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Date: July 31, 2001

Initial: CMGenesco

Facility Name: Vinkemulder Environmental, Inc.

Facility Identification Number: OHD 020 273 819

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Note: Transmittal Letter to Be Included with Reports.

Comments: 3 Boxes – 35 Folders Retrieved June 2002, 2 Boxes F/I Materials Retrieved June 2002 – 1 Box, 7 Folders – C.2(d) Retrieved August 2003 – Last Attached to Inventory July 7th

Vickery Environmental, Inc.
A Waste Management Company
3956 State Route 412
Vickery, Ohio 43464
419-547-7791
Fax: 419-547-6144

WASTE MANAGEMENT

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
7000 0600 0028 4272 6738

December 18, 2000

Mr. Thomas Matheson
U.S. Environmental Protection Agency Region V
DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60609

Re: Vickery Environmental, Inc.
OHD 020 273 819
RCRA Facility Investigation (RFI)

Dear Mr. Matheson:

In a November 27, 2000 telephone conversation with Ms. Sandy Clark of Vickery Environmental, Inc. (VEI), you stated that when the renewal of the facility's Ohio Part B Permit (Renewal Permit) is finalized, the Ohio EPA will take over the implementation of the RFI; therefore, the USEPA will no longer be approving anymore RFI submittals. Ohio EPA has stated that they cannot act on RFI submittals until the Renewal Permit is finalized. Therefore, VEI is ceasing further action on the RFI until this transition is complete. Following the issuance of the Renewal Permit, VEI will commence action under the direction of Ohio EPA.

If you have any questions, please contact Ms. Sandy Clark at (419)547-3335.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly

responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

VICKERY ENVIRONMENTAL, INC.

Stephen C. Lonneman
General Manager

SCL/slc

cc: Dave Schilt, OEPA Onsite Inspector

Vickery Environmental, Inc.
A Waste Management Company
3956 State Route 412
Vickery, Ohio 43464
419-547-7791
Fax: 419-547-6144

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
7000 0600 0028 4272 7209

November 7, 2000

Mr. Thomas Matheson
U.S. Environmental Protection Agency Region V
DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60609

Re: Vickery Environmental, Inc.
OHD 020 273 819
RCRA Facility Investigation (RFI)

Dear Mr. Matheson:

Vickery Environmental, Inc. is planning to perform the Phase IB field work, including sampling, during the week of November 27th. The work will commence on Monday, November 27, 2000 and should be completed by Wednesday, November 29, 2000. As required by US EPA's correspondence received October 30, 2000, VEI is providing the US EPA with a two week prior notification for field work and a one week prior notification of sampling. In addition, Ms. Sandy Clark of VEI informed you of the schedule via voice mail today. US EPA's correspondence also noted that the field work must be done during the times personnel of the US EPA or it's agent are present, unless US EPA determines otherwise. Please contact Ms. Clark at (419)547-3335 or via e-mail at sclark@wm.com as soon as possible in regards to US EPA's plan in this matter.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is to the best of my knowledge and belief, true,

accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

Sincerely,

VICKERY ENVIRONMENTAL, INC.

Stephen C. Lonneman
General Manager

SCL/slc

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

October 25, 2000

REPLY TO THE ATTENTION OF

DW-8J

CERTIFIED MAIL: P 140 678 671
RETURN RECEIPT REQUESTED

Mr. Stephen C. Lonneman
General Manager
Waste Management of Ohio, Inc.
3956 State Route 412
Vickery, Ohio 43464

RE: Approval of Phase 1B and Notice of Deficiency Comments on Responses to Comments Regarding "RCRA Facility Investigation (RFI) Phase I Report" Dated August 29, 2000
Waste Management of Ohio, Inc., Vickery, Ohio Vickery, Ohio
OHD 020 273 819

Dear Mr. Lonneman:

The U.S. Environmental Protection Agency (U.S. EPA) has conducted a technical review of the above-referenced report for the Waste Management of Ohio, Inc., facility in Vickery, Ohio. The response document is dated August 29, 2000, and was prepared by Cox-Colvin and Associates Inc. for Waste Management of Ohio, Inc. The U.S. EPA reviewed the responses to assess (1) their technical adequacy and completeness; (2) their compliance with the U.S. EPA notice of deficiency (NOD) dated July 12, 2000; and (3) the need for a Phase II RFI at the facility.

The U.S. EPA found that the responses pertaining to collection of background samples for Phase 1B of the RFI are adequate, complete, and comply with U.S. EPA's July 12, 2000 NOD. However, the responses pertaining to Resource Conservation and Recovery Act (RCRA) closure of Solid Waste Management Units (SWMU) 10 and 11 and to hydrogeologic issues are not adequate and complete, and do not comply with U.S. EPA's July 12, 2000 NOD. Therefore, further investigation of SWMUs 10 and 11 and site hydrogeology shall be performed during Phase II of the RFI.

The U.S. EPA approves WMO's plans for collection of background samples for Phase 1B of the RFI. Please note that WMO shall conduct all field work associated with its RFI only during the times personnel of the U.S. EPA, or its agent are present, unless U.S. EPA determines otherwise. WMO must notify the U.S. EPA Project Manager at least two weeks prior to beginning field

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work associated with the Phase 1B RFI. The U.S. EPA Project Manager must also be notified at least one week prior to any sampling activities that are connected with the RFI. The U.S. EPA may require any or all soil, groundwater, surface water, or sediment samples collected by WMO be split with the U.S. EPA at the time of collection.

As a result of the two rounds of U.S. EPA deficiency comments and WMO's responses to those deficiency comments, the U.S. EPA has elected to go forward with the corrective action activities at the Vickery site. WMO shall implement its Phase 1B activities according to the approved Agency requirements. Following the completion of its Phase 1B RFI, WMO shall develop its Phase 2 RFI work plan according to the Agency's requirements identified the enclosed comments. Therefore, U.S. EPA does not require, nor expect WMO to revise its "Responses to U.S. EPA Comments," but rather continue with the corrective action activities according to the requirements identified in this NOD.

If you have any questions regarding what information is required, please contact me at (312) 886-7569.

Sincerely,

Thom Matheson

Thomas Matheson, Corrective Action Project Manager
Waste Management Branch

Enclosure

cc: Ed Lim, OEPA/CO
Chuck Hull, OEPA/NWDO

TECHNICAL REVIEW OF RESPONSES TO COMMENTS REGARDING "RCRA FACILITY INVESTIGATION (RFI) PHASE I REPORT" WASTE MANAGEMENT OF OHIO, INC., VICKERY, OHIO

On August 29, 2000, Waste Management of Ohio, Inc. (WMO), submitted responses to U.S. Environmental Protection Agency (U.S. EPA) comments regarding the RFI Phase I report for the WMO facility in Vickery, Ohio. The responses were prepared by WMO's consultant, Cox-Colvin and Associates, Inc. (Cox-Colvin), to address U.S. EPA's July 12, 2000 comments on WMO's March 23, 2000, responses to U.S. EPA comments dated January 28, 2000. The August 29, 2000 responses were reviewed to assess (1) their technical adequacy and completeness; (2) their compliance with the U.S. EPA notice of deficiency (NOD) dated July 12, 2000; and (3) the need for a Phase II RFI at the facility.

The U.S. EPA found that the responses pertaining to collection of background samples for Phase 1B of the RFI are adequate, complete, and comply with U.S. EPA's July 12, 2000 NOD. However, the responses pertaining to Resource Conservation and Recovery Act (RCRA) closure of Solid Waste Management Units (SWMU) 10 and 11 and to hydrogeologic issues are not adequate and complete, and do not comply with EPA's July 12, 2000 NOD. Therefore, further investigation of SWMUs 10 and 11 and site hydrogeology should be performed during Phase II of the RFI. The responses' deficiencies are presented below.

RCRA CLOSURE OF SWMUs 10 AND 11

The responses to U.S. EPA General Comments 1 and 2, which required further investigation of SWMUs 10 and 11, state the following:

- WMO conducted groundwater monitoring at wells surrounding ponds 11 and 12 from 1993 to 1996 and that the monitoring results were accepted by the Ohio Environmental Protection Agency (OEPA) as being indicative of clean closure. The responses further state that OEPA relieved WMO of postclosure care and monitoring requirements as well as financial assurance requirements.

- According to U.S. EPA's "Notification of Final Rules" in the March 19, 1987, *Federal Register*, acceptance of clean closure for a hazardous waste management unit "terminates the owner/operator RCRA subtitle C responsibilities for the unit" (U.S. EPA 1987).

- U.S. EPA's reference to a 1998 memorandum on risk-based clean closure is an attempt "to revive the clean closure process through less restrictive interpretations of the regulations" and to replace the "nondetect or background concentration" performance standard with risk-based performance standards.

U.S. EPA's 1987 notification does not specifically state that clean closure terminates all RCRA Subtitle C responsibilities. Termination of responsibility for a unit is discussed only in the context of postclosure requirements and not in the context of all Subtitle C requirements as indicated in WMO's responses. Therefore, although the facility was relieved from postclosure

care and financial assurance requirements, it was not relieved from further investigation under RCRA corrective action requirements if such investigation is deemed necessary by U.S. EPA.

In addition, the U.S. EPA notification cited above states that "section 3004(u) of RCRA requires corrective action for releases not only of hazardous wastes but also hazardous constituents" (U.S. EPA, 1987). Furthermore, as stated in the May 1, 1996, *Federal Register*, "corrective action authority was not intended to be limited to hazardous waste and extends to hazardous constituents regardless of whether they also fall within the term hazardous waste or whether they were derived from hazardous waste. Under this interpretation, constituents that were contained in nonhazardous solid waste may also be addressed through corrective action" (U.S. EPA 1996).

U.S. EPA does not disagree with the nondetect and background concentration performance standard used in the closure of the ponds. However, the limited set of analytical parameters used in the closure does not fully address the clean closure standard that requires the control of hazardous constituents since only a portion of the constituents likely to be present were evaluated. As such the set of parameters used is also not consistent with RFI data needs. Specifically, analysis of samples for a more complete set of Appendix IX hazardous constituents is needed.

As indicated above, the clean closure data for soil and groundwater is not representative of all hazardous constituents associated with the ponds (according to the description of current conditions [DOCC] report prepared by Rust Environment and Infrastructure [Rust] in 1995, these constituents include polychlorinated biphenyls [PCB], metals, volatile organic compounds [VOC], polynuclear aromatic hydrocarbons [PAH], and unidentified constituents). Specifically, no soil data has been submitted for Appendix IX VOCs or semivolatile organic compounds (SVOC), and no valid groundwater data has been provided for Appendix IX hazardous constituents in wells within the lacustrine unit (except well L20, which was sampled during the Phase I RFI).

If the groundwater monitoring results for 1993 to 1996 meet RFI data needs, U.S. EPA may concur with WMO's contention that no further investigation is required at ponds 11 and 12. However, because this data has not been submitted to U.S. EPA for evaluation for consistency with RFI data needs, no such determination can be made at this time. At a minimum, this data would have to (1) be validated, (2) be representative of all lacustrine wells surrounding the ponds and all hazardous constituents historically associated with the ponds, and (3) have detection limits low enough to allow it to be compared to human health and ecological screening levels or background levels. This groundwater data should be submitted to U.S. EPA so that it can be evaluated relative to RFI data needs.

Unless valid historical soil and groundwater data for all constituents previously managed in the ponds can be submitted, Phase II of the RFI should include the following activities:

- Collection of soil samples in ponds 11 and 12 for analysis for Appendix IX VOCs and SVOCs. The responses indicate that WMO disagrees with U.S. EPA's recommendation to use soil analytical results from the 1992 closure sampling to direct further investigation. Therefore, WMO should use a grid pattern for soil sampling similar to that used in the closure of the ponds.

- Collection of groundwater samples from all lacustrine unit wells surrounding ponds 11 and 12 for analysis for all Appendix IX hazardous constituents. The responses indicate that wells surrounding the ponds may have been abandoned after the closure. If this is the case, temporary well points should be used for the sampling investigation.

GROUNDWATER MOVEMENT AND QUALITY

As part of its March 23, 2000, responses to U.S. EPA's January 28, 2000 comments on WMO's October 1999 Phase I RFI report, WMO submitted a technical position paper on groundwater movement and quality. The report was prepared by WMO's consultant, Cox-Colvin, and is intended to support WMO's conclusion that further investigation of groundwater in the unconsolidated material during the Phase II RFI is not necessary. General and specific review comments on this paper are presented below.

General Issues. The responses reassert WMO's position that the lacustrine and till units should be considered to be a single hydrogeologic unit. Much of the information presented in the responses, as well as historical information, indicates that this is not the case. In addition, the responses continue to assert that the predominant groundwater flow direction in the lacustrine and till units is vertical toward the bedrock. Based on the facility characterization data, this interpretation is inaccurate and shall not be used to support future decisions regarding groundwater monitoring at the facility.

Response to General Comment 2, Page 8. The response indicates that RFI Phase II data will address U.S. EPA's and WMO's differences in opinion regarding the conceptual hydraulic model. In the Phase 2 RFI work plan, WMO shall provide specific examples of data that will be collected during Phase 2 and explain exactly how it will address these differences.

Response to General Comment 2, Page 8. The response to bullet 1 states that "the results of the rising head tests conducted by Golder & Associates (Golder) in piezometers installed in the lacustrine deposit indicate that the hydraulic conductivity may be on the order of 1E-06 cm/sec [centimeter per second]." The response implies that multiple rising head tests were conducted by Golder Associates and documented in Golder's 1983 report. However, according to the 1983 report, only one rising head test was conducted in the lacustrine unit. One test is not adequate to

characterize the hydraulic characteristics of this water-bearing unit given the size of the facility. Therefore, as part of the Phase 2 RFI investigation, additional field tests shall be conducted to adequately characterize the horizontal hydraulic conductivity of the lacustrine unit.

Response to General Comment 2, Page 8. The last line on page 8 includes an estimated hydraulic conductivity value for the zone below the fractured zone of the lacustrine unit; however, the value's exponent appears to be missing. WMO should properly report this estimated value.

Response to General Comment 2, Page 9. The response states that the horizontal hydraulic gradient in the lacustrine unit is 0.0001 and that this value was calculated based on water level measurements taken in wells L15 and L23 in January 1986. To determine groundwater velocity, the hydraulic gradient must be calculated in the direction of the maximum rate of decrease (that is, directly downgradient). All the historical interpretations of groundwater flow at the facility indicate that a groundwater mound exists between wells L15 and L23; therefore, it is not acceptable to infer a groundwater flow direction between these wells and calculate a hydraulic gradient.

The RFI Phase I report states that the groundwater flow direction in the lacustrine unit is to the northwest. This direction of flow is consistent with information in previous reports prepared by Golder and Rust. The hydraulic gradient in the lacustrine unit to the northwest is reported to be 0.002 by Golder (1983). The DOCC report prepared by Rust (1995) also reports that hydraulic gradients in the lacustrine unit are in the range of 0.003 to 0.004 and are in the northwest direction. In addition, the hydraulic gradient calculated using water levels measured in wells L20 (606.64 feet above mean sea level [msl]) and L29 (600.47 feet above msl) is 0.006 and is in the northwest direction (Cox-Colvin 2000). These values are more than an order of magnitude greater than those reported by the facility in the responses. Therefore, an average hydraulic gradient of 0.0045 is more appropriate for use in calculating the horizontal velocity of groundwater flow in the lacustrine unit.

In addition, the response presents a horizontal hydraulic conductivity value of 1E-07 cm/sec. As previously stated, horizontal hydraulic conductivity value calculated based on field testing conducted by Golder is 1E-06 cm/sec (Golder 1983). Therefore, a hydraulic conductivity value of 1E-06 cm/sec is more appropriate for in calculating the horizontal velocity of groundwater flow in the lacustrine unit.

Based on an average hydraulic gradient of 0.0045, a horizontal hydraulic conductivity of 1E-06 cm/sec, and the porosity value of 0.1 estimated by Cox-Colvin (2000), the average horizontal velocity of groundwater flow in the lacustrine unit is 0.046 foot per year (ft/yr). This value is close to the vertical groundwater flow velocity of 0.04 ft/yr reported by Cox-Colvin. Therefore, WMO has not demonstrated that the predominant flow direction is vertical through the entire

overburden unit. In addition, based on field testing, the hydraulic conductivity in the lacustrine and bedrock units is at least two orders of magnitude greater than that in the till unit; therefore, groundwater flow is nearly horizontal in the lacustrine and bedrock units and is nearly vertical in the intervening till unit.

Response to General Comment 2, Page 9. The response to bullet 2 of U.S. EPA's comment is not adequate. WMO should have explained why the presence of consistently higher concentrations of contaminants in the till wells is consistent with vertical groundwater flow. As indicated in U.S. EPA's comment, a vertical flow component must exist for contamination to be present in the till unit; however, this vertical component is not the only (or the predominant) component of groundwater flow. In addition, the lower till unit consistently exhibits different water quality characteristics than the upper lacustrine unit, indicating that the water-bearing units have different hydraulic characteristics and should not be considered to be a single hydrogeologic unit.

Response to General Comment 2, Page 9. The response to bullet 3 of U.S. EPA's comment is not adequate. U.S. EPA disagrees with the response for reasons presented above and below.

Response to Specific Comment 1, Page 10. The response includes a table of groundwater recovery times. Groundwater levels in wells in the central portion of the facility recover faster than wells in the northeast and southwest portions of the facility. The northwest-southeast trend of faster-recovering wells coincides with the northwest groundwater flow direction identified in earlier site characterization reports. Phase II RFI activities shall include more rigorous characterization (such as slug testing) of the hydraulic conductivity of the lacustrine and till units in all areas of the facility, as well as additional water level monitoring.

Response to Specific Comment 2, Page 10: The response indicates that three wells were present in the northwest portion of cross-section F-F; however, no useful water level measurements are available. Additional field studies shall be conducted during Phase II of the RFI to fully characterize the hydrogeology in the area. These studies shall include installation of wells in both the lacustrine and till units.

Response to Specific Comment 3, Page 10. The response is inadequate as discussed above.

Response to Specific Comment 4, Page 11. The response refers to a 1990 Golder report, but U.S. EPA does not have this report. The basis for the porosity value of 0.1 for the lacustrine unit should have been provided along with the referenced report.

Response to Specific Comment 5, Page 11. The response to specific comment 5 refers to specific comment 3. This response is inadequate as discussed above.

Response to Specific Comment 6, Page 11. The response provides the results of tritium analysis of groundwater samples collected from a variety of wells. The average tritium units detected during analysis of groundwater samples collected from wells screened in the lacustrine and till units are 59 and 5.2, respectively. These results indicate that the groundwater in the lacustrine and till units is distinctly different and varies in age. These results further indicate that the lacustrine and till units should be considered to be two separate water-bearing units.

In addition, during a February 25, 2000 meeting with U.S. EPA, Cox-Colvin representatives stated that they believed that the major source of water in wells that recover slowly was surface water leaking down the annulus into the well screen of each well. Shapiro and others (1998) report that precipitation in the Ohio area has a tritium value of about 15 tritium units. Therefore, if surface water is the major source of the water collected for tritium analysis, a source of tritium is likely present near the facility.

Response to Specific Comment 7, Page 12. The response states that the wells within 20 feet of well L-19 are T-19 and MW-19R. These wells are screened in different hydrogeologic units and provide no useful information on the extent of contamination in the lacustrine unit. WMO shall further investigate the extent of contamination in the lacustrine unit in the area of well L-19 in its Phase 2 RFI activities.

Response to Specific Comment 10, Page 13. The response agrees with U.S. EPA's comment that there has been a general lack of subsurface characterization near the borrow pit. Much of the data presented in the response, as well as historical data indicates that the lacustrine and till units are two separate hydrogeologic units and that horizontal flow dominates the lacustrine unit. Therefore, additional subsurface characterization shall be performed in this portion of the facility as part of the Phase 2 RFI activities.

REFERENCES

Cox-Colvin and Associates Inc. (Cox-Colvin), 2000. "Phase I RFI Quality Assurance Project Plan Addendum for additional Background Soil Sampling, Waste Management of Ohio Inc., Vickery Ohio". March 23.

Golder & Associates. (Golder) 1983. "Summary and Characterization of Site Hydrogeologic Conditions, Chemical Waste Management, Inc., Vickery, Ohio Facility". September 29.

Rust Environment and Infrastructure. (Rust) 1995. "Report on Current Conditions, RCRA Facility Investigation, Chemical Waste Management, Vickery, Ohio". April.

Shapiro and Others. 1998. "Tritium - Helium 3 Dating under Complex Conditions in Hydraulically Stressed Areas of a Buried-Valley Aquifer." Water Resources Research. Volume 34, Number 5, Pages 1165-1180.

U.S. Environmental Protection Agency (EPA). 1987. "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities; Final Rule." 52 Federal register (FR) 8704. March 19.

EPA. 1996. "Corrective Action for Releases from Solid Waste Management Units at Hazardous Waste Management Facilities; Proposed Rule." 61 FR 19432. May 1.

EPA. 1998. Memorandum Regarding Risk-Based Clean Closure from Elizabeth Cotsworth To RCRA Senior Policy Advisors. March 16.

Tetra Tech EM Inc.

200 E. Randolph Drive, Suite 4700 ◆ Chicago, IL 60601 ◆ (312) 856-8700 ◆ FAX (312) 938-0118

October 18, 2000

Mr. Allen Wojtas
Work Assignment Manager
Enforcement and Compliance Assurance Branch (DE-9J)
U.S. Environmental Protection Agency Region 5
77 West Jackson Boulevard
Chicago, IL 60604

Subject: **Technical Review of Responses to Comments Regarding "RCRA Facility Investigation (RFI) Phase I Report" Waste Management of Ohio, Inc., Vickery, Ohio Contract No. 68-W9-9018, Work Assignment No. R05805**

Dear Mr. Wojtas:

Tetra Tech EM Inc. (Tetra Tech) has conducted a technical review of the above-referenced responses to U.S. Environmental Protection Agency (EPA) comments regarding the RFI Phase I report for the Waste Management of Ohio, Inc., facility in Vickery, Ohio. The response document is dated August 29, 2000, and was prepared by Cox-Colvin and Associates Inc. for Waste Management of Ohio, Inc. Tetra Tech reviewed the responses to assess (1) their technical adequacy and completeness; (2) their compliance with the EPA notice of deficiency (NOD) dated July 12, 2000 ;and (3) the need for a Phase II RFI at the facility.

Tetra Tech found that the responses pertaining to collection of background samples for Phase IB of the RFI are adequate, complete, and comply with EPA's July 12, 2000 NOD. However, the responses pertaining to Resource Conservation and Recovery Act (RCRA) closure of Solid Waste Management Units (SWMU) 10 and 11 and to hydrogeologic issues are not adequate and complete, and do not comply with EPA's July 12, 2000 NOD. Therefore, further investigation of SWMUs 10 and 11 and site hydrogeology should be performed during Phase II of the RFI. Tetra Tech's review of the responses pertaining to RCRA closure of SWMUs 10 and 11 relied heavily on Tetra Tech's interpretation of relevant information in the March 19, 1987 and May 1, 1996, issues of the *Federal Register*.

Tetra Tech's review comments on the responses are enclosed. Tetra Tech is also sending you an electronic copy of the review comments formatted in WordPerfect 6.1 by e-mail. The hard copy of the comments constitutes Tetra Tech's official deliverable. In addition, Tetra Tech is sending a copy of this letter and the enclosed review comments to Mr. Tom Matheson, the EPA technical advisor for the facility. If you or Mr. Matheson have any questions regarding Tetra Tech's comments, please call me at (312) 856-8786.

Sincerely,

Mary Wojciechowski
Project Manager

Enclosure

cc: Bernie Orenstein, EPA Regional Project Officer (letter only)
Tom Matheson, EPA Technical Advisor
Ed Schuessler, Tetra Tech Regional Manager (letter only)
Art Glazer, Tetra Tech Program Manager

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ENCLOSURE

TECHNICAL REVIEW OF RESPONSES TO COMMENTS REGARDING "RCRA FACILITY INVESTIGATION (RFI) PHASE I REPORT" WASTE MANAGEMENT OF OHIO, INC., VICKERY, OHIO

(Eight Pages)

TECHNICAL REVIEW OF RESPONSES TO COMMENTS REGARDING "RCRA FACILITY INVESTIGATION (RFI) PHASE I REPORT" WASTE MANAGEMENT OF OHIO, INC., VICKERY, OHIO

On August 29, 2000, Waste Management of Ohio, Inc. (WMO), submitted responses to U.S. Environmental Protection Agency (EPA) comments regarding the RFI Phase I report for the WMO facility in Vickery, Ohio. The responses were prepared by WMO's consultant, Cox-Colvin and Associates, Inc. (Cox-Colvin), to address EPA's July 12, 2000 comments on WMO's March 23, 2000, responses to EPA comments dated January 28, 2000. The August 29, 2000 responses were reviewed to assess (1) their technical adequacy and completeness; (2) their compliance with the EPA notice of deficiency (NOD) dated July 12, 2000; and (3) the need for a Phase II RFI at the facility.

Tetra Tech found that the responses pertaining to collection of background samples for Phase IB of the RFI are adequate, complete, and comply with EPA's July 12, 2000 NOD. However, the responses pertaining to Resource Conservation and Recovery Act (RCRA) closure of Solid Waste Management Units (SWMU) 10 and 11 and to hydrogeologic issues are not adequate and complete, and do not comply with EPA's July 12, 2000 NOD. Therefore, further investigation of SWMUs 10 and 11 and site hydrogeology should be performed during Phase II of the RFI. The responses' deficiencies are presented below.

RCRA CLOSURE OF SWMUs 10 AND 11

The responses to EPA General Comments 1 and 2, which required further investigation of SWMUs 10 and 11, state the following:

- WMO conducted groundwater monitoring at wells surrounding ponds 11 and 12 from 1993 to 1996 and that the monitoring results were accepted by the Ohio Environmental Protection Agency (OEPA) as being indicative of clean closure. The responses further state that OEPA relieved WMO of postclosure care and monitoring requirements as well as financial assurance requirements.
- According to EPA's "Notification of Final Rules" in the March 19, 1987, *Federal Register*, acceptance of clean closure for a hazardous waste management unit "terminates the owner/operator RCRA subtitle C responsibilities for the unit" (EPA 1987).
- EPA's reference to a 1998 memorandum on risk-based clean closure is an attempt "to revive the clean closure process through less restrictive interpretations of the regulations" and to replace the "nondetect or background concentration" performance standard with risk-based performance standards.

EPA's 1987 notification does not specifically state that clean closure terminates all RCRA Subtitle C responsibilities. Termination of responsibility for a unit is discussed only in the context of postclosure requirements and not in the context of all Subtitle C requirements as indicated in WMO's responses. Therefore, although the facility was relieved from postclosure care and financial assurance requirements, it was not relieved from further investigation under RCRA corrective action requirements if such investigation is deemed necessary by EPA.

In addition, the EPA notification cited above states that "section 3004(u) of RCRA requires corrective action for releases not only of hazardous wastes but also hazardous constituents" (EPA, 1987). Furthermore, as stated in the May 1, 1996, *Federal Register*, "corrective action authority was not intended to be limited to hazardous waste and extends to hazardous constituents regardless of whether they also fall within the term hazardous waste or whether they were derived from hazardous waste. Under this interpretation, constituents that were contained in nonhazardous solid waste may also be addressed through corrective action" (EPA 1996).

EPA does not disagree with the nondetect and background concentration performance standard used in the closure of the ponds. However, the limited set of analytical parameters used in the closure does not fully address the clean closure standard that requires the control of hazardous constituents since only a portion of the constituents likely to be present were evaluated. As such the set of parameters used is also not consistent with RFI data needs. Specifically, analysis of samples for a more complete set of Appendix IX hazardous constituents is needed.

As indicated above, the clean closure data for soil and groundwater is not representative of all hazardous constituents associated with the ponds (according to the description of current conditions [DOCC] report prepared by Rust Environment and Infrastructure [Rust] in 1995, these constituents include polychlorinated biphenyls [PCB], metals, volatile organic compounds [VOC], polynuclear aromatic hydrocarbons [PAH], and unidentified constituents). Specifically, no soil data has been submitted for Appendix IX VOCs or semivolatile organic compounds (SVOC), and no valid groundwater data has been provided for Appendix IX hazardous constituents in wells within the lacustrine unit (except well L20, which was sampled during the Phase I RFI).

If the groundwater monitoring results for 1993 to 1996 meet RFI data needs, EPA may concur with WMO's contention that no further investigation is required at ponds 11 and 12. However, because this data has not been submitted to EPA, no such determination can be made at this time. At a minimum, this data would have to (1) be validated, (2) be representative of all lacustrine wells surrounding the ponds and

all hazardous constituents historically associated with the ponds, and (3) have detection limits low enough to allow it to be compared to human health and ecological screening levels or background levels. This groundwater data should be submitted to EPA so that it can be evaluated relative to RFI data needs.

Unless valid historical soil and groundwater data for all constituents previously managed in the ponds can be submitted, Phase II of the RFI should include the following activities:

- Collection of soil samples in ponds 11 and 12 for analysis for Appendix IX VOCs and SVOCs. The responses indicate that WMO disagrees with EPA's recommendation to use soil analytical results from the 1992 closure sampling to direct further investigation. Therefore, WMO should use a grid pattern for soil sampling similar to that used in the closure of the ponds.

- Collection of groundwater samples from all lacustrine unit wells surrounding ponds 11 and 12 for analysis for all Appendix IX hazardous constituents. The responses indicate that wells surrounding the ponds may have been abandoned after the closure. If this is the case, temporary well points should be used for the sampling investigation.

GROUNDWATER MOVEMENT AND QUALITY

As part of its March 23, 2000, responses to EPA's January 28, 2000 comments on WMO's October 1999 Phase I RFI report, WMO submitted a technical position paper on groundwater movement and quality. The report was prepared by WMO's consultant, Cox-Colvin, and is intended to support WMO's conclusion that further investigation of groundwater in the unconsolidated material during the Phase II RFI is not necessary. General and specific review comments on this paper are presented below.

General Issues. The responses reassert WMO's position that the lacustrine and till units should be considered to be a single hydrogeologic unit. Much of the information presented in the responses, as well as historical information, indicates that this is not the case. In addition, the responses continue to assert that the predominant groundwater flow direction in the lacustrine and till units is vertical toward the bedrock. Based on the facility characterization data, this interpretation is inaccurate and should not be used to support future decisions regarding groundwater monitoring at the facility.

Response to General Comment 2, Page 8. The response indicates that RFI Phase II data will address EPA's and WMO's differences in opinion regarding the conceptual hydraulic model. WMO should

provide specific examples of data that will be collected during Phase II and explain exactly how it will address these differences.

Response to General Comment 2, Page 8. The response to bullet 1 states that "the results of the rising head tests conducted by Golder & Associates (Golder) in piezometers installed in the lacustrine deposit indicate that the hydraulic conductivity may be on the order of 1E-06 cm/sec [centimeter per second]." The response implies that multiple rising head tests were conducted by Golder Associates and documented in Golder's 1983 report. However, according to the 1983 report, only one rising head test was conducted in the lacustrine unit. One test is not adequate to characterize the hydraulic characteristics of this water-bearing unit given the size of the facility. Therefore, additional field tests should be conducted to adequately characterize the horizontal hydraulic conductivity of the lacustrine unit.

Response to General Comment 2, Page 8. The last line on page 8 includes an estimated hydraulic conductivity value for the zone below the fractured zone of the lacustrine unit; however, the value's ex ent appears to be missing. WMO should properly report this estimated value.

Response to General Comment 2, Page 9. The response states that the horizontal hydraulic gradient in the lacustrine unit is 0.0001 and that this value was calculated based on water level measurements taken in wells L15 and L23 in January 1986. To determine groundwater velocity, the hydraulic gradient must be calculated in the direction of the maximum rate of decrease (that is, directly downgradient). All the historical interpretations of groundwater flow at the facility indicate that a groundwater mound exists between wells L15 and L23; therefore, it is not acceptable to infer a groundwater flow direction between these wells and calculate a hydraulic gradient.

The RFI Phase I report states that the groundwater flow direction in the lacustrine unit is to the northwest. This direction of flow is consistent with information in previous reports prepared by Golder and Rust. The hydraulic gradient in the lacustrine unit to the northwest is reported to be 0.002 by Golder (1983). The DOCC report prepared by Rust (1995) also reports that hydraulic gradients in the lacustrine unit are in the range of 0.003 to 0.004 and are in the northwest direction. In addition, the hydraulic gradient calculated using water levels measured in wells L20 (606.64 feet above mean sea level [msl]) and L29 (600.47 feet above msl) is 0.006 and is in the northwest direction (Cox-Colvin 2000). These values are more than an order of magnitude greater than those reported by the facility in the responses. Therefore, an average

hydraulic gradient of 0.0045 is more appropriate for use in calculating the horizontal velocity of groundwater flow in the lacustrine unit.

In addition, the response presents a horizontal hydraulic conductivity value of 1E-07 cm/sec. As previously stated, horizontal hydraulic conductivity value calculated based on field testing conducted by Golder is 1E-06 cm/sec (Golder 1983). Therefore, a hydraulic conductivity value of 1E-06 cm/sec is more appropriate for in calculating the horizontal velocity of groundwater flow in the lacustrine unit.

Based on an average hydraulic gradient of 0.0045, a horizontal hydraulic conductivity of 1E-06 cm/sec, and the porosity value of 0.1 estimated by Cox-Colvin (2000), the average horizontal velocity of groundwater flow in the lacustrine unit is 0.046 foot per year (ft/yr). This value is close to the vertical groundwater flow velocity of 0.04 ft/yr reported by Cox-Colvin. Therefore, WMO has not demonstrated that the predominant flow direction is vertical through the entire overburden unit. In addition, based on field testing, the hydraulic conductivity in the lacustrine and bedrock units is at least two orders of magnitude greater than that in the till unit; therefore, groundwater flow is nearly horizontal in the lacustrine and bedrock units and is nearly vertical in the intervening till unit.

Response to General Comment 2, Page 9. The response to bullet 2 of EPA's comment is not adequate. WMO should explain why the presence of consistently higher concentrations of contaminants in the till wells is consistent with vertical groundwater flow. As indicated in EPA's comment, a vertical flow component must exist for contamination to be present in the till unit; however, this vertical component is not the only (or the predominant) component of groundwater flow. In addition, the lower till unit consistently exhibits different water quality characteristics than the upper lacustrine unit, indicating that the water-bearing units have different hydraulic characteristics and should not be considered to be a single hydrogeologic unit.

Response to General Comment 2, Page 9. The response to bullet 3 of EPA's comment is not adequate. EPA disagrees with the response for reasons presented above and below.

Response to Specific Comment 1, Page 10. The response includes a table of groundwater recovery times. Groundwater levels in wells in the central portion of the facility recover faster than wells in the northeast and southwest portions of the facility. The northwest-southeast trend of faster-recovering wells coincides with the northwest groundwater flow direction identified in earlier site characterization reports.

Phase II RFI activities should include more rigorous characterization (slug testing) of the hydraulic conductivity of the lacustrine and till units in all areas of the facility, as well as additional water level monitoring.

Response to Specific Comment 2, Page 10: The response indicates that three wells were present in the northwest portion of cross-section F-F; however, no useful water level measurements are available. Additional field studies should be conducted during Phase II of the RFI to fully characterize the hydrogeology in the area. These studies should include installation of wells in both the lacustrine and till units.

Response to Specific Comment 3, Page 10. The response is inadequate as discussed above.

Response to Specific Comment 4, Page 11. The response refers to a 1990 Golder report, but EPA does not have this report. The basis for the porosity value of 0.1 for the lacustrine unit should be provided along with the referenced report.

Response to Specific Comment 5, Page 11. The response to specific comment 5 refers to specific comment 3. This response is inadequate as discussed above.

Response to Specific Comment 6, Page 11. The response provides the results of tritium analysis of groundwater samples collected from a variety of wells. The average tritium units detected during analysis of groundwater samples collected from wells screened in the lacustrine and till units are 59 and 5.2, respectively. These results indicate that the groundwater in the lacustrine and till units is distinctly different and varies in age. These results further indicate that the lacustrine and till units should be considered to be two separate water-bearing units.

In addition, during a February 25, 2000 meeting with EPA, Cox-Colvin representatives stated that they believed that the major source of water in wells that recover slowly was surface water leaking down the annulus into the well screen of each well. Shapiro and others (1998) report that precipitation in the Ohio area has a tritium value of about 15 tritium units. Therefore, if surface water is the major source of the water collected for tritium analysis, a source of tritium is likely present near the facility.

Response to Specific Comment 7, Page 12. The response states that the wells within 20 feet of well L-19 are T-19 and MW-19R. These wells are screened in different hydrogeologic units and provide no useful information on the extent of contamination in the lacustrine unit. WMO should further investigate the extent of contamination in the lacustrine unit in the area of well L-19.

Response to Specific Comment 10, Page 13. The response agrees with EPA's comment that there has been a general lack of subsurface characterization near the borrow pit. Much of the data presented in the response, as well as historical data indicates that the lacustrine and till units are two separate hydrogeologic units and that horizontal flow dominates the lacustrine unit. Therefore, additional subsurface characterization should be performed in this portion of the facility.

REFERENCES

Cox-Colvin and Associates Inc. (Cox-Colvin), 2000. "Phase I RFI Quality Assurance Project Plan Addendum for additional Background Soil Sampling, Waste Management of Ohio Inc., Vickery Ohio". March 23.

Golder & Associates. (Golder) 1983. "Summary and Characterization of Site Hydrogeologic Conditions, Chemical Waste Management, Inc., Vickery, Ohio Facility". September 29.

Rust Environment and Infrastructure. (Rust) 1995. "Report on Current Conditions, RCRA Facility Investigation, Chemical Waste Management, Vickery, Ohio". April.

Shapiro and Others. 1998. "Tritium - Helium 3 Dating under Complex Conditions in Hydraulically Stressed Areas of a Buried-Valley Aquifer." Water Resources Research. Volume 34, Number 5, Pages 1165-1180.

U.S. Environmental Protection Agency (EPA). 1987. "Interim Status Standards for Owners and Operators of Hazardous Waste Treatment, Storage, and Disposal Facilities; Final Rule." 52 Federal register (FR) 8704. March 19.

EPA. 1996. "Corrective Action for Releases from Solid Waste Management Units at Hazardous Waste Management Facilities; Proposed Rule." 61 FR 19432. May 1.

EPA. 1998. Memorandum Regarding Risk-Based Clean Closure from Elizabeth Cotsworth To RCRA Senior Policy Advisors. March 16.

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August 29, 2000

Mr. Thomas Matheson
U.S. EPA, Region 5
77 Jackson Blvd.
Chicago, Illinois 60604-3590

RE: Vickery Environmental, Inc., RFI - Responses to U.S. EPA's July 12, 2000 Comments

Dear Mr Matheson:

On behalf of Vickery Environmental, Inc., Cox-Colvin & Associates, Inc. is pleased to submit for your approval two copies of the responses to your July 12, 2000 *Comments on Responses to U.S. EPA Comments on the "RCRA Facility Investigation (RFI) Phase I Report"*. Attached you will find a detailed response to each of your comments; an itemized list of all replacement pages, sections, tables, etc.; pages for insertion; and a diskette containing an electronic copy of the responses and electronically-available changed pages in portable document format (PDF). The size of the electronic file was such that it fit on a diskette and did not require the use of a compact disk (CD).

Vickery Environmental is prepared to begin Phase IB (background soil sampling) as soon as possible and would suggest that you focus your initial review on those responses concerning this issue. There were very few agency comments on Phase IB. Vickery Environmental agreed with the comments and incorporated the changes in attached documents. Moving forward with this aspect of the project now will allow us to conclude Phase I much sooner.

If you should have any questions or comments concerning the attached information please feel free to contact me or Ms. Sandra Clark.

Respectfully,
Cox-Colvin & Associates, Inc.

Craig A. Cox, CPG
Principal Scientist

Attachments

CC: Sandra Clark, Vickery Environmental w/ attachments
Edwin Lim, Ohio EPA w/ attachments
Chuck Hall, Ohio EPA w/ attachments
File

Itemized List of Replacement Pages
August 29, 2000 Response Package
Vickery Facility RFI

- **Attachment 1, RFI Conceptual Approach**

  - Changes to reflect the incorporation of the July 12, 2000 comments and to incorporate general considerations for constituent elimination.

- **Attachment 2, Phase IB and Phase II Implementation Schedule**

  - Schedule changed to reflect the current comment/response period.

- **Addendum to Phase I QAPP**

  - Cover pages and signature page changed to reflect revised date of submittal.
  - Page 4 changed to reflect revised statistical approach.
  - Page 5 changed to incorporate additional text on Page 4 and to remove reference used in the previous version of the text.
  - Figure 1 changed to reflect the relocation of three background soil sampling locations as requested by U.S. EPA.
  - Figure 3 changed to reflect time required for the review of this response package.
  - Appendix A changed to stipulate that the homogenization method would be limited to inorganic analyses only.
  - Appendix B replaced with more recent ASTM Standard Guide for Direct Push Sampling for Environmental Site Characterizations.

Vickery Environmental, Inc. Response to U.S. EPA Comments Dated July 12, 2000.

August 29, 2000

CLEAN CLOSURE OF SWMUS 10 AND 11

U.S. EPA GENERAL COMMENTS

1. *In the response to U.S. EPA's general comments 8 and 17, WMO argues that because SWMUs 10 and 11 have been clean closed, no further investigation is required under the RFI. However, WMO's 1992 closure report for these SWMUs reveals that the data collected during clean closure are not compatible with RFI data needs. Specifically, during closure, soil samples from the SWMUs were analyzed for (1) the F001 through F004 solvents listed in Title 40 of the Code of Federal Regulations (CFR), Part 261.31; (2) phenols; (3) polychlorinated biphenyls (PCB); and (4) metals. This list of closure target analytes appears sufficient for demonstrating that all hazardous wastes have been removed from the SWMUs. However, this list of analytes is not sufficient to demonstrate that a release of hazardous constituents as defined in 40 CFR Part 264, Appendix IX, has not occurred. WMO's 1995 description of current conditions (DCC) report indicates that these SWMUs, which began operating in 1971, accepted oily wastes, acids, pickle liquors, caustics, phenols, and unknown wastes. The DCC report also states that constituents of concern at these SWMUs include PCBs, metals, volatile organic compounds (VOC), polynuclear aromatic hydrocarbons (PAH), and unknowns constituents. The closure list of analytes also does not include degradation by-products of the F001 through F004 solvents, PAHs, or other semivolatile organic compounds (SVOC) that may have been contained in the waste.*

   As part of the interpretation of clean closure, U.S. EPA allows that "some limited quantity of hazardous constituents might remain in environmental media after clean closure provided they are at concentrations below levels that may pose a risk to human health and the environment" (EPA 1998). However, the closure data do not demonstrate that hazardous constituents are not present in the SWMUs at levels that could pose a risk to human health and the environment. A more comprehensive investigation is needed to make this determination. Therefore, as part of the Phase II RFI, additional soil samples should be collected in SWMUs 10 and 11 and analyzed for the full list of Appendix IX hazardous constituents. Also, soil sampling results from the 1992 closure report should be used to select sampling locations for Phase II of the RFI. Specifically, Phase II soil samples should be collected wherever closure target analytes were detected at concentrations exceeding laboratory reporting limits.

Vickery Environmental, Inc. Response:

Background

In July 1985, Chemical Waste Management (CWM) chose to close Ponds 11 and 12 by removing all hazardous waste and waste residues (and terminating responsibility for the unit) through "Clean Closure" as provided them in 40 CFR 265.228 and as a requirement of Consent Agreements between U.S. EPA and CWM, and Ohio EPA and CWM. A Closure Plan for Ponds 11 and 12 was developed and submitted to Ohio EPA for approval. The plan was approved, with modifications, on March 31, 1988. According to the Closure Plan approval letter from Ohio EPA:

- all contaminated soils would be removed and managed as hazardous waste if they contained RCRA-regulated organic compounds[1] above the compound's analytical detection limits or if they contained EP toxic metals at concentrations exceeding their regulatory limits (Modification 7);

- soils would be removed and managed as solid waste if they contained naturally occurring elements at concentrations exceeding background levels (Modification 9);

- the facility would be required to conduct at least three years of post-closure groundwater monitoring at wells surrounding the ponds (Modification 4); and

- closure could not proceed until the plan was also approved by U.S. EPA.

In 1991, closure of the ponds began. A post-excavation sampling program, developed to satisfy the requirements of 40 CFR 265.228, was implemented between August and October 1991. Soil samples were collected at a grid spacing of 200 feet and submitted for laboratory analysis. Analytical results were evaluated and additional excavation and post-excavation sampling conducted until non-detects for RCRA-regulated organics and background levels of metals were attained. Post-excavation sampling resulted in the collection and analysis of approximately 90 grab samples.

In December 1992, a Closure Certification for Ponds 11 and 12 was submitted to Ohio EPA. In September 1993, under the authority granted by U.S. EPA, Ohio EPA approved the "Clean Closure" of the ponds in accordance with the approved Closure Plans and in accordance with Rules 3745-66-12 through 3745-66-15 of the Ohio

[1]Based on waste characterization procedures set forth in the Consent Agreement between U.S. EPA and CWM.

Administrative Code (OAC)[2]. In addition, because of the "Full Clean Closure of Ponds 11 and 12", Ohio EPA concluded that the facility was no longer subject to post-closure care and the financial assurance requirements of OAC 3745-66-43[3].

As noted in the Closure Plans and in the Consent Agreements, three years of quarterly monitoring was required at wells surrounding the closed ponds. On April 30, 1996 Ohio EPA provided the facility with a letter stating that the analytical results for groundwater verify that the units are considered clean closed. The letter also recommends that the wells surrounding the ponds be abandoned.

Throughout the closure process (1984 to 1996), the owner/operator worked closely with personnel from Ohio EPA and U.S. EPA to ensure the successful completion of the project. Acceptance of the "Full Clean Closure" by Ohio EPA (as authorized by U.S. EPA) and waiving the need for post-closure care and financial assurances means that the closure is consistent with 40 CFR 265.228 (a)(1) which, according to U.S. EPA's March 19, 1987 notification of final rules, terminates the owner/operator's RCRA Subtitle C responsibilities for the unit.

Discussion

Achievement of performance standards of organics to non-detect, naturally occurring elements to background levels, and post-closure groundwater verification, conducted at Ponds 11 and 12 are the essential elements of "Clean Closure". This form of Clean Closure is very restrictive, but provides the owner/operator a mechanism for closing regulated units without incurring the lengthy and very costly post-closure care, monitoring, and permitting requirements associated with "waste in place" closures such as Landfill Closure. Clean Closure also provides the flexibility to utilize the clean closed area for any purpose, without restriction. According to a March 1998 U.S. EPA memorandum[4], the restrictive Clean Closures like that performed at Ponds 11 and 12 are done in such a way that "...further regulatory control under RCRA Subtitle C is not necessary to protect human health and the environment." Adopting a strategy of Clean Closure followed by additional required investigations during Corrective Action, as the commentator is promoting, will in effect, provide a significant disincentive for owner/operators to complete Clean Closure through

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[2]OAC 3745-66-12 through 3745-66-15 mimic the federal regulations (40 CFR 265.112 through 265.115).

[3]Ohio EPA, 1993. Notification from Ohio EPA to Chemical Waste Management of the approval of the closure of Ponds 11 and 12. Date September 3, 1993.

[4]March 16, 1998 Memorandum from Elizabeth Cotsworth (Acting Director, Office of Solid Waste) to RCRA Senior Policy Advisors regarding Risk-Based Clean Closure.

excavation or treatment to non-detect or background at other facilities and appears to be inconsistent with the 1998 guidance on this subject.

Response

U.S. EPA's current comment on the closure of Ponds 11 and 12 states that:

- degradation products or other compounds that may have been contained in the waste were not sampled for during closure,
- a more comprehensive investigation is needed to demonstrate that hazardous constituents are not present at levels that could pose a threat to human health and the environment, and
- soil sampling results from the 1992 post-excavation sampling should be used to direct the more comprehensive investigation.

Waste characterization was completed by CWM in accordance with the Consent Agreements and it is unlikely that degradation products would exist in soils that have been excavated to non-detect for their parent compounds. A very comprehensive study was conducted in accordance with a Closure Plan approved by U.S. EPA and Ohio EPA. The results of that study were approved by Ohio EPA under the authority of U.S. EPA. It is unclear how reviewing sample results of non-detect for organics or background levels for naturally occurring elements would direct a more comprehensive study.

Regarding the reference to the 1998 U.S. EPA Risk-Based Clean Closure memo, we believe that the reference is provided outside of the historical context of this discussion. The 1998 memo is an attempt by U.S. EPA to revive the Clean Closure process through less restrictive interpretations of the regulations and make available hybrid closures such as "Risk-Based Clean Closure" and the "Clean Closure under Industrial Standards". These lesser versions of Clean Closure have relaxed the "nondetect or background concentration" performance standard, allowing hazardous constituents to remain in place, while providing the owner/operator with relief from post-closure monitoring and care requirements.

However, at the time of the Clean Closure for Ponds 11 and 12 (early 1990s), the performance standard for Clean Closure required the removal of all wastes and contaminated environmental media to non-detect or background levels. Hybrid Clean Closures such as Risk-Based Clean Closure were not an option at that time and could not be pursued. Because of this, CWM was required to, and did, meet the more stringent performance standard of removal of waste and contaminated environmental media to non-detect or background levels.

Ponds 11 and 12 were fully Clean Closed in accordance with a U.S. EPA and Ohio EPA Approved Closure Plan. The Clean Closure, which removed all wastes and contaminated environmental media to non-detect and background levels is protective of human health and the environment. The closure was certified in 1992 by an independent professional engineer and accepted by Ohio EPA, under the authorization of U.S. EPA, in September 1993. Post-closure verification monitoring of groundwater was accepted as indicative of Clean Closure in 1996. The owner/operator was relieved of post-closure care and monitoring requirements as well as financial assurance requirements. Because of this, the units are not subject to further regulatory action under RCRA Subtitle C. For this reason, we do not feel that additional investigation of these units is appropriate.

2. *In order to meet the clean closure performance standard, U.S. EPA requires that "facility owners/operators must remove all wastes from the closing unit and remove or decontaminate all waste residues, contaminated containment systems, contaminated soils (including groundwater and other environmental media contaminated by releases from the closing unit), and structures and equipment contaminated with hazardous waste and hazardous waste leachate" (EPA 1998). The Phase I RFI report does include groundwater data collected from monitoring wells around SWMUs 10 and 11 in 1993. However, these data were not validated and are therefore of unknown quality. Although WMO argues that this data is of acceptable quality for use in the RFI no information is provided to support this claim such as laboratory data packages (including method detection limits and quality control [QC] sample results). Also, during the Phase I RFI, well number L-20, the only lacustrine well near these SWMUs that was sampled, contained chromium at 3,380 micrograms per liter (ug/L), which exceeds chromium's maximum contaminant level (MCL) by more than 30 times. This indicates that a release has occurred to groundwater, and further investigation is required. Therefore, all lacustrine, till, and bedrock groundwater monitoring wells surrounding SWMUs 10 and 11 should be sampled during the Phase II RFI and analyzed for the full list of Appendix IX hazardous constituents.*

Vickery Environmental, Inc. Response:

Please review the response to General Comment 1 concerning the Clean Closure of Ponds 11 and 12 for background information. In response to specific items presented in Comment 2, the Clean Closure performance standard was met and approved by Ohio EPA under authority of U.S. EPA in 1993. Because they have met the Clean Closure performance standard, they are no longer subject to regulatory action under Subtitle C and should not have been included in the list of SWMUs requiring further action at the facility. Therefore, the validity of their groundwater quality data should not be an issue during the RFI. These data were collected and analyzed in accordance with a U.S. EPA and Ohio EPA approved closure plan and Orders of Agreement. The results were reviewed and accepted as indicative of Clean Closure by Ohio EPA. As discussed previously, the larger issue is whether the additional

investigation is warranted at units which have been Clean Closed through excavation to non-detect or background. On this point, we do not agree with U.S. EPA's interpretation of the issue.

As for the reported chromium value for L-20, it seems very unlikely that the presence of chromium at such high levels would indicate that a release has occurred from a unit where wastes and affected soils have been excavated to concentrations equivalent to background. A review of all of the groundwater samples collected during the RFI indicates that chromium is either not detected, detected at very low levels, or detected at what appear to be anomalously high levels. The three highest detections are 11,300 ug/l, 3,380 ug/l, and 157 ug/l in monitor wells L-26, L-20, and L-25, respectively. These results are associated with unfiltered samples. Further review of the database indicates that the respective chromium values for filtered samples yield chromium values of 0.65 ug/l, <0.6 ug/l, and 1.8 ug/l, respectively. Samples from these three wells were collected over a period of time beginning on May 1 and ending on May 4, 1999. Review of Daily Field Reports for these days indicates that these wells were all low yield wells, each requiring two days to purge and sample. A review of the well's areal distribution indicates that the apparent high chromium wells are distributed around the site intermingled with wells yielding groundwater with little to no chromium in their samples. All of this information suggests that the apparently high chromium values are not representative of a release, but result from the preservation (acidification) of turbid groundwater from low yield wells that cannot be adequately developed.

No further sampling of L-20 or the other wells surrounding Ponds 11 and 12 will be conducted for the purposes of release determination.

WMO RFI CONCEPTUAL APPROACH

General Comment

1. *The protocol for eliminating analytical groups is not sufficiently described. The facility shall provide a detailed set of proposed decision rules for such a strategy.*

Vickery Environmental, Inc. Response:

In Attachment I of the March 23, 2000 Response to Comments Document, the conceptual approach for elimination of analytical groups is presented as the first full paragraph on page 2. It has always been the intention of Vickery Environmental to propose any lists of analytical groups for elimination to U.S. EPA for review and approval. This point, and others have been strengthened in the following text that will replace the paragraph in question. The proposed text will read:

"For SWMUs or AOCs at which a release has been concluded, the data will be evaluated to determine if constituent groups can be eliminated from future sampling [Box 7]. The determinations would be conducted on a media-specific, SWMU by SWMU basis. General considerations for constituent elimination will include:

- Detections - if all media-specific results for a given analytical group result in non-detects, the group would be considered for elimination.

- RBCs - if media-specific detected constituents within an analytical group are less than applicable RBCs, the group would be considered for elimination.

- Background - If naturally occurring constituents within media-specific sample sets are detected at concentrations consistent with background values, the analytical group, or a subset of the group would be considered for elimination.

The lists of constituents considered for elimination will be provided to U.S. EPA for review and approval prior to proceeding with additional RFI sampling activities."

TECHNICAL POSITION PAPER ON GROUNDWATER MOVEMENT AND QUALITY

GENERAL COMMENTS

2. *The position paper concludes that the lacustrine and till wells should be considered a single hydrogeologic unit. Available data do not support this conclusion for the reasons summarized below.*

   - *The only field test of hydraulic conductivity in the lacustrine well provided a hydraulic conductivity value of 1E-06. This is two orders of magnitude greater than the hydraulic conductivity values obtained during field tests of the till unit.*

   - *Whenever lacustrine and corresponding till wells were sampled during the same sampling period, contaminants detected in the lacustrine wells were either not detected or detected at much lower concentrations in the corresponding till wells.*

   - *The description of hydrogeology in the DCC report clearly demonstrates two flow systems: the lacustrine unit, which has a consistent flow rate of 3 to 4 feet per year (ft/yr) north and northeast, and the till unit, which has a flow rate of less than 0.01 ft/yr and a distinctly different flow pattern.*

   The position paper should be revised to more accurately discuss site hydrogeology as three interconnected units. Based on the data presented in the DCC report and the Phase I RFI report, it appears that groundwater flow is primarily horizontal in the lacustrine unit and

that it has a strong vertical component in the till unit. In addition, additional information should be collected during the Phase II RFI to characterize the movement of groundwater in the lacustrine and till units. This information should include field tests for hydraulic conductivity in areas around SWMUs that exhibit groundwater contamination and in the borrow pit area.

Vickery Environmental, Inc. Response:

The purpose of the position paper was to present Vickery Environmental's position on the occurrence and movement of groundwater beneath the site. It represents the facility's working hypothesis or conceptual model of hydrogeologic relationships at the site. The paper was developed following a detailed review of the hydrogeologic data developed to date.

It has been very useful in identifying areas where Vickery Environmental and the U.S. EPA have different opinions and will help to focus efforts in resolving such differences in the future. However, until after specific information is collected and evaluated during Phase II to answer these differences, the paper should remain in its current form.

The following responses are made in regard to the specific bulleted items presented in the General Comment 2:

Bullet 1 - Golder Associates completed the field tests of the hydraulic conductivity. According to pages 8 and 9 of their report (Golder Associates, Inc., 1983),

"The results of in situ rising head tests conducted by Golder Associates in piezometers installed in the lacustrine deposit indicate that the hydraulic conductivity ***may*** *[Emphasis added] be on the order of $1x10^{-6}$ cm/s. The greater hydraulic conductivity measured in situ may arise from two factors: 1) the in situ measurements are likely dominated by hydraulic conductivity in the horizontal direction, which is expected to be greater than in the vertical direction due to the layered nature of the soil and the presence of sandy partings; and 2) the presence of open fractures in the desiccated crust of the soil. Although fractures were not directly observed in samples of the lacustrine materials from the site, experience with similar soils suggests that a fracture "porosity" (i.e., ratio of the volume of open fractures to total volume) may typically be on the order of 0.001.*

On the basis of these laboratory and field tests it is estimated that the hydraulic conductivity of the lacustrine soils is about $1x10^{-6}$ cm/s ***in the fractured (desiccated) zone*** *[Emphasis added]. Beneath this* ***zone*** *[Emphasis added], it is estimated that the hydraulic conductivity in the vertical direction is about $2x10^{-8}$ cm/s, and in the horizontal direction, about $1x10^{-}$ cm/s."*

By 1990, Golder Associates' understanding of the site hydrogeology had evolved to the point that they began portraying the lacustrine and till units as a single hydrostratigraphic unit. On page 4 of their 1990 report[5] on the investigation at well L-19 they have grouped the Till/Lacustrine units into a single unit called overburden materials. According to their report,

"The vertical hydraulic conductivity (k) of the overburden materials has been estimated to be 2x10-8 cm/sec. Using a nominal thickness of 50 feet for the overburden and a groundwater head difference of 10 feet between the overburden and bedrock, the vertical hydraulic gradient (i) is calculated as 0.2 ft/ft. The effective porosity (ne) of the overburden unit is taken as 0.1. The vertical flow velocity is, therefore, estimated to be on the order of 0.04 ft/yr.

The lateral hydraulic conductivity (k) of the lacustrine soils has been estimated to be 1x10-7 cm/sec. Using a lateral hydraulic conductivity (i) within the lacustrine materials of 1x10-4 ft/ft, calculated from groundwater elevations measured January 14, 1986, between lacustrine monitoring wells L-15 and L-23, and an effective porosity (ne) of 0.1, the lateral flow velocity is estimated to be on the order of 0.0001 ft/yr, generally to the northwest. Vertical flow, therefore, dominates lateral flow, as vertical flow rates are two orders of magnitude greater than lateral flow rates."

Therefore, information gained from original studies at the site support the Position Paper that the Till/Lacustrine Confining unit is a single hydrostratigraphic unit and that the predominant flow direction is vertical.

Bullet 2 - The observation made by U.S. EPA is consistent with vertical groundwater flow through low permeability materials, and does not necessarily support U.S. EPA's view regarding this issue.

Bullet 3 - As noted in the response to Bullet 1, Golder Associates' evaluation of the lacustrine unit evolved through time to the point that in 1990, it is clearly presented that groundwater flow is predominantly vertical and that the horizontal flow is on the order 0.0001 ft/yr. This information supports those presented in the Position Paper. No changes to the text are proposed at this time.

SPECIFIC COMMENTS

1. ***Page 6, Section 3.2.*** *The text states that "most of the wells require many days to recover." The Phase II RFI report should provide information on the recovery rates of all wells sampled. The information should include whether complete or partial recovery (expressed*

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[5]Golder Associates, Inc., 1990. Investigation at Well L-19, Vickery, Ohio Facility. Unpublished Consultant's Report, Dated July 1990.

as a percentage of the original water column) was obtained and the relative time of recovery (minutes, hours, or days). The recovery rates of the wells may be related to the elevated levels of contaminants in many of the wells as wells as to zones of higher permeability either horizontally or vertically (lacustrine vs. till units).

Vickery Environmental, Inc. Response:

Vickery Environmental maintains a chart of well recovery performance based on the time required to obtain necessary volumes for groundwater samples. A copy of this chart is attached. Additional information into the recovery times for wells is not envisioned as a Phase II task.

Vickery Environmental agrees that recovery rates may be related to the apparent elevated levels of naturally occurring compounds in some wells. The discussion of the apparently elevated chromium data in L-20 is an example.

2. ***Page 7, Section 4.2.*** *This section refers to Plate 2, which shows a significant downward vertical gradient. Cross section F-F' trends northwest to southeast. The northwest portion of the cross section has no data points. This is a critical site area for two reasons: (1) there is a potential for shallow groundwater to flow horizontally toward the borrow pit and (2) the borrow pit is a sensitive ecosystem. Additional field studies should be conducted during the Phase II RFI to confirm the conceptual site model, advance soil borings to classify soil types, and install groundwater wells to characterize hydrogeology in this area.*

Vickery Environmental, Inc. Response:

The geologic information presented on the northwest portion of cross-section F-F' is based on well logs BM-1, BM-10, and P-11 which were in that area. During the drafting of the cross-section, their were mistakenly left off the diagram. Because these wells were decommissioned in October 1997, water levels in that area of the facility could not be collected on October 10, 1999 and the equipotential lines presented on Plate 2 should be dashed to indicate that they are approximate. Plates 1 and 2 will be redrafted and presented as part of the discussion of the conceptual site model in the Phase II scope of work.

Vickery Environmental disagrees that the borrow pits represent a sensitive ecosystem. However, this will be evaluated as part of a screening ecological risk assessment and ecological reconnaissance inventory as part of Phase II.

3. ***Page 8, Section 4.2.1.2.*** *The text states that the lacustrine and till unit has a representative hydraulic conductivity value of 2E-08 and that because the hydraulic conductivity values are essentially the same for the two units, they should be considered as a single unit. Field tests, which more accurately define the hydrogeology of a unit indicate that the hydraulic*

conductivity of the lacustrine unit is two orders of magnitude greater than the till unit. It appears that the lacustrine and till units have distinct hydrogeologic properties and should not be considered as one unit. The position paper should be revised accordingly.

Vickery Environmental, Inc. Response:

See the response to General Comment 2, Bullet 1.

4. ***Page 8, Section 4.2.1.3.*** *This section states that the horizontal flow velocity of 2 ft/yr is flawed and cites a porosity for the fractured lacustrine unit as 0.1 with no supporting documentation. This porosity value should be supported by documentation. In addition, the referenced 1983 Golder & Associates report does not indicate whether the porosity value of 0.001 is for the unsaturated portion of the lacustrine unit.*

Vickery Environmental, Inc. Response:

As noted in the above text, Golder Associates specifically tie a "fracture porosity" value of 0.001 based on "similar experience" to the dessication zone. This is only a portion of the total porosity, which would equal the primary porosity plus the fracture porosity. If the effective porosity is 0.1 as noted for the saturated portion of the lacustrine unit, then the total porosity would be equal to 0.1 plus 0.001, or 0.101. The difference between 0.1 and 0.101 is insignificant. This evaluation is supported by Golder Associates' 1990 report on the investigations at L-19 where they calculate the groundwater flow velocity of the lacustrine unit using an effective porosity of 0.1.

5. ***Page 9, Section 4.2.2.*** *This section uses a hydraulic conductivity value of 2 E-08 centimeter per second (cm/s) for the till/lacustrine unit. The only field test completed in the lacustrine unit resulted in a hydraulic conductivity value of 1E-06 cm/s, which is two orders of magnitude greater than the hydraulic conductivity value used in the position paper. In addition, this field test was conducted in a well located in the far southwestern portion of the facility far from SWMUs 10 and 11 and areas of groundwater contamination. Either the greater hydraulic conductivity value should be used and the conclusion of the position paper revised, or additional field tests should be conducted during the Phase II RFI to correctly determine the horizontal and vertical flow components of groundwater movement.*

Vickery Environmental, Inc. Response:

Please see the response to Specific Comment 3.

6. ***Page 10, Section 4.2.2.*** *This section refers to tritium analytical results from a 1984 report prepared by Golder & Associates. The text should provide information on which wells were sampled during the sampling event and provide the results. In addition, the text should*

provide the results of tritium analysis of groundwater samples collected from wells screened in bedrock.

Vickery Environmental, Inc. Response:

The wells that were sampled for tritium include P-1 through P-15, and wells 1N, 2, 3N, 4N, 5, 6N, 7, 8, 11, 12, and 13. Many of these wells were screened in bedrock. The results are provided on the attached table.

7. ***Page 10, Section 4.2.2.*** *This section discusses the nature and extent of contamination detected in lacustrine well L-19 and states that 1,2,-dichloroethane was not detected in wells screened within 20 feet of well L-19. The report should be revised to provide information on the locations of the wells, their construction, and analytical results.*

Vickery Environmental, Inc. Response:

The wells that are within 20 feet of L-19 are T-19 and MW-19R. The locations of the wells are provided on maps presented in Appendix D of the 1995 Description of Current Conditions Report. Details concerning well construction and sampling are provided in a 1990 Golder Associates report entitled *Investigation at Well L-19.*

8. ***Page 12, Section 6.0.*** *The conclusions in this section are based on the assumption that the lacustrine and till unit act as a single hydrogeologic unit. This assumption is not supported by the data in the DCC and Phase I RFI report. The conclusions should be revised to reflect the reported data.*

Vickery Environmental, Inc. Response:

These assumptions are supported by the interpretations presented in the documents that are the foundations of the DCC and the Phase I Report. Please see the response to Specific Comment 3 in regards to revising the Position Paper.

9. ***Page 13, Section 7.0.*** *The conclusion that the monitoring wells in the lacustrine unit are not viable monitoring points and should be abandoned is not supported. The data and interpretation provided in previous reports by both Golder Associates and Rust Infrastructure support a conclusion that groundwater in the lacustrine unit is capable of flowing several feet per year in the horizontal direction. The lacustrine unit should be considered a viable monitoring unit.*

Vickery Environmental, Inc. Response:

The flow rate is based on an erroneous interpretation of the porosity as discussed in the response to Specific Comment 4. The basic hydrogeologic relationships

presented in the Position Paper are still valid, based on the available information. It remains Vickery Environmental's position that the lacustrine wells should be abandoned. It should also be noted that Ohio EPA and U.S. EPA suggested that the wells surrounding Pond 11 and 12 in be abandoned as part of the Orders of Agreement and as a recommendation by Ohio EPA in 1996.

10. ***Page 14, Section 7.0.*** *The text concludes that horizontal migration of contaminants in the lacustrine/till unit to areas such as the borrow pit is very unlikely. This conclusion is not well supported. There is a general lack of subsurface characterization data for this area of the facility. Additional characterization should be completed during the Phase II RFI by advancing soil borings, installing monitoring wells, and conducting field testing of hydraulic conductivity.*

Vickery Environmental, Inc. Response:

Vickery Environmental agrees that there is a general lack of subsurface characterization data for this area of the facility. Aside from this shortcoming, other hydrogeologic information presented in the report and supported by the responses to General Comment 2 support the conceptual model that the dominant groundwater flow direction in the Till/Lacustrine Confining unit is vertical.

QAPP ADDENDUM FOR COLLECTION OF BACKGROUND SOIL SAMPLES

GENERAL COMMENTS

1. *The first full paragraph on Section 1.1, Page 1, correctly states that U.S. EPA 's original comment 9 "suggested that the 95% upper confidence limit (UCL) for the concentrations of each inorganic constituent should be calculated and used as the basis for comparison to each investigative sample result." Also, the second full paragraph states that U.S. EPA agreed that "maximum background values, with an outlier evaluation, should be used for release and extent determination comparisons." First, after discussions at the February 25, 2000, meeting, it was decided to not consider use of the 95% UCL as the basis of comparison to investigative sample results. Second, U.S. EPA does not concur with the statement that U.S. EPA agreed to the use of maximum background values as described in the text.*

   The proposed statistical procedure of relying on comparison of investigative sample results to maximum background values (coupled with an outlier evaluation) is insufficient to correctly determine whether the investigative sample data set represents values statistically greater than those represented by the background sample data set. Instead, comparison of background to investigative sample data sets should be based primarily on statistical comparison of the data set-specific mean concentrations. Various U.S. EPA guidance documents, including U.S. EPA 's 1995 "Determination of Background Concentrations of

Inorganics in Soils and Sediments at Hazardous Waste Sites" (EPA/540/S-96/500) and U.S. EPA 's 1998 "Guidance for Data Quality Assessment, Practical Methods for Data Analysis, U.S. EPA QA/G-9, QA97 Version" (EPA/600/R-96/085) include recommendations for appropriate statistical tests for comparing sample set-specific mean concentrations based on the distributions of the background and investigative sample sets.

However, as appropriate, additional statistical testing to determine whether a single sample result "has a high probability of exceeding background" can also be performed. This additional statistical testing can be performed by comparing the single value to the maximum background value (coupled with an outlier evaluation) as currently proposed in the QAPP addendum. Therefore, Section 1.1 of the QAPP addendum should be revised accordingly.

Vickery Environmental, Inc. Response:

Background data sets provide information on naturally occurring constituents that are used in two basic ways; release assessment, and extent determination. Comparisons of a statistical component of the background data set (such as the various statistical methods to compare means or variances) to the same component of the SWMU-specific data set can be used. Such comparisons answer a simple question, "Are the data sets similar?" If they are dissimilar it is assumed that the dissimilarity is due to a release from the SWMU. However, these methods do not provide a means to evaluate the extent of contamination because they do not yield a single "bright line" value that can be used to compare individual values outside the SWMU boundary.

Use of a maximum background statistic (such as the maximum background value or the background mean plus three times the standard deviation[6]) can be used to compare individual sample results in the SWMU to background. As such, they are useful in release assessment and extent determination. Also, use of the maximum background statistic is very conservative because any SWMU sample that yields a value greater than the statistic is indicative of a release. With populations methods, many samples may exceed the maximum background concentration and still have similar means and variances. Another potential problem, which the guidance does not adequately address, is the differences in the size of the background data sets which is small and the SWMU data set which is usually large.

Our recollection of the meeting was that U.S. EPA did agree to the use of maximum background with an outlier evaluation as a comparative approach to background. However, if U.S. EPA wishes to use population-based statistics for release determination, then such an approach will be specified in the text of the QAPP Addendum. The exact statistical method cannot be defined at this time, because not

[6]U.S. EPA, 1995. Determination of Background Concentrations of Inorganics in Soil and Sediments at Hazardous Waste Sites. EPA/540/S-96/500.

all of the data are currently available and a thorough evaluation of population normality has not been completed. Instead, a general approach will be presented in the QAPP Addendum as follows.

Section 4.0 of the QAPP Addendum will be revised to read:

"A statistical comparison of the background data set to SWMU-specific data sets will be used for release assessment purposes. Initial statistical analyses of the background data sets and SWMU-specific data sets will include:

- an evaluation of the percentage of censored data with appropriate steps taken to compensate (i.e., replacement with ½ detection limit, or use of detections limit as the value);
- normality testing (using commonly accepted statistical testing methods) and transformation, if necessary (all constituent-specific comparisons will be based on the same transformations); and
- outlier evaluation using Box-Plot and other methods.

Following the initial evaluations, constituent-specific comparisons will be completed comparing population statistics for each SWMU to background. Comparative methods may include Student's Two-Sample t-Test, Satterthwaite's Two-Sample t-Test, Wilcoxon's Rank Sum Test (also know as the Mann-Whitney Test) or others, as appropriate. The results of the comparisons and procedures used will be provided in the revised Phase I report."

2. *Figure 1 presents the locations of the 10 proposed background soil samples. Of these 10 locations, 3 appear to be too close to SWMUs being investigated during the RFI. Specifically, the three easternmost samples appear to be too close to SWMU groups B, D, and I. Therefore, the background sampling locations should be relocated as shown in the attached figure.*

Vickery Environmental, Inc. Response:

Vickery Environmental has reviewed the locations presented by U.S. EPA and has agreed to relocate the samples accordingly. A revised Figure 1 is attached.

3. *Section 3: This section states that the SOP for use of the Geoprobe "will be used as a general guideline". The facility shall either adhere to the US EPA approved SOP or propose and submit changes which will be reviewed by US EPA.*

Vickery Environmental, Inc. Response:

The U.S. EPA SOP is for an earlier version of the Geoprobe™ that may not be used at the site. The Geoprobe™ model proposed for use at the site is a dual-tube model that provides an improved method of retrieving depth-specific samples and minimizes that potential for cross-contamination and "drag down". The "Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations (ASTM Standard D 6282-98)" will be used as the SOP for background metals soil sampling. A copy of this SOP is attached.

4. *Appendix A: This procedure calls for homogenization of samples which are to be analyzed for organics. While this sampling activity does not include organics, this procedure shall not be used for other Corrective Action activities unless the reference to homogenizing samples for organics is removed.*

Vickery Environmental, Inc. Response:

The SOP presented is to be used for those samples that would require homogenization, as requested by U.S. EPA. As intended, the homogenization process will be limited to soil samples to be analyzed for inorganics only. The reference to homogenization organic is not applicable and will be removed.

REFERENCES

Cox-Colvin and Associates Inc. 2000. "Phase I RFI Quality Assurance Project Plan Addendum for Additional Background Soil Sampling, Waste Management of Ohio Inc., Vickery Ohio." March 23.

Golder Associates, Inc., 1983. Summary and Characterization of Site Hydrogeologic Conditions, Chemical Waste Management, Inc., Vickery, Ohio Facility. Unpublished Consultant's Report. Dated September 29, 1983

U.S. Environmental Protection Agency (EPA), 1998. Memorandum Regarding Risk-Based Clean Closure. From Elizabeth Cotsworth, Acting Director, Office of Solid Waste. To RCRA Senior Policy Advisors, Regions 1 through 9. March 16.

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Attachment 1

Vickery Environmental, Inc., RFI Conceptual Approach

Changed Pages

Attachment 1
Responses to January 28, **2000 and July 12**, 2000
NOD for the Phase I RFI Report
Waste Management of Ohio, Inc., Vickery, Ohio

Following the collection of additional background soil data and determination of maximum background concentrations as described in the Phase IB Quality Assurance Project Plan (QAPP) Addendum[1] (Cox-Colvin & Associates, 2000), the Phase I results will be evaluated for each SWMU and AOC to determine if a release to the primary environmental media/pathway has occurred and if further investigation is required during Phase II of the RFI. The evaluation will consist of a series of critical inter-related decision statements which are part of the overall RFI conceptual approach presented in the February 25, 2000 Waste Management/US EPA meeting and provided (with agency suggested revisions) as Figure 1. The essence of this approach was provided in the RFI Workplan and does not represent a significant shift or change in the direction of the RFI. Although the focus of this response is to outline the data evaluation process to be conducted during Phase I, the entire RFI conceptual approach is summarized below and will be revisited during preparation of the Phase II QAPP. Box numbers shown in brackets refer to individual boxes on the flow chart (Figure 1).

The starting point of the process is the identification of SWMUs or AOCs identified in the permit to be included for investigation during the RFI [Box 1]. The list of SWMUs or AOCs identified in the permit to be included in the RFI are discussed in the RFI Workplan and the Phase I Report. As indicated on Figure 1 [Box 2], those SWMUs or AOCs identified in the permit which have been clean-closed under RCRA are then removed from the RFI process. This issue was discussed in detail in the February 25, 2000 meeting in Chicago and agreed to by US EPA and Ohio EPA. For those SWMUs effected by this decision statement (SWMUs 4, 5, 7, 10, 11, 17, 18, and 28), the SWMU-specific data collected during Phase I will be presented in the revised RFI Report; however, no further action will be recommended for these SWMUs.

In the next decision statement [Box 3], Waste Management will determine if a SWMU or AOC is regulated under an equally protective regulatory program. If Waste Management determines that a SWMU or AOC is regulated under an equally protective regulatory program and that the overlapping application of authorities would result in unnecessary and overly burdensome duplication of effort [Box 5], Waste Management may elect to propose no further action for the SWMU or AOC.

If based on the previous steps, a SWMU or AOC requires investigation during the RFI, the primary environmental media/pathway is then sampled [Box 14] to determine if a release has occurred. Release determination was the primary objective of Phase I of the RFI. To confidently confirm if a release has occurred the number, location, and depth of sampling must be appropriate as described in [Box 15]. Assuming that the sampling strategy is appropriate, each SWMU and AOC is then evaluated to determine if a release has occurred [Box 6]. For naturally occurring constituents, this determination will be made by comparing maximum background to each constituent at each sample location within the primary environmental media/pathway. Maximum background values will be

[1]Cox-Colvin & Associates, Inc., 2000, Phase I RFI Quality Assurance Project Plan Addendum for Additional Background Soil Sampling, March 23, 2000.

determined during Phase IB. If one or more inorganic constituents are present above maximum background values at any location, a release of inorganic constituents at the SWMU or AOC will be concluded. For organic constituents, a release will be concluded if one or more organic constituents are present above project-specific reporting limits (PRLs). If based on this evaluation, a release has not occurred, no further action [Box 3] will be recommended for the SWMU or AOC.

For SWMUs or AOCs at which a release has been concluded, the data will be evaluated to determine if constituent groups can be eliminated ~~for~~**from** future sampling [Box 7]. ~~This~~**The determinations** would be conducted on a **media-specific,** SWMU by SWMU basis~~ and would be limited to the potential elimination of specific~~. **General considerations for constituent elimination will include:**

- **Detections - if all media-specific results for a given** analytical ~~groups (i.e. inorganics, herbicides, etc.) as opposed to individual constituents. Elimination of~~**group result in non-detects, the group would be considered for elimination.**

- **RBCs - if media-specific detected constituents within an** analytical ~~groups will be proposed based on sample coverage and locations, depth, number of occurrences and, concentrations.~~**group are less than applicable RBCs, the group would be considered for elimination.**

- **Background - If naturally occurring constituents within media-specific sample sets are detected at concentrations consistent with background values, the analytical group, or a subset of the group would be considered for elimination.**

The lists of constituents considered for elimination will be provided to U.S. EPA for review and approval prior to proceeding with additional RFI sampling activities.

If the extent of contamination has not been determined during Phase I or through previous efforts, the extent of contamination will be determined [Box 8] during Phase II as necessary to support the risk assessment using realistic and supported site exposure assumptions. Following Phase II field activities a baseline quantitative risk assessment will be conducted [Box 9] to determine if further action, in terms of a corrective measures study (CMS) and/or stabilization, is warranted. In an effort to streamline the RFI process a Risk Assessment Workplan will be submitted concurrent with the Phase II QAPP. The Risk Assessment Workplan will outline the procedures, methodologies, and assumptions to be used in conducting the human health and ecological risk assessment at the site. If the risks associated with a particular SWMU or AOC are acceptable, based on the quantitative risk assessment, then no further action will be proposed for the unit. Conversely, if the quantitative risk assessment indicates that the risk associated with a particular SWMU or AOC are unacceptable, then

the need to implement Interim Stabilization Measures (ISMs) will be evaluated [Box 11], and implemented if necessary [Box 12]. If ISMs are implemented, the ISM will be evaluated, in terms of the final remedy, as part of the CMS. If ISMs are not necessary, then a CMS [Box 13] will be recommended for each SWMU or AOC at which the risk has been determined to be unacceptable through the quantitative risk assessment.

The previous version of the RFI conceptual approach flow chart presented in the February 25, 2000 meeting included a comparison to risk-based screening levels (action levels) to determine if a release warrants further action. This step was removed from the flow chart based on US EPA and Ohio EPA's opposition. The primary opposition to the use of action levels was the potential to underestimate cumulative risk posed by numerous constituents present below individual action levels. For this reason and because the commonly accepted screening levels for soil do not take into account ecological risk, SWMUs will not be eliminated from further action (i.e., included in the quantitative risk assessment) based on a comparison to action levels. Although SWMUs or AOCs will not be eliminated from further action based on action levels, SWMU and AOC-specific data will be compared to risk-based action levels as described in the RFI Workplan for contaminant nature and extent evaluation and discussion purposes.

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Attachment 2

Phase IB and Phase II RFI Implementation Schedule

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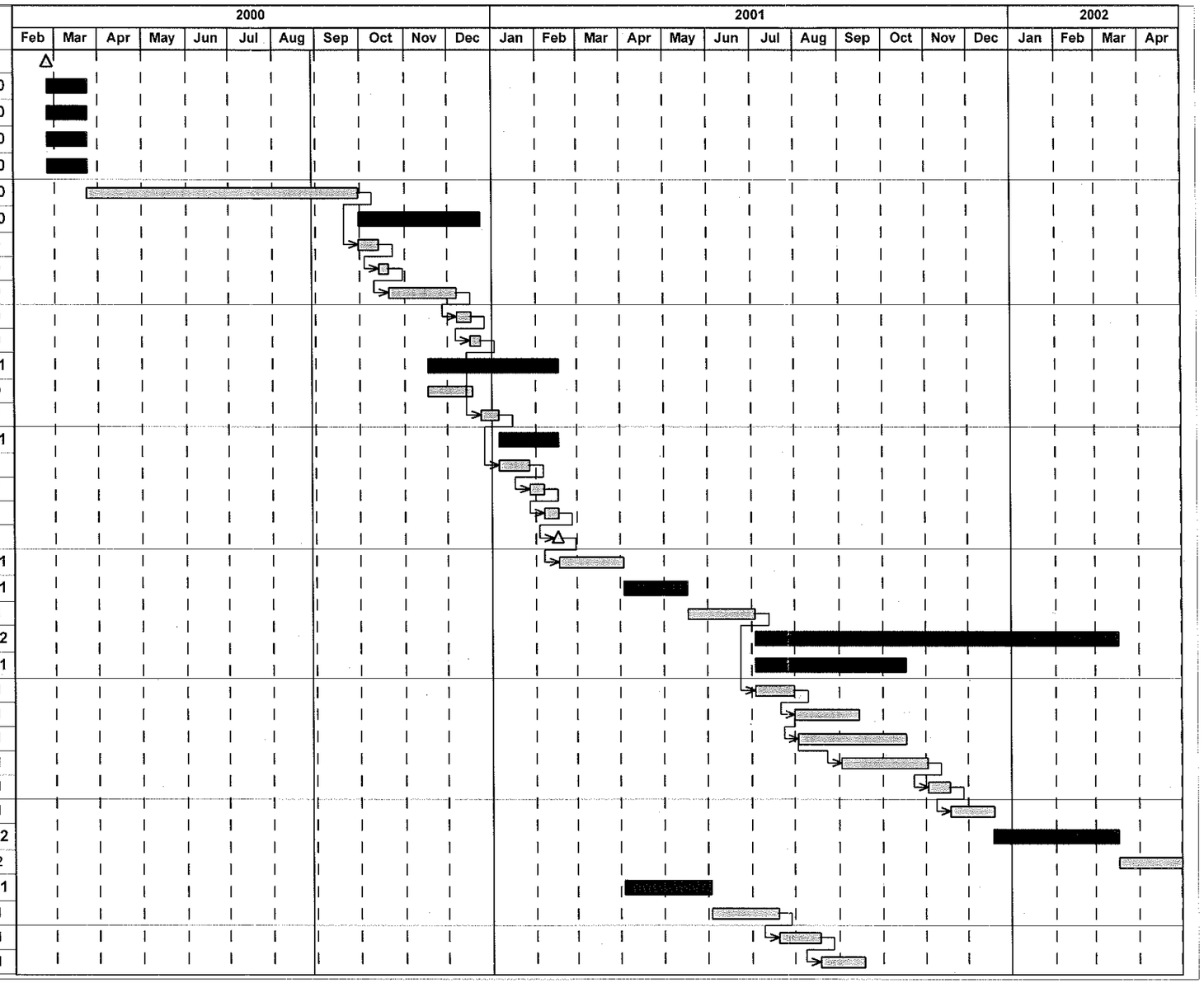
Phase IB and Phase II RFI Implementation Schedule
Waste Management of Ohio
Vickery, Ohio

Task Name	Start Date	Duration	End Date
USEPA Meeting	02/25/2000	0d	02/25/2000
Prepare Response to Comments & Bckgrd Adden	**02/25/2000**	**28.00d**	**03/23/2000**
+Prepare Response to Comments	**02/25/2000**	**28.00d**	**03/23/2000**
+Prepare Lacustrine Position Paper	**02/25/2000**	**28.00d**	**03/23/2000**
+Prepare Background Addendum	**02/25/2000**	**28.00d**	**03/23/2000**
***Agency Review and Approval**	**03/24/2000**	**187.00d**	**09/29/2000**
Phase IB (Background Metals)	**09/30/2000**	**83.00d**	**12/23/2000**
*Contracting and Mobilization	09/30/2000	14.00d	10/13/2000
Phase IB Field Work	10/14/2000	7.00d	10/20/2000
Laboratory Analysis	10/21/2000	45.00d	12/06/2000
Data Validation	12/07/2000	10.00d	12/16/2000
Statistical Review	12/17/2000	7.00d	12/23/2000
Revise Phase I Report	**11/17/2000**	**87.00d**	**02/15/2001**
Revise Non-Metals Sections of Report	11/17/2000	30.00d	12/17/2000
Screening for metals	12/24/2000	10.00d	01/05/2001
Report Preparation	**01/06/2001**	**41.00d**	**02/15/2001**
Compile Internal Draft	01/06/2001	21.00d	01/26/2001
WM Review	01/27/2001	10.00d	02/05/2001
Internal Revisions	02/06/2001	10.00d	02/15/2001
Submit to USEPA	02/15/2001	0d	02/15/2001
***Agency Review**	**02/16/2001**	**45.00d**	**04/02/2001**
+Prepare Phase II Scope of Work (Revised QAPjP)	**04/03/2001**	**45.00d**	**05/17/2001**
*Agency Review and Approval	05/18/2001	45.00d	07/02/2001
RFI Phase II	**07/03/2001**	**250.00d**	**03/16/2002**
Data Collection**	**07/03/2001**	**105.00d**	**10/17/2001**
Contracting and Mobilization	07/03/2001	27.00d	07/30/2001
Field Work	07/31/2001	45.00d	09/14/2001
Laboratory Analysis	08/03/2001	75.00d	10/17/2001
Data Validation	09/02/2001	60.00d	11/01/2001
Data Evaluation	11/02/2001	15.00d	11/17/2001
Risk Evaluation	11/18/2001	30.00d	12/18/2001
+Report Preparation	**12/19/2001**	**85.00d**	**03/16/2002**
*Agency Review	03/17/2002	45.00d	04/30/2002
+Risk Assessment Technical Assumptions Memo	**04/03/2001**	**60.00d**	**06/02/2001**
*Agency Review	06/03/2001	45.00d	07/18/2001
Respond to Comments	07/19/2001	30.00d	08/17/2001
*Agency Review and Approval	08/18/2001	30.00d	09/17/2001



*Items contingent on agency approval may start sooner or later depending when the facility receives approval.

Cox-Colvin & Associates, Inc.

Addendum to Phase I QAPP

Changed Pages

Phase I RFI Quality Assurance Project Plan Addendum for Additional Background Soil Sampling Waste Management of Ohio, Inc., Vickery, Ohio

~~March 23~~**August 29**, 2000

Submitted to:

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

Submitted by:

Cox-Colvin & Associates, Inc.
1679 Old Henderson Road
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(614) 442-1970

Cox-Colvin & Associates, Inc.
Environmental Services

Phase I RFI Quality Assurance Project Plan Addendum for Additional Background Soil Sampling Waste Management of Ohio, Inc., Vickery, Ohio

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~~March 23~~**August 29**, 2000

Submitted to:

Waste Management of Ohio, Inc.
3956 State Route 412
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Submitted by:

George H. Colvin, CPG
Principal
Cox-Colvin & Associates, Inc.

and

Craig A. Cox, CPG
Principal
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Cox-Colvin & Associates, Inc.
Environmental Services

4.0 Statistical Analysis

~~Statistical~~**A statistical comparison of the background data set to SWMU-specific data sets will be used for release assessment purposes. Initial statistical** analys~~e~~es of the background data ~~will include the determination of maximum background concentrations for each constituent from the combined Phase I and Phase IB background data set. These values will then be used in release and extent determinations by comparing single values at SWMUs and AOCs to the maximum background value. Due to the lacustrine unit's uniformity with depth, the 0-2 ft and 8-10 ft samples will be treated as a single data set for release and extent determination purposes. In the future, however, the two intervals may be considered as separate data sets for risk assessment purposes.~~

~~Prior to calculation of the maximum background concentration for each constituent, the data set will be tested for normality and transformed as necessary to allow for outlier evaluations. If possible, based on~~**sets and SWMU-specific data sets will include:**

- **an evaluation of** the percentage of censored ~~(non-detects) data and the distribution of the data set, the outlier evaluation will be conducted using the box-plot outlier evaluation method of Iglewicz and Hoaglin (1993). Normality~~**data with appropriate steps taken to compensate (i.e., replacement with ½ detection limit, or use of detections limit as the value);**

- **normality** testing ~~will be conducted in accordance with~~**(using** commonly accepted statistical testing methods~~. The statistical results~~**) and transformation, if necessary (all constituent-specific comparisons will be based on the same transformations); and**

- **outlier evaluation using Box-Plot and other methods.**

Following the initial evaluations, constituent-specific comparisons will be completed comparing population statistics for each SWMU to background. Comparative methods may include Student's Two-Sample t-Test, Satterthwaite's Two-Sample t-Test, Wilcoxon's Rank Sum Test (also know as the Mann-Whitney Test) or others, as appropriate. The results of the comparisons and procedures **used** will be provided in the revised Phase I report.

