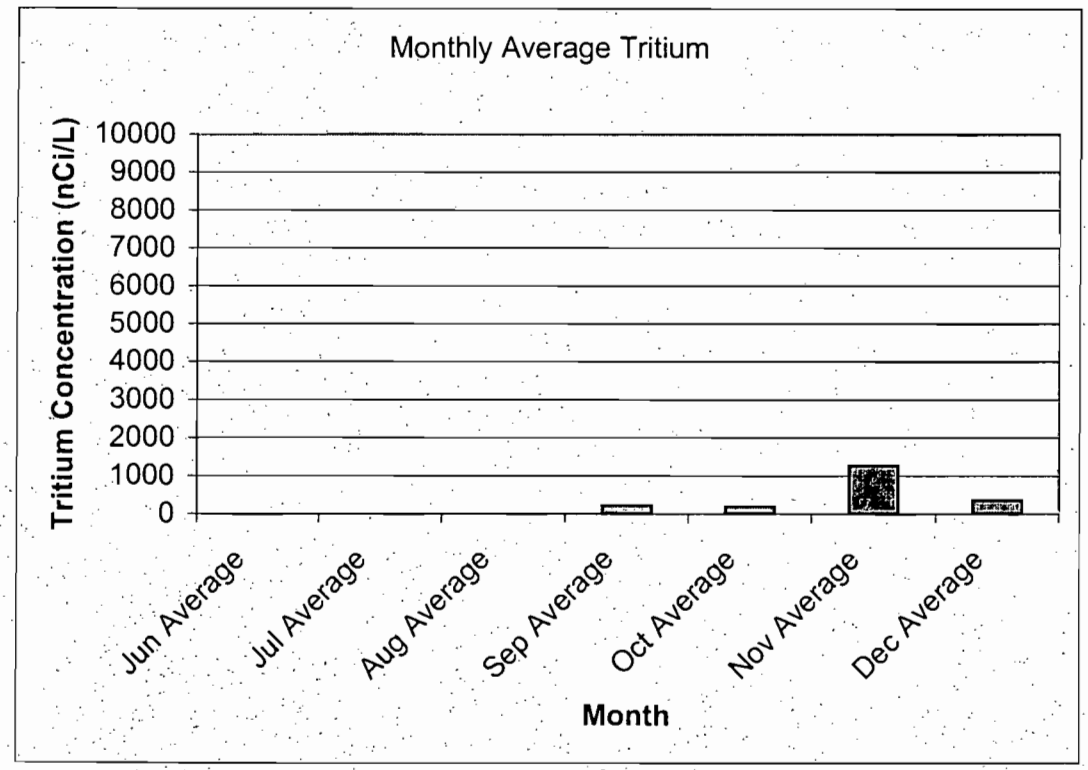
An earlier draft of the lease was inadvertently included in the Leasing Data Package. The attached draft of the lease has been edited in section #3, to read: "The Government will maintain the utility system within the leasehold granted hereby until the property transfers to the lessee."

24. Appendix A, U.S. Department of Energy Amendment to General Purpose Lease, Exhibit B. Exhibit B appears to be written for transfer rather than a lease. This needs to be written as a lease.

Exhibit B of the lease contains terms of the memorandum of agreement (MOA) between DOE, CH2M HILL, MMCIC, and the City of Miamisburg that set the framework for the lease. The lease has been agreed to, in principle, by DOE and MMCIC. The terms of the lease will be reviewed by legal representatives of the parties prior to the signing of the document. Additionally, the lease has been approved by the USEPA Region V Administrator.

25. Appendix A, U.S. Department of Energy Amendment to General Purpose Lease, Exhibit C. See comments above regarding Pages 19 and 20.

Please see responses to OEPA inquiries # 13, 15, 16, 17, and 18. The current draft of the lease is attached.



Plot of monthly average of Tritium values from daily sampling at Mound sewage disposal plant.