5.0 Project Organization

A revised overall project management organization for Phase IB of the RFI is provided on Figure 2. The revised organizational chart closely resembles the original organization chart provided in the RFI Phase I Project Management Plan (Rust Environmental and Infrastructure, 1998). Project titles and responsibilities as documented in the Project Management Plan have been left unchanged. The EarthTech project manager will act in an advisory role during Phase IB and assist in the transition of the Phase IB results from Cox-Colvin to EarthTech for use in the revised Phase I Report.

6.0 Schedule

The schedule for implementation of Phase IB is provided on Figure 3. This schedule is based on the Phase IB and Phase II schedule submitted to US EPA by Waste Management on March 3, 2000 (Waste Management, 2000). The schedule assumes agency approval of the Phase IB addendum on or before April 22, 2000.

7.0 References

EarthTech, 1999, RCRA Facility Investigation (RFI) Phase I Report, October, 1999.

~~Iglewicz, B. and Hoaglin, D., 1993, How to Detect and Handle Outliers, ASQC Quality Press, Milwaukee, Wisconsin, 87 pp.~~

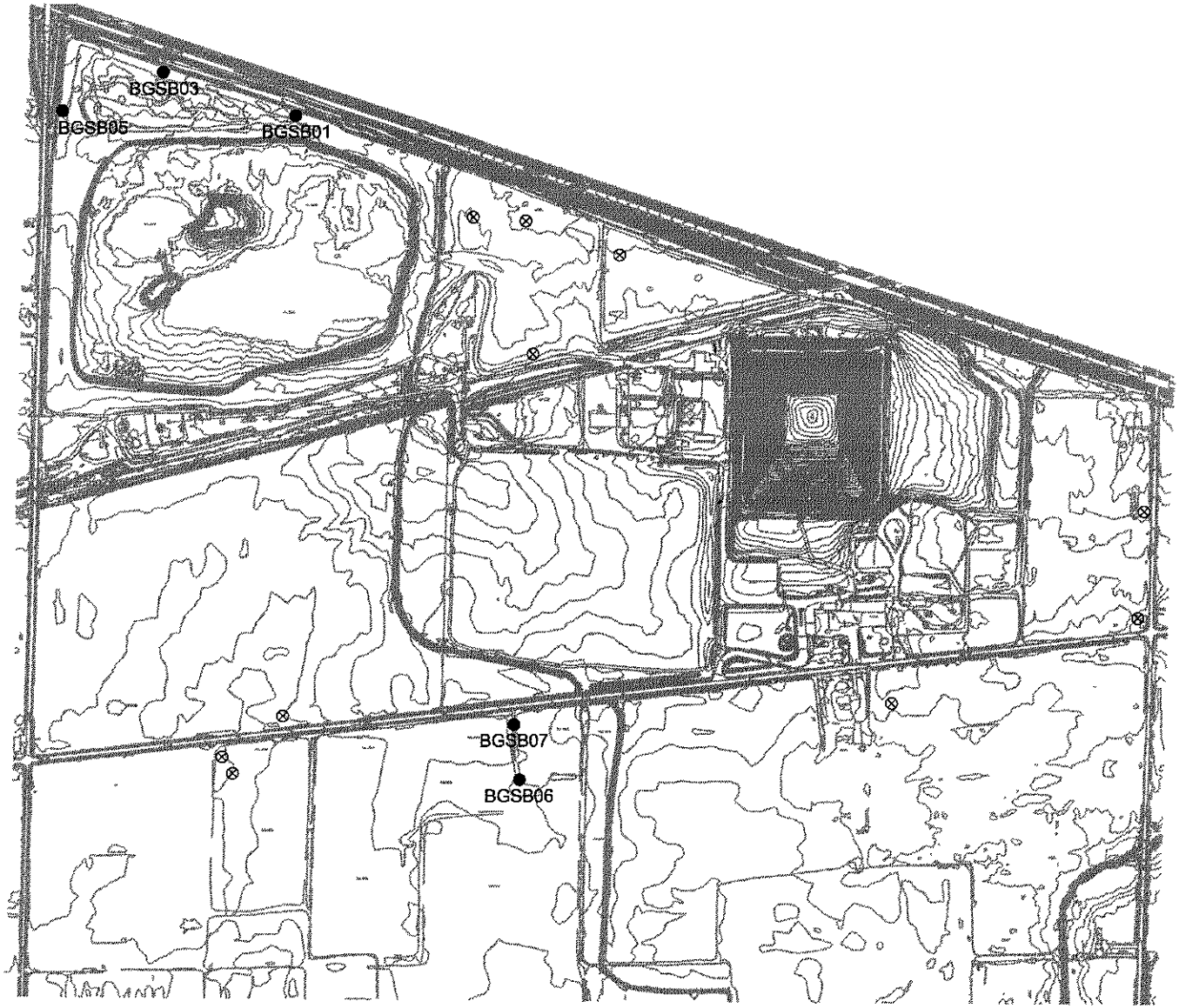
Rust Environment and Infrastructure, Inc., 1997, Quality Assurance Project Plan, November, 1997,

Rust Environment and Infrastructure, Inc., 1998, Phase I RFI Workplan, October 1998.

US EPA, 1995, Determination of Background Concentration of Inorganics in Soils and Sediments at Hazardous Waste Sites. Office of Solid Waste and Emergency Response, EPA/540/S-96/500, December, 1995.

Waste Management of Ohio, Inc., 2000, Letter from Sandra Clark to Tom Matheson, March 3, 2000.

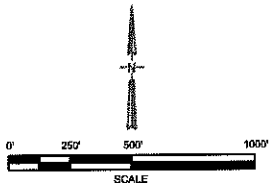
DWG NAME: backgroundsoil | DATE: 03/10/2000 | DRAWN BY: | CHECKED BY: | REVISION NO.:



Legend

● Phase I background soil sampling locations

⊗ Proposed Phase IB background soil sampling locations



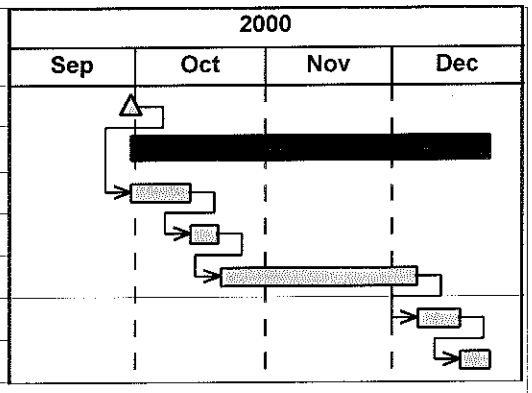
Cox-Colvin & Associates, Inc.
Environmental Services

Phase I and Proposed IB Background Soil Sampling Locations,
Waste Management of Ohio, Inc.,
Vickery, Ohio

Figure
1

Figure 3
Phase IB (Background Soil) Schedule*
Waste Management of Ohio, Inc., Vickery, Ohio

Task Name	Start Date	Duration	End Date
Agency Approval of Phase IB Addendum	09/30/2000	0d	09/30/2000
Phase IB (Background Metals)**	**09/30/2000**	**83.00d**	**12/23/2000**
*Contracting and Mobilization	09/30/2000	14.00d	10/13/2000
Phase IB Field Work	10/14/2000	7.00d	10/20/2000
Laboratory Analysis	10/21/2000	45.00d	12/06/2000
Data Validation	12/07/2000	10.00d	12/16/2000
Statistical Review	12/17/2000	7.00d	12/23/2000



*Based on Phase IB and Phase II Schedule Provided to US EPA by Waste Management of Ohio, Inc. on March 3, 2000.
**Assumes agency approval on or before April 22, 2000.

UNCONTROLLED DOCUMENT
AND
BUSINESS CONFIDENTIAL

SOP No: G.16

Title: Soil Homogenization and Compositing

1.0 SCOPE AND APPLICATION

1.1 This Standard Operating Procedure describes the procedure used to homogenize and/or composite soil replicate field samples to produce a representative sample for analytical use.

2.0 SUMMARY OF METHOD

2.1 Equal amounts of designated field soil samples are mixed in an inert container to provide composite sample. Soil from a container is homogenized outside of its jar and placed back to the jar. The entire content of a designated field sample is homogenized by mixing. If needed, sample can be dried and sieved prior to mixing.

3.0 INTERFERENCE

3.1 Depending on the type of analysis needed, certain precautions must be taken. Using a metal spatula to scoop soil may introduce contamination and should be avoided. ~~Gloves may introduce phthalate contamination if semivolatile organic analysis is needed.~~ **This procedure would be limited to inorganic analysis.**

4.0 APPARATUS AND MATERIAL

- Spatula – either wooden or metal
- Tray – glass, polyethylene, aluminum
- Gloves – nitrile or polyethylene
- Balance – top loader balance, accuracy 1g

5.0 PROCEDURE

5.1 Compositing

5.1.1 Compositing soil sample requires at least 2 field sample replicates collected from the same site or different sites (per project requirement). Using a soil scoop, take a scoop of soil sample from each sample jar. Make sure that each sample is matrix representative. Remove debris, rocks, leaves and other large non-representative items from the matrix. Sediment samples may contain a layer of water, which needs to be decanted and discarded. Next, weigh 100g of the scooped sample from each jar and place them in a mixing tray. Mix the soil thoroughly; crumble the large pieces with hand or spatula if needed. Then pour the composited sample into a pre-cleaned glass jar, put the lid on and store.

5.2 Homogenizing

5.2.1 Empty the entire sample jar into a mixing tray. Using a wooden spatula transfer any leftover sample from the jar into the tray. Remove all large debris, rocks, leaves and other foreign objects. Wear powder free gloves and mix sample thoroughly with a wooden spatula. Return the homogenized sample back to its sample jar, put the lid back on and store.

5.2.2 Samples matrices that are hard to break down or separate may require heating and sieving. Take about 100g or entire 4.0 ounce jar of a field sample and spread on glass or porcelain tray, then place in an oven. Dry the sample in a 50°C oven for 8 hours. Remove the sample from the oven and let it cool at room temperature, then break up and crumble large pieces using a wooden spatula. If needed, sample may be sieved, depending on contract requirement or judgement of the experienced chemist. Selection of sieve mesh size should be based on sample composition and makeup, therefore, may vary for each sampling site.

Note: Drying and sieving is only applicable to field samples that require metals analysis. ~~Samples designated for organic tests may be homogenized, but must not be heated.~~ **This procedure would be limited to inorganic analysis.**

Designation: D 6282 – 98

Standard Guide for Direct Push Soil Sampling for Environmental Site Characterizations[1]

This standard is issued under the fixed designation D 6282; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope

1.1 This guide addresses direct push soil samplers, which also may be driven into the ground from the surface or through prebored holes. The samplers can be continuous or discrete interval units. Samplers are advanced by a combination of static push, or impacts from hammers, or vibratory methods, or a combination thereof, to the depth of interest. The guide does not cover open chambered samplers operated by hand such as augers, agricultural samplers operated at shallow depths, or side wall samplers. This guide does not address single sampling events in the immediate base of the drill hole using rotary drilling equipment with incremental drill hole excavation. Other sampling standards, such as Test Methods D 1586 and D 1587 and Practice D 3550 apply to rotary drilling activities. This guide does not address advancement of sampler barrel systems with methods that employ cuttings removal as the sampler is advanced. Other drilling and sampling methods may apply for samples needed for engineering and construction applications.

1.2 Guidance on preservation and transport of samples, as given in Guide D 4220, may or may not apply. Samples for chemical analysis often must be subsampled and preserved for chemical analysis using special techniques. Practice D 3694 provides information on some of the special techniques required. Additional information on environmental sample preservation and transportation is available in other references (**1**, **2**).[2] Samples for classification may be preserved using procedures similar to Class A. In most cases, a direct push sample is considered as Class B in Practice D 4220 but is protected, representative, and suitable for chemical analysis. The samples taken with this practice do not usually produce Class C and D (with exception of thin wall samples of standard size) samples for testing for engineering properties, such as shear strength and compressibility. Guide D 4700 has some information on mechanical soil sampling devices similar to direct push techniques, however, it does not address most direct push sampling methods. If sampling is for chemical evaluation in the Vadose Zone, consult Guide D 4700 for any special considerations.

1.3 Field methods described in this guide, include the use of discreet and continuous sampling tools, split and solid barrel samplers and thin walled tubes with or without fixed piston style apparatus.

1.4 Insertion methods described include static push, impact, percussion, other vibratory/sonic driving, and combinations of these methods using direct push equipment adapted to drilling rigs, cone penetrometer units, and specially designed percussion/direct push combination machines. Hammers providing the force for insertion include drop style, hydraulically activated, air activated and mechanical lift devices.

1.5 Direct push soil sampling is limited to soils and unconsolidated materials that can be penetrated with the available equipment. The ability to penetrate strata is based on hammer energy, carrying vehicle weight, compactness of soil, and consistency of soil. Penetration may be limited or damage to samplers and conveying devices can occur in certain subsurface conditions, some of which are discussed in 5.5. Successful sample recovery also may be limited by the ability to retrieve tools from the borehole. Sufficient retract force must be available when attempting difficult or deep investigations.

1.6 This guide does not address the installation of any temporary or permanent soil, ground water, vapor monitoring, or remediation devices.

1.7 The practicing of direct push techniques may be controlled by local regulations governing subsurface penetration. Certification, or licensing requirements, or both, may need to be considered in establishing criteria for field activities.

1.8 The values stated in SI units are to be regarded as standard: however, dimensions used in the drilling industry are given in inch-pound units by convention. Inch-pound units are used where necessary in this guide.

1.9 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

1.10 *This guide offers an organized collection of information or a series of options and does not recommend a specific course of action. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this guide may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of*

[1] This guide is under the jurisdiction of ASTM Committee D-18 on Soil and Rock and is the direct responsibility of Subcommittee D18.21 on Ground Water and Vadose Zone Investigation.

Current edition approved July 10, 1998. Published February 1999.

[2] The boldface numbers in parentheses refer to the list of references at the end of this standard.

a given professional service must be judged, nor should this document be applied without consideration of a projects's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.

2. Referenced Documents

2.1 *ASTM Standards:*

D 420 Guide to Site Characterization for Engineering, Design and Construction Purposes[3]

D 653 Terminology Relating to Soil, Rock and Contained Fluids[3]

D 1452 Practice for Soil Investigation and Sampling by Auger Boring[3]

D 1586 Test Method for Penetration Test and Split-Barrel Sampling of Soils[3]

D 1587 Practice for Thin-Wall Tube Sampling of Soils[3]

D 2488 Practice for Description and Identification of Soils (Visual-Manual Method)[3]

D 3550 Practice for Ring-Lined Barrel Sampling of Soils[3]

D 3694 Practices for Preparation of Sample Containers and for Preservation of Organic Constituents[4]

D 4220 Practices for Preserving and Transporting Soil Samples[3]

D 4700 Guide for Soil Sampling from the Vadose Zone[3]

D 4750 Test Method for Determining Subsurface Liquid Levels in a Borehole or Monitor Well (Observation Well)[3]

D 5088 Practice for Decontamination of Field Equipment Used at Nonradioactive Waste Sites[5]

D 5092 Practice for Design and Installation of Ground Water Monitoring Wells in Acquifers[5]

D 5299 Guide for Decommisioning of Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities[5]

D 5314 Guide for Soil Gas Sampling in the Vadose Zone[5]

D 5434 Guide for Field Logging of Subsurface Explorations of Soil and Rock[5]

D 5730 Guide to Site Characterization for Environmental Purposes with Emphasis on Soil, Rock, the Vadose Zone, and Ground Water[5]

D 5778 Test Method for Performing Electronic Friction Cone and Piezocone Penetration Testing of Soils[5]

D 5783 Guide for Use of Direct Rotary Drilling with Water-Based Drilling Fluid for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality Monitoring Devices[5]

D 5784 Guide for Use of Hollow-stem Augers for Geoenvironmental Exploration and the Installation of Subsurface Water-Quality and Monitoring Devices[5]

D 6001 Guide for Direct-Push Water Sampling for Geoenvironmental Investigations[5]

3. Terminology

3.1 *Definitions*—General definitions for terminology used in this guide are in accordance with Terminology D 653. Definitions for terms related to direct push water sampling for geoenvironmental investigations are in accordance with Guide D 6001.

3.1.1 *assembly length, n*—length of sampler body and riser pipes.

3.1.2 *borehole, n*—a hole of circular cross-section made in soil or rock.

3.1.3 *casing, n*—pipe furnished in sections with either threaded connections or bevelled edges to be field-welded, which is installed temporarily or permanently to counteract caving, to advance the borehole, or to isolate the interval being monitored, or combination thereof.

3.1.4 *caving/sloughing, n*—the inflow of unconsolidated material into an unsupported borehole that occurs when the borehole walls lose their cohesive strength.

3.1.5 *decontamination, n*—the process of removing undesirable physical or chemical constituents, or both, from equipment to reduce the potential for cross-contamination.

3.1.6 *direct push sampling, n*—sampling devices that are advanced into the soil to be sampled without drilling or borehole excavation.

3.1.7 *extension rod, n*—hollow steel rod, threaded, in various lengths, used to advance and remove samplers and other devices during direct pushing boring. Also known as *drive rod.* In some applications, small diameter solid extension rods are used through hollow drive rods to activate closed samples at depth.

3.1.8 *incremental drilling and sampling, n*—insertion method where rotary drilling and sampling events are alternated for incremental sampling. Incremental drilling often is needed to penetrate harder or deeper formations.

3.1.9 *percussion driving, n*—insertion method where rapid hammer impacts are performed to advance the sampling device. The percussion normally is accompanied with the application of a static down-force.

3.1.10 *push depth, n*—the depth below a ground surface datum to which the lower end, or tip, of the direct-push sampling device is inserted.

3.1.11 *sample interval, n*—defined zone within a subsurface strata from which a sample is gathered.

3.1.12 *sample recovery, n*—the length of material recovered divided by the length of sampler advancement and stated as a percentage.

3.1.13 *soil core, n*—cylindrical shaped specimen of sediments or other unconsolidated accumulations of solid particles produced by the physical and chemical disintegration of rocks and which may or may not contain organic matter recovered from a soil sampler.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *closed barrel sampler, n*—a sampling device with a piston or other secured device that is held to block the movement of material into the barrel until the blocking device is removed or released. Liners are required in closed barrel samplers. Also may be referred to as a *protected type sampler.*

3.2.2 *impact heads/drive heads, n*—pieces or assemblies that fit to top of the above ground portion of the direct push tool assembly to receive the impact of the hammering device and transfer the impact energy to sampler extensions.

[3] *Annual Book of ASTM Standards*, Vol 04.08.
[4] *Annual Book of ASTM Standards*, Vol 11.02.
[5] *Annual Book of ASTM Standards*, Vol 04.09.

3.2.3 *open barrel sampler, n*—sampling barrel with open end allowing material to enter at any time or depth. Also may be referred to as an *unprotected type sampler.*

3.2.4 *piston lock, n*—device to lock the sampler piston in place to prevent any entry of a foreign substance into the sampler chamber prior to sampling.

3.2.5 *single tube system, n*—a system whereby single extension/drive rods with samplers attached are advanced into the subsurface strata to collect a soil sample.

3.2.6 *solid barrel sampler, n*—a soil sampling device consisting of a continuous or segmented tube with a wall thickness sufficient to withstand the forces necessary to penetrate the strata desired and gather a sample. A cutting shoe and a connecting head are attached to the barrel.

3.2.7 *split barrel sampler, n*—a soil sampling device consisting of the two half circle tubes manufactured to matching alignment, held together on one end by a shoe and on the other by a connecting head.

3.2.8 *two tube systems, n*—a system whereby inner and outer tubes are advanced simultaneously into the subsurface strata to collect a soil sample. The outer tube is used for borehole stabilization. The inner tube for sampler recovery and insertion.

4. Summary of Guide

4.1 Direct push soil sampling consists of advancing a sampling device into subsurface soils by applying static pressure, by applying impacts, or by applying vibration, or any combination thereof, to the above ground portion of the sampler extensions until the sampler has been advanced to the desired sampling depth. The sampler is recovered from the borehole and the sample removed from the sampler. The sampler is cleaned and the procedure repeated for the next desired sampling interval. Sampling can be continuous for full depth borehole logging or incremental for specific interval sampling. Samplers used can be protected type for controlled specimen gathering or unprotected for general soil specimen collection.

5. Significance and Use

5.1 Direct push methods of soil sampling are used for geologic investigations, soil chemical composition studies, and water quality investigations. Examples of a few types of investigations in which direct push sampling may be used include site assessments, underground storage tank investigations, and hazardous waste site investigations. Continuous sampling is used to provide a lithological detail of the subsurface strata and to gather samples for classification and index or for chemical testing. These investigations frequently are required in the characterization of hazardous waste sites. Samples, gathered by direct push methods, provide specimens necessary to determine the chemical composition of soils, and in most circumstances, contained pore fluids (**3**).

5.2 Direct push methods can provide accurate information on the characteristics of the soils encountered and of the chemical composition if provisions are made to ensure that discrete samples are collected, that sample recovery is maximized, and that clean decontaminated tools are used in the sample gathering procedure. For purposes of this guide, "soil" shall be defined in accordance with Terminology D 653. Using sealed or protected sampling tools, cased boreholes, and proper advancement techniques can assure good representative samples. Direct push boreholes may be considered as a supplementary part of the overall site investigation or may be used for the full site investigation if site conditions permit. As such, they should be directed by the same procedural review and quality assurance standards that apply to other types of subsurface borings. A general knowledge of subsurface conditions at the site is beneficial.

5.3 Soil strata profiling to shallow depths may be accomplished over large areas in less time than with conventional drilling methods because of the rapid sample gathering potential of the direct push method. More site time is available for actual productive investigation as the time required for ancillary activities, such as decontamination, rig setup, tool handling, borehole backfill, and site clean-up is reduced over conventional drilling techniques. Direct push soil sampling has benefits of smaller size tooling, smaller diameter boreholes, and minimal investigative derived waste.

5.4 The direct push soil sampling method may be used as a site characterization tool for subsurface investigation and for remedial investigation and corrective action. The initial direct push investigation program can provide good soil stratigraphic information depending on the soil density and particle size, determine ground water depth, and provide samples for field screening and for formal laboratory analysis to determine the chemical composition of soil and contained pore fluids. Use of this method, results in minimum site disturbance and no cuttings are generated.

5.5 This guide may not be the correct method for investigations in all cases. As with all drilling methods, subsurface conditions affect the performance of the sample gathering equipment and methods used. Direct push methods are not effective for solid rock and are marginally effective in partially weathered rock or very dense soils. These methods can be utilized to determine the rock surface depth. The presence or absence of ground water can affect the performance of the sampling tools. Compact gravelly tills containing boulders and cobbles, stiff clay, compacted gravel, and cemented soil may cause refusal to penetration. Certain cohesive soils, depending on their water content, can create friction on the sampling tools which can exceed the static delivery force, or the impact energy applied, or both, resulting in penetration refusal. Some or all of these conditions may complicate removal of the sampling tools from the borehole as well. Sufficient retract force should be available to ensure tool recovery. As with all borehole advancement methods, precautions must be taken to prevent cross contamination of aquifers through migration of contaminants up or down the borehole. Regardless of the tool size, the moving of drilling and sampling tools through contaminated strata carries risks. Minimization of this risk should be a controlling factor in selecting sampling methods and drilling procedures. The user should take into account the possible chemical reaction between the sample and the sampling tool itself, sample liners, or other items that may come into contact with the sample (**3, 4**).

5.6 In some cases this guide may combine water sampling,

or vapor sampling, or both, with soil sampling in the same investigation. Guides D 6001 and D 4700 can provide additional information on procedures to be used in such combined efforts.

6. Criteria for Selection

6.1 Important criteria to consider when selecting sampling tools include the following:

6.1.1 Size of sample.

6.1.2 Sample quality (Class A,B,C,D) for physical testing. Refer to Practice D 4220.

6.1.3 Sample handling requirements, such as containers, preservation requirements.

6.1.4 Soil conditions anticipated.

6.1.5 Ground water depth anticipated.

6.1.6 Boring depth required.

6.1.7 Chemical composition of soil and contained pore fluids.

6.1.8 Probability of cross contamination.

6.1.9 Available funds.

6.1.10 Estimated cost.

6.1.11 Time constraints.

6.1.12 History of tool performance under anticipated conditions (consult experienced users and manufacturers).

6.2 Important criteria to consider when selecting direct push equipment include the following:

6.2.1 Site accessibility.

6.2.2 Site visibility.

6.2.3 Soil conditions anticipated.

6.2.4 Boring depth required.

6.2.5 Borehole sealing requirements.

6.2.6 Equipment performance history.

6.2.7 Personnel requirements.

6.2.8 Decontamination requirements.

6.2.9 Equipment grouting capability.

6.2.10 Local regulatory requirements.

7. Apparatus

7.1 *General*—A direct push soil sampling system consists of a sample collection tool, hollow extension rods for advancement, retrieval, and transmission of energy to the sampler, and an energy source to force sampler penetration. Auxiliary tools are required to handle, assemble and disassemble, clean, and repair the sample collection tools and impact surfaces. Necessary expendable supplies are sample containers, sample container caps, sample liners, sample retainers, appropriate lubricants, and personal safety gear.

7.2 *Direct Push Tool Systems*:

7.2.1 *Two Tube System*—An outer casing and an inner extension rod with a sampler attached (see Fig. 1) are advanced simultaneously into the soil for the length capacity of the sampler. The sampler is removed from the borehole and a new sampler barrel or plug bit is inserted for each increment of depth. Two-tube sampling systems also may incorporate sample gathering chambers that are fitted into the outer casing shoe. These sample barrels are designed to create a minimum of sample disturbance while gathering high quality specimens (see Fig. 2). Samplers are held in the proper position by different methods, such as extension rods, pneumatic or mechanical packers, spring activated latches, or other devices (see Figs. 1 and 2). Locking devices must be strong enough to hold the sampler while penetrating the sample strata. The outer casing supports the borehole wall. Sample retrieval is expedited by the cased hole and continuous sampling is simplified. Continuous sampling may be a benefit to lithological logging. A cased borehole can be sealed from the bottom up as the casing is extracted (see Section 10). A cased hole may reduce the risk of contamination migration down the borehole and sample cross contamination. The two-tube system is more susceptible to soil friction because of its larger diameter and may require larger direct push energy than single-tube systems. An oversized drive shoe is sometimes used to reduce friction and buckling but may increase the risk of contamination migration down the borehole.

7.2.2 *Single Tube System*—The single tube system (see Fig. 3), uses a hollow extension/drive rod to advance and retrieve the sampler. The sampler is attached to the bottom of the extension/drive rod. A drive cap is added to the top of the extension/drive rod and the sampler is pushed into the soil. Extension/drive rods generally are smaller in diameter than the sampler. The single tube system minimizes effort for discrete interval sampling under many subsurface conditions. Tool connection time per interval is reduced. Time of removal and reinsertion of samplers into the borehole is affected by soil conditions. Repeated movement of the sampler through contaminated subsurface strata may increase the risk of contamination migration down the borehole. Bottom up borehole sealing may require re-entry in soil formations that collapse (see Section 10).

7.3 *Samplers*:

7.3.1 *Split Barrel Samplers*—Split barrel samplers (see Fig. 4) are available for use with direct push drilling methods and are available in various sizes up to 3.0 in. (76.2-mm) inside diameter. The inside tolerance should allow for use of liners. Split barrel sampler shoes used in two tube systems must be of sufficient diameter to prevent the intrusion of soil between the outer diameter of the shoe and the inside wall of the outer tube. Split barrel shoes should be replaced when the leading edge is damaged. Damaged shoes can negatively affect sample recovery. Samplers can be used with or without ball check value fitted split barrel heads. The ball check prevents uphole fluids from flowing down through the sample. Where soil sampling will be performed below the water table, the split barrel head, equipped with a ball check, should be used. The open split barrel is best used with the two tube system because the outer casing protects the borehole against cave-in or sloughing, or in soils in which the borehole wall will not collapse. Split barrel sealing systems are available. Split barrel sections can be joined to create a sampler with a nominal sample length capacity of 48 in. (1.22 m). It is understood that samplers with usable lengths beyond 24 in. (0.61 m) are used to advantage in certain soil types; however, the added weight of the soil sample in the chamber and the added friction within the sampler may prevent loose soils from entering the sampler, affecting sample recovery and representativeness. Split barrel samplers can be fitted with a basket to improve recovery in cohesionless soils. Retainers are available in many styles and materials. Retainers

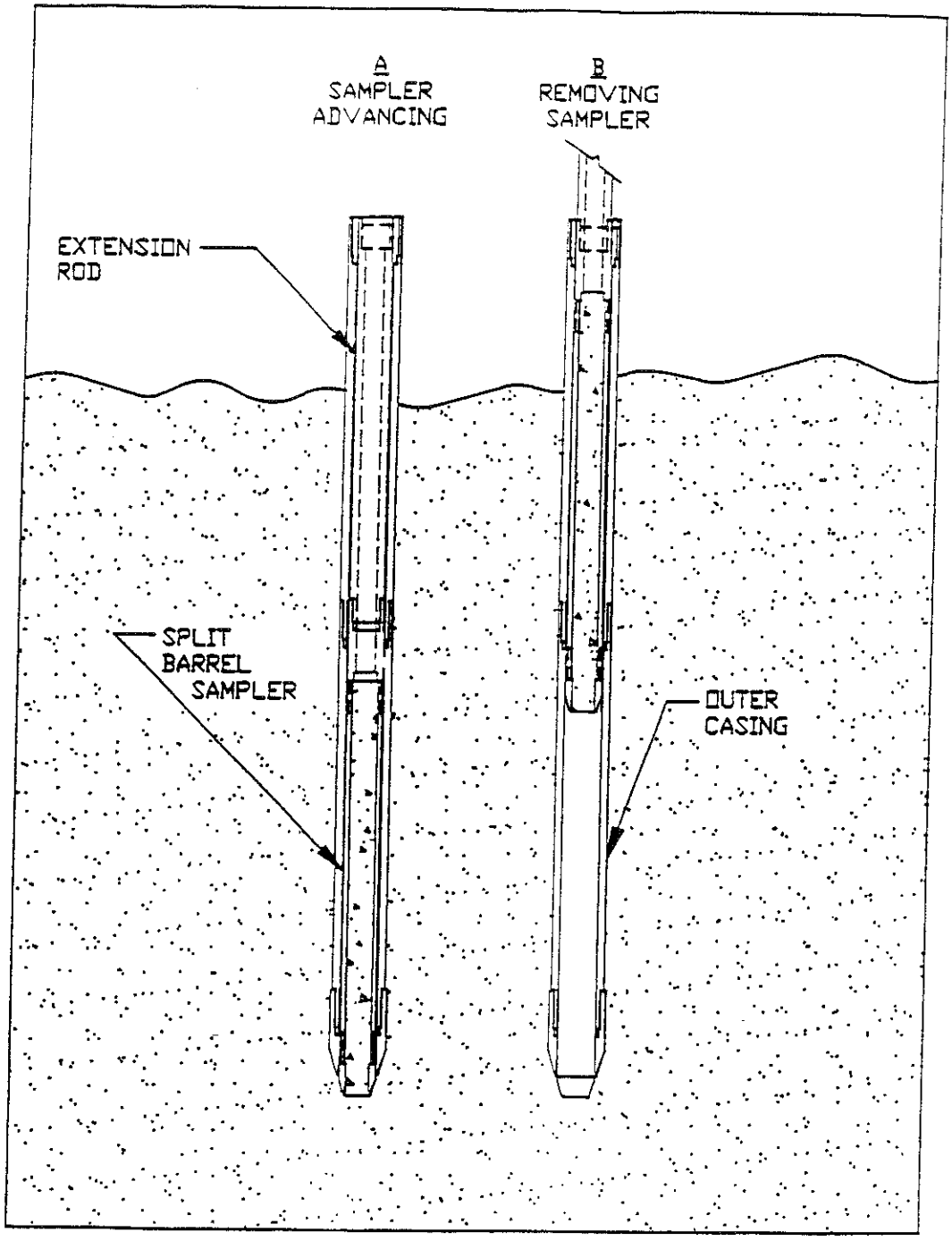


FIG. 1 Split Spoon Sampling, Two Tube System

should allow the passage of softer soils. Stiff retainers can reduce specimen recovery in soft soils.

7.3.2 *Solid Barrel Samplers*:

7.3.2.1 *Open Solid Barrel Samplers*—Open solid barrel (see Fig. 5) samplers are used with all types of direct push sampling systems. Solid barrels can have inside diameters ranging up to 3 in. (76.2 mm). Barrel lengths range from 6 in. (152.4 mm) to 5 ft (1.53 m). Solid barrel samplers may be one piece or segmented. Sample liners should be used to facilitate removal of the sample from the solid barrel. Without the use of liners, samples are extruded mechanically. Liner lengths should fit sampler barrel lengths. Solid barrel samplers are generally assembled with a removable cutting shoe and a drive head (see Fig. 6). The head provides a backing to hold the liner stationary while the sampler is advanced and serves as a connector to the extension/drive rods. The shoe is manufactured to hold the liner stationary during the soil collection procedure. The liner should be slightly larger than the inner diameter of the cutting shoe. It may be slipped over the cutting shoe (see Fig. 6) or nested inside of the cutting shoe (see Fig. 7). The shoe is manufactured to cut the sample to a slightly undersized diameter allowing it to pass into the sample liner with a minimum of side friction to reduce sample disturbance. The amount of specimen contact with the inside of the shoe should

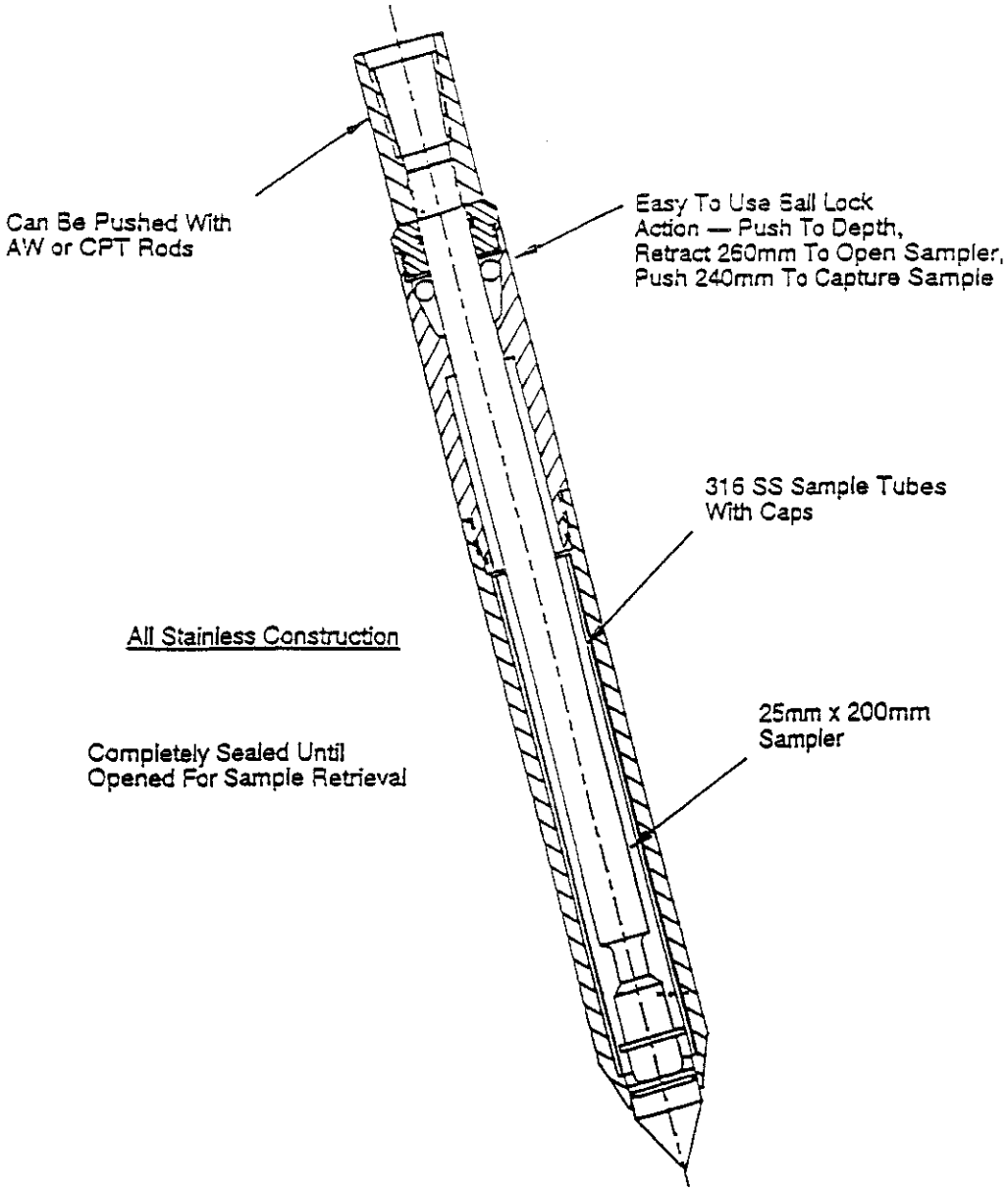


FIG. 2 Sealed Sample Barrel, Single Tube System

be held to the minimum distance possible to aid in achieving the maximum amount of recovery.

7.3.3 *Closed Barrel Sampler*—Closed barrel samplers (see Figs. 2 and 3, Figs. 5-8) are devices, which remain sealed shut until an action is taken to open the sample receiving chamber. These samplers are used most often for single events (discrete point sampling) where a sealed sampler is required to avoid cross contamination or in circumstances where borehole wall stability cannot be assured. The shoe sealing device generally is a point designed to allow the continuous flow of soil around and past the sampler until such time as it is removed or released. The piston point can be fitted with seals, such as "O" rings at top and bottom to hold fluid out until sampling the desired interval. The piston rod extends through the sample retaining liner and must be released or removed for the soil to enter (see Fig. 3, Fig. 5, Fig. 7). The piston can be removed manually before sampling or be displaced by the soil entering the sampler chamber. Using the displacement method can result in reduced recovery if sampled soils do not have sufficient strength to displace the piston. Pistons are locked in place by several methods, such as a spring loaded latch. The latch holds several balls (see Fig. 2, Fig. 7, Fig. 8) into a groove in the latch coupling. When the latch is released by lifting up on the latch stem, the balls slip back into the latch chamber allowing the piston to be removed. Another method uses a locking screw. A reverse thread pin (Fig. 3, Fig. 6) is positioned in the sampler head to prevent the piston from being displaced by the soil when advancing the sampler. At the sampling interval, small diameter extension rods are inserted through the sampler extension/drive rods and rotated clockwise to unscrew the locking pin. A third method uses an inflated packer. An inflated packer (see Fig. 9) is attached to the top of the sampler barrel. The sample barrel is lowered into position in the drive casing and the packer inflated. The packer is deflated to release

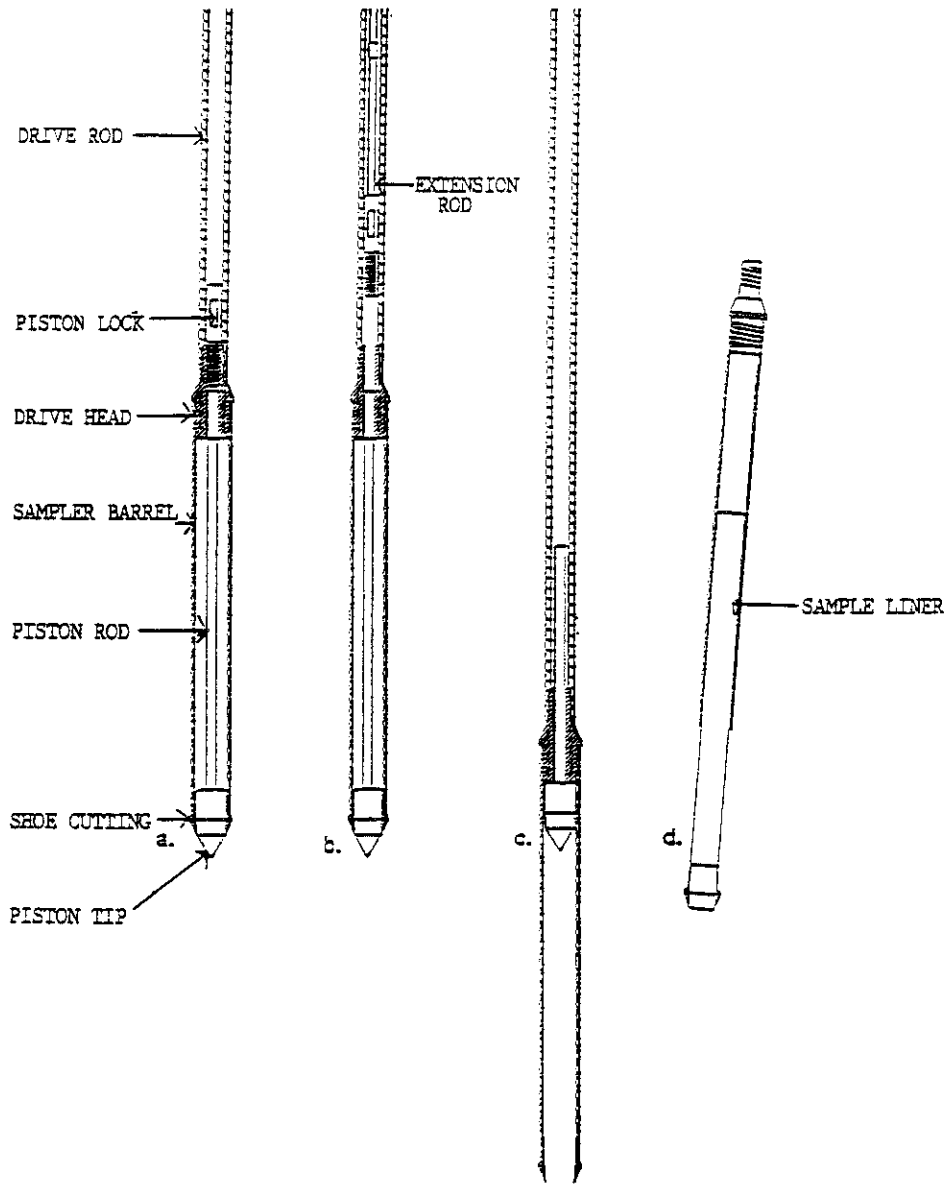


FIG. 3 Driving and Sampling, Single Tube System

(a) Driving the sealed sampler. (b) Removing the stop-pin.
(c) Collecting a sample (d) Recovering sample in liner.

and the sample barrel is recovered after being advanced the sampling interval.

7.3.4 *Thin Wall Tube*—A 1.0-in. (25.4-mm) diameter thin wall tube (see Fig. 10) is available for use with direct push equipment and is manufactured according to Practice D 1587. Thin wall tubes can be effective when used with dual tube direct push systems as the borehole must be kept clear of disturbed soil prior to gathering a sample. Thin wall tubes may be effective in cohesive soils with single tube systems when the borehole can be kept clear of disturbed soil. Thin wall tubes must have an outside diameter that will allow passage through the outer casing. The thin wall tube can be operated in accordance with Practice D 1587, or it can be advanced using the percussion hammer of the direct push equipment. The primary use of the thin wall tube is to gather relatively undisturbed samples in cohesive soils. Sealing of thin wall tube ends should be completed in accordance with Practice D 4220. Fixed piston apparatus (see Fig. 10) also is available for use with thin walled tubes. The fixed piston action allows the sampling of very soft formations, which may not be retained in conventional samplers. In certain soil formations, the thin wall tube provides the best method to collect an undisturbed sample.

7.3.5 *Sampler Extension/Drive Rods*—Sampler extension/drive rods are lengths of rod or tube generally constructed of steel to withstand the pushing or percussion forces applied. Extension drive rods are available in various lengths. Rod lengths should be mated with casing and sampling equipment used. Thread types and classes vary between equipment manufacturers. Rod joints can be sealed to prevent fluid intrusion with "O" rings. Teflon® washers or Teflon® tape. Because of the percussive effort, joint seals should be checked for each sampling effort. Extension/drive rods should have

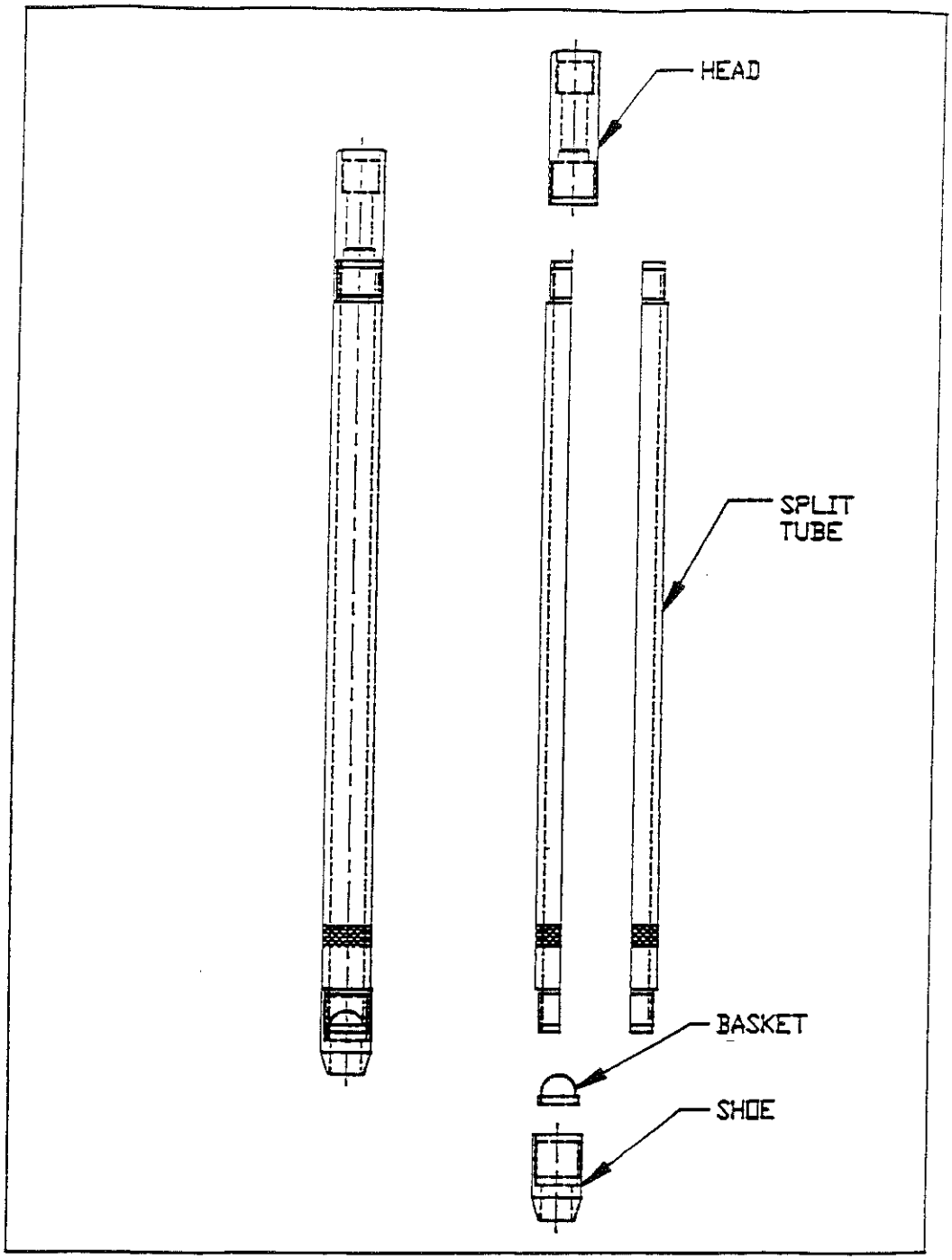


FIG. 4 Split Barrel Sampler, Two Tube System

sufficient inside diameter to accommodate the equipment necessary to perform the desired action.

7.3.6 *Sampler Liners*—Sampler liners are used to collect and store samples for shipment to laboratories, for field index testing of samples and for removing samples from solid barrel type samplers. Liners are available in plastics, Teflon®, brass, and stainless steel. Other materials can be used as testing needs dictate. Liners are available in lengths from 6 in. (152.4 mm) to 5.0 ft (1.53 m). Liner material selection often is based on the chemical composition of liner/soil to minimize sample reaction with liner. Most liner use is short term as samples are subsampled and preserved immediately on site. A general rule for liner selection is stainless steel for organic compounds and plastic for metals. Teflon® may be required for mixed wastes and for long time storage. Liners should be sealed in accordance with Practice D 4220 when samples are collected for physical testing. Other appropriate procedures must be used when samples are collected for environmental analysis (see Practices D 3694) (**1, 2**). Liners generally are split in the field for subsampling. Individually split liners are available in some sizes for field use. The liner should have a slightly larger inside diameter than the soil specimen to reduce soil friction and

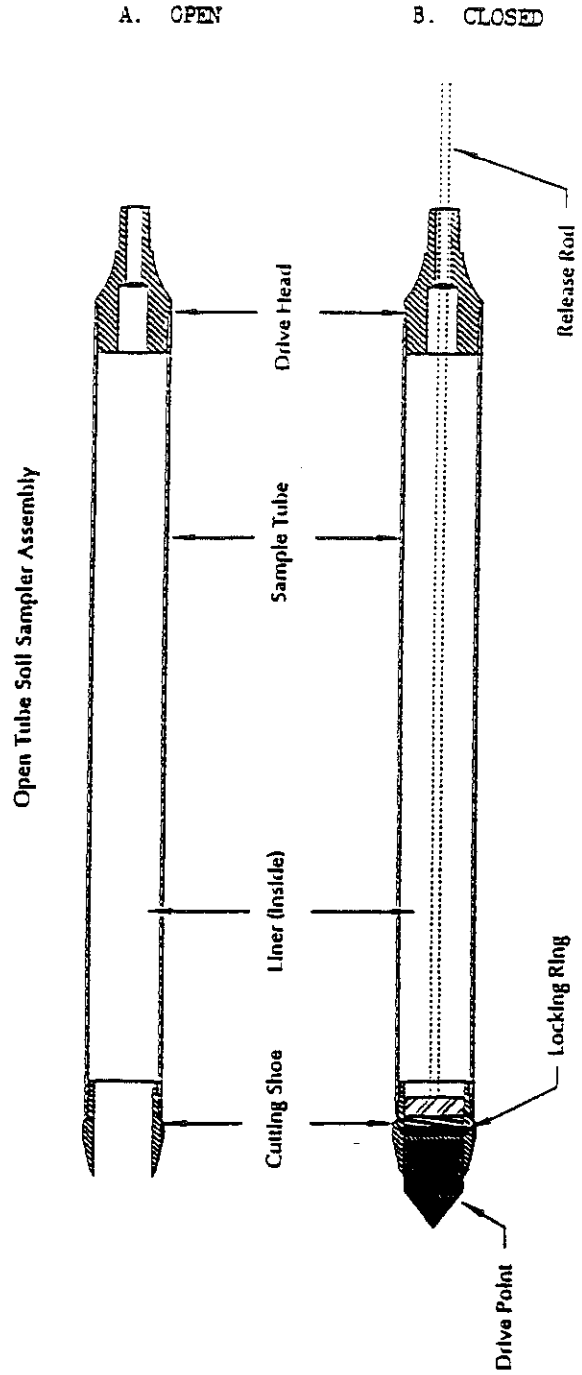


FIG. 5 (A) Open and (B) Closed Piston Sampler Assembly, Single Tube System

enhance recovery. When a slightly oversized liner is used, the potential for air space exists around the sample. Certain chemical samples may be affected by the enclosed air. Liners having less tolerance may be required and a shortened sampled interval used to reduce friction in the liner. Metal liners can be reused after proper cleaning and decontamination. Plastic liners should be disposed of properly after use.

7.3.7 *Sample Containers*—Sample containers should be prescribed according to the anticipated use of the sample specimen. Samples taken for chemical testing may require decontaminated containers with specific preservatives. Practice D 3694 provides information on some of the special containers and preservation techniques required (**1**, **2**). These containers generally will be decontaminated to specific criteria. Samples for geotechnical testing require certain minimum volumes and specific handling techniques. Practice D 4220 offers guidance for sample handling of samples submitted for physical testing.

7.4 *Direct Push Power Sources*—Soil probing percussion driving systems, penetrometer drive systems, and rotary drilling equipment may be used to drive casings and direct push soil sampling devices. The equipment should be capable of applying sufficient static force, or dynamic force, or both, to advance the sampler to the required depth to gather the desired sample. The system must have adequate retraction force to

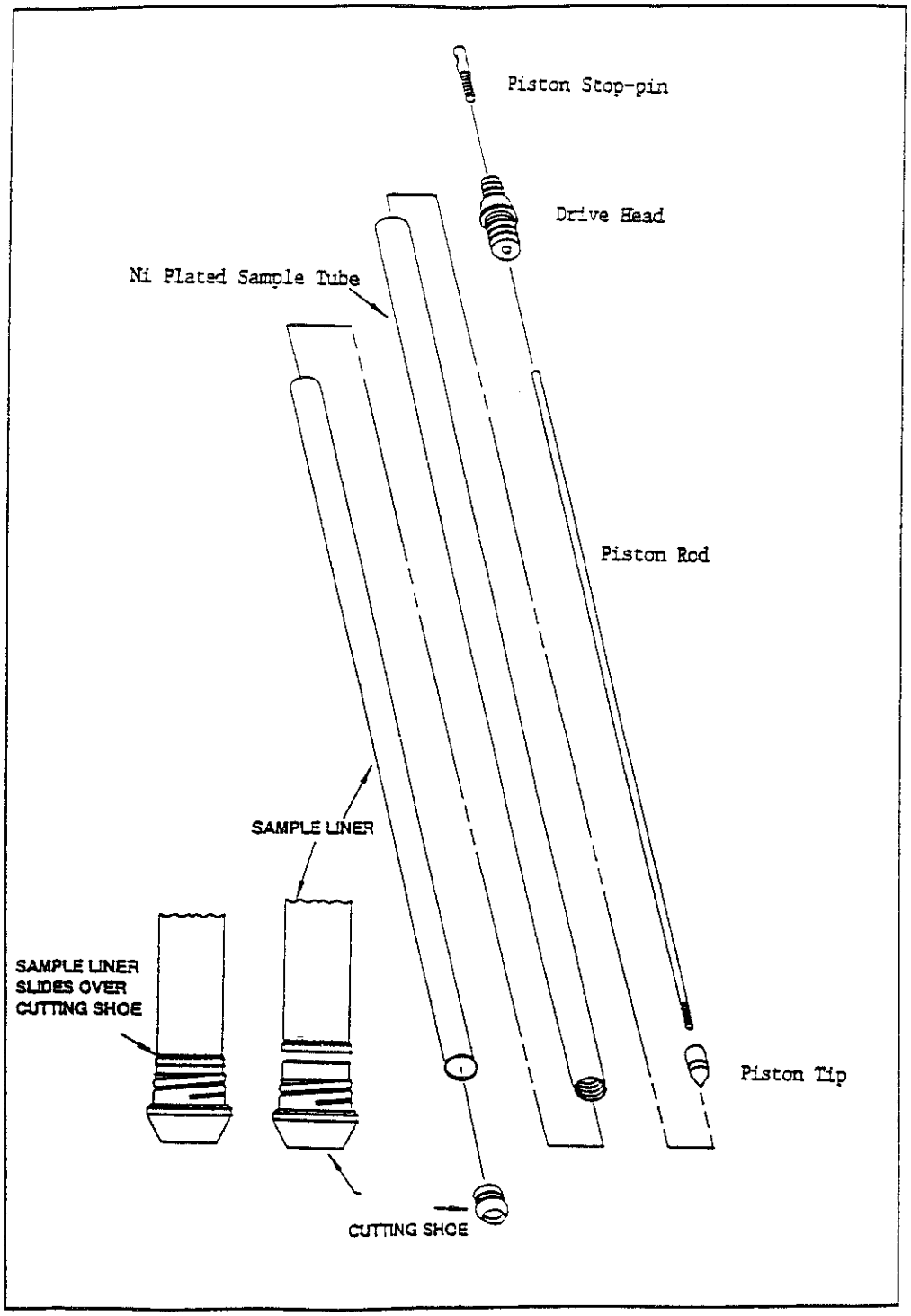


FIG. 6 Sampler Parts, Single Tube System

remove the sampler and extension/drive rods once the selected strata has been penetrated. Rotation of the drill string can be added during insertion, as well as during retraction if the drive system can impart rotation.

7.4.1 *Retraction Force*—The retraction force can be applied by direct mechanical pull back using the hydraulic system of the power source; line pull methods using mechanical or hydraulic powered winches, or cathead and rope windlass type devices. Winches used with direct push technology should have a minimum of 2000 lb (907 kg) top layer rating capacity and a line speed of 400 ft (121.96 m)/min to provide effective tool handling. Direct push sampling tools can be retracted by back pounding using weights similar to those of standard penetration testing practices. Backpounding to recover samples can affect recovery and cause disturbances to the sample. Other forms of extraction, such as jacking, that do not cause undue disturbance to the sample, are preferable.

7.4.2 *Percussion Devices*—Percussion devices for use with

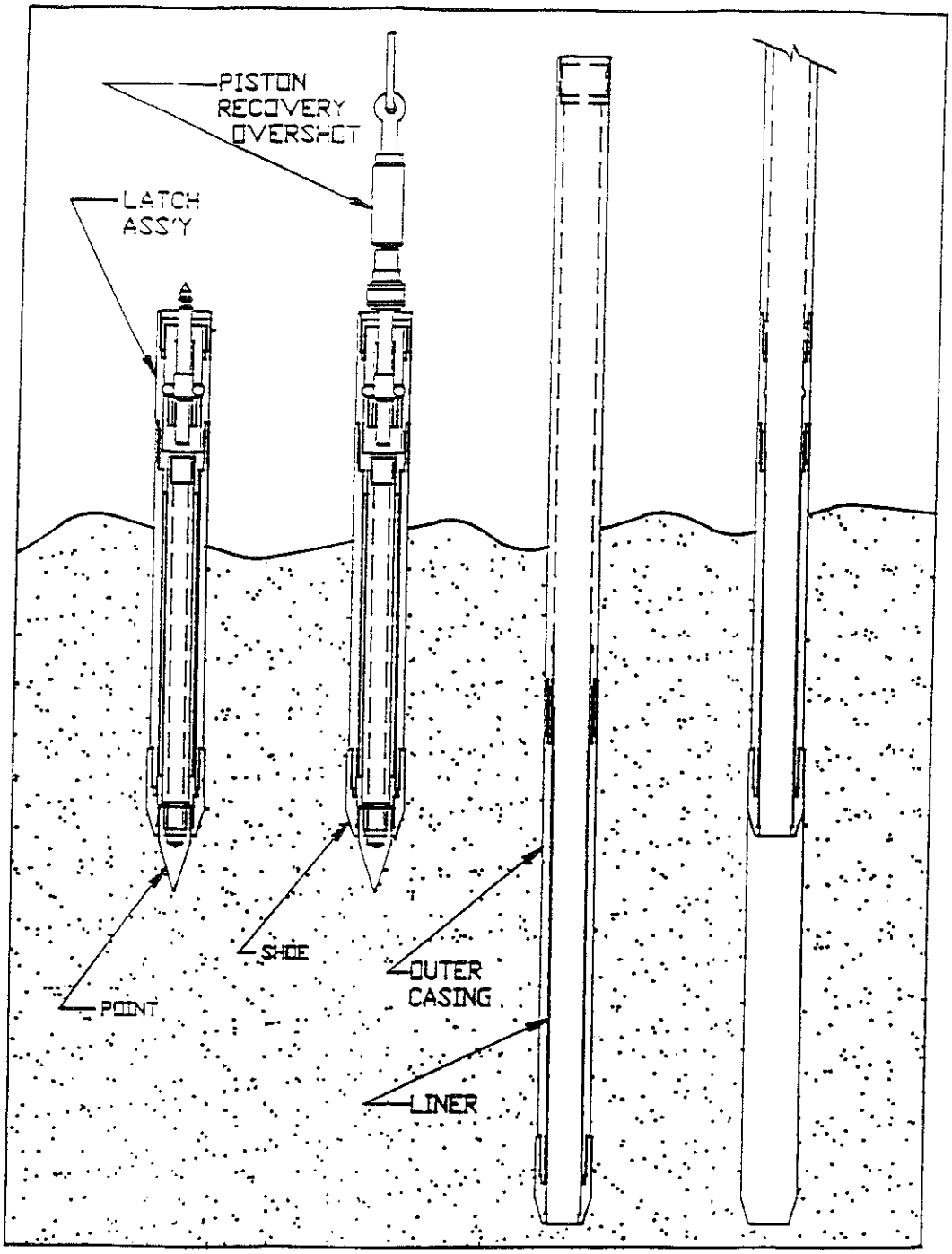


FIG. 7 Closed Solid Barrel Sampler, Single Tube System

direct push methods are hydraulically-operated hammers, air-operated hammers, and mechanically-operated hammers. Hydraulically-operated hammers should have sufficient energy to be effective in moving the samplers through the subsurface strata. The maximum energy application is dependent on the tools used. Hammer energy that exceeds tool tolerance will result in tool damage or loss and will not achieve the goal of collecting high quality samples. Air-operated hammers should be capable of delivering sufficient energy, as well. Hammer systems utilizing hydraulic oil or air should be operated in the range specified by the manufacturer. Manually-operated hammers can be used to advance direct push tools. These hammers can be operated mechanically or manually using cathead and rope. These systems generally involve using 140 lb, standard penetration (see Test Method D 1586) hammers, which can work well for direct push sampling. In operation, these hammers tend to be slower than hydraulic hammers and can cause tool damage if direct push tools are not designed to take the heavy blows associated with these hammers. The hydraulic- and air-operated hammers strike up to 2000 blows/min. In addition to the energy transferred, the rapid hammer action sets up a vibratory effect, which also aids in penetration.

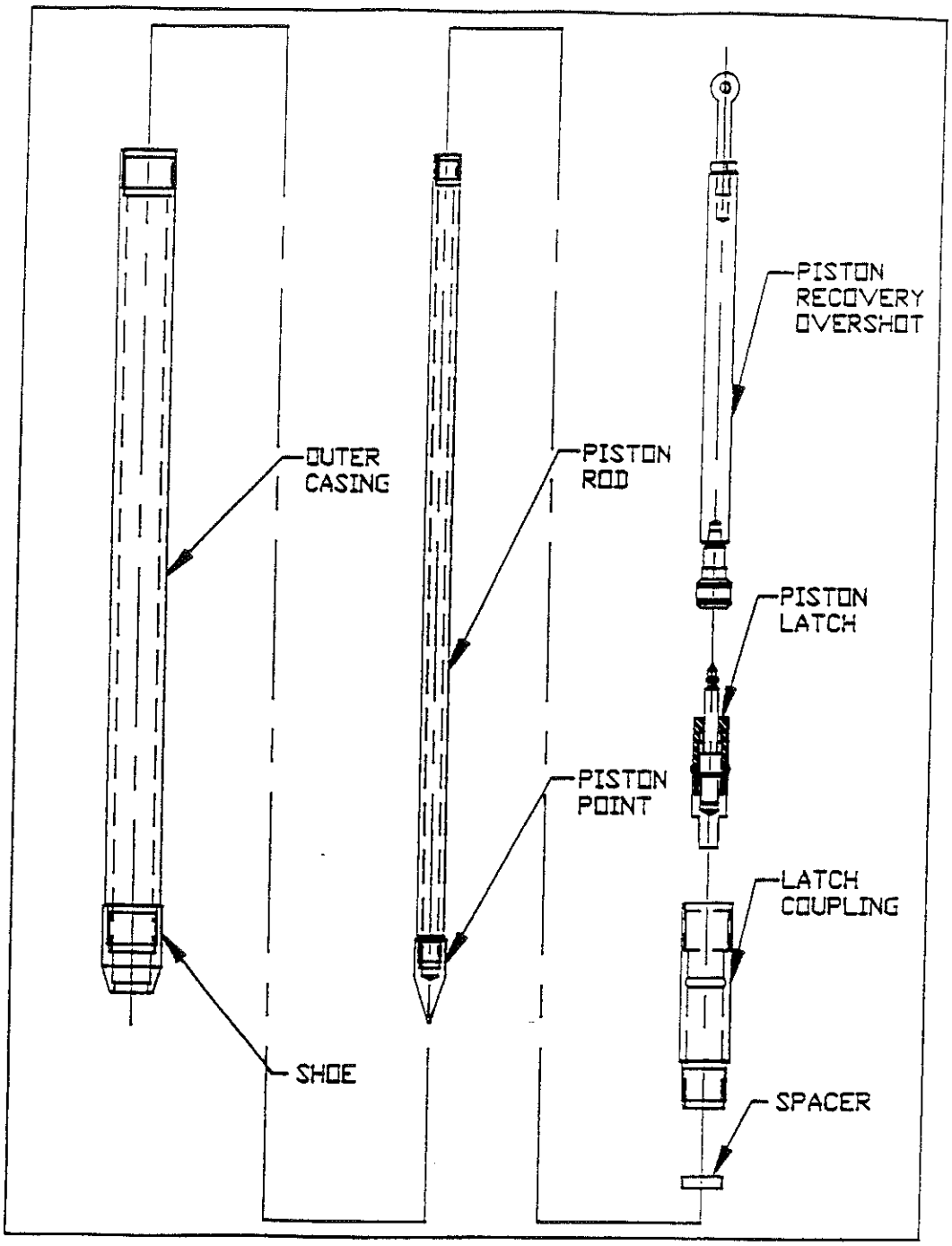


FIG. 8 Closed Solid Barrel Sampler, Single Tube System

This vibratory effect, along with the percussive effort, may disturb some soil samples.

7.4.3 *Static Push Systems*—Cone penetrometer systems are an example of static push systems. They impart energy to the sampler and extension rods by using hydraulic rams to apply pressure. The pressure applied is limited to the reactive weight of the drive vehicle. Retraction of the sampler and extension rods is by static pull from the hydraulic rams.

7.4.4 *Vibratory/Sonic Systems*—These systems utilize a vibratory device, which is attached to the top of the sampler extension rods. Reactive pressure and vibratory action are applied to the sampler extensions moving the sampler into the formation. In certain formations, sample recovery and formation penetration is expedited; however, all formations do not react the same to vibratory penetration methods.

7.4.4.1 *Sonic or Resonance Drilling Systems*—These are high powered vibratory systems that can be effective in advancing large diameter single or dual tube systems. They generally have depth capabilities beyond the smaller direct push systems.

7.4.5 *Rotary Drilling Equipment*—Direct push systems are readily adaptable to rotary drill units. The drill units offer a ready hydraulic system to operate percussion hammers, as well as reactive weight for static push. Because most drills are

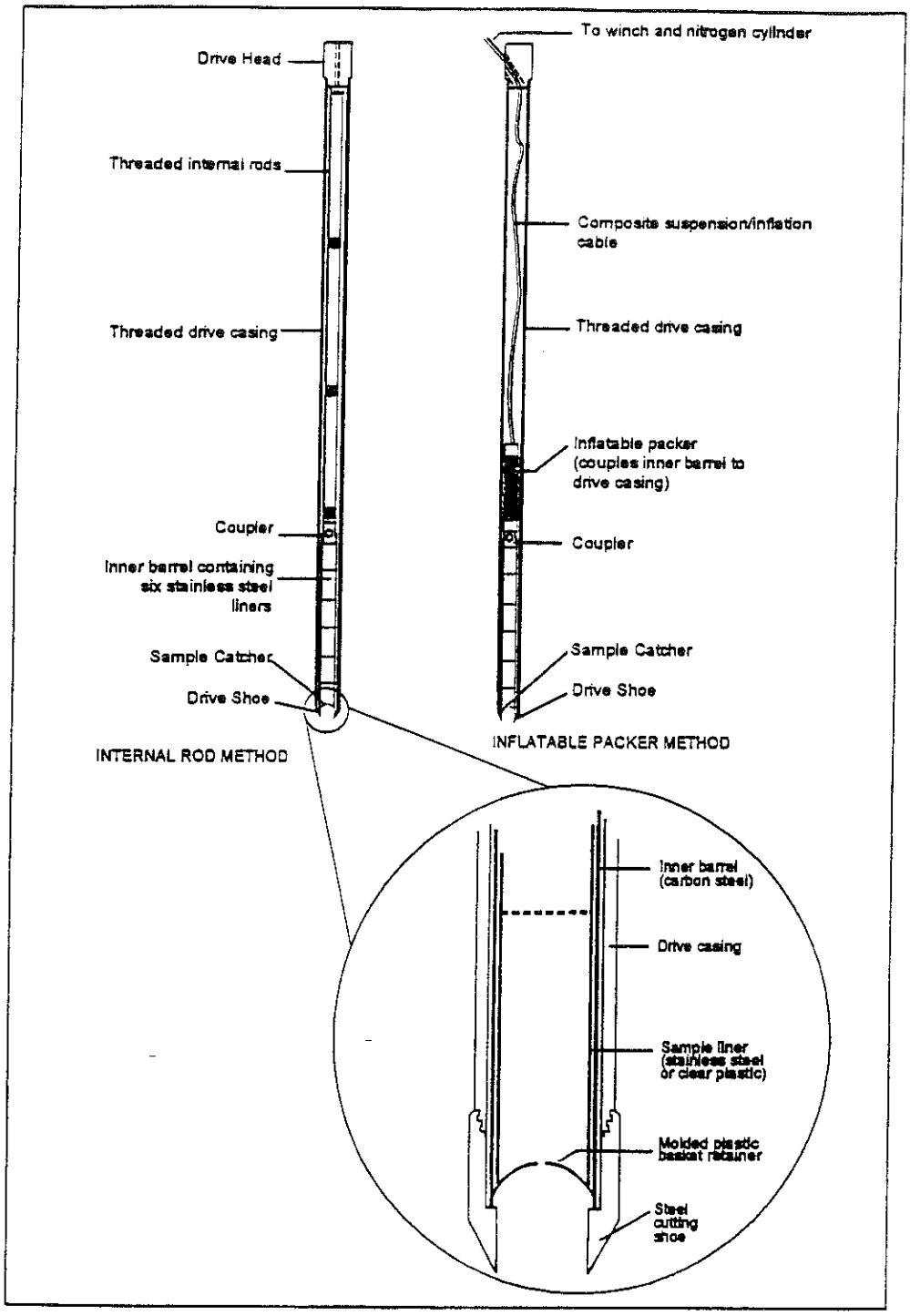


FIG. 9 Sampler Holding Methods, Two Tube System

equipped with leveling jacks, better weight application is achieved. Vertical pushing is improved because of the ability to level the machine. Tool handling is facilitated by high speed winches common to drilling rigs, extended masts for long tool pulls, and longer feed stroke length. Drill units with direct push adaptations also offer drilling techniques should obstacles be encountered while using direct push technology. Large drill units may have reactive weights that can exceed the tool capacity, thereby resulting in damaged tools.

8. Conditioning

8.1 *Decontamination*—Sampling equipment that will contact the soil to be sampled should be cleaned and decontaminated before and after the sampling event. Extension rods should be cleaned prior to each boring to avoid the transfer of contaminants and to ease the connecting of joints. Thread maintenance is necessary to ensure long service life of the tools. Sample liners should be kept in a sealed or clean

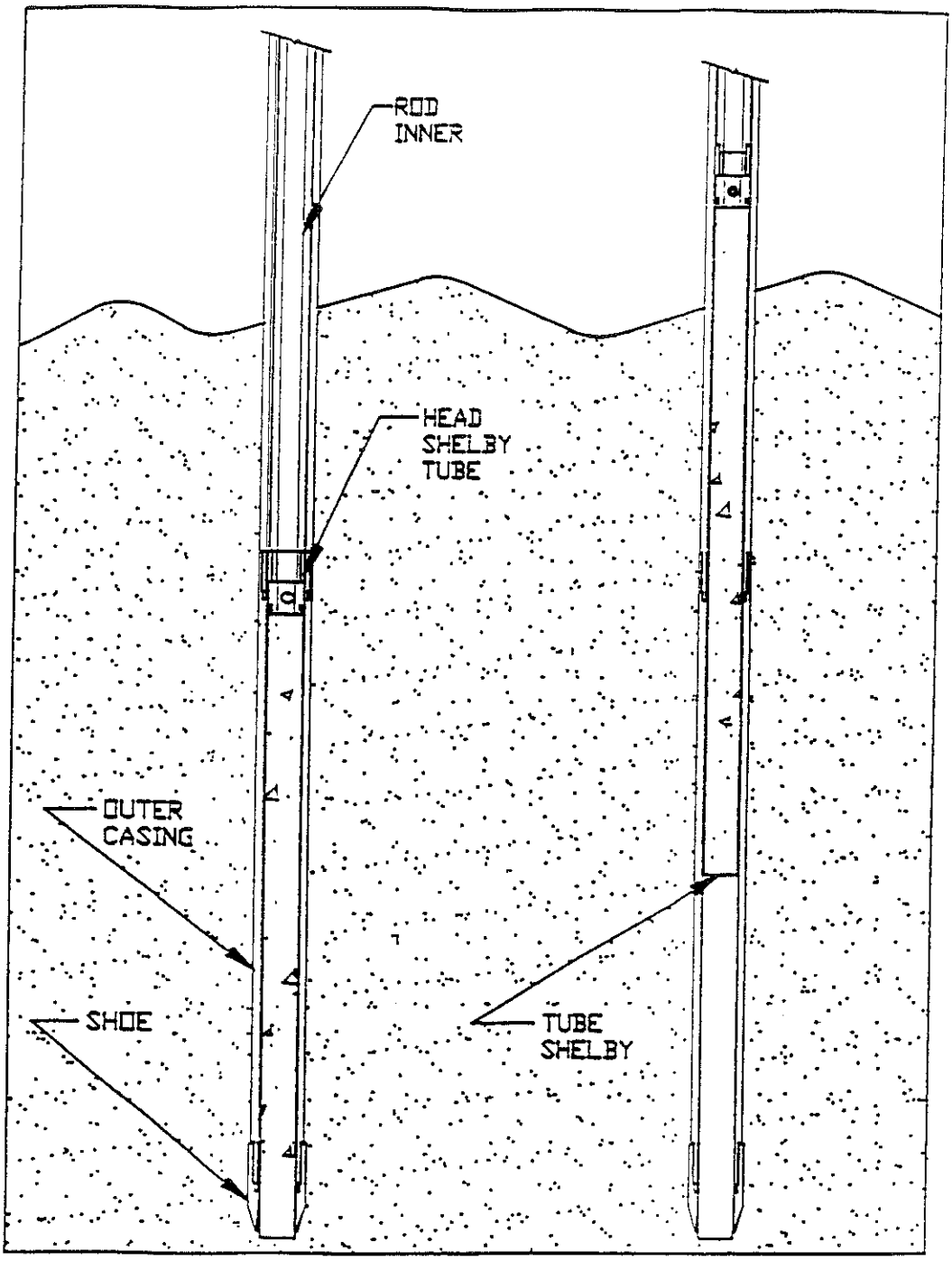


FIG. 10 Thin Wall Tube Sampler, Two Tube System

environment prior to use. Reusable liners should be decontaminated between each use. All ancillary tools used in the sampling process should be cleaned thoroughly, and if contaminants are encountered, decontaminated before leaving the site. It should not be assumed that new tools are clean. They should be cleaned and decontaminated before use. Decontamination should be performed following procedures outlined in Practice D 5088 along with any site safety plans, sampling protocols, or regulatory requirements.

8.2 *Tool Selection*—Prior to dispatch to the project site an inventory of the necessary sampling tools should be made. Sample liners, containers, sampling tools, and ancillary equipment should be checked to ensure its proper operation for the work program prescribed. Sampling is expedited by having two or more samplers on site. Since samples can be recovered quite fast, a supply of samplers will allow a boring to be completed so other functions can be performed while samples are being processed. A backup tool system adaptable to and within the capabilities of the power source should be available should the original planned method prove unworkable. Materials for proper sealing of boreholes should always be available at the site (5-7).

9. Procedure

9.1 While procedures for direct push soil sampling with two common direct push methods are outlined here, other systems may be available. As long as the basic principles of practice relating to sampler construction and use are followed, other systems may be acceptable.

9.2 *General Set-Up*—Select the boring location and check for underground and overhead utilities and other site obstructions. Establish a reference point on the site for datum measurements, and set the direct push unit over the boring location. Stabilize and level the unit, raise the drill mast or frame into the drilling position, and attach the hammer assembly to the drill head if not permanently attached. Attach the anvil assembly in the prescribed manner, slide the direct push unit into position over the borehole, save a portion of the sliding distance for alignment during tool advancement, and ready the tools for insertion.

9.2.1 *Tool Preparation*—Inspect the direct push tools before using, and clean and decontaminate as necessary. Inspect drive shoes for damaged cutting edges, dents, or thread failures as these conditions can cause loss of sample recovery and slow the advancement rate. Where permissible, lubricate rod joints with appropriate safe products, and check impact surfaces for cracks or other damage that could result in failure during operations. Assemble samples and install where required, install sample retainers where needed, and install and secure sampler pistons to ensure proper operation where needed.

9.2.2 *Sample Processing*—Sample processing should follow a standard procedure to ensure quality control procedures are completed. View sample in the original sampling device, if possible. Open the sampling device with care to keep disturbance to a minimum. When using liners or thin wall tubes, protect ends to prevent samples from falling out or being disturbed by movement within the liner. Measure recovery accurately, containerize as specified in the work plan or applicable ASTM procedures, and label recovered samples with sufficient information for proper identification. When collecting samples for volatile chemical analysis, sample specimens must be contained and preserved as soon as possible to prevent loss of these components. Follow work plan instructions or other appropriate documents (see Practice D 3694) when processing samples collected for chemical analysis.

9.3 *Two Tube System*:

9.3.1 *Split Barrel Sampling (see Fig. 1)*—Assemble the outer casing with the drive shoe on the bottom, attach the drive head to the top of the outer casing, and attach the sampler to the extension rods. Connect the drive head to the top of the sampler extension rods, and insert the sampler assembly into the outer casing. The sampler cutting shoe should contact the soil ahead of the outer casing to prevent unnecessary sample disturbance. The split spoon cutting shoe should extend a minimum of 0.25 in. (6.25 mm) ahead of the outer casing. Greater extensions may improve recovery in soft formations. Mark the outer casing to designate the required drive length, position the outer casing and sampler assembly under the drill head, and move the drill head downward to bring pressure on the tool string. If soil conditions allow, advance the sampler/casing assembly into the soil at a steady rate slow enough to allow the soil to be cut by the shoe and move up inside the sample barrel. If advancement is too rapid, it can result in loss of recovery because of soil friction in the shoe. Occasional hammer action during the push may help recovery by agitating the sample surface. If soil conditions prevent smooth static push advancement, activate the hammer to advance the sampler. Apply a continuous pressure while hammering to expedite soil penetration. The pressure required is controlled by subsurface conditions. Applications of excessive down pressure may result in the direct push unit being shifted off the borehole causing misalignment with possible tool damage. Stop the hammer at completion of advancement of the measured sampling barrel length. Release the pressure and move the drill head off the drive head. Attach a pulling device to the extension rods or position the hammer bail and retrieve the sampler from the borehole. At the surface remove the sampler from the extension rods and process. Soil classification is accomplished easily using split barrel samplers as the specimen is available readily for viewing, physical inspection and subsampling when the barrel is opened. Clean, decontaminate, and reassemble the sampler. Reattach the sampler to the extension rod, add the necessary extension rod and outer casing to reach the next sampling interval, and sound the borehole for free water before each sample interval. If water is present, it may be necessary to change sampling tools. Unequal pressure inside the casing may result in blow-in of material disturbing the soil immediately below the casing. Lower the sampler to its proper position, add the drive heads, and repeat the procedure. If it is desired that the pass through certain strata without sampling, install an extension rod point in lieu of the sampler. When the sampling interval is reached, remove the point and install the sampler. Advance the sampler as described. Upon completion of the borehole, remove the outer casing after instrumentation has been set or as the borehole is sealed as described in Section 10 (6).

9.3.2 *Two Tube System—Other Samplers*:

9.3.2.1 *Thin Wall Tubes*—Thin wall tubes (see Fig. 10) can be used with the dual tube system. Attach the tube to the tube head using removable screws. Attach the tube assembly to the extension rods and position at the base of the outer casing shoe protruding a minimum of 0.25 in. (6.25 mm) to contact the soil ahead of the outer casing. Advance the tube, with or without the outer casing, at a steady rate similar to the requirements of Practice D 1587. At completion of the advancement interval, let the tube remain stationary for 1 min. Rotate the tube slowly two revolutions to shear off the sample. Remove the tube from the borehole, measure recovery, and classify soil. The thin wall tube can be field extruded for on-site analysis or sealed in accordance with Practice D 4220 and sent to the laboratory for processing. Samples for environmental testing generally require the subsampling and preservation of samples in controlled containers. Soil samples generally are removed from the sampling device for storage and shipping. Thin wall tubes should be cleaned and decontaminated before and after use.

9.3.2.2 *Thin Wall Tube Piston Sampler (see Fig. 11)*—Check the fixed piston sampling equipment for proper operation of the cone clamping assembly and the condition of the

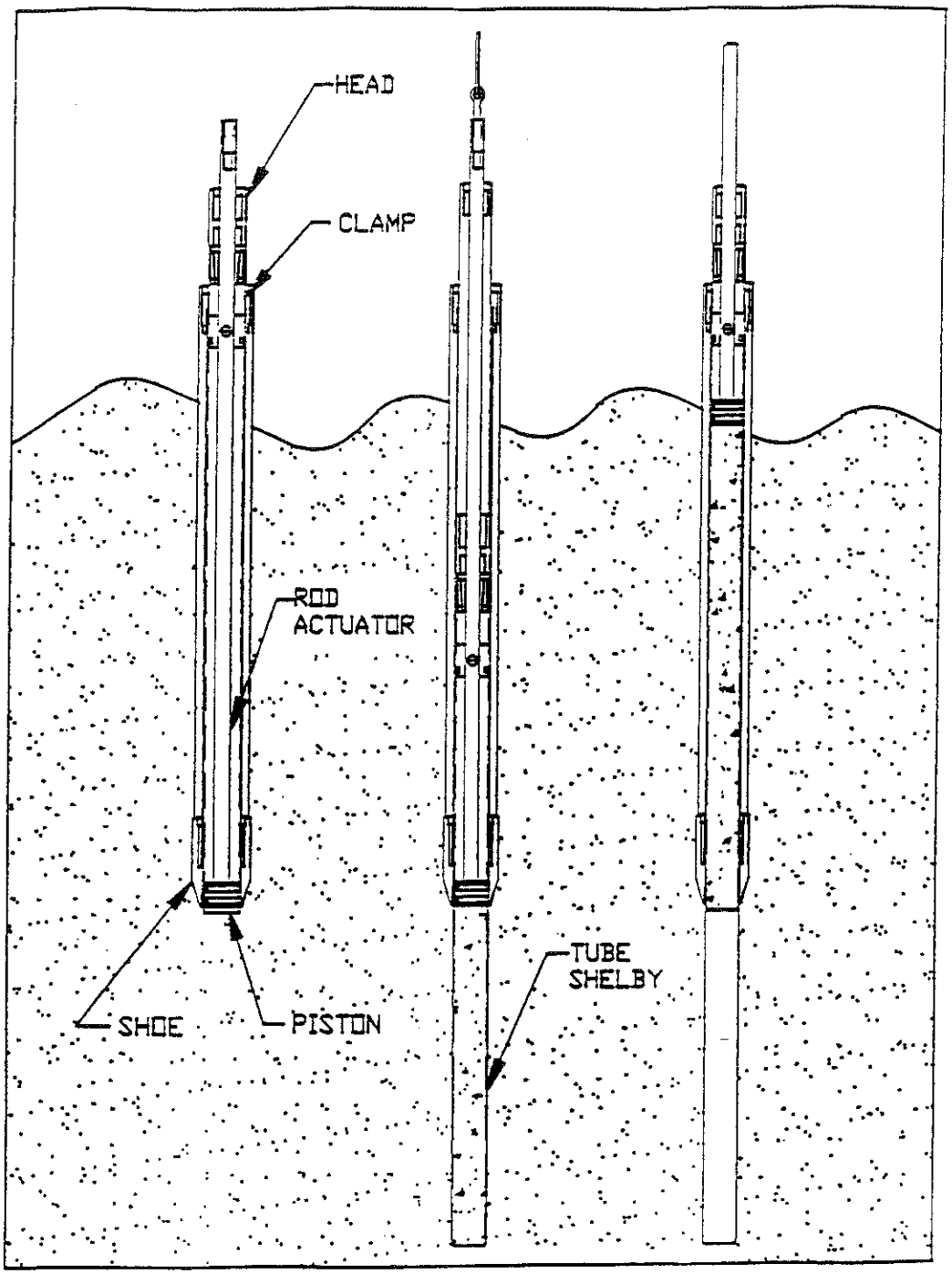


FIG. 11 Fixed Piston Sampler, Two Tube System

sealing "O" rings. Slide the thin wall tube over the piston, and attach it to the tube head. Position the piston at the sharpened end of the thin wall tube just above the sample relief bend. Attach the sampler assembly to the extension rods, and lower the sampler into position through the outer casing. Install the actuator rods through the extension rod, and attach to the actuator rod in the sampler assembly. Attach a holding ring to the top of the actuator rod string, and hook the winch cable or other hook to the holding ring to hold the actuator rods in a fixed position. Attach the pushing fork to the drill head/probe hammer, and slowly apply downward pressure to the extension rods advancing the thin wall tube over the fixed piston into the soil for the sample increment. Rest sampler 1 min to allow sample to conform to tube. Rotate tube one revolution to shear off sample. Remove sampler assembly from borehole and process sample (**6**).

9.3.2.3 *Open Solid Barrel Samplers*—Use solid barrel samplers in advance of the outer casing where the soil conditions could cause swelling of split barrel samplers, or where friction against the outer casing precludes its advancement and sampling must still be accomplished. The solid, single, or segmented barrel sampler requires the use of liners for removal of

the sample. The sampler must be cleaned and decontaminated before use. Use of the sampler follows the procedure described in 9.3.1.

9.4 *Single Tube System*:

9.4.1 *Open Solid Barrel Sampler (see Figs. 5 and 6)*—Attached the required liner to the cutting shoe by insertion into the machined receptacle area or by sliding over the machined tube. Insert the liner and shoe into the solid barrel, and attach the shoe (**6, 8-11**). Attach the sampler head to the sampler barrel providing a backing plate for the liner. Attach the sampler assembly to the drive rod and the drive head to the drive rod. Position the assembly under the hammer anvil and advanced as described in 9.3.1. At completion of the sampling increment, remove the sampler from the borehole. Remove the filled sample liner from the barrel by unscrewing the shoe, cap the liner for laboratory testing or spit open for field processing, and advance the borehole by repeating the procedure. Because the solid barrel cannot be opened for cleaning, it may require more effort for cleaning and decontamination. The open solid barrel sampler is used in soil formations that have sufficient wall strength to maintain a borehole wall without sloughing or cave-in. In soil formations not affording such structure, other sampling methods may be required or the opening sealed. To enhance recovery in some soil strata, it may be necessary to vary the length of the sampling increment. Shorter increments generally improve recovery because of lower sample friction and compression inside the sampler chamber. Sample recovery can be enhanced in some formations by intermittent use of the percussion hammer (**6, 8, 10, 11**).

9.4.2 *Closed Solid Barrel Sampler (see Figs. 5-7, Fig. 11)*—Insert or attach the sample liner to the shoe, and insert the assembly into the solid barrel sampler. Install sample retaining basket if desired. Attach the latch coupling or sampler head to the sampler barrel, and attach the piston assembly with point and" O" rings if free water is present, to the latching mechanism or holder. Insert the piston or packer into the liner to its proper position so the point leads the sampler shoe. Set latch, charge packer, or install locking pin, and attach assembled sampler to drive rod. Add drive head and position under the hammer anvil. Apply down pressure, hammer if needed, to penetrate soil strata above the sampling zone. When the sampling zone is reached, insert the piston latch release and recovery tool, removing the piston, or insert the locking pin removal/extension rods through the drive rods, turn counterclockwise, and remove the piston locking pin so the piston can float on top of the sample, or release any other piston holding device. Direct push or activate the hammer to advance the sampler the desired increment. Retrieve the sampler from the borehole by withdrawing the extension/drive rods. Remove the shoe, and withdraw the sample liner with sample for processing. Clean and decontaminate the sampler, reload as described, and repeat the procedure. Extreme stress is applied to the piston when driving through dense soils. If the piston releases prematurely, the sample will not be recovered from the correct interval, and a resample attempt must be made. The piston sampler can be used as a re-entry grouting tool for sealing boreholes on completion if it is equipped with a removable piston (**5, 6, 7, 10, 11**).

9.4.3 *Standard Split Barrel Sampler*—Attach the split spoon to an extension rod or drill rod. Using a mechanical or hydraulic hammer drive the sampler into the soil the desired increment, as long as that increment does not exceed the sampler chamber length. Remove the sampler from the borehole, disassemble, and process sample. Standard split barrel samplers can be used, as long as borehole wall integrity can be maintained and the additional friction can be overcome. If caving or sloughing occurs, the sampler tip should be sealed or other sampling tools used (**9**).

9.5 *Quality Control*:

9.5.1 *Quality Control*—Quality control measures are necessary to ensure that sample integrity is maintained and that project data quality objectives are accomplished. By following good engineering principles and applying common sense, reliable site characterizations can be accomplished.

9.5.2 *Water Checks*—Water seeping into the direct push casing or connecting rods from contaminated zones may influence testing results. Periodically check for ground water before inserting samplers into borehole or into outer casings in the two tube system. If water is encountered, it may be necessary to switch to the sealed piston type samplers to protect sample integrity. Sealed piston type samples may not always be water tight. Sealing of rod or casing joints can prevent ground water from entering through the joints.

9.5.3 *Datum Points*—Establishment of a good datum reference is essential to providing reliable sample interval depths and elevators. Select datum reference points that are sufficiently protected from the work effort, and that can be located for future reference. Field measurements should be to 0.1 ft (3.05 mm). Measure extension rods as the bore advances to locate sample depth. Mark rods before driving each sample interval to determine accurate measurement of sample recovery and to accurately log borehole depth.

9.5.4 *Sample Recovery*—Sample recovery should be monitored closely and results documented. Poor recovery could indicate a change in sampling method is needed, that improper sampling practices are being conducted, or that sampling tools are incorrect. Sample recovery involves both volume and condition. Poor sample recovery should cause an immediate review of the sampling program.

9.5.5 *Decontamination*—Follow established decontamination procedures. Taking shortcuts may result in erroneous or suspect data.

10. Completion and Sealing

10.1 *Completion*—For boreholes receiving permanent monitoring devices, completion should be in accordance with Practice D 5092, site work plan, or regulatory requirements.

10.2 *Borehole Sealing*—Seal direct push boreholes to minimize preferential pathways for containment migration. Additional information and guidance on borehole sealing can be found in Guide D 6001 and in Guide D 5299. State or local regulations may control both the method and the materials for borehole sealing. Regulations generally direct bottom up borehole sealing as it is the surest and most permanent method for complete sealing. High pressure grouting is available for use with direct push technology for bottom up borehole sealing.

10.2.1 *Sealing by Slurry, Two Tube System*—Sound the

borehole for free water. If water exists in the casing, place the extension rods, open-ended, to the bottom of the outer casing, as a tremie. Mix the slurry to standard specifications prescribed by regulation or work plan. Pump slurry through the extension/drive rod until it appears at the surface of the outer casing. Remove the extension rods. If no free water exists in the borehole, the slurry can be placed by gravity. Top off the outer casing as it is removed from the borehole.

10.2.1.1 *Slurry Mixes*—Slurry mixes used for slurry grouting of direct push boreholes generally are of lower viscosity because of the small diameter tremie pipes required. Usable mixes are 6 to 8 gal (22.7 to 30.28 L) of water/94-lb (42.64-kg) bag of cement with 5 lb (2.27 kg) of bentonite or 24 to 36 gal (90.84 to 136.28 L) of water to 50 lb (22.68 kg) of bentonite.

10.2.2 *Sealing by Gravity—Two Tube System*—Measure the cased hole to ensure it is open to depth. Slowly add bentonite chips or granular bentonite to fill the casing approximately 2 ft. Withdraw the casing 2 ft and recheck depth. Hydrate the bentonite by adding water. Repeat this procedure as the outer casing is withdrawn. The bentonite must be below the bottom of the casing during hydration. Wetness inside the rods may affect the flow of granular bentonite to the bottom of the casing. Fill the top foot of the borehole with material that is the same as exists in that zone.

10.2.3 *Borehole Sealing Single Tube System*:

10.2.3.1 *Gravity Sealing from Surface*—If the soil strata penetrated has sufficient wall strength to maintain an open hole, then it may be possible to add sealing materials from the surface. Dry bentonite chips or granular bentonite can be placed by gravity. The borehole volume should be determined and the borehole sounded every 10 ft (3 m) to ensure bridging has not occurred. The bentonite should be hydrated by adding approximately 1 pt (0.57 L) of water for each 5 ft of filled borehole. Seal the surface with native material.

10.2.3.2 *Wet Grout Mix Tremie Sealing*—Tremie sealing methods can be used with single tube systems when borehole wall strength is sufficient to maintain an open hole or when extension rods with an expendable point are used to reenter the borehole. The grout pipe should be inserted immediately after the direct push tools are withdrawn or through the annulus of the extension rods that have been reinserted down the borehole for grouting. Care must be taken to not plug the end of the grout pipe. Side discharge grout pipes also can be used to prevent plugging.

10.2.4 *Re-Entry Grouting*—If the borehole walls are not stable, the borehole can be re-entered by static pushing grouting tools, such as an expendable point attached to the extension/drive rods to the bottom of the original borehole. Pump a slurry through the rods as they are withdrawn. High pressure grouting equipment may be beneficial in pumping standard slurry mixes through small diameter gravity pipes. Care must be taken to ensure the original borehole is being sealed.

11. Record Keeping

11.1 *Field Report*—The field report may consist of boring log or a report of the sampling event and a description of the sample. Soil samples can be classified in accordance with Practice D 2488 or other methods as required for the investigation (**12**). Prepare the log in accordance with standards set in Guide D 5434 listing the parameters required for the field investigation program. List all contaminants identified, instrument readings taken, and comments on sampler advancement. Record any special field tests performed and sample processing procedures beyond those normally used in the defined investigation. Record borehole sealing procedures, materials used, and mix formulas on the boring log. Survey or otherwise locate the boring site to provide a permanent record of its replacement.

11.2 *Backfilling Record*—Record the method of sealing, materials used, and volume of materials placed in each borehole. This information can be added to the field boring log or recorded on a separate abandonment form.

12. Keywords

12.1 decontamination; direct push; ground water; sealing; soil sampling

REFERENCES

(1) Ford, Patrick J., and Turine, Paul J., *"Characterization of Hazardous Waste Sites—A Methods Manual" Vol II, Available Sampling Methods*, Second Edition, (Appendix A: Sample Containerization and Preservation), December 1984, EPA-600/4-84-076.

(2) Mayfield, D., Waugh, J., and Green, R., *"Environmental Sampling Guide in Environmental Testing and Analysis Product News*, Vol 1, No. 1, April 1993.

(3) McLoy and Associates, Inc. "Soil Sampling and Analysis—Practice and Pitfalls," *The Hazardous Waste Consultant*, Vol 10, Issue 6, 1992.

(4) Kay, J. N., "Technical Note," *"Symposium on Small Diameter Piston Sampling with Cone Penetrometer Equipment*," ASTM, 1991.

(5) Einearson, M.D., *"Wire Line Sample Recovery System,"* Precision Sampling Incorporated, San Fafael, CA, 1995.

(6) Ruda, T.C., "Operating the Diedrich Drill ESP System Tools," LaPorte, IN, 1995.

(7) Sales Division, "GS-1000 Series Grout System," Geoprobe System, 1996.

(8) Sales Division, "Catalogue of Products," Geoprobe, Inc., Standard Operating Procedures, Technical Bulletin No. 93-660, 1993.

(9) Sales Division, "Catalogue of Products," Diedrich Drill, Inc., LaPorte, IN, 1995.

(10) Sales Division, "Geoprobe Macro-Core Soil Sampler, Standard Operating Procedure," Technical Bulletin No. 95–8500, November 1995.

(11) Sales Division, "Geoprobe AT-660 Series Large Bore Soil Sampler, Standard Operating Procedures," Technical Bulletin No. 93–660, Revised: June 1995.

(12) Boulding, J.R., *"Description and Sampling of Contaminated Soils: A Field Pocket Guide,"* EPA-625/12-91/002; 1991 (second edition published in 1994 by Lewis Publishers).

The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, 100 Barr Harbor Drive, West Conshohocken, PA 19428.

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

REPLY TO THE ATTENTION OF:

July 12, 2000

DW-8J

CERTIFIED MAIL: P 140 678 633
RETURN RECEIPT REQUESTED

Mr. Stephen C. Lonneman
General Manager
Waste Management of Ohio, Inc.
3956 State Route 412
Vickery, Ohio 43464

RE: Notice of Deficiency Comments on Responses to U.S. EPA Comments on the "RCRA Facility Investigation (RFI) Phase I Report" Waste Management of Ohio, Inc., Vickery, Ohio OHD 020 273 819

Dear Mr. Lonneman:

The U.S. Environmental Protection Agency (U.S. EPA) has conducted a technical review of the above-referenced report for the Waste Management of Ohio, Inc., facility in Vickery, Ohio. The report is dated March 23, 2000, and was prepared by Cox-Colvin and Associates Inc. for Waste Management of Ohio, Inc. The U.S. EPA reviewed the report to assess (1) its technical adequacy and completeness, (2) their compliance with the U.S. EPA notice of deficiency dated January 28, 2000, and agreements made during the February 25, 2000, meeting with U.S. EPA and facility representatives; and (3) the need for a Phase II RFI at the facility.

Based on the technical review, the U.S. EPA determined the responses do not adequately address all previous U.S. EPA comments and issues discussed during the above-referenced meeting on February 25, 2000. General and specific deficiency comments on the report are provided in the enclosure. WMO is required to submit, within forty-five (45) days, its revised "Response to USEPA Comments on RFI Phase 1 Report", which addresses the enclosed deficiency comments.

The modified document shall be prepared in accordance with the following editorial protocol or convention:

1. Old language is overstruck.

2. New language is in bold type.

Recycled/Recyclable•Printed with Vegetable Oil Based Inks on 100% Recycled Paper (40% Postconsumer)

3. Page headers must indicate date of submission.

4. If any significant changes are necessary, pages should be renumbered, table of contents revised, and complete sections provided as required.

5. An itemized list of all replacement pages, sections, tables, etc., that are to be replaced in the modified submission, shall be provided.

In addition to the two copies of each document provided to the U.S. EPA, please provide one copy of each to:

Edwin Lim	Chuck Hull
Ohio EPA, DHWM	Ohio EPA, NWDO
P.O. Box 1049	347 N. Dunbridge Rd.
Columbus, OH 43266-0149	Bowling Green, OH 43402

Further, please provide two copies of the documents in electronic format in Compact Disc (CD) format to U.S. EPA and the a copy to each of the two OEPA offices.

If you have any questions regarding what information is required, please contact me at (312) 886-7569.

Sincerely,

Thomas Matheson, Corrective Action Project Manager
Waste Management Branch

Enclosure

cc: Ed Lim, OEPA/CO
Chuck Hull, OEPA/NWDO

TECHNICAL REVIEW COMMENTS ON RESPONSES TO U.S. EPA COMMENTS ON THE "RCRA FACILITY INVESTIGATION (RFI) PHASE I REPORT" WASTE MANAGEMENT OF OHIO, INC. VICKERY, OHIO

Waste Management of Ohio, Inc. (WMO), submitted its responses to U.S. Environmental Protection Agency (U.S. EPA) Comments on the "RCRA Facility Investigation (RFI) Phase I Report" on March 23, 2000, for its facility in Vickery, Ohio. The responses were prepared by WMO's consultant Cox-Colvin and Associates Inc. and includes (1) responses to individual comments, (2) a technical position paper on site groundwater quality and movement, (3) a quality assurance project plan (QAPP) addendum for collecting background soil samples, and (4) an RFI conceptual approach.

The responses were reviewed to assess (1) their technical adequacy and completeness; (2) their compliance with the U.S. EPA notice of deficiency dated January 28, 2000, and agreements made during the February 25, 2000, meeting with U.S. EPA and facility representatives; and (3) the need for a Phase II RFI at the facility. The responses contain the deficiencies discussed in the comments below. Also it should be noted that several responses to the comments simply state that the report will be revised to more clearly present information. This response cannot be evaluated or approved until the revised Phase I RFI report is reviewed.

The comments presented below pertain to (1) clean closure of solid waste management units (SWMU) 10 and 11, (2) WMO's RFI conceptual approach, (3) the technical position paper on groundwater movement and quality, and (4) the QAPP addendum for collecting background soil samples.

CLEAN CLOSURE OF SWMUS 10 AND 11

GENERAL COMMENTS

1. In the response to U.S. EPA 's general comments 8 and 17, WMO argues that because SWMUs 10 and 11 have been clean closed, no further investigation is required under the RFI. However, WMO's 1992 closure report for these SWMUs reveals that the data collected during clean closure are not compatible with RFI data needs. Specifically, during closure, soil samples from the SWMUs were analyzed for (1) the F001 through F004 solvents listed in Title 40 of the Code of Federal Regulations (CFR), Part 261.31; (2) phenols; (3) polychlorinated biphenyls (PCB); and (4) metals. This list of closure target analytes appears sufficient for demonstrating that all hazardous wastes have been removed from the SWMUs. However, this list of analytes is not sufficient to demonstrate that a release of hazardous constituents as defined in 40 CFR Part 264, Appendix IX, has not occurred. WMO's 1995 description of current conditions (DCC) report indicates that these SWMUs, which began operating in 1971, accepted oily wastes, acids, pickle liquors, caustics, phenols, and unknown wastes. The DCC report also states that constituents of concern at these SWMUs include PCBs, metals, volatile organic compounds (VOC), polynuclear aromatic hydrocarbons (PAH), and unknowns constituents. The closure list of analytes also does not include degradation by-products of the F001 through F004 solvents, PAHs, or other

semivolatile organic compounds (SVOC) that may have been contained in the waste.

As part of the interpretation of clean closure, U.S. EPA allows that "some limited quantity of hazardous constituents might remain in environmental media after clean closure provided they are at concentrations below levels that may pose a risk to human health and the environment" (EPA 1998). However, the closure data do not demonstrate that hazardous constituents are not present in the SWMUs at levels that could pose a risk to human health and the environment. A more comprehensive investigation is needed to make this determination. Therefore, as part of the Phase II RFI, additional soil samples should be collected in SWMUs 10 and 11 and analyzed for the full list of Appendix IX hazardous constituents. Also, soil sampling results from the 1992 closure report should be used to select sampling locations for Phase II of the RFI. Specifically , Phase II soil samples should be collected wherever closure target analytes were detected at concentrations exceeding laboratory reporting limits.

2. In order to meet the clean closure performance standard, U.S. EPA requires that "facility owners/operators must remove all wastes from the closing unit and remove or decontaminate all waste residues, contaminated containment systems, contaminated soils (including groundwater and other environmental media contaminated by releases from the closing unit), and structures and equipment contaminated with hazardous waste and hazardous waste leachate" (EPA 1998). The Phase I RFI report does include groundwater data collected from monitoring wells around SWMUs 10 and 11 in 1993. However, these data were not validated and are therefore of unknown quality. Although WMO argues that this data is of acceptable quality for use in the RFI no information is provided to support this claim such as laboratory data packages (including method detection limits and quality control [QC] sample results). Also, during the Phase I RFI, well number L-20, the only lacustrine well near these SWMUs that was sampled, contained chromium at 3,380 micrograms per liter (μg/L), which exceeds chromium's maximum contaminant level (MCL) by more than 30 times. This indicates that a release has occurred to groundwater, and further investigation is required. Therefore, all lacustrine, till, and bedrock groundwater monitoring wells surrounding SWMUs 10 and 11 should be sampled during the Phase II RFI and analyzed for the full list of Appendix IX hazardous constituents.

WMO RFI CONCEPTUAL APPROACH

General Comment

1. The protocol for eliminating analytical groups is not sufficiently described. The facility shall provide a detailed set of proposed decision rules for such a strategy.

TECHNICAL POSITION PAPER ON GROUNDWATER MOVEMENT AND QUALITY

GENERAL COMMENTS

2. The position paper concludes that the lacustrine and till wells should be considered a single hydrogeologic unit. Available data do not support this conclusion for the reasons summarized below.

   - The only field test of hydraulic conductivity in the lacustrine well provided a hydraulic conductivity value of 1E-06. This is two orders of magnitude greater than the hydraulic conductivity values obtained during field tests of the till unit.

   - Whenever lacustrine and corresponding till wells were sampled during the same sampling period, contaminants detected in the lacustrine wells were either not detected or detected at much lower concentrations in the corresponding till wells.

   - The description of hydrogeology in the DCC report clearly demonstrates two flow systems: the lacustrine unit, which has a consistent flow rate of 3 to 4 feet per year (ft/yr) north and northeast, and the till unit, which has a flow rate of less than 0.01 ft/yr and a distinctly different flow pattern.

   The position paper should be revised to more accurately discuss site hydrogeology as three interconnected units. Based on the data presented in the DCC report and the Phase I RFI report, it appears that groundwater flow is primarily horizontal in the lacustrine unit and that it has a strong vertical component in the till unit. In addition, additional information should be collected during the Phase II RFI to characterize the movement of groundwater in the lacustrine and till units. This information should include field tests for hydraulic conductivity in areas around SWMUs that exhibit groundwater contamination and in the borrow pit area.

SPECIFIC COMMENTS

1. **Page 6, Section 3.2**. The text states that "most of the wells require many days to recover." The Phase II RFI report should provide information on the recovery rates of all wells sampled. The information should include whether complete or partial recovery (expressed as a percentage of the original water column) was obtained and the relative time of recovery (minutes, hours, or days). The recovery rates of the wells may be related to the elevated levels of contaminants in many of the wells as wells as to zones of higher permeability either horizontally or vertically (lacustrine vs. till units).

2. **Page 7, Section 4.2**. This section refers to Plate 2, which shows a significant downward vertical gradient. Cross section F-F' trends northwest to southeast. The northwest portion of the cross section has no data points. This is a critical site area for two reasons: (1) there is a potential for shallow groundwater to flow horizontally toward the borrow pit and (2) the borrow pit is a sensitive ecosystem. Additional field studies should be conducted during the Phase II RFI to confirm the conceptual site model, advance soil borings to classify soil types, and install groundwater wells to characterize hydrogeology in this area.

3. **Page 8, Section 4.2.1.2**. The text states that the lacustrine and till unit has a representative hydraulic conductivity value of 2E-08 and that because the hydraulic conductivity values are essentially the same for the two units, they should be considered as a single unit. Field tests, which more accurately define the hydrogeology of a unit indicate that the hydraulic conductivity of the lacustrine unit is two orders of magnitude greater than the till unit. It appears that the lacustrine and till units have distinct hydrogeologic properties and should not be considered as one unit. The position paper should be revised accordingly.

4. **Page 8, Section 4.2.1.3**. This section states that the horizontal flow velocity of 2 ft/yr is flawed and cites a porosity for the fractured lacustrine unit as 0.1 with no supporting documentation. This porosity value should be supported by documentation. In addition, the referenced 1983 Golder & Associates report does not indicate whether the porosity value of 0.001 is for the unsaturated portion of the lacustrine unit.

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6. **Page 10, Section 4.2.2**. This section refers to tritium analytical results from a 1984 report prepared by Golder & Associates. The text should provide information on which wells were sampled during the sampling event and provide the results. In addition, the text should provide the results of tritium analysis of groundwater samples collected from wells screened in bedrock.

7. **Page 10, Section 4.2.2**. This section discusses the nature and extent of contamination detected in lacustrine well L-19 and states that 1,2,-dichloroethane was not detected in wells

screened within 20 feet of well L-19. The report should be revised to provide information on the locations of the wells, their construction, and analytical results.

8. **Page 12, Section 6.0**. The conclusions in this section are based on the assumption that the lacustrine and till unit act as a single hydrogeologic unit. This assumption is not supported by the data in the DCC and Phase I RFI report. The conclusions should be revised to reflect the reported data.

9. **Page 13, Section 7.0**. The conclusion that the monitoring wells in the lacustrine unit are not viable monitoring points and should be abandoned is not supported. The data and interpretation provided in previous reports by both Golder Associates and Rust Infrastructure support a conclusion that groundwater in the lacustrine unit is capable of flowing several feet per year in the horizontal direction. The lacustrine unit should be considered a viable monitoring unit.

10. **Page 14, Section 7.0**. The text concludes that horizontal migration of contaminants in the lacustrine/till unit to areas such as the borrow pit is very unlikely. This conclusion is not well supported. There is a general lack of subsurface characterization data for this area of the facility. Additional characterization should be completed during the Phase II RFI by advancing soil borings, installing monitoring wells, and conducting field testing of hydraulic conductivity.

QAPP ADDENDUM FOR COLLECTION OF BACKGROUND SOIL SAMPLES

GENERAL COMMENTS

1. The first full paragraph on Section 1.1, Page 1, correctly states that U.S. EPA 's original comment 9 "suggested that the 95% upper confidence limit (UCL) for the concentrations of each inorganic constituent should be calculated and used as the basis for comparison to each investigative sample result." Also, the second full paragraph states that U.S. EPA agreed that "maximum background values, with an outlier evaluation, should be used for release and extent determination comparisons." First, after discussions at the February 25, 2000, meeting, it was decided to not consider use of the 95% UCL as the basis of comparison to investigative sample results. Second, U.S. EPA does not concur with the statement that U.S. EPA agreed to the use of maximum background values as described in the text.

   The proposed statistical procedure of relying on comparison of investigative sample results to maximum background values (coupled with an outlier evaluation) is insufficient to correctly determine whether the investigative sample data set represents values statistically greater than those represented by the background sample data set. Instead, comparison of

background to investigative sample data sets should be based primarily on statistical comparison of the data set-specific mean concentrations. Various U.S. EPA guidance documents, including U.S. EPA 's 1995 "Determination of Background Concentrations of Inorganics in Soils and Sediments at Hazardous Waste Sites" (EPA/540/S-96/500) and U.S. EPA 's 1998 "Guidance for Data Quality Assessment, Practical Methods for Data Analysis, U.S. EPA QA/G-9, QA97 Version" (EPA/600/R-96/085) include recommendations for appropriate statistical tests for comparing sample set-specific mean concentrations based on the distributions of the background and investigative sample sets.

However, as appropriate, additional statistical testing to determine whether a single sample result "has a high probability of exceeding background" can also be performed. This additional statistical testing can be performed by comparing the single value to the maximum background value (coupled with an outlier evaluation) as currently proposed in the QAPP addendum. Therefore, Section 1.1 of the QAPP addendum should be revised accordingly.

2. Figure 1 presents the locations of the 10 proposed background soil samples. Of these 10 locations, 3 appear to be too close to SWMUs being investigated during the RFI. Specifically, the three easternmost samples appear to be too close to SWMU groups B, D, and I. Therefore, the background sampling locations should be relocated as shown in the attached figure.

3. Section 3: This section states that the SOP for use of the Geoprobe "will be used as a general guideline". The facility shall either adhere to the US EPA approved SOP or propose and submit changes which will be reviewed by US EPA.

4. Appendix A: This procedure calls for homogenization of samples which are to be analyzed for organics. While this sampling activity does not include organics, this procedure shall not be used for other Corrective Action activities unless the reference to homogenizing samples for organics is removed.

REFERENCES

Cox-Colvin and Associates Inc. 2000. "Phase I RFI Quality Assurance Project Plan Addendum for Additional Background Soil Sampling, Waste Management of Ohio Inc., Vickery Ohio." March 23.

U.S. Environmental Protection Agency (EPA). 1998. Memorandum Regarding Risk-Based Clean Closure. From Elizabeth Cotsworth, Acting Director, Office of Solid Waste. To RCRA Senior Policy Advisors, Regions 1 through 9. March 16.

Tetra Tech EM Inc.

200 E. Randolph Drive, Suite 4700 ◆ Chicago, IL 60601 ◆ (312) 856-8700 ◆ FAX (312) 938-0118

June 7, 2000

Mr. Allen Wojtas
Work Assignment Manager
Enforcement and Compliance Assurance Branch (DE-9J)
U.S. Environmental Protection Agency Region 5
77 West Jackson Boulevard
Chicago, IL 60604

Subject: **Technical Review Comments on Responses to EPA Comments on the "RCRA Facility Investigation (RFI) Phase I Report"**
Waste Management of Ohio, Inc., Vickery, Ohio
Contract No. 68-W9-9018, Work Assignment No. R05805

Dear Mr. Wojtas:

Tetra Tech EM Inc. (Tetra Tech) has conducted a technical review of the above-referenced document for the Waste Management of Ohio, Inc., facility in Vickery, Ohio. The report is dated March 23, 2000, and was prepared by Cox-Colvin and Associates Inc. for Waste Management of Ohio, Inc. Tetra Tech reviewed the responses to assess (1) their technical adequacy and completeness; (2) their compliance with the U.S. Environmental Protection Agency (EPA) notice of deficiency dated January 28, 2000, and agreements made during the February 25, 2000, meeting with EPA and facility representatives; and (3) the need for a Phase II RFI at the facility.

Tetra Tech found that the responses do not adequately address all previous EPA comments and issues discussed during the above-referenced meeting on February 25, 2000.

Tetra Tech's comments on the responses are enclosed. Tetra Tech is also sending you by e-mail an electronic copy of the review comments formatted in WordPerfect 6.1. The hard copy of the comments constitutes Tetra Tech's official deliverable. Tetra Tech is also sending a copy of this letter and the enclosed review comments to Mr. Tom Matheson, the EPA technical advisor for the facility. If you or Mr. Matheson have any questions regarding Tetra Tech's comments, please call me at (312) 856-8786.

Sincerely,

Mary Wojciechowski
Project Manager

Enclosure

cc: Bernie Orenstein, EPA Regional Project Officer (letter only)
Tom Matheson, EPA Technical Advisor
Ed Schuessler, Tetra Tech Regional Manager (letter only)
Art Glazer, Tetra Tech Program Manager

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ENCLOSURE

TECHNICAL REVIEW COMMENTS ON RESPONSES TO EPA COMMENTS ON THE "RCRA FACILITY INVESTIGATION (RFI) PHASE I REPORT" WASTE MANAGEMENT OF OHIO, INC. VICKERY, OHIO

(Seven Pages)

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8. **Page 12, Section 6.0.** The conclusions in this section are based on the assumption that the lacustrine and till unit act as a single hydrogeologic unit. This assumption is not supported by the data in the DCC and Phase I RFI report. The conclusions should be revised to reflect the reported data.

9. **Page 13, Section 7.0.** The conclusion that the monitoring wells in the lacustrine unit are not viable monitoring points and should be abandoned is not supported. The data and interpretation provided in previous reports by both Golder Associates and Rust Infrastructure support a conclusion that groundwater in the lacustrine unit is capable of flowing several feet per year in the horizontal direction. The lacustrine unit should be considered a viable monitoring unit.

10. **Page 14, Section 7.0.** The text concludes that horizontal migration of contaminants in the lacustrine/till unit to areas such as the borrow pit is very unlikely. This conclusion is not well supported. There is a general lack of subsurface characterization data for this area of the facility. Additional characterization should be completed during the Phase II RFI by advancing soil borings, installing monitoring wells, and conducting field testing of hydraulic conductivity.

QAPP ADDENDUM FOR COLLECTION OF BACKGROUND SOIL SAMPLES

GENERAL COMMENTS

1. The first full paragraph on Section 1.1, Page 1, correctly states that EPA's original comment 9 "suggested that the 95% upper confidence limit (UCL) for the concentrations of each inorganic constituent should be calculated and used as the basis for comparison to each investigative sample result." Also, the second full paragraph states that EPA agreed that "maximum background values, with an outlier evaluation, should be used for release and extent determination comparisons." First, after discussions at the February 25, 2000, meeting, it was decided to not consider use of the 95% UCL as the basis of comparison to investigative sample results. Second, EPA does not concur with the statement that EPA agreed to the use of maximum background values as described in the text.

   The proposed statistical procedure of relying on comparison of investigative sample results to maximum background values (coupled with an outlier evaluation) is insufficient to correctly determine whether the investigative sample data set represents values statistically greater than those represented by the background sample data set. Instead, comparison of background to investigative sample data sets should be based primarily on statistical comparison of the data set-specific mean concentrations. Various EPA guidance documents, including EPA's 1995

"Determination of Background Concentrations of Inorganics in Soils and Sediments at Hazardous Waste Sites" (EPA/540/S-96/500) and EPA's 1998 "Guidance for Data Quality Assessment, Practical Methods for Data Analysis, EPA QA/G-9, QA97 Version" (EPA/600/R-96/085) include recommendations for appropriate statistical tests for comparing sample set-specific mean concentrations based on the distributions of the background and investigative sample sets.

However, as appropriate, additional statistical testing to determine whether a single sample result "has a high probability of exceeding background" can also be performed. This additional statistical testing can be performed by comparing the single value to the maximum background value (coupled with an outlier evaluation) as currently proposed in the QAPP addendum. Therefore, Section 1.1 of the QAPP addendum should be revised accordingly.

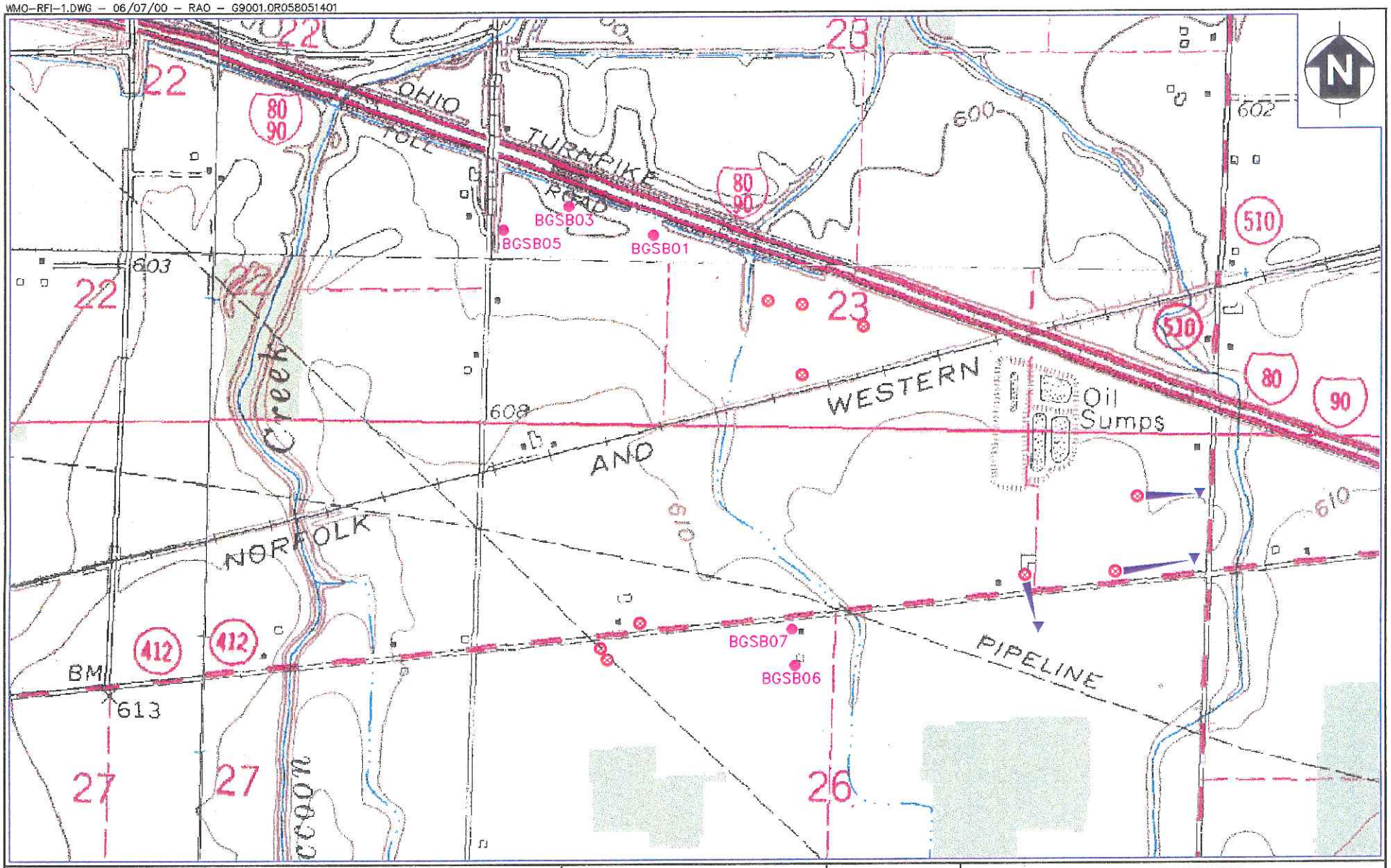
2. Figure 1 presents the locations of the 10 proposed background soil samples. Of these 10 locations, 3 appear to be too close to SWMUs being investigated during the RFI. Specifically, the three easternmost samples appear to be too close to SWMU groups B, D, and I. Therefore, the background sampling locations should be relocated as shown in the attached figure.

REFERENCES

Cox-Colvin and Associates Inc. 2000. "Phase I RFI Quality Assurance Project Plan Addendum for Additional Background Soil Sampling, Waste Management of Ohio Inc., Vickery Ohio." March 23.

U.S. Environmental Protection Agency (EPA). 1998. Memorandum Regarding Risk-Based Clean Closure. From Elizabeth Cotsworth, Acting Director, Office of Solid Waste. To RCRA Senior Policy Advisors, Regions 1 through 9. March 16.

WMO-RFI-1.DWG – 06/07/00 – RAO – G9001.0R058051401



LEGEND

- Primary Highway
- Light Duty Road
- Unimproved Road
- Railroad
- Phase I background soil sampling locations
- Proposed Phase IB background soil sampling locations
- Revised Phase IB background soil sampling locations

SOURCE: Modified from USGS, Clyde, Ohio, Quadrangle, 1969, Vickery, Ohio, Quadrangle, 1969, Freemont East, Ohio, Quadrangle, 1980, Wightmans Grove, Ohio, Quadrangle, 1979, and Cox-Colvin & Associates, Inc, 2000

SCALE 1:12000

0 — 1/4 MILE

500' 0 500' 1,000'

SCALE 1" = 1,000 FEET

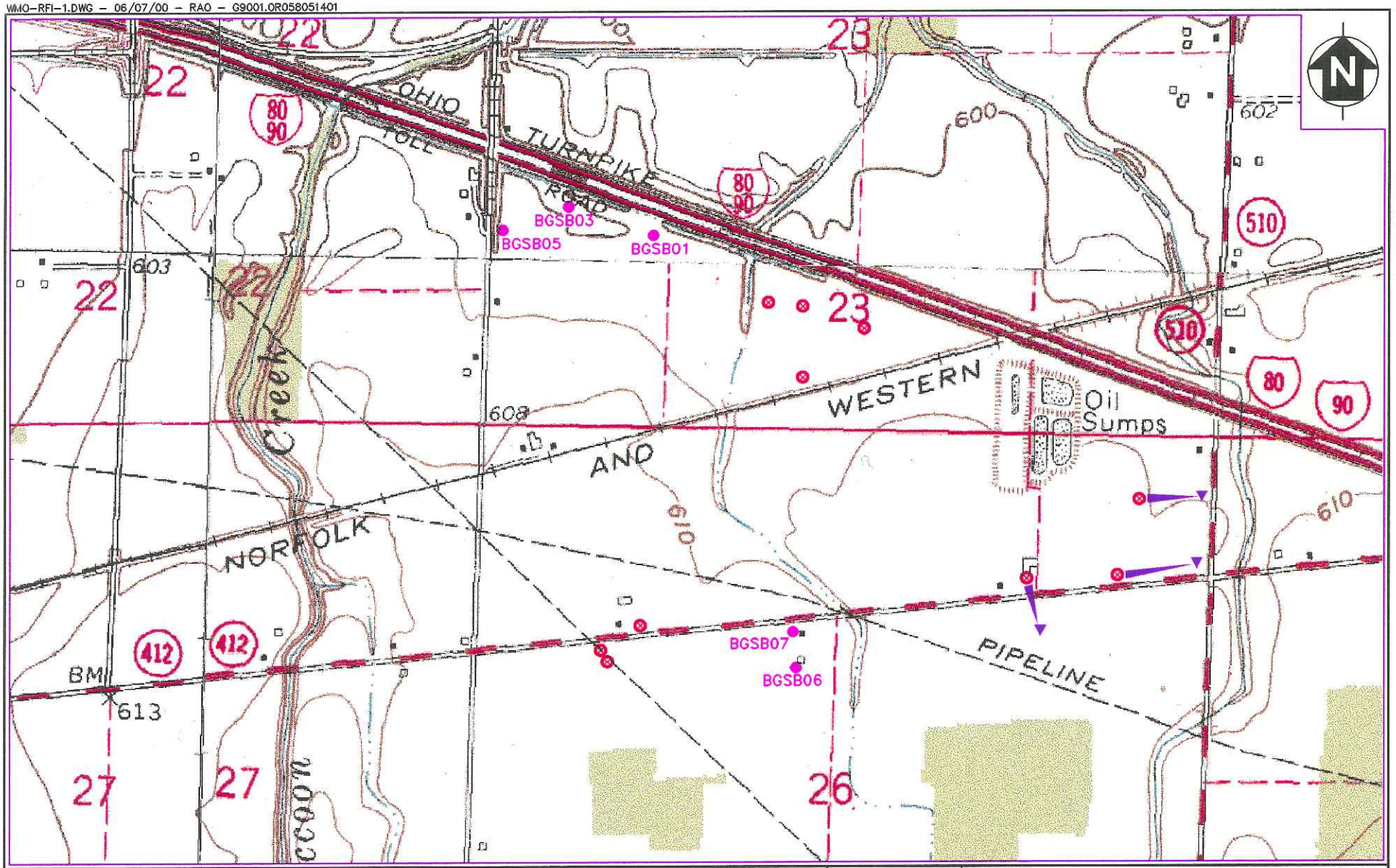
Quadrangle Location

WMO-RFI REVIEW
VICKERY, OHIO

REVISIONS TO PROPOSED PHASE IB BACKGROUND SOIL SAMPLE LOCATIONS

Tetra Tech EM Inc.

WMO-RFI-1.DWG - 06/07/00 - RAO - G9001.0R058051401



LEGEND

- Primary Highway
- Light Duty Road
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- Phase I background soil sampling locations
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SOURCE: Modified from USGS, Clyde, Ohio, Quadrangle, 1969, Vickery, Ohio, Quadrangle, 1969, Freemont East, Ohio, Quadrangle, 1980, Wightmans Grove, Ohio, Quadrangle, 1979, and Cox-Colvin & Associates, Inc, 2000

SCALE 1:12000

0 — 1/4 MILE

500' 0 500' 1,000'

SCALE 1" = 1,000 FEET

Quadrangle Location

WMO-RFI REVIEW
VICKERY, OHIO

REVISIONS TO PROPOSED PHASE IB BACKGROUND SOIL SAMPLE LOCATIONS

Tetra Tech EM Inc.

RESPONSE TO USEPA COMMENTS ON RCRA FACILITY INVESTIGATION (RFI) PHASE I REPORT

WASTE MANAGEMENT OF OHIO, INC.
VICKERY FACILITY

Submitted
March 23, 2000

Vickery Facility
A Waste Management Company
3956 State Route 412
Vickery, Ohio 43464
419-547-7791
Fax: 419-547-6144

AIRBORNE EXPRESS
Airbill # 3643923382

March 23, 2000

Mr. Thomas Matheson
U.S. Environmental Protection Agency Region V
DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60609

Re: Waste Management of Ohio, Inc. - Vickery, Ohio
OHD 020 273 819
Responses to US EPA Comments
on RCRA Facility Investigation (RFI) Phase I Report

Dear Mr. Matheson:

Waste Management of Ohio, Inc. (WMO) Vickery Facility submits the enclosed response to the US EPA's January 28, 2000 comments on WMO's RFI Phase I Report (Report). Below is a list of the enclosures included in this submittal. Following that list is a brief description of the documents and the basis for it's submittal.

1. Response to Comments
2. RFI Conceptual Approach
3. Phase IB and Phase II RFI Implementation Schedule
4. Technical Position Paper on the Occurrence, Movement, and Quality of Groundwater at WMO Vickery
5. Phase I RFI Quality Assurance Project Plan / Addendum for Additional Background Soil Sampling

The Response to Comments (Response) is being submitted as requested by the US EPA correspondence dated January 28, 2000. A submittal date of March 24, 2000 was agreed upon at the WMO/US EPA February 25, 2000 project meeting (meeting) held in Chicago, IL. For ease of reading, the Response includes the US EPA's comment, followed by WMO's response. The Response is in the format of a letter, explaining if and how the Report will be revised. The revisions

to the Report will be submitted after collection of additional background sampling (Phase IB), as discussed in the meeting and later presented in the schedule submitted to the US EPA in WMO's March 3, 2000 correspondence. The revised Report will be submitted in accordance with the requirements outlined on page 2 of the US EPA's January 28, 2000 correspondence and this Response.

Provided with the Response as Attachment 1 is a document which summarizes the conceptual approach for the WMO RFI. The conceptual approach was presented and discussed in the February 25th meeting and does not represent a significant shift or change in the direction of the RFI.

Included as Attachment 2 to the Response is the Phase IB and Phase II RFI Implementation Schedule. This document was submitted to the US EPA in correspondence dated March 3, 2000 and is included here for reference and for completeness.

The "Technical Position Paper on the Occurrence, Movement, and Quality of Groundwater at Waste Management of Ohio, Inc. Vickery Facility," (Position Paper), is included in this submittal. This Position Paper presents WMO's position on the occurrence, movement, and natural quality of shallow waters that exist in the geologic materials underlying the facility. It is WMO's position that the groundwater to be investigated at the facility is in the bedrock aquifer and that the unconsolidated material should be investigated through soil sampling. This position was presented by WMO during the meeting. Both Ohio EPA and US EPA TSCA have come to this conclusion in regards to post-closure groundwater monitoring. Based on discussions at the meeting, we understand that the hydrogeologic studies completed to date in support of the monitoring of only the bedrock aquifer were not as well supported in the Report as they could have been. The representatives of Tetra Tech requested that the facility provide additional information to support WMO's position. It was agreed that a technical position paper would be the appropriate format for the presentation of this information.

It was also decided at the meeting that additional background sampling is necessary to increase the size of the data set for statistical purposes. This additional phase is called Phase IB. Although Phase IB will result in a slight delay in submitting a revised report, WMO is confident that the additional background soil characterization will reduce potential future background soil related complications. The requirements for Phase IB are included in the QAPP Addendum for Additional Background Soil Sampling which is the last document in this submittal. **This document should be inserted in your copy of the Phase I RFI QAPP.**

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information,

the information submitted is to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

If you have any questions, please contact Ms. Sandy Clark at (419)547-3335.

Sincerely,

WASTE MANAGEMENT OF OHIO, INC.

Robin Wuertz
for Steve Lonneman

Stephen C. Lonneman
General Manager

Enclosures/Attachments

SCL/slc

cc w:/ Mr. Thomas Matheson, US EPA (2 additional copies)
Edwin Lim, OEPA-DHWM
Chuck Hull, OEPA-NWDO

Responses to US EPA Comments on
WMO Vickery's Phase I RFI Report

GENERAL COMMENTS

US EPA General Comment #1:

The Report indicates that several deviations from the Phase I RFI work plan and QAPP occurred. The Report should be revised to explain the deviations discussed below.

WMO Response to General Comment #1:

Agreed. The Report will be revised to explain the deviations discussed below.

US EPA General Comment #1a:

QAPP Table 1-1 indicates that background soil samples would be collected from 10 locations. However, Table 5-2 and Figure 5-2.1a of the Report show analytical results for background samples collected at only five locations (BGSBG01, BGSBG03, BGSBG05, BGSBG06, and BGSBG07).

WMO Response to General Comment #1a:

Samples were taken in accordance with Table 1-1 of the QAPP. This table does not indicate that background soil samples will be collected from ten locations. The table indicates that a total of ten background investigative samples will be collected. The confusion is due to the fact that two samples were collected from each of five borings for a total of ten investigative samples. With the collection of additional background soil samples during Phase IB, all references to background sampling will be modified in the revised Phase I Report (Report). The revisions will be made in a manner which avoids confusion regarding this issue.

US EPA General Comment #1b:

Based on the data provided in Appendix H of the Report, samples collected from monitoring well L-17 were analyzed only for volatile organic compounds (VOC). However, QAPP Table 1-1 indicates that all groundwater samples would be analyzed for semivolatile organic compounds (SVOC), polychlorinated biphenyls (PCB), pesticides, herbicides, metals, cyanide, and sulfide as well as VOCs.

WMO Response to General Comment #1b:

The entire parameter list could not be sampled due to poor recharge at the well. The references regarding this situation are as follows. Section 4.4 of the

Report, page 11, paragraph 4, states: "Well L-17 recovered only enough to provide sufficient sample volume for volatiles analysis". On April 30, 1999, well L-17 was purged dry. Due to low recharge, only volatile samples were collected from L-17 the following day. This is in accordance with the order of sample collection as outlined in the facility's Groundwater Sampling and Analysis (GWSA) Plan and the Phase I RFI QAPP. The groundwater-sampling event for the RFI was conducted over a period of several days. During that time, well L-17 never recharged enough to collect sufficient volume for additional analyses.

During the October 1999 semi-annual sampling event, the well was dry. There has not been sufficient groundwater recharge to provide enough water volume for sampling. This problem is one of the many associated with sampling the lacustrine wells. Sampling of the lacustrine wells was discussed in the February 25th meeting in Chicago and is discussed further in the *Technical Position Paper on the Occurrence, Movement, and Quality of Groundwater at WMO Vickery* (Cox-Colvin & Associates, 2000a).

US EPA General Comment #1c:

Section 5.7.1.2 of the Phase I RFI work plan states that select location soils would be sampled from the ground surface to the point of borehole termination. However, Section 4.3.2.1 of the Report states that select location soils were sampled from three feet below the ground surface until borehole termination.

WMO Response to General Comment #1c:

The statement provided in Section 5.7.2.1. is incorrect. Section 4.3.2.1, page 7, paragraph 3, of the Report will be revised to state; "Select location soils were sampled from the ground surface until borehole termination criteria were met."

The Report will be modified accordingly.

US EPA General Comment #1d:

The table of results in Section 5.3.3 of the Report indicates that grid node samples were collected at depths ranging from 11 to 15 feet (ft) below ground surface (bgs) in SWMU 9, and Paragraph 1 on Page 10 states that the base of SWMU 9 was estimated to be about 20 ft bgs. This information is not consistent with Sections 4.3.2.2 and 5.7.1.1 of the Phase I RFI work plan, which state that grid node samples would be collected 2 to 4 ft below the base of the SWMU.

WMO Response to General Comment #1d:

RFI Phase I work plan, Section 5.7.1.1, Grid Node Location Sampling Procedures, discusses field methods to use to determine the depth of bottom of the former SWMU and collection of native soil at a depth two feet below the bottom. Page 17, paragraph 6 of this same section states, "If fixed waste is not identified within the borehole during coring, the soil sample will be collected at 2 feet below the deepest recorded depth of the associated SWMU." Sampling in the area of former SWMU #9 consisted of 12 grid node samples and 2 select location samples. Waste was encountered a varying depths at each of these boreholes. Furthermore, depths of surrounding boreholes appear to be consistent with morphology of a former surface impoundment with sloping sides and an irregular bottom due to fixing the waste in place. This is consistent with the workplan and no revisions are necessary.

US EPA General Comment #1e:

Note 3 of QAPP Table 1-1 states that if PCBs were detected in soil samples at concentrations above the project reporting limit (PRL), those samples would also be analyzed for dioxins and furans. Appendix E of the Report indicates that PCBs were detected at concentrations above the PRL in SWMU 42 soil sample SL01-01, but this sample was not analyzed for dioxins and furans.

WMO Response to General Comment #1e:

Given the laboratory run times for PCBs and the holding times for dioxins and furans it was impractical to follow the prescribed work plan procedure. In order to fulfill the requirements of the Work Plan, WMO will resample at this location and depth and analyze for dioxins and furans, during Phase II. The revised Report will explain the problem and the corrective action.

US EPA General Comment #2:

The sampling locations shown in the Report are not entirely consistent with those presented in the Phase I RFI work plan. The Report should be revised to explain the sampling location deviations discussed below.

US EPA General Comment #2a:

SWMU Group D - Figure 5-3.4b of the Report indicates that grid node samples A2 and C3 were not collected at the center of the grid nodes as shown in work plan Figure 5-9.

WMO Response to General Comment #2a:

SWMU Group D, former SWMU #12, grid node A2 (GNA2) was originally located within a basin and not safely accessible. It was relocated as indicated on figure 5-3.4b. SWMU Group D, former SWMU #12, grid node C3 (GNC3) was originally located in a topographically low area with accumulate water. The area was not safely accessible with the drill rig. GNC3 was relocated as shown on figure 5-3.4b. WMO will revise the Report text to include the reasoning for these location changes and how they were addressed.

US EPA General Comment #2b:

SWMU Group F - Figure 5-3.6d of the Report indicates that soil samples SF01-01 and SF02-01 in SWMU 35 and SF020-01 in SWMU 36 were not collected at the locations shown in work plan Figure 5-11.

WMO Response to General Comment #2b:

WMO will revise the Report text and Figure 5-3.6d to reflect the actual sampling locations.

US EPA General Comment #2c:

SWMU Group G - Figure 5-3.7c of the Report indicates that soil sample SF01-01 in SWMU 27 was not collected at the location shown in work plan Figure 5-12.

WMO Response to General Comment #2c:

SWMU Group G, SWMU #27, surface sample 1 (S27:SL:SF01-01) was relocated due to accessibility problems with the original location. Exterior piping attached to the building made access here impossible. S27:SL:SF01-01 was relocated as presented on Figure 5-3.7c.

WMO will revise the Report text to include these location changes and the reasoning for them.

US EPA General Comment #2d:

SWMU Group I - Figure 5-3.9 of the Report indicates that grid node samples A1, C1, and C2 were not collected at the center of the grid nodes as shown in work plan Figure 5-14.

WMO Response to General Comment #2d:

SWMU Group I, SWMU #15, grid node A1 (GNA1) was originally located within the footprint of an existing building. GNA1 was relocated as presented on Figure 5-3.9.

SWMU Group I, SWMU #15, grid node C1 (GNC1) was originally located in an area with ponded water. Two attempts were made to collect the sample in this area. The final location for (GNC1) is presented on Figure 5-3.9.

SWMU Group I, SWMU #15, grid node C2 (GNC2) was also located in an area of ponded water, and as with GNC1, two attempts were made to obtain a sample. The final location for GNC2 is presented on Figure 5-3.9.

WMO will revise the Report text to include these location changes and the reasoning for them.

US EPA General Comment #3:

Figure 5-4.8 of the Report shows that sediment samples were collected off site in the tributary to Little Raccoon Creek that flows around the facilitys eastern boundary. This information does not comply with Section 5.10.8 of the Phase I RFI work plan, which states that sediment samples would be collected downstream of the confluence of Meyers Ditch (which flows off site from the facilitys north-central boundary) and Little Raccoon Creek. These samples should be collected in the correct locations during Phase II of the RFI.

WMO Response to General Comment #3:

All of the sediment samples were collected in Little Raccoon Creek, in accordance with the Work Plan. Two (2) sediment samples were collected downstream of the confluence with Meyer's Ditch. The remaining sample was collected upstream of the confluence of Meyer's Ditch. WMO will revise the map so that Meyer's Ditch, Little Raccoon Creek and the sample locations will be represented and labeled appropriately on Figure 5-4.8.

US EPA's Comments on Use of Historical Groundwater Data:

WMO's General Response to the Use of Historical Groundwater Data:

WMO has been monitoring groundwater at the facility on an semi-annual basis for over 10 years under an agency approved groundwater monitoring program. With this wealth of information collected under a different, but equally stringent program, WMO felt that it was only reasonable that the data could be

used for the RFI. Per US EPA request, WMO validated several rounds of historical data for use in the RFI. Although, as your comments indicate, the historical validation was not completed, in every case, to the degree required, we do feel that the data is of sufficient quality for use in the RFI. Since completion of the Workplan in 1998, EPA has developed detailed guidance for the use of historical data. With US EPA's request to use the recent guidance, we are now faced with meeting an even higher standard for use of the data. A detailed review of the guidance indicates that it is unlikely that the historical data would meet the requirements of the new guidance.

This issue was discussed during our February 25th meeting and we concluded that is was no longer worthwhile to pursue using historical data for risk management decision making. Instead, WMO agreed to collect the necessary groundwater samples during Phase II of the RFI. Based on information presented in the Position Paper (Cox-Colvin & Associates, Inc., March 2000a), we believe groundwater sampling should be limited to the bedrock aquifer; however, the details regarding groundwater sampling during Phase II of the RFI will be provided in the Phase II QAPP. The Report will be revised to state that historical data will not be used for risk-based decision making. Because the data may be used to support general groundwater related conclusions generated during Phase II, the historical data will remain "as is" in Appendix F of the Report.

Despite the above conclusions, WMO is providing the following response stating our position on each of the historical groundwater related comments provided by US EPA.

US EPA General Comment #4:

The Report uses one round of RFI groundwater analytical data collected in May 1999 and nine rounds of historical groundwater analytical data collected in January 1993, April 1993, July 1993, October 1993, April 1997, October 1997, April 1998, October 1998, and April 1999 for lacustrine and bedrock monitoring wells to evaluate releases to groundwater at the facility. However, the April 1997 groundwater analytical data is missing from Appendix F of the Report. Also, groundwater elevations for monitoring wells sampled in October 1998, April 1999, and May 1999 are missing from the Report. The Report should be revised to include (1) the April 1997 groundwater analytical data, (2) an additional table showing groundwater elevations at each monitoring well sampled during all ten rounds of groundwater sampling, and (3) potentiometric surface maps for both the lacustrine and bedrock aquifers developed using the groundwater elevation data.

WMO Response to General Comment #4:

Section 5.11 of the Work Plan states that "...the three most-recent rounds of historical data..." would be validated and presented in the Report. At the time of groundwater sample collection for the Phase I RFI in May 1999, the three most-recent groundwater sampling events for bedrock monitoring wells were the April 1998, October 1998, and April 1999 events. The April 1997 and October 1997 data were validated, and the October 1997 data were included in the Report, for information purposes. Presentation of the April 1997 and October 1997 data was not required by the Work Plan. Therefore, Appendix F does not need to be modified to include additional data.

WMO will revise the Report text to describe why historical data will not be used. The historical data will remain "as is" in Appendix F.

US EPA General Comment #5:

Section 5.6 and Appendix F of the Report state that the 1993 historical groundwater data could not be validated. Therefore, this data is useful for decision-making purposes only if it is consistent with validated data obtained during other rounds of groundwater sampling at the same locations. Section 5.6 also states that the 1993 data indicates the presence of nickel, chromium, and lead in some of the lacustrine wells sampled. However, data collected during the Phase I RFI indicates the presence of several additional metals, VOCs, and cyanide in the same wells. Because the 1993 data was not validated and is not consistent with the RFI data obtained for the same wells, the 1993 data is not acceptable for use in the RFI.

WMO Response to General Comment #5:

WMO is not surprised that the results from the lacustrine wells are not consistent through time. Given that the wells are screened in clay and silt-rich lacustrine deposits that do not meet the strictest definition of an aquifer and are sampled for total metals, this level of inconsistency is to be expected and will make it nearly impossible to draw meaningful and consistent conclusions regarding groundwater quality in the unconsolidated deposits.

US EPA General Comment #6:

The data validation of the historical groundwater data for bedrock wells and the capillary drain collected from April 1997 through April 1999, which is discussed in Appendix F of the Report, considers only surrogate recoveries, matrix spike (MS)/MS duplicate results, laboratory control sample data, and blank data. However, the introduction to the data validation reports for current RFI data in Appendix I notes that the main issues that led to qualification of this fully validated data were

holding times, calibrations, and internal standard responses. None of these additional criteria was considered in the validation of the historical groundwater data; therefore, the validation of the historical groundwater data must be considered incomplete. For this reason, the April 1997 through April 1999 historical groundwater data is useful for decision-making purposes only if it is consistent with fully validated data for the same sampling locations. Appendix F indicates that the April 1997 through April 1999 data contained detections of phenols and nickel in the capillary drain and MW-24R, respectively. However, RFI data indicates the presence of cyanide in the capillary drain and antimony, chromium, silver, and SVOCs in MW-24R. Because the validation of the April 1997 through April 1999 data is incomplete and the data is not consistent with the RFI data for the same wells, this historical data is not acceptable for use in the RFI.

WMO Response to General Comment #6:

Understood. See WMO's general response to the use of historical data.

US EPA General Comment #7:

The Report does not contain monitoring well construction logs for the wells sampled prior to and during the Phase I RFI. The screened depth interval of each well must be known to determine whether the wells can be appropriately used to monitor migration of contaminants from potential source areas of varying depths that were identified during the Phase I RFI. Therefore, the Report should be revised to include the monitoring well construction logs.

WMO Response to General Comment #7:

Construction logs for the wells sampled prior to and during the Phase I RFI are included in Appendix C of the Phase I Workplan.

US EPA Comments on Use of RCRA Closure Data:

US EPA General Comment #8:

The Report states that data collected for the closure of SWMUs 4, 5, 7, 10, and 11 in SWMU Group B; SWMUs 18 and 28 in SWMU Group I; and AOC D is provided in Appendix G. However, the closure data provided in Appendix G is insufficient to meet corrective action requirements. Specifically, the closure reports in Appendix G lack the items discussed below.

The 1983 Closed Lagoons report contains no data for SWMUs 5, 7, 10, and 11 or AOC D. Also, the soil data provided for SWMU 4 does not include analytical data for all the Appendix IX parameters required in the RFI; only data for PCBs and extraction procedure (EP) toxic metals is included.

The 1992 Closure of W-Tanks report does not include a map showing soil sampling locations and depths. Also, the soil sample data does not include analytical data for all the Appendix IX parameters required in the RFI; only data for metals, cyanide, phenols, PCBs, and a limited list of VOCs is included.

The 1996 Closure Report for Pump House, Tank Containment, and Sluice Pit does not include a map showing soil sampling locations and depths.

In addition, the data provided in Appendix G of the report generally lacks (1) quality control (QC) sample and data validation results and (2) documentation of sample preservation and transport methods. Based on the abovementioned deficiencies, the closure data in Appendix G is not acceptable for use in the RFI.

WMO Response to General Comment #8:

As discussed during the February 25th meeting, SWMUs which have been clean closed under RCRA will not be further investigated during the RFI. Data collected during Phase I which pertains to the RCRA clean closed units will remain in the revised Report. The revised Report will, however, conclude that further action is not necessary for these units, based on the above agreement. Historical closure information will remain "as is" in Appendix G.

US EPA Comments on Use of Background Data:

US EPA General Comment #9:

The Report indicates that inorganic soil data was compared to average background concentrations and the range of background concentrations. For example, in SWMU Group F, arsenic concentrations were found to exceed the average background concentration. Section 5.3.6 states that although the average background concentration was exceeded, the arsenic concentrations were still within the observed range of background concentrations. This method of comparison is not statistically valid. To provide a more statistically valid comparison, the 95 percent upper confidence limit for the background concentrations of each inorganic constituent should be calculated and then used as a basis of comparison for each investigative sample result. The Report should be revised accordingly.

WMO Response to General Comment #9:

As discussed during the February 25th meeting, background concentrations will be re-evaluated. Additional samples will be collected and an appropriate statistical

evaluation of maximum background concentrations (including an outlier analysis) will be developed during Phase IB of the RFI. The revised Phase IB background values will be used to screen the soil samples collected during Phase I of the RFI. After completion of the Phase IB statistical evaluation, the report text, tables, and figures will be modified accordingly and submitted in accordance with the schedule presented in Attachment 2.

The Phase IB scope of work and methodologies are provided in the *Phase I RFI Quality Assurance Project Plan (QAPP) Addendum for Additional Background Soil Sampling* (Phase I QAPP Addendum) (Cox-Colvin & Associates, Inc, 2000b).

US EPA General Comment #10:

Section 5.3.2 of the Report, which discusses groundwater sample analytical results, states that the table presented on Page 8 presents all detections, in contrast to other tables within this section, to illustrate the quality of the downgradient samples as compared to two wells upgradient of the Closure Cell (L-26 and MW-24R). Exceedances of Region 5 DQLs for groundwater, which are the applicable standards in accordance with the WP, are shown in bold. According to the QAPP, background groundwater concentrations in upgradient wells (L-26 and MW-24R) are the applicable standards for metals detected in the lacustrine and bedrock wells. EPA Region 5 data quality levels (DQL) are the applicable standards for organics detected in the lacustrine and bedrock wells. According to analytical data provided in Appendix D, Appendix E, Figure 5-3.2c, and Figure 5-3.2d of the Report, downgradient lacustrine wells L-19A, L-20, and L-25 and the capillary drain contain metal concentrations that exceed the background concentrations in upgradient well L-26. However, these results are not shown on the table on Page 8. For each downgradient monitoring well, the table on Page 8 should be revised to include all metals whose concentrations exceed background groundwater concentrations in the upgradient wells. Also, Sections 5.3.2 and 7.2.1 should be revised to discuss metals whose concentrations exceed background groundwater concentrations.

WMO Response to General Comment #10:

The text and table on Page 8 will be revised accordingly. The Position Paper (Cox-Colvin & Associates, 2000a) also discusses the concepts of water in the lacustrine soils at the site and the inherent problems presented by consideration of well L-26, or any other lacustrine monitoring well. The revised report revisions will include references to this paper. Although Region V DQLs are included in RFI Workplan as applicable standards, we believe their use as standards should be limited to determining if appropriate reporting levels have been met. To meet the requirement of the Phase I Workplan, DQLs will continue to be used for comparison purposes in the revised Report. However, their use in the Phase II investigation may be limited to their intended use of determining if laboratory reporting limits have been met.

US EPA Comments on Data Validation:

US EPA General Comment #11:

During review of data in Appendix H of the Report, many cases were noted in which field duplicate samples had concentrations quite different from those of their primary samples. For instance, the lead concentration in sample S49:SL:SF01-01 was 11.3 milligrams per kilogram (mg/kg), but that in its field duplicate, sample S49:SL:SF01-01-FD, was 537 mg/kg, almost 50 times as much. The repeated instances of major variations imply considerable heterogeneity in the distribution of the various analytes in the materials sampled. With such high heterogeneity, it is not clear whether the primary sample result, the field duplicate sample result, or the average of the two results more closely reflects the true concentration in a given area. To be conservative, the higher result for each analyte in each field duplicate pair should be used for decision-making. When more information on localized variations in concentrations is available, it may be possible to adopt less conservative measures, but considerably more data will be required to support such a change in procedure. The Report should be revised accordingly.

WMO Response to General Comment #11:

It is not uncommon for soil samples to exhibit "major variations" in analytical results in even the most homogeneous soil. For this reason, field duplicates are often not collected for soil. The Report will be revised to consider the higher of the two results for duplicate samples for all locations where duplicate samples were collected. Per US EPA's request, analysis of Phase IB background soil samples and Phase II soil samples will include a procedure for homogenizing soil samples at the laboratory prior to analysis. This SOP is provided in the Phase I QAPP Addendum (Cox-Colvin & Associates, Inc, 2000a).

US EPA General Comment #12:

Review of Appendix I of the Report revealed that the validation of data collected during the Phase I RFI was generally well done. In most instances, the validation results were accurately transcribed into Appendix H and those results can be used as qualified. However, in two general cases, R flags for data that is not usable were not included in Appendix H.

The first case involves the calibrations, both initial and continuing, in the VOC and SVOC analyses. In all the analytical runs examined, a small number of analytes had relative response factors (RRF) less than 0.05. The analytes involved included chemicals well known to produce poor, irregular responses in the analytical system, such as acetone; acrolein; acetonitrile; 1,4-dioxane; and 4-nitroquinoline-N-oxide. The results for these analytes were generally nondetects and their reporting

limits are qualified as estimates in Appendix H. However, EPAs 1994 National Functional Guidelines for Organic Data Review states that such low-RRF, nondetect results should be rejected. Appendix H should be revised to include the correct qualifiers for these analytes, and the text of the Report should discuss the data gap associated with rejection of the results for these potential contaminants for all or most of the samples.

The second case involves the metal MS analyses. In several cases (involving samples S09:SL:GNE2-01, S16:SL:GND5-01, ACA:SL:SF05-01, S12:SL:GNF3-01, S15:SL:GNA1-01, and ACH:SL:SF02-01 and possibly other samples), the recovery of antimony from the MS was less than 30 percent. As noted in EPAs 1994 National Functional Guidelines for Inorganic Data Review, such low recoveries indicate that nondetect results for the parent samples should be rejected. However, these results are qualified as UJ in Appendix H. The appendix should be revised to reflect rejection of these nondetect results, and the associated data gap should be discussed as necessary in the text of the Report. Because this rejection applies to only the individual samples used in the MS analysis rather than all the samples analyzed in an analytical run, it will have far less effect on data completeness than the irregularities in the VOC and SVOC analysis calibrations.

WMO Response to General Comment #12:

All non-detect sample results for volatile and semi-volatile organic compounds associated with initial or continuing calibration relative response factors less than 0.05 will be flagged as rejected ("R") and the resulting data gap will be discussed in the text of the revised Report.

All non-detect sample results for inorganic analytes associated with matrix spike recoveries less than 30% will be flagged as rejected ("R") and the resulting data gap will be discussed in the text of the revised Report.

US EPA Comments on RFI Data Presentation:

US EPA General Comment #13:

The sample summary tables provided in Sections 5.3 and 5.4 of the Report present only the numbers of investigative and QC samples collected in a particular SWMU group or AOC. These tables should be revised to provide more detailed descriptions of the samples collected. Specifically, the tables should be expanded to show the identification number, collection depth, and analyses performed for each sample collected during Phase I of the RFI.

WMO Response to General Comment #13:

All of the above mentioned data is presented within the Report. Insertion of a table with all of the above information into the existing text format would result in a cumbersome and less readable Section 5. However, the current text and table format in Sections 5.3 and 5.4 can and will be revised to present the above data in a more clear and concise format for the reader.

US EPA General Comment #14:

Section 4.3.2.2 of the Report states that grid node samples in SWMU Groups A, C, and D and SWMU 15 were collected approximately 2 to 4 ft below the SWMU base. However, it cannot be determined whether samples were actually collected at this depth because the Report does not clearly specify the depth at which the base of each SWMU was encountered. For example, for SWMU Group A, which contains five former surface impoundments, Section 5.3.1 states that the depth of the bases of the impoundments ranges from 9 to 12 ft bgs. This section should be revised to identify the specific depth at which the base was encountered during drilling activities for each surface impoundment. Also, for SWMU Group C, Section 5.3.3 does not identify a depth for the base of SWMU 19. In addition, no base depths are provided for the SWMUs in SWMU Group D or for SWMU 15 in SWMU Group I. The Report should be revised to specify the base depth for each SWMU.

WMO Response to General Comment #14:

As discussed above in the response to General Comment 1d, these former SWMUs were surface impoundments with sloping morphologies and irregular bottoms, probably caused by fixing the waste in place. The depth of SWMU 19 would be extremely difficult to determine as it was a former drum storage area, located over top of a closed surface impoundment area. By following grid node sampling procedures, field determinations for native soil were indicated at depths between 10 and 14 feet. This would indicate that the underlying surface impoundment was interfering with determining the bottom of the shallower former drum storage pad/area.

The Report will be revised to provide a more clear and concise table and text format for the vertical and horizontal delineation of contamination associated with an individual SWMU.

US EPA General Comment #15:

The Report states that in SWMUs 1, 3, 9, 12, 14, 16, and 43, additional soil samples were collected to delineate the vertical extent of contamination. However, the collection depth for these additional

samples is not always specified. For example, Section 5.3.3 states that sample S09:SL:SL02-11 was collected to determine the vertical extent of contamination, but the collection depth for this sample is not specified. The Report should be revised to specify the collection depth for each sample collected to delineate the vertical extent of contamination.

WMO Response to General Comment #15:

The Report will be revised to provide a more clear and concise table and text format for the vertical and horizontal delineation of contamination associated with an individual SWMU.

US EPA General Comment #16:

There are many inconsistencies between the data presented in the tables and figures of Section 5.0. For example, Figure 5-3.1c indicates that chlorobenzene was detected in soil in SWMU 2 at a concentration of 300,000 micrograms per kilogram (g/kg), (which is above the preliminary remediation goal [PRG] of 183,370 g/kg). However, this result is not reported in the table provided in Section 5.3.1. Similarly, the table in Section 5.3.2 lists no detections of inorganics in groundwater samples collected from monitoring well L-25, but Figure 5-3.2d lists several inorganics detected in this well. Section 5.0 and the rest of the Report should be thoroughly checked and revised as necessary to ensure that all data is consistently reported in tables and figures.

WMO Response to General Comment #16:

The Report will be revised to correct any inconsistencies found between the data presented within the tables and figures in Section 5.0.

US EPA Recommendations for a Phase II RFI:

US EPA General Comment #17:

The data presented in Section 5.0 of the Report does not adequately support the conclusions presented in Section 7.0. Therefore, a Phase II RFI is required for several SWMU groups, SWMUs, and AOCs. Table E-1, which appears at the end of this comment document, summarizes the Phase I RFI findings and conclusions presented in the Report and the areas included in the Phase II RFI.

WMO Response to General Comment #17:

WMO understands that Phase II is necessary. The conclusions represented in Section 7.0 will be revised to take into account Table E-1, recent conclusions regarding further investigation of RCRA clean closed units, revised background soil

concentrations, and information presented in the Position Paper (Cox-Colvin & Associates, 2000a). To assist in the evaluation of Phase I, Phase IB, and Phase II data, a RFI conceptual approach flow chart is provided as Attachment 1 to these responses. This flow chart and approach was presented in the February 25th meeting and has been revised per recommendations from the meeting.

SPECIFIC COMMENTS

US EPA Specific Comment #1:

Section 5.3.1, Page 4, Paragraph 3. The text states that no PRGs are exceeded below the base of the surface impoundment in SWMU 3. However, several organic contaminants were detected in SWMU 3 at concentrations significantly above their PRGs. The text should be revised to discuss these exceedances. Also, the text states that soil sample S03:SL:SL01 was collected to determine the vertical extent of contamination, but no analytical results are presented in Appendix D or E to support this statement. The Report should be revised to present the analytical results for this soil sample in order to demonstrate that the vertical extent of contamination has been determined.

WMO Response to Specific Comment #1:

Appendix D, page 8 of 29, lines 17 to 29 show the inorganic results, compared to background averages and EPA Region 9 PRGs, of the samples collected at borehole S03:SL:SL01. Appendix E, page 2 of 4, lines 11 and 12, show the organic results, exceeding the EPA Region 9 PRGs, for samples collected at borehole S03:SL:SL01. Sampling depths, corresponding to each sample point, are shown in the third and fourth columns of each table. S03:SL:SL01-04 was collected because field observations at this location indicated possible contamination at the base of SWMU#3. No PRGs (except for arsenic) were exceeded at this sample location. No revisions to the Report are necessary.

US EPA Specific Comment #2:

Section 5.3.1, Page 5, Paragraph 2. The text states that the benzene concentration in a soil sample collected at grid node B5 in SWMU 2 was above the PRG. The text also states that this exceedance may be the result of smearing of contamination from the base of the surface impoundment. This explanation is questionable because the soil sample was collected at a depth of 21 to 23 ft bgs and Page 4 states that the base of the surface impoundment is estimated to be 9 to 12 ft bgs. Additional soil samples should be collected to determine the extent of contamination from 12 to 21 ft bgs. In addition, the level of contamination present in the sample collected from 21 to 23 ft bgs requires that

additional soil samples be collected at greater depths to determine whether a release to the environment has taken place.

WMO Response to Specific Comment #2:

The estimated depth of former SWMU#2 is 19 to 23 feet bgs based on samples collected at gridnode B4 and B5. S02:SL:GNB4-01 was collected at 19 to 21 feet bgs, 2 feet below the observed base of SWMU#2. S02:SL:GNB5-01 was collected at 21-23 feet bgs, also 2 feet below the observed base of SWMU#2.

The Report will be revised to provide a more clear and concise table and text format for the vertical and horizontal delineation of contamination associated with an individual SWMU.

Field observations noted that soil was saturated at depth and the possibility that the contamination was "smeared" down the borehole. However, due to the concentrations of benzene observed in sample S02:SL:GNB5-01, further investigation is required by the Work Plan. At least one additional soil sample will be collected at this location during Phase II of the RFI.

US EPA Specific Comment #3:

Section 5.3.2, Page 8, Paragraph 1. The text states that the sample analytical results do not indicate a significant impact on the wells downgradient of SWMU Group B. This statement is not supported by the results for well L-25, which are shown in Figure 5-3.2d. The text should be revised to discuss the results from well L-25. Furthermore, well L-17 should be resampled and additional samples should be collected downgradient of well L-25 to assess the impact of SWMU Group B on the lacustrine aquifer.

WMO Response to Specific Comment #3:

The results for monitoring well L-25 were inadvertently omitted from the Report text. The Report text and tables will be revised to include the results from well L-25. The Position Paper, (Cox-Colvin & Associates, 2000a), discusses the concepts of water in the lacustrine soils at the site and the problems associated with consideration of water in these wells as representative of anything other than conditions immediately surrounding the wells. The Report revisions will include reference to this paper.

As discussed the response to General Comment #1b, monitoring well L-17 does not have sufficient recharge to provide enough water volume for a full sample for all parameters.

US EPA Specific Comment #4:

Section 5.3.2, Page 8, Paragraph 1. The text states that the sampling results do not indicate a significant impact from the facility in the sampled downgradient wells. As discussed in General Comment 10, the table on Page 8 should be revised to include metals detected in downgradient monitoring wells at concentrations exceeding background groundwater concentrations in the upgradient wells. Analytical results indicate that metal concentrations in downgradient wells L-19A, L-20, and L-25 exceeded background metal concentrations in upgradient well L-26. These analytical results indicate that past operations in SWMU Group B have impacted groundwater quality in the lacustrine deposits at the facility. Sections 5.3.2 and 7.2.1 should be revised to reflect these findings.

WMO Response to Specific Comment #4:

As noted in the response to General Comment 10, the text and table on Page 8 will be revised. The Position Paper, (Cox-Colvin & Associates, 2000a), discusses the concepts of water in the lacustrine soils at the site and the inherent problems presented with sampling L-26, or any other lacustrine monitoring well. Sampling of lacustrine wells is also complicated by the fact that the wells are completed in silt and clay units and sampled for total metals. No amount of sampling will provide a consistent characterization of metals in the unconsolidated deposits under these conditions.

US EPA Specific Comment #5:

Section 5.3.2, Page 8, Paragraph 1. The text states that the results show evidence of impact in L-26, one of the wells upgradient of the TSCA Closure Cell. This may be due to facility activities in the area. The analytical results indicate that groundwater quality in the lacustrine deposits near well L-26 has been impacted. The text should be revised to state whether the organics detected in well L-26 are related to past operations associated with a specific SWMU group or current activities not related to a SWMU group. Sections 5.3.2 and 7.2.1 should be revised accordingly.

WMO Response5 to Specific Comment #5:

In accordance with the Position Paper (Cox-Colvin & Associates, 2000a), the Report will be revised to indicate that the observed constituents in the L-26 water are likely due to infiltration vertically along the well casing and are not indicative of overall water quality.

US EPA Specific Comment #6:

Section 5.3.2, Page 8, Table of Results. The table indicates that there were no detections in monitoring well L-17. As discussed in General Comment 10, the table should be revised to include

all metals detected in downgradient monitoring wells at concentrations exceeding background groundwater concentrations in the upgradient wells. Also, the analytical results shown in the table for the antimony and silver detected in monitoring well MW-24R appear to be reversed when compared to the analytical results presented in Figure 5-3.2b and Appendix B. The analytical results should be verified and the table revised accordingly.

WMO Response to Specific Comment #6:

The text and table on Page 8, and Figure 5-3.2b, will be revised accordingly.

US EPA Specific Comment #7:

Section 5.3.4, Page 11, Paragraph 5. The text states that grid node samples were collected in SWMU Group D at a depth of approximately 2.5 to 4.5 ft. The text should be revised to clarify whether these samples were collected 2.5 to 4.5 ft below each SWMU base. The text also states that the sampling depth interval was based on the approximate depth of mixing used during operation of the landfarms. The text should be revised to identify the approximate depth of mixing.

WMO Response to Specific Comment #7:

The Report will be revised to provide a more clear and concise table and text format for the vertical and horizontal delineation of contamination associated with an individual SWMU.

US EPA Specific Comment #8:

Section 5.3.4, Page 12, Table of Results. The table indicates that soil samples were initially collected at grid node locations F2 in SWMU 12 and A2 in SWMU 14 at a depth of 2.5 to 4.5 ft. It is not clear whether this depth interval is bgs or below the base of the SWMU. The table should be revised to clarify the depth intervals of the above samples. The table also indicates that samples were collected to delineate the vertical extent of contamination at depths of 8.5 to 10.5 ft and 18.5 to 20.5 ft in SWMUs 12 and 14, respectively. It is not clear why samples intended to delineate the vertical extent of contamination were not collected in the depth intervals immediately beneath the 2.5- to 4.5-ft interval. The text should be revised to explain this matter.

WMO Response to Specific Comment #8:

The Report will be revised to provide a more clear and concise table and text format for the vertical and horizontal delineation of contamination associated with an individual SWMU.

US EPA Specific Comment #9:

Section 5.3.9, Page 22, Paragraph 3. The text states that another soil sample was collected at a depth of 2 to 4 ft bgs. However, the table of results on Page 22 indicates that this sample was collected at a depth of 6 to 8 ft bgs. The text or table should be revised to resolve this discrepancy.

WMO Response to Specific Comment #9:

The Report will be revised to provide a more clear and concise table and text format for the vertical and horizontal delineation of contamination associated with an individual SWMU.

US EPA Specific Comment #10:

Section 5.3.9, Page 23, Paragraph 1. The text states that in SWMU 43, another sample to characterize the vertical extent of contamination was collected 8 to 10 ft bgs at the first selected location. The text should be revised to provide the identification number of the sample collected at the first selected location.

WMO Response to Specific Comment #10:

The Report will be revised to provide a more clear and concise table and text format for the vertical and horizontal delineation of contamination associated with an individual SWMU.

US EPA Specific Comment #11:

Section 5.3.9, Page 23, Paragraph 4. The text states that soil sampling locations and analytical results for SWMUs 44 and 45 are presented in Figures 5-3.9i and 5-3.9j. However, Figure 5-3.9i is not included in the Report. The Report should be revised to include this figure.

WMO Response to Specific Comment #11:

Figure 5-3.9i was inadvertently left out of the Report. It will be included with the revised Report.

US EPA Specific Comment #12:

Section 5.6, Page 33, Paragraph 1. The 1993 historical data summary states the following: The 1993 data, although it could not be fully validated at this time, showed the presence of nickel, and lesser occurrences of chromium and lead, in some of the lacustrine wells. However, the data (see

Appendix F) did not display a trend or pattern that could be clearly attributable to impact from the facility; in fact, the concentrations of some of these parameters were higher in the upgradient well. Although some parameters were present at higher concentrations in upgradient well L-26, most detections of nickel, chromium, and lead in the monitoring wells downgradient of SWMU Group B exceeded the concentrations in well L-26. These findings indicate that SWMU Group B has impacted groundwater quality in the lacustrine deposits underlying the facility. Sections 5.6 and 7.2.3 should be revised to reflect these findings.

WMO Response to Specific Comment #12:

WMO disagrees with this conclusion. We feel that this information supports our earlier claims that total metals sampling of wells completed in clay and silt is inappropriate and will not provide consistent or understandable result. As discussed in the Position Paper (Cox-Colvin & Associates, 2000a), based on the dominantly vertical flow gradient in the lacustrine unit, the wells could not possibly detect a release from the SWMU. The Report will be revised to take into account this comment, recent conclusions regarding further investigation of RCRA clean closed units, and information presented in the Position Paper (Cox-Colvin & Associates, 2000a).

US EPA Specific Comment #13:

Section 5.6, Page 33, Paragraph 3. The 1997-1999 historical data summary states the following: With the exception of conductivity and pH, no detections were noted in any of the samples. The downgradient wells (MW-14R, MW-15R, MW-16R, MW-20R, MW-30R, and MW-36R) monitor groundwater in the bedrock beneath the site and are downgradient of the TSCA closure cell and SWMU Group A. The upgradient wells (MW-24R and MW-37R) were used as background reference points for this evaluation. Review of the historical data reveals the following detections in the monitoring wells indicated: phenols at 0.01 microgram per liter (g/L) in MW-15R and chromium-total at 10.3 g/L in MW-16R during the October 1997 sampling event; nickel-total at 83.6 g/L in MW-24R during the April 1998 sampling event; and arsenic at 10.2 g/L in MW-30R during the April 1999 sampling event. The constituent concentrations detected in wells MW-15R, MW-16R, and MW-30R during the October 1997 and April 1999 sampling events exceeded background groundwater concentrations in upgradient well MW-24R. Sections 5.6 and 7.2.3 should be revised to reflect these findings.

WMO Response to Specific Comment #13:

The statement should have read "The results show that there were no statistical exceedances of any parameters at any of the wells." None of the detections noted were above the prediction limits established in the site's Ohio Part B Permit, which

were developed based on years of background data collection. Bedrock groundwater will be fully evaluated in Phase II of the RFI and will not be dependent on historical data. WMO will revise the Report text to describe why historical data will not be used. The historical data will remain "as is" in Appendix F.

US EPA Specific Comment #14:

Section 7.2.1, Page 3, SWMU Group B. As discussed in General Comment 10 and Specific Comments 3, 4, 5, 6, and 13, sample analytical results indicate that past operations at SWMU Group B and activities near monitoring well L-26 have impacted groundwater quality in the lacustrine deposits underlying the facility. The text should be revised to reflect this information.

WMO Response to Specific Comment #14:

See responses to General Comment #10 and Specific Comment #3, #4, #5, #6, and #13.

US EPA Specific Comment #15:

Section 7.2.3, Page 8, Paragraph 3. The text states that the April and October 1997 and April 1998 monitoring data demonstrate that there is no detectable impact on bedrock groundwater quality from the features monitored by the bedrock wells. As discussed in Specific Comment 13, concentrations of several constituents detected in downgradient monitoring wells during the October 1997 and April 1999 sampling events exceeded background groundwater concentrations in upgradient monitoring well MW-24R. The text should be revised to reflect these findings.

WMO Response to Specific Comment #15:

See response to Specific Comment #13 above.

WMO References

Cox-Colvin & Associates, Inc., 2000a, Position Paper, Technical Position Paper on the Occurrence, Movement, and Quality of Groundwater at the Waste Management of Ohio – Vickery Facility, March 23, 2000.

Cox-Colvin & Associates, Inc., 2000b, Phase I RFI Quality Assurance Project Plan (QAPP) Addendum for Additional Background Soil Sampling, March 23, 2000.