U. S. DEPARTMENT OF ENERGY
AMENDMENT TO GENERAL PURPOSE LEASE

WITNESETH:

The Lease, entered into on the 7th day of September, 1994, between the UNITED STATES OF AMERICA, acting by and through the Department of Energy, hereinafter referred to as the "GOVERNMENT," and the Miamisburg Mound Community Improvement Corporation, hereinafter referred to as the "Lessee," is amended this day as follows:

(a) The real property shown in Exhibit A, inclusive of the Mound sewer utility system contained therein, is hereby included within the Lease effective as of the date of this document.

(b) The Lessee hereby agrees to reliably provide a sewer collection system for the benefit of the Government and all Government contractors / subcontractors located at the Installation effective October 31, 2004 or at such other time as specifically agreed to by the parties in writing. Upon such date the parties' Interim Utility Agreement of March 3, 1999, is amended to eliminate the duty of the Government to supply sewage treatment and disposal service.

1. The parties agree that the Lessee may charge the Government for utility service provided hereunder at a rate no greater than the lowest rate under the published rate structure of the City of Miamisburg.

2. The Lessee agrees to reliably supply utility service to the Government with interruptions no longer than those experienced by any other user of such service unless excessive interruption of service to the Government is solely due to a unique situation impacting supply to the Government or causes by the Government or its contractors/subcontractors.

3. The Government will maintain the utility system within the leasehold granted hereby until the property transfers to the lessee.

4. The parties agree that the exchange of responsibility for operation of the Mound sewer system shall be conducted according to the steps and conditions outlined in Exhibit B and the Special Work procedures as outlined in Exhibit C. It is anticipated that transfer of the system will occur between Lessee and the Government.

(c) The Government hereby agrees to indemnify Lessee pursuant to and to the extent of the authority granted in 42 USC § 7274q (b)(2)(B) which is or is to be codified at 50 USC §2811.

IN WITNESS WHEREOF, the parties hereto have caused this Lease amendment to be executed on their behalf by their duly authorized representative effective as of the date last executed below.

MIAMISBURG MOUND COMMUNITY
IMPROVEMENT CORPORATION

By_____

Title_____

THE UNITED STATES OF AMERICA

By_____

Title_____

STATE OF)
) ss:
COUNTY OF)

The foregoing instrument was signed before me, a Notary Public, this ___ day of _____, 2004 by Michael J. Grauwelman as President of the Miamisburg Mound Community Improvement Corporation, an Ohio non-profit corporation, on behalf of the corporation.

_____
Notary Public

STATE OF)
)ss:
COUNTY OF)

The foregoing instrument was signed before me, a Notary Public, this ___ day of _____, 2004 by H. Boyd Hathaway, Realty Officer, U.S. Department of Energy, of The United States of America, on behalf of the United States of America.

_____
Notary Public

Exhibit A

Legal Description

Highlighted linear sections of attached map of Mound Closure Project site on Parcel 'H' and Parcel '3' situated in the State of Ohio, county of Montgomery, in the City of Miamisburg, being a part of section 30 and fractional section 36, Town 2, Range 5, Miami Rivers Survey (M.R.S.), and being on city lot numbered 2259 lying within the corporate limits of Miamisburg, being on the tracts of land conveyed to the United States of America by instruments as recorded in Deed Book 1214 pages 12-14, Micro-Fiche 81-376A01 and Micro-Fiche 81-323A11 of the Deed Records of Montgomery County.

Exhibit B

The following are steps and conditions relevant to the lease that are included in the Memorandum of Agreement between DOE, MMCIC, City of Miamisburg, and CH2M HILL. Some of the dates of the steps and conditions have been overcome by events leading to the lease.

1. Completed Re-route: CH2M HILL/DOE has completed the installation of piping to bypass and re-route sewer lines around and outside of PRS (potential release site) 66 and PRSs on the Main Hill. Future reroutes and repairs by CH2M HILL/DOE will be in compliance with City utility specifications and MMCIC's Reuse Plan, so long as such compliance with the Reuse Plan does not increase cost or schedule.

2. Completed Off-Site Extension: MMCIC has extended a sanitary sewer line to the site's western boundary (1999/2000) to support the transition of the sanitary sewer service to the City.

3. Sewer Re-route: A second re-route of the sanitary sewer may be necessary to by-pass PRS 273 on Parcel 7. CH2M Hill will perform the reroute if necessary and MMCIC and the City shall review and inspect the location and installation of the work.

4. Line Isolation: As part of the ongoing demolition of buildings and structures at the Mound, CH2M HILL will isolate and cap the sewer system lines where services have been removed. Capped line locations will be identified on a system map provided to the City and MMCIC.

5. Sewer Cleaning: CH2M HILL has completed the cleaning and flushing of the sanitary sewer system that will be transferred. The City and MMCIC reviewed the cleaning plans with CH2M HILL prior to the beginning of the work.

6. Sewer Videotape: CH2M HILL has completed video/TV inspections and has provided the videotapes and written reports to the City and MMCIC.

7. Condition Documentation: CH2M HILL will provide available written documentation concerning the history of sanitary sewer breaks and repairs, type and size of pipe material, as-builts, electronic files and system maps to MMCIC by July 10, 2004. Electronic maps of the sewer system will be provided to MMCIC in a format that is compatible with MMCIC's current atlas model, assuming no increase in cost or schedule.

8. System Characterization: The parties agree that the Interagency Steering Committee on Radiation Standards (ISCORS) is an appropriate radiological guidance for characterization of the acceptability of the waste stream. CH2M Hill and the Ohio Department of Health will perform risk evaluations for two exposure scenarios" 1) the resident farmer of a City land application site and 2) a City wastewater treatment plant worker.

9. Pretreatment Screening: MMCIC and CH2M HILL will fill out the City's industrial waste survey forms and submit them to the City no later than July 15, 2004. Prior to August 15, 2004 the City will have the opportunity to inspect any MMCIC or CH2M HILL operations that require further review based on the industrial waste surveys.

10. Sewer Condition: From videotape data, CH2M HILL has identified three areas of the sewer system requiring repairs. The City and MMCIC will review the videotapes and identify any additional areas requiring repairs no later than July 10, 2004. The Parties will reach agreement on the repair locations and repair methods. If the sewer system is agreed to be acceptable for transfer, CH2M HILL/DOE will be responsible for making these repairs.

11. By-Pass Installation: If the sewer system is agreed to be acceptable for transfer, CH2M HILL/DOE will install a bypass of the Mound sewage disposal (SD) plant and extend the existing SD plant discharge line from the existing manhole to connect to the existing City Sewer. MMCIC will coordinate the execution of easements and right-of-way for offsite property with DOE and the City. The connection will not be activated without OEPA concurrence. The work is scheduled for completion by October 31, 2004.

12. System Transfer: If the sewer system is agreed to be acceptable for transfer, the City will apply for the Permit to Install (PTI) with OEPA and receive approval prior to system transfer. Transfer of the system will take place no later than October 31, 2004 unless extended by CH2M HILL with mutual consent of the Parties. MMCIC will pay the appropriate application fees to OEPA for the PTI. Other costs and application fees will be borne by the City and MMCIC (i.e., change in the City NPDES permit, lease/easement recording fees, etc.). Sewer service accounts will be established for each service location and any applicable fee or sewer usage charges will be paid per the City's utility ordinances.

13. Operating Procedures: Prior to system transfer, in conjunction with the City and MMCIC, CH2M HILL will develop operating procedures to access and perform work on site in areas under lease from DOE. CH2M HILL will also provide training and orientation for the Mound site to MMCIC staff and its contractors.

14. Excavation Soils: All soils from excavation work to repair sewer mains will remain on the Mound site and be placed at the direction of CH2M HILL or MMCIC. CH2M HILL and MMCIC will work together to determine the location of the soils.

15. Inspections: CH2M HILL will enable the City and MMCIC to perform a site inspection of all sanitary sewer facilities prior to transfer.