TABLE E-1

PHASE I RFI FINDINGS AND CONCLUSIONS AND REQUIRED PHASE II RFI ACTIVITIES

Area to be Investigated	Phase I Findings	Phase I Conclusions	Required Phase II Activities	*WMO Response*
Groundwater	Historical groundwater data is provided in Appendix F.	There was no detectable impact on bedrock groundwater quality. Data for the lacustrine wells did not display a trend or pattern that was clearly attributable to an impact from the facility.	As stated in General Comments 5 and 6, the historical groundwater data is not acceptable for use in the RFI. All monitoring wells should be sampled.	*All appropriate wells will be sampled during Phase II of the RFI. Historical data will not be used for decision making in the RFI. It may be used to support conclusions based on data collected during the RFI.*
SWMU Group B (Soil)	Clean closure data is provided in Appendix G.	SWMUs in this group were clean-closed.	As stated in General Comment 8, the clean closure data is not acceptable for use in the RFI. Soil samples should be collected in SWMUs 10 and 11.	*Per the February 25, 2000 meeting with US EPA in Chicago, RCRA clean-closed units will not be further investigated.*
SWMU Group B (Groundwater)	A capillary drain samples cyanide concentration exceeded the DQL.	Detections did not appear to be related to wastes handled in this area.	Groundwater samples should be collected to determine the source and extent of contamination.	*Per the February 25, 2000 meeting with US EPA in Chicago, RCRA clean-closed units will not be further investigated.*
	Cyanide concentrations exceeded the DQL at monitoring wells L-19A and M-14R.	Detections did not appear to be related to wastes handled in this area.	Groundwater samples should be collected to determine the source and extent of contamination.	*Per the February 25, 2000 meeting with US EPA in Chicago, RCRA clean-closed units will not be further investigated. Per the Technical Position Paper[1], sampling of the lacustrine wells is inappropriate and unnecessary. Well MW-14R will be included in the list of bedrock wells to be monitored during Phase II and the parameter list will include cyanide.*
	Concentrations of several VOCs and lead exceeded the DQLs at monitoring well L-26.	Contaminants may be from an upgradient source.	Groundwater samples should be collected to determine the source and extent of contamination.	*Per the February 25, 2000 meeting with US EPA in Chicago, RCRA clean-closed units will not be further investigated. Per the Technical Position Paper[1], sampling of the lacustrine wells is inappropriate and unnecessary.*

Area to be Investigated	Phase I Findings	Phase I Conclusions	Required Phase II Activities	*WMO Response*
SWMU Group A	Benzene was found in soil at a concentration above its PRG at grid node location B5 at a depth of 21 to 23 ft bgs.	The benzene exceedance may have resulted from smearing contamination from the base of the surface impoundment.	The vertical extent of contamination should be delineated.	*Agreed. The vertical extent of benzene at this location will be further investigated during Phase II.*
SWMU Group A (SWMU 2)	Chlorobenzene and benzo(a)pyrene concentrations above the PRGs were found in soil at select location SL02-03 at a depth of 6 to 8 ft bgs.	The sample was not collected below the base of the SWMU. Therefore, no PRGs were exceeded below the SWMU base.	Although the sample was collected above the SWMU base, the vertical extent of contamination should be delineated.	*As per the Workplan, the sample was collected within fixed waste at the interval that had the highest reading for total VOCs as measured by a field PID. This sample was a "Select" sample. "Select" samples are not intended to be used for vertical delineation; that is the purpose of the grid node samples. In addition, this "select" sample is surrounded by four grid node samples that did not indicate migration of these constituents from the fixed waste. Vertical extent determination is not necessary.*
SWMU Group A (SWMU 3)	Several VOCs were found in soil at concentrations above the PRGs near the northwestern SWMU boundary at select location SL02-03 at a depth of 6 to 8 ft bgs.	Because samples were collected within fixed waste materials, this was an expected finding.	The sample was collected near the SWMU perimeter. Although the finding was expected, the lateral and vertical extent of soil contamination northwest of the sampling location should be delineated.	*Agreed. The lateral and vertical extent of contamination will be investigated by collecting one grid node sample near the northwestern boundary of this SWMU during Phase II.*
SWMU Group A (SWMU 16)	Dieldrin was found in soil at a concentration above its PRG at select location SL02-03 at a depth of 6 to 8 ft bgs.	Because the sample was collected within fixed waste materials, this was an expected finding.	Although the sample was collected within fixed waste materials, the vertical extent of contamination should be delineated.	*Grid node and "select" samples were collected from the same borehole at grid node B6. Dieldrin and several other organic compounds were found in stabilized waste at "select" sample SL02-03. Several of these organic compounds were also found in the sample immediately beneath the waste (GNB6-01) indicating a release to soil. These constituents were not present in the next interval (GNB6-01), indicating that the extent has been determined. Further extent determination is not necessary. Figure 5-3 will be revised to present the order of sample collection within the borehole at grid node B6.*

Area to be Investigated	Phase I Findings	Phase I Conclusions	Required Phase II Activities	*WMO Response*
SWMU Group C (SWMU 9)	Grid node samples were not collected 2 to 4 ft below the SWMU base as called for in the Phase I RFI work plan.	There was no evidence of contamination beneath the SWMU base.	The work plan was not followed. Grid node locations should be resampled at the correct depth intervals.	*The work performed was consistent with the workplan. The confusion is due to the slopng morphology of the lagoons as discussed in the responses to General Comments. The RFI Report will be revised to more clearly demonstrate the locations of samples with respect to the bases of the lagoon.*
SWMU Group D (SWMU 12)	Benzo(a)pyrene was found in soil at concentrations above its PRG near the eastern SWMU boundary at grid node location GNF2-01 at a depth of 2.5 to 4.5 ft bgs.	Because only one sample exceeded the PRG, there was no widespread impact from this SWMU.	The sample was collected near the SWMU perimeter. Therefore, the lateral and vertical extent of soil contamination of this location should be delineated.	*The extent of benzo(a)pyrene in soil at this location will be determined during Phase II of the RFI.*
SWMU Group F (SWMU 40)	Chromium was found in soil at a concentration above its PRG near the southern SWMU boundary at surface location SF02-01 at a depth of 0 to 2 ft bgs.	There was no evidence of contamination from this SWMU.	The chromium concentration in the sample, which was collected outside the SWMU perimeter, was almost two times greater than the PRG. Therefore, the lateral and vertical extent of soil contamination south of this location should be delineated.	*Release determination for naturally occurring inorganic constituents will be re-evaluated in the revised RFI Report after collecting additional background data during Phase IB.*
SWMU Group I (SWMU 15)	PCBs were detected in soil at concentrations above the PRL at select location SL:GNA3-01 at a depth of 2 to 4 feet bgs, but the sample was not analyzed for dioxins and furans as required by the QAPP.	Previous remediation conducted at this SWMU was sufficient.	The QAPP was not followed. The location should be resampled for dioxin and furan analysis.	*This location will be analyzed for dioxins and furans during Phase II.*

Area to be Investigated	Phase I Findings	Phase I Conclusions	Required Phase II Activities	*WMO Response*
SWMU Group I (SWMU 18)	Clean closure data is provided in Appendix G.	This SWMU was clean-closed.	As stated in General Comment 8, the clean closure data is not acceptable for use in the RFI. Soil samples should be collected in this SWMU.	*Per the February 25, 2000 meeting in Chicago, RCRA clean-closed units will not be further investigated*
SWMU Group I (SWMU 28)	Clean closure data is provided in Appendix G.	This SWMU was clean- closed.	As stated in General Comment 8, the clean closure data is not acceptable for use in the RFI. Soil samples should be collected in this SWMU.	*Per the February 25, 2000 meeting in Chicago, RCRA clean-closed units will not be further investigated.*
SWMU Group I (SWMU 41)	Benzo(a)pyrene was found in soil at a concentration above its PRG near the northeastern SWMU boundary at surface location SF02-01 at a depth of 0 to 2 ft bgs.	The benzo(a)pyrene concentration detected did not indicate a significant impact.	The benzo(a)pyrene concentration in the sample, which was collected outside the SWMU perimeter, was more than three times greater than the PRG. Therefore, the lateral and vertical extent of soil contamination at this location should be delineated.	*The extent of benzo(a)pyrene in soil at this location will be determined during Phase II of the RFI.*
SWMU Group I (SWMU 42)	Chromium was found in soil at a concentration above its PRG at surface location SL01-01 at a depth of 0 to 2 ft bgs. This location was the only one sampled in this SWMU.	Chromium is not related to the wastes managed in this SWMU.	This SWMU managed waste oil, which can contain metals. Also, no other samples were collected in this SWMU. Therefore, the lateral extent of soil contamination at this location should be delineated.	*Release determination for naturally occurring inorganic constituents will be re-evaluated in the revised RFI Report after collecting additional background data during Phase 1B.*
AOC A	Several polyaromatic hydrocarbons (PAH) were found in soil at concentrations above their PRGs near the western AOC boundary at surface location SF15-01.	The contaminants are related to asphalt paving.	The Report does not discuss asphalt paving in relation to this AOC. Therefore, the lateral and vertical extent of soil contamination west of this location should be delineated.	*Although, based on waste stream information, it is highly unlikely that PAH's in soil are due to a release from this unit, the extent of PAHs in soil at SL:SF01-01 will be determined during Phase II.*

Area to be Investigated	Phase I Findings	Phase I Conclusions	Required Phase II Activities	*WMO Response*
AOC B	Several PAHs and chromium were found in soil at concentrations above their PRGs near the northwestern AOC boundary at surface location SF01-01.	The PAHs are related to asphalt paving. The chromium was interpreted as being naturally occurring.	The Report does not discuss asphalt paving in relation to this AOC. Therefore, the lateral and vertical extent of soil contamination northwest of this location should be delineated.	*The extent of PAHs in soil at this location will be determined during Phase II. The Chromium result will be re-evaluated in the revised Report, based on the Phase 1B background results.*
AOC D	Clean closure data is provided in Appendix G.	This AOC was clean-closed.	As stated in General Comment 8, the clean closure data is not acceptable for use in the RFI. Soil samples should be collected in this AOC.	*Per the February 25, 2000 meeting in Chicago, RCRA clean-closed units will not be further investigated.*
AOC H	Figure 5-4.8d shows that sediment samples were collected off site in the tributary to Little Raccoon Creek that flows around the facilitys eastern boundary. This information does not comply with Section 5.10.8 of the Phase I RFI work plan, which states that sediment samples would be collected downstream of the confluence of Meyers Ditch (which flows off site from the facilitys north-central boundary) and Little Raccoon Creek.	No impact was evident in the sediment samples.	The Phase I RFI work plan was not followed. Sediment samples should be collected at the correct locations.	*The RFI Workplan was followed. The figure did not include Meyers Ditch. As noted in the response to General Comment #3, this figure will be revised and submitted with the revised Report.*

ATTACHMENT 1

WMO VICKERY RFI CONCEPTUAL APPROACH

Attachment 1
Response to January 28, 2000
NOD for the Phase I RFI Report
Waste Management of Ohio, Inc., Vickery, Ohio

Following the collection of additional background soil data and determination of maximum background concentrations as described in the Phase IB Quality Assurance Project Plan (QAPP) Addendum[1] (Cox-Colvin & Associates, 2000), the Phase I results will be evaluated for each SWMU and AOC to determine if a release to the primary environmental media/pathway has occurred and if further investigation is required during Phase II of the RFI. The evaluation will consist of a series of critical inter-related decision statements which are part of the overall RFI conceptual approach presented in the February 25, 2000 Waste Management/US EPA meeting and provided (with agency suggested revisions) as Figure 1. The essence of this approach was provided in the RFI Workplan and does not represent a significant shift or change in the direction of the RFI. Although the focus of this response is to outline the data evaluation process to be conducted during Phase I, the entire RFI conceptual approach is summarized below and will be revisited during preparation of the Phase II QAPP. Box numbers shown in brackets refer to individual boxes on the flow chart (Figure 1).

The starting point of the process is the identification of SWMUs or AOCs identified in the permit to be included for investigation during the RFI [Box 1]. The list of SWMUs or AOCs identified in the permit to be included in the RFI are discussed in the RFI Workplan and the Phase I Report. As indicated on Figure 1 [Box 2], those SWMUs or AOCs identified in the permit which have been clean-closed under RCRA are then removed from the RFI process. This issue was discussed in detail in the February 25, 2000 meeting in Chicago and agreed to by US EPA and Ohio EPA. For those SWMUs effected by this decision statement (SWMUs 4, 5, 7, 10, 11, 17, 18, and 28), the SWMU-specific data collected during Phase I will be presented in the revised RFI Report; however, no further action will be recommended for these SWMUs.

In the next decision statement [Box 3], Waste Management will determine if a SWMU or AOC is regulated under an equally protective regulatory program. If Waste Management determines that a SWMU or AOC is regulated under an equally protective regulatory program and that the overlapping application of authorities would result in unnecessary and overly burdensome duplication of effort [Box 5], Waste Management may elect to propose no further action for the SWMU or AOC.

If based on the previous steps, a SWMU or AOC requires investigation during the RFI, the primary environmental media/pathway is then sampled [Box 14] to determine if a release has occurred. Release determination was the primary objective of Phase I of the RFI. To confidently confirm if a release has occurred the number, location, and depth of sampling must be appropriate as described in [Box 15]. Assuming that the sampling strategy is appropriate, each SWMU and AOC is then evaluated to determine if a release has occurred [Box 6]. For naturally occurring constituents, this determination will be made by comparing maximum background to each constituent at each sample location within the primary environmental media/pathway. Maximum background values will be

[1]Cox-Colvin & Associates, Inc., 2000, Phase I RFI Quality Assurance Project Plan Addendum for Additional Background Soil Sampling, March 23, 2000.

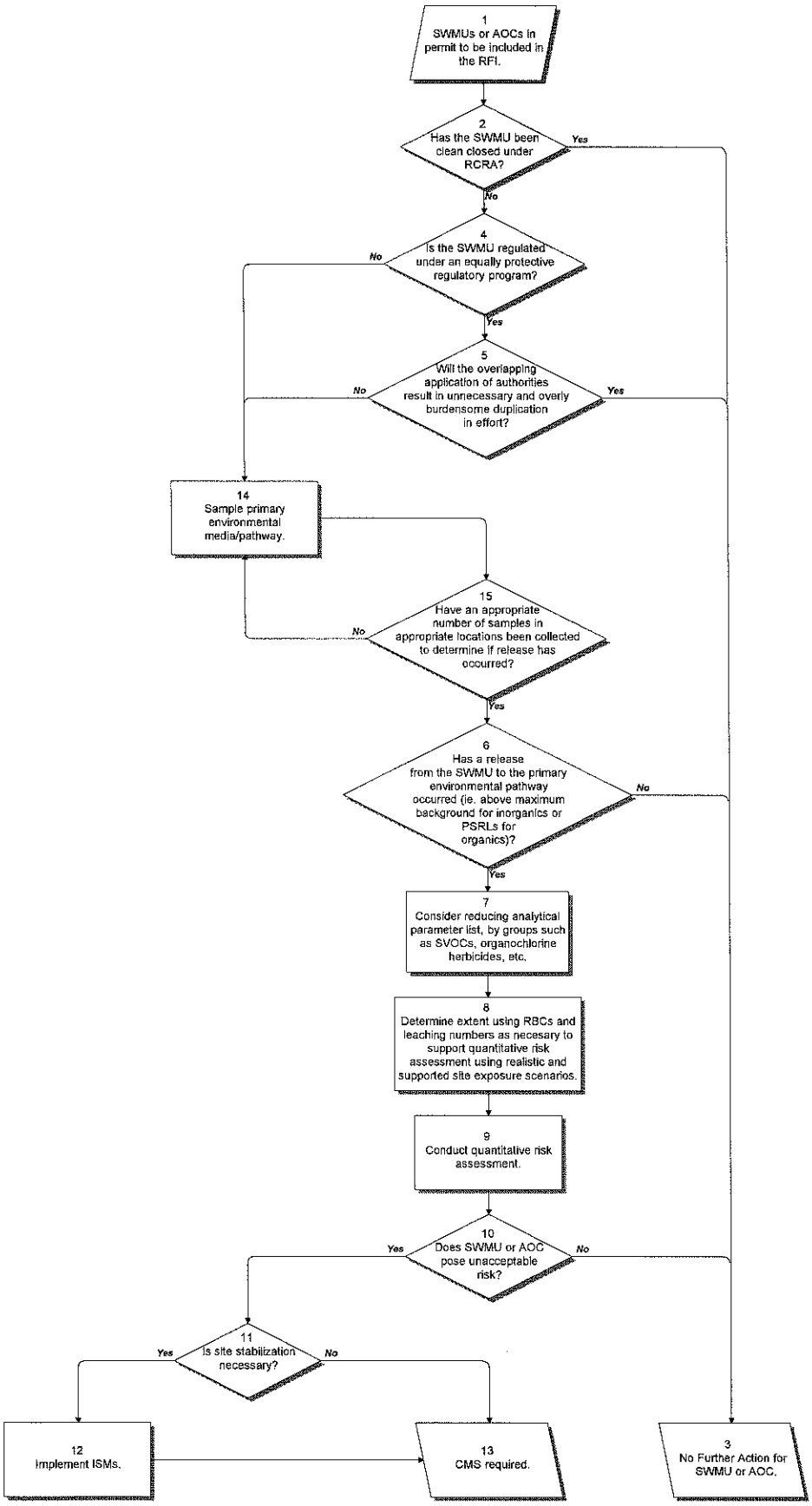
determined during Phase IB. If one or more inorganic constituents are present above maximum background values at any location, a release of inorganic constituents at the SWMU or AOC will be concluded. For organic constituents, a release will be concluded if one or more organic constituents are present above project-specific reporting limits (PRLs). If based on this evaluation, a release has not occurred, no further action [Box 3] will be recommended for the SWMU or AOC.

For SWMUs or AOCs at which a release has been concluded, the data will be evaluated to determine if constituent groups can be eliminated for future sampling [Box 7]. This would be conducted on a SWMU by SWMU basis and would be limited to the potential elimination of specific analytical groups (i.e. inorganics, herbicides, etc.) as opposed to individual constituents. Elimination of analytical groups will be proposed based on sample coverage and locations, depth, number of occurrences and, concentrations.

If the extent of contamination has not been determined during Phase I or through previous efforts, the extent of contamination will be determined [Box 8] during Phase II as necessary to support the risk assessment using realistic and supported site exposure assumptions. Following Phase II field activities a baseline quantitative risk assessment will be conducted [Box 9] to determine if further action, in terms of a corrective measures study (CMS) and/or stabilization, is warranted. In an effort to streamline the RFI process a Risk Assessment Workplan will be submitted concurrent with the Phase II QAPP. The Risk Assessment Workplan will outline the procedures, methodologies, and assumptions to be used in conducting the human health and ecological risk assessment at the site. If the risks associated with a particular SWMU or AOC are acceptable, based on the quantitative risk assessment, then no further action will be proposed for the unit. Conversely, if the quantitative risk assessment indicates that the risk associated with a particular SWMU or AOC are unacceptable, then the need to implement Interim Stabilization Measures (ISMs) will be evaluated [Box 11], and implemented if necessary [Box 12]. If ISMs are implemented, the ISM will be evaluated, in terms of the final remedy, as part of the CMS. If ISMs are not necessary, then a CMS [Box 13] will be recommended for each SWMU or AOC at which the risk has been determined to be unacceptable through the quantitative risk assessment.

The previous version of the RFI conceptual approach flow chart presented in the February 25, 2000 meeting included a comparison to risk-based screening levels (action levels) to determine if a release warrants further action. This step was removed from the flow chart based on US EPA and Ohio EPA's opposition. The primary opposition to the use of action levels was the potential to underestimate cumulative risk posed by numerous constituents present below individual action levels. For this reason and because the commonly accepted screening levels for soil do not take into account ecological risk, SWMUs will not be eliminated from further action (i.e., included in the quantitative risk assessment) based on a comparison to action levels. Although SWMUs or AOCs will not be eliminated from further action based on action levels, SWMU and AOC-specific data will be compared to risk-based action levels as described in the RFI Workplan for contaminant nature and extent evaluation and discussion purposes.

Figure 1
RFI Conceptual Approach,
Waste Management of Ohio, Inc.
Vickery, Ohio

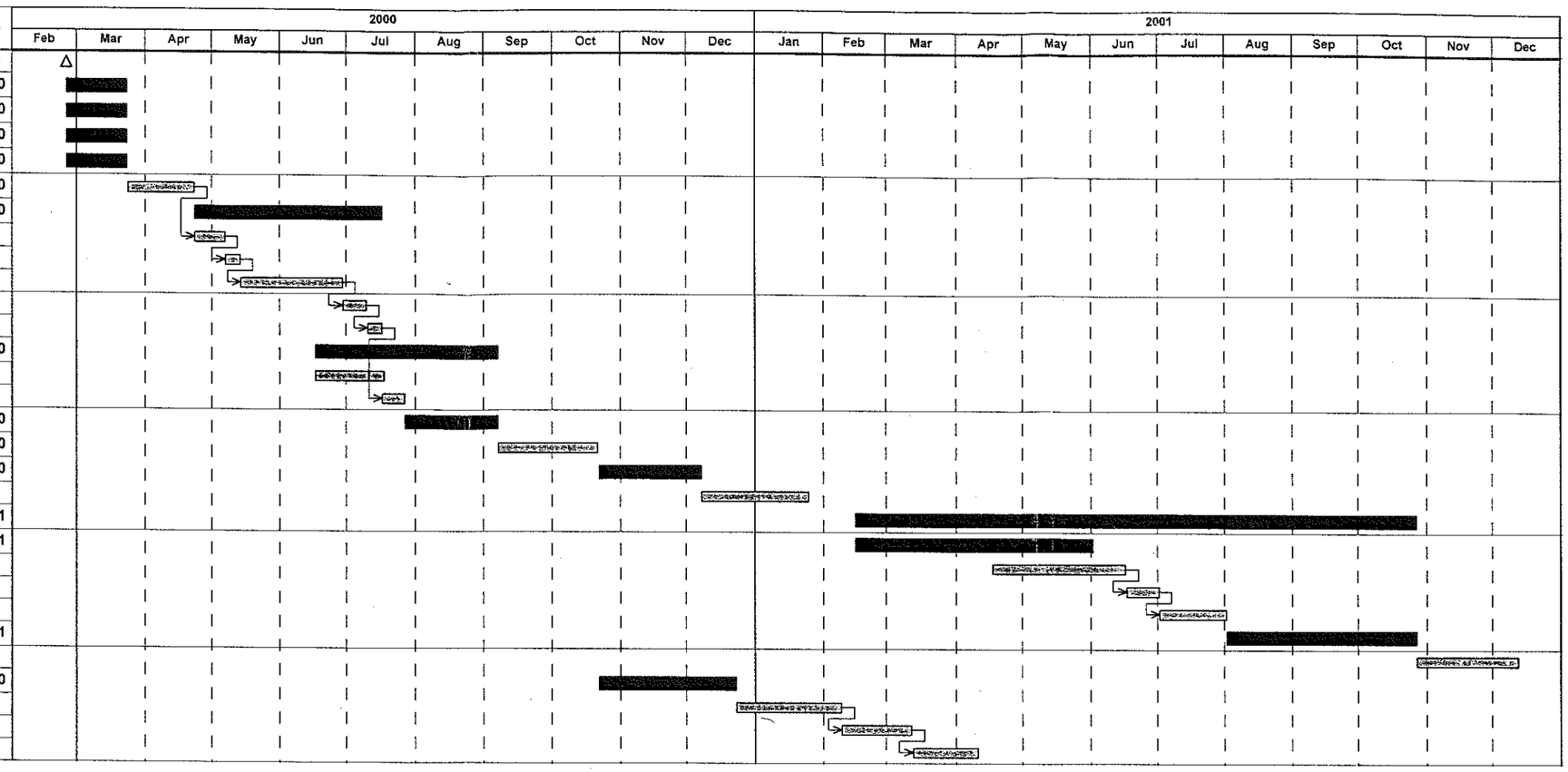


ATTACHMENT 2

PHASE IB AND PHASE II RFI IMPLEMENTATION SCHEDULE

Phase IB and Phase II RFI Implementation Schedule
Waste Management of Ohio
Vickery, Ohio

Task Name	Start Date	Duration	End Date
USEPA Meeting	02/25/2000	0d	02/25/2000
Prepare Response to Comments & Bckgrd Adden	**02/25/2000**	**28.00d**	**03/23/2000**
+Prepare Response to Comments	**02/25/2000**	**28.00d**	**03/23/2000**
+Prepare Lacustrine Position Paper	**02/25/2000**	**28.00d**	**03/23/2000**
+Prepare Background Addendum	**02/25/2000**	**28.00d**	**03/23/2000**
***Agency Review and Approval**	**03/24/2000**	**30.00d**	**04/22/2000**
Phase IB (Background Metals)	**04/23/2000**	**83.00d**	**07/16/2000**
*Contracting and Mobilization	04/23/2000	14.00d	05/06/2000
Phase IB Field Work	05/07/2000	7.00d	05/13/2000
Laboratory Analysis	05/14/2000	45.00d	06/28/2000
Data Validation	06/29/2000	10.00d	07/09/2000
Statistical Review	07/10/2000	7.00d	07/16/2000
Revise Phase I Report	**06/17/2000**	**80.00d**	**09/06/2000**
Revise Non-Metals Sections of Report	06/17/2000	30.00d	07/17/2000
Screening for metals	07/17/2000	10.00d	07/26/2000
+Report Preparation	**07/27/2000**	**41.00d**	**09/06/2000**
***Agency Review**	**09/07/2000**	**45.00d**	**10/21/2000**
+Prepare Phase II Scope of Work (Revised QAPjP)	**10/22/2000**	**45.00d**	**12/07/2000**
*Agency Review and Approval	12/08/2000	45.00d	01/24/2001
RFI Phase II	**02/15/2001**	**250.00d**	**10/26/2001**
+Data Collection**	**02/15/2001**	**105.00d**	**06/01/2001**
Data Validation	04/17/2001	60.00d	06/16/2001
Data Evaluation	06/17/2001	15.00d	07/01/2001
Risk Evaluation	07/02/2001	30.00d	08/01/2001
+Report Preparation	**08/02/2001**	**85.00d**	**10/26/2001**
*Agency Review	10/27/2001	45.00d	12/12/2001
+Risk Assessment Technical Assumptions Memo	**10/22/2000**	**60.00d**	**12/22/2000**
*Agency Review	12/23/2000	45.00d	02/08/2001
Respond to Comments	02/09/2001	30.00d	03/11/2001
*Agency Review and Approval	03/12/2001	30.00d	04/10/2001



*Items contingent on agency approval may start sooner or later depending when the facility receives approval.
**Phase II data collection start date based on weather conditions which prevent field work before March 15. Data collection duration estimated due to unknown scope.

Cox-Colvin & Associates, Inc.

Technical Position Paper on the Occurrence, Movement, and Quality of Groundwater at Waste Management of Ohio, Inc. - Vickery Facility

March 23, 2000

Submitted to:

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

Submitted by:

Cox-Colvin & Associates, Inc.
1679 Old Henderson Road
Columbus, Ohio 43220
(614) 442-1970

Cox-Colvin & Associates, Inc.
Environmental Services

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Submitted by:

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Principal
Cox-Colvin & Associates, Inc.

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Craig A. Cox, CPG
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Cox-Colvin & Associates, Inc.

Cox-Colvin & Associates, Inc.
Environmental Services

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3 Phreatic Surface Contours, Lacustrine Monitor Wells, October 18, 1999, Waste Management of Ohio, Inc., Vickery, Ohio.

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4 Potentiometric Elevation Contours, Till Monitoring Wells, October 18, 1999, Waste Management of Ohio, Inc., Vickery, Ohio.

5 Potentiometric Elevation Contours, Bedrock Monitoring Wells, October 18, 1999, Waste Management of Ohio, Inc., Vickery, Ohio.

6 Potentiometric Elevation Contours Bedrock Monitoring Wells Under Pumping Conditions, October 14, 1999, Waste Management of Ohio, Inc., Vickery, Ohio.

7 Selected Water-Quality and HydroChemical Conditions for the Bedrock Aquifer in Eastern Sandusky County, Ohio.

8 Conceptual Hydrologic Model, Waste Management of Ohio, Inc., Vickery, Ohio.

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1 Geologic Cross-Sections, Waste Management of Ohio, Inc., Vickery, Ohio.

2 Vertical Groundwater Flow Elevation, Waste Management of Ohio, Inc., Vickery, Ohio.

1.0 Introduction

The purpose of this report is to present Waste Management of Ohio, Inc.'s (Waste Management) position on the occurrence, movement, and natural quality of shallow waters that exist in geologic materials underlying the Waste Management, Vickery Facility. This position paper was developed at the request of US EPA during a February 25, 2000 project meeting held in Chicago, Illinois to discuss their comments on the October 1999 Phase I RFI Report. Information and conclusions provided in this document will be used to assist in:

- the evaluation of the number and type of aqueous samples to be collected during subsequent phases of the RFI, and
- the evaluation of potential exposure pathways to human and ecological receptors in support of a risk assessment.

This position paper is based on published regional hydrogeologic studies, and site-specific information collected during previous investigations at the site. Information presented throughout this document will be used to build a conceptual hydrologic model of the site that summarizes the geologic setting; defines hydrostratigraphic units; presents dominant groundwater flow directions and relative ages; and discusses groundwater use, groundwater sampling, and potential receptors.

2.0 Geologic Setting

In this document, geologic setting will be limited to the near-surface geology including the glacial lacustrine and till units and the uppermost bedrock units that contain groundwater. The discussion considers both the regional and site-specific settings. Information concerning the regional setting is taken largely from Ohio Department of Natural Resources (1970), Breen and Dumouchelle (1991), and US Soil Conservation Service (1987). Site-specific information is taken from the reports completed by Golder Associates (1983, 1984, and 1990), and the RFI Current Conditions Report prepared by Rust Environment & Infrastructure (1995).

2.1 Regional Setting

The Vickery site is located in eastern Sandusky County in northwestern Ohio. Sandusky County lies along the eastern flank of an anticlinal feature known as the Findlay Arch. The Findlay Arch separates the Michigan Basin to the northwest from the Appalachian Basin to the southeast. Middle Silurian through Middle Devonian age strata are the principal

near-surface rocks on the eastern flank of the Findlay Arch in Sandusky County. The Devonian rocks consist of hundreds of feet of interbedded limestone, dolomite, anhydrite (a calcium-sulfate evaporite), and shale that dip slightly to the southeast at less than 0.5 degrees. In the uppermost units, much of the anhydrite has been altered to gypsum, which in many cases has been removed by leaching to groundwater. The top of bedrock in eastern Sandusky County is an erosional surface that at one time drained to the northwest toward a deeply incised valley along the western edge of the county.

Overlying the carbonate/anhydrite bedrock are Pleistocene age glacial deposits that attain a thickness of approximately 50 feet in eastern Sandusky County. These deposits typically consist of twenty to thirty feet of clay-rich tills overlain by clay-rich glacial lacustrine deposits.

Soils formed on the lacustrine units are described as moderately to very poorly draining with low to moderate shrink/swell potential (US Soil Conservation Service, 1987). They are typically saturated and unuseable for development or agriculture until they have been drained by open ditches or underground drainage tiles.

Prior to the settlement of the area, much of Sandusky County consisted of lowland swamps and wetland areas known as the Black Swamp. The Black Swamp was the last vestige of the glacial lakes that were present in the area at the close of the Pleistocene Era approximately 10,000 years ago. Beginning in the 1870s, much of the area was drained to allow for agricultural development through the use of interconnected ditches. These ditches still provide drainage to the north into Lake Erie.

2.2 Site-Specific Setting

Our understanding of the site-specific geology is based on a large number of borings and monitor wells that have been used to characterize the site and to evaluate the nature and extent of contaminants in the subsurface. Over sixty borings and monitor wells have encountered bedrock at depths of 32 to 52 feet below ground surface. The bedrock is described as anhydrite and gypsum-rich dolomites and limestones. Cox-Colvin has used the elevations at which the bedrock surface was encountered to reinterpret the bedrock topography (Figure 1). The reinterpretation indicates that the bedrock surface has as much as twenty feet of relief and that it was an erosional surface that drained to the northwest. The site-specific description and topography of bedrock are consistent with our regional understanding.

Overlying bedrock are clay-rich till and lacustrine deposits. The till exists throughout the site. The topography on the top of the till indicates that it occurs at the surface in the southeastern corner of the facility and that the undulating surface generally deepens to the

northwest (Figure 2). Overlying the till are lacustrine deposits. These deposits are absent in the extreme southeastern corner of the facility, where the till is present at or near the surface. The lacustrine deposits thicken to the northwest to nearly thirty feet, where the till surface is deepest. Cross sections illustrating the stratigraphic relationship of the site-specific geology are presented on Plate 1.

The clay-rich lacustrine deposits are generally comprised of laminated silty clay with occasional silt and fine sand partings. The till also has a high clay content, but contains a greater amount of sand and gravel-sized material. Golder Associates (1983) reports that the lacustrine and till deposits are generally soft, have a high moisture content (near the liquid limit for soils), and appear to be normally consolidated. However, they also noted that the uppermost five to ten feet of the glacial deposits are considerably stiffer and have a lower moisture content. They have called this zone the "dessication zone". Based on the low to moderate shrink/swell potential noted for the soils developed on the lacustrine unit, there is a possibility that the desiccation zone contains small vertical fractures. However, these fractures would only extend to the base of the desiccation zone at a depth of approximately 5 to 10 feet.

Internal site surface drainage is provided by a ditch and flow control gate system. Runoff is either contained onsite or allowed to discharge from the site at selected locations. Drainage from the site is to Racoon Creek via ditches along the side of State Route 510, or into the intermittent, man-made tributary to Racoon Creek known as Meyers Ditch. Meyers Ditch drains from south to north, bisecting the site. The depth of the dessication zone seen in the glacial deposits roughly coincides with the depth of Meyers Ditch and the internal drainage systems. It is believed that the drainage systems helped to produce the dessication zone by channeling runoff from precipitation away from the site, thereby reducing ponding and infiltration.

3.0 Occurrence of Groundwater

For this report, the term groundwater will be used in the broadest sense possible to include any water present in the near-surface geologic section. However, the occurrence of groundwater within any particular unit discussed below does not imply that the unit acts as an aquifer. Water contained within the capillary fringe and elsewhere within the vadose zone is also considered groundwater in this report.

3.1 Regional Occurrences

Groundwater occurs in the near-surface bedrock units throughout the county. The water is present in fractures, karst features, vugs, and along bedding planes. Water also occurs in the unconsolidated sediments, including the glacial till and lacustrine units. Based on

historical information presented in the Sandusky County Soil Survey (US Soil Conservation Service, 1987), prior to the implementation of drainage efforts, nearly the entire unconsolidated soil column existed under saturated conditions. It is reasonable to assume that the saturated conditions were present since the end of the Pleistocene.

Groundwater within the bedrock aquifer exists under semi-confined conditions. Confined conditions mean that the level of water within wells that penetrate the aquifer rises above the base of the confining unit. In semi-confined conditions, some water moves through the confining zone, to or from the aquifer. In Sandusky County, the principal aquifer is the dolomite/anhydrite bedrock units with the glacial deposits acting as the upper confining units (Breen and Dumouchelle, 1991; Ohio Department of Natural Resources, 1970).

3.2 Site-Specific Occurrences

Numerous monitor wells are present in the lacustrine, till, and bedrock units at the site. Groundwater occurs in each of these units. The bedrock units can supply water in sufficient quantities to wells and acts as an aquifer. For instance, the site uses a bedrock production well for washing tanker trucks. The lacustrine and till units, however, cannot supply sufficient quantities of water to wells because of their fine-grained nature. Following evacuation, most of the wells require many days to recover. These deposits act as confining units. Water-level measurements collected from nested wells of lacustrine, till and bedrock wells indicate that there is a downward gradient with the bedrock aquifer under semi-confined conditions. This interpretation on the occurrence of groundwater is consistent with the regional understanding.

4.0 Movement of Groundwater

Groundwater moves through the subsurface in response to changes in the potentiometric head (pressure). The change in potentiometric head between two points is the hydraulic gradient. Areas of high potentiometric head may represent zones of groundwater recharge. Areas of low potentiometric head may represent zones of groundwater discharge. The rate at which groundwater moves through the subsurface is a function of the hydraulic gradient, the permeability of the subsurface units, and the effective porosity.

4.1 Regional Groundwater Flow

Regional groundwater studies in eastern Sandusky County focus on the bedrock aquifer because it is the only unit capable of supplying water to wells in quantities sufficient for beneficial use. The dominant groundwater flow direction in eastern Sandusky County is from recharge areas in the southeast to discharge areas in the north-northwest (Breen and

Dumouchelle, 1991). The primary recharge area is in the southeastern corner of the county where the glacial deposits are thin and extensive karst features have developed in the carbonate bedrock. Groundwater discharges to major streams and rivers to the north-northwest, and to numerous springs along the southern edge of Lake Erie. Recharge also occurs as leakage through the unconsolidated glacial sediments; however, recharge of this type is minimal.

Wells within the bedrock aquifer in eastern Sandusky County have reported transmissivities from aquifer tests of 6,000 to 22,000 gallons per day per foot and are capable of producing sustained yields between 500 and 1000 gallons per minute (Ohio Department of Natural Resources, 1970).

4.2 Site-Specific Groundwater Flow

The evaluation of site-specific groundwater flow is based on:

- water levels obtained from monitor wells,
- hydraulic conductivity values obtained from in-situ and laboratory tests,
- a detailed study of the stratigraphy of the site,
- an evaluation of tritium data collected at the site, and
- the results of previous investigations at the site.

Water levels collected at the site in October 1999 are used as the basis for this discussion (Figures 3 through 6). As noted above, groundwater within the bedrock aquifer occurs under semi-confined conditions. The semi-confining zone is the combined till and lacustrine deposits. Water-level measurements within the lacustrine units are typically at a higher elevation than those of the till, which are higher than those of the bedrock aquifer. This downward hydraulic gradient indicates that there is a vertical flow component within the confining units and presented on Plate 2. Understanding vertical flow within the confining unit is key to understanding groundwater flow at the site (Dr. Wayne Pettyjohn, personal communication, March 7, 2000). Vertical flow is evaluated through the use of vertical flow nets and water levels presented on Figures 3, 4, and 6. The vertical flow nets are discussed in subsequent sections of this report and presented on Plate 2.

4.2.1 Hydrostratigraphic Units

The first step in evaluating vertical flow is to define the hydrostratigraphic units to be evaluated. Hydrostratigraphic units are geologic formations, parts of formations, or groups of formations in which there are similar hydrologic characteristics allowing them to be grouped as aquifers or confining layers. From the bottom up, Cox-Colvin has defined three hydrostratigraphic units at the site. These units are the bedrock aquifer, the till/lacustrine

confining unit, and the desiccation zone (Plate 2). The hydrologic characteristics of each of these units are discussed below.

4.2.1.1 Bedrock Aquifer

The lowermost hydrostratigraphic unit is the bedrock aquifer. The bedrock aquifer is considered a separate unit because of its very high hydraulic conductivity and potentially high groundwater flow rates. Reported hydraulic conductivity of the bedrock aquifer at the site is 1 x 10^{-2} cm/sec (Golder Associates, 1983), which is many orders of magnitude higher than the overlying till/lacustrine confining unit. The reported hydraulic conductivity value is consistent with those reported for fractured bedrock (US Department of Interior, 1985) and karst systems developed in carbonate rocks (Freeze and Cherry, 1979). The bedrock aquifer is hydraulically connected to the overlying till/lacustrine confining unit; however, its primary source of recharge is southern Sandusky County where the bedrock is near the surface or exposed.

4.2.1.2 Till/Lacustrine Confining Unit

The middle hydrostratigraphic unit is the till/lacustrine confining unit. Reported hydraulic conductivities from laboratory analysis for the till/lacustrine confining unit range from 10^{-7} to 10^{-9} cm/sec, with a representative value of 2 x 10^{-8} cm/sec (Golder Associates, 1983). These hydraulic conductivities are within the range of those reported for clay (Fetter, 1980) and clay-rich till (Freeze and Cherry, 1979). Because the hydraulic conductivity of the till and lacustrine units are essentially the same, they act as a single hydrostratigraphic unit. This unit is approximately 40 feet thick and is saturated throughout the year. The effective porosity (which is equal to the specific yield) is estimated at approximately 10%. It is unlikely that this unit is effected by evapotranspiration, and therefore all water losses must be through the vertical migration of groundwater to underlying units. Recharge to this unit is suspected to be from the overlying desiccation zone.

4.2.1.3 Desiccation Zone

The uppermost hydrostratigraphic unit is the desiccation zone. This unit, which makes up the upper 5 to 10 feet of soils developed on the lacustrine clay, is typically unsaturated. Small desiccation cracks have been theorized in this unit by Golder Associates (1983); however, none have been seen. Water within this unit is expected to be the direct result of infiltration of precipitation, and through bank storage along the length of drainage ditches and streams. Because of the low to moderate shrink/swell potential associated with these soils, it is expected that desiccation cracks would be small, would heal themselves fairly rapidly upon wetting, and that vertical infiltration and horizontal migration of water within the zone would be limited. Golder Associates (1983) discuss a horizontal velocity of 2 ft /year for a fractured upper lacustrine deposit; however, Cox-Colvin believes that their

interpretation is flawed. This belief is based on Golder Associates' use of the horizontal gradient measured in the saturated till/lacustrine confining unit and an effective porosity that is two orders of magnitude less than that of the saturated till/lacustrine confining unit. It is difficult to interpret a hydraulic gradient in an unsaturated zone because they are very temporary. In addition, the porosity of the unit should be slightly higher than the underlying saturated deposits because of the theorized desiccation cracks. Discharges from this unit are expected to include releases from bank storage to surface water, evapotranspiration, and vertical migration to the saturated till/lacustrine confining unit. Many of the wells within the lacustrine unit are screened within, or have sand packs that are within the desiccation zone. It is believed by Cox-Colvin that some portion of the water within many of the lacustrine wells enters as recharge from the desiccation zone during rain events.

4.2.2 Vertical Flow Field

The second step in evaluating vertical flow is to map the vertical flow field (equipotential lines and flowlines) using head measurements obtained from nested wells. The head measurement for each well is applied at the midpoint of its screen length and then contoured. Flow lines are drawn from higher head to lower head, keeping them perpendicular to the equipotential lines. When flowlines cross a geologic boundary between two units with different values of hydraulic conductivity, they refract according to the tangent law. In semi-confined aquifer systems with permeability contrasts of two orders of magnitude or more, flow lines tend to become almost horizontal in the aquifers and almost vertical in the confining units (Freeze and Cherry, 1979).

The vertical flow field is shown on Plate 2. There is a dominant vertical (downward) flow component within the till/lacustrine confining unit and the upper portions of the bedrock aquifer. The vertical hydraulic gradient in the till/lacustrine unit is approximately 0.4 ft/ft. The horizontal gradient, based on the October 1999 water levels, is approximately 0.014 ft/ft. Using these gradients, a hydraulic conductivity of 2.07×10^{-2} ft/year (equivalent to 2×10^{-8} cm/sec) and an effective porosity of 0.1, the vertical and horizontal flow rates can be calculated using the equation:

$$V = {ki}/{n_e}$$

where $\boldsymbol{k}$ is the hydraulic conductivity, $\boldsymbol{i}$ is the hydraulic gradient, and $\boldsymbol{n_e}$ is the effective porosity. The resultant vertical and horizontal velocities are 0.08 ft/year and 0.003 ft/year, respectively. Using a travel path length of 40 feet (the saturated thickness of the till/lacustrine confining unit), the time required for groundwater to reach the bedrock unit is approximately 500 years. During that same period of time, the horizontal component of

flow would account for only 1.5 feet of movement. It is obvious, that the dominant flow pattern is downward.

Flow rates within the bedrock aquifer are much higher. Using information provided by the 1983 Golder Associates report (hydraulic conductivity of 1×10^4 ft/year, hydraulic gradient of 1.6×10^{-3} ft/ft and an effective porosity of 0.01), the calculated rate of horizontal groundwater flow is 1,600 ft/year. This flow rate is 20,000 times greater than the vertical flow recharging the system from the overlying semi-confining unit.

Assuming the vertical and horizontal flow rates have remained relatively constant since activities at the site began 42 years ago, groundwater has migrated beyond the base of the desiccation zone a vertical distance of less than 4 feet and a horizontal distance of less than 0.13 feet.

As a means of validating the concepts presented, site-specific tritium data presented by Golder Associates (1984) and data from the L-19 Investigation (Golder Associates, 1990) have been reviewed to look for inconsistencies.

Tritium is an isotope of hydrogen that occurs at very low levels in nature. However, as a result of atmospheric testing of thermonuclear weapons in the 1950s and 1960s, elevated tritium levels have occurred in precipitation. For example, it is estimated that the tritium levels prior to 1953 were about 5 to 20 tritium units (TU). Tritium levels in rainwater after 1953 range from approximately 100 to several thousand TU (Golder Associates, 1984). In 1983, Golder Associates collected groundwater samples for tritium analyses. The data indicated that tritium levels exceeding 20 TU exist in the shallow groundwater at the site to depths of approximately 16 feet below grade (Golder Associates, 1984). Given that the base of the desiccation zone is at approximately 10 feet, the presence of post-1952 water at a depth of 16 feet is consistent with the conceptual model.

Investigation into the nature and extent of contamination detected in lacustrine well L-19 were undertaken by Golder Associates (1990). Following their investigation, they conclude that the vertical component of flow is very much greater than the horizontal component. Because of this flow condition, the contaminant, 1-2, dichloroethane, was not detected in samples of water collected at four locations surrounding the well at a horizontal distance of 20 feet or less.

5.0 Natural Quality of Groundwater

A review of the natural quality of groundwater on the regional and site-specific level will be an important aspect in the evaluation of potential exposure pathways to human and ecological receptors. This review is based on published studies of the quality of

groundwater in Sandusky County, conversations with the Sandusky County Health Department, and groundwater use patterns present in the county.

5.1 Regional Groundwater Quality

The bedrock aquifer is the only source of groundwater in eastern Sandusky County. As noted earlier in this paper, the near-surface bedrock contains thick sequences of evaporites including the calcium sulfate minerals (anhydrite and gypsum), and other salts. These minerals readily dissolve in groundwater resulting in high levels of hardness, total dissolved solids (TDS), sulfate, iron, and hydrogen sulfide. These aesthetic factors limit the use of groundwater in many areas of the county (Breen and Dumouchelle, 1991). In addition, arsenic, chromium, lithium, mercury, strontium, barium, nickel, aluminum, and zinc are commonly detected in the samples analyzed.

Breen and Dumouchelle (1991) report that:

> *"the central portion of eastern Sandusky County is an area where elevated concentrations of sulfate in wells and springs are derived from gypsum and anhydrite in the rocks. In the north central part, the utility of water is especially limited because the water is locally saline and is a sodium chloride type."*

They also report that:

> *"Hydrogen sulfide is present at objectionable concentrations (concentrations of about 2 mg/l or greater) in the north-south trending area in the central part of eastern Sandusky County. Hydrogen sulfide is associated with wells completed in carbonate rocks containing gypsum and anhydrite."*

The location of the sulfate-rich and sodium chloride-rich waters discussed above in eastern Sandusky County is provided as Figure 7. The concentrations presented on Figure 7 for total dissolved solids, chloride, and sulfate in the vicinity of the site are as high as 10000 mg/l, 2500 mg/l, and 2100 mg/l, respectively. These values greatly exceed Secondary Drinking Water Standards adopted under the Safe Drinking Water Act of 500 mg/l for total dissolved solids, 250 mg/l for chloride, and 250 mg/l for sulfate.

Because of the poor natural quality of groundwater, very few people in eastern Sandusky County have wells for potable use. Instead, they use cisterns to hold water trucked in from above-ground reservoirs located in Fremont and Clyde (Sandusky County Health Department, personal communication February 24, 2000). Many well drillers refuse to drill wells in the central portion of eastern Sandusky County because of the poor quality.

5.2 Site-Specific Groundwater Quality

Samples collected at the site confirm the poor natural quality of the bedrock aquifer. The site maintains an active production well, but its use is limited to truck washing. Hauled water is used for potable purposes.

6.0 Conceptual Hydrologic Model

Our understanding of the hydrostratigraphic relationships at the Vickery site are summarized in Figure 8. This figure presents the conceptual hydrologic model for the site. The conceptual hydrologic model presents the geologic units, the relative groundwater ages based on tritium analyses, the general groundwater flow directions, typical well configurations and water levels, approximate boundary depths, hydrostratigraphic units, hydraulic properties, dominant flow directions and rates, groundwater use, future groundwater sampling candidates, and potential receptors.

Waste Management's position on groundwater at the site is presented in the conceptual hydrologic model. According to the model:

1) There are three hydrostratigraphic units at the site. These units are the bedrock aquifer, the till/lacustrine confining unit, and the desiccation zone.

2) Groundwater enters the desiccation zone through precipitation, or as bank storage along nearby ditches and streams. Water within the desiccation zone will exit the zone through the release of bank storage into the ditches and steams, through evapotranspiration, through preferential pathways along shallow well casing and sand packs, or as recharge to the underlying till/lacustrine confining zone.

3) **Groundwater flow within the till/lacustrine unit is dominantly vertical toward the bedrock aquifer.** The top of the till/lacustrine confining unit is too deep to be effected by evapotranspiration or to discharge to drainage ditches or other surface water bodies. Because of this, the only discharge point for water within the lacustrine unit is to the bedrock aquifer. However, the extremely low permeability of the unit results in a vertical flow rate of only 0.08 ft/year.

4) Groundwater flow within the till/lacustrine confining unit since the site became operational is less than 4 feet vertically and less than 0.13 feet horizontally.

5) Regional groundwater flow patterns within the bedrock aquifer are dominantly horizontal with flow rates of approximately 1,600 ft/year.

6) The only aquifer available for use in eastern Sandusky County is the bedrock aquifer; however, groundwater use is limited because of the poor natural quality of the water.

7.0 Conclusions

The purpose of this report is to present Waste Management's position on the occurrence, movement, and natural quality of waters that exist in the geologic materials underlying the Vickery, Ohio facility. Information and conclusions provided in this report will be used to assist in:

- the evaluation of the number and type of aqueous samples to be collected during subsequent phases of the RFI, and
- the evaluation of potential exposure pathways to human and ecological receptors in support of a risk assessment.

As presented in the conceptual hydrologic model, the dominant flow direction in the till/lacustrine confining unit is vertical. Because of this, groundwater monitoring adjacent to an area of interest is not possible. **Therefore, the current lacustrine and till wells do not represent viable monitoring points and should be properly abandoned. The only practical and consistent way to investigate contamination in the till/lacustrine confining unit is through soil sampling.** The only practical means of obtaining downgradient samples of groundwater beyond the lateral extent of the monitored unit would be through the use of bedrock monitor wells which have a significant horizontal flow component. However, the time required for groundwater to reach the bedrock aquifer is on the order of 500 years. **Based on this interpretation of flow, subsequent sampling of water during the RFI should not include the lacustrine or till wells.**

Potential human and ecological groundwater receptors at or near the site appear to be limited. Human receptors could be exposed to bedrock groundwater. However, the poor natural quality of the water limits its use and the high flow rate compared to that of the till/lacustrine confining unit would indicate that if contaminants migrated through the confining unit, they would be severely diluted by the high flow rates of the bedrock aquifer.

Ecological receptors would most likely be exposed to groundwater associated with the desiccation zone, in the immediate vicinity of the drainage ditches and streams. Because of the low potential for horizontal flow, it is expected that these receptors would only be

exposed to releases from bank storage and that their exposure to contaminants would be minimal. Horizontal migration of contaminants within the till/lacustrine zone to areas such as the borrow pond is also very unlikely based on the above information.

8.0 References

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U.S. Soil Conservation Service, 1987. Soil Survey of Sandusky County Ohio. U.S. Department of Agriculture. 160 pp.

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Figures

1 Bedrock Topography, Waste Management of Ohio, Inc., Vickery, Ohio.

2 Top of Till, Waste Management of Ohio, Inc., Vickery, Ohio.

3 Phreatic Surface Contours, Lacustrine Monitor Wells, October 18, 1999, Waste Management of Ohio, Inc., Vickery, Ohio.

4 Potentiometric Elevation Contours, Till Monitoring Wells, October 18, 1999, Waste Management of Ohio, Inc., Vickery, Ohio.

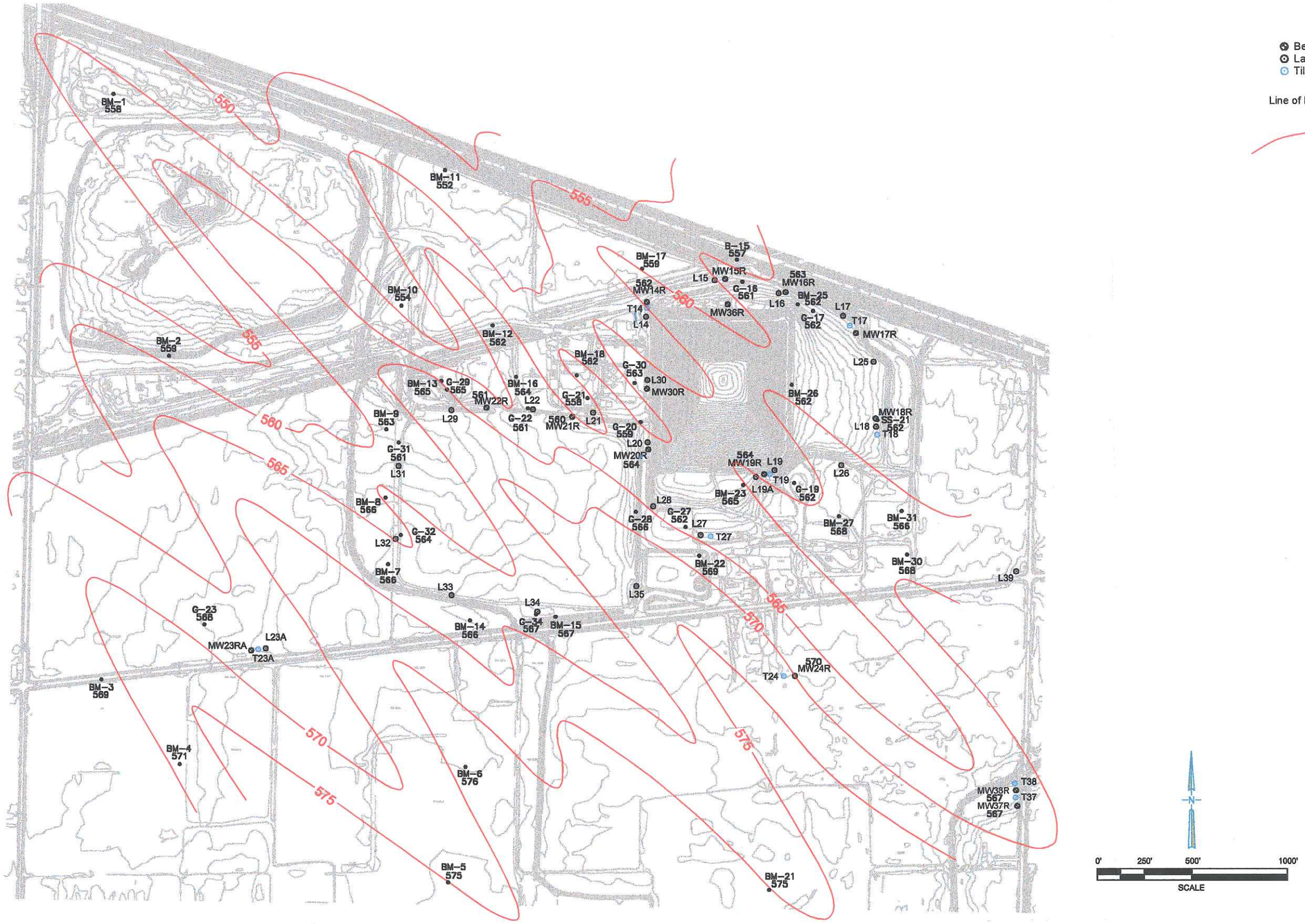
5 Potentiometric Elevation Contours, Bedrock Monitoring Wells, October 18, 1999, Waste Management of Ohio, Inc., Vickery, Ohio.

6 Potentiometric Elevation Contours Bedrock Monitoring Wells Under Pumping Conditions, October 14, 1999, Waste Management of Ohio, Inc., Vickery, Ohio.

7 Selected Water-Quality and HydroChemical Conditions for the Bedrock Aquifer in Eastern Sandusky County, Ohio.

8 Conceptual Hydrologic Model, Waste Management of Ohio, Inc., Vickery, Ohio.

DWG NAME: rock | DATE: 03/15/2000 | DRAWN BY: | CHECKED BY: | REVISION NO.:



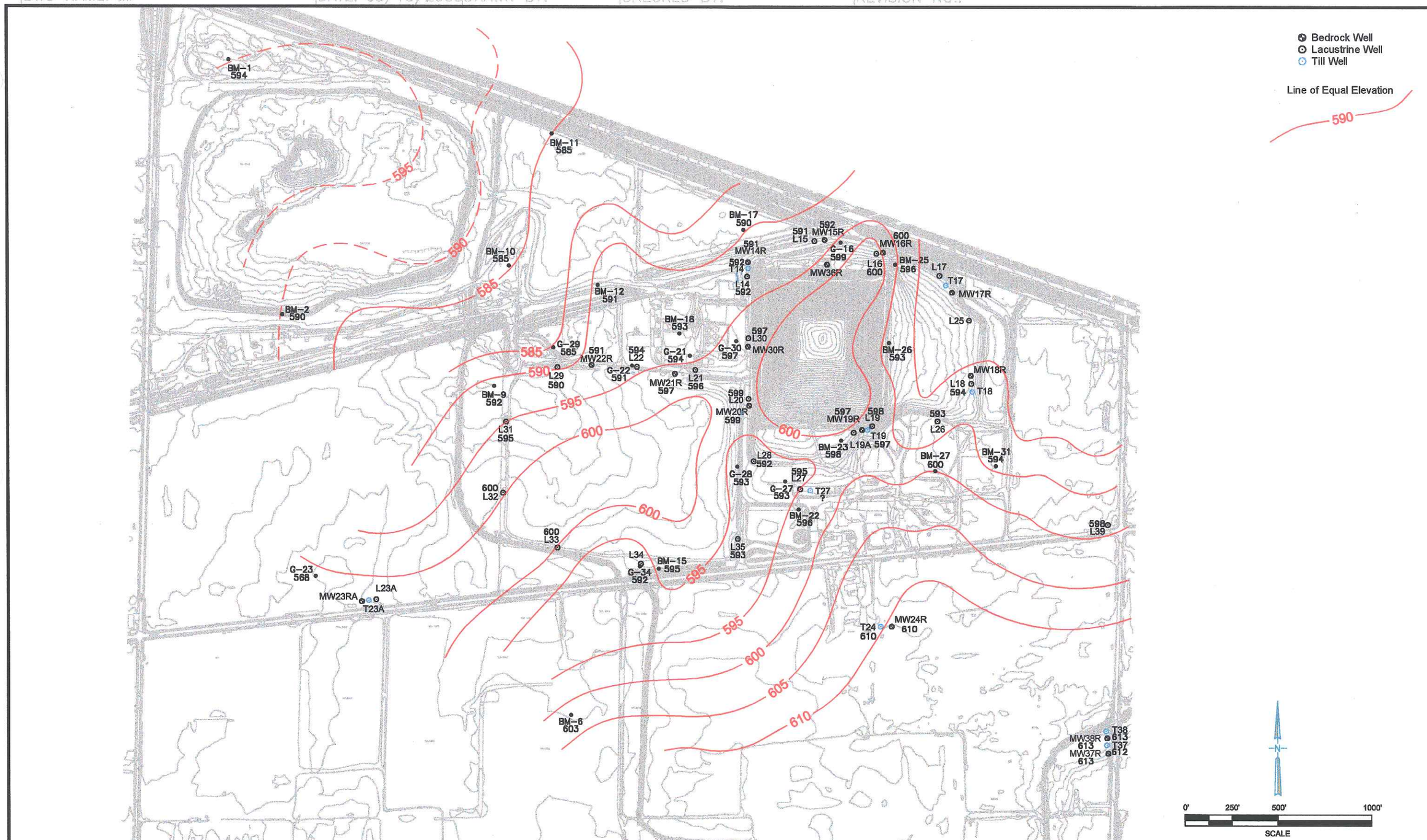
Bedrock Topography

Cox-Colvin & Associates, Inc.
Environmental Services

Bedrock Topography,
Waste Management of Ohio, Inc.,
Vickery, Ohio

Figure
1

DWG NAME: till | DATE: 03/15/2000 | DRAWN BY: | CHECKED BY: | REVISION NO.:

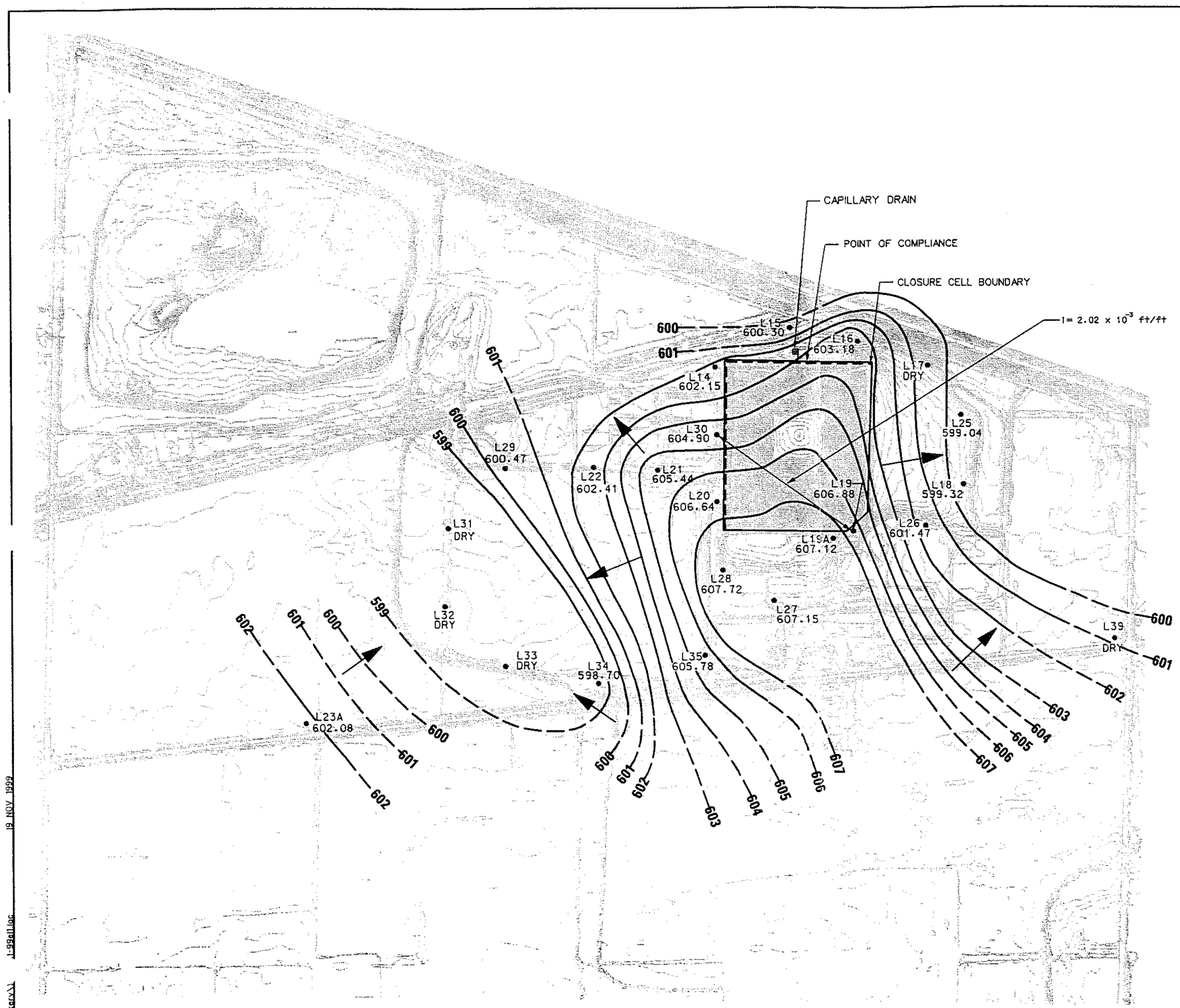


Top of Till

Cox-Colvin & Associates, Inc.
Environmental Services

Top of Till,
Waste Management of Ohio, Inc.,
Vickery, Ohio

Figure
2



LEGEND

● L25	LACUSTRINE SOIL MONITORING WELL
601.47	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL).
⟵	DIRECTION OF FLOW
- - -	POINT OF COMPLIANCE
———	CLOSURE CELL BOUNDARY
— —	INFERRED GROUNDWATER ELEVATION CONTOUR
———	GROUNDWATER ELEVATION CONTOUR

NOTES:

1. TOPOGRAPHIC INFORMATION SUPPLIED BY AERO-METRIC ENGINEERING, INC.
2. CONTOUR INTERVAL IS ONE FOOT.

THE HORIZONTAL FLOW RATE IN THE LACUSTRINE DEPOSITS IS APPROXIMATED USING DARCY'S RELATIONSHIP:

$$V = ki/n = 2.08 \text{ ft/yr}$$

WHERE $k = 1.03$ ft/yr*
$i = 2.02 \times 10^{-3}$ ft/ft
$n = 0.001$**

* FROM THE GOLDER ASSOCIATES REPORT TITLED "PHASE I GROUNDWATER MONITORING PROGRAM," CHEMICAL WASTE MANAGEMENT, INC. VICKERY FACILITY, DATED MARCH 1986.

** FROM THE GOLDER ASSOCIATES REPORT TITLED "SUMMARY AND CHARACTERIZATION OF THE SITE HYDROGEOLOGIC CONDITIONS", CHEMICAL WASTE MANAGEMENT, INC. VICKERY FACILITY, DATED SEPTEMBER 1983.

0' 300' 600' 1200'
SCALE

REV.	DATE	DRN BY	APP BY

DATE: NOVEMBER 1999
PROJECT NO. 35717
SCALE: AS NOTED
PROJECT: VICKERY, OHIO FACILITY

DES BY	ARF
DRN BY	VPR
CHK BY	MFB
REV BY	MTC
APP BY	MFB

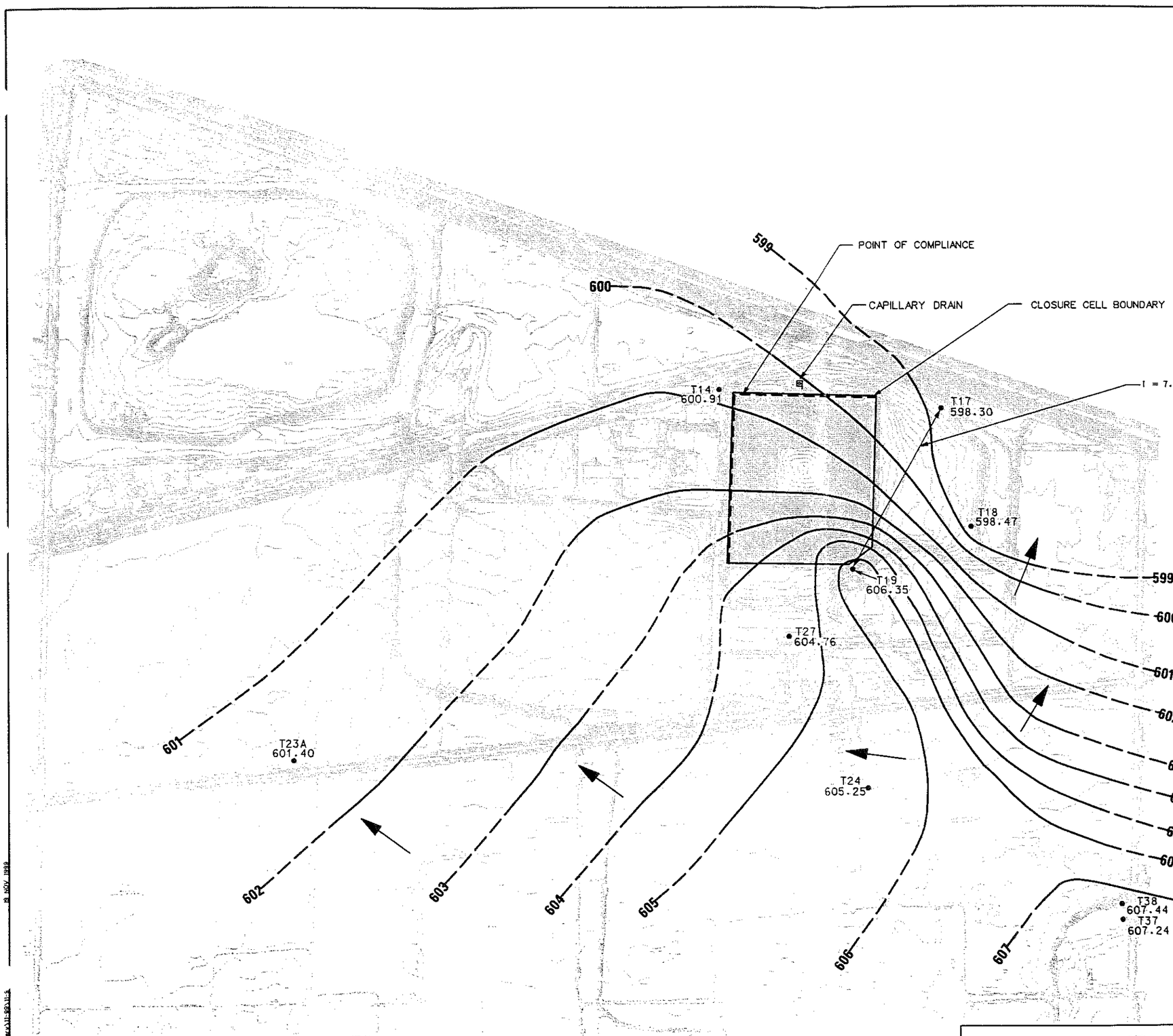
PHREATIC SURFACE CONTOURS
LACUSTRINE MONITORING WELLS
OCTOBER 18, 1999

EARTH TECH

Waste Management of Ohio, Inc.

SHEET 4 OF 4
DRAWING NO.
FIGURE 3

19 NOV 1999



LEGEND

• T17	TILL MONITORING WELL
598.47	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
◄	DIRECTION OF FLOW
— — —	POINT OF COMPLIANCE
———	CLOSURE CELL BOUNDARY
— — —	INFERRED GROUNDWATER ELEVATION CONTOUR
———	GROUNDWATER ELEVATION CONTOUR

NOTES:

1. TOPOGRAPHICAL INFORMATION SUPPLIED BY AERO-METRIC ENGINEERING, INC.
2. CONTOUR INTERVAL IS ONE FOOT.

THE HORIZONTAL FLOW RATE IN THE TILL DEPOSITS IS APPROXIMATED USING DARCY'S RELATIONSHIP:

$v = ki/n = 1.55 \times 10^{-2}$ ft/yr.

WHERE: $k = 2.07 \times 10^{-1}$ ft/yr. *

$i = 7.52 \times 10^{-3}$ ft/ft.

$n = 0.1$ **

* FROM THE GOLDER ASSOCIATES REPORT TITLED "PHASE I GROUNDWATER MONITORING PROGRAM," CHEMICAL WASTE MANAGEMENT, INC. VICKERY FACILITY, DATED MARCH 1986.

** FROM THE GOLDER ASSOCIATES REPORT TITLED "SUMMARY AND CHARACTERIZATION OF THE SITE HYDROGEOLOGIC CONDITIONS", CHEMICAL WASTE MANAGEMENT, INC. VICKERY FACILITY, DATED SEPTEMBER 1983.

0' 300' 600' 1200'
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DATE: NOVEMBER 1999		PROJECT NO. 35717	SCALE: AS NOTED	
DES BY	ARF	PROJECT: VICKERY, OHIO FACILITY		
DRN BY	VPR			
CHK BY	MFB	POTENTIOMETRIC ELEVATION CONTOURS TILL MONITORING WELLS OCTOBER 18, 1999		
REV BY	MTC			
APP BY	MFB			

EARTH TECH

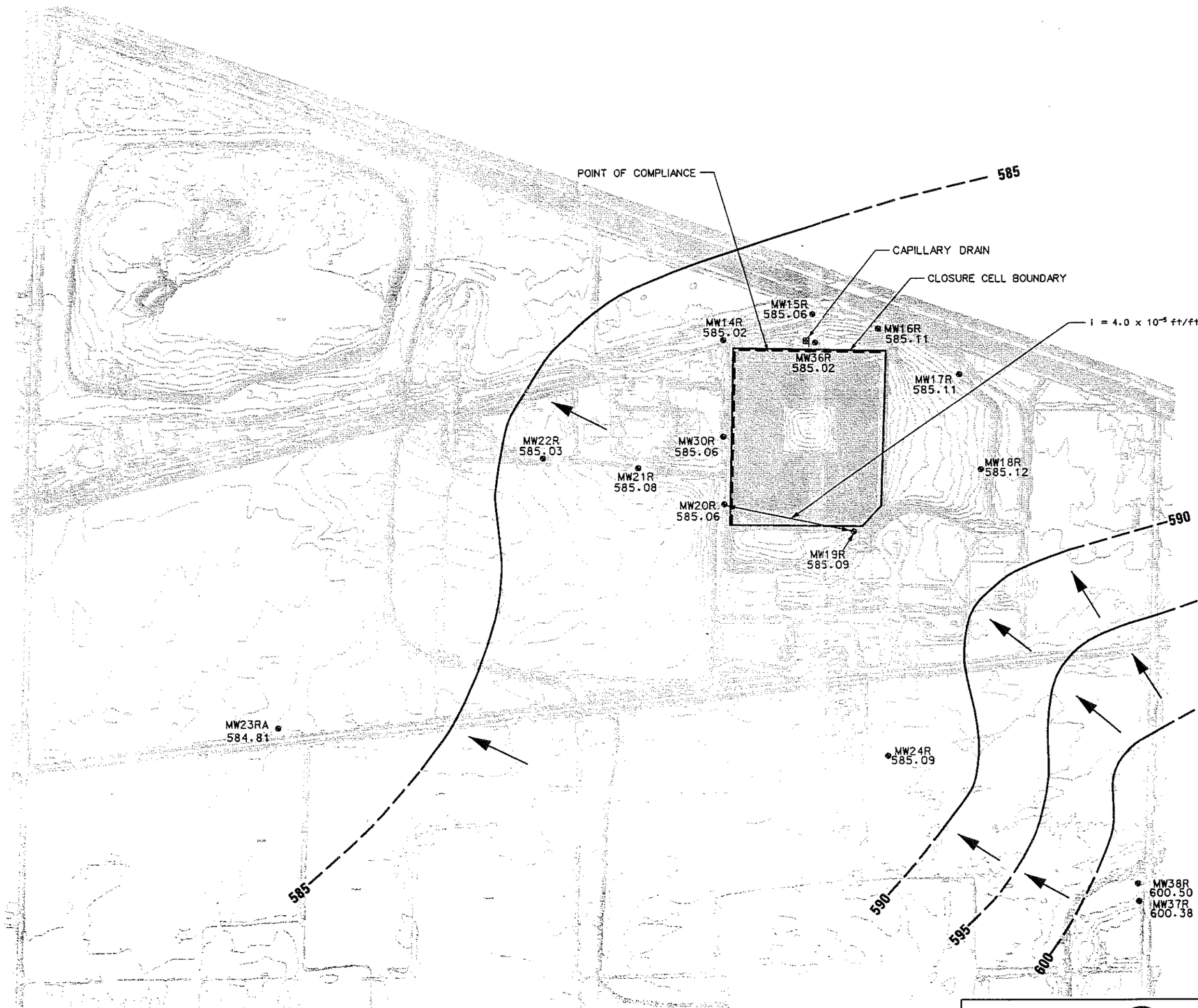
Waste Management of Ohio, Inc.

SHEET 3 OF 4

DRAWING NO.

FIGURE 4

18 NOV 1999



N

LEGEND

MW38R	BEDROCK MONITORING WELL
585.12	GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
	DIRECTION OF FLOW
	POINT OF COMPLIANCE
	CLOSURE CELL BOUNDARY
	INFERRED GROUNDWATER ELEVATION CONTOUR
	GROUNDWATER ELEVATION CONTOUR

NOTES:

1. TOPOGRAPHICAL INFORMATION SUPPLIED BY AERO-METRIC ENGINEERING, INC.
2. CONTOUR INTERVAL IS 5 FEET.

THE HORIZONTAL FLOW RATE IN THE BEDROCK IS APPROXIMATED USING DARCY'S RELATIONSHIP:

$v = ki/n = 20.7$ ft/yr.

WHERE: $k = 5.17 \times 10^{3}$ ft/yr. *

$i = 4.0 \times 10^{-5}$ ft/ft.

$n = 0.01$ (fracture porosity)**

* FROM THE GOLDER ASSOCIATES REPORT TITLED "PHASE I GROUNDWATER MONITORING PROGRAM," CHEMICAL WASTE MANAGEMENT, INC. VICKERY FACILITY, DATED MARCH 1986.

** FROM THE GOLDER ASSOCIATES REPORT TITLED "SUMMARY AND CHARACTERIZATION OF THE SITE HYDROGEOLOGIC CONDITIONS", CHEMICAL WASTE MANAGEMENT, INC. VICKERY FACILITY, DATED SEPTEMBER 1983.

0' 300' 600' 1200'

SCALE

REV.	DATE		DRN BY	APP BY

DATE: NOVEMBER 1999	PROJECT NO. 35717	SCALE: AS NOTED
DES BY ARF	PROJECT: VICKERY, OHIO FACILITY	
DRN BY VPR		
CHK BY MFB	POTENTIOMETRIC ELEVATION CONTOURS BEDROCK MONITORING WELLS OCTOBER 18, 1999	
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APP BY MFB		

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Waste Management of Ohio, Inc.

SHEET 2 OF 4

DRAWING NO.

FIGURE 5

18 NOV 1999

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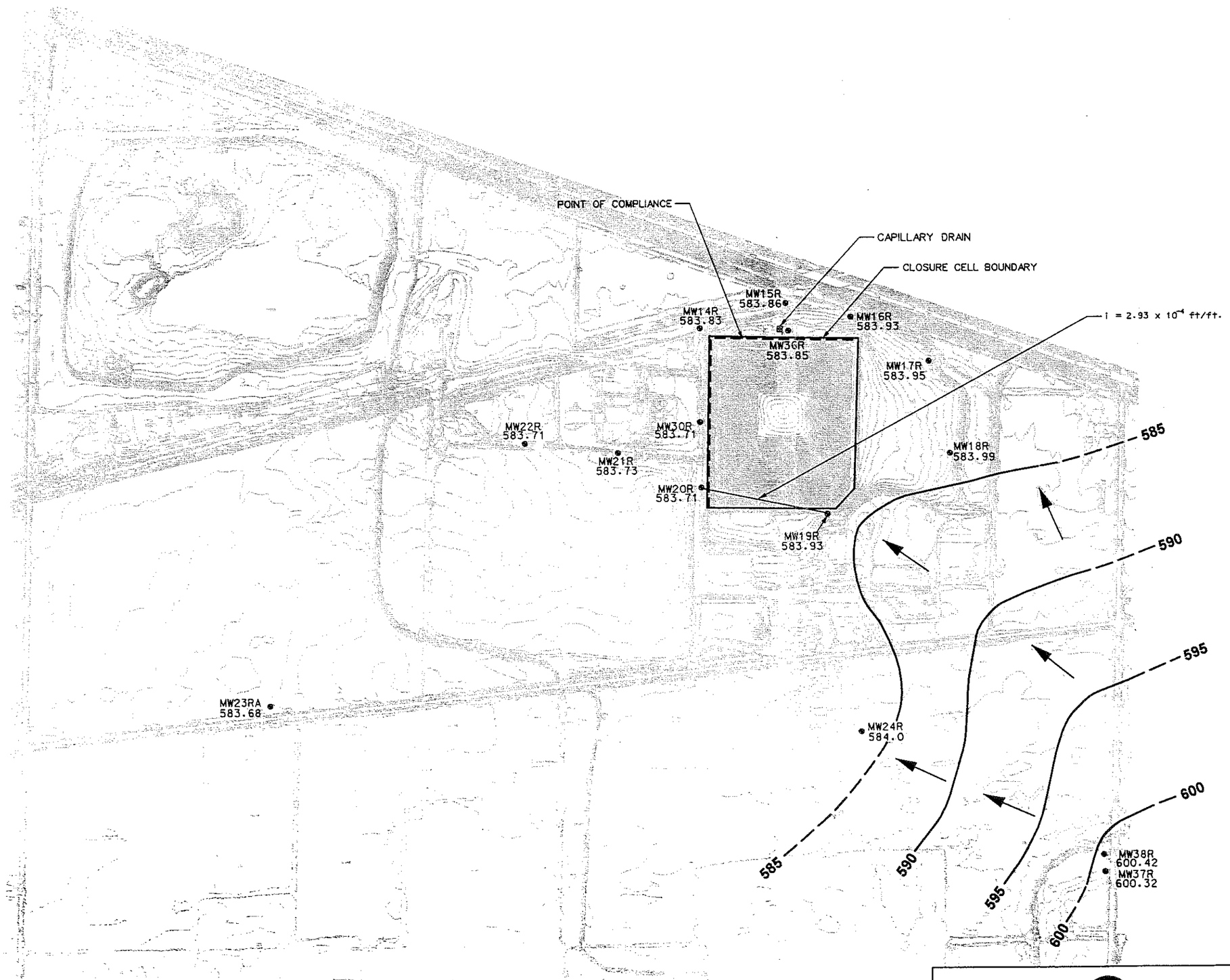

LEGEND

- MW38R — BEDROCK MONITORING WELL
- 583.93 — GROUNDWATER ELEVATION (FEET ABOVE MEAN SEA LEVEL)
- DIRECTION OF FLOW
- POINT OF COMPLIANCE
- CLOSURE CELL BOUNDARY
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER ELEVATION CONTOUR

NOTES:

1. TOPOGRAPHICAL INFORMATION SUPPLIED BY AERO-METRIC ENGINEERING, INC.
2. CONTOUR INTERVAL IS 5 FEET.

THE HORIZONTAL FLOW RATE IN THE BEDROCK IS APPROXIMATED USING DARCY'S RELATIONSHIP:

$v = ki/n = 151.5$ ft/yr.

WHERE: $k = 5.17 \times 10^{3}$ ft/yr. *

$i = 2.93 \times 10^{-4}$ ft/ft.

$n = 0.01$ (fracture porosity) **

* FROM THE GOLDER ASSOCIATES REPORT TITLED "PHASE I GROUNDWATER MONITORING PROGRAM," CHEMICAL WASTE MANAGEMENT, INC. VICKERY FACILITY, DATED MARCH 1986.

** FROM THE GOLDER ASSOCIATES REPORT TITLED "SUMMARY AND CHARACTERIZATION OF THE SITE HYDROGEOLOGIC CONDITIONS", CHEMICAL WASTE MANAGEMENT, INC. VICKERY FACILITY, DATED SEPTEMBER 1983.

0' 300' 600' 1200'
SCALE

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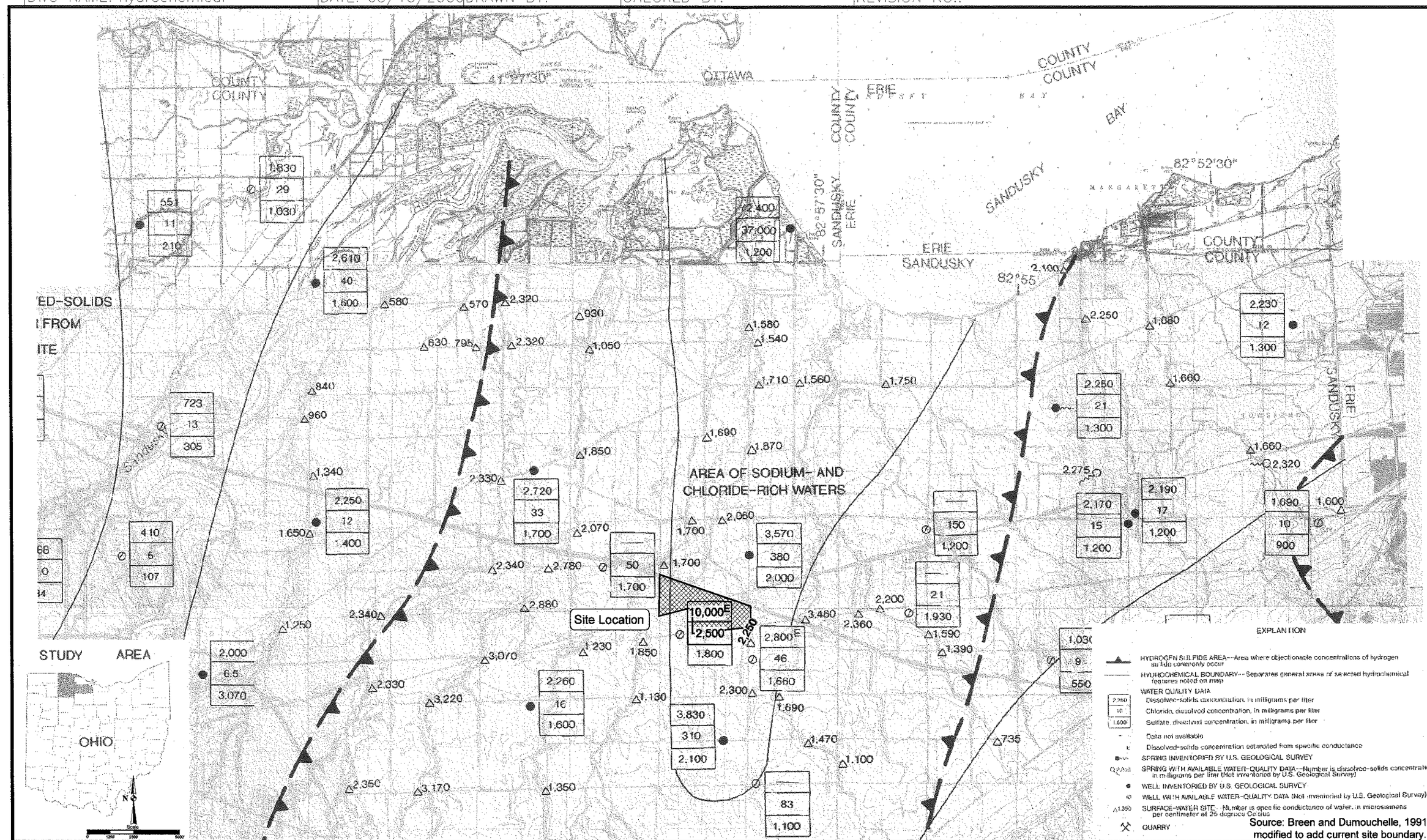
DATE: NOVEMBER 1999		PROJECT NO. 35717	SCALE: AS NOTED	
DES BY	ARF	PROJECT: VICKERY, OHIO FACILITY		
DRN BY	VPR	POTENTIOMETRIC ELEVATION CONTOURS BEDROCK MONITORING WELLS UNDER PUMPING CONDITIONS OCTOBER 14, 1999		
CHK BY	MFB			
REV BY	MTC			
APP BY	MFB		SHEET 1 OF 1	
			DRAWING NO.	

EARTH TECH

Waste Management of Ohio, Inc.

FIGURE 6

DWG NAME: hydrochemical | DATE: 03/15/2000 | DRAWN BY: | CHECKED BY: | REVISION NO.:



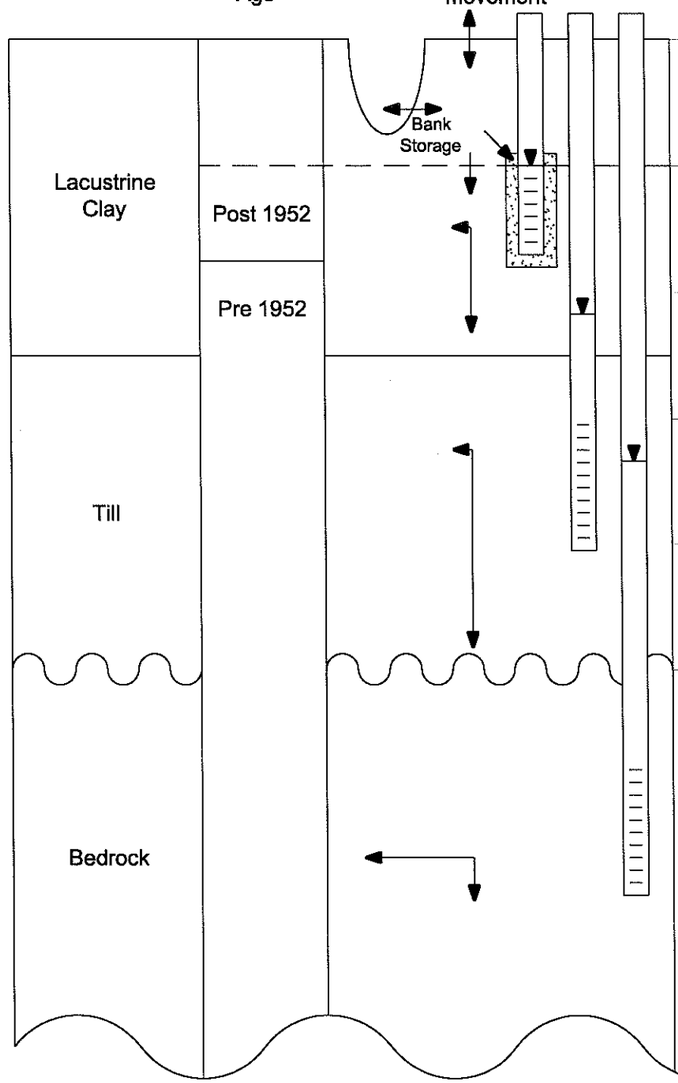
Source: Breen and Dumouchelle, 1991, modified to add current site boundary.

Selected Water-Quality and HydroChemical Conditions for the Bedrock Aquifer in Eastern Sandusky County, Ohio

Cox-Colvin & Associates, Inc.
Environmental Services

Selected Water-Quality and HydroChemical Conditions for the Bedrock Aquifer in Eastern Sandusky County, Ohio

Figure 7



Hydrostratigraphic Units	Hydraulic Properties	Dominant Flow Direction and Rate	Groundwater Use	Future Groundwater Sampling Candidate	Potential Receptors
Desiccation Zone (Vadose Zone)	K, Variable n >0.1 i_v, Temporary i_h, Temporary	Variable, affected by bank storage and evapotranspiration.	None	N/A	Limited, horizontal flow in this unit limited to bank storage.
Till / Lacustrine Semi-Confining Unit	$K=2X10^{-8}$ cm/sec n_e= 0.1 i_v=0.4 i_h=0.014	Vertical at 0.08 ft/year (Downward travel time through unit is ~500 years).	None, low permeability (Monitor wells go dry during purging).	No, horizontal rate of flow (~0.003 ft/year) is too slow to warrant use of wells.	No, depth to water is below the limit for burrowing species. Dominant downward flow prevents movement of contaminants to surface water bodies.
Bedrock Aquifer (Semi-confined Regional Aquifer)	$K=1X10^{-2}$ cm/sec n_e=0.01 i_h=$1.6X10^{-3}$	Horizontal at 1,600 ft/year.	Limited to industrial non-potable use due to poor natural quality.	Yes, horizontal flow direction and rate sufficient to warrant sampling.	Poor natural quality limits human receptors.

* Based on Tritium Concentrations
K=Hydraulic Conductivity
n_e=Effective Porosity (Specific Yield)
i_v=Vertical Hydraulic Gradient
i_h=Horizontal Hydraulic Gradient

Conceptual Hydrologic Model

Cox-Colvin & Associates, Inc.
Environmental Services

Conceptual Hydrologic Model,
Waste Management of Ohio, Inc.,
Vickery, Ohio

Figure
8

Plates

1 Geologic Cross-Sections, Waste Management of Ohio, Inc., Vickery, Ohio.

2 Vertical Groundwater Flow Elevation, Waste Management of Ohio, Inc., Vickery, Ohio.

Phase I RFI Quality Assurance Project Plan Addendum for Additional Background Soil Sampling Waste Management of Ohio, Inc., Vickery, Ohio

March 23, 2000

Submitted to:

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

Submitted by:

Cox-Colvin & Associates, Inc.
1679 Old Henderson Road
Columbus, Ohio 43220
(614) 442-1970

Cox-Colvin & Associates, Inc.
Environmental Services

Phase I RFI Quality Assurance Project Plan Addendum for Additional Background Soil Sampling Waste Management of Ohio, Inc., Vickery, Ohio

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March 23, 2000

Submitted to:

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

Submitted by:

George H. Colvin, CPG
Principal
Cox-Colvin & Associates, Inc.

and

Craig A. Cox, CPG
Principal
Cox-Colvin & Associates, Inc.

Cox-Colvin & Associates, Inc.
Environmental Services

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1 Phase I and Proposed Phase IB Background Soil Sampling Locations, Waste Management of Ohio, Inc., Vickery, Ohio.

2 RFI Phase IB Project Organization Chart, Waste Management of Ohio, Inc., Vickery, Ohio.

3 Phase IB Schedule, Waste Management of Ohio, Inc., Vickery, Ohio.

Appendices

A GPL Standard Operating Procedure for Soil Homogenization and Compositing Prior to Analysis.

B SOP for Geoprobe (Direct Push) Operation.

1.0 Introduction

This addendum to the November 1997 Waste Management of Ohio, Inc., (Waste Management) Phase I RCRA Facility Investigation (RFI) Quality Assurance Project Plan (QAPP) (Rust Environment and Infrastructure, 1997) and by reference the Field Sampling Plan (Rust Environment and Infrastructure, 1998) presents the scope of work and necessary modifications to the QAPP for additional background soil sampling to be conducted as Phase IB of the RFI. With the following exceptions, the QAPP remains unchanged:

- an increase in the number of background soil samples and the use of a standard operating procedure (SOP) for homogenization of soil prior to analysis (scope of work);
- the use of direct-push soil sampling in place of conventional split-spoon sampling (sampling and decontamination methodology);
- a more detailed approach to statistical analysis of the background data (statistical analysis); and
- a modification in project organization and responsibility (project organization).

Following a review of the current background soil data set, each of these necessary modification to the Phase I QAPP are discussed below.

1.1 Review of Phase I Background Soil Data Collection and Evaluation

During Phase I of the RFI, background soil samples were collected from 0-2 ft and 8-10 ft at five locations. The general locations of these samples were selected based upon previous knowledge of the site which indicates that the areas were unaffected by past waste management practices. The depths were selected to collectively characterize background metals concentrations in the unconsolidated lacustrine deposits at the surface and at depth. The lacustrine deposits are the uppermost unconsolidated unit at the site and are present to depths of between 10 and 30 feet below ground surface. Based on this unit's presence from the ground surface to depths of 10 to 30 ft, the lacustrine deposits also represent the primary environmental migration pathway from SWMUs to soil. The 0-2 ft and 8-10 ft samples were also selected to correspond in the risk assessment to the surface soil exposure pathway (0-2 ft) for a site worker, and the combined surface and subsurface soil exposure pathway (0-2 ft and 8-10 ft) for an excavation worker. Typically, the 0-2 ft interval is also the most critical depth for ecological risk assessment issues and, due to the number of samples, will be well represented in the background data set. Background soil samples from the

underlying till unit have not been collected and will not be collected because it is unlikely that a release to the till unit has occurred or will be evaluated as part of the risk assessment. If for some unanticipated reason, background values from the till unit are necessary, the lacustrine and till unit are similar enough in grain size and composition that the lacustrine data set can be used to represent the till unit.

In the October 1999 Phase I RFI Report (EarthTech, 1999), the mean background concentration for each metal was compared to individual sampling results at SWMUs and AOCs. An exception to this approach was applied to the arsenic data. Instead of comparing to the mean, the maximum background arsenic value was used. This is because arsenic failed the mean comparison very frequently but was believed to be representative of background conditions. In US EPA's January 28, 2000 Notice of Deficiency for the Phase I RFI Report, comment No. 9 suggested that the 95% upper confidence limit (UCL) for the background concentrations of each inorganic constituent should be calculated and used as the basis for comparison to each investigative sample result. As discussed during the February 25, 2000 meeting in Chicago, both of these methodologies are inappropriate in their application to this situation. Use of a single sample comparison to each SWMU to the mean background will invariably result in failure of approximately half of the comparisons even if a release has not occurred. Nearly half of the background data set would also fail such a comparison. Use of the 95% UCL is inappropriate for release and extent determination purposes because this involves comparing population results in the form of a UCL to individual sample results at the SWMU or AOC (US EPA, 1995).

As an alternative, Waste Management proposed and US EPA agreed, during the February 25 meeting, that maximum background values, with an outlier evaluation, should be used for release and extent determination comparisons. With this approach, the maximum background from the data set is compared to each investigative result to determine if a release of inorganic constituents has occurred. This approach is actually more conservative than the comparison of background UCL to UCL at the SWMU because there is a greater potential for failure due to the number of samples and comparisons at each SWMU or AOC. In further discussion, it was determined that the limited existing Phase I background data set would make an outlier evaluation problematic. Additional background characterization as Phase IB was therefore agreed upon. It was also agreed that an addendum to the Phase I QAPP would be submitted outlining the scope of work for the collection of the additional background metals sampling.

2.0 Scope of Work

Phase I background sampling locations (BGSB01 through BGSB05) and proposed Phase IB background sampling locations are shown on Figure 1. The Phase 1B sample locations were selected to cover as much of the site as possible while avoiding areas which may have

been used for management of hazardous waste. Downwind areas of the active area of the facility were also avoided to the extent possible. At each of the ten locations, soil samples will be collected continuously from the ground surface to a depth of 10 feet for visual examination and description. Consistent with Phase I, background soil samples will be collected for laboratory analysis at depths of 0-2 feet and 8-10 feet. Background soil sampling will be conducted using direct-push technology as discussed below. The borings will be completed by a yet to be determined qualified direct push contractor under the direction of a Cox-Colvin hydrogeologist. The borings will be abandoned by slowly pouring granular bentonite down the borehole and hydrating the bentonite with potable water. A survey stake, marked with a unique identification number, will then be placed in each abandoned borehole so that the location can be accurately surveyed. Surveying will be conducted by Kusmer & Associates, Inc., of Fremont, Ohio.

Quality Assurance/Quality Control samples will be collected in accordance with the QAPP and will include two field duplicates, one laboratory duplicate, two field blanks, and one potable/decontamination water blank. All samples will be analyzed for Appendix IX metals by GLP Laboratories, LLLP (GPL) in accordance with the QAPP and the attached (Appendix A) GLP SOP for laboratory homogenization and compositing of soil samples for metals analysis. US EPA requested during the February 25, 2000 meeting that homogenization of soil samples for metals analysis is conducted. Although compositing is discussed in the SOP along with homogenization, sample compositing will not be conducted.

Reporting limits and data quality limits presented in the Phase I QAPjP will be used for Phase IB. The Phase I reporting limits took into account Region V human health data quality levels and project-specific data quality objectives. Based on the use of the data for release and extent determination purposes and the potential for statistical problems associated with multiple reporting levels, the project specific reporting limits for the Phase IB work will not be modified to specifically meet the Region V ecological data quality levels (EDQLs). However, a review of the project reporting levels against the most recent (October 4, 1999) Region V EDQLs indicates that approximately half of the inorganic parameters to be evaluated will be below the EDQLs. Upon receipt, analytical data will be validated and documented in accordance with the QAPP. Due to the limited scope of work and the limited potential for cross contamination, an internal field audit will not be conducted during sampling.

3.0 Sampling and Decontamination Methodology

Soil sampling will be conducted using direct-push sampling technology. Phase I soil sampling was done using conventional hollow-stem auger drilling with split-spoon

samplers. Permission to use direct-push sampling for Phase IB was requested and granted by US EPA and Ohio EPA during the February 25, 2000 meeting.

Direct-push technology has the following advantages over conventional split-spoon sampling methods:

- Smaller diameter borehole;
- Less investigation derived waste;
- Less potential for cross contamination through drag down;
- Rapid mobilization; and
- Less decontamination required between locations and samples.

US EPA has prepared a SOP for use with the popular GEOPROBE™ Model 5400 direct-push unit. Although, at this time, it is not known what brand or model of direct-push unit will be used during Phase IB, the SOP (Appendix B) will be used as a general guideline for sampling during Phase IB. New acetate liners will be used for each sample collected.

Due to the physically smaller size of the sampling equipment and the fact that very few pieces of equipment can come in contact with soil or water, equipment decontamination can be readily conducted at the boring location using soap, buckets, and scrub brushes. Decontamination of soil sampling equipment will be conducted as described below. Stainless-steel sampling tubes will be decontaminated between each sample. Outer probe rod and drive shoe will be decontaminated between locations. Decontamination will be conducted at each boring location using the following procedures:

- In one clean 5-gallon bucket, wash and scrub equipment using laboratory grade glassware detergent and potable water;

- Place cleaned equipment in second clean 5 gallon bucket for rinsing, using potable water.

- Spray or pour distilled water over equipment immediately prior to use as final rinse.

If visual contamination persists, or gross contamination is suspected, the affected piece of equipment will be replaced or the equipment will be steam cleaned as described in Section 5.5.2 of the RFI Field Sampling Plan. Due primarily to the fact that the soil sampling is being conducted for metals, the sampling devices will not be wrapped in aluminum foil after cleaning as described in the Field Sampling Plan.

4.0 Statistical Analysis

Statistical analysis of the background data will include the determination of maximum background concentrations for each constituent from the combined Phase I and Phase IB background data set. These values will then be used in release and extent determinations by comparing single values at SWMUs and AOCs to the maximum background value. Due to the lacustrine unit's uniformity with depth, the 0-2 ft and 8-10 ft samples will be treated as a single data set for release and extent determination purposes. In the future, however, the two intervals may be considered as separate data sets for risk assessment purposes.

Prior to calculation of the maximum background concentration for each constituent, the data set will be tested for normality and transformed as necessary to allow for outlier evaluations. If possible, based on the percentage of censored (non-detects) data and the distribution of the data set, the outlier evaluation will be conducted using the box-plot outlier evaluation method of Iglewicz and Hoaglin (1993). Normality testing will be conducted in accordance with commonly accepted statistical testing methods. The statistical results and procedures will be provided in the revised Phase I report.

5.0 Project Organization

A revised overall project management organization for Phase IB of the RFI is provided on Figure 2. The revised organizational chart closely resembles the original organization chart provided in the RFI Phase I Project Management Plan (Rust Environmental and Infrastructure, 1998). Project titles and responsibilities as documented in the Project Management Plan have been left unchanged. The EarthTech project manager will act in an advisory role during Phase IB and assist in the transition of the Phase IB results from Cox-Colvin to EarthTech for use in the revised Phase I Report.

6.0 Schedule

The schedule for implementation of Phase IB is provided on Figure 3. This schedule is based on the Phase IB and Phase II schedule submitted to US EPA by Waste Management on March 3, 2000 (Waste Management, 2000). The schedule assumes agency approval of the Phase IB addendum on or before April 22, 2000.

7.0 References

EarthTech, 1999, RCRA Facility Investigation (RFI) Phase I Report, October, 1999.

Iglewicz, B. and Hoaglin, D., 1993, How to Detect and Handle Outliers, ASQC Quality Press, Milwaukee, Wisconsin, 87 pp.

Rust Environment and Infrastructure, Inc., 1997, Quality Assurance Project Plan, November, 1997,

Rust Environment and Infrastructure, Inc., 1998, Phase I RFI Workplan, October 1998.

US EPA, 1995, Determination of Background Concentration of Inorganics in Soils and Sediments at Hazardous Waste Sites. Office of Solid Waste and Emergency Response, EPA/540/S-96/500, December, 1995.

Waste Management of Ohio, Inc., 2000, Letter from Sandra Clark to Tom Matheson, March 3, 2000.

Figures

1. Phase I and Proposed Phase IB Background Soil Sampling Locations, Waste Management of Ohio, Inc., Vickery, Ohio.

2. RFI Phase IB Project Organization Chart, Waste Management of Ohio, Inc., Vickery, Ohio.

3. Phase IB Schedule, Waste Management of Ohio, Inc., Vickery, Ohio.

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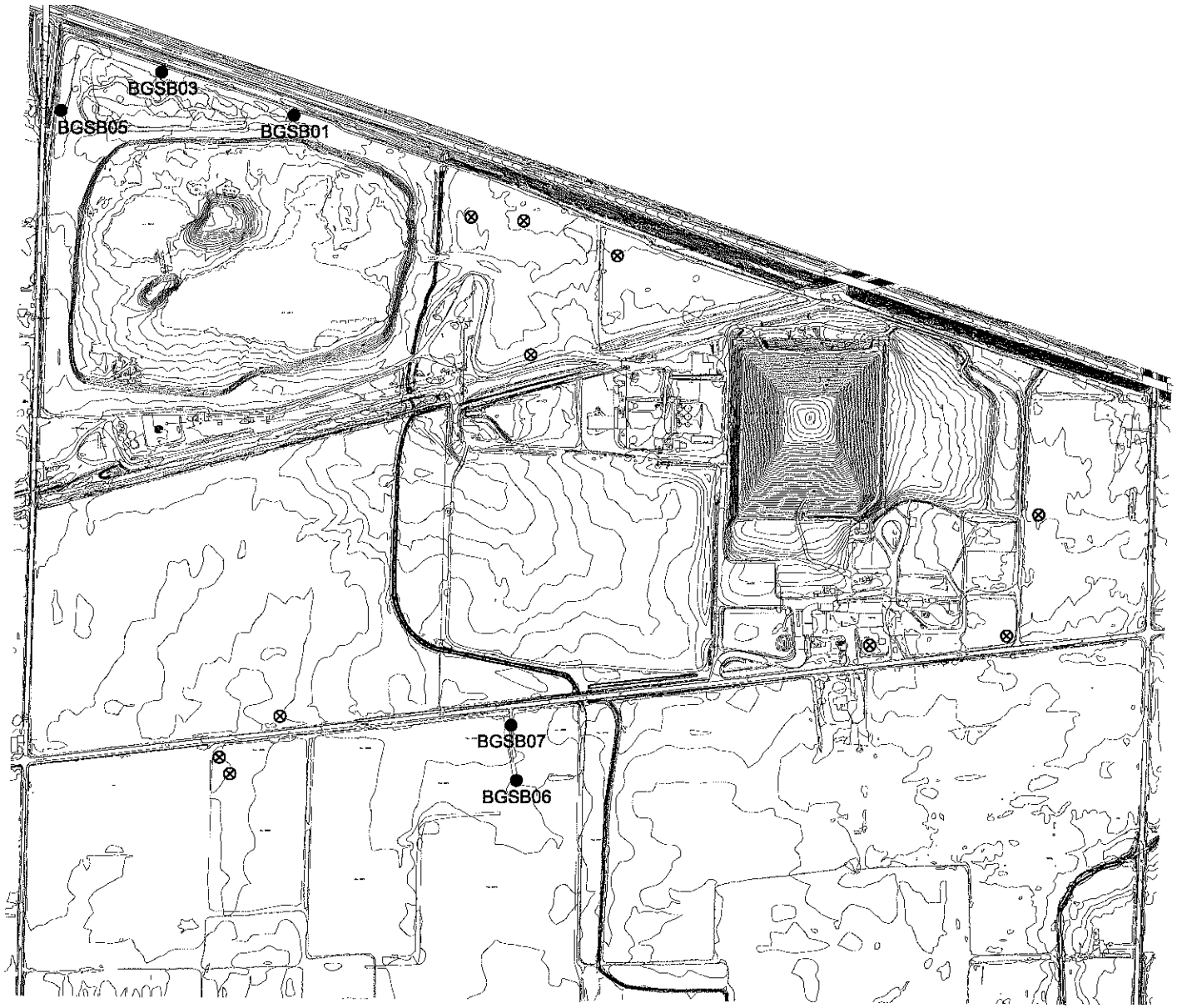
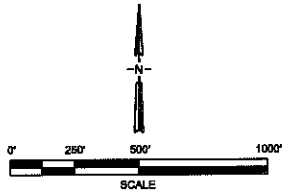


Legend

- ● Phase I background soil sampling locations
- ⊗ Proposed Phase IB background soil sampling locations



Cox-Colvin & Associates, Inc.
Environmental Services

Phase I and Proposed IB Background Soil Sampling Locations,
Waste Management of Ohio, Inc.,
Vickery, Ohio

Figure
1

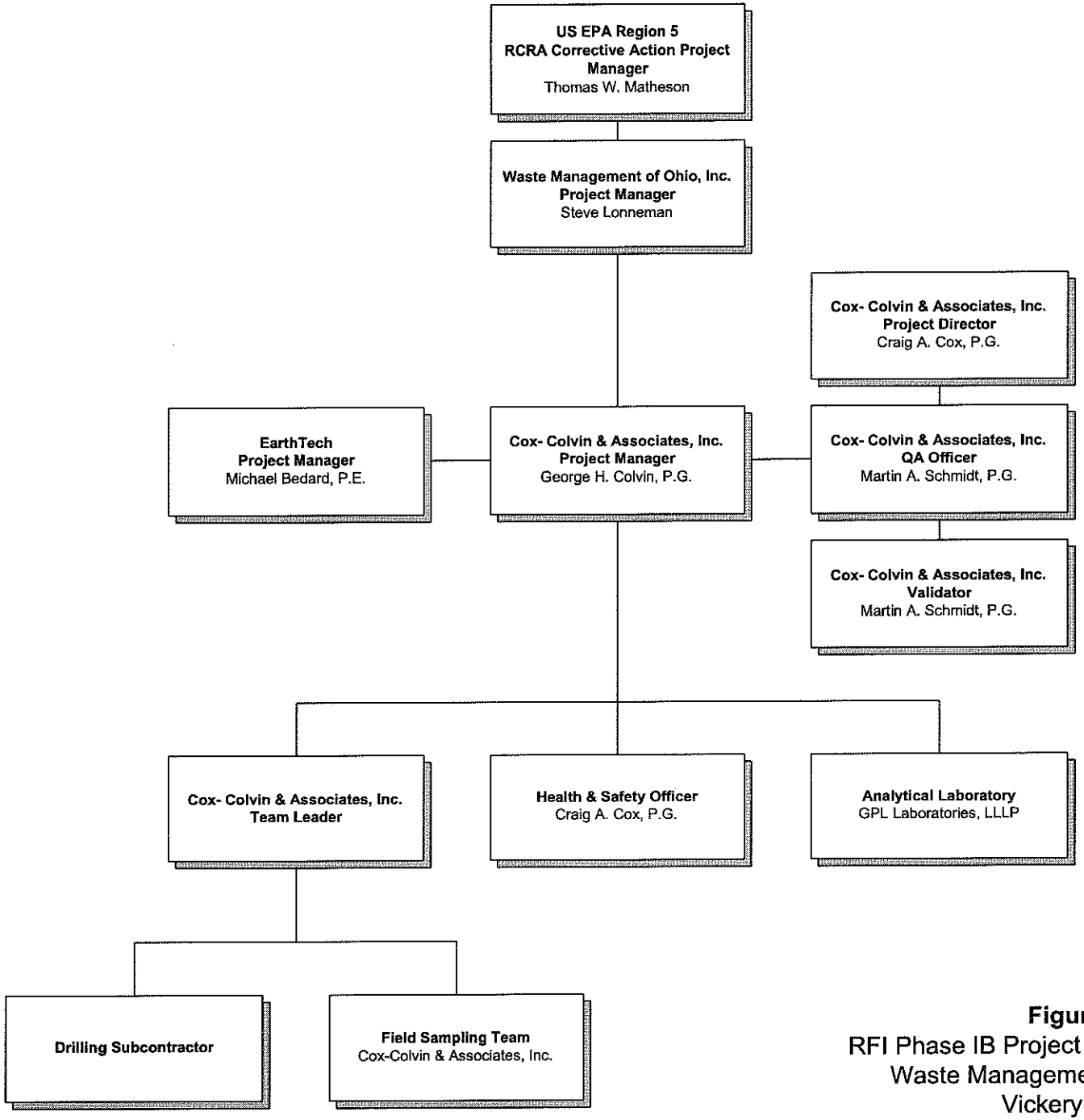
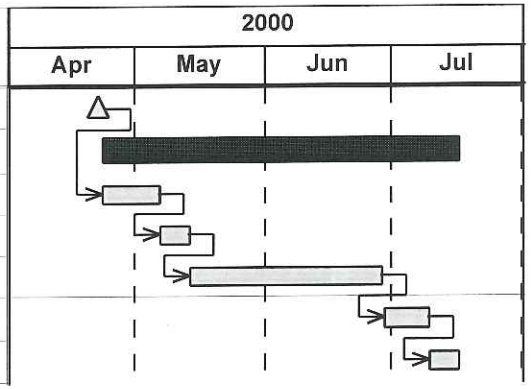


Figure 2
RFI Phase IB Project Organization Chart,
Waste Management of Ohio, Inc.,
Vickery, Ohio

Figure 3
Phase IB (Background Soil) Schedule*
Waste Management of Ohio, Inc., Vickery, Ohio

Task Name	Start Date	Duration	End Date
Agency Approval of Phase IB Addendum	04/22/2000	0d	04/22/2000
Phase IB (Background Metals)**	**04/23/2000**	**83.00d**	**07/16/2000**
*Contracting and Mobilization	04/23/2000	14.00d	05/06/2000
Phase IB Field Work	05/07/2000	7.00d	05/13/2000
Laboratory Analysis	05/14/2000	45.00d	06/28/2000
Data Validation	06/29/2000	10.00d	07/09/2000
Statistical Review	07/10/2000	7.00d	07/16/2000



*Based on Phase IB and Phase II Schedule Provided to US EPA by Waste Management of Ohio, Inc. on March 3, 2000.
**Assumes agency approval on or before April 22, 2000.

Appendix A

A. GPL Standard Operating Procedures for Soil Homogenization and Compositing Prior to Analysis.

SOP No: G.16

Title: Soil Homogenization and Compositing

1.0 SCOPE AND APPLICATION

1.1 This Standard Operating Procedure describes the procedure used to homogenize and/or composite soil replicate field samples to produce a representative sample for analytical use.

2.0 SUMMARY OF METHOD

2.1 Equal amounts of designated field soil samples are mixed in an inert container to provide composite sample. Soil from a container is homogenized outside of its jar and placed back to the jar. The entire content of a designated field sample is homogenized by mixing. If needed, sample can be dried and sieved prior to mixing.

3.0 INTERFERENCE

3.1 Depending on the type of analysis needed, certain precautions must be taken. Using a metal spatula to scoop soil may introduce contamination and should be avoided. Gloves may introduce phthalate contamination if semivolatile organic analysis is needed.

4.0 APPARATUS AND MATERIAL

- Spatula – either wooden or metal
- Tray – glass, polyethylene, aluminum
- Gloves – nitrile or polyethylene
- Balance – top loader balance, accuracy 1g

5.0 PROCEDURE

5.1 Compositing

5.1.1 Compositing soil sample requires at least 2 field sample replicates collected from the same site or different sites (per project requirement). Using a soil scoop, take a scoop of soil sample from each sample jar. Make sure that each sample is matrix representative. Remove debris, rocks, leaves and other large non-representative items from the matrix. Sediment samples may contain a layer of water, which needs to be decanted and discarded. Next, weigh 100g of the scooped sample from each jar and place them in a mixing tray. Mix the soil thoroughly; crumble the large pieces with hand or spatula if needed. Then pour the composited sample into a pre-cleaned glass jar, put the lid on and store.

5.2 Homogenizing

5.2.1 Empty the entire sample jar into a mixing tray. Using a wooden spatula transfer any leftover sample from the jar into the tray. Remove all large debris, rocks, leaves and other foreign objects. Wear powder free gloves and mix sample thoroughly with a wooden spatula. Return the homogenized sample back to its sample jar, put the lid back on and store.

5.2.2 Samples matrices that are hard to break down or separate may require heating and sieving. Take about 100g or entire 4.0 ounce jar of a field sample and spread on glass or porcelain tray, then place in an oven. Dry the sample in a 50°C oven for 8 hours. Remove the sample from the oven and let it cool at room temperature, then break up and crumble large pieces using a wooden spatula. If needed, sample may be sieved, depending on contract requirement or judgement of the experienced chemist. Selection of sieve mesh size should be based on sample composition and makeup, therefore, may vary for each sampling site.

Note: Drying and sieving is only applicable to field samples that require metals analysis. Samples designated for organic tests may be homogenized, but must not be heated.

Appendix B

B. SOP for Geoprobe (Direct Push) Operation.

MODEL 5400 GEOPROBE™ OPERATION

SOP#: 2050
DATE: 03/27/96
REV. #: 0.0

1.0 SCOPE AND APPLICATION

The purpose of this standard operating procedure (SOP) is to describe the collection of representative soil, soil-gas, and groundwater samples using a Model 5400 Geoprobe™ sampling device. Any deviations from these procedures should be documented in the site/field logbook and stated in project deliverables.

Mention of trade names or commercial products does not constitute U.S. Environmental Protection Agency (U.S. EPA) endorsement or recommendation for use.

2.0 METHOD SUMMARY

The Geoprobe™ sampling device is used to collect soil, soil-gas and groundwater samples at specific depths below ground surface (BGS). The Geoprobe™ is hydraulically powered and is mounted in a customized four-wheel drive vehicle. The base of the sampling device is positioned on the ground over the sampling location and the vehicle is hydraulically raised on the base. As the weight of the vehicle is transferred to the probe, the probe is pushed into the ground. A built-in hammer mechanism allows the probe to be driven through dense materials. Maximum depth penetration under favorable circumstances is about 50 feet. Components of the Model 5400 Geoprobe™ are shown in Figures 1 through 6 (Appendix A).

Soil samples are collected with a specially-designed sample tube. The sample tube is pushed and/or vibrated to a specified depth (approximately one foot above the intended sample interval). The interior plug of the sample tube is removed by inserting small-diameter threaded rods. The sample tube is then driven an additional foot to collect the samples. The probe sections and sample tube are then withdrawn and the sample is extruded from the tube into sample jars.

Soil gas can be collected in two ways. One method involves withdrawing a sample directly from the probe rods, after evacuating a sufficient volume of air from the probe rods. The other method involves collecting a sample through tubing attached by an adaptor to the bottom probe section. Correctly used, the latter method provides more reliable results.

Slotted lengths of probe can be used to collect groundwater samples if the probe rods can be driven to the water table. Groundwater samples are collected using either a peristaltic pump or a small bailer.

3.0 SAMPLE PRESERVATION, CONTAINERS, HANDLING AND STORAGE

Refer to specific ERT SOPs for procedures appropriate to the matrix, parameters and sampling objector.

Applicable ERT SOPs include:

ERT #2012, Soil Sampling

ERT #2007, Groundwater Well Sampling

ERT #2042, Soil Gas Sampling

4.0 INTERFERENCES AND POTENTIAL PROBLEMS

A preliminary site survey should identify areas to be avoided with the truck. All underground utilities should be located and avoided during sampling. Begin sampling activities with an adequate fuel supply.

Decontamination of sampling tubes, probe rods, adaptors, non-expendable points and other equipment that contacts the soil is necessary to prevent cross-contamination of samples. During sampling, the bottom portion and outside of the sampling tubes can be contaminated with soil from other depth intervals.

Care must be taken to prevent soil which does not represent the sampled interval form being incorporated into the sample. Excess soil should be carefully wiped from the outside surface of the sampling tube and the bottom 3 inches of the sample should be discarded before extruding the sample into a sample jar.

The amount of sample to be collected and the proper sample container type (i.e., glass, plastic), chemical preservation, and storage requirements are dependent upon the parameter(s) of interest. Guidelines for the containment, preservation, handling and storage of soil-gas samples are described in ERT SOP #2042, Soil-Gas Sampling.

Obtaining sufficient volume of soil for multiple analyses from one sample location may present a problem. The Geoprobe™ soil sampling system recovers a limited volume of soil and it is not possible to reenter the same hole and collect additional soil. When multiple analyses are to be performed on soil samples collected with the Geoprobe™, it is important that the relative importance of the analyses be identified. Identifying the order of importance will ensure that the limited sample volume will be used for the most crucial analyses.

5.0 EQUIPMENT/APPARATUS

Sampling with the Geoprobe™ involves use of the equipment listed below. Some of the equipment is used for all sample types, others are specific to soil (S), soil gas (SG), or groundwater (GW) as noted.

- Geoprobe™ sampling device
- Threaded probe rods (36", 24", and 12" lengths)
- Drive Caps
- Pull Caps
- Rod Extractor
- Expendable Point Holders
- Expendable Drive Points
- Solid Drive Points
- Extension Rods
- Extension Rod Couplers
- Extension Rod Handle
- Hammer Anvil
- Hammer Latch
- Hammer Latch Tool
- Drill Steels
- Carbide-Tipped Drill Bit
- Mill-Slotted Well Point (GW)
- Threaded Drive Point (GW)
- Well Mini-Bailer (GW)
- Tubing Bottom Check Valve (GW)
- 3/8" O.D. Low Density Polyethylene Tubing (GW, SG)
- Gas Sampling Adaptor and Cap (SG)
- Teflon Tape
- Neoprene "O" - Rings (SG)
- Vacuum System (mounted in vehicle) (SG)
- Piston Tip (S)
- Piston Rod (S)
- Piston Stop (S)
- Sample Tube (11.5" in length) (S)
- Vinyl Ends Caps (S)
- Sample Extruder (S)
- Extruder Pistons (Wooden Dowels) (S)
- Wire Brush
- Brush Adapters
- Cleaning Brush (Bottle)

6.0 REAGENTS

Decontamination solutions are specified in ERT SOP #2006, Sampling Equipment Decontamination.

7.0 PROCEDURES

Portions of the following sections have been condensed from the Model 5400 Geoprobe™ Operations Manual(1). Refer to this manual for more detailed information concerning equipment specifications, general maintenance, tools, throttle control, clutch pump, GSK-58 Hammer, and trouble-shooting. A copy of this manual will be maintained with the Geoprobe™ and on file in the Quality Assurance (QA) office.

7.1 Preparation

1. Determine extent of the sampling effort, sample matrices to be collected, and types and amounts of equipment and supplies required to complete the sampling effort.

2. Obtain and organize necessary sampling and monitoring equipment.

3. Decontaminate or pre-clean equipment, and ensure that it is in working order.

4. Perform a general site survey prior to site

entry in accordance with the site-specific Health and Safety Plan.

5. Use stakes or flagging to identify and mark all sampling locations. All sample locations should be cleared for utilities prior to sampling.

7.2 Setup of Geoprobe™

1. Back carrier vehicle to probing location.

2. Shift the vehicle to park and shut off ignition.

3. Set parking brake and place chocks under rear tires.

4. Attach exhaust hoses so exhaust blows downwind of the sampling location (this is particularly important during soil gas sampling).

5. Start engine using the remote ignition at the Geoprobe™ operator position.

6. Activate hydraulic system by turning on the Electrical Control Switch located on the Geoprobe™ electrical control panel (Figure 1, Appendix A). When positioning the probe, always use the SLOW speed. The SLOW speed switch is located on the hydraulic control panel (Figure 2, Appendix A).

   Important: Check for clearance on vehicle roof before folding Geoprobe™ out of the carrier vehicle.

7. Laterally extend the Geoprobe™ from the vehicle as far as possible by pulling the EXTEND control lever toward the back of the vehicle while the Geoprobe™ is horizontal.

8. Using the FOOT control, lower the Derrick Slide so it is below cylinder (A) before folding the Geoprobe™ out of the carrier vehicle (Figure 3, Appendix A). This will ensure clearance at the roof of the vehicle.

9. Use the FOLD, FOOT, and EXTEND controls to place Geoprobe™ to the exact probing location. Never begin probing in the fully extended position.

10. Using the FOLD control, adjust the long axis of the probe cylinder so that it is perpendicular (visually) to the ground surface.

11. Using the FOOT control, put the weight of the vehicle on the probe unit. Do not raise the rear of the vehicle more than six inches.

Important: Keep rear vehicle wheels on the ground surface when transferring the weight of the vehicle to the probe unit. Otherwise, vehicle may shift when probing begins.

12. When the probe axis is vertical and the weight of the vehicle is on the probe unit, probing is ready to begin.

7.3 Drilling Through Surface Pavement or Concrete

1. Position carrier vehicle to drilling location.

2. Fold unit out of carrier vehicle.

3. Deactivate hydraulics.

4. Insert carbide-tipped drill bit into hammer.

5. Activate HAMMER ROTATION control by turning knob counter-clockwise (Figure 4, Appendix A). This allows the drill bit to rotate when the HAMMER control is pressed.

6. Press down on HAMMER control to activate counterclockwise rotation.

7. Both the HAMMER control and the PROBE control must be used when drilling through the surface (Figure 4, Appendix A). Fully depress the HAMMER control, and incrementally lower the bit gradually into the pavement by periodically depressing the PROBE control.

8. When the surface has been penetrated, turn the HAMMER Control Valve knob clockwise to deactivate hammer rotation and remove the drill bit from the HAMMER.

Important: Be sure to deactivate the rotary action before driving probe rods.

7.4 Probing

1. Position the carrier vehicle to the desired sampling location and set the vehicle parking brake.

2. Deploy Geoprobe™ Sampling Device.

3. Make sure the hydraulic system is turned off.

4. Lift up latch and insert hammer anvil into hammer - push latch back in (Figure 5, Appendix A).

5. Thread the drive cap onto the male end of the probe rod.

6. Thread an expendable point holder onto the other end of the first probe rod.

7. Slip an expendable drive point into point holder.

8. Position the leading probe rod with expendable drive point in the center of the derrick foot and directly below the hammer anvil.

   Important: Positioning the first probe rod is critical in order to drive the probe rod vertically. Therefore, both the probe rod and the probe cylinder shaft must be in the vertical position (Figure 6, Appendix A).

9. To begin probing, activate the hydraulics and push the PROBE Control downward. When advancing the first probe rod, always use the SLOW speed. Many times the probe rods can be advanced using only the weight of the carrier vehicle. When this is the case, only the PROBE control is used.

   Important: When advancing rods, always keep the probe rods parallel to the probe cylinder shaft (Figure 6, Appendix A). This is done by making minor adjustments with the FOLD control. Failure to keep probe rods parallel to probe cylinder shaft may result in broken rods and increased difficulty in achieving desired sampling depth.

7.5 Probing - Percussion Hammer

The percussion hammer must be used in situations where the weight of the vehicle is not sufficient to advance the probe rods.

1. Make sure the Hammer Rotation Valve is closed.

2. Using the PROBE control to advance the rod, press down the HAMMER control to allow percussion to drive the rods (Figure 2, Appendix A).

   Important: Always keep static weight on the probe rod or the rod will vibrate and chatter while you are hammering, causing rod threads to fracture and break.

3. Keep the hammer tight to the drive cap so the rod will not vibrate.

4. Periodically stop hammering and check if the probe rods can be advanced by pushing only.

5. Any time the downward progress of the probe rods is refused, the derrick foot may lift off of the ground surface. When this happens, reduce pressure on the PROBE control. Do not allow the foot to rise more than six inches off the ground or the vehicle's wheels may lift off the ground surface, causing the vehicle to shift (Figure 6, Appendix A).

6. As the derrick foot is raised off the ground surface, the probe cylinder may not be in a perpendicular position. If this happens, use the FOLD control to correct the probe cylinder position.

7.6 Probing - Adding Rods

1. Standard probe rods are three feet in length. If the desired depth is more than three feet, another rod must be threaded onto the rod that has been driven into the ground. In order to ensure a vacuum-tight seal (soil-gas sampling), two wraps of teflon tape around the thread is recommended.

2. Using the PROBE control, raise the probe cylinder as high as possible.

   Important: Always deactivate hydraulics when adding rods.

3. Deactivate hydraulics.

4. Unthread the drive cap from the probe rod that is in the ground.

5. Wrap teflon tape around the threads.

6. Thread the drive cap onto the male end of the next probe rod to be used.

7. After threading the drive cap onto the rod to be added, thread the rod onto the probe rod that has been driven into the ground. Make sure threads have been teflon taped. Continue probing.

8. Continue these steps until the desired sampling depth has been reached.

7.7 Probing/Pulling Rods

1. Once the probe rods have been driven to depth, they can also be pulled using the Geoprobe™ Machine.

2. Turn off the hydraulics.

3. Lift up latch and take the hammer anvil out of the hammer.

4. Replace the drive cap from the last probe rod driven with a pull cap.

5. Lift up the hammer latch.

6. Activate the hydraulics.

7. Hold down on the PROBE control, and move the probe cylinder down until the latch can be closed over the pull cap.

   Important: If the latch will not close over the pull cap, adjust the derrick assembly by using the extend control. This will allow you to center the pull cap directly below the hammer latch.

8. Retract the probe rods by pulling up on the PROBE control.

Important: Do not raise the probe cylinder all the way when pulling probe rods or it will be impossible to detach a rod that has been pulled out. However, it is necessary to raise the probe cylinder far enough to allow the next probe section to be pulled.

9. After retracting the first probe rod, lower the probe cylinder only slightly to ease the pressure off of the hammer latch.

10. Attach a clamping device to the base of the rods where it meets the ground to prevent rods from falling back into the hole.

11. Raise the hammer latch.

12. Hold the PROBE control up and raise the probe cylinder as high as possible.

13. Unthread the pull cap from the retracted rod.

14. Unthread the retracted rod.

15. Thread the pull cap onto the next rod that is to be pulled.

16. Continue these steps until all the rods are retracted from the hole.

17. Decontaminate all portions of the equipment that have been in contact with the soil, soil gas and groundwater.

7.8 Soil-Gas Sampling Without Interior Tubing

1. Follow procedures outlined in Sections 7.1 through 7.6.

2. Remove hammer anvil from hammer.

3. Thread on pull cap to end of probe rod.

4. Retract rod approximately six inches. Retraction of the rod disengages expendable drive point and allows for soil vapor to enter rod.

5. Unthread pull cap and replace it with a gas sampling cap. Cap is furnished with barbed hose connector.

Important: Shut engine off before taking sample (exhaust fumes can cause faulty sample data).

6. Turn vacuum pump on and allow vacuum to build in tank.

7. Open line control valve. For each rod used, purge 300 liters of volume. Example: Three rods used = 900 liters = .900 on gauge.

8. After achieving sufficient purge volume, close valve and allow sample line pressure gauge to return to zero. This returns sample train to atmospheric pressure.

9. The vapor sample can now be taken.

    1. Pinch hose near gas sampling cap to prevent any outside vapors from entering the rods.

    2. Insert syringe needle into center of barbed hose connector and withdraw vapor sample.

10. To maintain suction at the sampling location, periodically drain the vacuum tank.

11. To remove rods, follow procedures outlined in Section 7.7.

7.9 Soil-Gas Sampling With Post-Run Tubing (PRT)

1. Follow procedures outlined in Sections 7.1 through 7.6.

2. Retract rod approximately six inches. Retraction of rod disengages expendable drive point and allows for soil vapor to enter rod.

3. Remove pull cap from the end of the probe rod.

4. Position the Geoprobe™ to allow room to work.

5. Secure PRT Tubing Adapter with "O" - Ring to selected tubing.

6. Insert the adapter end of the tubing down the inside diameter of the probe rods.

7. Feed the tubing down the hole until it hits bottom on the expendable point holder. Cut the tubing approximately two feet from the top probe rod.

8. Grasp excess tubing and apply some downward pressure while turning it in a counter-clockwise motion to engage the adapter threads with the expendable point holder.

9. Pull up lightly on the tubing to test engagement of threads.

10. Connect the outer end of the tubing to silicon tubing and vacuum hose (or other sampling apparatus).

11. Follow the appropriate sampling procedure (ERT SOP #2042, Soil Gas Sampling) to collect a soil-gas sample.

12. After collecting a sample, disconnect the tubing from the vacuum hose or sampling system.

13. Pull up firmly on the tubing until it releases from the adapter at the bottom of the hole.

14. Extract the probe rods from the ground and recover the expendable point holder with the attached adapter.

15. Inspect the "O"-ring at the base of the adapter to verify that proper sealing was achieved during sampling. The "O"-ring should be compressed.

    Note: If the "O"-ring is not compressed, vapors from within the probe sections may have been collected rather than vapors from the intended sample interval.

7.10 Soil Sampling

1. Follow procedures outlined in Sections 7.1 through 7.6.

2. Assemble soil-sampling tube.

    1. Thread piston rod into piston tip.

    2. Insert piston tip into sample tube, seating piston tip into cutting edge of sample tube.

    3. Thread drive head into threaded end of sample tube.

    4. Thread piston stop pin into drive head. Stop pin should be tightened with wrench so that it exerts pressure against the piston rod.

3. Attach assembled sampler onto leading probe rod.

4. Drive the sampler with the attached probe rods to the top of the interval to be sampled.

5. Move probe unit back from the top of the probe rods to allow work room.

6. Remove drive cap and lower extension rods into inside diameter of probe rods using couplers to join rods together.

7. Attach extension rod handle to top extension rod.

8. Rotate extension rod handle clockwise until the leading extension rod is threaded into the piston stop in downhole.

9. Continue to rotate extension rod handle clockwise until reverse-threaded stop-pin has disengaged from the drive head.

10. Remove extension rods and attached stop-pin from the probe rods.

11. Replace drive cap onto top probe rod.

12. Mark the top probe rod with a marker or tape at the appropriate distance above the ground surface (dependent on sample tube length).

13. Drive probe rods and sampler the designated distance. Be careful not to overdrive the sampler which could compact the soil sample

in the tube, making it difficult to extrude.

Important: Documentation of sample location should include both surface and subsurface identifiers. Example: Correct Method - Sample Location S-6, 12.0' - 13.0'. Incorrect Method - Sample Location S-6, 12.0'.

14. Retract probe rods from the hole and recover the sample tube. Inspect the sample tube to confirm that a sample was recovered.

15. Disassemble sampler. Remove all parts.

16. Position extruder rack on the foot of the Geoprobe™ derrick.

17. Insert sample tube into extruder rack with the cutting end up.

18. Insert hammer anvil into hammer.

19. Position the extruder piston (wood dowel) and push sample out of the tube using the PROBE control on the Geoprobe™. Collect the sample as it is extruded in an appropriate sample container.

    Caution: use care when performing this task. Apply downward pressure gradually. Use of excessive force could result in injury to operator or damage to tools. Make sure proper diameter extruder piston is used.

20. To remove rods follow procedures outlined in Section 7.7.

7.11 Groundwater Sampling

1. Follow Sections 7.1 thorough 7.6 with the following exception: the Mill-Slotted Well Rod with attached threaded drive point should be the first section probed into the ground. Multiple sections of mill-slotted well rods can be used to provide a greater vertical section into which groundwater can flow.

2. Probe to a depth at which groundwater is expected.

3. Remove Drive Cap and insert an electric water-level indicator to determine if water has entered the slotted sections of probe rod. Refer to ERT SOP #2043, Water Level Measurement, to determine water level.

4. If water is not detected in the probe rods, replace the drive cap and continue probing. Stop after each additional probe length and determine if groundwater has entered the slotted rods.

5. After the probe rods have been driven into the saturated zone, sufficient time should be allowed for the water level in the probe rods to stabilize.

   Note: It will be difficult if not impossible to collect a groundwater sample in aquifer material small enough to pass through the slots (<0.02 inch diameter).

6. Groundwater samples may be collected with the 20-mL well Mini-Bailer or a pumping device. If samples are being collected for volatile organic analysis (VOA), the 20-mL Well Mini-Bailer should be used. If samples are being collected for a variety of analyses, VOA samples should be collected first using the bailer. Remaining samples can be collected by pumping water to the surface. Withdrawing water with the pump is more efficient than collecting water with the 20-mL well Mini-Bailer.

   Important: Documentation of sample location should include both surface and subsurface identifiers. Example: Sample Location GW-6, 17'-21' bgs, water level in probe rods is 17 feet bgs, and the leading section of probe rod is 21 feet bgs. The water sample is from this zone, not from 17 feet bgs or 21 feet bgs.

7. Remove rods following procedures outlined in Section 7.7.

8.0 CALCULATIONS

Calculating Vapor Purge Volume for Soil-Gas Sampling without Interior Tubing

Volume of Air to be Purged (Liters) = 300 x Number of Rods in the Ground

Volume in Liters/1000 = Reading on Vacuum Pump Instrument Gauge

9.0 QUALITY ASSURANCE/ QUALITY CONTROL

The following general QA procedures apply:

1. All data must be documented on field data sheets or within site logbooks.

2. All instrumentation must be operated in accordance with operating instructions as supplied by the manufacturer, unless otherwise specified in the work plan. Equipment checkout and calibration activities must occur prior to sampling/operation and they must be documented.

10.0 DATA VALIDATION

This section is not applicable to this SOP.

11.0 HEALTH AND SAFETY

When working with potentially hazardous materials, follow U.S. EPA, OSHA and the REAC site specific Health and Safety Plan. The following is a list of health and safety precautions which specifically apply to Geoprobe™ operation.

1. Always put vehicle in "park", set emergency the brake, and place chocks under the tires, before engaging remote ignition.

2. If vehicle is parked on a loose or soft surface, do not fully raise rear of vehicle with probe foot, as vehicle may fall or move.

3. Always extend the probe unit out from the vehicle and deploy the foot to clear vehicle roof line before folding the probe unit out.

4. Operators should wear OSHA approved steel-toed shoes and keep feet clear of probe foot.

5. Operator should wear ANSI approved hard hats.

6. Only one person should operate the probe machine and the assemble or disassemble probe rods and accessories.

7. Never place hands on top of a rod while it is under the machine.

8. Turn off the hydraulic system while changing rods, inserting the hammer anvil, or attaching accessories.

9. Operator must stand on the control side of the probe machine, clear of the probe foot and mast, while operating controls.

10. Wear safety glasses at all times during the operation of this machine.

11. Never continue to exert downward pressure on the probe rods when the probe foot has risen six inches off the ground.

12. Never exert enough downward pressure on a probe rod so as to lift the rear tires of the vehicle off the ground.

13. Always remove the hammer anvil or other tool from the machine before folding the machine to the horizontal position.

14. The vehicle catalytic converter is hot and may present a fire hazard when operating over dry grass or combustibles.

15. Geoprobe™ operators must wear ear protection. OSHA approved ear protection for sound levels exceeding 85 dba is recommended.

16. Locations of buried or underground utilities and services must be known before starting to drill or probe.

17. Shut down the hydraulic system and stop the vehicle engine before attempting to clean or service the equipment.

18. Exercise extreme caution when using extruder pistons (wooden dowels) to extrude soil from sample tubes. Soil in the sample tube may be compacted to the point that the extruder piston will break or shatter before it will push the sample out.

19. A dry chemical fire extinguisher (Type ABC) should be kept with the vehicle at <u>all</u> times.

12.0 REFERENCES

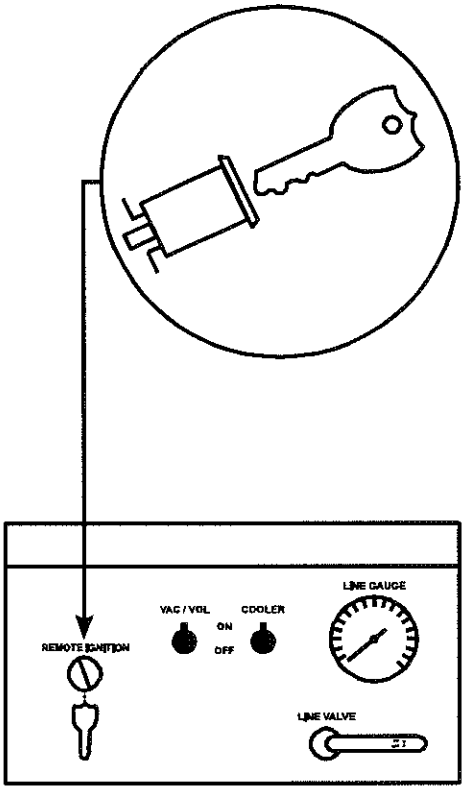
1. Model 5400 Geoprobe™ Operations Manual. Geoprobe™ Systems, Salina, Kansas. July 27, 1990.

2. Geoprobe™ Systems - 1995-96 Tools and Equipment Catalog.

APPENDIX A

Figures

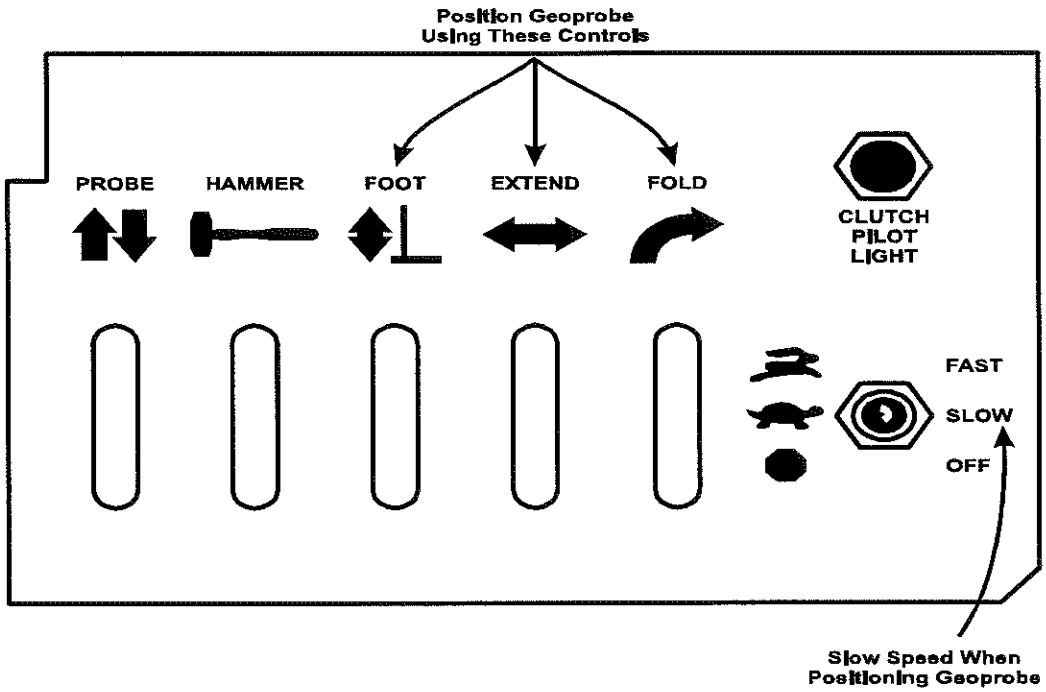
FIGURE 1. Electrical Control Panel



APPENDIX A (Cont'd)

Figures

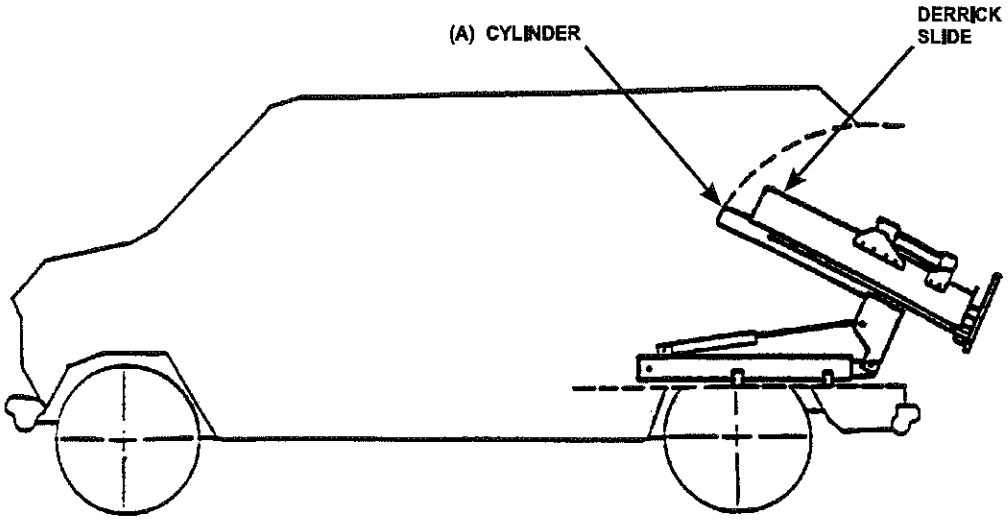
FIGURE 2. Hydraulic Control Panel



APPENDIX A (Cont'd)

Figures

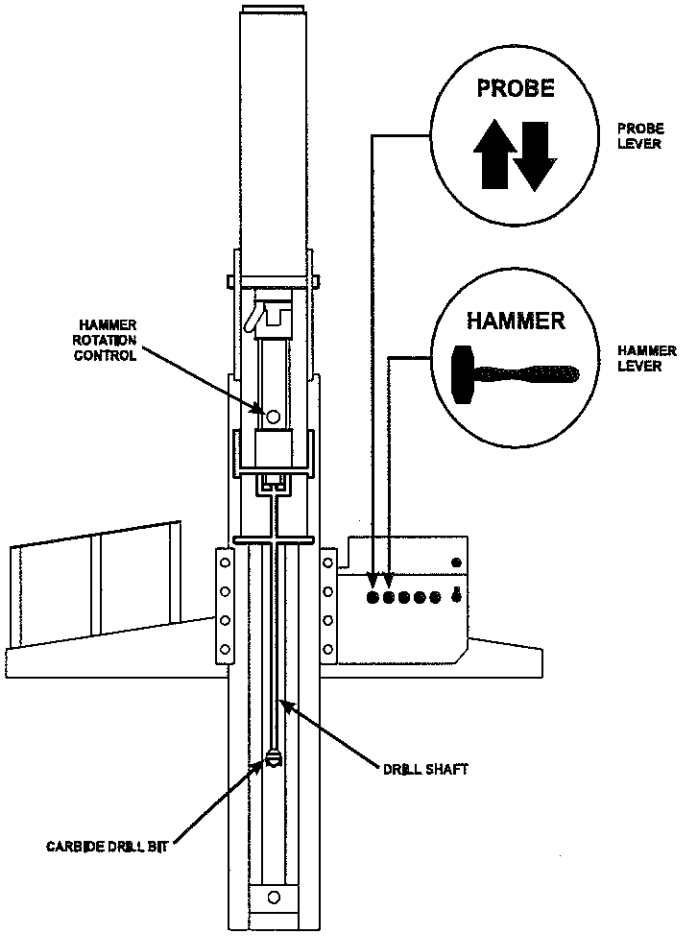
FIGURE 3. Deployment of Geoprobe™ from Sampling Vehicle



APPENDIX A (Cont'd)

Figures

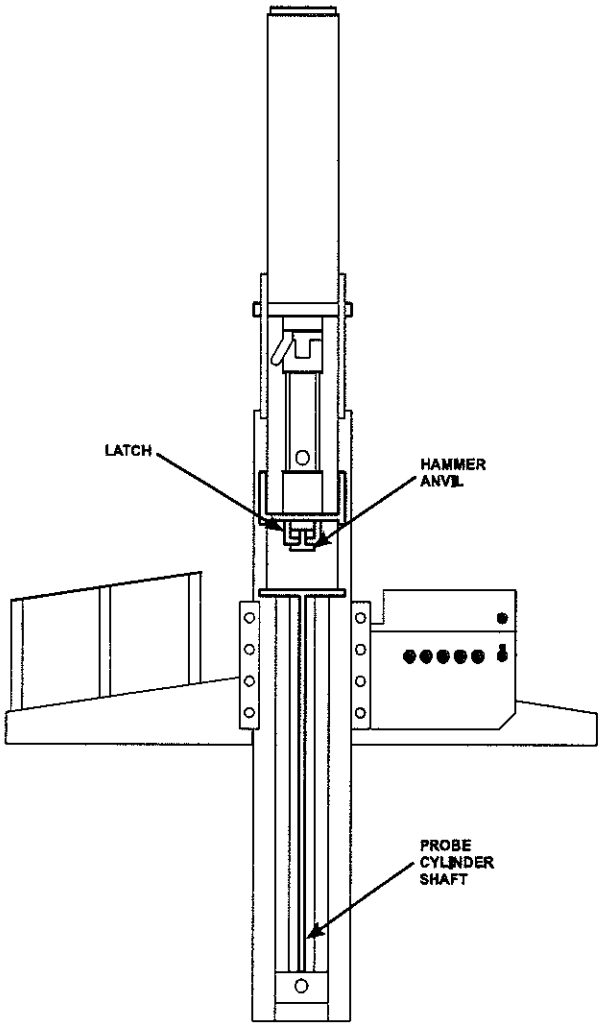
FIGURE 4. Geoprobe™ Setup for Drilling Through Concrete and Pavement



APPENDIX A (Cont'd)

Figures

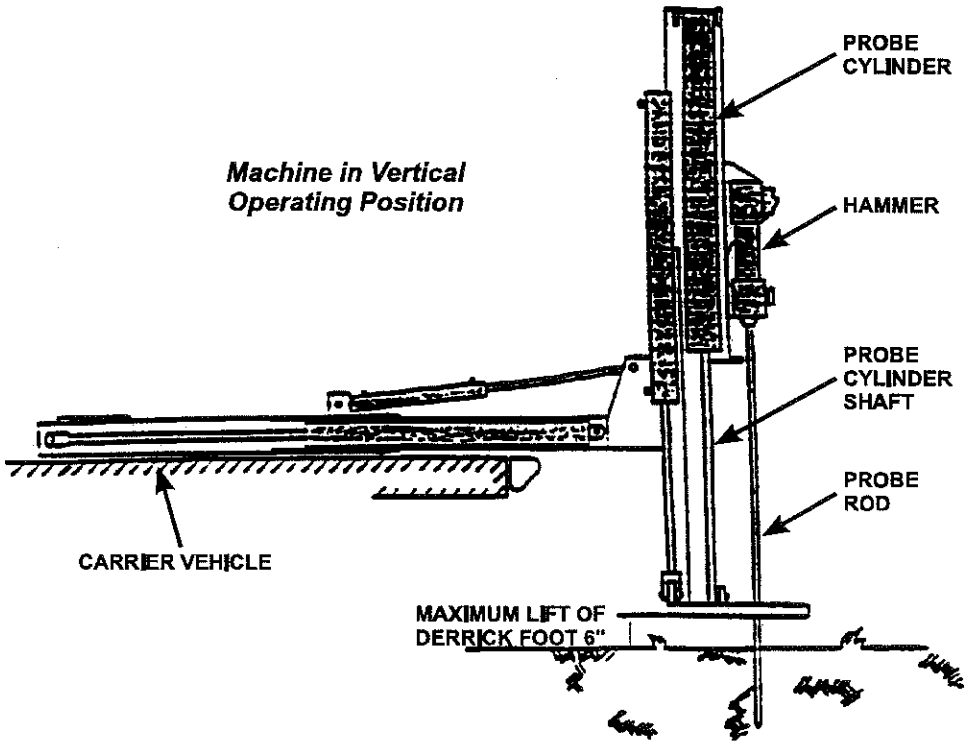
FIGURE 5. Inserting Hammer Anvil



APPENDIX A (Cont'd)

Figures

FIGURE 6. Probe Cylinder Shaft and Probe Rod - Parallel and Vertical



WM-VICKERY
MEETING
2/25/2000

NAME		TELE
STEVE LONNEMAN	WASTE MANAGEMENT - VICKERY	419-547-7791
Sandra Clark	" "	"
Michael Bedard	Earth Tech	215-244-7142
George Colvin	Cox-Colvin & Assoc	614-442-1970
Craig Cox	Cox-Colvin + Assoc.	614 442-1970
Megan Smith	US EPA	312 886-4446
Allen A. Debus	U.S. EPA	312-886-6186
MARIO MANGINO	U.S. EPA	" " -2589
JIM OTTARSON	Ohio EPA (by Cont. Phone)	
Dave Schilt	" " " " "	
Ed Schuessler	Tetra Tech	312/856-8700
Mary Wojciechowski	Tetra Tech	" "
THOMAS MATHESON	USEPA	312 886-7569
VIA TELEPHONE:		
JIM OTTARSON	OEPA/NWDO	419 373-3069
DAVE Schilt		

REVISED Agenda
WM-Vickery
Phase 2 RFI Meeting
February 25, 2000
9:00 am - 12 noon
U.S. EPA Region 5
Conf. Rm. 812
77 West Jackson Blvd.
Chicago, IL

Scheduled Attendees:

Thomas Matheson, USEPA
Mario Mangino, USEPA
Meagan Smith, USEPA
Al Debus, USEPA
Mary Wojciechowski, USEPA (Tetra Tech EMI)
Ed Schuessler, USEPA (Tetra Tech EMI)
Jim Ottarson, OEPA
Dave Schilt, OEPA

Stephen Lonneman, Waste Management
Sandra Clark, Waste Management
Craig Cox, Cox-Colvin & Assoc.
George Colvin, Cox-Colvin & Assoc.
Michael Bedard, Earth Tech

1. Introductions
   - Site Conceptual Model

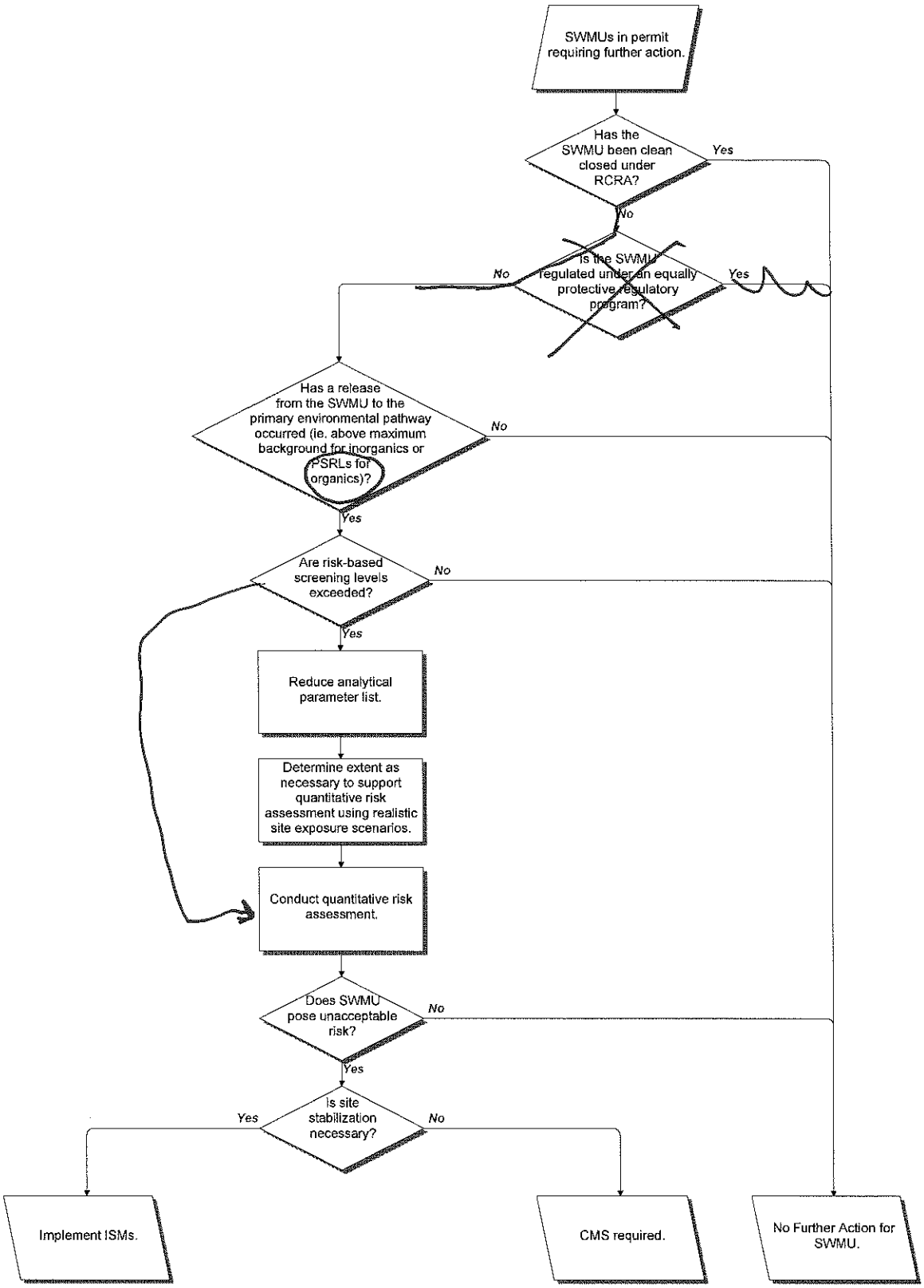
2. Usability of Previously Collected Data
   - RCRA Clean Closure Data vs. Corrective Action Needs
   - Background Values for Metals - Method of Comparisons
   - Use of Total Metals vs. Dissolved Metals Data for Bedrock Wells.
   - Lacustrine Groundwater Data

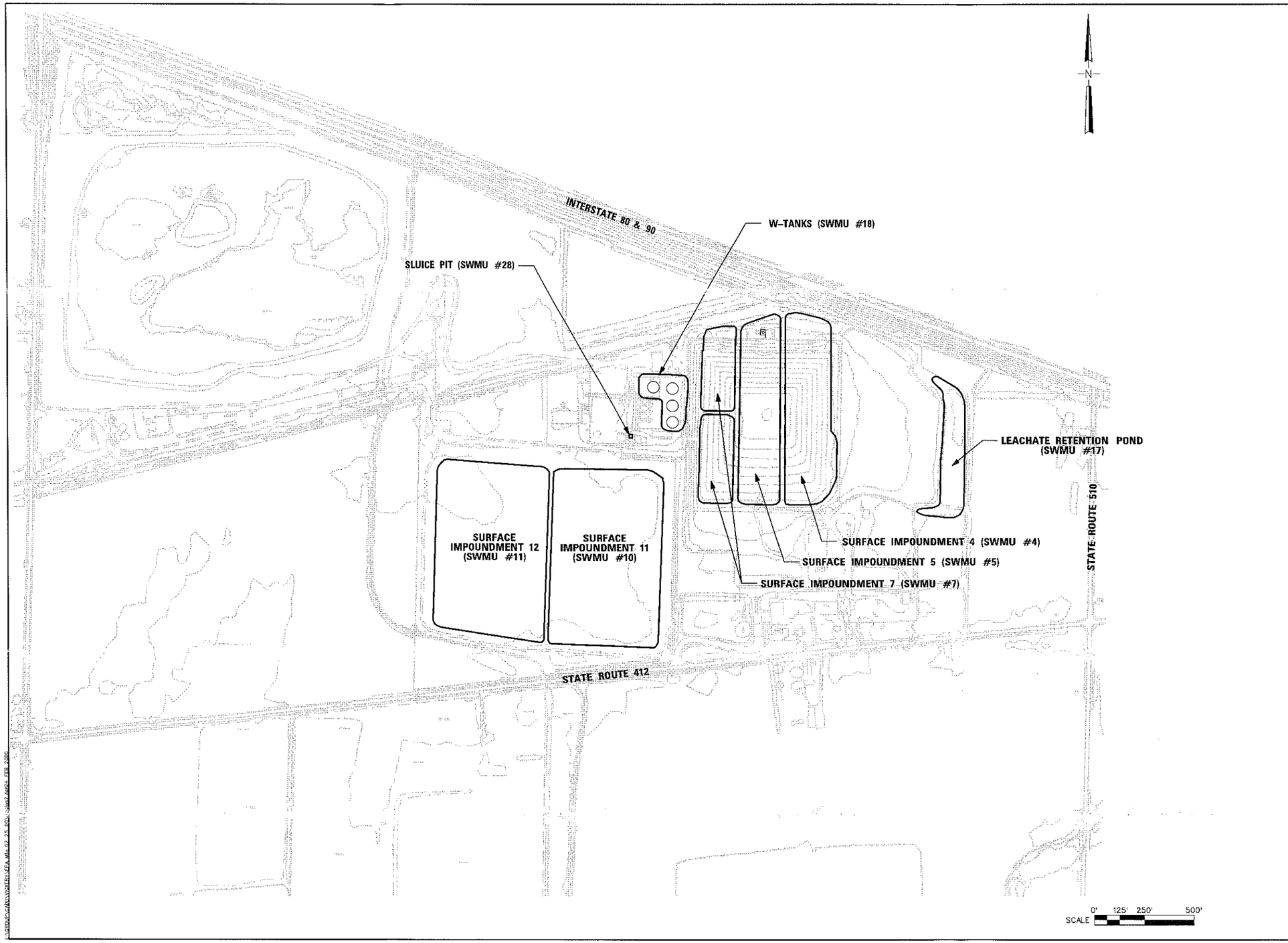
3. Phase 2 Activities
   - Risk Assessment Needs:
     - ✓ Ecological Assessment
     - ✓ Human Health Assessment

4. Phase 2 Pre-QAPP Requirements.

5. Environmental Indicators

RFI SWMU Screening Strategy, Waste Management of Ohio, Vickery, Ohio





NO	REVISIONS	DRN	CHK	DATE

4 NESHAMINY INTERPLEX
TREVOSE, PA 19053

DRN MFB
DES ARF
CHK ARF
APP MFB

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PREPARED FOR
WASTE MANAGEMENT OF OHIO, INC.

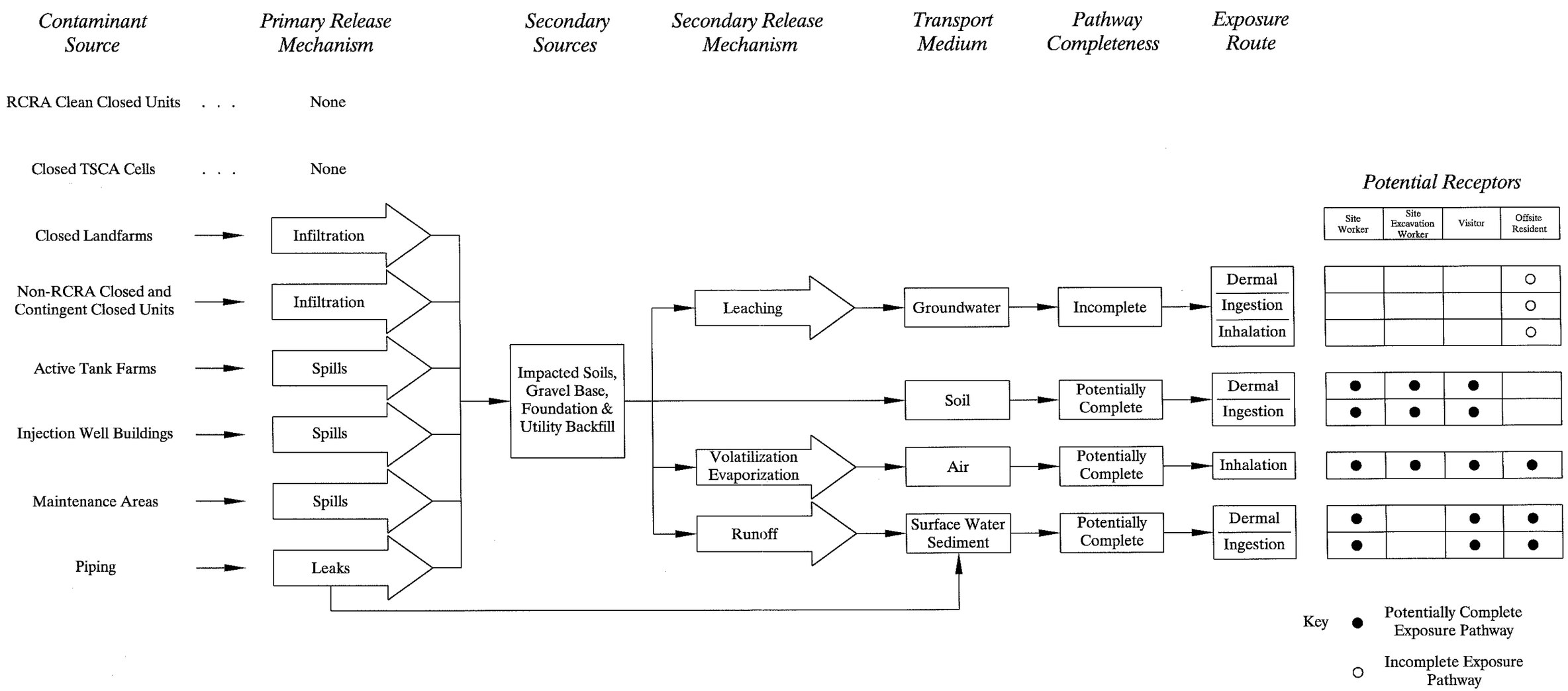
PREPARED BY
EARTH TECH

WM-VICKERY
PHASE I RFI
VICKERY, OHIO

LOCATIONS OF CLEAN-CLOSED
SOLID WASTE MANAGEMENT UNITS

DATE FEBRUARY 2000
PROJECT NO 33976
FILENAME ...\cinclos2.dgn
SHEET NO 1 OF 1
DRAWING NO
FIGURE A

DWG NAME: conceptual | DATE: 02/22/2000 | DRAWN BY: GAL | CHECKED BY: CAC | REVISION NO.:



Cox-Colvin & Associates, Inc.
Environmental Services

HUMAN HEALTH
Conceptual Site Exposure Model for the
Waste Management of Ohio - Vickery Site,
Waste Management of Ohio, Inc., Vickery, Ohio

Figure
1

Vickery Facility
A Waste Management Company
3956 State Route 412
Vickery, Ohio 43464
419-547-7791
Fax: 419-547-6144

AIRBORNE EXPRESS
Airbill # 3643930684

Mr. Thomas Matheson
U.S. Environmental Protection Agency Region V
DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60609

Re: Waste Management of Ohio, Inc. - Vickery, Ohio
OHD 020 273 819
RCRA Facility Investigation (RFI)

Dear Mr. Matheson:

Based on the discussions at the joint US EPA, Ohio EPA and Waste Management of Ohio, Inc. Vickery facility (WMO) meeting held on February 25, 2000, WMO has developed a schedule for actions items discussed at the meeting. As shown in the enclosesd Implementation Schedule, the Letter Report including the Response to Comments for the majority of the comments, the Lacustrine Position Paper and the Background Soil Sampling Addendum will be sent to you by March 24, 2000. Following Agency review and approval, the field work for the Phase IB background metals data collection will commence. Following this data collection period and re-screening of the data, the revised Phase I Report will be resubmitted which will include the revisions noted in the Letter Report submitted on March 24, 2000. Following the Agency's review and approval of the revised Phase I Report, WMO will commence preparation of the Phase II Scope of Work and Revised QAPjP. Please see the enclosed Implementation Schedule for additional detail.

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

If you have any questions, please contact Ms. Sandy Clark at (419)547-3335.

Sincerely,

WASTE MANAGEMENT OF OHIO, INC.

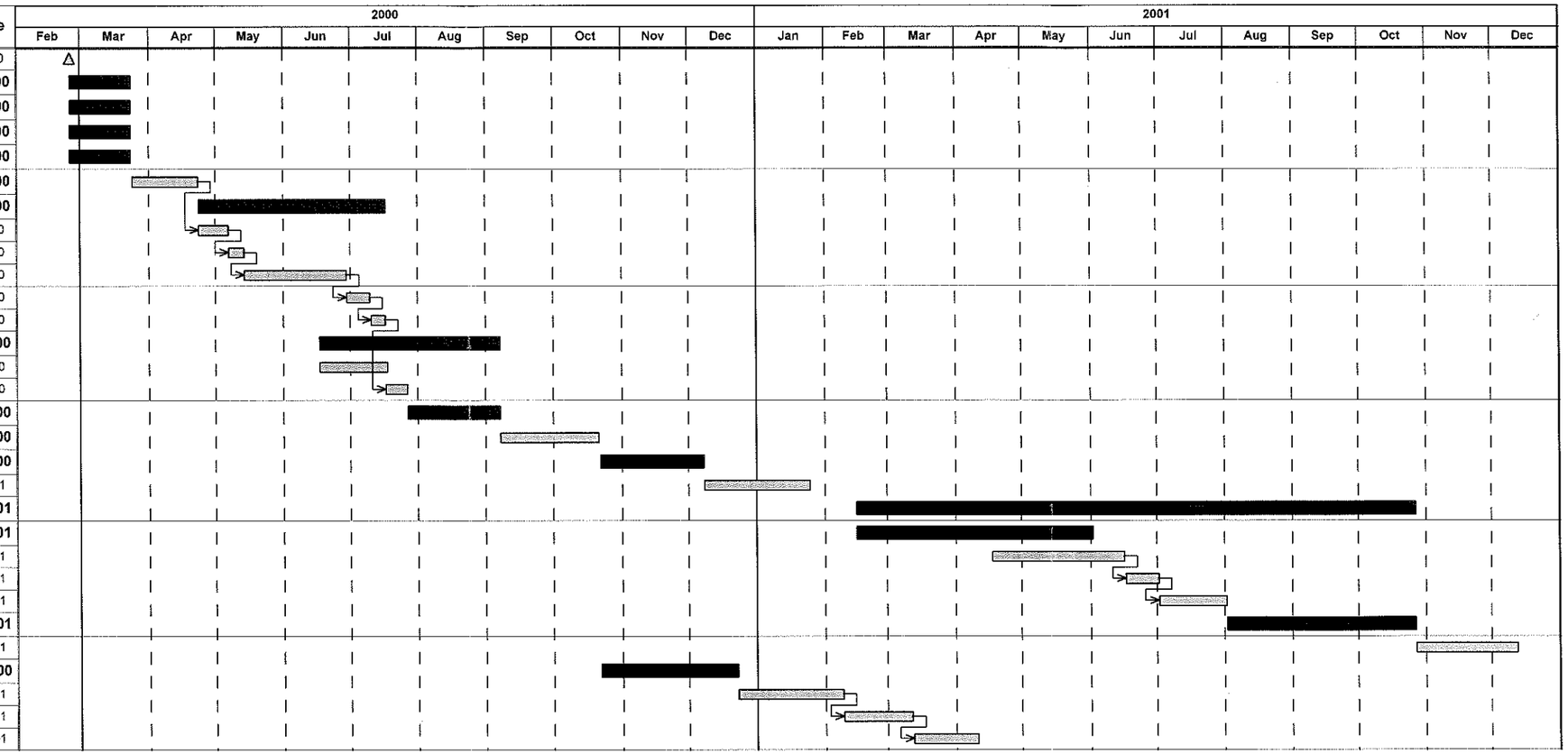
Stephen C. Lonneman
General Manager

Enclosure

SCL/slc

Phase IB and Phase II RFI Implementation Schedule
Waste Management of Ohio
Vickery, Ohio

Task Name	Start Date	Duration	End Date
USEPA Meeting	02/25/2000	0d	02/25/2000
Prepare Response to Comments & Bckgrd Adden	**02/25/2000**	**28.00d**	**03/23/2000**
+Prepare Response to Comments	**02/25/2000**	**28.00d**	**03/23/2000**
+Prepare Lacustrine Position Paper	**02/25/2000**	**28.00d**	**03/23/2000**
+Prepare Background Addendum	**02/25/2000**	**28.00d**	**03/23/2000**
***Agency Review and Approval**	**03/24/2000**	**30.00d**	**04/22/2000**
Phase IB (Background Metals)	**04/23/2000**	**83.00d**	**07/16/2000**
*Contracting and Mobilization	04/23/2000	14.00d	05/06/2000
Phase IB Field Work	05/07/2000	7.00d	05/13/2000
Laboratory Analysis	05/14/2000	45.00d	06/28/2000
Data Validation	06/29/2000	10.00d	07/09/2000
Statistical Review	07/10/2000	7.00d	07/16/2000
Revise Phase I Report	**06/17/2000**	**80.00d**	**09/06/2000**
Revise Non-Metals Sections of Report	06/17/2000	30.00d	07/17/2000
Screening for metals	07/17/2000	10.00d	07/26/2000
+Report Preparation	**07/27/2000**	**41.00d**	**09/06/2000**
***Agency Review**	**09/07/2000**	**45.00d**	**10/21/2000**
+Prepare Phase II Scope of Work (Revised QAPjP)	**10/22/2000**	**45.00d**	**12/07/2000**
*Agency Review and Approval	12/08/2000	45.00d	01/24/2001
RFI Phase II	**02/15/2001**	**250.00d**	**10/26/2001**
+Data Collection**	**02/15/2001**	**105.00d**	**06/01/2001**
Data Validation	04/17/2001	60.00d	06/16/2001
Data Evaluation	06/17/2001	15.00d	07/01/2001
Risk Evaluation	07/02/2001	30.00d	08/01/2001
+Report Preparation	**08/02/2001**	**85.00d**	**10/26/2001**
*Agency Review	10/27/2001	45.00d	12/12/2001
+Risk Assessment Technical Assumptions Memo	**10/22/2000**	**60.00d**	**12/22/2000**
*Agency Review	12/23/2000	45.00d	02/08/2001
Respond to Comments	02/09/2001	30.00d	03/11/2001
*Agency Review and Approval	03/12/2001	30.00d	04/10/2001



*Items contingent on agency approval may start sooner or later depending when the facility receives approval.
**Phase II data collection start date based on weather conditions which prevent field work before March 15. Data collection duration estimated due to unknown scope.

Cox-Colvin & Associates, Inc.

From: Wayne A. Pettyjohn <wpettyj@fullnet.net>
To: R5WST.R5RCRA(matheson-thomas)
Date: 5/30/96 12:17pm
Subject: Review CWM Work Plan

Review Of
RCRA Facility Investigation (RFI)
Phase I Work Plan
Chemical Waste Management
Vickery, Ohio

by

Wayne A. Pettyjohn
May 28, 1996

Review of the most recently revised Work Plan was both confusing and difficult because the report was not complete. It was not clear whether various graphics, such as water-level maps, were deleted or simply not included in the report.

The purpose of this RFI Phase I Work Plan "is specifically focused on determining if releases have actually occurred." The approach, as outlined in the text, does not appear capable of meeting this goal, at least relative to ground water, although the objectives could be achieved with minor modifications.

The purpose of my previous written remarks and subsequent conference call was to provide an understanding of the hydrogeologic system and the manner in which it functions at the Chemical Waste Management facility at Vickery, OH. The following is a brief review of these discussions.

It is a well known fact that glacial deposits in the U.S. are commonly weathered and oxidized to a depth of 20 to 30 feet. As a consequence, they contain an abundance of nearly vertical fractures or macropores that permit rather rapid transfer of water from the surface to the water table and below. In this zone of active ground-water circulation, the water is quite young. Below this depth the permeability of glacial deposits tends to rapidly decrease, water movement is very slow, and the water is in the range of 10,000 or so years old. These deposits of much lower permeability, so to speak, form the bottom of the box. The situation in deeper, consolidated rocks might be considerably different, however, depending on hydraulic parameters and recharge-discharge relations.

Four lines of evidence at the Chemical Waste Management site indicate that the conditions there are similar to those described in the above paragraph. First, the heads decrease with depth, equipotential lines on the vertical flow nets (Figure 4-24) are roughly parallel to land surface and

closely spaced below a depth of 20 feet or so, tritium data indicate a young water in the upper 20 feet, and, finally, according to
Golder Associates (March, 1982) shear strength changes significantly at a depth of about 25 feet.

What these facts indicate is that the upper 20-25 feet of the glacial material, be it lacustrine or ice deposited, is more permeable than the underlying unconsolidated sediments. This is the zone in which water movement, both vertically and horizontally, is most rapid. If there has been a release or releases at Chemical Waste Management, the contamination is most likely to be in these surficial deposits, and probably at a depth that is less than about 25 feet. The likelihood of detecting surface-origin contamination in the underlying rock aquifer is slight.

To determine if a release(s) has occurred at Chemical Waste
Management, one would need to use existing wells or install additional monitoring wells that are no more than about 20 feet deep, that is "L" wells. Their location or placement should be based on an examination of lacustrine water-level maps on which have been constructed a number of flow lines. The wells should be placed along flow lines that originate at the central part of an AOC or other potential source.

Water-level maps of lacustrine deposits indicate the presence of a ground-water mound, the crest of which trends roughly north northwest more or less through the central part of the closure cell. Flow lines extend generally east, north, and west from the divide. Several "L" monitoring wells lie on both sides of the divide. The wells for which sufficient data are clearly shown in the report include only L-17, L-18, L-19A, and L-25, but these wells have screens positioned so that the water table is below the top at least part of the time. If samples from all of the "L" wells are not contaminated, the possibility exists that the lacustrine deposits have not been significantly impacted. Water quality data are not available to me to make this determination.

The ground-water quality investigation part of the RFI Work Plan appears to be quite limited; apparently only five wells are proposed to be used for monitoring the entire facility. In addition, these wells are all bedrock wells, are probably not contaminated, and it is not likely that they would indicate a surface release. The deeper ground-water system is protected from contamination originating at the surface by the low permeability of the overlying glacial till.

With some significant exceptions, the vertical flow nets (Figure
4-24) represent a reasonable explanation of the ground-water flow system, considering the information on which they were based. The first exception is that hydrologic cross-sections or vertical flow nets should be constructed, as closely as possible, along flow lines, and the data points should be based on wells of different depth with short screens. This was not the case here. Secondly, the equipotential lines must bend upward, starting at a depth of about 20 feet or so, to reflect the horizontal flow in the zone of higher permeability. Presently, the flow nets indicate that all of the ground water is flowing downward through a zone of very low permeability. If this were actually the case, the rate of movement
(reportedly 100 years to reach the dolomite) would be so slow that precipitation and infiltration would soon turn the entire region into a lake. In addition, the hydrographs of both till wells and lacustrine wells indicate an annual fluctuation of several feet, which would be possible only if

most of the flow is horizontal.

Although most of the parts are available, a generalized description of the hydrogeologic system and the manner in which it functions has not been prepared. That is, it would be useful to have available a written, integrated section that relates precipitation, water-level fluctuation, ground-water movement, and water quality. A section of this type might well reduce confusion between parties. For example, water-level fluctuations in till wells and lacustrine wells are all very similar. Does this reflect the data base or is it a direct interaction of these two units? Why do the water-level contours of, for example, the lacustrine deposits differ from one time to the next? Or what concentrations of selected constituents are present in monitoring wells, and do they change from one sampling period to the next? Clearly, it is difficult to develop an adequate picture or understanding of ground-water movement and recharge/discharge without records from a continuous water-level recorder and a recording rain gage.

Specifically, precipitation data listed in Appendix C as Table 3 represent only 1995, yet the hydrographs generally extend from 1986 to mid
1995. Furthermore, the hydrographs not only have an unusual vertical scale, but the fluctuations are listed as "Concentration."

January 28, 2000

DW-8J

CERTIFIED MAIL: P 371 896 655
RETURN RECEIPT REQUESTED

Mr. Stephen C. Lonneman
General Manager
Waste Management of Ohio, Inc.
3956 State Route 412
Vickery, Ohio 43464

RE: Notice of Deficiency
RCRA Facility Investigation (RFI) Report
Waste Management of Ohio, Inc.
OHD 020 273 819

Dear Mr. Lonneman:

The United States Environmental Protection Agency (U.S. EPA) has conducted a technical review of the above-referenced report for the Waste Management of Ohio, Inc., facility in Vickery, Ohio. The report is dated October 1999 and was prepared by Earth Tech, Inc., for Waste Management of Ohio, Inc. The U.S. EPA reviewed the report to assess, (1) its technical adequacy and completeness, (2) its compliance with the Phase I RFI work plan for the facility, dated November 1997, (3) its compliance with applicable U.S. EPA RFI guidance, and (4) the need for a Phase II RFI at the facility.

Based on the technical review, the U.S. EPA determined the report contains errors and discrepancies and is missing some data. Also, the data in the report indicates that releases to soil and groundwater have occurred at various solid waste management units (SWMU) and areas of concern (AOC) at the facility. Therefore, U.S. EPA requires that a Phase II RFI be conducted at these SWMUs and AOCs to determine the extent of contamination.

General and specific deficiency comments on the report are provided in the enclosure. WMO is required to submit, within forty-five (45) days, its revised RFI Phase 1 Report, which addresses the enclosed deficiency comments and a RFI Phase 2 work plan and Quality Assurance Project Plan. WMO shall schedule a meeting with the U.S. EPA, to be held within twenty (20) days of receipt of this letter, to discuss WMO's responses to the deficiency comments and U.S. EPA's expectations for the Phase 2 RFI.

The modified Phase 1 RFI Report shall be prepared in accordance with the following editorial protocol or convention:

1. Old language is overstruck.

2. New language is in bold type.

3. Page headers must indicate date of submission.

4. If any significant changes are necessary, pages should be renumbered, table of contents revised, and complete sections provided as required.

5. An itemized list of all replacement pages, sections, tables, etc., that are to be replaced in the modified submission, shall be provided.

In addition to the two copies of each document provided to the U.S. EPA, please provide one copy of each to:

Edwin Lim	Chuck Hull
Ohio EPA, DHWM	Ohio EPA, NWDO
P.O. Box 1049	347 N. Dunbridge Rd.
Columbus, OH 43266-0149	Bowling Green, OH 43402

Further, please provide two copies of the documents in electronic format on Compact Discs (CD) to U.S. EPA and a copy to each of the two OEPA offices.

If you have any questions regarding what information is required, please contact me at (312) 886-7569.

Sincerely,

Thomas Matheson, Corrective Action Project Manager
Waste Management Branch

Enclosure

cc: Ed Lim, OEPA/CO
Chuck Hull, OEPA/NWDO

semivolatile organic compounds (SVOC), polychlorinated biphenyls (PCB), pesticides, herbicides, metals, cyanide, and sulfide as well as VOCs.

- Section 5.7.1.2 of the Phase I RFI work plan states that "select location" soils would be sampled from the ground surface to the point of borehole termination. However, Section 4.3.2.1 of the report states that "select location soils were sampled from three feet below the ground surface until borehole termination."

- The table of results in Section 5.3.3 of the report indicates that grid node samples were collected at depths ranging from 11 to 15 feet (ft) below ground surface (bgs) in SWMU 9, and Paragraph 1 on Page 10 states that the base of SWMU 9 was estimated to be about 20 ft bgs. This information is not consistent with Sections 4.3.2.2 and 5.7.1.1 of the Phase I RFI work plan, which state that grid node samples would be collected 2 to 4 ft below the base of the SWMU.