16. Agreement Period: If the system is not deemed to be acceptable for transfer by July 31, 2004, the parties will continue to work in a cooperative manner to identify and implement the best alternative to transition the system while at all times maintaining service to the site.

17. Core Team Review: The Core Team will review the sanitary sewer collection system and the soils data on a 15-foot radius of the pipes to ensure that the system is acceptable for transfer.

18. Non-radiological pollutants: The City will review all non-radiological sampling data for pollutants that may cause issues for the transfer of the system and treatment at the City's wastewater treatment plant.

19. Successors and Assigns: This Exhibit shall be binding on the parties, their employees, agents, successors, and assigns.

Exhibit C

Special Work Procedures for Sanitary Sewer Protection During PRS Remediations

This protocol allows for protection of the sanitary sewer during site remediation activities that occur after the Mound sanitary sewer lines are leased to MMCIC. Under this plan, DOE will operate and maintain the sanitary sewer collection system on all parcels of land owned by DOE. MMCIC will lease the entire collection system identified for transfer on DOE property. Any damage to the collection system will be repaired in accordance with City of Miamisburg standards. This plan applies to the following PRSs:

PRS 41 – Thorium drum storage and re-drumming area

PRS 67 – Plant storm drainage ditch

PRS 87 – Bldg 49 solvent storage shed

Sewer section near Bldg 22 location

The plan also applies to any other PRS remediation activities that infringe within a 15-foot radius of the sanitary sewer collection system.

Protocol

1. Include this protocol in the Core Team Sanitary Sewer Information Package.

2. Provide MMCIC a list of expected pollutants of concern for all applicable PRSs. Update the pollutants of concern list (and provide to MMCIC) as often as new pollutants of concern are discovered in the field.

3. This protocol will be followed while performing the work plans for applicable PRSs following the initiation of the lease.

4. Provide a copy of the Work Plan to MMCIC at the same time it is provided to the regulators.

5. *This protocol was approved by the USEPA on November 18, 2004.* If DOE/CH2M HILL plans an excavation within 5 feet of an active sanitary sewer line within a contaminated area, a variance plan is required. The variance plan must be approved by CH2M HILL management and will establish limits of the depth and safeguards for the excavation with mechanical equipment. Whenever the potential exists for compromising the integrity of the sewer pipe by undermining the surrounding fill, a temporary aboveground sanitary sewer bypass will be installed

   However, the MMCIC intends to implement the following additional control per their agreement with the City of Miamisburg. Construct and operate an above ground sanitary sewer bypass prior to remedial work encroaching within a 15-foot radius of the sanitary sewer pipe location. If the bypass is not required by the DOE/CH2M HILL work plan, MMCIC will provide for all costs for the parts, materials, and labor to construct and operate the bypass and assume any liabilities incurred by the bypass.

6. DOE / CH2M HILL will notify MMCIC when these procedures are activated so that MMCIC personnel can inspect and verify that these procedures are in place.

7. DOE / CH2M HILL will provide 24 hour prior notice to MMCIC for inspection purposes prior to removal and termination of any bypass installed.

8. If any damage to any component of the collection system (including piping, joints and manholes) occurs in the proximity of a contaminated area, then prior to reactivating that section of the sewer collection system, radiological surveys will be performed on the collection system that was exposed or potentially exposed. If any contamination above site free release criteria is found on the collection system, normal site radiological control procedures will be followed to return the system to acceptable levels. MMCIC will be consulted on a path forward for repair, replacement or decontamination of the affected portion of the collection system.