- Note 3 of QAPP Table 1-1 states that if PCBs were detected in soil samples at concentrations above the project reporting limit (PRL), those samples would also be analyzed for dioxins and furans. Appendix E of the report indicates that PCBs were detected at concentrations above the PRL in SWMU 42 soil sample SL01-01, but this sample was not analyzed for dioxins and furans.

2. The sampling locations shown in the report are not entirely consistent with those presented in the Phase I RFI work plan. The report should be revised to explain the sampling location deviations discussed below.

   - SWMU Group D - Figure 5-3.4b of the report indicates that grid node samples A2 and C3 were not collected at the center of the grid nodes as shown in work plan Figure 5-9.

   - SWMU Group F - Figure 5-3.6d of the report indicates that soil samples SF01-01 and SF02-01 in SWMU 35 and SF020-01 in SWMU 36 were not collected at the locations shown in work plan Figure 5-11.

   - SWMU Group G - Figure 5-3.7c of the report indicates that soil sample SF01-01 in SWMU 27 was not collected at the location shown in work plan Figure 5-12.

   - SWMU Group I - Figure 5-3.9 of the report indicates that grid node samples A1, C1, and C2 were not collected at the center of the grid nodes as shown in work plan Figure 5-14.

3. Figure 5-4.8 of the report shows that sediment samples were collected off site in the tributary to Little Raccoon Creek that flows around the facility's eastern boundary. This information does not comply with Section 5.10.8 of the Phase I RFI work plan, which states

validation of the April 1997 through April 1999 data is incomplete and the data is not consistent with the RFI data for the same wells, this historical data is not acceptable for use in the RFI.

7. The report does not contain monitoring well construction logs for the wells sampled prior to and during the Phase I RFI. The screened depth interval of each well must be known to determine whether the wells can be appropriately used to monitor migration of contaminants from potential source areas of varying depths that were identified during the Phase I RFI. Therefore, the report should be revised to include the monitoring well construction logs.

Use of RCRA Closure Data

8. The report states that data collected for the closure of SWMUs 4, 5, 7, 10, and 11 in SWMU Group B; SWMUs 18 and 28 in SWMU Group I; and AOC D is provided in Appendix G. However, the closure data provided in Appendix G is insufficient to meet corrective action requirements. Specifically, the closure reports in Appendix G lack the items discussed below.

   - The 1983 "Closed Lagoons" report contains no data for SWMUs 5, 7, 10, and 11 or AOC D. Also, the soil data provided for SWMU 4 does not include analytical data for all the Appendix IX parameters required in the RFI; only data for PCBs and extraction procedure (EP) toxic metals is included.

   - The 1992 "Closure of W-Tanks" report does not include a map showing soil sampling locations and depths. Also, the soil sample data does not include analytical data for all the Appendix IX parameters required in the RFI; only data for metals, cyanide, phenols, PCBs, and a limited list of VOCs is included.

   - The 1996 "Closure Report for Pump House, Tank Containment, and Sluice Pit" does not include a map showing soil sampling locations and depths.

   In addition, the data provided in Appendix G of the report generally lacks (1) quality control (QC) sample and data validation results and (2) documentation of sample preservation and transport methods. Based on the abovementioned deficiencies, the closure data in Appendix G is not acceptable for use in the RFI.

Use of Background Data

9. The report indicates that inorganic soil data was compared to average background concentrations and the range of background concentrations. For example, in SWMU Group F, arsenic concentrations were found to exceed the average background concentration. Section 5.3.6 states that although the average background concentration was exceeded, the

accurately transcribed into Appendix H and those results can be used as qualified. However, in two general cases, "R" flags for data that is not usable were not included in Appendix H.

The first case involves the calibrations, both initial and continuing, in the VOC and SVOC analyses. In all the analytical runs examined, a small number of analytes had relative response factors (RRF) less than 0.05. The analytes involved included chemicals well known to produce poor, irregular responses in the analytical system, such as acetone; acrolein; acetonitrile; 1,4-dioxane; and 4-nitroquinoline-N-oxide. The results for these analytes were generally nondetects and their reporting limits are qualified as estimates in Appendix H. However, EPA's 1994 "National Functional Guidelines for Organic Data Review" states that such low-RRF, nondetect results should be rejected. Appendix H should be revised to include the correct qualifiers for these analytes, and the text of the report should discuss the data gap associated with rejection of the results for these potential contaminants for all or most of the samples.

The second case involves the metal MS analyses. In several cases (involving samples S09:SL:GNE2-01, S16:SL:GND5-01, ACA:SL:SF05-01, S12:SL:GNF3-01, S15:SL:GNA1-01, and ACH:SL:SF02-01 and possibly other samples), the recovery of antimony from the MS was less than 30 percent. As noted in EPA's 1994 "National Functional Guidelines for Inorganic Data Review," such low recoveries indicate that nondetect results for the parent samples should be rejected. However, these results are qualified as "UJ" in Appendix H. The appendix should be revised to reflect rejection of these nondetect results, and the associated data gap should be discussed as necessary in the text of the report. Because this rejection applies to only the individual samples used in the MS analysis rather than all the samples analyzed in an analytical run, it will have far less effect on data completeness than the irregularities in the VOC and SVOC analysis calibrations.

RFI Data Presentation

13. The sample summary tables provided in Sections 5.3 and 5.4 of the report present only the numbers of investigative and QC samples collected in a particular SWMU group or AOC. These tables should be revised to provide more detailed descriptions of the samples collected. Specifically, the tables should be expanded to show the identification number, collection depth, and analyses performed for each sample collected during Phase I of the RFI.

14. Section 4.3.2.2 of the report states that grid node samples in SWMU Groups A, C, and D and SWMU 15 were collected approximately 2 to 4 ft below the SWMU base. However, it cannot be determined whether samples were actually collected at this depth because the

revised to discuss these exceedances. Also, the text states that soil sample S03:SL:SL01 was collected to determine the vertical extent of contamination, but no analytical results are presented in Appendix D or E to support this statement. The report should be revised to present the analytical results for this soil sample in order to demonstrate that the vertical extent of contamination has been determined.

2. **Section 5.3.1, Page 5, Paragraph 2.** The text states that the benzene concentration in a soil sample collected at grid node B5 in SWMU 2 was above the PRG. The text also states that this exceedance may be the result of "smearing" of contamination from the base of the surface impoundment. This explanation is questionable because the soil sample was collected at a depth of 21 to 23 ft bgs and Page 4 states that the base of the surface impoundment is estimated to be 9 to 12 ft bgs. Additional soil samples should be collected to determine the extent of contamination from 12 to 21 ft bgs. In addition, the level of contamination present in the sample collected from 21 to 23 ft bgs requires that additional soil samples be collected at greater depths to determine whether a release to the environment has taken place.

3. **Section 5.3.2, Page 8, Paragraph 1**. The text states that the sample analytical results do not indicate a significant impact on the wells downgradient of SWMU Group B. This statement is not supported by the results for well L-25, which are shown in Figure 5-3.2d. The text should be revised to discuss the results from well L-25. Furthermore, well L-17 should be resampled and additional samples should be collected downgradient of well L-25 to assess the impact of SWMU Group B on the lacustrine aquifer.

4. **Section 5.3.2, Page 8, Paragraph 1**. The text states that "the sampling results do not indicate a significant impact from the facility in the sampled downgradient wells." As discussed in General Comment 10, the table on Page 8 should be revised to include metals detected in downgradient monitoring wells at concentrations exceeding background groundwater concentrations in the upgradient wells. Analytical results indicate that metal concentrations in downgradient wells L-19A, L-20, and L-25 exceeded background metal concentrations in upgradient well L-26. These analytical results indicate that past operations in SWMU Group B have impacted groundwater quality in the lacustrine deposits at the facility. Sections 5.3.2 and 7.2.1 should be revised to reflect these findings.

5. **Section 5.3.2, Page 8, Paragraph 1**. The text states that "the results show evidence of impact in L-26, one of the wells upgradient of the TSCA Closure Cell. This may be due to facility activities in the area." The analytical results indicate that groundwater quality in the lacustrine deposits near well L-26 has been impacted. The text should be revised to state whether the organics detected in well L-26 are related to past operations associated with a specific SWMU group or current activities not related to a SWMU group. Sections 5.3.2 and 7.2.1 should be revised accordingly.

"The 1993 data, although it could not be fully validated at this time, showed the presence of nickel, and lesser occurrences of chromium and lead, in some of the lacustrine wells. However, the data (see Appendix F) did not display a trend or pattern that could be clearly attributable to impact from the facility; in fact, the concentrations of some of these parameters were higher in the upgradient well." Although some parameters were present at higher concentrations in upgradient well L-26, most detections of nickel, chromium, and lead in the monitoring wells downgradient of SWMU Group B exceeded the concentrations in well L-26. These findings indicate that SWMU Group B has impacted groundwater quality in the lacustrine deposits underlying the facility. Sections 5.6 and 7.2.3 should be revised to reflect these findings.

13. **Section 5.6, Page 33, Paragraph 3**. The 1997-1999 historical data summary states the following: "With the exception of conductivity and pH, no detections were noted in any of the samples. The downgradient wells (MW-14R, MW-15R, MW-16R, MW-20R, MW-30R, and MW-36R) monitor groundwater in the bedrock beneath the site and are downgradient of the TSCA closure cell and SWMU Group A. The upgradient wells (MW-24R and MW-37R) were used as background reference points for this evaluation." Review of the historical data reveals the following detections in the monitoring wells indicated: phenols at 0.01 microgram per liter (μg/L) in MW-15R and chromium-total at 10.3 μg/L in MW-16R during the October 1997 sampling event; nickel-total at 83.6 μg/L in MW-24R during the April 1998 sampling event; and arsenic at 10.2 μg/L in MW-30R during the April 1999 sampling event. The constituent concentrations detected in wells MW-15R, MW-16R, and MW-30R during the October 1997 and April 1999 sampling events exceeded background groundwater concentrations in upgradient well MW-24R. Sections 5.6 and 7.2.3 should be revised to reflect these findings.

14. **Section 7.2.1, Page 3, SWMU Group B**. As discussed in General Comment 10 and Specific Comments 3, 4, 5, 6, and 13, sample analytical results indicate that past operations at SWMU Group B and activities near monitoring well L-26 have impacted groundwater quality in the lacustrine deposits underlying the facility. The text should be revised to reflect this information.

15. **Section 7.2.3, Page 8, Paragraph 3**. The text states that "the April and October 1997 and April 1998 monitoring data demonstrate that there is no detectable impact on bedrock groundwater quality from the features monitored by the bedrock wells." As discussed in Specific Comment 13, concentrations of several constituents detected in downgradient monitoring wells during the October 1997 and April 1999 sampling events exceeded background groundwater concentrations in upgradient monitoring well MW-24R. The text should be revised to reflect these findings.

TABLE E-1 (Continued)

PHASE I RFI FINDINGS AND CONCLUSIONS AND REQUIRED PHASE II RFI ACTIVITIES

Area to be Investigated	Phase I Findings	Phase I Conclusions	Required Phase II Activities
SWMU Group A (SWMU 3)	Several VOCs were found in soil at concentrations above the PRGs near the northwestern SWMU boundary at select location SL02-03 at a depth of 6 to 8 ft bgs.	Because samples were collected within fixed waste materials, this was an expected finding.	The sample was collected near the SWMU perimeter. Although the finding was expected, the lateral and vertical extent of soil contamination northwest of the sampling location should be delineated.
SWMU Group A (SWMU 16)	Dieldrin was found in soil at a concentration above its PRG at select location SL02-03 at a depth of 6 to 8 ft bgs.	Because the sample was collected within fixed waste materials, this was an expected finding.	Although the sample was collected within fixed waste materials, the vertical extent of contamination should be delineated.
SWMU Group C (SWMU 9)	Grid node samples were not collected 2 to 4 ft below the SWMU base as called for in the Phase I RFI work plan.	There was no evidence of contamination beneath the SWMU base.	The work plan was not followed. Grid node locations should be resampled at the correct depth intervals.
SWMU Group D (SWMU 12)	Benzo(a)pyrene was found in soil at concentrations above its PRG near the eastern SWMU boundary at grid node location GNF2-01 at a depth of 2.5 to 4.5 ft bgs.	Because only one sample exceeded the PRG, there was no widespread impact from this SWMU.	The sample was collected near the SWMU perimeter. Therefore, the lateral and vertical extent of soil contamination of this location should be delineated.
SWMU Group F (SWMU 40)	Chromium was found in soil at a concentration above its PRG near the southern SWMU boundary at surface location SF02-01 at a depth of 0 to 2 ft bgs.	There was no evidence of contamination from this SWMU.	The chromium concentration in the sample, which was collected outside the SWMU perimeter, was almost two times greater than the PRG. Therefore, the lateral and vertical extent of soil contamination south of this location should be delineated.

TABLE E-1 (Continued)

PHASE I RFI FINDINGS AND CONCLUSIONS AND REQUIRED PHASE II RFI ACTIVITIES

Area to be Investigated	Phase I Findings	Phase I Conclusions	Required Phase II Activities
AOC A	Several polyaromatic hydrocarbons (PAH) were found in soil at concentrations above their PRGs near the western AOC boundary at surface location SF15-01.	The contaminants are related to asphalt paving.	The report does not discuss asphalt paving in relation to this AOC. Therefore, the lateral and vertical extent of soil contamination west of this location should be delineated.
AOC B	Several PAHs and chromium were found in soil at concentrations above their PRGs near the northwestern AOC boundary at surface location SF01-01.	The PAHs are related to asphalt paving. The chromium was interpreted as being naturally occurring.	The report does not discuss asphalt paving in relation to this AOC. Therefore, the lateral and vertical extent of soil contamination northwest of this location should be delineated.
AOC D	Clean closure data is provided in Appendix G.	This AOC was clean-closed.	As stated in General Comment 8, the clean closure data is not acceptable for use in the RFI. Soil samples should be collected in this AOC.
AOC H	Figure 5-4.8d shows that sediment samples were collected off site in the tributary to Little Raccoon Creek that flows around the facility's eastern boundary. This information does not comply with Section 5.10.8 of the Phase I RFI work plan, which states that sediment samples would be collected downstream of the confluence of Meyers Ditch (which flows off site from the facility's north-central boundary) and Little Raccoon Creek.	No impact was evident in the sediment samples.	The Phase I RFI work plan was not followed. Sediment samples should be collected at the correct locations.

The modified Phase 1 RFI Report shall be prepared in accordance with the following editorial protocol or convention:

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2. New language is in bold type.

3. Page headers must indicate date of submission.

4. If any significant changes are necessary, pages should be renumbered, table of contents revised, and complete sections provided as required.

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If you have any questions regarding what information is required, please contact me at (312) 886-7569.

Sincerely,

Thomas Matheson, Corrective Action Project Manager
Waste Management Branch

Enclosure

cc: Ed Lim, OEPA/CO
Chuck Hull, OEPA/NWDO

TECHNICAL DEFICIENCY COMMENTS ON "RCRA FACILITY INVESTIGATION (RFI) PHASE I REPORT" WASTE MANAGEMENT OF OHIO, INC., VICKERY, OHIO

The United States Environmental Protection Agency (U.S. EPA) has completed a technical review of the above-referenced report for the Waste Management of Ohio, Inc. (WMO), facility in Vickery, Ohio. The report is dated October 1999 and was prepared by Earth Tech, Inc., for Waste Management of Ohio, Inc. The report was reviewed to assess (1) its technical adequacy and completeness, (2) its compliance with the Phase I RFI work plan for the facility dated November 1997, (3) its compliance with applicable U.S. EPA RFI guidance, and (4) the need for a Phase II RFI at the facility.

Based on the review, the U.S. EPA determined the report contains errors and discrepancies and is missing some data. Also, the data in the report indicates that releases to soil and groundwater have occurred at various solid waste management units (SWMU) and areas of concern (AOC) at the facility. Therefore, the U.S. EPA determined a Phase II RFI be conducted at these SWMUs and AOCs to determine the extent of contamination.

The general and specific deficiency review comments on the report are provided below. The general comments pertain to major deficiencies noted in the report. The specific comments pertain to particular sections, pages, and paragraphs of the report. The first full paragraph on a page is identified as "Paragraph 1." A paragraph that carries over from a previous page is identified as "Paragraph 0."

GENERAL COMMENTS

Major deficiencies in the report pertain to (1) compliance with the Phase I RFI work plan and quality assurance project plan (QAPP), (2) use of historical groundwater data, (3) use of Resource Conservation and Recovery Act (RCRA) closure data, (4) use of background data, (5) data validation, (6) RFI data presentation, and (7) recommendations for a Phase II RFI. These deficiencies are discussed in the general comments presented below.

Compliance with Phase I RFI Work Plan and QAPP

1. The report indicates that several deviations from the Phase I RFI work plan and QAPP occurred. The report should be revised to explain the deviations discussed below.

    - QAPP Table 1-1 indicates that background soil samples would be collected from 10 locations. However, Table 5-2 and Figure 5-2.1a of the report show analytical results for background samples collected at only five locations (BGSBG01, BGSBG03, BGSBG05, BGSBG06, and BGSBG07).

    - Based on the data provided in Appendix H of the report, samples collected from monitoring well L-17 were analyzed only for volatile organic compounds (VOC). However, QAPP Table 1-1 indicates that all groundwater samples would be analyzed for

semivolatile organic compounds (SVOC), polychlorinated biphenyls (PCB), pesticides, herbicides, metals, cyanide, and sulfide as well as VOCs.

- Section 5.7.1.2 of the Phase I RFI work plan states that "select location" soils would be sampled from the ground surface to the point of borehole termination. However, Section 4.3.2.1 of the report states that "select location soils were sampled from three feet below the ground surface until borehole termination."

- The table of results in Section 5.3.3 of the report indicates that grid node samples were collected at depths ranging from 11 to 15 feet (ft) below ground surface (bgs) in SWMU 9, and Paragraph 1 on Page 10 states that the base of SWMU 9 was estimated to be about 20 ft bgs. This information is not consistent with Sections 4.3.2.2 and 5.7.1.1 of the Phase I RFI work plan, which state that grid node samples would be collected 2 to 4 ft below the base of the SWMU.

- Note 3 of QAPP Table 1-1 states that if PCBs were detected in soil samples at concentrations above the project reporting limit (PRL), those samples would also be analyzed for dioxins and furans. Appendix E of the report indicates that PCBs were detected at concentrations above the PRL in SWMU 42 soil sample SL01-01, but this sample was not analyzed for dioxins and furans.

2. The sampling locations shown in the report are not entirely consistent with those presented in the Phase I RFI work plan. The report should be revised to explain the sampling location deviations discussed below.

   - SWMU Group D - Figure 5-3.4b of the report indicates that grid node samples A2 and C3 were not collected at the center of the grid nodes as shown in work plan Figure 5-9.

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3. Figure 5-4.8 of the report shows that sediment samples were collected off site in the tributary to Little Raccoon Creek that flows around the facility's eastern boundary. This information does not comply with Section 5.10.8 of the Phase I RFI work plan, which states

that sediment samples would be collected downstream of the confluence of Meyers Ditch (which flows off site from the facility's north-central boundary) and Little Raccoon Creek. These samples should be collected in the correct locations during Phase II of the RFI.

Use of Historical Groundwater Data

4. The report uses one round of RFI groundwater analytical data collected in May 1999 and nine rounds of historical groundwater analytical data collected in January 1993, April 1993, July 1993, October 1993, April 1997, October 1997, April 1998, October 1998, and April 1999 for lacustrine and bedrock monitoring wells to evaluate releases to groundwater at the facility. However, the April 1997 groundwater analytical data is missing from Appendix F of the report. Also, groundwater elevations for monitoring wells sampled in October 1998, April 1999, and May 1999 are missing from the report. The report should be revised to include (1) the April 1997 groundwater analytical data, (2) an additional table showing groundwater elevations at each monitoring well sampled during all ten rounds of groundwater sampling, and (3) potentiometric surface maps for both the lacustrine and bedrock aquifers developed using the groundwater elevation data.

5. Section 5.6 and Appendix F of the report state that the 1993 historical groundwater data could not be validated. Therefore, this data is useful for decision-making purposes only if it is consistent with validated data obtained during other rounds of groundwater sampling at the same locations. Section 5.6 also states that the 1993 data indicates the presence of nickel, chromium, and lead in some of the lacustrine wells sampled. However, data collected during the Phase I RFI indicates the presence of several additional metals, VOCs, and cyanide in the same wells. Because the 1993 data was not validated and is not consistent with the RFI data obtained for the same wells, the 1993 data is not acceptable for use in the RFI.

6. The data validation of the historical groundwater data for bedrock wells and the capillary drain collected from April 1997 through April 1999, which is discussed in Appendix F of the report, considers only surrogate recoveries, matrix spike (MS)/MS duplicate results, laboratory control sample data, and blank data. However, the introduction to the data validation reports for current RFI data in Appendix I notes that the "main issues" that led to qualification of this fully validated data were holding times, calibrations, and internal standard responses. None of these additional criteria was considered in the validation of the historical groundwater data; therefore, the validation of the historical groundwater data must be considered incomplete. For this reason, the April 1997 through April 1999 historical groundwater data is useful for decision-making purposes only if it is consistent with fully validated data for the same sampling locations. Appendix F indicates that the April 1997 through April 1999 data contained detections of phenols and nickel in the capillary drain and MW-24R, respectively. However, RFI data indicates the presence of cyanide in the capillary drain and antimony, chromium, silver, and SVOCs in MW-24R. Because the

validation of the April 1997 through April 1999 data is incomplete and the data is not consistent with the RFI data for the same wells, this historical data is not acceptable for use in the RFI.

7. The report does not contain monitoring well construction logs for the wells sampled prior to and during the Phase I RFI. The screened depth interval of each well must be known to determine whether the wells can be appropriately used to monitor migration of contaminants from potential source areas of varying depths that were identified during the Phase I RFI. Therefore, the report should be revised to include the monitoring well construction logs.

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   In addition, the data provided in Appendix G of the report generally lacks (1) quality control (QC) sample and data validation results and (2) documentation of sample preservation and transport methods. Based on the abovementioned deficiencies, the closure data in Appendix G is not acceptable for use in the RFI.

Use of Background Data

9. The report indicates that inorganic soil data was compared to average background concentrations and the range of background concentrations. For example, in SWMU Group F, arsenic concentrations were found to exceed the average background concentration. Section 5.3.6 states that although the average background concentration was exceeded, the

arsenic concentrations were still within the observed range of background concentrations. This method of comparison is not statistically valid. To provide a more statistically valid comparison, the 95 percent upper confidence limit for the background concentrations of each inorganic constituent should be calculated and then used as a basis of comparison for each investigative sample result. The report should be revised accordingly.

10. Section 5.3.2 of the report, which discusses groundwater sample analytical results, states that the table presented on Page 8 "presents all detections, in contrast to other tables within this section, to illustrate the quality of the downgradient samples as compared to two wells upgradient of the Closure Cell (L-26 and MW-24R). Exceedances of Region 5 DQLs for groundwater, which are the applicable standards in accordance with the WP, are shown in bold." According to the QAPP, background groundwater concentrations in upgradient wells (L-26 and MW-24R) are the applicable standards for metals detected in the lacustrine and bedrock wells. EPA Region 5 data quality levels (DQL) are the applicable standards for organics detected in the lacustrine and bedrock wells. According to analytical data provided in Appendix D, Appendix E, Figure 5-3.2c, and Figure 5-3.2d of the report, downgradient lacustrine wells L-19A, L-20, and L-25 and the capillary drain contain metal concentrations that exceed the background concentrations in upgradient well L-26. However, these results are not shown on the table on Page 8. For each downgradient monitoring well, the table on Page 8 should be revised to include all metals whose concentrations exceed background groundwater concentrations in the upgradient wells. Also, Sections 5.3.2 and 7.2.1 should be revised to discuss metals whose concentrations exceed background groundwater concentrations.

Data Validation

11. During review of data in Appendix H of the report, many cases were noted in which field duplicate samples had concentrations quite different from those of their primary samples. For instance, the lead concentration in sample S49:SL:SF01-01 was 11.3 milligrams per kilogram (mg/kg), but that in its field duplicate, sample S49:SL:SF01-01-FD, was 537 mg/kg, almost 50 times as much. The repeated instances of major variations imply considerable heterogeneity in the distribution of the various analytes in the materials sampled. With such high heterogeneity, it is not clear whether the primary sample result, the field duplicate sample result, or the average of the two results more closely reflects the true concentration in a given area. To be conservative, the higher result for each analyte in each field duplicate pair should be used for decision-making. When more information on localized variations in concentrations is available, it may be possible to adopt less conservative measures, but considerably more data will be required to support such a change in procedure. The report should be revised accordingly.

12. Review of Appendix I of the report revealed that the validation of data collected during the Phase I RFI was generally well done. In most instances, the validation results were

accurately transcribed into Appendix H and those results can be used as qualified. However, in two general cases, "R" flags for data that is not usable were not included in Appendix H.

The first case involves the calibrations, both initial and continuing, in the VOC and SVOC analyses. In all the analytical runs examined, a small number of analytes had relative response factors (RRF) less than 0.05. The analytes involved included chemicals well known to produce poor, irregular responses in the analytical system, such as acetone; acrolein; acetonitrile; 1,4-dioxane; and 4-nitroquinoline-N-oxide. The results for these analytes were generally nondetects and their reporting limits are qualified as estimates in Appendix H. However, EPA's 1994 "National Functional Guidelines for Organic Data Review" states that such low-RRF, nondetect results should be rejected. Appendix H should be revised to include the correct qualifiers for these analytes, and the text of the report should discuss the data gap associated with rejection of the results for these potential contaminants for all or most of the samples.

The second case involves the metal MS analyses. In several cases (involving samples S09:SL:GNE2-01, S16:SL:GND5-01, ACA:SL:SF05-01, S12:SL:GNF3-01, S15:SL:GNA1-01, and ACH:SL:SF02-01 and possibly other samples), the recovery of antimony from the MS was less than 30 percent. As noted in EPA's 1994 "National Functional Guidelines for Inorganic Data Review," such low recoveries indicate that nondetect results for the parent samples should be rejected. However, these results are qualified as "UJ" in Appendix H. The appendix should be revised to reflect rejection of these nondetect results, and the associated data gap should be discussed as necessary in the text of the report. Because this rejection applies to only the individual samples used in the MS analysis rather than all the samples analyzed in an analytical run, it will have far less effect on data completeness than the irregularities in the VOC and SVOC analysis calibrations.

RFI Data Presentation

13. The sample summary tables provided in Sections 5.3 and 5.4 of the report present only the numbers of investigative and QC samples collected in a particular SWMU group or AOC. These tables should be revised to provide more detailed descriptions of the samples collected. Specifically, the tables should be expanded to show the identification number, collection depth, and analyses performed for each sample collected during Phase I of the RFI.

14. Section 4.3.2.2 of the report states that grid node samples in SWMU Groups A, C, and D and SWMU 15 were collected approximately 2 to 4 ft below the SWMU base. However, it cannot be determined whether samples were actually collected at this depth because the

report does not clearly specify the depth at which the base of each SWMU was encountered. For example, for SWMU Group A, which contains five former surface impoundments, Section 5.3.1 states that the depth of the bases of the impoundments ranges from 9 to 12 ft bgs. This section should be revised to identify the specific depth at which the base was encountered during drilling activities for each surface impoundment. Also, for SWMU Group C, Section 5.3.3 does not identify a depth for the base of SWMU 19. In addition, no base depths are provided for the SWMUs in SWMU Group D or for SWMU 15 in SWMU Group I. The report should be revised to specify the base depth for each SWMU.

15. The report states that in SWMUs 1, 3, 9, 12, 14, 16, and 43, additional soil samples were collected to delineate the vertical extent of contamination. However, the collection depth for these additional samples is not always specified. For example, Section 5.3.3 states that sample S09:SL:SL02-11 was collected to determine the vertical extent of contamination, but the collection depth for this sample is not specified. The report should be revised to specify the collection depth for each sample collected to delineate the vertical extent of contamination.

16. There are many inconsistencies between the data presented in the tables and figures of Section 5.0. For example, Figure 5-3.1c indicates that chlorobenzene was detected in soil in SWMU 2 at a concentration of 300,000 micrograms per kilogram (μg/kg), (which is above the preliminary remediation goal [PRG] of 183,370 μg/kg). However, this result is not reported in the table provided in Section 5.3.1. Similarly, the table in Section 5.3.2 lists no detections of inorganics in groundwater samples collected from monitoring well L-25, but Figure 5-3.2d lists several inorganics detected in this well. Section 5.0 and the rest of the report should be thoroughly checked and revised as necessary to ensure that all data is consistently reported in tables and figures.

Recommendations for a Phase II RFI

17. The data presented in Section 5.0 of the report does not adequately support the conclusions presented in Section 7.0. Therefore, a Phase II RFI is required for several SWMU groups, SWMUs, and AOCs. Table E-1, which appears at the end of this comment document, summarizes the Phase I RFI findings and conclusions presented in the report and the areas included in the Phase II RFI.

SPECIFIC COMMENTS

1. **Section 5.3.1, Page 4, Paragraph 3.** The text states that no PRGs are exceeded below the base of the surface impoundment in SWMU 3. However, several organic contaminants were detected in SWMU 3 at concentrations significantly above their PRGs. The text should be

revised to discuss these exceedances. Also, the text states that soil sample S03:SL:SL01 was collected to determine the vertical extent of contamination, but no analytical results are presented in Appendix D or E to support this statement. The report should be revised to present the analytical results for this soil sample in order to demonstrate that the vertical extent of contamination has been determined.

2. **Section 5.3.1, Page 5, Paragraph 2.** The text states that the benzene concentration in a soil sample collected at grid node B5 in SWMU 2 was above the PRG. The text also states that this exceedance may be the result of "smearing" of contamination from the base of the surface impoundment. This explanation is questionable because the soil sample was collected at a depth of 21 to 23 ft bgs and Page 4 states that the base of the surface impoundment is estimated to be 9 to 12 ft bgs. Additional soil samples should be collected to determine the extent of contamination from 12 to 21 ft bgs. In addition, the level of contamination present in the sample collected from 21 to 23 ft bgs requires that additional soil samples be collected at greater depths to determine whether a release to the environment has taken place.

3. **Section 5.3.2, Page 8, Paragraph 1**. The text states that the sample analytical results do not indicate a significant impact on the wells downgradient of SWMU Group B. This statement is not supported by the results for well L-25, which are shown in Figure 5-3.2d. The text should be revised to discuss the results from well L-25. Furthermore, well L-17 should be resampled and additional samples should be collected downgradient of well L-25 to assess the impact of SWMU Group B on the lacustrine aquifer.

4. **Section 5.3.2, Page 8, Paragraph 1**. The text states that "the sampling results do not indicate a significant impact from the facility in the sampled downgradient wells." As discussed in General Comment 10, the table on Page 8 should be revised to include metals detected in downgradient monitoring wells at concentrations exceeding background groundwater concentrations in the upgradient wells. Analytical results indicate that metal concentrations in downgradient wells L-19A, L-20, and L-25 exceeded background metal concentrations in upgradient well L-26. These analytical results indicate that past operations in SWMU Group B have impacted groundwater quality in the lacustrine deposits at the facility. Sections 5.3.2 and 7.2.1 should be revised to reflect these findings.

5. **Section 5.3.2, Page 8, Paragraph 1**. The text states that "the results show evidence of impact in L-26, one of the wells upgradient of the TSCA Closure Cell. This may be due to facility activities in the area." The analytical results indicate that groundwater quality in the lacustrine deposits near well L-26 has been impacted. The text should be revised to state whether the organics detected in well L-26 are related to past operations associated with a specific SWMU group or current activities not related to a SWMU group. Sections 5.3.2 and 7.2.1 should be revised accordingly.

6. **Section 5.3.2, Page 8, Table of Results**. The table indicates that there were no detections in monitoring well L-17. As discussed in General Comment 10, the table should be revised to include all metals detected in downgradient monitoring wells at concentrations exceeding background groundwater concentrations in the upgradient wells. Also, the analytical results shown in the table for the antimony and silver detected in monitoring well MW-24R appear to be reversed when compared to the analytical results presented in Figure 5-3.2b and Appendix B. The analytical results should be verified and the table revised accordingly.

7. **Section 5.3.4, Page 11, Paragraph 5**. The text states that grid node samples were collected in SWMU Group D at a depth of approximately "2.5 to 4.5 ft." The text should be revised to clarify whether these samples were collected 2.5 to 4.5 ft below each SWMU base. The text also states that the sampling depth interval was based on the approximate "depth of mixing" used during operation of the landfarms. The text should be revised to identify the approximate "depth of mixing."

8. **Section 5.3.4, Page 12, Table of Results**. The table indicates that soil samples were initially collected at grid node locations F2 in SWMU 12 and A2 in SWMU 14 at a depth of 2.5 to 4.5 ft. It is not clear whether this depth interval is bgs or below the base of the SWMU. The table should be revised to clarify the depth intervals of the above samples. The table also indicates that samples were collected to delineate the vertical extent of contamination at depths of 8.5 to 10.5 ft and 18.5 to 20.5 ft in SWMUs 12 and 14, respectively. It is not clear why samples intended to delineate the vertical extent of contamination were not collected in the depth intervals immediately beneath the 2.5- to 4.5-ft interval. The text should be revised to explain this matter.

9. **Section 5.3.9, Page 22, Paragraph 3**. The text states that another soil sample was collected at a depth of 2 to 4 ft bgs. However, the table of results on Page 22 indicates that this sample was collected at a depth of 6 to 8 ft bgs. The text or table should be revised to resolve this discrepancy.

10. **Section 5.3.9, Page 23, Paragraph 1**. The text states that in SWMU 43, "another sample to characterize the vertical extent of contamination was collected 8 to 10 ft bgs at the first selected location." The text should be revised to provide the identification number of the sample collected at the "first selected location."

11. **Section 5.3.9, Page 23, Paragraph 4**. The text states that soil sampling locations and analytical results for SWMUs 44 and 45 are presented in Figures 5-3.9i and 5-3.9j. However, Figure 5-3.9i is not included in the report. The report should be revised to include this figure.

12. **Section 5.6, Page 33, Paragraph 1**. The 1993 historical data summary states the following:

"The 1993 data, although it could not be fully validated at this time, showed the presence of nickel, and lesser occurrences of chromium and lead, in some of the lacustrine wells. However, the data (see Appendix F) did not display a trend or pattern that could be clearly attributable to impact from the facility; in fact, the concentrations of some of these parameters were higher in the upgradient well." Although some parameters were present at higher concentrations in upgradient well L-26, most detections of nickel, chromium, and lead in the monitoring wells downgradient of SWMU Group B exceeded the concentrations in well L-26. These findings indicate that SWMU Group B has impacted groundwater quality in the lacustrine deposits underlying the facility. Sections 5.6 and 7.2.3 should be revised to reflect these findings.

13. **Section 5.6, Page 33, Paragraph 3**. The 1997-1999 historical data summary states the following: "With the exception of conductivity and pH, no detections were noted in any of the samples. The downgradient wells (MW-14R, MW-15R, MW-16R, MW-20R, MW-30R, and MW-36R) monitor groundwater in the bedrock beneath the site and are downgradient of the TSCA closure cell and SWMU Group A. The upgradient wells (MW-24R and MW-37R) were used as background reference points for this evaluation." Review of the historical data reveals the following detections in the monitoring wells indicated: phenols at 0.01 microgram per liter (μg/L) in MW-15R and chromium-total at 10.3 μg/L in MW-16R during the October 1997 sampling event; nickel-total at 83.6 μg/L in MW-24R during the April 1998 sampling event; and arsenic at 10.2 μg/L in MW-30R during the April 1999 sampling event. The constituent concentrations detected in wells MW-15R, MW-16R, and MW-30R during the October 1997 and April 1999 sampling events exceeded background groundwater concentrations in upgradient well MW-24R. Sections 5.6 and 7.2.3 should be revised to reflect these findings.

14. **Section 7.2.1, Page 3, SWMU Group B**. As discussed in General Comment 10 and Specific Comments 3, 4, 5, 6, and 13, sample analytical results indicate that past operations at SWMU Group B and activities near monitoring well L-26 have impacted groundwater quality in the lacustrine deposits underlying the facility. The text should be revised to reflect this information.

15. **Section 7.2.3, Page 8, Paragraph 3**. The text states that "the April and October 1997 and April 1998 monitoring data demonstrate that there is no detectable impact on bedrock groundwater quality from the features monitored by the bedrock wells." As discussed in Specific Comment 13, concentrations of several constituents detected in downgradient monitoring wells during the October 1997 and April 1999 sampling events exceeded background groundwater concentrations in upgradient monitoring well MW-24R. The text should be revised to reflect these findings.

TABLE E-1
PHASE I RFI FINDINGS AND CONCLUSIONS AND REQUIRED PHASE II RFI ACTIVITIES

Area to be Investigated	Phase I Findings	Phase I Conclusions	Required Phase II Activities
Groundwater	Historical groundwater data is provided in Appendix F.	There was no detectable impact on bedrock groundwater quality. Data for the lacustrine wells did not display a trend or pattern that was clearly attributable to an impact from the facility.	As stated in General Comments 5 and 6, the historical groundwater data is not acceptable for use in the RFI. All monitoring wells should be sampled.
SWMU Group B (Soil)	Clean closure data is provided in Appendix G.	SWMUs in this group were clean-closed.	As stated in General Comment 8, the clean closure data is not acceptable for use in the RFI. Soil samples should be collected in SWMUs 10 and 11.
SWMU Group B (Groundwater)	A capillary drain sample's cyanide concentration exceeded the DQL.	Detections did not appear to be related to wastes handled in this area.	Groundwater samples should be collected to determine the source and extent of contamination.
	Cyanide concentrations exceeded the DQL at monitoring wells L-19A and M-14R.	Detections did not appear to be related to wastes handled in this area.	Groundwater samples should be collected to determine the source and extent of contamination.
	Concentrations of several VOCs and lead exceeded the DQLs at monitoring well L-26.	Contaminants may be from an upgradient source.	Groundwater samples should be collected to determine the source and extent of contamination.
SWMU Group A	Benzene was found in soil at a concentration above its PRG at grid node location B5 at a depth of 21 to 23 ft bgs.	The benzene exceedance may have resulted from "smearing contamination from the base of the surface impoundment."	The vertical extent of contamination should be delineated.
SWMU Group A (SWMU 2)	Chlorobenzene and benzo(a)pyrene concentrations above the PRGs were found in soil at select location SL02-03 at a depth of 6 to 8 ft bgs.	The sample was not collected below the base of the SWMU. Therefore, no PRGs were exceeded below the SWMU base.	Although the sample was collected above the SWMU base, the vertical extent of contamination should be delineated.

TABLE E-1 (Continued)

PHASE I RFI FINDINGS AND CONCLUSIONS AND REQUIRED PHASE II RFI ACTIVITIES

Area to be Investigated	Phase I Findings	Phase I Conclusions	Required Phase II Activities
SWMU Group A (SWMU 3)	Several VOCs were found in soil at concentrations above the PRGs near the northwestern SWMU boundary at select location SL02-03 at a depth of 6 to 8 ft bgs.	Because samples were collected within fixed waste materials, this was an expected finding.	The sample was collected near the SWMU perimeter. Although the finding was expected, the lateral and vertical extent of soil contamination northwest of the sampling location should be delineated.
SWMU Group A (SWMU 16)	Dieldrin was found in soil at a concentration above its PRG at select location SL02-03 at a depth of 6 to 8 ft bgs.	Because the sample was collected within fixed waste materials, this was an expected finding.	Although the sample was collected within fixed waste materials, the vertical extent of contamination should be delineated.
SWMU Group C (SWMU 9)	Grid node samples were not collected 2 to 4 ft below the SWMU base as called for in the Phase I RFI work plan.	There was no evidence of contamination beneath the SWMU base.	The work plan was not followed. Grid node locations should be resampled at the correct depth intervals.
SWMU Group D (SWMU 12)	Benzo(a)pyrene was found in soil at concentrations above its PRG near the eastern SWMU boundary at grid node location GNF2-01 at a depth of 2.5 to 4.5 ft bgs.	Because only one sample exceeded the PRG, there was no widespread impact from this SWMU.	The sample was collected near the SWMU perimeter. Therefore, the lateral and vertical extent of soil contamination of this location should be delineated.
SWMU Group F (SWMU 40)	Chromium was found in soil at a concentration above its PRG near the southern SWMU boundary at surface location SF02-01 at a depth of 0 to 2 ft bgs.	There was no evidence of contamination from this SWMU.	The chromium concentration in the sample, which was collected outside the SWMU perimeter, was almost two times greater than the PRG. Therefore, the lateral and vertical extent of soil contamination south of this location should be delineated.

TABLE E-1 (Continued)

PHASE I RFI FINDINGS AND CONCLUSIONS AND REQUIRED PHASE II RFI ACTIVITIES

Area to be Investigated	Phase I Findings	Phase I Conclusions	Required Phase II Activities
SWMU Group I (SWMU 15)	PCBs were detected in soil at concentrations above the PRL at select location SL:GNA3-01 at a depth of 2 to 4 feet bgs, but the sample was not analyzed for dioxins and furans as required by the QAPP.	Previous remediation conducted at this SWMU was sufficient.	The QAPP was not followed. The location should be resampled for dioxin and furan analysis.
SWMU Group I (SWMU 18)	Clean closure data is provided in Appendix G.	This SWMU was clean-closed.	As stated in General Comment 8, the clean closure data is not acceptable for use in the RFI. Soil samples should be collected in this SWMU.
SWMU Group I (SWMU 28)	Clean closure data is provided in Appendix G.	This SWMU was clean- closed.	As stated in General Comment 8, the clean closure data is not acceptable for use in the RFI. Soil samples should be collected in this SWMU.
SWMU Group I (SWMU 41)	Benzo(a)pyrene was found in soil at a concentration above its PRG near the northeastern SWMU boundary at surface location SF02-01 at a depth of 0 to 2 ft bgs.	The benzo(a)pyrene concentration detected did not indicate a significant impact.	The benzo(a)pyrene concentration in the sample, which was collected outside the SWMU perimeter, was more than three times greater than the PRG. Therefore, the lateral and vertical extent of soil contamination at this location should be delineated.
SWMU Group I (SWMU 42)	Chromium was found in soil at a concentration above its PRG at surface location SL01-01 at a depth of 0 to 2 ft bgs. This location was the only one sampled in this SWMU.	Chromium is not related to the wastes managed in this SWMU.	This SWMU managed waste oil, which can contain metals. Also, no other samples were collected in this SWMU. Therefore, the lateral extent of soil contamination at this location should be delineated.

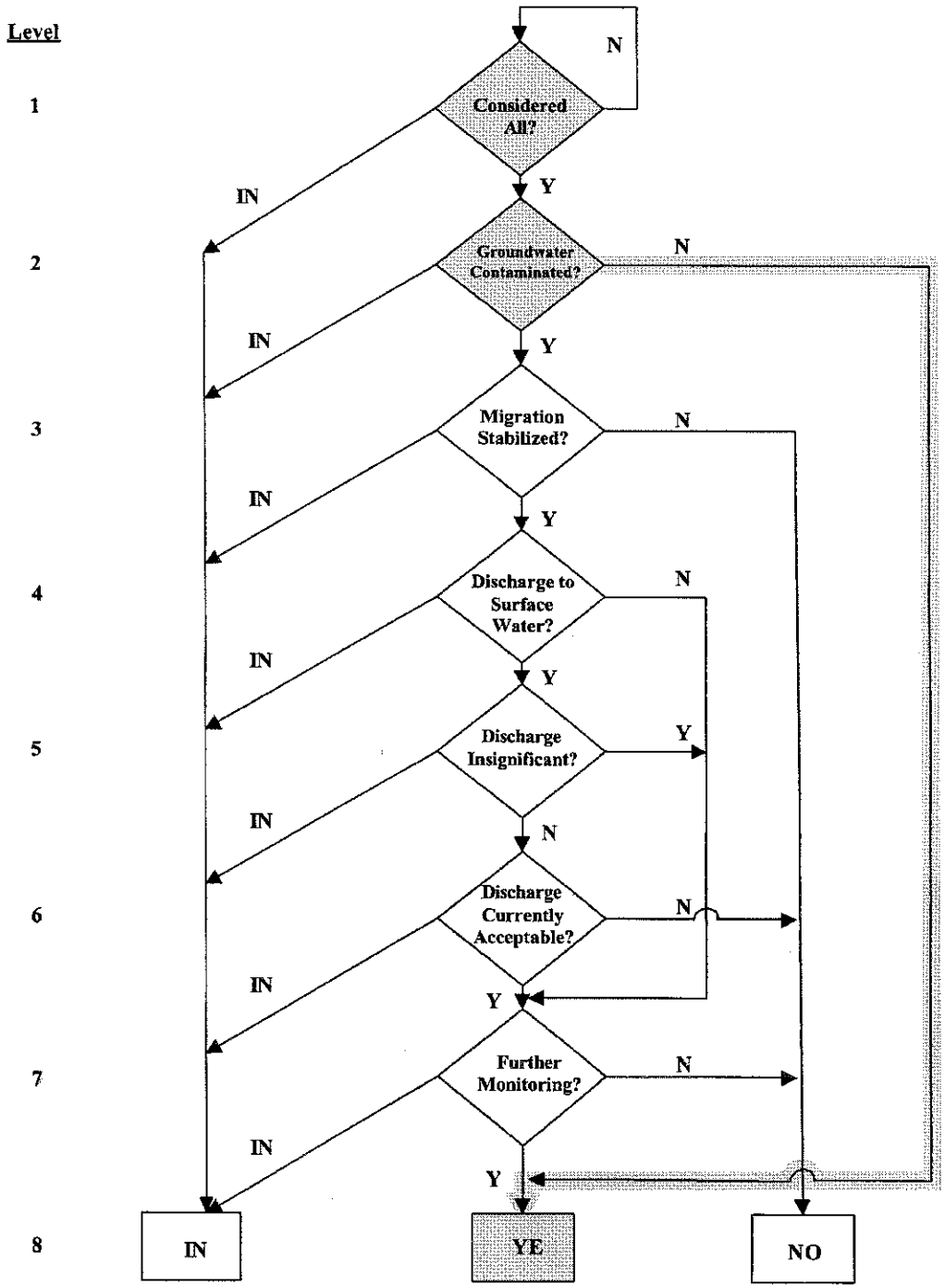
TABLE E-1 (Continued)

PHASE I RFI FINDINGS AND CONCLUSIONS AND REQUIRED PHASE II RFI ACTIVITIES

Area to be Investigated	Phase I Findings	Phase I Conclusions	Required Phase II Activities
AOC A	Several polyaromatic hydrocarbons (PAH) were found in soil at concentrations above their PRGs near the western AOC boundary at surface location SF15-01.	The contaminants are related to asphalt paving.	The report does not discuss asphalt paving in relation to this AOC. Therefore, the lateral and vertical extent of soil contamination west of this location should be delineated.
AOC B	Several PAHs and chromium were found in soil at concentrations above their PRGs near the northwestern AOC boundary at surface location SF01-01.	The PAHs are related to asphalt paving. The chromium was interpreted as being naturally occurring.	The report does not discuss asphalt paving in relation to this AOC. Therefore, the lateral and vertical extent of soil contamination northwest of this location should be delineated.
AOC D	Clean closure data is provided in Appendix G.	This AOC was clean-closed.	As stated in General Comment 8, the clean closure data is not acceptable for use in the RFI. Soil samples should be collected in this AOC.
AOC H	Figure 5-4.8d shows that sediment samples were collected off site in the tributary to Little Raccoon Creek that flows around the facility's eastern boundary. This information does not comply with Section 5.10.8 of the Phase I RFI work plan, which states that sediment samples would be collected downstream of the confluence of Meyers Ditch (which flows off site from the facility's north-central boundary) and Little Raccoon Creek.	No impact was evident in the sediment samples.	The Phase I RFI work plan was not followed. Sediment samples should be collected at the correct locations.

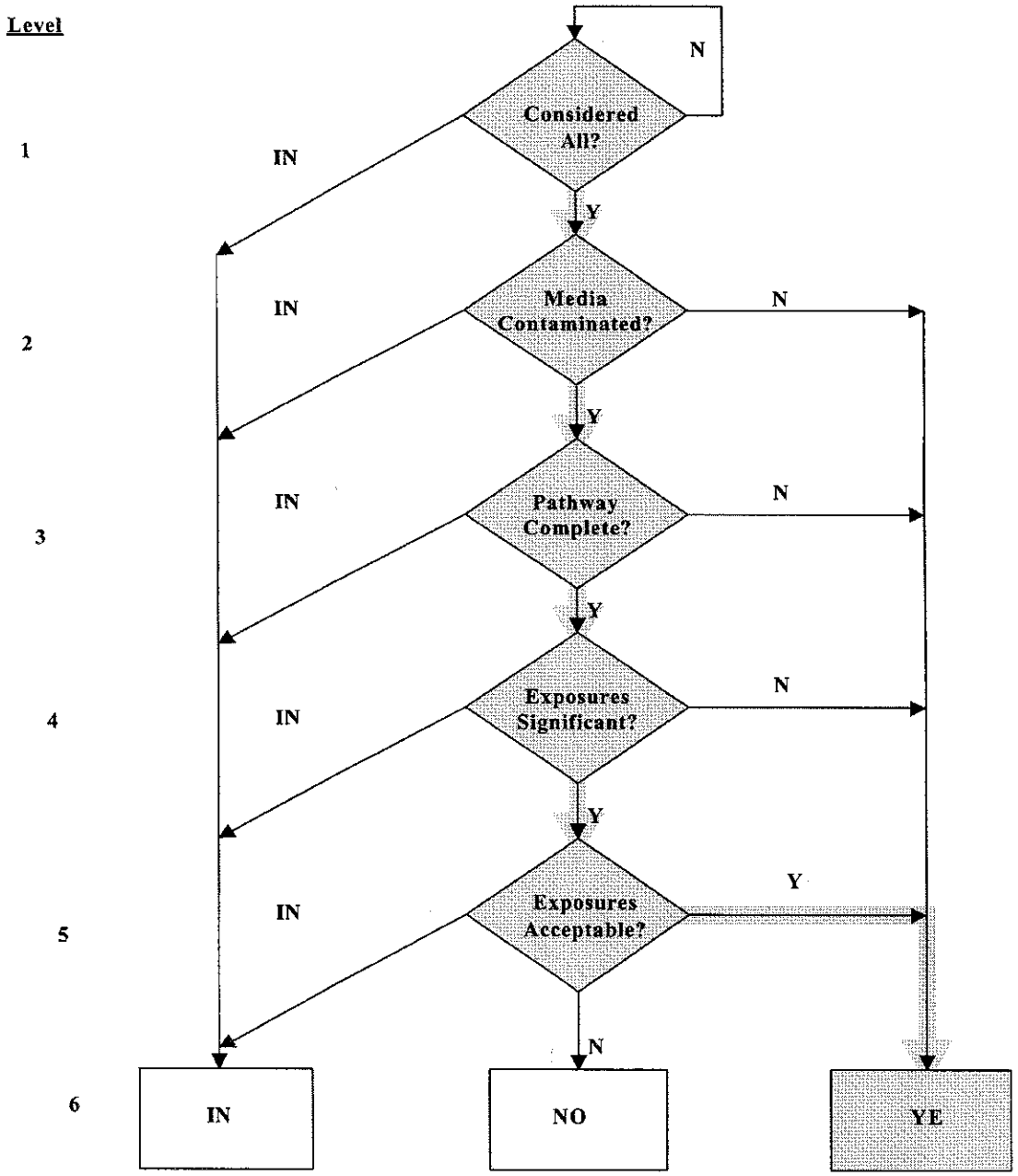
Facility Name: ***Waste Management of Ohio***
EPA ID#: ***OHD020273819***
City/State: ***Vickery, Ohio***

MIGRATION OF CONTAMINATED GROUNDWATER UNDER CONTROL (CA 750)



Facility Name: ***Waste Management of Ohio***
EPA ID#: ***OHD020273819***
City/State: ***Vickery, Ohio***

CURRENT HUMAN EXPOSURES UNDER CONTROL (CA 725)



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

January 28, 2000

REPLY TO THE ATTENTION OF
DW-8J

CERTIFIED MAIL: P 371 896 655
RETURN RECEIPT REQUESTED

Mr. Stephen C. Lonneman
General Manager
Waste Management of Ohio, Inc.
3956 State Route 412
Vickery, Ohio 43464

RE: Notice of Deficiency
RCRA Facility Investigation (RFI) Report
Waste Management of Ohio, Inc.
OHD 020 273 819

Dear Mr. Lonneman:

The United States Environmental Protection Agency (U.S. EPA) has conducted a technical review of the above-referenced report for the Waste Management of Ohio, Inc., facility in Vickery, Ohio. The report is dated October 1999 and was prepared by Earth Tech, Inc., for Waste Management of Ohio, Inc. The U.S. EPA reviewed the report to assess, (1) its technical adequacy and completeness, (2) its compliance with the Phase I RFI work plan for the facility, dated November 1997, (3) its compliance with applicable U.S. EPA RFI guidance, and (4) the need for a Phase II RFI at the facility.

Based on the technical review, the U.S. EPA determined the report contains errors and discrepancies and is missing some data. Also, the data in the report indicates that releases to soil and groundwater have occurred at various solid waste management units (SWMU) and areas of concern (AOC) at the facility. Therefore, U.S. EPA requires that a Phase II RFI be conducted at these SWMUs and AOCs to determine the extent of contamination.

General and specific deficiency comments on the report are provided in the enclosure. WMO is required to submit, within forty-five (45) days, its revised RFI Phase 1 Report, which addresses the enclosed deficiency comments and a RFI Phase 2 work plan and Quality Assurance Project Plan. WMO shall schedule a meeting with the U.S. EPA, to be held within twenty (20) days of receipt of this letter, to discuss WMO's responses to the deficiency comments and U.S. EPA's expectations for the Phase 2 RFI.

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The modified Phase 1 RFI Report shall be prepared in accordance with the following editorial protocol or convention:

1. Old language is overstruck.

2. New language is in bold type.

3. Page headers must indicate date of submission.

4. If any significant changes are necessary, pages should be renumbered, table of contents revised, and complete sections provided as required.

5. An itemized list of all replacement pages, sections, tables, etc., that are to be replaced in the modified submission, shall be provided.

In addition to the two copies of each document provided to the U.S. EPA, please provide one copy of each to:

Edwin Lim	Chuck Hull
Ohio EPA, DHWM	Ohio EPA, NWDO
P.O. Box 1049	347 N. Dunbridge Rd.
Columbus, OH 43266-0149	Bowling Green, OH 43402

Further, please provide two copies of the documents in electronic format on Compact Discs (CD) to U.S. EPA and a copy to each of the two OEPA offices.

If you have any questions regarding what information is required, please contact me at (312) 886-7569.

Sincerely,

Thomas Matheson, Corrective Action Project Manager
Waste Management Branch

Enclosure

cc: Ed Lim, OEPA/CO
Chuck Hull, OEPA/NWDO

TECHNICAL DEFICIENCY COMMENTS ON "RCRA FACILITY INVESTIGATION (RFI) PHASE I REPORT" WASTE MANAGEMENT OF OHIO, INC., VICKERY, OHIO

The United States Environmental Protection Agency (U.S. EPA) has completed a technical review of the above-referenced report for the Waste Management of Ohio, Inc. (WMO), facility in Vickery, Ohio. The report is dated October 1999 and was prepared by Earth Tech, Inc., for Waste Management of Ohio, Inc. The report was reviewed to assess (1) its technical adequacy and completeness, (2) its compliance with the Phase I RFI work plan for the facility dated November 1997, (3) its compliance with applicable U.S. EPA RFI guidance, and (4) the need for a Phase II RFI at the facility.

Based on the review, the U.S. EPA determined the report contains errors and discrepancies and is missing some data. Also, the data in the report indicates that releases to soil and groundwater have occurred at various solid waste management units (SWMU) and areas of concern (AOC) at the facility. Therefore, the U.S. EPA determined a Phase II RFI be conducted at these SWMUs and AOCs to determine the extent of contamination.

The general and specific deficiency review comments on the report are provided below. The general comments pertain to major deficiencies noted in the report. The specific comments pertain to particular sections, pages, and paragraphs of the report. The first full paragraph on a page is identified as "Paragraph 1." A paragraph that carries over from a previous page is identified as "Paragraph 0."

GENERAL COMMENTS

Major deficiencies in the report pertain to (1) compliance with the Phase I RFI work plan and quality assurance project plan (QAPP), (2) use of historical groundwater data, (3) use of Resource Conservation and Recovery Act (RCRA) closure data, (4) use of background data, (5) data validation, (6) RFI data presentation, and (7) recommendations for a Phase II RFI. These deficiencies are discussed in the general comments presented below.

Compliance with Phase I RFI Work Plan and QAPP

1. The report indicates that several deviations from the Phase I RFI work plan and QAPP occurred. The report should be revised to explain the deviations discussed below.

    - QAPP Table 1-1 indicates that background soil samples would be collected from 10 locations. However, Table 5-2 and Figure 5-2.1a of the report show analytical results for background samples collected at only five locations (BGSBG01, BGSBG03, BGSBG05, BGSBG06, and BGSBG07).

    - Based on the data provided in Appendix H of the report, samples collected from monitoring well L-17 were analyzed only for volatile organic compounds (VOC). However, QAPP Table 1-1 indicates that all groundwater samples would be analyzed for

semivolatile organic compounds (SVOC), polychlorinated biphenyls (PCB), pesticides, herbicides, metals, cyanide, and sulfide as well as VOCs.

- Section 5.7.1.2 of the Phase I RFI work plan states that "select location" soils would be sampled from the ground surface to the point of borehole termination. However, Section 4.3.2.1 of the report states that "select location soils were sampled from three feet below the ground surface until borehole termination."

- The table of results in Section 5.3.3 of the report indicates that grid node samples were collected at depths ranging from 11 to 15 feet (ft) below ground surface (bgs) in SWMU 9, and Paragraph 1 on Page 10 states that the base of SWMU 9 was estimated to be about 20 ft bgs. This information is not consistent with Sections 4.3.2.2 and 5.7.1.1 of the Phase I RFI work plan, which state that grid node samples would be collected 2 to 4 ft below the base of the SWMU.

- Note 3 of QAPP Table 1-1 states that if PCBs were detected in soil samples at concentrations above the project reporting limit (PRL), those samples would also be analyzed for dioxins and furans. Appendix E of the report indicates that PCBs were detected at concentrations above the PRL in SWMU 42 soil sample SL01-01, but this sample was not analyzed for dioxins and furans.

2. The sampling locations shown in the report are not entirely consistent with those presented in the Phase I RFI work plan. The report should be revised to explain the sampling location deviations discussed below.

   - SWMU Group D - Figure 5-3.4b of the report indicates that grid node samples A2 and C3 were not collected at the center of the grid nodes as shown in work plan Figure 5-9.

   - SWMU Group F - Figure 5-3.6d of the report indicates that soil samples SF01-01 and SF02-01 in SWMU 35 and SF020-01 in SWMU 36 were not collected at the locations shown in work plan Figure 5-11.

   - SWMU Group G - Figure 5-3.7c of the report indicates that soil sample SF01-01 in SWMU 27 was not collected at the location shown in work plan Figure 5-12.

   - SWMU Group I - Figure 5-3.9 of the report indicates that grid node samples A1, C1, and C2 were not collected at the center of the grid nodes as shown in work plan Figure 5-14.

3. Figure 5-4.8 of the report shows that sediment samples were collected off site in the tributary to Little Raccoon Creek that flows around the facility's eastern boundary. This information does not comply with Section 5.10.8 of the Phase I RFI work plan, which states

that sediment samples would be collected downstream of the confluence of Meyers Ditch (which flows off site from the facility's north-central boundary) and Little Raccoon Creek. These samples should be collected in the correct locations during Phase II of the RFI.

Use of Historical Groundwater Data

4. The report uses one round of RFI groundwater analytical data collected in May 1999 and nine rounds of historical groundwater analytical data collected in January 1993, April 1993, July 1993, October 1993, April 1997, October 1997, April 1998, October 1998, and April 1999 for lacustrine and bedrock monitoring wells to evaluate releases to groundwater at the facility. However, the April 1997 groundwater analytical data is missing from Appendix F of the report. Also, groundwater elevations for monitoring wells sampled in October 1998, April 1999, and May 1999 are missing from the report. The report should be revised to include (1) the April 1997 groundwater analytical data, (2) an additional table showing groundwater elevations at each monitoring well sampled during all ten rounds of groundwater sampling, and (3) potentiometric surface maps for both the lacustrine and bedrock aquifers developed using the groundwater elevation data.

5. Section 5.6 and Appendix F of the report state that the 1993 historical groundwater data could not be validated. Therefore, this data is useful for decision-making purposes only if it is consistent with validated data obtained during other rounds of groundwater sampling at the same locations. Section 5.6 also states that the 1993 data indicates the presence of nickel, chromium, and lead in some of the lacustrine wells sampled. However, data collected during the Phase I RFI indicates the presence of several additional metals, VOCs, and cyanide in the same wells. Because the 1993 data was not validated and is not consistent with the RFI data obtained for the same wells, the 1993 data is not acceptable for use in the RFI.

6. The data validation of the historical groundwater data for bedrock wells and the capillary drain collected from April 1997 through April 1999, which is discussed in Appendix F of the report, considers only surrogate recoveries, matrix spike (MS)/MS duplicate results, laboratory control sample data, and blank data. However, the introduction to the data validation reports for current RFI data in Appendix I notes that the "main issues" that led to qualification of this fully validated data were holding times, calibrations, and internal standard responses. None of these additional criteria was considered in the validation of the historical groundwater data; therefore, the validation of the historical groundwater data must be considered incomplete. For this reason, the April 1997 through April 1999 historical groundwater data is useful for decision-making purposes only if it is consistent with fully validated data for the same sampling locations. Appendix F indicates that the April 1997 through April 1999 data contained detections of phenols and nickel in the capillary drain and MW-24R, respectively. However, RFI data indicates the presence of cyanide in the capillary drain and antimony, chromium, silver, and SVOCs in MW-24R. Because the

validation of the April 1997 through April 1999 data is incomplete and the data is not consistent with the RFI data for the same wells, this historical data is not acceptable for use in the RFI.

7. The report does not contain monitoring well construction logs for the wells sampled prior to and during the Phase I RFI. The screened depth interval of each well must be known to determine whether the wells can be appropriately used to monitor migration of contaminants from potential source areas of varying depths that were identified during the Phase I RFI. Therefore, the report should be revised to include the monitoring well construction logs.

Use of RCRA Closure Data

8. The report states that data collected for the closure of SWMUs 4, 5, 7, 10, and 11 in SWMU Group B; SWMUs 18 and 28 in SWMU Group I; and AOC D is provided in Appendix G. However, the closure data provided in Appendix G is insufficient to meet corrective action requirements. Specifically, the closure reports in Appendix G lack the items discussed below.

   - The 1983 "Closed Lagoons" report contains no data for SWMUs 5, 7, 10, and 11 or AOC D. Also, the soil data provided for SWMU 4 does not include analytical data for all the Appendix IX parameters required in the RFI; only data for PCBs and extraction procedure (EP) toxic metals is included.

   - The 1992 "Closure of W-Tanks" report does not include a map showing soil sampling locations and depths. Also, the soil sample data does not include analytical data for all the Appendix IX parameters required in the RFI; only data for metals, cyanide, phenols, PCBs, and a limited list of VOCs is included.

   - The 1996 "Closure Report for Pump House, Tank Containment, and Sluice Pit" does not include a map showing soil sampling locations and depths.

   In addition, the data provided in Appendix G of the report generally lacks (1) quality control (QC) sample and data validation results and (2) documentation of sample preservation and transport methods. Based on the abovementioned deficiencies, the closure data in Appendix G is not acceptable for use in the RFI.

Use of Background Data

9. The report indicates that inorganic soil data was compared to average background concentrations and the range of background concentrations. For example, in SWMU Group F, arsenic concentrations were found to exceed the average background concentration. Section 5.3.6 states that although the average background concentration was exceeded, the

arsenic concentrations were still within the observed range of background concentrations. This method of comparison is not statistically valid. To provide a more statistically valid comparison, the 95 percent upper confidence limit for the background concentrations of each inorganic constituent should be calculated and then used as a basis of comparison for each investigative sample result. The report should be revised accordingly.

10. Section 5.3.2 of the report, which discusses groundwater sample analytical results, states that the table presented on Page 8 "presents all detections, in contrast to other tables within this section, to illustrate the quality of the downgradient samples as compared to two wells upgradient of the Closure Cell (L-26 and MW-24R). Exceedances of Region 5 DQLs for groundwater, which are the applicable standards in accordance with the WP, are shown in bold." According to the QAPP, background groundwater concentrations in upgradient wells (L-26 and MW-24R) are the applicable standards for metals detected in the lacustrine and bedrock wells. EPA Region 5 data quality levels (DQL) are the applicable standards for organics detected in the lacustrine and bedrock wells. According to analytical data provided in Appendix D, Appendix E, Figure 5-3.2c, and Figure 5-3.2d of the report, downgradient lacustrine wells L-19A, L-20, and L-25 and the capillary drain contain metal concentrations that exceed the background concentrations in upgradient well L-26. However, these results are not shown on the table on Page 8. For each downgradient monitoring well, the table on Page 8 should be revised to include all metals whose concentrations exceed background groundwater concentrations in the upgradient wells. Also, Sections 5.3.2 and 7.2.1 should be revised to discuss metals whose concentrations exceed background groundwater concentrations.

Data Validation

11. During review of data in Appendix H of the report, many cases were noted in which field duplicate samples had concentrations quite different from those of their primary samples. For instance, the lead concentration in sample S49:SL:SF01-01 was 11.3 milligrams per kilogram (mg/kg), but that in its field duplicate, sample S49:SL:SF01-01-FD, was 537 mg/kg, almost 50 times as much. The repeated instances of major variations imply considerable heterogeneity in the distribution of the various analytes in the materials sampled. With such high heterogeneity, it is not clear whether the primary sample result, the field duplicate sample result, or the average of the two results more closely reflects the true concentration in a given area. To be conservative, the higher result for each analyte in each field duplicate pair should be used for decision-making. When more information on localized variations in concentrations is available, it may be possible to adopt less conservative measures, but considerably more data will be required to support such a change in procedure. The report should be revised accordingly.

12. Review of Appendix I of the report revealed that the validation of data collected during the Phase I RFI was generally well done. In most instances, the validation results were

accurately transcribed into Appendix H and those results can be used as qualified. However, in two general cases, "R" flags for data that is not usable were not included in Appendix H.

The first case involves the calibrations, both initial and continuing, in the VOC and SVOC analyses. In all the analytical runs examined, a small number of analytes had relative response factors (RRF) less than 0.05. The analytes involved included chemicals well known to produce poor, irregular responses in the analytical system, such as acetone; acrolein; acetonitrile; 1,4-dioxane; and 4-nitroquinoline-N-oxide. The results for these analytes were generally nondetects and their reporting limits are qualified as estimates in Appendix H. However, EPA's 1994 "National Functional Guidelines for Organic Data Review" states that such low-RRF, nondetect results should be rejected. Appendix H should be revised to include the correct qualifiers for these analytes, and the text of the report should discuss the data gap associated with rejection of the results for these potential contaminants for all or most of the samples.

The second case involves the metal MS analyses. In several cases (involving samples S09:SL:GNE2-01, S16:SL:GND5-01, ACA:SL:SF05-01, S12:SL:GNF3-01, S15:SL:GNA1-01, and ACH:SL:SF02-01 and possibly other samples), the recovery of antimony from the MS was less than 30 percent. As noted in EPA's 1994 "National Functional Guidelines for Inorganic Data Review," such low recoveries indicate that nondetect results for the parent samples should be rejected. However, these results are qualified as "UJ" in Appendix H. The appendix should be revised to reflect rejection of these nondetect results, and the associated data gap should be discussed as necessary in the text of the report. Because this rejection applies to only the individual samples used in the MS analysis rather than all the samples analyzed in an analytical run, it will have far less effect on data completeness than the irregularities in the VOC and SVOC analysis calibrations.

RFI Data Presentation

13. The sample summary tables provided in Sections 5.3 and 5.4 of the report present only the numbers of investigative and QC samples collected in a particular SWMU group or AOC. These tables should be revised to provide more detailed descriptions of the samples collected. Specifically, the tables should be expanded to show the identification number, collection depth, and analyses performed for each sample collected during Phase I of the RFI.

14. Section 4.3.2.2 of the report states that grid node samples in SWMU Groups A, C, and D and SWMU 15 were collected approximately 2 to 4 ft below the SWMU base. However, it cannot be determined whether samples were actually collected at this depth because the

report does not clearly specify the depth at which the base of each SWMU was encountered. For example, for SWMU Group A, which contains five former surface impoundments, Section 5.3.1 states that the depth of the bases of the impoundments ranges from 9 to 12 ft bgs. This section should be revised to identify the specific depth at which the base was encountered during drilling activities for each surface impoundment. Also, for SWMU Group C, Section 5.3.3 does not identify a depth for the base of SWMU 19. In addition, no base depths are provided for the SWMUs in SWMU Group D or for SWMU 15 in SWMU Group I. The report should be revised to specify the base depth for each SWMU.

15. The report states that in SWMUs 1, 3, 9, 12, 14, 16, and 43, additional soil samples were collected to delineate the vertical extent of contamination. However, the collection depth for these additional samples is not always specified. For example, Section 5.3.3 states that sample S09:SL:SL02-11 was collected to determine the vertical extent of contamination, but the collection depth for this sample is not specified. The report should be revised to specify the collection depth for each sample collected to delineate the vertical extent of contamination.

16. There are many inconsistencies between the data presented in the tables and figures of Section 5.0. For example, Figure 5-3.1c indicates that chlorobenzene was detected in soil in SWMU 2 at a concentration of 300,000 micrograms per kilogram (μg/kg), (which is above the preliminary remediation goal [PRG] of 183,370 μg/kg). However, this result is not reported in the table provided in Section 5.3.1. Similarly, the table in Section 5.3.2 lists no detections of inorganics in groundwater samples collected from monitoring well L-25, but Figure 5-3.2d lists several inorganics detected in this well. Section 5.0 and the rest of the report should be thoroughly checked and revised as necessary to ensure that all data is consistently reported in tables and figures.

Recommendations for a Phase II RFI

17. The data presented in Section 5.0 of the report does not adequately support the conclusions presented in Section 7.0. Therefore, a Phase II RFI is required for several SWMU groups, SWMUs, and AOCs. Table E-1, which appears at the end of this comment document, summarizes the Phase I RFI findings and conclusions presented in the report and the areas included in the Phase II RFI.

SPECIFIC COMMENTS

1. **Section 5.3.1, Page 4, Paragraph 3.** The text states that no PRGs are exceeded below the base of the surface impoundment in SWMU 3. However, several organic contaminants were detected in SWMU 3 at concentrations significantly above their PRGs. The text should be

revised to discuss these exceedances. Also, the text states that soil sample S03:SL:SL01 was collected to determine the vertical extent of contamination, but no analytical results are presented in Appendix D or E to support this statement. The report should be revised to present the analytical results for this soil sample in order to demonstrate that the vertical extent of contamination has been determined.

2. **Section 5.3.1, Page 5, Paragraph 2.** The text states that the benzene concentration in a soil sample collected at grid node B5 in SWMU 2 was above the PRG. The text also states that this exceedance may be the result of "smearing" of contamination from the base of the surface impoundment. This explanation is questionable because the soil sample was collected at a depth of 21 to 23 ft bgs and Page 4 states that the base of the surface impoundment is estimated to be 9 to 12 ft bgs. Additional soil samples should be collected to determine the extent of contamination from 12 to 21 ft bgs. In addition, the level of contamination present in the sample collected from 21 to 23 ft bgs requires that additional soil samples be collected at greater depths to determine whether a release to the environment has taken place.

3. **Section 5.3.2, Page 8, Paragraph 1**. The text states that the sample analytical results do not indicate a significant impact on the wells downgradient of SWMU Group B. This statement is not supported by the results for well L-25, which are shown in Figure 5-3.2d. The text should be revised to discuss the results from well L-25. Furthermore, well L-17 should be resampled and additional samples should be collected downgradient of well L-25 to assess the impact of SWMU Group B on the lacustrine aquifer.

4. **Section 5.3.2, Page 8, Paragraph 1**. The text states that "the sampling results do not indicate a significant impact from the facility in the sampled downgradient wells." As discussed in General Comment 10, the table on Page 8 should be revised to include metals detected in downgradient monitoring wells at concentrations exceeding background groundwater concentrations in the upgradient wells. Analytical results indicate that metal concentrations in downgradient wells L-19A, L-20, and L-25 exceeded background metal concentrations in upgradient well L-26. These analytical results indicate that past operations in SWMU Group B have impacted groundwater quality in the lacustrine deposits at the facility. Sections 5.3.2 and 7.2.1 should be revised to reflect these findings.

5. **Section 5.3.2, Page 8, Paragraph 1**. The text states that "the results show evidence of impact in L-26, one of the wells upgradient of the TSCA Closure Cell. This may be due to facility activities in the area." The analytical results indicate that groundwater quality in the lacustrine deposits near well L-26 has been impacted. The text should be revised to state whether the organics detected in well L-26 are related to past operations associated with a specific SWMU group or current activities not related to a SWMU group. Sections 5.3.2 and 7.2.1 should be revised accordingly.

6. **Section 5.3.2, Page 8, Table of Results**. The table indicates that there were no detections in monitoring well L-17. As discussed in General Comment 10, the table should be revised to include all metals detected in downgradient monitoring wells at concentrations exceeding background groundwater concentrations in the upgradient wells. Also, the analytical results shown in the table for the antimony and silver detected in monitoring well MW-24R appear to be reversed when compared to the analytical results presented in Figure 5-3.2b and Appendix B. The analytical results should be verified and the table revised accordingly.

7. **Section 5.3.4, Page 11, Paragraph 5**. The text states that grid node samples were collected in SWMU Group D at a depth of approximately "2.5 to 4.5 ft." The text should be revised to clarify whether these samples were collected 2.5 to 4.5 ft below each SWMU base. The text also states that the sampling depth interval was based on the approximate "depth of mixing" used during operation of the landfarms. The text should be revised to identify the approximate "depth of mixing."

8. **Section 5.3.4, Page 12, Table of Results**. The table indicates that soil samples were initially collected at grid node locations F2 in SWMU 12 and A2 in SWMU 14 at a depth of 2.5 to 4.5 ft. It is not clear whether this depth interval is bgs or below the base of the SWMU. The table should be revised to clarify the depth intervals of the above samples. The table also indicates that samples were collected to delineate the vertical extent of contamination at depths of 8.5 to 10.5 ft and 18.5 to 20.5 ft in SWMUs 12 and 14, respectively. It is not clear why samples intended to delineate the vertical extent of contamination were not collected in the depth intervals immediately beneath the 2.5- to 4.5-ft interval. The text should be revised to explain this matter.

9. **Section 5.3.9, Page 22, Paragraph 3**. The text states that another soil sample was collected at a depth of 2 to 4 ft bgs. However, the table of results on Page 22 indicates that this sample was collected at a depth of 6 to 8 ft bgs. The text or table should be revised to resolve this discrepancy.

10. **Section 5.3.9, Page 23, Paragraph 1**. The text states that in SWMU 43, "another sample to characterize the vertical extent of contamination was collected 8 to 10 ft bgs at the first selected location." The text should be revised to provide the identification number of the sample collected at the "first selected location."

11. **Section 5.3.9, Page 23, Paragraph 4**. The text states that soil sampling locations and analytical results for SWMUs 44 and 45 are presented in Figures 5-3.9i and 5-3.9j. However, Figure 5-3.9i is not included in the report. The report should be revised to include this figure.

12. **Section 5.6, Page 33, Paragraph 1**. The 1993 historical data summary states the following:

"The 1993 data, although it could not be fully validated at this time, showed the presence of nickel, and lesser occurrences of chromium and lead, in some of the lacustrine wells. However, the data (see Appendix F) did not display a trend or pattern that could be clearly attributable to impact from the facility; in fact, the concentrations of some of these parameters were higher in the upgradient well." Although some parameters were present at higher concentrations in upgradient well L-26, most detections of nickel, chromium, and lead in the monitoring wells downgradient of SWMU Group B exceeded the concentrations in well L-26. These findings indicate that SWMU Group B has impacted groundwater quality in the lacustrine deposits underlying the facility. Sections 5.6 and 7.2.3 should be revised to reflect these findings.

13. **Section 5.6, Page 33, Paragraph 3**. The 1997-1999 historical data summary states the following: "With the exception of conductivity and pH, no detections were noted in any of the samples. The downgradient wells (MW-14R, MW-15R, MW-16R, MW-20R, MW-30R, and MW-36R) monitor groundwater in the bedrock beneath the site and are downgradient of the TSCA closure cell and SWMU Group A. The upgradient wells (MW-24R and MW-37R) were used as background reference points for this evaluation." Review of the historical data reveals the following detections in the monitoring wells indicated: phenols at 0.01 microgram per liter (μg/L) in MW-15R and chromium-total at 10.3 μg/L in MW-16R during the October 1997 sampling event; nickel-total at 83.6 μg/L in MW-24R during the April 1998 sampling event; and arsenic at 10.2 μg/L in MW-30R during the April 1999 sampling event. The constituent concentrations detected in wells MW-15R, MW-16R, and MW-30R during the October 1997 and April 1999 sampling events exceeded background groundwater concentrations in upgradient well MW-24R. Sections 5.6 and 7.2.3 should be revised to reflect these findings.

14. **Section 7.2.1, Page 3, SWMU Group B**. As discussed in General Comment 10 and Specific Comments 3, 4, 5, 6, and 13, sample analytical results indicate that past operations at SWMU Group B and activities near monitoring well L-26 have impacted groundwater quality in the lacustrine deposits underlying the facility. The text should be revised to reflect this information.

15. **Section 7.2.3, Page 8, Paragraph 3**. The text states that "the April and October 1997 and April 1998 monitoring data demonstrate that there is no detectable impact on bedrock groundwater quality from the features monitored by the bedrock wells." As discussed in Specific Comment 13, concentrations of several constituents detected in downgradient monitoring wells during the October 1997 and April 1999 sampling events exceeded background groundwater concentrations in upgradient monitoring well MW-24R. The text should be revised to reflect these findings.

TABLE E-1
PHASE I RFI FINDINGS AND CONCLUSIONS AND REQUIRED PHASE II RFI ACTIVITIES

Area to be Investigated	Phase I Findings	Phase I Conclusions	Required Phase II Activities
Groundwater	Historical groundwater data is provided in Appendix F.	There was no detectable impact on bedrock groundwater quality. Data for the lacustrine wells did not display a trend or pattern that was clearly attributable to an impact from the facility.	As stated in General Comments 5 and 6, the historical groundwater data is not acceptable for use in the RFI. All monitoring wells should be sampled.
SWMU Group B (Soil)	Clean closure data is provided in Appendix G.	SWMUs in this group were clean-closed.	As stated in General Comment 8, the clean closure data is not acceptable for use in the RFI. Soil samples should be collected in SWMUs 10 and 11.
SWMU Group B (Groundwater)	A capillary drain sample's cyanide concentration exceeded the DQL.	Detections did not appear to be related to wastes handled in this area.	Groundwater samples should be collected to determine the source and extent of contamination.
	Cyanide concentrations exceeded the DQL at monitoring wells L-19A and M-14R.	Detections did not appear to be related to wastes handled in this area.	Groundwater samples should be collected to determine the source and extent of contamination.
	Concentrations of several VOCs and lead exceeded the DQLs at monitoring well L-26.	Contaminants may be from an upgradient source.	Groundwater samples should be collected to determine the source and extent of contamination.
SWMU Group A	Benzene was found in soil at a concentration above its PRG at grid node location B5 at a depth of 21 to 23 ft bgs.	The benzene exceedance may have resulted from "smearing contamination from the base of the surface impoundment."	The vertical extent of contamination should be delineated.
SWMU Group A (SWMU 2)	Chlorobenzene and benzo(a)pyrene concentrations above the PRGs were found in soil at select location SL02-03 at a depth of 6 to 8 ft bgs.	The sample was not collected below the base of the SWMU. Therefore, no PRGs were exceeded below the SWMU base.	Although the sample was collected above the SWMU base, the vertical extent of contamination should be delineated.

TABLE E-1 (Continued)

PHASE I RFI FINDINGS AND CONCLUSIONS AND REQUIRED PHASE II RFI ACTIVITIES

Area to be Investigated	Phase I Findings	Phase I Conclusions	Required Phase II Activities
SWMU Group A (SWMU 3)	Several VOCs were found in soil at concentrations above the PRGs near the northwestern SWMU boundary at select location SL02-03 at a depth of 6 to 8 ft bgs.	Because samples were collected within fixed waste materials, this was an expected finding.	The sample was collected near the SWMU perimeter. Although the finding was expected, the lateral and vertical extent of soil contamination northwest of the sampling location should be delineated.
SWMU Group A (SWMU 16)	Dieldrin was found in soil at a concentration above its PRG at select location SL02-03 at a depth of 6 to 8 ft bgs.	Because the sample was collected within fixed waste materials, this was an expected finding.	Although the sample was collected within fixed waste materials, the vertical extent of contamination should be delineated.
SWMU Group C (SWMU 9)	Grid node samples were not collected 2 to 4 ft below the SWMU base as called for in the Phase I RFI work plan.	There was no evidence of contamination beneath the SWMU base.	The work plan was not followed. Grid node locations should be resampled at the correct depth intervals.
SWMU Group D (SWMU 12)	Benzo(a)pyrene was found in soil at concentrations above its PRG near the eastern SWMU boundary at grid node location GNF2-01 at a depth of 2.5 to 4.5 ft bgs.	Because only one sample exceeded the PRG, there was no widespread impact from this SWMU.	The sample was collected near the SWMU perimeter. Therefore, the lateral and vertical extent of soil contamination of this location should be delineated.
SWMU Group F (SWMU 40)	Chromium was found in soil at a concentration above its PRG near the southern SWMU boundary at surface location SF02-01 at a depth of 0 to 2 ft bgs.	There was no evidence of contamination from this SWMU.	The chromium concentration in the sample, which was collected outside the SWMU perimeter, was almost two times greater than the PRG. Therefore, the lateral and vertical extent of soil contamination south of this location should be delineated.

TABLE E-1 (Continued)

PHASE I RFI FINDINGS AND CONCLUSIONS AND REQUIRED PHASE II RFI ACTIVITIES

Area to be Investigated	Phase I Findings	Phase I Conclusions	Required Phase II Activities
SWMU Group I (SWMU 15)	PCBs were detected in soil at concentrations above the PRL at select location SL:GNA3-01 at a depth of 2 to 4 feet bgs, but the sample was not analyzed for dioxins and furans as required by the QAPP.	Previous remediation conducted at this SWMU was sufficient.	The QAPP was not followed. The location should be resampled for dioxin and furan analysis.
SWMU Group I (SWMU 18)	Clean closure data is provided in Appendix G.	This SWMU was clean-closed.	As stated in General Comment 8, the clean closure data is not acceptable for use in the RFI. Soil samples should be collected in this SWMU.
SWMU Group I (SWMU 28)	Clean closure data is provided in Appendix G.	This SWMU was clean- closed.	As stated in General Comment 8, the clean closure data is not acceptable for use in the RFI. Soil samples should be collected in this SWMU.
SWMU Group I (SWMU 41)	Benzo(a)pyrene was found in soil at a concentration above its PRG near the northeastern SWMU boundary at surface location SF02-01 at a depth of 0 to 2 ft bgs.	The benzo(a)pyrene concentration detected did not indicate a significant impact.	The benzo(a)pyrene concentration in the sample, which was collected outside the SWMU perimeter, was more than three times greater than the PRG. Therefore, the lateral and vertical extent of soil contamination at this location should be delineated.
SWMU Group I (SWMU 42)	Chromium was found in soil at a concentration above its PRG at surface location SL01-01 at a depth of 0 to 2 ft bgs. This location was the only one sampled in this SWMU.	Chromium is not related to the wastes managed in this SWMU.	This SWMU managed waste oil, which can contain metals. Also, no other samples were collected in this SWMU. Therefore, the lateral extent of soil contamination at this location should be delineated.

TABLE E-1 (Continued)

PHASE I RFI FINDINGS AND CONCLUSIONS AND REQUIRED PHASE II RFI ACTIVITIES

Area to be Investigated	Phase I Findings	Phase I Conclusions	Required Phase II Activities
AOC A	Several polyaromatic hydrocarbons (PAH) were found in soil at concentrations above their PRGs near the western AOC boundary at surface location SF15-01.	The contaminants are related to asphalt paving.	The report does not discuss asphalt paving in relation to this AOC. Therefore, the lateral and vertical extent of soil contamination west of this location should be delineated.
AOC B	Several PAHs and chromium were found in soil at concentrations above their PRGs near the northwestern AOC boundary at surface location SF01-01.	The PAHs are related to asphalt paving. The chromium was interpreted as being naturally occurring.	The report does not discuss asphalt paving in relation to this AOC. Therefore, the lateral and vertical extent of soil contamination northwest of this location should be delineated.
AOC D	Clean closure data is provided in Appendix G.	This AOC was clean-closed.	As stated in General Comment 8, the clean closure data is not acceptable for use in the RFI. Soil samples should be collected in this AOC.
AOC H	Figure 5-4.8d shows that sediment samples were collected off site in the tributary to Little Raccoon Creek that flows around the facility's eastern boundary. This information does not comply with Section 5.10.8 of the Phase I RFI work plan, which states that sediment samples would be collected downstream of the confluence of Meyers Ditch (which flows off site from the facility's north-central boundary) and Little Raccoon Creek.	No impact was evident in the sediment samples.	The Phase I RFI work plan was not followed. Sediment samples should be collected at the correct locations.

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WASTE MANAGEMENT

AIRBORNE EXPRESS

November 18, 1999

Mr. Thomas Matheson
U.S. Environmental Protection Agency Region V
DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60609

Re: Waste Management of Ohio, Inc. - Vickery, Ohio
OHD 020 273 819
RCRA Facility Investigation (RFI)

Dear Mr. Matheson:

Enclosed you will find a CD which contains electronic files for Waste Management of Ohio, Inc. Vickery facility's final Phase I RFI Report (Report). The hard copy of the Report was submitted on October 28, 1999. A summary of the sections of the Report that are included on the CD, the file format, and the program required to read each file is included inside the CD cover. If you have any questions, please contact Ms. Sandy Clark at (419)547-3335.

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

Sincerely,
WASTE MANAGEMENT OF OHIO, INC.

Stephen C. Lonneman
General Manager

Enclosure

SCL/slc

cc w/: Mr. Chuck Hull, OEPA-NWDO

Tetra Tech EM Inc.

200 E. Randolph Drive, Suite 4700 ◆ Chicago, IL 60601 ◆ (312) 856-8700 ◆ FAX (312) 938-0118

November 8, 1999

Mr. Allen Wojtas
Work Assignment Manager
U.S. Environmental Protection Agency Region 5
Enforcement and Compliance Assurance Branch (DE-9J)
77 West Jackson Boulevard
Chicago, IL 60604

Subject: **Technical Review of Documents**
Cost Estimate for Technical Direction Memorandum Dated November 1, 1999
Waste Management of Ohio, Inc., Vickery, Ohio
EPA Contract No. 68-W9-9018, Work Assignment No. R05805

Dear Mr.Wojtas:

Tetra Tech EM Inc. (Tetra Tech) is submitting this cost estimate for the above-referenced work assignment (WA) technical direction memorandum (TDM). Tetra Tech is also submitting one copy of the cost estimate directly to Mr. Thomas Matheson, the U.S. Environmental Protection Agency (EPA) technical advisor for this facility. The technical approach and all other elements of the approved work plan for WA No. R05805 and subsequent amendments are incorporated into the cost estimate by reference.

The revised cost estimate has been prepared in accordance with the requirements of the TDM and discussions with EPA. The TDM requires Tetra Tech to assist EPA by completing a review of technical documents listed in the TDM. Tetra Tech will complete the technical review of the draft phase I RCRA facility investigation (RFI) report in November, 1999. The schedule for completing review of the draft phase II RFI work plan and quality assurance project plan as well as the final versions of all documents will be determined at a later date. The total cost estimate for completing the work required under the TDM is $16, 914 and 348 level-of-effort (LOE) hours. The cost estimate is business confidential.

Please contact me at (312) 856-8786 or Jill Ciraulo at (312) 946-6479 if you have questions about the cost estimate or need additional information.

Sincerely,

Mary Wojciechowski
Project Manager

Enclosure

cc: Bernie Orenstein, EPA Regional Project Officer
Thomas Matheson, EPA Technical Advisor
Doris Bean, Tetra Tech Financial Manager
Ed Schuessler, Tetra Tech Regional Manager
Jill Ciraulo, Tetra Tech Site Manager
Art Glazer, Tetra Tech Program Manager

contains recycled fiber and is recyclable

ENCLOSURE

WORK ASSIGNMENT REVISED COST ESTIMATE
FOR TECHNICAL DIRECTION MEMORANDUM
DATED NOVEMBER 1, 1999
Work Assignment No. R05805

(Three Sheets)

WORK ASSIGNMENT COST ESTIMATE
FOR TECHNICAL DIRECTION MEMORANDUM
DATED NOVEMBER 1, 1999
Work Assignment No. R05805

This work assignment (WA) cost estimate was prepared in response to a technical direction memorandum (TDM) issued by the U.S. Environmental Protection Agency (EPA) Region 5 on November 1, 1999. The TDM clarifies the scope of work for Task 3 of WA No. R05805. The TDM requires that Tetra Tech EM Inc. (Tetra Tech) (1) assist EPA in completing a technical review of the Phase I Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Report and the Phase II RFI work plan and QAPP and (2) provide technical support at meetings and conference calls for the Waste Management of Ohio, Inc. Facility in Vickery, Ohio.

The cost estimate for the TDM dated November 1, 1999, includes one table that summarizes the cost for completing all work required under the TDM. Cost Estimate details for individual subtask and cost element are available upon request. The following sections provide subtask-specific assumptions used to prepare the cost estimate.

TASK 3 – TECHNICAL REVIEW OF DOCUMENTS

For Task 3, Tetra Tech estimates a total of 348 level-of-effort (LOE) hours will be needed to provide a technical review of the requested documents. The assumptions for the technical review of each document requested in the TDM are presented below.

Tetra Tech estimates that its review of the draft Phase I RFI report will require a total of 92 LOE hours. This estimate includes LOE hours required to review RCRA closure and historical groundwater data that was submitted to supplement the phase I RFI data. Tetra Tech also anticipates that an additional 46 LOE hours will be required to review the final version of this document. Therefore a total of 138 LOE hours will be required to complete this subtask.

Tetra Tech also estimates that its review of the draft Phase II RFI work plan will require a total of 72 LOE hours. Tetra Tech also anticipates that an additional 36 LOE hours will be required to review the final version of the document. Therefore a total of 108 LOE hours will be required to complete this subtask.

Tetra Tech also estimates that its review of the draft Phase II RFI QAPP will require a total of 52 LOE hours. Tetra Tech also anticipates that an additional 26 LOE hours will be required to review the final version of the document. Therefore a total of 78 LOE hours will be required to complete this subtask.

Tetra Tech anticipates that its review of the final report, work plan and QAPP will be limited to evaluating the facility's responses to Tetra Tech's comments on the draft report and work plan and that all reviews performed under Task 3 will involve submittal of technical review comments.

Tetra Tech will participate in meetings and conference calls with the facility and it's contractors to discuss the content of the above documents and the basis for comments. Tetra Tech anticipates that two persons will require 12 hours each for a total of 24 hours to complete this subtask.

TETRA TECH EM INC.
REPA 2 ZONE II CONTRACT 68-W-99-018
WORK ASSIGNMENT SUMMARY

W.A. NO. : **R05805**
W.A. NAME : **Technical Document Review -Waste Management of Ohio Inc.**

LABOR CATEGORY		Hours	Costs
P4		16	$593
P3		156	3,826
P2		106	2,005
P1		70	1,016
T2		0	0
Team Subcontractors		0	
Total LOE		348	
Clerical :	Tetra Tech	6	80
	Team Subcontractors	0	
TOTAL HOURS		354	

Tetra Tech Direct Labor		$7,520
Team Subcontractors		0
Vendors/Non-Team Subcontractors		0
Travel Costs :	Air	0
	Per Diem	0
	Hotel	0
	Ground	0
Total Travel Costs		0
ODCs :	Reproduction	208
	Freight	0
	Computer	207
	Telephone	75
	Supplies	0
	Equipment	0
	All Other	0
Total ODCs		490
Indirect Costs		7,096
Total Cost		15,106
Fixed Fee		1,808
TOTAL COST & FEE		$16,914

Vickery Facility
A Waste Management Company
3956 State Route 412
Vickery, Ohio 43464
419-547-7791
Fax: 419-547-6144

WASTE MANAGEMENT

FEDERAL EXPRESS

October 28, 1999

Mr. Thomas Matheson
U.S. Environmental Protection Agency Region V
DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60609

Re: Waste Management of Ohio, Inc. - Vickery, Ohio
OHD 020 273 819
RCRA Facility Investigation (RFI)

Dear Mr. Matheson:

Enclosed you will find Waste Management of Ohio, Inc. Vickery facility's final Phase I RFI Report. If you have any questions, please contact Ms. Sandy Clark at (419)547-3335.

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

Sincerely,
WASTE MANAGEMENT OF OHIO, INC.

Stephen C. Lonneman
General Manager

Enclosure

SCL/slc

cc w/: Mr. Thomas Matheson (2 additional copies)
Mr. Ed Lim, OEPA-CO
Mr. Chuck Hull, OEPA-NWDO
Birchard Public Library

Waste Management of Ohio, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

AIRBORNE EXPRESS
Airbill #5600880084

July 13, 1999

Mr. Thomas Matheson
U.S. Environmental Protection Agency Region V
DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60609

Re: Waste Management of Ohio, Inc. - Vickery, Ohio
OHD 020 273 819
RCRA Facility Investigation (RFI)

Dear Mr. Matheson:

As specified in the RFI Workplan, the attached monthly report is being submitted. If you have any questions, please contact me at (419)547-3305.

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

Sincerely,
WASTE MANAGEMENT OF OHIO, INC.

Stephen C. Lonneman
General Manager

Attachment

SCL/slc

bcc w/: File Room

bcc w/out: Agency Correspondence
EMD

C:\WPWIN60\DOC\RCRA\USEPA\rfirpt799.wpd

412 Lincoln Highway, Fairless Hills, Pennsylvania 19030

April 6, 1999

Mr. Thomas Matheson
Corrective Action Project Manager
Waste Management Branch
U. S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Subject: **WM-Vickery Phase I RCRA Facility Investigation (RFI)**
Vickery, Ohio
US EPA ID No. OHD 020 273 819

Telephone
215.269.2100
Facsimile
215.269.2171

Dear Mr. Matheson:

This letter will serve as documentation of the issues discussed during our phone conversation on March 23, 1999. The conversation participants included Michael Christopher and Michael Bedard of Earth Tech and you. The following issues and resolutions were discussed. Michael Bedard provided further clarification in a March 30, 1999 voice message to you regarding borehole abandonment and collection of background soil samples.

1. Collection of multiple shallow and deep samples for SWMU 14 (South Landfarm)

Soil samples were collected at shallow (2.5 ft to 4.5 ft) and deep (greater than 20 ft) intervals for the first two grid node locations that were investigated at this SWMU (grid nodes A1 and A2). This raised a concern because collection of shallow and deep soil samples at every grid node location within this particular SWMU is not consistent with the intent of the workplan. However, at subsequent grid node locations within this SWMU, as well as the other former landfarms (SWMUs 12 and 13), such an excessive drilling depth or collection of samples below the initial target depth of 2.5 to 4.5 ft has not been necessary, based on clarification of "background" readings with the screening instruments used in the field. Therefore, no issue needs to be resolved at this time.

2. Equipment decontamination

The workplan specifies certain equipment items, such as split spoons and augers, to be decontaminated between each borehole. However, the workplan does not state whether the entire drill rig must be decontaminated between each borehole. In Earth Tech's opinion, it is not the intent of the workplan to require decontamination of the entire drill rig between each borehole, because adequate precautions can be taken to maintain the integrity of data from subsequent boreholes. Earth Tech evaluates the condition of the drill rig after removal of the augers from each borehole. Significant accumulation of subsurface soil on the drill rig due to drilling activities at a given borehole will necessitate decontamination of the drill rig prior to advancement of the next borehole.

3. Borehole abandonment

The acceptability of using hydrated bentonite chips instead of grout for borehole abandonment was discussed. The use of hydrated bentonite chips instead of grout will provide equivalent protection of the abandoned borehole. In accordance with your direction, the on-site Ohio EPA representative (David C. Schilt) was asked for input on this issue. Mr. Schilt does not object to our use of hydrated bentonite chips. Earth Tech will proceed using hydrated bentonite chips for abandonment of all boreholes.

4. 2-ft split spoons vs. 5-ft continuous corers

Field experience to date indicates that the use of 2-ft split spoons instead of the 5-ft continuous corers discussed in the workplan allows greater accuracy in delineating the bottom of SWMUs and the interface between SWMU material and native soil. Therefore, logging and sampling of boreholes will proceed with 2-ft split spoons instead of 5-ft continuous corers.

5. Background soil sample locations

Five background soil samples will be collected and analyzed for metals concentrations in accordance with the workplan. These subsurface soil samples will be collected from "...areas of the property that have not been used for waste management purposes." Several samples already were collected from the northwest corner of the property. According to Mr. Steve Lonneman (Site Operations Manager), that area was never used for waste management purposes and is not likely to have been affected by past remediation activities at the site. In accordance with your direction, Earth Tech will investigate the feasibility of sampling alternate background locations. Earth Tech likely will analyze three samples from the northwest corner of the property, and two samples from former crop land across Route 412 from the facility.

We greatly appreciate your cooperation on these issues. If you have any questions, please do not hesitate to contact me at (215) 269-2142.

Very truly yours,

Earth Tech, Inc.

MFBedard

Michael F. Bedard, P.E.
Project Manager

c: Jim Forney, Steve Lonneman, Laura Keener, WM
M. Christopher, Earth Tech

N:\ENV\PROJECTS\33976\CORRESP\EPA\040699TM.WPD

412 Lincoln Highway, Fairless Hills, Pennsylvania 19030

March 12, 1999

Mr. Thomas Matheson
Corrective Action Project Manager
Waste Management Branch
U. S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Subject: **WM-Vickery Phase I RCRA Facility Investigation (RFI)**
Vickery, Ohio
US EPA ID No. OHD 020 273 819

Dear Mr. Matheson:

Telephone
215.269.2100
Facsimile
215.269.2171

As I indicated to you during our telephone conversation on March 9, 1999, Earth Tech intends to use a microwave oven instead of a crock pot and water bath for warming of bagged soil samples that will be subject to headspace screening. Your verbal approval of this method during our conversation allows us to use this method. Earth Tech is in the process of modifying Section 5.7.1.2 of the Workplan text to reflect this change. Next week we will provide "bold/strikeout" text that highlights the revisions, revised "clean" text, and instructions for page insertion into the Workplan binder. The revision package, and the distribution of copies, will be consistent with the previous revisions that have been made to the Workplan.

We greatly appreciate your cooperation on this issue. If you have any questions, please do not hesitate to contact Mr. Jim Forney of WM at (734) 462-6961, or you can contact me at (215) 269-2142.

Very Truly Yours,

Earth Tech, Inc.

Michael F. Bedard, P.E.
Project Manager

c: Jim Forney, Steve Lonneman, WM
M. Christopher, Earth Tech

N:\ENV\PROJECTS\33976\CORRESP\EPA\031299TM.WPD

Waste Management of Ohio, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 311 952 140

March 1, 1999

Mr. Thomas W. Matheson
USEPA - Region V, DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

RE: RCRA Facility Investigation (FRI), Waste Management of Ohio, Inc. Vickery Facility, OHD 020 273 819

Dear Mr. Matheson:

As specified in the RFI workplan, this monthly report is being submitted. The folowing activities were performed in February:

1. On February 19, you were notified of our intent to initiate field activities on March 12, 1999.

2. An organizational meeting was held on February 23 at the Vickery site with Waste Management, Earth Tech (formerly Rust) and Bowser-Morner to prepare for field activities.

If you have any questions, please contact Steve Lonneman at 419-547-3305.

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

412 Lincoln Highway, Fairless Hills, Pennsylvania 19030

Telephone
215.269.2100
Facsimile
215.269.2171

February 19, 1999

Mr. Thomas Matheson
Corrective Action Project Manager
Waste Management Branch
U. S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Subject: **WM-Vickery Phase I RCRA Facility Investigation (RFI)**
Vickery, Ohio
US EPA ID No. OHD 020 273 819

Dear Mr. Matheson:

As I indicated to you during our telephone conversation today, Earth Tech (formerly Rust Environment & Infrastructure, Inc.) intends to begin field sampling at the Waste Management (WM)-Vickery Facility beginning on March 12, 1999. We are sending this letter on behalf of WM to serve as formal notification of the intended start date for field activities. We will arrive at the site March 9, 1999 to prepare for the sampling activities, so an on-site health and safety meeting between representatives of the U. S. Environmental Protection Agency (US EPA), WM, and Earth Tech could occur prior to March 12. Earth Tech suggests holding this meeting March 10, 1999.

As I also indicated during our telephone conversation, Earth Tech intends to follow a field schedule that includes working 10 consecutive days followed by 4 days off, with half days on "working" Sundays. This cycle will start March 9, 1999 and will allow 4-day weekends for the Easter and Memorial Day holidays.

I will contact you to set up the exact date and time for the on-site meeting. If you have any questions regarding the initiation of field activities, please do not hesitate to contact Mr. Jim Forney of WM at (734) 462-6961, or you can contact me at (215) 269-2142.

Very Truly Yours,

Earth Tech, Inc.

MFBedard

Michael F. Bedard, P.E.
Project Manager

c: Jim Forney, Steve Lonneman, WM
M. Christopher, Earth Tech

N:\ENV\PROJECTS\33976\CORRESP\EPA\021999TM.WPD

Waste Management of Ohio, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 311 952 058

January 4, 1999

Mr. Thomas W. Matheson
USEPA - Region V, DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

RE: RCRA Facility Investigation (FRI), Waste Management of Ohio, Inc. Vickery Facility, OHD 020 273 819

Dear Mr. Matheson:

As specified in the RFI workplan, this monthly report is being submitted. As of today, we preparing to initiate field activities in the spring of 1999. If you have any questions, please contact Steve Lonneman at 419-547-3317.

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

Sincerely Yours:
WASTE MANAGEMENT OF OHIO, INC.

F.G. Nicar
General Manager

cc: Agency Correspondence File
Sandy Clark
Steve Lonneman
Jim Forney

Waste Management of Ohio, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 311 952 057

December 1, 1998

Mr. Thomas W. Matheson
USEPA - Region V, DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

RE: RCRA Facility Investigation (RFI), Waste Management of Ohio, Inc. Vickery Facility, OHD 020 273 819

Dear Mr. Matheson:

As specified in the RFI workplan, this monthly report is being submitted. On November 2, 1998, Waste Management of Ohio, Inc (WMO) received final approval of the RFI Workplan and QAPP. WMO is preparing to implement the Workplan and QAPP per the schedule in the workplan.

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

Sincerely Yours:
WASTE MANAGEMENT OF OHIO, INC.

F.G. Nicar
General Manager

cc: Agency Correspondence File
Sandy Clark
Steve Lonneman
Jim Forney, WMI Livonia

Waste Management of Ohio, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 311 952 056

November 4, 1998

Mr. Thomas W. Matheson
USEPA - Region V, DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

RE: RCRA Facility Investigation (RFI), Waste Management of Ohio, Inc. Vickery Facility, OHD 020 273 819

Dear Mr. Matheson:

As specified in the RFI workplan, this monthly report is being submitted. Through the month of October, 1998, we were awaiting approval of the RFI Workplan.

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

Sincerely Yours:
WASTE MANAGEMENT OF OHIO, INC.

F.G. Nicar
General Manager

cc: Agency Correspondence File
Sandy Clark
Steve Lonneman
Jim Forney, WMI Livonia

Waste Management of Ohio, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 311 952 055

October 12, 1998

Mr. Thomas W. Matheson
USEPA - Region V, DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

RE: RCRA Facility Investigation (RFI), Waste Management of Ohio, Inc. Vickery Facility, OHD 020 273 819

Dear Mr. Matheson:

As specified in the RFI workplan, this monthly report is being submitted. As of today, we are awaiting final plan approval.

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

Sincerely Yours:
WASTE MANAGEMENT OF OHIO, INC.

F.G. Nicar
General Manager

cc: Agency Correspondence File
Sandy Clark
Steve Lonneman
Jim Forney, WMI Livonia

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

September 14, 1998

REPLY TO THE ATTENTION OF:

DW-8J

CERTIFIED MAIL: 371 896 644
RETURN RECEIPT REQUESTED

Fred G. Nicar, General Manager
Waste Management of Ohio, Inc.
Vickery Facility
3956 State Route 412
Vickery, Ohio 43464

RE: Deficiencies in the Volatiles in Soil Sampling and Analysis
RCRA Facility Investigation (RFI)
Waste Management of Ohio, Inc. - Vickery Facility
OHD 020 273 819

Dear Mr. Nicar:

The United States Environmental Protection Agency (U.S. EPA) has completed its review of the Waste Management of Ohio, Inc.- Vickery (WM-Vickery) August 25, 1998 Response to Comments and have identified a few deficiencies. The August 25, 1998, submission was in response to the U.S. EPA's July 21, 1998, requirement that WM-Vickery modify its RCRA Facility Investigation (RFI) work plan and quality assurance project plan (QAPP) to adhere to the U.S. EPA's new method of sampling and analysis of volatiles in soils.

The U.S. EPA's deficiency comments are enclosed as an attachment to this letter. WM-Vickery. is required to modify its RFI work plans to address the deficiencies. The modified RFI Work Plan and QAPP shall be submitted no later than thirty (30) days from the receipt of this letter.

All documents and letters submitted by Waste Management of Ohio, Inc.- Vickery must include its U.S. EPA Identification number, which for this facility is OHD 050 273 819. The modified RFI Workplan and QAPP shall be prepared in accordance with the following editorial protocol or convention:

1. Provide a complete listing of all locations where the text has been replaced, modified, deleted, or added and provide the replaced, modified, or added text. This information may be included in an appendix to the documents or as a separate document. The text in the appendix or separate document should have:

Recycled/Recyclable • Printed with Vegetable Oil Based Inks on 50% Recycled Paper (20% Postconsumer)

a. Old language is overstruck.

b. New language is in **bold type**.

c. An itemized list of all replacement pages, sections, tables, etc., that are to be replaced in the modified submission, shall be provided.

2. Page headers must indicate date of submission.

3. If any significant changes are necessary, pages shall be renumbered, table of contents revised, and complete sections provided as required.

In addition to the two copies of the modified submission required by the U.S. EPA, please send one copy of each to:

Edwin Lim
Ohio EPA, DHWM
P.O. Box 1049
1800 WaterMark Drive
Columbus, OH 43266-0149

Chuck Hull
Ohio EPA, NWDO
347 N. Dunbridge Rd.
Bowling Green, OH 43402

If you have any questions, please contact me at (312) 886-7569.

Sincerely,

Thomas Matheson, Corrective Action Project Manager
Waste Management Branch

Enclosure

cc: Ed Lim, OEPA/CO
Chuck Hull, OEPA/NWDO

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 5
DEFICIENCY COMMENTS ON THE AUGUST 25, 1998
VOLATILES IN SOILS SUBMISSION
FOR THE
WASTE MANAGEMENT OF OHIO, INC VICKERY FACILITY

1. Table 1-2 in the QAPP indicates that all VOCs in soil data would be reported using the low concentration analysis. However, it does not anticipate circumstances when a high level concentration (> 200 ug/kg) might have to be reported. Note that a methanol preserved vial will be collected for each sampling point anyway. What is the anticipated data usage for VOCs data in which the reporting limit will be < 200 ug/ kg? Alternatively, for the WM-Vickery RFI, perhaps the extra vial reserved for high level analysis could be a sample in which only 1 to 2 grams of soil has been added. Perhaps this circumstance could be reflected in a footnote to the table.

2. The GP Environmental Services, Inc. (GP) SOP allows for a number of options, which are outlined in the SW-846 5035 method. The sampling plan must detail whether sample vials collected for high level concentration analysis will be sent to the field with methanol already added, or if these samples might be collected using an EnCore sampler prior to immersing these same samples in vials containing methanol in the laboratory. Also, it should be explained whether a 40 mL or 60 mL vial will be used for this purpose. (Bulk samples should not be collected for high level concentration analyses even though this is an allowed option in method 5035. See comment 18 below.)

3. The procedure associated with section 2.3 is not summarized. Should mention be made of the polyethylene glycol (PEG) solvent here? Will this sub-option of the GP SOP most likely be implemented?

4. In section 5.1, add the phrase "...of SW-846." to the end of the sentence.

5. It would be appropriate to mention or reference the procedures to be followed in the event calcareous effervescing soils are encountered in section 6.1.1.3. The "NOTE" in section 6.2.1.2 could be referenced.

6. In section 6.1.3.5, change the phrase, "added to the sample" to "added to the vial containing the soil sample". If the high level concentration (field-preserved) option is used (in lieu of the low level concentration technique), then it would be acceptable to abandon use of the MS/MSD samples for the high level analysis. This is because the matrix being audited would be the methanol soil extraction matrix, not a soil matrix, which would be of lesser interest for the intended purpose of assessing matrix effects.

7. In the "NOTE" in section 6.2.1.2, add reference to the procedure that will be used for sample preservation if soil samples are found to effervesce. (Also, analogous changes should be made to the sample holding time and preservation table in the QAPP.) If soil will effervesce, sodium bisulfate preservative should not be used. Instead reagent grade organic free water should be substituted in 40 mL sample vials. Then samples should be shipped on ice for a period not to exceed two days. They must then be stored for no longer than 12 days at a temperature of less than minus 10 degrees C prior to analysis.

8. In section 6.2.2.3, correct a typo. "Screw-cap".

9. In section 6.2.1.8, how many EnCore samplers should be taken per sample location (in lieu of sample collection using 40 mL vials)? This procedure should be described in detail in the Field Sampling Plan as well.

10. Referring to section 6.2.3, aliquots for dry weight determination should only be taken after the aliquot for methanol preservation has been subsampled (i.e. by adding aliquot to the methanol container). The practice of collecting an unpreserved sample for high level analysis is not recommended however. (reference - "Clarification Regarding use of SW-846 Methods", August 7, 1998.)

11. Modify the sample storage procedure in section 6.4 based on discussion in comment 8 above.

12. The intention of the instructions presented in section 7.1.1.4 is unclear. Referring to the 3rd sentence, surely the calibration standards are not shipped to the field, are they? This must be clarified.

13. In section 7.1.2, is the standard indicated here supposed to be an independently prepared calibration standard?

14. In section 7.1.3.3, the contents of the matrix spiking solution should include all of the key VOC compounds of concern for this project for the soil matrix. These compounds should be identified in the QAPP, Table 1-2.

15. Method 8015 is mentioned in section 7.1.4, when perhaps method 8260B should be referred to (instead or) also.

16. Section 7.2 refers to section 7.3.1, which is not present in this SOP.

17. Is the procedure referred to in section 7.2 intended to be used when an oily soil sample is encountered? The relation of this section to section 6.2.3 is unclear.

18. Section 7.2 refers to weighing soil samples on a top-loading balance prior to analysis. This step would undermine the closed-system strategy and intent to produce data that is as accurate as possible. Therefore, it is not recommended that this procedure be utilized for the WM-Vickery RFI project.

19. Section 7.2.6 refers to section 7.5, which is not in the SOP.

End of Deficiency Comments

Waste Management of Ohio, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 130 072 440

September 2, 1998

Mr. Thomas W. Matheson
USEPA - Region V, DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

RE: RCRA Facility Investigation (RFI), Waste Management of Ohio, Inc. Vickery Facility, OHD 020 273 819

Dear Mr. Matheson:

As specified in the RFI workplan, this monthly report is being submitted. As of today, we are awaiting final plan approval. WMO did submit revised pages for the RFI Workplan and Quality Assurance Project Plan on August 25, 1998.

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

Sincerely Yours:
WASTE MANAGEMENT OF OHIO, INC.

F.G. Nicar
General Manager

cc: Agency Correspondence File
Sandy Clark
Steve Lonneman
Jim Forney, WMI Livonia

Waste Management, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

FEDERAL EXPRESS

August 25, 1998

Mr. Thomas Matheson HRP-8J
U.S. Environmental Protection Agency
Region V
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Subject: Response to Comments - RCRA Facility Investigation (RFI) - Workplan
Vickery Facility, Chemical Waste Management, Inc.
EPA I.D. #OHD020273819

Dear Mr. Matheson:

In response to your letter dated July 21, 1998, attached are three (3) copies of revised pages of the Workplan and Quality Assurance Project Plan.

Copies have been sent to the Ohio Environmental Protection Agency as requested and a copy will be place in the CWM Vickery Information Repository. Should you have any questions regarding this matter, please contact Steve Lonneman at (419) 547-7791.

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

Sincerely,
WASTE MANAGEMENT, INC

F.G. Nicar
General Manager

Attachments

cc w/attachment: Edwin Lim, OEPA DHWM Columbus
Chuck Hull, OEPA NWDO Bowling Green
CWM Vickery Information Repository

Waste Management of Ohio, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

CERTIFIED MAIL
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P 130 072 439

August 11, 1998

Mr. Thomas W. Matheson
USEPA - Region V, DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

RE: RCRA Facility Investigation (RFI), Waste Management of Ohio, Inc. Vickery Facility, OHD 020 273 819

Dear Mr. Matheson:

As specified in the RFI workplan, this monthly report is being submitted. As of today, we are awaiting final plan approval.

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

Sincerely Yours:
WASTE MANAGEMENT OF OHIO, INC.

F.G. Nicar
General Manager

cc: Agency Correspondence File
Sandy Clark
Steve Lonneman
Jim Forney, WMI Livonia

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

July 21, 1998

REPLY TO THE ATTENTION OF:

DW-8J

CERTIFIED MAIL: 371 896 643
RETURN RECEIPT REQUESTED

Fred G. Nicar, General Manager
Waste Management of Ohio, Inc.
Vickery Facility
3956 State Route 412
Vickery, Ohio 43464

RE: Revision to Volatiles in Soil Sampling and Analysis Requirements for the RCRA Facility Investigation (RFI) Waste Management of Ohio, Inc. - Vickery Facility OHD 020 273 819

Dear Mr. Nicar:

In December 1997, the United States Environmental Protection Agency (U.S. EPA) Region 5 issued a directive for change in the methodology for collection and analysis of volatiles in soils for all RCRA investigations. The enclosed directive for change, which became effective on January 1, 1998, requires all facilities to modify its sampling and analysis plan and quality assurance project plan (QAPP) to adhere to the new method of sampling and analysis.

Waste Management of Ohio, Inc. is required to modify its RFI work plans to comply with the revised methodology. The modified RFI Work Plan and QAPP shall be submitted no later than thirty (30) days from the receipt of this letter.

All documents and letters submitted by Waste Management of Ohio, Inc.- Vickery must include its U.S. EPA Identification number, which for this facility is OHD 050 273 819. The modified RFI Workplan and QAPP shall be prepared in accordance with the following editorial protocol or convention:

1. Provide a complete listing of all locations where the text has been replaced, modified, deleted, or added and provide the replaced, modified, or added text. This information may be included in an appendix to the documents or as a separate document. The text in the appendix or separate document should have:

Recycled/Recyclable - Printed with Vegetable Oil Based Inks on 50% Recycled Paper (20% Postconsumer)

a. Old language is overstruck.

b. New language is in **bold type**.

c. An itemized list of all replacement pages, sections, tables, etc., that are to be replaced in the modified submission, shall be provided.

2. Page headers must indicate date of submission.

3. If any significant changes are necessary, pages shall be renumbered, table of contents revised, and complete sections provided as required.

In addition to the two copies of the modified submission required by the U.S. EPA, please send one copy of each to:

Edwin Lim
Ohio EPA, DHWM
P.O. Box 1049
1800 WaterMark Drive
Columbus, OH 43266-0149

Chuck Hull
Ohio EPA, NWDO
347 N. Dunbridge Rd.
Bowling Green, OH 43402

If you have any questions, please contact me at (312) 886-7569.

Sincerely,

Thomas Matheson, Corrective Action Project Manager
Waste Management Branch

Enclosure

cc: Ed Lim, OEPA/CO
Chuck Hull, OEPA/NWDO

December 22, 1997

MEMORANDUM

SUBJECT: Determination of Volatiles in Soil - Directive for Change

FROM: Norman R. Niedergang, Director
Waste, Pesticides and Toxics Division

TO: Corrective Action Project Managers
QA Staff

I. INTRODUCTION/SUMMARY

Soil/Solids traditionally have been collected for volatile organic determinations using "low concentration volatiles in soil" techniques described in Update II to SW-846, or earlier editions. Update III to SW-846, published June 13, 1997, deleted the "low concentration volatiles in soil" sample collection/laboratory procedure. Update III mandates that analysis aliquots (field or off-site lab) be collected in the VOA vial (with TFE lined septa cap) used for laboratory analysis. Either a methanol extraction reagent or a matrix modifying reagent are to be added to a soil aliquot at time of sample collection. Separate soil samples are collected for percent moisture determinations for reporting volatile results on a dry weight basis.

Technical and QA staff of our Waste, Pesticides and Toxics Division (WPTD) have reviewed and disseminated published experimental data comparing Update II and Update III soil sample collection techniques for volatile organics. Our Division has supported some of this work through the UST program in Wisconsin. Update III sample collection techniques are more complicated and tedious for volatiles than those of Update II; however, the accuracy of the modern Update III soil collection techniques warrant their immediate use versus traditional methods. Previous methodology has been shown to significantly under-report the presence of volatiles in soil.

II. DIRECTIVE

1. Starting January 1, 1998, all RCRA Corrective Actions and Underground Storage Tank (UST) activities under the direct control of the Waste, Pesticides and Toxics Division will determine volatiles in soil using sample collection procedures

   consistent with Methods 5021 or 5035 of Update III to SW-846, "Test Methods

for Evaluating Solid Waste" as published in Federal Register of June 13, 1997, Vol. 62, No. 114, pp. 32452-463.

2. If Work Plan/Quality Assurance Project Plans (QAPPs) were approved prior to January 1, 1998 using the traditional "low-concentration volatiles in soil" procedures of Update II to SW-846, these documents are to be modified for future sampling, done after January 1, 1998 to reflect use of Update III techniques for soil/solids. Significant numbers of corrective action soil surveys are not expected to occur during first quarter of calendar year 1998. Time should be available to update sample collection/laboratory test procedures for soil volatiles. Updating these documents will be a high priority of the QA staff. Any exceptional circumstances that suggest use of the old procedure must be brought to the attention of the Corrective Action Process Manager and QA staff no later than January 15, 1998.

3. Although Update III to SW-846 was effective June 13, 1997, EPA's Office of Solid Waste, in a policy memorandum, recommended Update III changes be cautiously implemented to allow laboratory and sampling organizations time to purchase new instrumentation/equipment. A six (6) month delay in implementing Update III was suggested, and this is equivalent to the above January 1, 1998 date.

4. Update III to SW-846 provides three (3) options for volatile determinations of soil, either at on-site field labs, or for off-site analytical support laboratories.

    a. Soils will be collected and tested using only the methanol extract option of Method 5035.

    b. Soils will be collected and tested using both the methanol extract option of Method 5035 for large volatile concentrations and either one of the low concentration procedures of Method 5021/5035.

    c. Alternatively, soils can be collected using the En-Core (or equivalent) sampler for subsequent sample preparation by Methods 5021or 5035 in a field or off-site laboratory.

The need and use of a low concentration option from Method 5021 or Method 5035 will be determined for each Corrective Action or UST activity based on Data Quality Objectives, risk, project needs, intended data use, etc. This directive does not apply to in-situ field determinations of volatiles in soil. Attached to this Directive is a table identifying EPA Region 9 Soil Preliminary Remedial Goals

and Superfund Soil Screening Levels whose values for volatiles are less than 200 ppb. The table identifies critical volatile compounds that may dictate use of low concentration options. The 200 ppb cutoff is taken from SW-846 guidance. This criteria may vary for specific lab instrumentation.

5. It is relatively easy to implement the methanol extraction for sample collection/laboratory analysis. Volatile soil determinations, using methanol, are done using the same instrumentation currently in place for waters. Many or most laboratories are now purchasing sample preparation instrumentation necessary for the low concentration option of Method 5035, or for Method 5021, hence the 6-month delay in implementation. Consistent use of Update III will provide a level playing field for sampling/lab organizations.

6. U.S. EPA contractor support (e.g.,-oversight activities) for RCRA Corrective Action or UST activities, will determine volatiles in soil/solids using Update III procedures.

7. Soils/samples tested at the Region 5 Central Regional Laboratory for the WPTD will determine soil volatiles consistent with Update III.

III. DETAILED BACKGROUND

The analysis of volatile organic compounds, or volatiles in soil commonly has utilized collection of a soil in a 40-60 ml VOA vial with TFE lined septa, refrigerated transport to a laboratory (field or off-site), and soil subaliquots (2-5) selected by the laboratory for heated purge and trap GC or GC/MS analysis. This process has been known as the "low concentration volatiles in soil" test procedure. For medium or high level volatile concentrations in soil, the laboratory could alternatively extract the soil with water-misible methanol extraction solvent and then test the methanol extract (after dilution) as they would for water. Methanol extraction values were traditionally a very minor part of all volatile soil data reported.

A large body of state, federal, and private research, independent from operational EPA staff and programs, has demonstrated the above "low concentration volatiles in soil" methodology to be inaccurate and biased low versus sample collection in the specific VOA containers used for laboratory analysis (field or lab). Negative errors are commonly observed for the traditional technique and are caused by a variety of field/transport/lab volatile concentration losses.

Update III to SW-846, published in the June 13, 1997 Federal Register, deleted the "low concentration volatiles in soil" protocol from the manual and replaced it with the following three (3) alternatives:

1. Method 5021 - Heated Head Space. This is applicable to volatile concentration below 200 ppb.

2. Method 5035 - Heated Purge and Trap (Low Concentration Option in range of 5 to 200 ppb). Five (5) mls of a matrix modifying solution is added to 2-5g of soil at time of sample collection.

3. Method 5035 - Methanol Extract (High Concentration Option for volatiles exceeding 200 ppb). Methanol is added to 2-5g of soil at time of collection, then subsequently diluted with water and tested for volatiles by Method 5030.

All of the three alternatives require a tared VOA vial with matrix modifying solution or methanol, addition of 2-5g soil at time of collection to the vial, and then a final vial weight to determine soil aliquot weight by difference. Separate vials are used for the collection and determination of soil moisture content.

The above options can be implemented in several ways depending on field or off-site lab capability or based on Data Quality Objectives.

1. A separate VOA vial is always collected for a percent moisture value.

2. A single methanol extract VOA vial is collected for each soil site to provide for volatile concentrations exceeding 200 ppb. Analyses can be repeated, since the methanol extract is easily rediluted.

3. Two or more low concentration option VOA vials (Methods 5021 or 5035) are collected for each soil site. One is necessary for concentration measurements below 200 ppb - the other serves as a backup for any reanalyses. The heated headspace analysis (Method 5021) can be repeated using a different or smaller air volume.

4. The methanol extract VOA vial alone may suffice for many soil surveys. The low level options of Methods 5021 and 5035 may be unnecessary, depending on DQOs or risk assessment values. A unique aspect of methanol extracts is that soils can be composited for volatiles via their methanol extracts.

5. Method 5035 specifies/approves the use of the En-Core proprietary/patented soil sampler, as an alternative to use of methanol reagent in the field. This sampler can collect 5g soil cores with no loss in sample integrity if transported to a lab within two days of sample collection. Sample preparation can then be done by any of the above techniques.

The above procedures and alternatives are more complicated and tedious than the traditional "low-concentration volatiles in soil," however, their accuracy warrants and justifies their use versus the traditional techniques. The new procedures require careful coordination between

field and lab personnel and use of VOA vials that are compatible with specific laboratory instrumentation. For more information, or assistance in choosing the new option best suited to project objectives, please consult with QA staff members.

Attachment

ATTACHMENT

Volatile Contaminants, whose EPA Region 9 Soil Preliminary Remedial Goals (PRGs) or Superfund Soil Screening Levels:

1. Are less than 200 ppb (ug/kg) threshold/detection of methanol extraction for method 8260; or
2. Between 200 and 1,000 ppb (0.2 - 1.0 ppm), where quantitation is uncertain for method 8260 after methanol extraction of soil.

Tap Water PRGs which are less than 1 ug/L (ppb) (threshold of Method 8260) are listed for comparison.
(If Soil PRG is greater than 1,000 ppb or 1.0 ppm, it is not listed and methanol extraction should be successful for risk assessment.)

Volatile Contaminant Group	**Soil Residential PRG (ug/kg or ppb) (<200) (200-1000)**	**Soil Industrial PRG (ug/kg or ppb) (<200) (200-1000)**	**Superfund Soil Screening level-DAF 20 (ug/kg or ppb) (<200) (200-1000)**	**Tap Water PRG (ug/L) (<1)**
Appendix IX Hydrocarbon:				
benzene (ca)	630		30	0.39
Non Appendix IX Hydrocarbon:				
1,3 butadiene (ca)	6.5	14	Not Available	.011
Common Appendix IX Halogenated Hydrocarbons:				
bromomethane (nc)			800	
carbon tetrachloride (ca)	230	500	70	.17
1,2 dichloroethane (ca)	250	550	20	.12
1,1 dichloroethene (ca)	37	80	60	.046
cis-1,2 dichloroethene (nc)			400	
trans-1,2 dichloroethene (nc)			700	
1,2 dichloropropane (ca)	310	680	30	.16
1,3 dichloropropene (ca)	250	550	4	.081
methylene chloride (ca)			20	4.3 (lab cont.)
Volatile Contaminant Group	**Soil Residential (ug/kg or ppb) (<200) (200-1000)**	**Soil Industrial PRG (ug/kg or ppb) (<200) (200-1000)**	**Superfund Soil Screening level -DAF 20 (ug/kg or ppb) (<200) (200-1000)**	**Tap Water PRG (ug/L) (<1)**

1,1,2,2 tetrachloroethane (ca)	450		3	.055
1,1,1,2 tetrachloroethane (ca)				.43
tetrachloroethene (PCE) (ca)			60	1.1
1,1,2 trichloroethene (ca)	650		20	.20
Vinyl chloride	16	35	10	.02
1,4 dichlorobenzene (ca)				.47
Non Appendix IX Halogenated Hydrocarbons:				
vinyl bromide (ca)	190		410	.10
Appendix IX Trihalomethanes:				
chloroform (ca)	250	530	600	.16
bromodichloromethane (ca)	630		600	.18
Dibromochloromethane (ca)			400	1.0
Bromoform (ca)			800	
Specialized Appendix IX Halogenated Hydrocarbons:				
1,2 dibromo-3-chloropropane (DBCP) (ca)	320		Not Available	.048
1,2 dibromoethane (EDB) (ca)	4.9	20	Not Available	.00076
1,4 dichloro-2-butene (ca)	7.5	100	Not Available	.0012
1,2,3 trichloropropane (ca)	1.4	3.1	Not Available	.0016
Volatile Contaminant Group	**Soil Residential PRG (ug/kg or ppb) (<200) (200-1000)**	**Soil Industrial PRG (ug/kg or ppb) (<200) (200-1000)**	**Superfund Soil Screening Level- DAF 20 (ug/kg or ppb) (<200) (200-1000)**	**Tap Water PRG (Ug/L) (<1)**
Appendix IX Water -- Miscible Volatiles:				
acrolein (nc)	100	340*	Not Available	.042

acrylonitrile	190	470*	Not Available	3.7*
1,4 dioxane			Not Available	1.0*
methacrylonitrile (nc)	2,000*		Not available	
acetonitrile (nc)			Not Available	71*
non Appendix IX Water Miscible Volatiles:				
acrylamide (ca)	980		Not Available	.015
ethyl acrylate (ca)	210	450	Not Available	.23
ethylene oxide (ca)	130	320	Not Available	.024
malonitrile (nc)	1,300*		Not Available	.73
propylene oxide (ca)	Not Available	Not Available	Not Available	.22

Ca) - Cancer PRG **(Nca) - noncancer PRG**

*All water miscible volatiles have poor purging efficiencies by method 8260. Detection limits are elevated for method 8260 for these types of volatiles. Asterisked volatile criteria are adjusted for purging efficiency. 1,4 dioxane has less than 1% purging efficiency at room temperature.

Waste Management of Ohio, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

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JUL 08 1998
DIVISION FRONT OFFICE
Waste, Pesticides & Toxics Division
U.S. EPA—REGION 5

CERTIFIED MAIL
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P 130 072 437

July 1, 1998

Mr. Thomas W. Matheson
USEPA - Region V, DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

RE: RCRA Facility Investigation (RFI), Waste Management of Ohio, Inc. Vickery Facility, OHD 020 273 819

Dear Mr. Matheson:

As specified in the RFI workplan, this monthly report is being submitted. As of today, we are awaiting final plan approval. Additional information was submitted to Mr. Alan Debus from GP Environmental Services related to the results of the PE sample.

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

Sincerely Yours:
WASTE MANAGEMENT OF OHIO, INC.

F.G. Nicar

F.G. Nicar
General Manager

cc: Agency Correspondence File
Sandy Clark
Steve Lonneman
Jim Forney, WMI Livonia

Waste Management of Ohio, Inc.

3956 State Route 412 • Vickery, Ohio 43464 • 419-547-7791 • Fax: 419-547-6144

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RECEIVED
MAY 22 1998
DIVISION FRONT OFFICE
Waste, Pesticides & Toxics Division
U.S. EPA – REGION 5

May 15, 1998

Mr. Thomas W. Matheson
USEPA - Region V, DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

RE: RCRA Facility Investigation (RFI), Waste Management of Ohio, Inc. Vickery Facility, OHD 020 273 819

Dear Mr. Matheson:

As specified in the RFI workplan, this monthly report is being submitted. As of today, we are awaiting final plan approval.

I'd like to introduce to you Mr. Jim Forney. Jim will be contacting you in the future related to this project. Jim will be function as project manager in the future. He can be reached at 313-462-6961 in out Livonia, Michigan office. If you have any questions, please contact Steve Lonneman at 419-547-3317.

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

Sincerely Yours:
WASTE MANAGEMENT OF OHIO, INC.

F.G. Nicar

F.G. Nicar
General Manager

Waste Management of Ohio, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

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JUN 09 1998
DIVISION FRONT OFFICE
Waste, Pesticides & Toxics Division
U.S. EPA – REGION 5

CERTIFIED MAIL
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June 1, 1998

Mr. Thomas W. Matheson
USEPA - Region V, DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

RE: RCRA Facility Investigation (RFI), Waste Management of Ohio, Inc. Vickery Facility, OHD 020 273 819

Dear Mr. Matheson:

As specified in the RFI workplan, this monthly report is being submitted. As of today, we are awaiting final plan approval. A conference call was held on Friday, May 29, 1998 to review the results of the PE sample. Participants in this call included USEPA, RUST, GP Environmental Lab, and WMO.

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

Sincerely Yours:
WASTE MANAGEMENT OF OHIO, INC.

F.G. Nicar

F.G. Nicar
General Manager

cc: Agency Correspondence File
Sandy Clark
Steve Lonneman
Jim Forney, WMI Livonia

Waste Management of Ohio, Inc.

3956 STATE ROUTE 412 VICKERY, OHIO 43464 419-547-7791 FAX: 419-547-6144

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RECEIVED
MAR 06 1998
DIVISION FRONT OFFICE
Waste, Pesticides & Toxics Division
U.S. EPA – REGION 5

March 2, 1998

Mr. Thomas W. Matheson
USEPA - Region V, DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

RE: RCRA Facility Investigation (FRI), Waste Management of Ohio, Inc. Vickery Facility, OHD 020 273 819

Dear Mr. Matheson:

As specified in the RFI workplan, this monthly report is being submitted. As of today, we are awaiting final plan approval.

If you have any questions, please contact Steve Lonneman at 419-547-3317.

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

Sincerely Yours:
WASTE MANAGEMENT OF OHIO, INC.

F.G. Nicar
General Manager

cc: Agency Correspondence File
Sandy Clark
Steve Lonneman

Waste Management of Ohio, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

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FEB 11 1997
DIVISION FRONT OFFICE
Waste, Pesticides & Toxics Division
U.S. EPA – REGION 5

February 2, 1998

Mr. Thomas W. Matheson
USEPA - Region V, DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

RE: RCRA Facility Investigation (FRI), Waste Management of Ohio, Inc. Vickery Facility, OHD 020 273 819

Dear Mr. Matheson:

As specified in the RFI workplan, this monthly report is being submitted. As of today, we are awaiting final plan approval.

If you have any questions, please contact Steve Lonneman at 419-547-3317.

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

Sincerely Yours:
WASTE MANAGEMENT OF OHIO, INC.

F.G. Nicar
General Manager

cc: Agency Correspondence File
Sandy Clark

Tetra Tech EM Inc.

200 E. Randolph Drive, Suite 4700 ◆ Chicago, IL 60601 ◆ (312) 856-8700 ◆ FAX (312) 938-0118

January 26, 1998

Mr. Tom Matheson
U.S. Environmental Protection Agency Region 5
77 West Jackson Boulevard
Chicago, IL 60604

Subject: **Technical Review Comments on the Method Detection Limit (MDL) Study Conducted by GP Environmental Services (GP) Chemical Waste Management (CWM), Vickery, Ohio EPA Contract No. 68-W4-0007, Work Assignment No. R05021**

Dear Mr. Matheson:

On September 11, 1997, U.S. Environmental Protection Agency (EPA) Region 5 issued a conditional approval of the Resource Conservation and Recovery Act (RCRA) facility investigation work plan and quality assurance project plan (QAPP) for the above-referenced facility. One of the conditions for approval required CWM's contractor laboratory, GP, to participate in and pass a laboratary performance evaluation. The above-referenced MDL study is part of this laboratory performance evaluation. The MDL study provides soil and water data pertaining to SW-846 Methods 8260A, 8270B, 8081, 8150B, 6010A, and 7470. It should be noted that Method 8150B, used by GP in this study, has been deleted from SW-846 and replaced by Method 8151A. Also, Method 7470 was used in this study for the analysis of mercury in soil; however, Table 1-7 of the QAPP references Method 7471A for this analysis.

Tetra Tech EM Inc. (Tetra Tech) is providing the enclosed technical review comments on the MDL study. Tetra Tech reviewed the MDL study to answer questions and concerns Tetra Tech received from EPA along with GP's MDL study on January 8, 1998. Tetra Tech's specific review comments on the MDL study to address EPA questions are included the enclosure.

Because more than one set of study results are sometimes presented, Tetra Tech's review needs explanation. First, water MDL data for Method 8260A dated March 5, 1997, and May 1, 1997, are both included in the MDL study results. The March 1997 results were obtained using a 25-milliliter (mL) purge, and the May 1997 results were obtained using a 5-mL purge. According to GP, the 25-mL purge produces a lower MDL than the 5-mL purge. Because GP will be using a 25-mL purge for all CWM samples, the March 1997 results were used in this review. Second, two sets of water MDL results for Method 8270B are included in the MDL study. Each table presents a different compound list; therefore, Tetra Tech reviewed both sets of results. Finally, backup data for the soil results for Method 8270B are dated later than the final result table and show different final MDL results. Tetra Tech used the most recent soil results for its review.

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This letter and the enclosure have also been sent to you by e-mail. The enclosed hard copy constitutes Tetra Tech's official deliverable. If you have any questions about these comments, please call me at (312) 946-6479 or Harry Ellis at (312) 856-8756.

Sincerely,

Jill Ciraulo

Jill Ciraulo
Project Manager

Enclosure

cc: Bernie Orenstein, EPA Region 5 (letter only)
Ed Schuessler, Tetra Tech (letter only)
Art Glazer, Tetra Tech
Harry Ellis, Tetra Tech

ENCLOSURE

TECHNICAL REVIEW COMMENTS ON THE METHOD DETECTION LIMIT (MDL) STUDY CONDUCTED BY GP ENVIRONMENTAL SERVICES (GP) CHEMICAL WASTE MANAGEMENT (CWM), VICKERY, OHIO

(Four Pages)

TECHNICAL REVIEW COMMENTS ON THE METHOD DETECTION LIMIT (MDL) STUDY CONDUCTED BY GP ENVIRONMENTAL SERVICES (GP) CHEMICAL WASTE MANAGEMENT (CWM), VICKERY, OHIO

On September 11, 1997, U.S. Environmental Protection Agency (EPA) Region 5 issued a conditional approval of the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) workplan and quality assurance project plan (QAPP) for the above-referenced site. One of the conditions for approval required CWM's contractor laboratory, GP, to participate in and pass a laboratory performance evaluation. The above-referenced MDL study is part of this laboratory performance evaluation. The MDL study provides soil and water data pertaining to SW-846 Methods 8260A, 8270B, 8081, 8150B, 6010A, and 7470. It should be noted that Method 8150B, used by GP in this study, has been deleted from SW-846 and replaced by Method 8151A. Also, Method 7470 was used in this study for the analysis of mercury in soil; however, Table 1-7 of the QAPP references Method 7471A for this analysis.

Tetra Tech EM Inc. (Tetra Tech) reviewed the MDL study report to answer questions and concerns Tetra Tech received from EPA along with GP's MDL study on January 8, 1998. Because more than one set of study results are sometimes presented, Tetra Tech's review needs explanation. First, water MDL data for Method 8260A dated March 5, 1997, and May 1, 1997, are both included in the MDL study results. The March 1997 results were obtained using a 25-milliliter (mL) purge, and the May 1997 results were obtained using a 5-mL purge. According to GP, the 25-mL purge produces a lower MDL than the 5-mL purge. Because GP will be using a 25-mL purge for all CWM samples, the March 1997 results were used in this review. Second, two sets of water MDL results for Method 8270B are included in the MDL study. Each table presents a different compound list; therefore, Tetra Tech reviewed both sets of results. Finally, backup data for the soil results for Method 8270B are dated later than the final result table and show different final MDL results. Tetra Tech used the most recent soil results for its review.

The following specific comments address questions Tetra Tech received from EPA regarding the document.

SPECIFIC COMMENTS

1. EPA question: Do the calculations of the MDL values match the 1984 Federal Register (FR) guidance?

   GP's calculations of the MDL values appear to match the calculation method set forth in the 1984 FR guidance. Tetra Tech recalculated 10 percent of the listed MDLs for each method using the official procedure presented in Appendix B of Title 40 Code of Federal Regulations (CFR) 136, which is the same as the method in the 1984 FR guidance. Minor differences between Tetra Tech's calculation results and those listed in the MDL study are attributable to roundoff errors, not procedural errors. The analytical instruments generally give concentration results to six or seven digits, and GP apparently used all of these digits all the way through the calculations, not rounding off until the end, which is a good procedure. However, some of the tabulated analytical results available to Tetra Tech for recalculating MDLs were presented to only one or two significant figures, such as 0.9 and 1.1. These figures produced results slightly different from those listed in the MDL study because of roundoff error. GP calculations using the values generated by analytical instruments provide the more accurate MDLs.

2. EPA question: Are the practical quantitation limits (PQL) listed in the MDL study realistic, specifically those for acetone and acrylonitrile?

   The numbers listed as laboratory PQLs for acetone, acrolein, acrylonitrile, and 2-chloroethylvinyl ether for water using Method 8260A dated March 5, 1997, are not realistic because the PQLs for these compounds are less than the MDLs.

   The MDL is the lowest concentration one can be 99 percent certain of detecting in spite of instrumental "noise" and the PQL is the lowest concentration one can put a reasonably accurate number on; therefore, the PQL is normally set as a small multiple (greater than 2) of the MDL. GP apparently did not use this method in setting PQLs. This may not be an issue of concern for this project because the project reporting limits (PRL) for acetone, acrolein, and acrylonitrile are well above the MDLs listed in the study results and because 2-chloroethylvinyl ether is not a contaminant of concern at this site.

3. EPA question: Can the laboratory meet the QAPP requirements?

   Tetra Tech compared the QAPP PRLs and the laboratory MDLs from GP. In general, PRLs should be at least twice the MDL values. In several cases, GP's MDL is close to or actually exceeds the PRL, and the laboratory cannot meet the PRL requirements in the QAPP. The following tables summarize these cases.

TABLE E-1
COMPARISON OF AQUEOUS PRLs
AND CALCULATED MDLs

QAPP Table No.	Compound	PRL (μg/L)	MDL (μg/L)
1-3	Benzo(a)anthracene	1	1.1
1-3	Benzo(b)fluoranthene	3	2.5
1-3	Benzo(k)fluoranthene	3	2.6
1-3	Chlorobenzilate	2	2.0
1-3	Chrysene	1	1.3
1-3	Dimethoate	3	2.6
1-3	2,4-Dimethylphenol	10	10.2
1-3	1,3-Dinitrobenzene	1	2.2
1-3	Hexachlorobenzene	10	9.5
1-3	Hexachlorocyclopentadiene	10	8.9
1-3	Indeno(1,2,3-cd)pyrene	1	1.4
1-3	Pentachloronitrobenzene	NA	2.2
1-3	Tetraethyldithiopyrophosphate	0.70	NA
1-3	2,4,6-Trichlorophenol	2	4.7
1-4	Hexachlorophene	50	NA
1-5	Disulfoton [a]	0.7	3.3
1-5	Phorate [a]	0.4	4.7
1-5	Ethylparathion [a]	0.6	2.6
1-5	Methylparathion [a]	1.2	2.6
1-7	Lead	1.0	1.3
1-7	Selenium	2.0	2.5
1-7	Silver	1.0	0.7
1-7	Cyanide	5.0	NA

NA = Not available, no values presented in the report
MDL = Method detection limit
PRL = Project reporting limit
QAPP = Quality assurance project plan
μg/L = Microgram per liter

[a] The laboratory proposes to analyze the Method 8141A analytes (organophosphorus pesticides in Table 1-5 of the QAPP) by Method 8270; therefore, their MDLs are rather high.

TABLE E-2
COMPARISON OF SOIL PRLs
AND CALCULATED MDLs

QAPP Table No.	Compounds	PRL (μg/kg)	MDL (μg/kg)
1-2	Chloroform	0.21	0.54
1-5	Disulfoton	4.69	NA
1-5	Phorate	2.68	NA
1-5	Ethylparathion	4.02	NA
1-5	Methylparathion	8.04	NA
1-5	Famphur	660	NA
1-6	2, 4-D	20	56.84
1-6	Dinoseb	14	23.45
1-6	2, 4, 5-TP (Silvex)	2	58.80
1-6	2, 4, 5-T	2	22.05
1-7	Lead	100	130

NA = Not available, no values presented in the report
MDL = Method detection limit
PRL = Project reporting limit
QAPP = Quality assurance project plan
μg/kg = Microgram per kilogram

Waste Management of Ohio, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 130 072 426

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JAN 08 1998
DIVISION FRONT OFFICE
Waste, Pesticides & Toxics Division
U.S. EPA – REGION 5

January 6, 1998

Mr. Thomas W. Matheson
USEPA - Region V, DRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

RE: RCRA Facility Investigation (FRI), Waste Management of Ohio, Inc. Vickery Facility, OHD 020 273 819

Dear Mr. Matheson:

As specified in the RFI workplan, this monthly report is being submitted. As of today, we are awaiting final plan approval.

If you have any questions, please contact Steve Lonneman at 419-547-3317.

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

Sincerely Yours:
WASTE MANAGEMENT OF OHIO, INC.

F.G. Nicar

F.G. Nicar
General Manager

cc: Agency Correspondence File
Sandy Clark

Waste Management, Inc.

3956 State Route 412 • Vickery, Ohio 43464 • 419-547-7791 • Fax: 419-547-6144

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DIVISION FRONT OFFICE
Waste, Pesticides & Toxics Division
U.S. EPA – REGION 5

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P 130 072 424

December 5, 1997

Mr. Thomas W. Matheson
USEPA - Region V, HRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Dear Mr. Matheson:

As we discussed yesterday on the telephone, Chemical Waste Management, Inc., (CWM) Vickery, Ohio is beginning implementation of the RCRA Facility Investigation (RFI) workplan as required by your conditional approval received on September 15, 1997.

As you confirmed, you have received both the revised workplan and quality assurance project plan (QAPP). CWM is planning to beginning field work in the spring of 1998. As we discussed, field work will not begin until we have received final approval of the workplan and QAPP. We will begin submitting monthly reports as specified in the workplan. As of today, we are awaiting final plan approval.

Sincerely yours,
Chemical Waste Management, Inc.

Stephen C. Lonneman
Project Manager

cc: Agency Correspondence File

Tetra Tech EM Inc.

200 E. Randolph Drive, Suite 4700 ◆ Chicago, IL 60601 ◆ (312) 856-8700 ◆ FAX (312) 938-0118

December 4, 1997

Mr. Tom Matheson
U.S. Environmental Protection Agency Region 5
77 West Jackson Boulevard
Chicago, IL 60604

Subject: **Technical Review Comments on November 1997 Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Work Plan, Chemical Waste Management (CWM), Vickery, Ohio EPA Contract No. 68-W4-0007, Work Assignment No. R05021**

Dear Mr. Matheson:

Tetra Tech EM Inc. (Tetra Tech) is providing its final technical review comments on the above-referenced document. Tetra Tech reviewed the document to determine whether the U.S. Environmental Protection Agency (EPA) conditional approval comments dated September 11, 1997, which were discussed at the October 15, 1997, meeting between EPA, CWM, and Tetra Tech, had been addressed. In reviewing the RFI work plan dated November 1997, Tetra Tech found that all the EPA conditional approval comments had been addressed. However, one issue that was discussed at the meeting has been only partially addressed. This issue is discussed below.

The old truck scale was added to area of concern (AOC) F as requested in EPA's conditional approval comments. At the October 15, 1997, meeting it was agreed that the old truck scale would be added to the RFI and that a total of four surface soil samples would be collected, three at the back end of the scale and one at the front end. However, Figure 5-24 indicates that only one surface soil sample will be collected at this location. CWM should revise the figure to show that three additional surface soil samples will be collected at this location.

This letter has also been sent to you via e-mail. The hard copy constitutes Tetra Tech's official deliverable. If you have any questions about Tetra Tech's comments, please call me at (312) 946-6479.

Sincerely,

Jill Ciraulo

Jill Ciraulo
Project Manager

cc: Bernie Orenstein, EPA Region 5
Ed Schuessler, Tetra Tech
Art Glazer, Tetra Tech

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Waste Management, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

FEDERAL EXPRESS

November 21, 1997

Mr. Thomas Matheson HRP-8J
U.S. Environmental Protection Agency
Region V
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Subject: Response to Comments - RCRA Facility Investigation (RFI) - Workplan
Vickery Facility, Chemical Waste Management, Inc.
EPA I.D. #OHD020273819

Dear Mr. Matheson:

In response to you letter dated September 11, 1997 and our meeting of October 15, 1997, attached are ~~four (4)~~ three (3) copies of our revised Quality Assurance Project Plan.

Copies have been sent to the Ohio Environmental Protection Agency as requested and a copy will be place in the CWM Vickery Information Repository. Should you have any questions regarding this matter, please contact Steve Lonneman at (419) 547-7791.

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

Sincerely,
WASTE MANAGEMENT, INC

F.G. Nicar

F.G. Nicar
General Manager

Attachments

cc w/attachment: Edwin Lim, OEPA DHWM Columbus
Chuck Hull, OEPA NWDO Bowling Green
CWM Vickery Information Repository

Waste Management, Inc.

3956 STATE ROUTE 412 • VICKERY, OHIO 43464 • 419-547-7791 • FAX: 419-547-6144

FEDERAL EXPRESS

November 14, 1997

Mr. Thomas Matheson HRP-8J
U.S. Environmental Protection Agency
Region V
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Subject: Response to Comments - RCRA Facility Investigation (RFI) - Workplan
Vickery Facility, Chemical Waste Management, Inc.
EPA I.D. #OHD020273819

Dear Mr. Matheson:

In response to you letter dated September 11, 1997 and our meeting of October 15, 1997, attached are our comments together with ~~four (4)~~ 3 copies of our revised Workplan. As directed in our meeting, we have completed the Workplan and the Quality Assurance Project Plan is being completed and will be sent under separate cover.

Copies have been sent to the Ohio Environmental Protection Agency as requested and a copy will be place in the CWM Vickery Information Repository. Should you have any questions regarding this matter, please contact Steve Lonneman at (419) 547-7791.

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

Sincerely,
WASTE MANAGEMENT, INC

F.G. Nicar
General Manager

Attachments

cc w/attachment: Edwin Lim, OEPA DHWM Columbus
Chuck Hull, OEPA NWDO Bowling Green
CWM Vickery Information Repository

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

September 11, 1997

REPLY TO THE ATTENTION OF:
DRP-8J

CERTIFIED MAIL: P 371 896 627
RETURN RECEIPT REQUESTED

Fred G. Nicar, General Manager
Chemical Waste Management, Inc.
Vickery Facility
3956 State Route 412
Vickery, Ohio 43464

RE: Conditional Approval RCRA Facility Investigation (RFI) Workplan and Quality Assurance Project Plan (QAPP), Chemical Waste Management, Inc. Vickery Facility (CWM-Vickery)
OHD 020 273 819

Dear Mr. Nicar:

The United States Environmental Protection Agency (U.S. EPA) has reviewed CWM-Vickery's RFI Workplan and RFI Workplan Quality Assurance Project Plan (QAPP) dated May 1996 and has determined the documents to be deficient in some areas.

In an effort to move this project forward, the U.S. EPA decided to undertake an endeavor to correct the deficiencies identified in CWM-Vickery's submissions. Through this effort, CWM-Vickery will be able to receive a conditional approval of its RFI Work Plan and QAPP by incorporating the U.S. EPA's conditions into its RFI Work Plan and QAPP. The U.S. EPA conditions are of two different types: (1) comments that include specific instructions on how to revise the text of the work plan and QAPP and, in some cases, exact replacement text and (2) comments identifying missing information that prevent specific instructions from being provided and that shall therefore be provided by CWM-Vickery.

In a effort to expedite the approval process, the U.S. EPA **conditionally approves** the RFI Work Plan, provided CWM-Vickery incorporates the condtitions in its Final RFI Work Plan and QAPP and its laboratory successfully completes a performance evaluation sample demonstration audit. The U.S. EPA will review the submissions identified in the conditions and if satisfactory, will grant full approval to CWM-Vickery. The modified RFI Work Plan and QAPP shall be submitted no later than sixty (60) days from the receipt of this letter. Within thirty days from receipt of this letter, CWM-Vickery must arrange to meet with the U.S. EPA to discuss issues associated with implementation of the conditionally approved RFI Work Plan and QAPP.

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Again, U.S. EPA approval of the RFI Work Plan and QAPP is contingent upon CWM-Vickery's incorporation of the enclosed comments and full approval will be granted when CWM-Vickery submits the information identified in the enclosed comments and its laboratory participates and passes a laboratory performance evaluation sample demonstration audit.

All documents and letters submitted by CWM-Vickery must include its **U.S. EPA Identification number**, which for this facility is **OHD 050 273 819**. The modified RFI Workplan and QAPP shall be prepared in accordance with the following editorial protocol or convention:

1. Provide a complete listing of all locations where the text has been replaced, modified, deleted, or added and provide the replaced, modified, or added text. This information may be included in an appendix to the documents or as a separate document. The text in the appendix or separate document should have:

    a. Old language is overstruck.

    b. New language is capitalized.

    c. An itemized list of all replacement pages, sections, tables, etc., that are to be replaced in the modified submission, shall be provided.

2. Page headers must indicate date of submission.

3. If any significant changes are necessary, pages shall be renumbered, table of contents revised, and complete sections provided as required.

In addition to three copies of the modified submission required by the U.S. EPA, please send one copy of each to:

Edwin Lim
Ohio EPA, DHWM
P.O. Box 1049
1800 WaterMark Drive
Columbus, OH 43266-0149

Chuck Hull
Ohio EPA, NWDO
347 N. Dunbridge Rd.
Bowling Green, OH 43402

If you have any questions, please contact me at (312) 886-7569.

Sincerely,

Thomas Matheson

Thomas Matheson, Corrective Action Project Manager
Waste Management Branch

Enclosures

cc: Ed Lim, OEPA
Chuck Hull, OEPA/NWDO

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 5
CONDITIONS OF APPROVAL FOR THE
CHEMICAL WASTE MANAGEMENT, INC VICKERY FACILITY
RFI WORKPLAN AND QAPP

RFI WORK PLAN CONDITIONS

The United States Environmental Protection Agency (U.S. EPA), conducted a technical review of the revised Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) Phase I work plan for the Chemical Waste Management-Vickery, Inc. (CWM-Vickery), facility in Vickery, Ohio. The revised RFI work plan, dated May, 1996, was prepared by RUST Environment and Infrastructure, Inc. (RUST), for CWM-Vickery. The U.S. EPA's comments on the original work plan and the first revision were issued to Chemical Waste Management of Vickery, Ohio (CWM-Vickery), on July 26, 1995, and February 27, 1996, respectively. Most of CWM-Vickery's responses adequately address the U.S. EPA's comments. However, the CWM-Vickery responses discussed below do not adequately address the previous U.S. EPA comments dated July 26, 1995, and February 27, 1996.

For clarity, the U.S. EPA's comments are organized in the same manner as CWM-Vickery's May 1996 responses to comments. The U.S. EPA's organization scheme reflects the CWM-Vickery's responses both in the section headings and in the comment labeling. However, the U.S. EPA has dropped from the comment labels references to previous U.S. EPA comments prior to the February 1996 U.S. EPA comments; for example, CWM-Vickery's response labeled "Comment 3-Comment on Response to General Comment 4" is labeled in the current U.S. EPA's comments as "Comment 3." U.S. EPA comments that CWM-Vickery has addressed adequately are not discussed below. Also, because new text has been inserted in the second revision of the RFI work plan, an additional specific comment that identifies a new issue in the work plan is presented below. Finally, comments from an expert hydrogeologist have been included following the "SPECIFIC COMMENTS ON NEW RFI WORK PLAN TEXT" section. As conditions for approval of the RFI work plan, CWM-Vickery must address the following comments by either inserting the provided language or providing the information required in the specific comment.

GENERAL COMMENTS

1. **Comment 1**. CWM-Vickery's response states that five existing monitoring wells will be sampled during Phase I field activities as confirmation samples to characterize groundwater conditions at the facility. Confirmation sampling shall adequately represent existing groundwater data for the facility. Because existing data have been gathered from several water-bearing units at the facility, data from wells screened in the lacustrine and till units

shall also be included in the confirmation sampling program in addition to the bedrock monitoring wells that have been proposed. Therefore, the work plan shall be revised to state that lacustrine and till monitoring wells will be sampled to characterize groundwater downgradient from selected SWMUs and AOCs at the facility.

2. **Comment 3.** This comment has been only partially addressed. Section 5.7.1.1 states that only one sample will be collected approximately 2 to 4 feet below the bottom of the solid waste management unit (SWMU) for laboratory analysis. However, Section 5.1, Page 2, Bullet 2 states that when field observations indicate that contamination is present in the uppermost native soil, additional soil samples will be collected at greater depths to characterize the vertical extent of contaminant migration. This information in Section 5.1 shall be added to the new text in Section 5.7.1.1.

   The following sentence shall be added as the second bullet of the new text on Page 19 of Section 5.0: "Where field observations indicate that contamination is present in the uppermost native soil, at least one additional soil sample will be collected at a greater depth to characterize the vertical extent of contamination."

RESPONSE TO EPA SPECIFIC COMMENTS

3. **Comment 5**. Based on discussions during the March 19, 1996, meeting between EPA and CWM-Vickery, historical information, including sampling locations and data, shall be submitted by CWM-Vickery to EPA so that clean closure and the potential for contamination to have migrated beyond the boundaries of SWMUs and areas of concern (AOC) can be evaluated. The RFI work plan shall be revised to specify when this information will be submitted. In addition, the text in Section 5.0 shall be revised to state that closure data will be submitted for SWMUs 11 and 12 and AOC D.

   The following sentence shall be added as the last sentence of Section 5.10.4: "Data collected for the closure of SWMUs 11 and 12 and AOC D will be submitted in the RFI report."

RESPONSE TO EPA NEW GENERAL COMMENT

4. **Comment 1**. This comment discusses the historical use of data in the RFI process. CWM-Vickery's response states that only representative sample analytical results will be validated.

During the March 19, 1996, meeting between EPA and CWM-Vickery, it was agreed that all data submitted to characterize groundwater conditions at the facility would be validated and submitted in a useable format. Therefore, all sample analytical results, not just representative sample analytical results, shall be validated before being submitted to the U.S. EPA. In addition, CWM-Vickery's response states that samples will be collected from five existing monitoring wells during Phase I field activities to characterize groundwater conditions at the facility. The sampling approach shall be comprehensive enough to verify existing groundwater data for the facility. Because data has been gathered for several water-bearing units at the facility, samples from wells screened in the lacustrine and till units must be included in the sampling program in addition to the bedrock monitoring well samples proposed. Therefore, the RFI work plan shall be revised to state that lacustrine and till monitoring wells will be sampled to characterize groundwater downgradient from selected SWMUs and AOCs at the facility.

RESPONSE TO EPA NEW SPECIFIC COMMENTS

5. **Comment 6.** This comment has been only partially addressed. Numerous discrepancies still exist between the quality assurance project plan (QAPP) and the RFI work plan. These discrepancies are discussed below.

   a. Table 1-1 of the QAPP and Section 5.9.2 of the RFI work plan indicate that SWMU Group B includes SWMUs 4, 5, 7, 10, 11, 17, and 53. However, Table 4-1 of the RFI work plan indicates that SWMU Group B includes SWMUs 4, 5, 7, 11, 12, and 17. Therefore, the following phrases shall be added to the SWMU column of the Group B row of Table 4-1: "SWMU #10-Surface Impoundment, SWMU #17-Leachate Retention Pond, SWMU #53-TSCA Closure Cell." Also, the following phrase shall be removed from the SWMU column of the Group B row of Table 4-1: "SWMU #12-Pond 12."

   b. Table 1-1 of the QAPP indicates that soil samples collected from SWMU Group C will be analyzed for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), pesticides, polychlorinated biphenyls (PCB), herbicides, metals, cyanide, and sulfide. However, Section 5.9.3 of the RFI work plan indicates that the soil samples will be analyzed for compounds listed in Tables 1-2 through 1-4 of the QAPP (VOCs, SVOCs, organochloride pesticides, and PCBs). To accurately reflect the parameters for which SWMU Group C samples will be analyzed, Section 5.9.3, Page 28, Paragraph 3,

Sentence 2 shall be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

c. Table 1-1 of the QAPP and Section 5.9.3 of the RFI work plan indicate that for SWMU Group C, five soil samples will be collected. However, Figure 5-8 of the RFI work plan shows only three soil sampling locations. Figure 5-8 shall be revised to show a total of five soil sampling locations.

d. Table 1-1 of the QAPP indicates that samples collected from SWMU Group D will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, Section 5.9.4 of the RFI work plan states that the samples will be analyzed for compounds included in Tables 1-2 through 1-4 of the QAPP (VOCs, SVOCs, organochloride pesticides, and PCBs). To accurately reflect the parameters for which SWMU Group D samples will be analyzed, Section 5.9.4, Page 30, Paragraph 4, Sentence 2 shall be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

e. Table 1-1 of the QAPP indicates that samples collected from SWMU Groups E and F will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, Sections 5.9.5 and 5.9.6 of the RFI work plan state that the samples will be analyzed for compounds included in Tables 1-4 through 1-8 of the QAPP (pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans). To accurately reflect the parameters for which SWMU Group E samples will be analyzed, Section 5.9.5, Page 31, Paragraph 3, Sentence 2 shall be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP." To accurately reflect the parameters for which SWMU Group F samples will be analyzed, the last sentence of Section 5.9.6, Page 33, Paragraph 2 shall be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

f. Table 1-1 of the QAPP indicates that SWMU Group G consists of SWMUs 21 through 30. However, Section 5.9.7 of the RFI work plan indicates that SWMU Group G consists of SWMUs 21 through 27, 29, and 30. Therefore, SWMU 28 shall be removed from the SWMU Group G list in Table 1-1 of the QAPP.

g. Table 1-1 of the QAPP indicates that samples collected from SWMU Group G will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, Section 5.9.7 of the RFI work plan indicates that the samples will be analyzed for compounds included in Tables 1-4 through 1-8 of the QAPP (pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans). To accurately reflect the parameters for which SWMU Group G samples will be analyzed, the last sentence of Section 5.9.7, Page 35, Paragraph 1 shall be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-8 of the QAPP."

h. Table 1-1 of the QAPP indicates that 13 soil samples will be collected from SWMU Group G. However, Section 5.9.7 of the RFI work plan indicates that four soil samples will be collected at SWMU 23, two soil samples will be collected at SWMU 27, three soil samples will be collected at SWMU 29, and three soil samples will be collected at SWMU 30, for a total of 12 soil samples to be collected from SWMU Group G. Figure 5-12 of the RFI work plan shows 12 soil sampling locations at SWMU Group G. This discrepancy shall be resolved and the text, tables, and figures shall be revised accordingly. Therefore, Section 5.9.7, Page 36, Paragraph 1, Sentence 2 shall be revised to state: "Three surface soil samples will be collected around the building according to the procedures described in Section 5.7.2." Also, Figure 5-12 shall be revised to indicate three soil samples will be collected from SWMU 29.

i. Table 1-1 of the QAPP indicates that soil samples collected from SWMU Group H and SWMU 15 will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxins, and furans. However, Sections 5.9.8 and 5.9.9.1 of the RFI work plan state that the soil samples will be analyzed for compounds included in Tables 1-4 through 1-8 of the QAPP (pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans). To accurately reflect the parameters for which SWMU Group H samples will be analyzed, the last sentence of Section 5.9.8, Page 38, Paragraph 3, shall be revised to state: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-8 of the QAPP." To accurately reflect the parameters for which SWMU 15 samples will be analyzed, Section 5.9.9.1, Page 40, Paragraph 1, Sentence 9 shall be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-8 of the QAPP."

j. Table 1-1 of the QAPP indicates that soil samples collected from SWMUs 20 and 28 will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, Sections 5.9.9.3 and 5.9.9.4 of the RFI work plan state that the soil samples will be analyzed for compounds included in Tables 1-4 through 1-8 of the QAPP (pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans). To accurately reflect the parameters for which SWMU 20 samples will be analyzed, Section 5.9.9.3, Page 42, Paragraph 1, Sentence 2 shall be revised to read: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-8 of the QAPP." To accurately reflect the parameters for which SWMU 28 samples will be analyzed, Section 5.9.9.4, Page 43, Paragraph 0, Sentence 5 shall be revised to read: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-8 of the QAPP."

k. Table 1-1 of the QAPP indicates that soil samples collected from SWMU 41 will be analyzed for VOCs, SVOCs, and PCBs. However, Section 5.9.9.5 of the RFI work plan states that the soil samples will be analyzed only for PCBs. The text shall be revised to reflect the information presented in the table because VOCs and SVOCs are listed as potential waste constituents in Section 5.9.9.5. In addition, Section 5.9.9.5 states that metals with waste codes D004 through D011 are potential waste constituents that have been identified at SWMU 41. Therefore, Table 1-1 and Section 5.9.9.5 shall be revised to include metals among the sample analytical parameters. Therefore, Section 5.9.9.5, Page 44, Paragraph 0, Sentence 2 shall be revised to read as follows: "Soil samples collected within this SWMU will be analyzed for the compounds listed in Tables 1-2 through 1-4 and 1-7 of the QAPP."

l. Table 1-1 of the QAPP indicates that soil samples collected from SWMUs 44 and 45 will be analyzed for VOCs, SVOCs, metals, chloride, and PCBs. However, Section 5.9.9.8 of the RFI work plan states that these soil samples will be analyzed for VOCs, SVOCs, chloride, and metals. Therefore, Section 5.9.9.8, Page 46, Paragraph 2, Sentence 4 shall be revised to read as follows: "The soil samples collected within SWMUs 44 and 45 will be sent to the laboratory for analysis for VOCs, SVOCs, metals, chloride, and PCBs."

m. Table 1-1 of the QAPP and Section 5.10.1 of the RFI work plan state that soil samples will be collected from beneath each of the 30 maintenance tanks that constitute AOC A. However, Figure 5-26 of the RFI work plan indicates only that 19 surface soil samples

will be collected at AOC A. Therefore, Figure 5-26 shall be revised to depict the 30 soil sampling locations beneath the 30 maintenance tanks.

n. Table 1-1 of the QAPP indicates that soil samples collected from AOCs A, B, C, F, H, and I will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, Sections 5.10.1, 5.10.2, 5.10.3, 5.10.6, 5.10.8, and 5.10.9 state that the soil samples will be analyzed for compounds included in Tables 1-4 through 1-8 of the QAPP (pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans). To accurately reflect the parameters for which AOC A, B, C, F, H, and I soil samples will be analyzed, these sections shall be revised as follows:

   i. For AOC A, Section 5.10.1, Page 47, Paragraph 1, Sentence 9 shall be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

   ii. For AOC B, Section 5.10.2, Page 48, Paragraph 1, Sentence 10 shall be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

   iii. For AOC C, Section 5.10.3, Page 49, Paragraph 0, Sentence 6 shall be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

   iv. For AOC F, Section 5.10.6, Page 50, Paragraph 1, Sentence 5 shall be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

   v. For AOC H, Section 5.10.8, Page 51, Paragraph 3, Sentence 2 shall be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

   vi. For AOC I, Section 5.10.9, Page 53, Paragraph 0, Sentence 6 shall be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

vii. Table 1-1 of the QAPP indicates that two sediment samples will be collected from Meyer's Ditch. However, Section 5.10.8 and Figure 5-26 of the RFI work plan indicate that nine sediment samples will be collected from Meyer's Ditch. In addition, Table 1-1 indicates that sediment samples will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, no analytical parameters are specified for sediment samples in Section 5.10.8. To achieve a clear consistent presentation of the sediment sampling approach for Meyer's Ditch, the following revisions shall be made:

viii. Table 1-1 shall be revised to specify that nine sediment samples will be collected from Meyer's Ditch.

ix. The last sentence of Section 5.10.8, Page 51, Paragraph 2 shall be revised to read as follows: "Nine sediment samples will be collected using the procedures outlined in Section 5.7.3."

x. The following sentence shall be added as the third sentence of Section 5.10.8, Page 51, Paragraph 3: "The sediment samples will be analyzed for the compounds included in Tables 1-2 through 1-7 of the QAPP."

xi. Figure 5-26 shall be revised to indicate that the nine spill-related soil sampling points are sediment sampling points.

o. Table 1-1 of the QAPP indicates that surface water samples will be collected from Meyer's Ditch during the RFI Phase I field investigation. However, no surface water samples are discussed in the RFI work plan. This discrepancy needs to be resolved. Therefore, the following sentence shall be added to Section 5.10.8, Page 51, Paragraph 2 of the RFI work plan: "Two surface water samples will be collected from Meyer's Ditch and analyzed for compounds summarized in Table 1-1 and listed in Tables 1-2 through 1-7 of the QAPP." Also, Figure 5-26 shall be revised to indicate the surface water sampling locations.

p. Table 1-1 of the QAPP indicates that groundwater samples to be collected from the capillary drain and from existing bedrock monitoring wells will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans.

However, Sections 5.9.2 and 5.11 of the RFI work plan do not specify analytical parameters for the capillary drain and monitoring well samples. Sections 5.9.2 and 5.11 shall be revised as follows to identify the analytical parameters for these samples:

i. The following sentence shall be inserted after Section 5.9.2, Page 26, Paragraph 3, Sentence 8: "The water sample will be analyzed for compounds summarized in Table 1-1 and listed in Tables 1-2 through 1-8 of the QAPP."

ii. The following sentence shall be inserted after Section 5.11, Page 54, Paragraph 3, Sentence 1: "The groundwater samples will be analyzed for compounds listed in Tables 1-2 through 1-8 of the QAPP."

GENERAL COMMENTS ON NEW RFI TEXT

6. Throughout the RFI, CWM-Vickery states it will perform sampling to "confirm no contamination exists". The purpose of the RFI is to determine whether contamination exits, therefore, CWM-Vickery shall replace all references to confirming no contamination to "determine whether contamination exists".

7. CWM-Vickery has failed to identify the old truck scale as a SWMU or AOC. Prior to 1985, trucks were sampled at the present maintenance receiving gate, and weighed on a scale adjacent to the guardhouse. A review of historical aerial photographs of the CWM-Vickery site indicates that prior to 1985, access to the site was controlled by the main gate to the east of the office/laboratory building. This area is identified as having a truck scale on Plan Drawing B-3 "Vickery Ohio Facility", Existing Facility Plan, Part B Permit, dated October 24, 1994.

   The old truck scale and sampling area has not been identified as an AOC or SWMU in any of the previous reports. This area apparently does not have any secondary containment. Prior to 1985, there were reports of leaking waste loads coming into the site from residents living in the area. There is a high degree of probability that soil contamination may exist in the area of the old truck scale and sampling area. CWM-Vickery shall include investigation of potential soil and groundwater contamination at this AOC/SWMU.

SPECIFIC COMMENTS ON NEW RFI WORK PLAN TEXT

8. **Section 3.3.3, Page 7, Paragraph 2**. Golder's calculated vertical gradient is given a dimension of "feet/foot". The hydrogeological term gradient is dimensionless, therefore, CWM-Vickery shall remove "feet/foot" in its description of gradient.

9. **Section 4, Page 5, Bullet 3**. The sampling approach must be comprehensive enough to verify existing groundwater data for each SWMU, SWMU Group, or AOC. It is not sufficient of characterize the groundwater on a site-wide basis. Lacustrine and till units must be included in the groundwater investigation. CWM-Vickery shall revise its RFI work plan and QAPP to include the lacustrine and saturated till zones in its groundwater investigation by evaluating validated historical data and, if necessary, additional sampling and analysis, of groundwater in the lacustrine and till zones.

10. **Section 4, Page 2, Paragraph 2**. CWM-Vickery states it will characterize the groundwater with five on-site groundwater monitoring wells. The five bedrock groundwater wells will neither characterize the groundwater at the site, nor determine whether activities at SWMUs or AOCs have impacted the groundwater. CWM-Vickery must revise its RFI work plan to include an investigation that will adequately characterize the deep and shallow groundwater at each SWMU or SWMU Group and AOC at the facility.

11. **Section 4, Page 3, Paragraph 1**. CWM-Vickery shall revise its RFI work plan and QAPP to state all historical data will be validated, as specified in the meeting between CWM-Vickery and U.S. EPA.

12. **Section 4, Page 3, Paragraph 2**. CWM-Vickery shall include sample collection procedures in items to be reviewed.

13. **Section 4, Page 5, Paragraph 3**. CWM-Vickery's approach to characterize the groundwater at each SWMU, SWMU Group or AOC by using five bedrock groundwater monitoring wells for the entire facility is unacceptable. CWM-Vickery shall investigate the shallow and deep groundwater at each SWMU, SWMU Group and AOC to determine whether CWM-Vickery's activities have impacted the groundwater. CWM-Vickery shall revise its RFI work plan and QAPP to include an investigation that will adequately characterize the deep and shallow groundwater at each SWMU, SWMU Group or AOC at the facility.

14. **Section 4, Page 6, Paragraph 1**. CWM-Vickery shall replace "as a migration pathway" with "media".

15. **Section 5.9.4, Page 30, Paragraph 3**. CWM-Vickery shall revise the second sentence to state: " Samples will be collected at a depth of approximately 2.5 to 4.5 feet, to ensure the samples will be collected below the tilled depth."

16. **Section 5.11, Page 54, Paragraph 5**. This paragraph states that the facility groundwater sampling plan for the Part B permit is presented in Appendix C. The paragraph shall be revised to state the groundwater sampling plan for the Part B permit is in Appendix D.

17. **Section 5.11, Page 54, Paragraph 5**. The text in this paragraph states that the order of groundwater sampling and the filtering procedures for dissolved metals sample aliquot will be the same as described in the facility groundwater sampling plan for the Part B permit as presented in Appendix C. Actually, Appendix C includes water level hydrographs, monitoring well construction logs, precipitation data, a report summarizing the L-19 investigation, and a report discussing tritium concentrations in groundwater. Appendix D contains the groundwater sampling plan for the Part B permit. The text in Section 5.11 shall be revised to address this discrepancy.

18. **Section 7.6, Page 6**. The monthly progress reports shall be submitted by the 12th day of the following month. Therefore, CWM-Vickery shall revise the second sentence in this section to include the following at the end of the sentence: ". . . by the 12th day of the following month."

19. **Section 8.2, Page 1, Last Sentence in the Section**. This sentence is incomplete. The sentence shall be revised to state: "These fact sheets will be prepared periodically throughout the Phase I RFI and reviewed by the U.S. EPA prior to distribution."

EXPERT HYDROGEOLOGIST COMMENTS ON THE RFI WORK PLAN

An expert hydrogeologist reviewed the second revision of the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) work plan dated May 1996 for technical adequacy in relation to hydrogeological issues and to verify that U.S. Environmental Protection

Agency (EPA) comments related to hydrogeologic issues made on the first revision of the work plan dated August 1995 have been addressed. EPA's comments on the original work plan and the first revision were issued to Chemical Waste Management Vickery, Ohio (CWM-Vickery), on July 26, 1995, and February 27, 1996, respectively. The responses discussed below do not adequately address the previous comments dated February 27, 1996. CWM-Vickery has adequately addressed all EPA comments dated July 26, 1995. Comments that CWM-Vickery has addressed adequately are not discussed below. Also, because new text has been inserted into the latest revision of the work plan, additional comments that identify new issues in the May 1996 version of the work plan are presented below.

SPECIFIC COMMENTS

20. **Response to New General Comment 1.** The text states that the purpose of the RFI Phase I work plan "is specifically focused on determining if releases have actually occurred." However, the approach outlined in the work plan does not appear capable of determining if a release to groundwater has occurred for the reasons discussed below.

    a. Glacial deposits in the U.S. are commonly weathered and oxidized to a depth of 20 to 30 feet below ground surface (bgs). As a consequence, they contain an abundance of nearly vertical fractures or macropores that permit rather rapid transfer of water from the ground surface to the water table and below. In this zone of active groundwater circulation, the water is relatively young compared to groundwater in unweathered glacial till. Below the weathered zone, the permeability of glacial deposits tends to rapidly decrease, water movement is very slow, and the water is approximately 10,000 years old.

    b. At the CWM-Vickery facility, the upper 20 to 25 feet of glacial material appears to be weathered, and groundwater movement is more rapid in the upper 20 to 25 feet of these deposits than it is in the deeper glacial deposits, as indicated by the decrease of hydraulic heads with depth and the equipotential lines on the vertical flow nets presented in Figure 4-24, which are roughly parallel to land surface and closely spaced below a depth of about 20 feet bgs. These lines indicate a very low permeability below 20 feet bgs. Tritium data also indicate young water in the upper 20 feet.

    c. Finally, according to a March 1982 Golder Associates report, shear strength increases significantly at a depth of about 25 feet bgs, indicating that the glacial till below 25 feet

bgs may not be as weathered as the till located in the upper 25 feet. This evidence indicates that the upper 20 to 25 feet of the glacial material is more permeable than the underlying unconsolidated sediments.

d. At the CWM-Vickery facility, both vertical and horizontal water movement are most rapid in the upper 20 to 25 feet of glacial material. If a release has occurred, the contamination is most likely located in these surficial deposits and probably at a depth of less than 25 feet bgs. The likelihood of detecting surface-origin contamination in the underlying bedrock aquifer is slight.

To determine if a release has occurred at CWM-Vickery, shallow wells screened in the lacustrine deposits at a depth of about 20 feet bgs shall be sampled. The placement of these wells or the selection of existing wells shall be based on an examination of lacustrine water-level maps showing flow lines. The wells shall be placed along flow lines that originate at the central part of a solid waste management unit (SWMU) or area of concern (AOC).

Water-level maps of lacustrine deposits indicate the presence of a groundwater mound, the crest of which trends roughly north-northwest through the central part of the closure cell. Flow lines extend generally east, north, and west from the divide. Several lacustrine monitoring wells lie on both sides of the divide and include monitoring wells L-17, L-18, L-19A, and L-25. If samples from these wells are not contaminated, the possibility exists that the lacustrine deposits have not been significantly impacted. Analytical data from monitoring wells are not available at this time to make this determination.

21. The groundwater quality investigation portion of the RFI work plan is quite limited. Only five wells are proposed for monitoring the entire facility. In addition, these wells are all bedrock wells, which are probably not contaminated based on geologic conditions at the facility, and it is not likely that they would indicate a surface release. Therefore, the work plan shall be revised to include groundwater samples collected from lacustrine-screened monitoring wells in order to determine if groundwater has been impacted by facility operations and to confirm existing groundwater data that will be validated as part of the Phase I RFI.

GENERAL COMMENT ON NEW APPENDIX C TEXT

22. The work plan lacks a complete generalized description of the hydrogeologic system and the manner in which it functions. The generalized discussion shall be revised to specify details such as precipitation data, water level fluctuations, groundwater movement, and groundwater quality. For example, water level fluctuations in till wells and lacustrine wells are very similar, and it is unclear if the similarity reflects the quality of the database or direct interaction between the two units. Section 3.0 of the work plan shall be revised to include a discussion that summarizes information presented in Appendix C of the work plan.