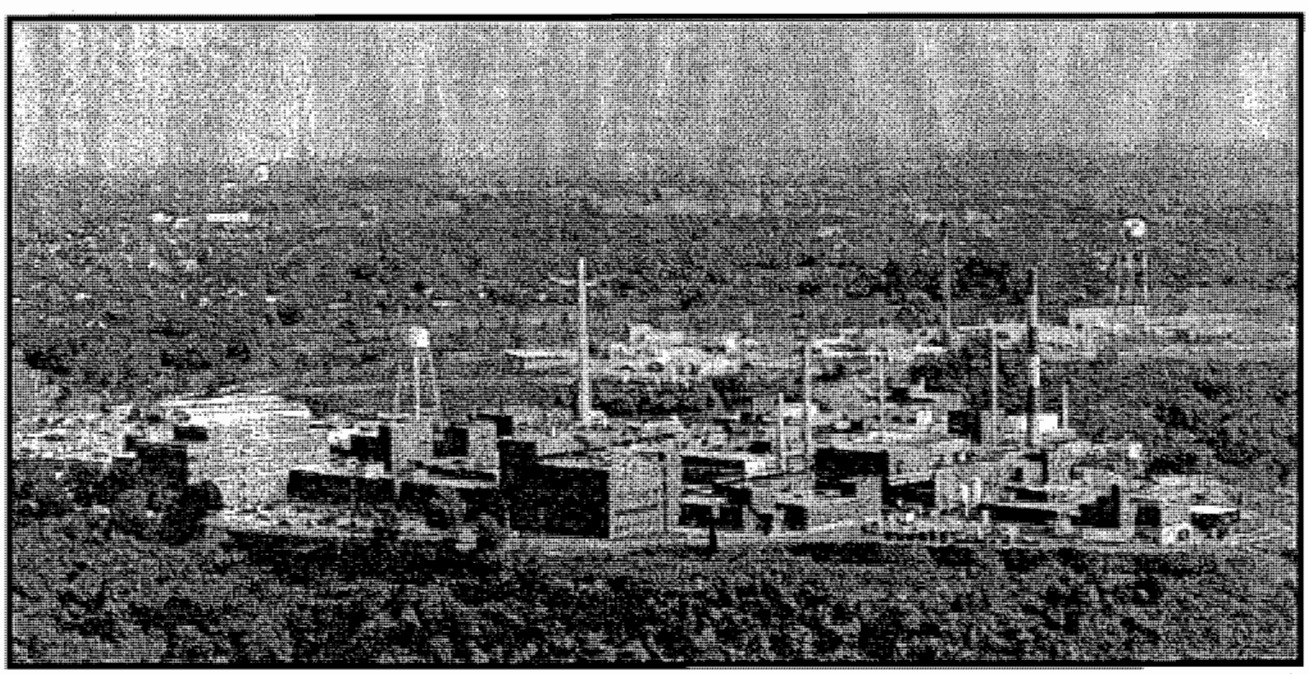
9. This Exhibit shall be binding on the parties, their employees, agents, successors, and assigns.

Environmental
Restoration
Program

Miamisburg Closure Project
LEASING DATA PACKAGE
Resubmittal

Mound Sanitary Sewer System

Final Edited Submittal January 2005



Legend

- Structures
- Paved roadway
- Unpaved roadway
- Railroad
- ~Year Approximate Installation Date
- Mound Plant boundary
- Sanitary Line (1993 to Present)
- Sanitary Line (Pre - 1993)
- Sanitary Line to be Abandoned or Existing Abandoned

0 100 200 400 600 800 1000
Scale in Feet

ISS	DATE	REVISION	BY	CHKR	ENG	LP&EC	APVD	M
	10/06/04	PLAN VIEW	MR					

MOUND
Environmental Restoration Geographic Information System

SHEET	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
ISSUE																					

SHEET	1	2	3	4	5	6
ISSUE						

PART CLASSIFICATION

Mound Plant
SANITARY SEWER PIPING INFORMATION PLAN

300504-06042400002 #1

DRAWING CLASSIFICATION: UNCLASSIFIED
SIZE
DRAWING NUMBER: san_info_plan.dgn
JOB NUMBER
DWG TYPE: STE
PRMG: ER-GIS
CAGEC
SCALE: GRAPH
SHEET 1
STATUS: MD-REL-07/22/04
ORIGIN: MSTATION / J

Legend

- Structures
- Structures to Remain
- Demolished Structures Contributing to Sewage
- Mound Plant boundary
- Sanitary Line (1993 to Present)
- Sanitary Line (Pre - 1993)
- Sanitary Line to be Abandoned or Existing Abandoned

ISS	DATE	REVISION	BY	CHKR	ENG	LP&EC	APVD	M
	07/26/04	PLAN VIEW	MR					

MOUND

Environmental Restoration Geographic Information System

SHEET	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
ISSUE																					

SHEET	1	2	3	4	5	6
ISSUE						

PART CLASSIFICATION

Mound Plant

SANITARY SEWER LEASE PLAN

300504-060424 0002 #2

DRAWING CLASSIFICATION: UNCLASSIFIED

SIZE

DRAWING NUMBER: san_lease_plan.dgn

JOB NUMBER

DWG TYPE: STE | PRMG: ER-GIS | CAGEC | SCALE: GRAPH | SHEET 1

STATUS: MD-REL-07/22/04 | ORIGIN: MSTATION / J

Historic Sample Locations within 15 feet of Sanitary Sewer Lines

* Note: Measured Values were checked against the following criteria:
(1) Cleanup Objective (10-5 RBGV (Risk-Based Guideline Value) + background)
(2) Hazard Index=1 + background
There are no results greater than the Guide Value
for the Hazard Index =1 + background

Legend

- Structures
- Paved roadway
- Unpaved roadway
- Railroad
- ~Year Approximate Installation Date
- Mound Plant boundary
- Sanitary Line (1993 to Present)
- Sanitary Line (Pre - 1993)
- Sanitary Line to be Abandoned or Existing Abandoned

0 100 200 400 600 800 1000
Scale in Feet

ISS	DATE	REVISION	BY	CHKR	ENG	LP&EC	APVD	M
	07/26/04	PLAN VIEW	MR					

MOUND
Environmental Restoration Geographic Information System

SHEET	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
ISSUE																					
SHEET	1	2	3	4	5	6															
ISSUE																					

PART CLASSIFICATION

Mound Plant
SANITARY SEWER PIPING INFORMATION PLAN

3DD504-0604240002 #4

DRAWING CLASSIFICATION: UNCLASSIFIED
SIZE
DRAWING NUMBER: san_info_plan.dgn
JOB NUMBER
DWG TYPE: STE
PRMG: ER-GIS
CAGEC
SCALE: GRAPH
SHEET 1
STATUS: MD-REL-07/22/04
ORIGIN: MSTATION / J

Contaminants of Concern above Cleanup Objectives within 15' of Sanitary Sewer Line

100 0 100 200 300 400 500 Feet

During sewer installation, multiple results of these contaminants were found and removed:

Pu238 up to 547
Th230 up to 144
Am241 up to 414

BD22 Area

PRS 286

Storm Sewer Reroute

Th232=2.1@15-16'

Th232=2.5@0-6'

Th232=3.6@1.5'

Th232=4.6@0-3'

Th232=13@12-16'

Th232=3.9@0'-1.5'

Th232=2.1@0'-1.5'

Pu238=75@0'

Pu238=1235@0'

Th232=3.6@0'-1.5'

Th232=2.8@0'-1.5'

Th232=48@0'

Pu238=241@0'-6"

Pu238=63, 614, 66, 1198, 540, 180, 118, & 256 @ 0-1.5'

Pu238=127@0'-6"

Pu238=84@0'-1.5'

Pu238=100@6"

Pu238=170@0'

Pu238=74@0-4'

Pu238=81@4-6'

Pu238 max=490 up to 4'

isolated removal of TCE to 8'

new sanitary line

waste staging area

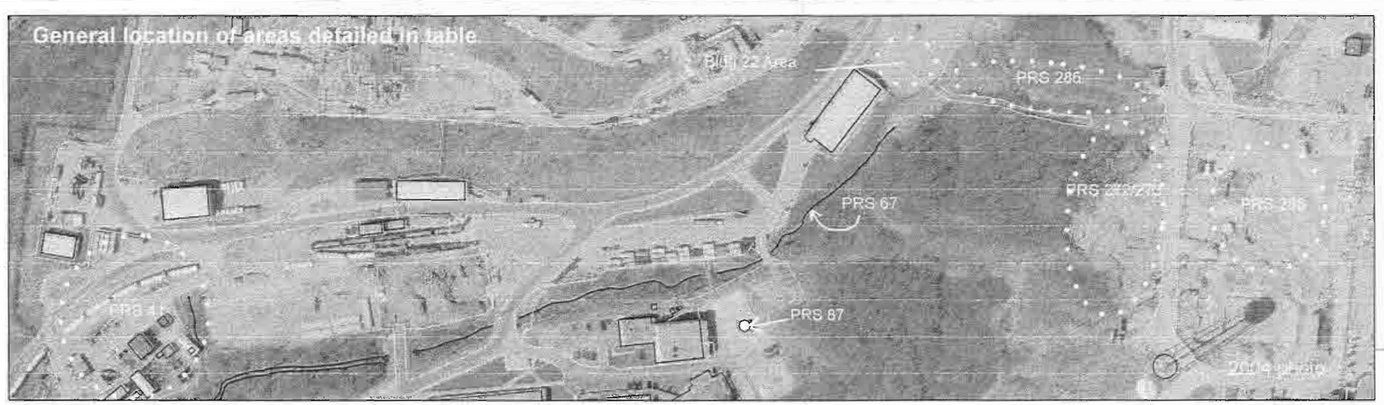
49 SLAB

NOTES: all units pCi/g

sample locations shown include a wide variety of analyses and methods. Some of these data have been excavated as part of site utility and/or maintenance projects but are shown here for completeness.

Isotope	cleanup objective	hot spot criteria
Pu-238	55	165
Th-232	2.1	3.5
Th-230	2.8	4.6
Am-241	63	189

- Sample has the potential to leach to groundwater at unacceptable levels
- Sample > cleanup criteria
- All other results where no action is required (grey)
- Existing sanitary lines
- New sanitary lines



Matrix of Environmental Concerns

Location	Source	Contaminants of Concern	& depth	Sewer Depth	Anticipated Completion (subject to change) Remediation[2]	Verification[1]
PRS 41	Th-232 drum staging & waste line break	Th-232 & Pu-238	0-16' max.	7'+	4/13/05	5/16/05
					Closeout 6/2005	
PRS 67	site drainage ditch, surface runoff	Pu-238	0-4'	3.5'	3/22/05	7/14/05
					Closeout 9/2005	
PRS 87	solvent storage shed	TCE	0-8'	4'	3/21/05	6/30/05
					Closeout 8/2005	
Building 22 area	being evaluated	Pu-238, Th-230, & Am-241	8-15'	12'+	3/31/05	6/30/05
					Closeout 8/2005	
Waste staging area	Waste staging activities	Upon completion of waste shipping this area will be evaluated to ensure contaminants do not remain at unacceptable levels.				
PRS 286[3]	septic tank/ leachfield	Pu-238	na	9'	complete	12/2004
					Closeout 2/2005	
PRS 272/273	hillside disposal of debris	Th-232, Pu-238	na	10	complete	11/9/04
					Closeout 1/2005	
PRS 288	SM process area	Th-232, Pu-238	na	6-8'	complete	11/9/04
					Closeout 1/2005	

TCE: trichloroethene
(1) Assumes validated dataset is complete and is the end date of the Verification Data Summary Activity from the Integrated Status Schedule
(2) Based on Integrated Status Schedule (ERST) run date 9/22/04
(3) Fieldwork date for PRS 286 assumes discovery of additional contamination during verification sampling. Initial sampling will be conducted in parallel with Group 5 verification sampling

N W E S

MOUND

300504-0604240002 #5

27oct04kma