SPECIFIC COMMENTS ON NEW APPENDIX C TEXT

23. **Figure 4-24.** With some exceptions, the vertical flow nets presented in Figure 4-24 in Appendix C represent a reasonable explanation of the groundwater flow system at the facility. However, the vertical flow nets shall be constructed as closely as possible along flow lines, and the data shall be based on wells of different depths with short screens. Secondly, the equipotential lines must bend upward starting at a depth of about 20 feet to reflect horizontal flow in the zone of higher permeability. Presently, the flow nets indicate that all groundwater flows vertically downward through a zone of very low permeability. However, the fact that a horizontal flow component in the zone of higher permeability exists is based on the annual fluctuation of water levels shown in hydrographs for both the till and lacustrine wells. Figure 4-24 shall be revised accordingly.

24. **Hydrographs.** Appendix C presents hydrographs showing water level fluctuations at the facility. The hydrographs present data from 1986 to mid-1995. However, Table 3 in Appendix C presents precipitation data for 1995. In order to adequately compare precipitation data to water level fluctuations, additional precipitation data shall be included in Appendix C that extend back to at least 1986. In addition, the vertical scale on the hydrographs reads "concentrations." The vertical scale on the hydrographs shall be changed to accurately reflect the information presented.

End of RFI Work Plan Conditions of Approval

CONDITIONS OF APPROVAL FOR THE RFI QUALITY ASSURANCE PROJECT PLAN (QAPP)

SPECIFIC COMMENTS

1. **Response to General Comment 1.** This comment has been only partially addressed. Section 1.4.2 of the QAPP defines potential contamination as any detection above the project reporting limits (PRL) or any nondetect for which the PRL is above the EPA Region 5 data quality level (DQL).

   a. The procedure for data comparison shall be presented as follows:

      i. On-site soil sample metal data will be compared to background concentrations. All other on-site soil sample data will be compared to U.S. EPA Region 9 industrial PRLs.

      ii. Groundwater sample metal data will be compared to background concentrations. All other groundwater sample data will be compared to U.S. EPA Region 5 DQLs.

      iii. Surface water and sediment sample data will be compared to surface water quality levels, if available. If surface water quality levels are not available, the data will be compared to Ecotox thresholds. If Ecotox thresholds are not available, the data will be compared to DQLs.

   b. The QAPP should be revised to state that Phase II samples will be collected at every Phase I location where analytical results exceed any of the following, as outlined in the previous condition, (DQLs, PRLs, background concentrations, surface water quality levels, and Ecotox thresholds). The text in the QAPP should also indicate whether nondetected analyte data will be reported as the PRLs for use in the risk assessment. Finally, the QAPP's use of the term "potential contamination" must be clarified to underscore that all Phase I and Phase II data shall be used in the risk assessment. The appropriate sections of the QAPP should be revised accordingly.

2. **Response to General Comment 7.** The QAPP still contains several deficiencies, inconsistencies, and discrepancies regarding some of the analytical methods used to

determine target parameters. These deficiencies, inconsistencies, and discrepancies are discussed below and shall be addressed accordingly. Specific Comment 56 also applies here and shall be addressed.

a. The QAPP includes references to Method 8240B, which is not being performed during this project. The reference to Method 8240B shall be deleted throughout the QAPP, and appropriate sections of the QAPP shall be revised accordingly.

b. Two versions (July 1995 and April 1996) of the standard operation procedures (SOP) for Methods 8270B, 8080A, and 6010A are included in the QAPP. The QAPP shall be revised to include only the most recent version of these methods.

c. Table 3-4 is titled "Precision and Accuracy Criteria, Appendix IX Volatile Organic Compound by Method 8260A" but presents precision and accuracy criteria for organophosphate pesticides by Method 8141. This discrepancy shall be addressed.

d. Table 6-1 does not include calibration procedures for Methods 300 (chloride) and 376.1 (sulfide). Table 6-1 shall be revised to include this information. In addition, Table 6-1 presents calibration procedures for Method 8240B, which is not being performed during the RFI. This discrepancy shall be addressed.

e. SOP No. 13.1 for Method 8240B has been included in the QAPP. However, this method is not being used during this project. Therefore, SOP No. 13.1 shall be deleted from the QAPP.

f. No SOP for Method 300 (chloride) has been included in the QAPP. However, a SOP for Method 325.3 (chloride), which is not being used during the RFI, is included. Therefore, the SOP for Method 325.3 shall be deleted from the QAPP, and the SOP for Method 300 shall be added to the QAPP. In addition, no SOP for EPA Method 9080, cation exchange capacity analyses, which is identified on Table 7-2 of the QAPP, is included in the QAPP. This discrepancy shall be addressed.

RESPONSES TO SPECIFIC COMMENTS

3. **Response to Specific Comment 2.** Several inconsistencies still exist between the table of contents and the materials included in the appendices to the QAPP. The items listed below are incorrectly identified in the table of contents as being included in Appendix A of the QAPP. These materials shall be included in Appendix A.

   - GP Environmental Services SOP for Chloride (SOP No. 11.55)
   - Rust Environment and Infrastructure, Inc., geotechnical laboratory SOPs
   - SOP No. QA000-0000 for data validation
   - Guidelines for the preparation of SOPs of field and laboratory measurements
   - SOP for the field measurement of volatile organics by HNu
   - SOP for the measurement of pH in the field using the Fisher Accumet Model 955 portable pH/mV temperature meter
   - SOP for the measurement of specific conductance in the field using the Cole Parmer Model 4070 conductivity meter

4. **Response to Specific Comment 3.** The response to this comment states that data will be validated using the SOP entitled "Data Validation Procedures for EPA Level III Data." Level II data is not sufficient for use in an RFI. Data packages comparable to a CLP-like content should be generated and submitted to the U.S. EPA. The QAPP shall be revised to include provisions for submittal of a CLP-like data package with independent data validation of these packages comparable and analogous to the CLP Functional guidelines.

5. **Response to Specific Comment 6.** The response to this comment states that a field duplicate will be collected at the capillary drain sump to provide additional information on the reproducibility or statistical significance of the results. However, collection of a field duplicate does not ensure statistical significance. In order to ensure statistical significance, more investigative samples (at least three) shall be collected from the capillary drain sump. Therefore, the QAPP shall revise the first sentence of the second bullet on Page 3 of Section 1 to include the phrase, ". . . Closure Cell by collecting three groundwater samples from the capillary drainage layer."

6. **Response to Specific Comment 7.** Section 1.1.2 shall be revised to state:

   a. An undisturbed soil sample from an area that is unaffected by land-use activities will be collected to verify the true extent of the surficial soil layer and,

   b. This sample may be collected at a depth of greater than 24 inches below ground surface (bgs), depending on land-use activities.

   Therefore, the following sentences shall be added after the third bullet on Page 4 in Section 1.1.2: "An undisturbed soil sample will be collected from an area that is unaffected by land-use activities to verify the true extent of the surficial soil layer. The undisturbed soil sample may be collected more than 24 inches below ground surface."

7. **Response to Specific Comment 9.** This comment has been partially addressed. During groundwater sampling, several field parameters need to be monitored to verify that a representative groundwater sample is collected. In addition to pH, these parameters include turbidity, dissolved oxygen, specific conductivity, and temperature. Presently, the QAPP does not identify turbidity, dissolved oxygen, specific conductivity, and temperature as field parameters that will be measured. These parameters shall be identified in Table 1-1 and in all other relevant parts of the QAPP. For example, the following sentence shall be added at the end of the first paragraph on Page 5 in Section 1.1.2: "The field parameters to be monitored during groundwater sampling activities will include pH, turbidity, dissolved oxygen, specific conductivity, and temperature to verify that a representative groundwater sample is collected."

   Also, turbidity and temperature shall be added to the test parameter column of Table 1-1 for the solid waste management unit (SWMU) Group A in the MW-15R location row, Group B row, Group C MW-20R row, and Meyer's Ditch row. In addition, an SOP for turbidity measurement shall be added to Appendix A.

8. **Response to Specific Comment 12.** This comment has been partially addressed. The response states that data collected during Phase I will be compared to PRLs. However, the text in Section 1.1.2 needs to be further revised to reflect how data collected during Phase I will be compared to PRLs and how Phase II will be initiated, based on the results of the Phase I data. The following sentences shall be added to Section 1.1.2: "Data collected

during the Phase I investigation will be used to determine whether a release to the environment has occurred. Data collected during the Phase I investigation will also be used to determine Phase II sampling locations and frequencies in order to assess the vertical and horizontal extent of soil and groundwater contamination."

9. **Response to Specific Comment 15.** This comment has not been addressed. The text in Section 1.3.3, Page 13, Bullet No. 1, states that all releases to Little Raccoon Creek and Meyers Ditch were remediated immediately after the release. However, Table 3-1 of the 1993 report referenced in Section 1.3.3 lists high metals concentrations in sediment samples collected from Little Racoon Creek. Therefore, an additional sediment sample from Meyer's Ditch and three sediment samples from Little Raccoon Creek shall be collected for metals, semivolatile organic compound (SVOC), and polychlorinated biphenyl (PCB) analyses to evaluate the contamination in Little Raccoon Creek and Meyer's Ditch. Table 1-1 and appropriate sections of the QAPP and RFI work plan shall be revised accordingly.

10. **Response to Specific Comment 18.** This comment has been partially addressed. The QAPP shall be revised to state that Phase II activities will be undertaken at all locations where any Phase I analytical result exceed a DQL, PRL, Surface Water Quality Level, Ecotox level, or background for a specific compound, according to the criteria in **1. Response to General Comment 1**, identified during the Phase I investigation. Risk will be evaluated after all data from both phases of the RFI are collected, and the need for corrective measures will be determined during the risk assessment. The QAPP shall be revised accordingly.

11. **Response to Specific Comment 19.** This comment has not been addressed. The text on page 15, paragraph 4 of Section 1.4.1 states that samples of residual materials will be collected at SWMUs where clean closure has not been certified. However, the text shall be revised to state: ". . . where clean closure has not been performed, samples of the residual materials and soil samples from an appropriate depth below the residual materials will be collected and analyzed for Appendix IX parameters." Specific sampling depths for SWMUS and AOCs are provided in Section 5.0 of the RFI work plan.

12. **Response to Specific Comment 20.** This comment has been partially addressed. The text in Section 1.4.2 states that Phase I data will be compared to PRLs in order to define potential contamination for use in the QRA. However, several issues regarding the comparison of

data to PRLs need to be discussed in text. The text in section 1.4.2 of the QAPP shall be revised to state that Phase II samples will be collected at every Phase I location where an analytical result exceeds the PRL or, if the result is a nondetect, the PRL exceeds the DQL, possibly using more sensitive instrumentation. The text shall also discuss whether nondetects will be reported as the PRLs for use in the QRA. Finally, the text shall be revised to specify the process that will be used to assess and interpret the analytical results.

13. **Response to Specific Comment 21.** This comment has been partially addressed. Section 1.5, Page 18, Paragraph 2, states that additional soil samples will be collected at locations where field observations indicate that the uppermost native soil is contaminated. However, the text shall be revised to state: ""If additional soil samples are collected at locations where field observations indicate that the uppermost native soil is contaminated, a sampling plan addendum will be submitted to the U.S. EPA. Implementation of this activity should be suspended until written approval is obtained from the U.S. EPA Project Officer."

14. **Response to Specific Comment 23.** This comment has been partially addressed. However, several inconsistencies are still present in Table 1-2. These inconsistencies are discussed below.

    a. Table 1-2 presents the DQLs for 2-chloro-1,3 butadiene; chloromethane; and 1,1-dichloroethene. However, the December 1995 EPA Region 5 DQL document does not list DQLs for these compounds. Therefore, a footnote shall be added to Table 1-2 to identify the source of these DQLs.

    b. The water PRLs listed in Table 1-2 for 1,2-dibromo-3-chloropropane; 1,2-dibromomethane; 1,2-dichloroethane; 1,1,1,2-tetrachloroethane; 1,1,2,2-tetrachloroethane; and 1,1,2-trichloroethane are greater than the EPA Region 5 DQLs. The December 1995 EPA Region 5 DQL document states that if Method 8260B is used instead of Method 8260, reporting limits (RL) for water analysis can either satisfy or be close to EPA DQLs for the above compounds. The QAPP proposes use of Method 8260A for the analysis of these compounds; however, lower RLs, that are less than the DQLs, can be achieved by Method 8260B. Therefore, the QAPP should be revised to propose use of Method 8260B with a 25 mL purge volume instead of Method 8260A, so that lower PRLs can be achieved for these compounds. (Demonstration of appropriate detection limits shall take place during the U.S. EPA's evaluation of the proposed laboratory.)

15. **Response to Specific Comment 24.** Several deficiencies are still present in Table 1-3. According to the December 1995 EPA Region 5 DQL document, lower RLs for water analysis could be achieved if alternative methods other than Method 8270 are used for some compounds. These compounds, RLs, and methods are listed in the table below.

Parameter	Lower RL (µg/L)	Method
Benzo(a)anthracene	0.13	8310
Benzo(b)fluoranthene	0.18	8310
Benzo(k)fluoranthene	0.17	8310
Benzo(g,h,i)perylene	0.76	8310
Benzo(a)pyrene	0.23	8310
Bis(2-ethylhexyl)phthalate	2.7	8061A
Dibenzo(a,h)anthracene	0.3	8310
1,4-Dichlorobenzene	0.07/1.0	8021B/8260B
3,3'-Dimethylbenzidine	10	8210C
Hexachlorobenzene	0.056	8121
Hexachlorobutadiene	0.014	8121
Hexachloroethane	0.016	8121
Indeno(1,2,3-cd)pyrene	0.43	8310
2-Nitroanaline	10	8131
n-Nitrosodimethylamine	1.5	8070A
n-Nitrosodi-n-propylamine	4.6	8070A

The QAPP shall be revised to use the methods listed above so that lower RLs can be achieved. SOPs for these methods shall also be provided.

16. **Response to Specific Comment 25.** Several deficiencies still exist in Table 1-4. The December 1995 EPA Region 5 DQL document does not list DQLs for arochlor compounds.

However, Table 1-4 lists DQLs for arochlor compounds. The table shall be revised to indicate the source of these DQLs. In addition, lower RLs for water analysis can be achieved for heptachlor epoxide and toxaphene by using Method 8081A. Table 1-4 shall be revised to list RLs of 0.32 and 0.86 μg/L for heptachlor expoxide and toxaphene, respectively.

17. **Response to Specific Comment 26.** No PRLs for soil and water analyses are listed in Table 1-5 for parathion. Although no DQLs for parathion are listed in the December 1995 EPA Region 5 DQL document, Table 1-5 should be revised to indicate that the PRL for parathion will be consistent with the detection limits in Method 8141A. If there was no recommended Region 5 DQL expressed in the Region 5 guidance document, the source of the values indicated in Table 1-5 shall be cited.

18. **Response to Specific Comment 34.** This comment has been partially addressed. Figure 2-1 still contains names of personnel whose responsibilities are not discussed in text. Figure 2-1 must contain the names of all personnel whose responsibilities are discussed in the text. The text in section 2 of the QAPP shall be revised to discuss responsibilities of all individuals indicated in figure 2-1. Figure 2-1 shall be revised to show the names of all personnel and their corresponding responsibilities. For example, Bryan Kline is listed in Figure 2-1, but his responsibilities are not discussed in text. Also, the names of the drilling and ground penetrating radar subcontractors are shown in Figure 2-1, but their responsibilities are not discussed in text.

19. **Response to Specific Comment 41.** This comment has not been addressed. A footnote to Table 3-3 states that a minimum 10 percent recovery of the surrogate compound is used as an action limit. However, Table 3-3 also indicates that the acceptable range for surrogate recovery is 24 to 150 percent. The following sentence shall be added to the footnote in Table 3-3: "A recovery of less than 10 percent will require rejection of the associated analytical results. A recovery of 10 to 23 percent will require that the associated analytical results be qualified as estimated."

20. **Response to Specific Comment 42.** This comment has not been addressed. Table 3-6 shows that arsenic will be analyzed for using SW-846 Method 7060. This table and other relevant portions of the QAPP shall be revised to indicate that arsenic will be analyzed for using SW-846 Method 7060A, which is the most recently promulgated method.

21. **Response to Specific Comment 44.** This comment has been partially addressed. Inconsistencies and deficiencies still exist in Section 4.0 of the QAPP and sections of the work plan, which are referenced in the QAPP.

    a. Section 4.0 of the QAPP should be revised to correctly cite sections of the RFI work plan. Correspondingly, the following phrases should be revised:

        i. Bullet 4 shall be revised to "Field Blank Collection-Section 5.2.5.1.3."

        ii. Bullet 5 shall be revised to "Field Duplicate Collection-Section 5.2.5.1.1."

        iii. Bullet 6 shall be revised to "MS/MSD Duplicate Collection-Section 5.2.5.1.2."

        iv. Bullet 7 shall be revised to "Trip Blank Preparation-Section 5.2.5.1.4."

    b. Section 5.2.5.1.4 of the work plan shall be revised to state that trip blanks will be included in every cooler or shipping container with aqueous samples for volatile organic compound (VOC) analysis.

    c. Footnote 2 from Table 4-2 shall define the holding time as beginning from the time of sample collection and not as beginning from the time of sample receipt. Footnote 2 of Table 4-2 shall be revised to read "...following the Validated Time of Sample Collection." In addition, the reference to Footnote 6 in Row 4, Column 1 of Table 4-2 should be deleted because Footnote 6 does not apply to metals.

    d. The order in which sample parameters will be collected is not specified in Section 4.0 of the QAPP or Section 5.0 of the work plan. Therefore, Section 4.0 of the QAPP and Section 5.0 of the RFI work plan shall be revised to specify the order of sample collection. The following text shall be added to these sections:

        "Samples will be collected in the following order:
        1. Samples for VOC analysis
        2. Samples for SVOC analysis
        3. Samples for inorganic analysis"

22. **Response to Specific Comment 46.** This comment has been partially addressed. The text in Section 6.1.3 of the work plan states that field and trip blanks will have unique identification numbers. Examples of the unique identification numbers shall be provided, in Section 6.1.3. In addition, Section 6.1.3 shall be revised to explain how the sample identification scheme will indicate the SWMU number, sample type, matrix type, sampling location, and sampling depth (if appropriate). Further, sample tags and labels will be used.

23. **Response to Specific Comment 47.** This comment has been partially addressed. Section 5.2, Page 4, Paragraph 1, of the QAPP states that laboratory custody procedures for Rust Environment and Infrastructure, Inc., are included in Appendix A (SOP No. GT-001). However, this information is not included in Appendix A. The QAPP shall be revised to include this SOP.

24. **Response to Specific Comment 49.** This comment has been partially addressed. Table 6-1 shall be revised to provide the number of standards for Method 8280. In addition, Table 6-1 describes the frequency of initial calibration verification for Methods 8080a and 8270B as "as needed." Table 6-1 shall be revised to explicitly state what is meant by "as needed" by providing a quantitative frequency and shall specify the conditions under which verification would be performed. The following sentence shall be added to Table 6-1: "The minimum frequency for initial calibration verification is whenever the continuing calibration verification for any analyte exceeds the quality control limit."

25. **Response to Specific Comment 52.** This comment has been partially addressed. Table 7-1 of the QAPP indicates that sulfide will be analyzed for by Method 376.1. However, Table 8-1 shows that sulfide will be analyzed for by SW-846 Method 9030. To be consistent with the rest of the QAPP, Method 9030 shall be deleted from this table and replaced with Method 376.1.

26. **Response to Specific Comment 56.** This comment has been partially addressed.

    a. Table 8-1 identifies storage blanks, method blanks, laboratory control samples, and blank spike/blank spike duplicate samples as internal quality control checks. However, these samples are not discussed in Section 8.2. Thus, Section 8.2 shall be revised to explain the purpose of these samples and how they will be prepared. In the case of blank spike samples, specific information concerning the preparation procedure, collection

frequency and associated purpose must be inserted into the appropriate QAPP section. Therefore, the following definitions should be added to Section 8.2 of the QAPP:

i. Storage blanks: a blank prepared and stored in a refrigerated area to determine whether additional contaminants are present.

ii. Method blank: a matrix blank carried through the complete sample preparation and analytical procedure to document contamination resulting from the analytical process.

iii. Laboratory control sample: a known matrix spiked with one or more chemicals representative of the target analytes that is used to document laboratory performance.

b. Table 8-1 of the QAPP references Method 9030, which is not identified elsewhere in the QAPP. This discrepancy shall be resolved. In addition, Table 8-1 does not specify internal QC checks for Method 8141 (organophosphorus pesticides), Method 325.3 (chloride), and Method 376.1 (sulfide). Table 8-1 shall be revised accordingly to include this information.

c. Method 9030 shall be deleted from the table and replaced with Method 376.1. The internal QC checks for Method 8141 shall consist of the same procedures as those outlined for Method 8080A in Table 8-2, with the surrogates and matrix spikes consisting of compounds listed in Table 3-4. The internal QC checks for Methods 376.1 and 325.3 shall consist of the same procedures as those outlined for Method 9030A in Table 8-2.

27. **Response to Specific Comment 60.** Table 11-1 still contains several inconsistencies and deficiencies that are discussed below.

a. Table 11-1 shows that the Perkin-Elmer 3030B and 460AA spectrophotometers will be used during the RFI. However, the analytical methods for which these instruments will be used is not identified. Therefore, Table 11-1 shall be revised to identify the analytical methods for which these instruments will be used.

b. Table 11-1 shows that Method 8240B will be used during the RFI. However, this method will not be used during this project and shall be deleted from Table 11-1.

c. Table 11-1 shows that the Spectronic 21 Spectrophotometer will be used during the RFI. However, the analytical methods for which this instrument will be used is not identified. Table 11-1 shall be revised to identify the analytical methods for which this instrument will be used.

d. Dioxins and furans will be analyzed for during the RFI using Method 8280. However, Table 11-1 does not specify the types of equipment that will be used to perform the analysis. Table 11-1 shall be revised to identify the equipment that will be used to analyze for dioxins and furans.

28. Before the RFI can be implemented, the laboratory CWM-Vickery has selected must participate in and pass a laboratory performance evaluation sample demonstration audit. Samples of unknown nature and substance will be delivered to proposed laboratories for analysis. CWM-Vickery must agree to pay for the analysis and reporting of data for these performance evaluation demonstration samples. These samples must be analyzed in accordance with provisions of this conditionally approved QAPP. If the results and supporting data packages are not of an accurate and appropriate nature, then this evidence will be used as basis for rejecting the audited laboratory. This would necessitate withdrawing the conditional approval of the RFI work plan and QAPP. Only after the proposed laboratory has passed the audit demonstrations will the QAPP qualify for final approval, resulting in a document to be signed by the RCRA Permitting QA Coordinator prior to project implementation.

End of QAPP Conditions

PRC

PRC Environmental Management, Inc.

We're changing our name to

Tetra Tech EM Inc.

200 E. Randolph Drive, Suite 4700 ◆ Chicago, IL 60601 ◆ (312) 856-8700 ◆ FAX (312) 938-0118

July 29, 1997

Mr. Tom Matheson
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604

Subject: **Expert Hydrogeologist Technical Review Comments**
Addendum to Technical Review Comments on
May 1996 RCRA Facility Investigation Phase I Work Plan, Chemical Waste Management, Vickery, Ohio
Contract No. 68-W4-0007, Work Assignment No. R05021

Dear Mr. Matheson:

As you requested, Tetra Tech EM Inc. (Tetra Tech) is submitting an addendum to its July 14, 1997, final technical review comments on the above-referenced document. The enclosed addendum contains expert hydrogeologist technical review comments on the above-referenced document. Tetra Tech reviewed the document, which is dated May 1996, to determine whether U.S. Environmental Protection Agency (EPA) comments on earlier submittals of the document had been addressed. In general, the May 1996 version of the work plan contains deficiencies, inconsistencies, and inaccuracies that need to be addressed.

This letter and the addendum have also been sent to you via e-mail. The hard copies of the documents constitute Tetra Tech's official deliverables.

If you have any questions about Tetra Tech's comments, please call me at (312) 946-6479.

Sincerely,

Jill Ciraulo

Jill Ciraulo
Project Manager

Enclosure

cc: Bernie Orenstein, EPA Region 5 (letter only)
Ed Schuessler, Tetra Tech (letter only)
Art Glazer, Tetra Tech

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ENCLOSURE

EXPERT HYDROGEOLOGIST TECHNICAL REVIEW COMMENTS
ADDENDUM TO TECHNICAL REVIEW COMMENTS ON
MAY 1996 RCRA FACILITY INVESTIGATION PHASE I WORK PLAN
CHEMICAL WASTE MANAGEMENT
VICKERY, OHIO

(Three Pages)

EXPERT HYDROGEOLOGIST TECHNICAL REVIEW COMMENTS
ADDENDUM TO TECHNICAL REVIEW COMMENTS ON
MAY 1996 RCRA FACILITY INVESTIGATION PHASE I WORK PLAN
CHEMICAL WASTE MANAGEMENT
VICKERY, OHIO

Under the direction of Tetra Tech EM Inc. (Tetra Tech), an expert hydrogeologist reviewed the second revision of the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) Phase I work plan dated May 1996 for the Chemical Waste Management facility in Vickery, Ohio (CWM-Vickery). The Phase I work plan was reviewed for technical adequacy in relation to hydrogeologic issues and to verify that U.S. Environmental Protection Agency (EPA) comments related to hydrogeologic issues made on the first revision of the work plan dated August 1995 had been addressed. EPA's comments on the original work plan and the first revision were issued to CWM-Vickery on July 26, 1995, and February 27, 1996, respectively. The CWM-Vickery response discussed below does not adequately address the EPA comments dated February 27, 1996. CWM-Vickery has adequately addressed all EPA comments dated July 26, 1995. Comments that CWM-Vickery has addressed adequately are not discussed below. Also, new text has been inserted into the second revision of the work plan, and additional comments identifying new issues in this version of the work plan are presented below.

EPA SPECIFIC COMMENT ON RFI PHASE I WORK PLAN

Comment 1. The text states that the purpose of the RFI Phase I work plan "is specifically focused on determining if releases have actually occurred." However, the approach outlined in the work plan does not appear capable of determining if a release to groundwater has occurred for the reasons discussed below.

Glacial deposits in the U.S. are commonly weathered and oxidized to a depth of 20 to 30 feet below ground surface (bgs). As a consequence, they contain an abundance of nearly vertical fractures or macropores that permit rather rapid transfer of water from the ground surface to the water table and below. In this zone of active groundwater circulation, the water is relatively young compared to groundwater in unweathered glacial till. Below the weathered zone, the permeability of glacial deposits tends to rapidly decrease, water movement is very slow, and the water is approximately 10,000 years old.

At the CWM-Vickery facility, the upper 20 to 25 feet of glacial material appears to be weathered, and groundwater movement is more rapid in the upper 20 to 25 feet of these deposits than it is in the deeper

glacial deposits, as indicated by the decrease of hydraulic heads with depth and the equipotential lines on the vertical flow nets presented in Figure 4-24, which are roughly parallel to land surface and closely spaced below a depth of about 20 feet bgs. These lines indicate a very low permeability below 20 feet bgs. Tritium data also indicate young water in the upper 20 feet. Finally, according to a March 1982 Golder Associates report, shear strength increases significantly at a depth of about 25 feet bgs, indicating that the glacial till below 25 feet bgs may not be as weathered as the till located in the upper 25 feet. This evidence indicates that the upper 20 to 25 feet of the glacial material is more permeable than the underlying unconsolidated sediments.

At the CWM-Vickery facility, both vertical and horizontal water movement are most rapid in the upper 20 to 25 feet of glacial material. If a release has occurred, the contamination is most likely located in these surficial deposits and probably at a depth of less than 25 feet bgs. The likelihood of detecting surface-origin contamination in the underlying bedrock aquifer is slight. To determine if a release has occurred at CWM-Vickery, shallow wells screened in the lacustrine deposits at a depth of about 20 feet bgs should be sampled. The placement of these wells or the selection of existing wells should be based on an examination of lacustrine water-level maps showing flow lines. The wells should be placed along flow lines that originate at the central part of a solid waste management unit (SWMU) or area of concern (AOC).

Water-level maps of lacustrine deposits indicate the presence of a groundwater mound, the crest of which trends roughly north-northwest through the central part of the closure cell. Flow lines extend generally east, north, and west from the divide. Several lacustrine monitoring wells lie on both sides of the divide and include monitoring wells L-17, L-18, L-19A, and L-25. If samples from these wells are not contaminated, the possibility exists that the lacustrine deposits have not been significantly impacted. Analytical data from monitoring wells are not available at this time to make this determination.

The groundwater quality investigation portion of the RFI work plan is quite limited. Only five wells are proposed for monitoring the entire facility. In addition, these wells are all bedrock wells, which are probably not contaminated based on geologic conditions at the facility, and it is not likely that they would indicate a surface release. Therefore, the work plan should be revised to include groundwater samples collected from lacustrine-screened monitoring wells in order to determine if groundwater has been impacted by facility operations and to confirm existing groundwater data that will be validated as part of the Phase I RFI.

GENERAL COMMENT ON NEW APPENDIX C TEXT

The work plan lacks a complete generalized description of the hydrogeologic system and the manner in which it functions. The generalized discussion should be revised to specify details such as precipitation data, water level fluctuations, groundwater movement, and groundwater quality. For example, water level fluctuations in till wells and lacustrine wells are very similar, and it is unclear if the similarity reflects the quality of the database or direct interaction between the two units. Section 3.0 of the work plan should be revised to include a discussion that summarizes information presented in Appendix C of the work plan.

SPECIFIC COMMENTS ON NEW APPENDIX C TEXT

1. **Figure 4-24.** With some exceptions, the vertical flow nets presented in Figure 4-24 in Appendix C represent a reasonable explanation of the groundwater flow system at the facility. However, the vertical flow nets should be constructed as closely as possible along flow lines, and the data should be based on wells of different depths with short screens. Secondly, the equipotential lines must bend upward starting at a depth of about 20 feet to reflect horizontal flow in the zone of higher permeability. Presently, the flow nets indicate that all groundwater flows vertically downward through a zone of very low permeability. However, the fact that a horizontal flow component in the zone of higher permeability exists is based on the annual fluctuation of water levels shown in hydrographs for both the till and lacustrine wells. Figure 4-24 should be revised accordingly.

2. **Hydrographs.** Appendix C presents hydrographs showing water level fluctuations at the facility. The hydrographs present data from 1986 to mid-1995. However, Table 3 in Appendix C presents precipitation data for 1995. In order to adequately compare precipitation data to water level fluctuations, additional precipitation data should be included in Appendix C that extend back to at least 1986. In addition, the vertical scale on the hydrographs reads "concentrations." The vertical scale on the hydrographs should be changed to accurately reflect the information presented.

PRC
PRC Environmental Management, Inc.

We're changing our name to
Tetra Tech EM Inc.

200 E. Randolph Drive, Suite 4700 ◆ Chicago, IL 60601 ◆ (312) 856-8700 ◆ FAX (312) 938-0118

July 14, 1997

Mr. Tom Matheson
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604

Subject: **Technical Review Comments**
May 1996 Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Phase I Work Plan and RFI Quality Assurance Project Plan (QAPP)
Chemical Waste Management, Vickery, Ohio
Contract No. 68-W4-0007, Work Assignment No. R05021

Dear Mr. Matheson:

PRC Environmental Management, Inc. (PRC), is submitting its final technical review comments on the above-referenced documents. PRC reviewed the documents, which are dated May 1996, to determine whether U.S. Environmental Protection Agency (EPA) comments on earlier submittals of the document had been addressed. In general, the May 1996 versions of the work plan contain deficiencies, inconsistencies, and inaccuracies that need to be addressed.

PRC's comments on the work plan and QAPP are included in Enclosures 1 and 2, respectively, and are of two different types: (1) comments that include specific instructions on how to revise the text of the work plan and, in some cases, exact replacement text and (2) comments identifying missing information that prevent specific instructions from being provided and that should therefore be provided by Chemical Waste Management. Please note that by providing Chemical Waste Management with revised text, EPA assumes responsibility for that text.

This letter and the enclosures have also been sent to you via E-mail. Hard copies of the documents constitute PRC's official deliverables.

If you have any questions about PRC's comments, please call me at (312) 856-8791.

Sincerely,

Timothy J. Schlichting
Project Manager

TJS/car

Enclosures (2)

cc: Bernie Orenstein, EPA Region 5 (letter only)
Ed Schuessler, PRC (letter only)

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ENCLOSURE 1

TECHNICAL REVIEW COMMENTS ON THE MAY 1996
RCRA FACILITY INVESTIGATION PHASE I WORK PLAN
CHEMICAL WASTE MANAGEMENT
VICKERY, OHIO

(Nine Pages)

TECHNICAL REVIEW COMMENTS ON THE MAY 1996
RCRA FACILITY INVESTIGATION PHASE I WORK PLAN
CHEMICAL WASTE MANAGEMENT
VICKERY, OHIO

PRC Environmental Management, Inc. (PRC), reviewed the second revision of the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) work plan and responses to comments dated May 1996 for the Chemical Waste Management Vickery (CWM-Vickery) facility in Vickery, Ohio. PRC reviewed the RFI work plan and CWM-Vickery's responses to comments for overall technical adequacy and to ensure that U.S. Environmental Protection Agency (EPA) comments on the first revision of the work plan dated August 1995 had been addressed. EPA's comments on the August 1995 revised work plan were issued to CWM-Vickery on February 27, 1996. Most of CWM-Vickery's responses adequately address EPA's comments, but the CWM-Vickery responses discussed below do not adequately address the previous EPA comments dated February 27, 1996.

For the sake of clarity, PRC's comments are organized in the same manner as CWM-Vickery's May 1996 responses to comments. PRC's organization scheme reflects the CWM-Vickery's responses both in the section headings and in the comment labeling. However, PRC has dropped from the comment labels references to previous EPA comments prior to the February 1996 EPA comments; for example, CWM-Vickery's response labeled "Comment 3-Comment on Response to General Comment 4" is labeled in PRC's comments as "Comment 3." EPA comments that CWM-Vickery has addressed adequately are not discussed below. Also, because new text has been inserted in the second revision of the RFI work plan, an additional specific comment that identifies a new issue in the work plan is presented below.

RESPONSE TO EPA GENERAL COMMENTS

1. **Comment 3**. This comment has been only partially addressed. Section 5.7.1.1 states that only one sample will be collected approximately 2 to 4 feet below the bottom of the solid waste management unit (SWMU) for laboratory analysis. However, Section 5.1, Page 2, Bullet 2 states that when field observations indicate that contamination is present in the uppermost native soil, additional soil samples will be collected at greater depths to characterize the vertical extent of contaminant migration. This information in Section 5.1 should be added to the new text in Section 5.7.1.1.

Therefore, the following sentence should be added as the second bullet of the new text on Page 19 of Section 5.0: "Where field observations indicate that contamination is present in the uppermost native soil, at least one additional soil sample will be collected at a greater depth to characterize the vertical extent of contamination."

RESPONSE TO EPA SPECIFIC COMMENTS

1. **Comment 5**. This comment has been only partially addressed. Based on discussions during the March 19, 1996, meeting between EPA and CWM-Vickery, historical information, including sampling locations and data, should be submitted by CWM-Vickery to EPA so that clean closure and the potential for contamination to have migrated beyond the boundaries of SWMUs and areas of concern (AOC) can be evaluated. The RFI work plan should be revised to specify when this information will be submitted. In addition, the text in Section 5.0 should be revised to state that closure data will be submitted for SWMUs 11 and 12 and AOC D.

   Therefore, the following sentence should be added as the last sentence of Section 5.10.4: "Data collected for the closure of SWMUs 11 and 12 and AOC D will be submitted in the RFI report."

RESPONSE TO EPA NEW GENERAL COMMENT

1. **Comment 1**. This comment discusses the historical use of data in the RFI process. CWM-Vickery's response states that only representative sample analytical results will be validated. During the March 19, 1996, meeting between EPA and CWM-Vickery, it was agreed that all data submitted to characterize groundwater conditions at the facility would be validated and submitted in a useable format. Therefore, all sample analytical results, not just representative sample analytical results, should be validated before being submitted to EPA. In addition, CWM-Vickery's response states that samples will be collected from five existing monitoring wells during Phase I field activities to characterize groundwater conditions at the facility. The sampling approach should be comprehensive enough to verify existing groundwater data for the facility. Because data has been gathered for several water-bearing units at the facility, samples from wells screened in the lacustrine and till units should be included in the sampling program in addition to the bedrock monitoring well samples proposed. Therefore, the RFI work plan should

be revised to state that lacustrine and till monitoring wells will be sampled to characterize groundwater downgradient from selected SWMUs and AOCs at the facility.

RESPONSE TO EPA NEW SPECIFIC COMMENTS

1. **Comment 6.** This comment has been only partially addressed. Numerous discrepancies still exist between the quality assurance project plan (QAPP) and the RFI work plan. These discrepancies are discussed below.

   Table 1-1 of the QAPP and Section 5.9.2 of the RFI work plan indicate that SWMU Group B includes SWMUs 4, 5, 7, 10, 11, 17, and 53. However, Table 4-1 of the RFI work plan indicates that SWMU Group B includes SWMUs 4, 5, 7, 11, 12, and 17. Therefore, the following phrases should be added to the SWMU column of the Group B row of Table 4-1: "SWMU #10-Surface Impoundment, SWMU #17-Leachate Retention Pond, SWMU #53-TSCA Closure Cell." Also, the following phrase should be removed from the SWMU column of the Group B row of Table 4-1: "SWMU #12-Pond 12."

   Table 1-1 of the QAPP indicates that soil samples collected from SWMU Group C will be analyzed for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), pesticides, polychlorinated biphenyls (PCB), herbicides, metals, cyanide, and sulfide. However, Section 5.9.3 of the RFI work plan indicates that the soil samples will be analyzed for compounds listed in Tables 1-2 through 1-4 of the QAPP (VOCs, SVOCs, organochloride pesticides, and PCBs). To accurately reflect the parameters for which SWMU Group C samples will be analyzed, Section 5.9.3, Page 28, Paragraph 3, Sentence 2 should be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

   Table 1-1 of the QAPP and Section 5.9.3 of the RFI work plan indicate that for SWMU Group C, five soil samples will be collected. However, Figure 5-8 of the RFI work plan shows only three soil sampling locations. Figure 5-8 should be revised to show a total of five soil sampling locations.

Table 1-1 of the QAPP indicates that samples collected from SWMU Group D will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, Section 5.9.4 of the RFI work plan states that the samples will be analyzed for compounds included in Tables 1-2 through 1-4 of the QAPP (VOCs, SVOCs, organochloride pesticides, and PCBs). To accurately reflect the parameters for which SWMU Group D samples will be analyzed, Section 5.9.4, Page 30, Paragraph 4, Sentence 2 should be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

Table 1-1 of the QAPP indicates that samples collected from SWMU Groups E and F will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, Sections 5.9.5 and 5.9.6 of the RFI work plan state that the samples will be analyzed for compounds included in Tables 1-4 through 1-8 of the QAPP (pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans). To accurately reflect the parameters for which SWMU Group E samples will be analyzed, Section 5.9.5, Page 31, Paragraph 3, Sentence 2 should be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP." To accurately reflect the parameters for which SWMU Group F samples will be analyzed, the last sentence of Section 5.9.6, Page 33, Paragraph 2 should be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

Table 1-1 of the QAPP indicates that SWMU Group G consists of SWMUs 21 through 30. However, Section 5.9.7 of the RFI work plan indicates that SWMU Group G consists of SWMUs 21 through 27, 29, and 30. Therefore, SWMU 28 should be removed from the SMWU Group G list in Table 1-1 of the QAPP.

Table 1-1 of the QAPP indicates that samples collected from SWMU Group G will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, Section 5.9.7 of the RFI work plan indicates that the samples will be analyzed for compounds included in Tables 1-4 through 1-8 of the QAPP (pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans). To accurately reflect the parameters for which SWMU Group G samples will be analyzed, the last sentence of Section 5.9.7, Page 35, Paragraph 1 should be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-8 of the QAPP."

Table 1-1 of the QAPP indicates that 13 soil samples will be collected from SWMU Group G. However, Section 5.9.7 of the RFI work plan indicates that four soil samples will be collected at SWMU 23, two soil samples will be collected at SWMU 27, three soil samples will be collected at SWMU 29, and three soil samples will be collected at SWMU 30, for a total of 12 soil samples to be collected from SWMU Group G. Figure 5-12 of the RFI work plan shows 12 soil sampling locations at SWMU Group G. This discrepancy should be resolved and the text, tables, and figures should be revised accordingly. Therefore, Section 5.9.7, Page 36, Paragraph 1, Sentence 2 should be revised to read as follows: "Three surface soil samples will be collected around the building according to the procedures described in Section 5.7.2." Also, Figure 5-12 should be revised to indicate that three soil samples will be collected from SWMU 29.

Table 1-1 of the QAPP indicates that soil samples collected from SWMU Group H and SWMU 15 will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxins, and furans. However, Sections 5.9.8 and 5.9.9.1 of the RFI work plan state that the soil samples will be analyzed for compounds included in Tables 1-4 through 1-8 of the QAPP (pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans). To accurately reflect the parameters for which SWMU Group H samples will be analyzed, the last sentence of Section 5.9.8, Page 38, Paragraph 3, should be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-8 of the QAPP." To accurately reflect the parameters for which SWMU 15 samples will be analyzed, Section 5.9.9.1, Page 40, Paragraph 1, Sentence 9 should be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-8 of the QAPP."

Table 1-1 of the QAPP indicates that soil samples collected from SWMUs 20 and 28 will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, Sections 5.9.9.3 and 5.9.9.4 of the RFI work plan state that the soil samples will be analyzed for compounds included in Tables 1-4 through 1-8 of the QAPP (pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans). To accurately reflect the parameters for which SWMU 20 samples will be analyzed, Section 5.9.9.3, Page 42, Paragraph 1, Sentence 2 should be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-8 of the QAPP." To accurately reflect the parameters for which SWMU 28 samples will be analyzed, Section 5.9.9.4, Page 43, Paragraph 0, Sentence 5 should

be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-8 of the QAPP."

Table 1-1 of the QAPP indicates that soil samples collected from SWMU 41 will be analyzed for VOCs, SVOCs, and PCBs. However, Section 5.9.9.5 of the RFI work plan states that the soil samples will be analyzed only for PCBs. The text should be revised to reflect the information presented in the table because VOCs and SVOCs are listed as potential waste constituents in Section 5.9.9.5. In addition, Section 5.9.9.5 states that metals with waste codes D004 through D011 are potential waste constituents that have been identified at SWMU 41. Therefore, Table 1-1 and Section 5.9.9.5 should be revised to include metals among the sample analytical parameters. Therefore, Section 5.9.9.5, Page 44, Paragraph 0, Sentence 2 should be revised to read as follows: "Soil samples collected within this SWMU will be analyzed for the compounds listed in Tables 1-2 through 1-4 and 1-7 of the QAPP."

Table 1-1 of the QAPP indicates that soil samples collected from SWMUs 44 and 45 will be analyzed for VOCs, SVOCs, metals, chloride, and PCBs. However, Section 5.9.9.8 of the RFI work plan states that these soil samples will be analyzed for VOCs, SVOCs, chloride, and metals. Therefore, Section 5.9.9.8, Page 46, Paragraph 2, Sentence 4 should be revised to read as follows: "The soil samples collected within SWMUs 44 and 45 will be sent to the laboratory for analysis for VOCs, SVOCs, metals, chloride, and PCBs."

Table 1-1 of the QAPP and Section 5.10.1 of the RFI work plan state that soil samples will be collected from beneath each of the 30 maintenance tanks that constitute AOC A. However, Figure 5-26 of the RFI work plan indicates only that 19 surface soil samples will be collected at AOC A. Therefore, Figure 5-26 should be revised to depict the 30 soil sampling locations beneath the 30 maintenance tanks.

Table 1-1 of the QAPP indicates that soil samples collected from AOCs A, B, C, F, H, and I will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, Sections 5.10.1, 5.10.2, 5.10.3, 5.10.6, 5.10.8, and 5.10.9 state that the soil samples will be analyzed for compounds included in Tables 1-4 through 1-8 of the QAPP (pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans). To accurately reflect the

parameters for which AOC A, B, C, F, H, and I soil samples will be analyzed, these sections should be revised as follows:

- For AOC A, Section 5.10.1, Page 47, Paragraph 1, Sentence 9 should be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

- For AOC B, Section 5.10.2, Page 48, Paragraph 1, Sentence 10 should be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

- For AOC C, Section 5.10.3, Page 49, Paragraph 0, Sentence 6 should be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

- For AOC F, Section 5.10.6, Page 50, Paragraph 1, Sentence 5 should be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

- For AOC H, Section 5.10.8, Page 51, Paragraph 3, Sentence 2 should be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

- For AOC I, Section 5.10.9, Page 53, Paragraph 0, Sentence 6 should be revised to read as follows: "The compounds are summarized in Table 1-1 and are listed in Tables 1-2 through 1-7 of the QAPP."

- Table 1-1 of the QAPP indicates that two sediment samples will be collected from Meyer's Ditch. However, Section 5.10.8 and Figure 5-26 of the RFI work plan indicate that nine sediment samples will be collected from Meyer's Ditch. In addition, Table 1-1 indicates that sediment samples will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, no analytical parameters are specified for sediment samples in Section 5.10.8. To achieve a clear consistent

presentation of the sediment sampling approach for Meyer's Ditch, the following revisions should be made:

- Table 1-1 should be revised to specify that nine sediment samples will be collected from Meyer's Ditch.

- The last sentence of Section 5.10.8, Page 51, Paragraph 2 should be revised to read as follows: "Nine sediment samples will be collected using the procedures outlined in Section 5.7.3."

- The following sentence should be added as the third sentence of Section 5.10.8, Page 51, Paragraph 3: "The sediment samples will be analyzed for the compounds included in Tables 1-2 through 1-7 of the QAPP."

- Figure 5-26 should be revised to indicate that the nine spill-related soil sampling points are sediment sampling points.

Table 1-1 of the QAPP indicates that surface water samples will be collected from Meyer's Ditch during the RDI Phase I field investigation. However, no surface water samples are discussed in the RFI work plan. This discrepancy needs to be resolved. Therefore, the following sentence should be added to Section 5.10.8, Page 51, Paragraph 2 of the RFI work plan: "Two surface water samples will be collected from Meyer's Ditch and analyzed for compounds summarized in Table 1-1 and listed in Tables 1-2 through 1-7 of the QAPP." Also, Figure 5-26 should be revised to indicate the surface water sampling locations.

Table 1-1 of the QAPP indicates that groundwater samples to be collected from the capillary drain and from existing bedrock monitoring wells will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans. However, Sections 5.9.2 and 5.11 of the RFI work plan do not specify analytical parameters for the capillary drain and monitoring well samples. Sections 5.9.2 and 5.11 should be revised as follows to identify the analytical parameters for these samples:

- The following sentence should be inserted after Section 5.9.2, Page 26, Paragraph 3, Sentence 8: "The water sample will be analyzed for compounds summarized in Table 1-1 and listed in Tables 1-2 through 1-8 of the QAPP."

- The following sentence should be inserted after Section 5.11, Page 54, Paragraph 3, Sentence 1: "The groundwater samples will be analyzed for compounds listed in Tables 1-2 through 1-8 of the QAPP."

SPECIFIC COMMENT ON NEW RFI WORK PLAN TEXT

1. **Section 5.11, Page 54, Paragraph 5.** This paragraph states that the facility groundwater sampling plan for the Part B permit is presented in Appendix C. Actually, Appendix D contains the groundwater sampling plan for the Part B permit. The paragraph should be revised to correct this error.

ENCLOSURE 2

TECHNICAL REVIEW COMMENTS ON THE MAY 1996
RCRA FACILITY INVESTIGATION QUALITY ASSURANCE PROJECT PLAN
CHEMICAL WASTE MANAGEMENT
VICKERY, OHIO

(13 Pages)

TECHNICAL REVIEW COMMENTS ON THE MAY 1996
RCRA FACILITY INVESTIGATION QUALITY ASSURANCE PROJECT PLAN
CHEMICAL WASTE MANAGEMENT
VICKERY, OHIO

PRC Environmental Management, Inc. (PRC), reviewed the second revision of the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) quality assurance project plan (QAPP) and responses to comments dated May 1996 for the Chemical Waste Management Vickery (CWM-Vickery) facility in Vickery, Ohio. PRC reviewed the RFI work plan and CWM-Vickery's responses to comments for overall technical adequacy and to ensure that U.S. Environmental Protection Agency (EPA) comments on the first revision of the work plan dated August 1995 had been addressed. EPA's comments on the August 1995 revised work plan were issued to CWM-Vickery on February 27, 1996. Most of CWM-Vickery's responses adequately address EPA's comments, but the CWM-Vickery responses discussed below do not adequately address the previous EPA comments dated February 27, 1996.

For the sake of clarity, PRC's comments are organized in the same manner as CWM-Vickery's May 1996 responses to comments. PRC's organization scheme reflects the CWM-Vickery's responses both in the section headings and in the comment labeling. EPA comments that CWM-Vickery has addressed adequately are not discussed below. Also, because new text has been inserted in the second revision of the RFI work plan, an additional specific comment that identifies a new issue in the work plan is presented below.

RESPONSES TO EPA GENERAL COMMENTS

1. **Comment 1**. This comment has been only partially addressed. Section 1.4.2 of the QAPP defines "potential contamination" as any detection above the project reporting limit (PRL) or any nondetect for which the PRL is above the EPA Region 5 data quality level (DQL). However, the QAPP does not clearly explain the procedures for data comparison. The procedure for data comparison should be presented as follows:

    - On-site soil sample metal data will be compared to background concentrations. All other sample data will be compared to EPA Region 9 industrial PRLs.

- Groundwater sample metal data will be compared to background concentrations. All other sample data will be compared to DQLs.

- Surface water and sediment sample data will be compared to surface water quality levels, if available. If surface water quality levels are not available, the data will be compared to Ecotox thresholds. If Ecotox thresholds are not available, the data will be compared to DQLs.

In addition, the text in the QAPP should be revised to state that Phase II samples will be collected at every Phase I location where analytical results exceed the above-specified levels (DQLs, PRLs, background concentrations, surface water quality levels, and Ecotox thresholds). The text in the QAPP should also indicate whether nondetects will be reported as the PRLs for use in the quantitative risk assessment (QRA). Finally, the QAPP's use of the term "potential contamination" is problematic because it implies that some data will not be used in the QRA. All Phase I and Phase II data should be used in the QRA. Appropriate sections of the QAPP should be revised accordingly.

2. **Comment 7.** The QAPP still contains several deficiencies and inconsistencies regarding some of the analytical methods to be used. These deficiencies and inconsistencies are discussed below and should be addressed. EPA Specific Comment 56 also applies to RFI sampling and analysis and should be addressed (see item 28 of this document).

The QAPP includes references to Method 8240B, which is not being used for the project. The references to Method 8240B should be deleted throughout the QAPP, and appropriate sections of the QAPP should be revised accordingly.

Two versions (July 1995 and April 1996) of the standard operating procedures (SOP) for Methods 8270B, 8080A, and 6010A are included in the QAPP. The QAPP should be revised to include only the most recent version of each of these SOPs.

Table 3-4 is titled "Precision and Accuracy Criteria, Appendix IX Volatile Organic Compound by Method 8260A" but presents precision and accuracy criteria for organophosphate pesticide analysis by Method 8141. Table 3-4 should be retitled as "Precision and Accuracy Criteria, Appendix IX Organophosphate Pesticides by Method 8141."

Table 6-1 does not include calibration procedures for 300-series Method 376.1 (sulfide). Table 6-1 should be revised to include this information. An SOP for Method 3253 (chloride) is included in the QAPP; therefore, this method should be the chloride method consistently presented throughout the QAPP. In addition, Table 6-1 presents calibration procedures for Method 8240B, which is not being used for the RFI. These procedures should be deleted from the table.

SOP No. 13.1 for Method 8240B has been included in the QAPP. However, this method is not being used for the project. Therefore, SOP No. 13.1 should be deleted from the QAPP.

No SOP for EPA Method 9080 (cation exchange capacity analyses), which is identified in Table 7-2, is included in the QAPP. The QAPP should be revised to include the SOP for EPA Method 9080.

RESPONSES TO EPA SPECIFIC COMMENTS

3. **Comment 2.** Several inconsistencies still exist between the table of contents and the materials included in the appendixes to the QAPP. The items listed below are cited in text and incorrectly identified in the table of contents as being included in Appendix A of the QAPP. These materials should be included in Appendix A.

   - GP Environmental Services SOP for Chloride (SOP No. 11.55)
   - Rust Environment and Infrastructure, Inc., geotechnical laboratory SOPs
   - SOP No. QA000-0000 for data validation
   - Guidelines for preparation of SOPs for field and laboratory measurements
   - SOP for HNu field measurement of volatile organics
   - SOP for measurement of pH in the field using the Fisher Accumet Model 955 portable pH/mV temperature meter
   - SOP for the measurement of specific conductance in the field using the Cole Parmer Model 4070 conductivity meter

4. **Comment 3.** The response to this comment states that data will be validated using the SOP entitled "Data Validation Procedures for EPA Level III Data." Level III data is not sufficient for

use in an RFI risk assessment. Also, no data validation SOP is included in the QAPP. Therefore, the QAPP should be revised to include a Level IV data validation SOP.

5. **Comment 6.** The response to this comment states that a field duplicate will be collected at the capillary drain sump to provide additional information on the reproducibility or statistical significance of the sample analytical results. However, collection of a field duplicate will not ensure the statistical significance of the results. To ensure statistically significant results, more investigative samples (at least three) should be collected from the capillary drain sump. The QAPP should be revised accordingly. Therefore, the first sentence of the second bullet on Page 3 of Section 1 should be revised to read "...Closure Cell by collecting three groundwater samples from the capillary drainage layer."

6. **Comment 7.** Section 1.1.2 should be revised to state that (1) an undisturbed soil sample will be collected from an area that is unaffected by land-use activities to verify the true extent of the surficial soil layer and (2) this sample may be collected more than 24 inches below ground surface, depending on land-use activities. Therefore, the following sentences should be added after the third bullet on Page 4 in Section 1.1.2: "An undisturbed soil sample will be collected from an area that is unaffected by land-use activities to verify the true extent of the surficial soil layer. The undisturbed soil sample may be collected more than 24 inches below ground surface."

7. **Comment 9.** This comment has been only partially addressed. During groundwater sampling, several field parameters need to be monitored in order to verify that a representative groundwater sample is collected. In addition to pH, these parameters include specific conductivity, turbidity, and temperature. The QAPP does not identify turbidity, specific conductivity, and temperature as field parameters that will be measured. These parameters should be identified in Table 1-1 and in all other relevant parts of the QAPP. For example, the following sentence should be added at the end of the first paragraph on Page 5 in Section 1.1.2: "The field parameters to be monitored during groundwater sampling activities will include pH, specific conductivity, turbidity, and temperature to verify that a representative groundwater sample is collected."

Also, turbidity and temperature should be added to the test parameter column of Table 1-1 for the solid waste management unit (SWMU) Group A in the MW-15R location row, Group B row, Group C MW-20R row, and Meyer's Ditch row.

In addition, an SOP for turbidity measurement should be added to Appendix A.

8. **Comment 12.** This comment has been only partially addressed. The response states that data collected during Phase I will be compared to PRLs. However, the text in Section 1.1.2 needs to be further revised to reflect the data comparison procedures and Phase II initiation conditions presented in EPA General Comment 1 (see item 1 of this document).

   Therefore, the following sentences should be added to Section 1.1.2: "Data collected during the Phase I investigation will be used to determine whether a release to the environment has occurred. Data collected during the Phase I investigation will also be used to determine Phase II sampling locations and frequencies in order to assess the vertical and horizontal extent of soil and groundwater contamination."

9. **Comment 15.** This comment has not been addressed. The first bullet on Page 13 in Section 1.3.3 states that all releases to Little Raccoon Creek and Meyer's Ditch were remediated immediately after the releases. However, Table 3-1 of the 1993 report cited in Section 1.3.3 lists high metal concentrations in sediment samples collected from Little Raccoon Creek. Table 1-1 of the QAPP identifies samples to be collected from Meyer's Ditch but does not address sampling in Little Raccoon Creek. One additional sediment sample from Meyer's Ditch and three sediment samples from Little Raccoon Creek should be collected for metal, semivolatile organic compound (SVOC), and polychlorinated biphenyl (PCB) analyses to evaluate the current nature and extent of contamination in Little Raccoon Creek and Meyer's Ditch. Table 1-1 and appropriate sections of the QAPP and RFI work plan should be revised accordingly.

10. **Specific Comment 18.** This comment has been only partially addressed. The QAPP should be revised to state that Phase II sampling will be undertaken at all locations where Phase I analytical results exceed the levels presented in EPA General Comment 1 (see item 1 of this document). Also, the QAPP should be revised to state that risks will be assessed after all data from both

phases of the RFI is collected, and that the need for corrective measures will be determined during the QRA.

11. **Comment 19.** This comment has not been addressed. The text in Section 1.4.1 states that samples of residual materials will be collected at SWMUs where clean closure has not been certified. However, the text should be revised to state that in addition to residual material sampling, soil samples will be collected from an appropriate depth below the residual materials and analyzed for Appendix IX parameters. Therefore, the first sentence of Paragraph 4 on Page 15 in Section 1.4.1 should be revised to read "...where clean closure has not been performed, samples of the residual materials and soil samples from an appropriate depth below the residual materials will be collected and analyzed for Appendix IX parameters." Specific sampling depths for SWMUS and AOCs are provided in Section 5.0 of the RFI work plan.

12. **Comment 20.** This comment has been only partially addressed. The text in Section 1.4.2 states that Phase I data will be compared with PRLs to define potential contamination for consideration in the QRA. However, as noted in EPA General Comment 1 (see item 1 of this document), several issues regarding the comparison of data to PRLs need to be discussed. The text should state that Phase II samples will be collected at every Phase I location where an analytical result exceeds the PRL or, if the result is a nondetect, the PRL exceeds the DQL. The text should also discuss whether nondetects will be reported as the PRLs for use in the QRA. Finally, the text should be revised to specify the process that will be used to interpret the analytical results.

13. **Comment 21.** This comment has been only partially addressed. Section 1.5, Page 18, Paragraph 2 states that additional soil samples will be collected at locations where field observations indicate that the uppermost native soil is contaminated. However, the text should be revised to state that an addendum to the sampling plan will be submitted to EPA if additional soil samples are collected during Phase I.

    Therefore, the following sentence should be added at the end of Paragraph 2 on Page 18 in Section 1.5: "If additional soil samples are collected at locations where field observations indicate that the uppermost native soil is contaminated, a sampling plan addendum will be submitted to EPA."

14. **Comment 22.** Several inconsistencies still exist between Table 1-1 and the RFI work plan. Specific inconsistencies are discussed in item 4 of Enclosure 1. Table 1-1 and the RFI work plan should be revised to resolve these inconsistencies.

15. **Comment 23.** This comment has been only partially addressed, as several deficiencies still exist in Table 1-2. These deficiencies are discussed below.

Table 1-2 presents the DQLs for 2-chloro-1,3-butadiene; chloromethane; and 1,1-dichloroethene. However, the December 1995 EPA Region 5 DQL document does not list DQLs for these compounds. Therefore, a footnote should be added to Table 1-2 to identify the source of the DQLs for these compounds.

The water PRLs listed in Table 1-2 for 1,2-dibromo-3-chloropropane; 1,2-dibromomethane; 1,2-dichloroethane; 1,1,1,2-tetrachloroethane; 1,1,2,2-tetrachloroethane; and 1,1,2-trichloroethane are greater than the EPA Region 5 DQLs. The QAPP proposes use of Method 8260A for the analysis of these compounds; however, lower reporting limits that are less than the DQLs can be achieved by Method 8260B. Therefore, the QAPP should be revised to propose use of Method 8260B instead of Method 8260A so that lower PRLs can be achieved for these compounds.

16. **Comment 24.** Several deficiencies still exist in Table 1-3. According to the December 1995 EPA Region 5 DQL document, lower reporting limits (RL) for water analysis could be achieved if methods other than Method 8270B were used for some compounds. These compounds, RLs, and methods are listed below.

Compound	Lower RL (µg/L)[a]	Method
Benzo(a)anthracene	0.13	8310
Benzo(b)fluoranthene	0.18	8310
Benzo(k)fluoranthene	0.17	8310
Benzo(g,h,i)perylene	0.76	8310
Benzo(a)pyrene	0.23	8310
Bis(2-ethylhexyl)phthalate	2.7	8061A

Compound	Lower RL (µg/L)[a]	Method
Dibenzo(a,h)anthracene	0.3	8310
1,4-Dichlorobenzene	0.07/1.0	8021B/8260B
3,3'-Dimethylbenzidine	10	8210C
Hexachlorobenzene	0.056	8121
Hexachlorobutadiene	0.014	8121
Hexachloroethane	0.016	8121
Indeno(1,2,3-cd)pyrene	0.43	8310
2-Nitroanaline	10	8131
N-Nitrosodimethylamine	1.5	8070A
N-Nitrosodi-n-propylamine	4.6	8070A

Note:

[a] µg/L = micrograms per liter

The QAPP should be revised to propose use of the methods listed above so that the lower RLs can be achieved. SOPs for these methods should also be included in the QAPP.

17. **Comment 25.** Lower PRLs for water analysis can be achieved for heptachlor epoxide and toxaphene by Method 8081A. The QAPP should be revised to propose the use of Method 8081A.

18. **Comment 26.** No PRLs for soil and water analyses are listed in Table 1-5 for parathion. Although no DQLs for parathion are listed in the December 1995 EPA Region 5 DQL document, Table 1-5 should be revised to indicate that the PRL for parathion will be consistent with the detection limits in Method 8141A.

19. **Comment 34.** This comment has been only partially addressed. Figure 2-1 still contains the names of personnel whose responsibilities are not discussed in text. For example, Bryan Kline is listed in Figure 2-1, but his responsibilities are not discussed in text. Also, the names of the drilling and ground penetrating radar subcontractors are shown in Figure 2-1, but their responsibilities are not discussed in text. The text should be revised to discuss Mr. Kline's and

the subcontractors' responsibilities. In addition, the following personnel are discussed in text but are not shown in Figure 2-1: Ken Ives, Albert Ellis, Bobby Ghrist, June Fischer, Stephen Grant, and Dorothy Walden. Figure 2-1 should be revised to show the names of these personnel and their corresponding responsibilities.

21. **Comment 41.** This comment has not been addressed. A footnote to Table 3-3 states that a 10 percent recovery of the surrogate compound is to be used as an action limit. However, Table 3-3 also indicates that the acceptable range for surrogate recovery is 24 to 150 percent. Therefore, the following sentence should be added to the footnote in Table 3-3: "A recovery of less than 10 percent will require rejection of the associated analytical results. A recovery of 10 to 23 percent will require that the associated analytical results be qualified as estimated."

22. **Comment 42.** This comment has not been addressed. Table 3-6 indicates that arsenic will be analyzed for using SW-846 Method 7060. This table and other relevant portions of the QAPP should be revised to indicate that arsenic will be analyzed for using SW-846 Method 7060A, which is the most recently promulgated version of the method.

23. **Comment 44.** This comment has been only partially addressed. Inconsistencies and deficiencies still exist in Section 4.0 of the QAPP, many of which involve sections of the RFI work plan cited in the QAPP. These inconsistencies and deficiencies should be addressed as discussed below.

Section 4.0 of the QAPP still incorrectly cites sections of the RFI work plan. Field blank collection is actually discussed in Section 5.2.5.1.3 of the RFI work plan, field duplicate collection in Section 5.2.5.1.1, matrix spike/matrix spike duplicate collection in Section 5.2.5.1.2, and trip blank preparation in Section 5.2.5.1.4. Section 4.0 of the QAPP should be revised to correctly cite sections of the RFI work plan.

Correspondingly, the following phrases should be revised:

- Bullet 4 should be revised to "Field Blank Collection-Section 5.2.5.1.3."
- Bullet 5 should be revised to "Field Duplicate Collection-Section 5.2.5.1.1."
- Bullet 6 should be revised to "MS/MSD Duplicate Collection-Section 5.2.5.1.2."

- Bullet 7 should be revised to "Trip Blank Preparation-Section 5.2.5.1.4."

Also, Section 5.2.5.1.4 of the RFI work plan should be revised to state that trip blanks will be included in every cooler or shipping container with aqueous samples for volatile organic compound (VOC) analysis.

Footnote 2 of Table 4-2 in the QAPP should define the holding time as beginning at the time of sample collection, not at the time of sample receipt. Footnote 2 of Table 4-2 should be revised to read "...following the Validated Time of Sample Collection." In addition, the reference to Footnote 6 in Row 4, Column 1 of Table 4-2 should be deleted because Footnote 6 does not apply to metals.

The order of sample collection for particular analyses is not specified in Section 4.0 of the QAPP or Section 5.0 of the RFI work plan. The QAPP and RFI work plan should be revised to specify the order of sample collection. Therefore, the following text should be added to Section 4.0 of the QAPP:

"Samples will be collected in the following order:

1. Samples for VOC analysis
2. Samples for SVOC analysis
3. Samples for inorganic analysis"

24. **Comment 46.** This comment has been only partially addressed and CWM-Vickery's responses to comments indicate that the information is provided in SOP No. GT-001. Section 6.1.3 of the RFI work plan states that field and trip blanks will have unique identification numbers. Examples of the unique identification numbers should be provided in Section 6.1.3. In addition, Section 6.1.3 should be revised to explain how the sample identification scheme will indicate the SWMU number, sample type, matrix type, sampling location, and sampling depth (if appropriate).

25. **Comment 47.** This comment has been only partially addressed. Section 5.2, Page 4, Paragraph 1 of the QAPP states that laboratory custody procedures for Rust Environment and

Infrastructure, Inc., are included as SOP No. GT-001 in Appendix A. However, this SOP is not included in Appendix A. The QAPP should be revised to include this SOP.

26. **Comment 49.** This comment has been only partially addressed. Table 6-1 should be revised to provide the number of standards for Method 8280. In addition, Table 6-1 describes the frequency of initial calibration verification for Methods 8080A and 8270B as "as needed." Table 6-1 should be revised to explicitly state what is meant by "as needed" by providing a quantitative frequency and to specify the conditions under which verification would be performed. Therefore, the following sentence should be added to Table 6-1: "The minimum frequency for initial calibration verification is whenever the continuing calibration verification for any analyte exceeds the quality control limit."

27. **Comment 52.** This comment has been only partially addressed. Table 7-1 indicates that sulfide will be analyzed for by Method 376.1. However, Table 8-1 indicates that sulfide will be analyzed for by Method 9030. To be consistent with the rest of the QAPP, Method 9030 should be deleted from this table and replaced with Method 376.1.

28. **Comment 56.** This comment has been only partially addressed. Table 8-1 identifies storage blanks, method blanks, laboratory control samples, and blank spike/blank spike duplicate samples as internal quality control (QC) checks. However, these samples are not discussed in Section 8.2. Section 8.2 should be revised to explain the purpose of these samples and how they will be prepared. Therefore, the following definitions should be added to Section 8.2 of the QAPP:

- Storage blanks: a blank prepared and stored in a refrigerated area to determine whether additional contaminants are present
- Method blank: a matrix blank carried through the complete sample preparation and analytical procedure to document contamination resulting from the analytical process
- Laboratory control sample: a known matrix spiked with one or more chemicals representative of the target analytes that is used to document laboratory performance

- Blank spike sample: an aliquot of sample spiked with a known concentration of one or more target analytes. The spiking occurs before sample preparation and analysis and is used to determine the bias of a method for a given sample matrix.

- Blank spike duplicate sample: an intralaboratory split sample of a blank spike sample used to determine the precision and bias of an analytical method for a given sample matrix

Also, Table 8-1 cites Method 9030, which is not identified elsewhere in the QAPP. This discrepancy should be resolved. In addition, Table 8-1 does not specify internal QC checks for Method 8141 (organophosphate pesticides), Method 325.3 (chloride), and Method 376.1 (sulfide). Table 8-1 should be revised to include this information.

Therefore, Method 9030 should be deleted from the table and replaced with Method 376.1. The internal QC checks for Method 8141 should consist of the same procedures as those outlined for Method 8080A in Table 8-2, with the surrogates and matrix spikes consisting of compounds listed in Table 3-4. The internal QC checks for Methods 376.1 and 325.3 should consist of the same procedures as those outlined for Method 9030A in Table 8-2.

29. **Comment 60**. Table 11-1 still contains the inconsistencies and deficiencies discussed below.

Table 11-1 shows that the Perkin-Elmer 3030B and 460AA spectrophotometers will be used during the RFI. However, the analytical methods for which these instruments will be used are not identified. Therefore, Table 11-1 should be revised to identify the analytical methods for which these instruments will be used.

Table 11-1 indicates that Method 8240B will be used during the RFI, but this method will not be used during the project and should be deleted from the table.

Table 11-1 shows that the Spectronic 21 spectrophotometer will be used during the RFI. However, the analytical methods for which this instrument will be used are not identified. Table 11-1 should be revised to identify the analytical methods for which this instrument will be used.

Dioxins and furans will be analyzed for during the RFI by Method 8280. However, Table 11-1 does not specify the types of equipment that will be used to perform the analysis. Table 11-1 should be revised to identify the equipment that will be used to analyze for dioxins and furans.

PRC Environmental Management, Inc.
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312-856-8700
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June 7, 1996

Mr. Tom Matheson
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, Illinois 60604

Subject: **Review of May 1996 Resource Conservation and Recovery Act (RCRA) Facility Investigation (RFI) Phase I Work Plan and RFI Quality Assurance Project Plan (QAPP) for Chemical Waste Management, Vickery, Ohio Contract No. 68-W4-0007, Work Assignment No. R05021**

Dear Mr. Matheson:

PRC Environmental Management, Inc. (PRC), has enclosed one paper copy and one diskette copy in WordPerfect 6.1 format of its technical review comments on the above-referenced documents. PRC's general and specific review comments on the RFI work plan and QAPP are included as Enclosures 1 and 2. In addition, general and specific review comments by an expert hydrogeologist on Appendix C of the RFI work plan and other hydrogeological information in the work plan are included as Enclosure 3.

PRC reviewed these documents for overall technical adequacy and to ensure that U.S. Environmental Protection Agency (EPA) comments, dated February 27, 1996, on the August 1995 RFI work plan and QAPP have been addressed. The work plan and QAPP contain numerous deficiencies, which are documented in the enclosed review comments.

If you have any questions or comments, please call me at (312) 856-8762.

Sincerely,

John Maher
Project Manager

Enclosures (3)

cc: Bernie Orenstein, EPA Region 5 (letter only)
Ed Schuessler, PRC (letter only)

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ENCLOSURE 1

TECHNICAL REVIEW COMMENTS ON THE MAY 1996
RCRA FACILITY INVESTIGATION PHASE I WORK PLAN
CHEMICAL WASTE MANAGEMENT
VICKERY, OHIO

(Six Pages)

TECHNICAL REVIEW COMMENTS ON THE MAY 1996
RCRA FACILITY INVESTIGATION PHASE I WORK PLAN
CHEMICAL WASTE MANAGEMENT
VICKERY, OHIO

PRC Environmental Management, Inc. (PRC), reviewed the second revision of the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) work plan dated May 1996 for overall technical adequacy and to ensure that U.S. Environmental Protection Agency (EPA) comments on the first revision of the work plan dated August 1995 have been addressed. EPA's comments on the original work plan and the first revision were issued to Chemical Waste Management of Vickery, Ohio (CWM-Vickery), on July 26, 1995, and February 27, 1996, respectively. Most of CWM-Vickery's responses adequately address EPA's comments. However, the CWM-Vickery responses discussed below do not adequately address the previous EPA comments dated July 26, 1995, and February 27, 1996. EPA comments that CWM-Vickery has addressed adequately are not discussed below. Also, because new text has been inserted into the latest revision of the work plan, an additional comment that identifies new issues in the May 1996 version of the work plan is presented below.

SPECIFIC COMMENTS

1. **Response to General Comment 4.** This comment has been partially addressed. The text in Section 5.7.1.1 states that only one sample will be collected at a depth of approximately 2 to 4 feet below the bottom of the solid waste management unit (SWMU) for laboratory analysis. However, this statement does not correspond with the text in Section 5.1, Page 2, Bullet 2, which states that when field observations indicate that contamination is present in the uppermost native soil, additional soil samples will be collected at greater depths to characterize the vertical extent of contaminant migration. This contingency from Section 5.1 should be added to the new text in Section 5.7.1.1.

2. **Response to Specific Comment 17.** This comment has been partially addressed. Based on discussions during the March 19, 1996, meeting between representatives from EPA and CWM-Vickery, historical information, including data and sampling locations, should be submitted by CWM-Vickery to EPA so that clean closure and the potential for contamination to have migrated beyond the boundaries of SWMUs and areas of concern (AOC) can be evaluated. The work plan should be revised to specify when this information will be submitted. In addition, the text in

Section 5.0 should be revised to state that closure data will be submitted for SWMUs 11 and 12 and AOC D.

3. **Response to New General Comment 1.** General Comment 1 discusses the historical use of data in the RFI process. CWM-Vickery's response states that only representative sample analytical results will be validated. Based on discussions during the March 19, 1996, meeting between representatives from EPA and CWM-Vickery, it was agreed that all data submitted to characterize groundwater conditions at the facility shall be validated and submitted in a useable format. Therefore, all sample analytical results, and not just representative sample analytical results, should be validated prior to being submitted for review. In addition, CWM-Vickery's response states that five existing monitoring wells will be sampled during Phase I field activities as confirmation samples to characterize groundwater conditions at the facility. Confirmation sampling should adequately represent existing groundwater data for the facility. Because existing data have been gathered from several water-bearing units at the facility, data from wells screened in the lacustrine and till units should also be included in the confirmation sampling program in addition to the bedrock monitoring wells that have been proposed. Therefore, the work plan should be revised to state that lacustrine and till monitoring wells will be sampled to characterize groundwater downgradient from selected SWMUs and AOCs at the facility.

4. **Response to New Specific Comment 6.** This comment has been partially addressed. Numerous discrepancies still exist between the information presented in Table 1-1 and the work plan. These discrepancies are discussed below.

Table 1-1 and Section 5.9.2 indicate that SWMU Group B includes SWMUs 4, 5, 7, 10, 11, 17, and 53. However, Table 4-1 in the work plan shows that SWMU Group B includes SWMUs 4, 5, 7, 11, 12, and 17. This discrepancy needs to be addressed, and the text and tables should be revised accordingly.

Table 1-1 indicates that samples collected from SWMU Group C will be analyzed for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), pesticides, polychlorinated biphenyls (PCB), herbicides, metals, cyanide, and sulfide. However, the text in Section 5.9.3 states that the soil samples will be analyzed for VOCs, SVOCs, organochloride pesticides, and

PCBs. This discrepancy needs to be addressed, and the text should be revised to reflect the information presented in the table.

Table 1-1 and the text in Section 5.9.3 indicate that for SWMU Group C, five soil samples will be collected. However, Figure 5-8 of the work plan shows only three soil sampling locations. This discrepancy needs to be resolved, and the text, table, and figure should be revised accordingly.

Table 1-1 indicates that samples collected from SWMU Group D will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, the text in Section 5.9.4 states that the soil samples will be analyzed for VOCs, SVOCs, organochloride pesticides, and PCBs. This discrepancy needs to be addressed, and the text should be revised to reflect the information presented in the table.

Table 1-1 indicates that samples collected from SWMU Groups E and F will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, the text in Sections 5.9.5 and 5.9.6 states that the soil samples will be analyzed for pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans. This discrepancy needs to be addressed, and the text should be revised to reflect the information presented in the table.

Table 1-1 indicates that SWMU Group G consists of SWMUs 21 through 30. However, the text in Section 5.9.7 indicates that SWMU Group G consists of SWMUs 21 through 27 and SWMUs 29 and 30. This discrepancy needs to be addressed, and the text and tables should be revised accordingly.

Table 1-1 indicates that samples collected from SWMU Group G will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, the text in Section 5.9.7 states that the soil samples will be analyzed for pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans. This discrepancy needs to be addressed, and the text should be revised to reflect the information presented in the table.

Table 1-1 indicates that 13 soil samples will be collected from SWMU Group G. However, the text in Section 5.9.7 indicates that four samples will be collected at SWMU 23, two soil samples

will be collected at SWMU 27, three soil samples will be collected at SWMU 29, and three soil samples will be collected at SWMU 30, for a total of 12 soil samples to be collected at SWMU Group G. Figure 5-12 also shows 12 soil sampling locations at SWMU Group G. This discrepancy needs to be addressed, and the text, tables, and figures should be revised accordingly.

Table 1-1 indicates that samples collected from SWMU Group H and SWMU 15 will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxins, and furans. However, the text in Sections 5.9.8 and 5.9.9.1 states that the soil samples will be analyzed for pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans. This discrepancy needs to be addressed, and the text should be revised to reflect the information presented in the table.

Table 1-1 indicates that samples collected from SWMUs 20 and 28 will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, the text in Section 5.9.9.3 and 5.9.9.4 states that the soil samples will be analyzed for pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans. This discrepancy needs to be addressed, and the text should be revised to reflect the information presented in the table.

Table 1-1 indicates that samples collected from SWMU 41 will be analyzed for VOCs, SVOCs, and PCBs. However, the text in Section 5.9.9.5 states that the soil samples will be analyzed for PCBs. This discrepancy needs to be addressed, and the text should be revised to reflect the information presented in the table because VOCs and phenols are listed as potential waste constituents in Section 5.9.9.5. In addition, the text in Section 5.9.9.5 states that metals with waste codes D004 through D011 are potential waste constituents that have been identified at SWMU 41. Therefore, Table 1-1 and the text in Section 5.9.9.5 should be revised to include metals as a test parameter.

Table 1-1 indicates that samples collected from SWMUs 44 and 45 will be analyzed for VOCs, SVOCs, metals, chloride, and PCBs. However, the text in Section 5.9.9.8 states that soil samples will be analyzed for VOCs, SVOCs, chloride, and metals. This discrepancy needs to be addressed, and the text and table should be revised accordingly.

Table 1-1 and the text in Section 5.10.1 state that soil samples will be collected from beneath each of the 30 maintenance tanks. However, Figure 5-26 indicates that 19 surface soil samples will be collected at AOC A. This discrepancy needs to be addressed, and the text, table, and figure should be revised accordingly.

Table 1-1 indicates that samples collected from AOCs A, B, C, F, H, and I will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, the text in Sections 5.10.1, 5.10.2, 5.10.3, 5.10.6, 5.10.8, and 5.10.9 states that soil samples will be analyzed for pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans. This discrepancy needs to be addressed, and the text should be revised to reflect the information presented in the table.

Table 1-1 indicates that two sediment samples will be collected from Meyer's Ditch. However, the text in Section 5.10.8 and Figure 5-26 indicate that nine sediment samples will be collected from Meyer's Ditch. This discrepancy needs to be resolved, and the text, table, and figure need to be revised accordingly. In addition, Table 1-1 indicates that sediment samples will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide. However, no analytical parameters are specified in Section 5.10.8 for sediment samples. Section 5.10.8 should be revised to include analytical parameters for sediment samples.

Table 1-1 indicates that surface water samples will be collected during the Phase I RFI field investigation. However, no surface water samples are included in the work plan. This discrepancy needs to be resolved, and the table and work plan text should be revised accordingly.

Table 1-1 indicates that groundwater samples to be collected from the capillary drain and from existing bedrock monitoring wells will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, sulfide, dioxin, and furans. However, in Sections 5.9.2 and 5.11, no analytical parameters are specified for the groundwater and capillary drain samples. Sections 5.9.2 and 5.11 should be revised to include the analytical parameters for these samples.

SPECIFIC COMMENT ON NEW RFI TEXT

1. **Section 5.11, Page 54, Paragraph 5**. The text in this paragraph states that the order of groundwater sampling and the filtering procedures for dissolved metals sample aliquot will be the same as described in the facility groundwater sampling plan for the Part B permit as presented in Appendix C. Actually, Appendix C includes water level hydrographs, monitoring well construction logs, precipitation data, a report summarizing the L-19 investigation, and a report discussing tritium concentrations in groundwater. Appendix D contains the groundwater sampling plan for the Part B permit. The text in Section 5.11 should be revised to address this discrepancy.

ENCLOSURE 2

TECHNICAL REVIEW COMMENTS ON THE MAY 1996
RCRA FACILITY INVESTIGATION QUALITY ASSURANCE PROJECT PLAN
CHEMICAL WASTE MANAGEMENT
VICKERY, OHIO

(10 Pages)

TECHNICAL REVIEW COMMENTS ON THE MAY 1996
RCRA FACILITY INVESTIGATION QUALITY ASSURANCE PROJECT PLAN
CHEMICAL WASTE MANAGEMENT
VICKERY, OHIO

PRC Environmental Management, Inc. (PRC), reviewed the second revision of the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) quality assurance project plan (QAPP) dated May 1996 for overall technical adequacy and to ensure that U.S. Environmental Protection Agency (EPA) comments on the original and first revision of the RFI work plan and QAPP dated August 1995 have been addressed. EPA's comments on the original work plan and the first revision were issued to Chemical Waste Management Vickery, Ohio (CWM-Vickery), on July 26, 1995, and February 27, 1996, respectively. The responses discussed below do not adequately address the previous EPA comments dated July 26, 1995. EPA comments that CWM-Vickery has addressed adequately are not discussed below. In general, the QAPP still contains several deficiencies and inconsistencies.

SPECIFIC COMMENTS

1. **Response to General Comment 1.** This comment has been only partially addressed. Section 1.4.2 of the QAPP defines potential contamination as any detection above the project reporting limits (PRL) or any nondetect for which the PRL is above the EPA Region 5 data quality level (DQL). CWM-Vickery's definition of potential contamination does not directly discuss background levels for metals as requested by EPA. If CWM-Vickery does not intend to collect background metals samples and will compare metals data to PRLs and DQLs, this fact should be clearly stated in text. In addition, the text in the QAPP should be clarified to state whether Phase II samples will be collected at every Phase I location where analytical results, including analytical results for metals, either exceed the PRL or are reported as nondetects and the PRL exceeds the DQL. The text in the QAPP should also indicate if nondetects will be reported as the PRL for use in the quantitative risk assessment (QRA). Finally, the use of the term "potential contamination" is problematic because it implies that some results will not be used in the QRA. All Phase I and Phase II data should be used in the QRA. Appropriate sections of the QAPP should be revised accordingly.

2. **Response to General Comment 7.** The QAPP still contains several deficiencies, inconsistencies, and discrepancies regarding some of the analytical methods used to determine target parameters. These deficiencies, inconsistencies, and discrepancies are discussed below and should be addressed accordingly. Specific Comment 56 also applies here and should be addressed.

The QAPP includes references to Method 8240B, which is not being performed during this project. The reference to Method 8240B should be deleted throughout the QAPP, and appropriate sections of the QAPP should be revised accordingly.

Two versions (July 1995 and April 1996) of the standard operation procedures (SOP) for Methods 8270B, 8080A, and 6010A are included in the QAPP. The QAPP should be revised to include only the most recent version of these methods.

Table 3-4 is titled "Precision and Accuracy Criteria, Appendix IX Volatile Organic Compound by Method 8260A" but presents precision and accuracy criteria for organophosphate pesticides by Method 8141. This discrepancy should be addressed.

Table 6-1 does not include calibration procedures for Methods 300 (chloride) and 376.1 (sulfide). Table 6-1 should be revised to include this information. In addition, Table 6-1 presents calibration procedures for Method 8240B, which is not being performed during the RFI. This discrepancy should be addressed.

SOP No. 13.1 for Method 8240B has been included in the QAPP. However, this method is not being used during this project. Therefore, SOP No. 13.1 should be deleted from the QAPP.

No SOP for Method 300 (chloride) has been included in the QAPP. However, a SOP for Method 325.3 (chloride), which is not being used during the RFI, is included. Therefore, the SOP for Method 325.3 should be deleted from the QAPP, and the SOP for Method 300 should be added to the QAPP. In addition, no SOP for EPA Method 9080, cation exchange capacity analyses, which is identified on Table 7-2 of the QAPP, is included in the QAPP. This discrepancy should be addressed.

RESPONSES TO SPECIFIC COMMENTS

3. **Response to Specific Comment 2.** Several inconsistencies still exist between the table of contents and the materials included in the appendices to the QAPP. The items listed below are incorrectly identified in the table of contents as being included in Appendix A of the QAPP. These materials have been referenced in the text and should be included in Appendix A.

   - GP Environmental Services SOP for Chloride (SOP No. 11.55)
   - Rust Environment and Infrastructure, Inc., geotechnical laboratory SOPs
   - SOP No. QA000-0000 for data validation
   - Guidelines for the preparation of SOPs of field and laboratory measurements
   - SOP for the field measurement of volatile organics by HNu
   - SOP for the measurement of pH in the field using the Fisher Accumet Model 955 portable pH/mV temperature meter
   - SOP for the measurement of specific conductance in the field using the Cole Parmer Model 4070 conductivity meter

4. **Response to Specific Comment 3.** The response to this comment states that data will be validated using the SOP entitled "Data Validation Procedures for EPA Level III Data." Level II data is not sufficient for use in an RFI. Also, a data validation SOP is not included in the QAPP. Therefore, the QAPP should be revised to include the SOP entitled "Data Validation Procedures for EPA Level III Data."

5. **Response to Specific Comment 6.** The response to this comment states that a field duplicate will be collected at the capillary drain sump to provide additional information on the reproducibility or statistical significance of the results. However, collection of a field duplicate does not ensure statistical significance. In order to ensure statistical significance, more investigative samples (at least three) should be collected from the capillary drain sump. The QAPP should be revised to reflect this requirement.

6. **Response to Specific Comment 7.** Section 1.1.2 should be revised to state that an undisturbed soil sample from an area that is unaffected by land-use activities will be collected to verify the true

extent of the surficial soil layer and that this sample may be collected at a depth of greater than 24 inches below ground surface (bgs), depending on land-use activities.

7. **Response to Specific Comment 9.** This comment has been partially addressed. During groundwater sampling, several field parameters need to be monitored to verify that a representative groundwater sample is collected. In addition to pH, these parameters include turbidity, dissolved oxygen, and temperature. The QAPP does not identify turbidity, dissolved oxygen, and temperature as field parameters that will be measured. These parameters should be identified in Table 1-1 and in all other relevant parts of the QAPP.

8. **Response to Specific Comment 12.** This comment has been partially addressed. The response states that data collected during Phase I will be compared to PRLs. However, the text in Section 1.1.2 needs to be further revised to state explicitly action that will be taken after the Phase I results are compared to PRLs and how Phase II of the RFI will be impacted after the data collected during Phase I are compared to PRLs. The text in Section 1.1.2 needs to be revised accordingly.

9. **Response to Specific Comment 15.** This comment has not been addressed. The text in Section 1.3.3, Page 13, Bullet No. 1, states that all releases to Little Raccoon Creek and Meyers Ditch were remediated immediately after the release. However, Table 3-1 of the 1993 report referenced in Section 1.3.3 lists high metals concentrations in sediment samples collected from Little Racoon Creek. Therefore, additional sediment samples should be collected for metals analysis to evaluate the current nature and extent of contamination in Little Raccoon Creek and Meyers Ditch. Appropriate sections of text in the QAPP and work plan should be revised accordingly.

10. **Response to Specific Comment 18.** This comment has been partially addressed. The QAPP should be revised to state that Phase II activities will be undertaken at all locations where any Phase I analytical result exceeds a DQL for a specific compound or an accepted background level for metals identified during the Phase I investigation. Risk will be evaluated after all data from both phases of the RFI are collected, and the need for corrective measures will be determined during the QRA. The QAPP should be revised accordingly.

11. **Response to Specific Comment 19.** This comment has not been addressed. The text in Section 1.4.1 states that samples of residual materials will be collected at SWMUs where clean closure has not been certified. However, the text should be revised to state that in addition to residual materials, soil samples from an adequate depth below the residual materials will be collected and analyzed for Appendix IX parameters. The QAPP should be revised accordingly.

12. **Response to Specific Comment 20.** This comment has been partially addressed. The text in Section 1.4.2 states that Phase I data will be compared to PRLs in order to define potential contamination for use in the QRA. However, several issues regarding the comparison of data to PRLs need to be discussed in text. The text should clarify if Phase II samples will be collected at every Phase I location where results either exceed the PRL or, if the result is a nondetect, at locations where the PRL exceeds the DQL. The text should also discuss if nondetects will be reported at the PRL for use in the QRA. Finally, the text in the QAPP should be revised to specify the process that will be used to interpret the analytical results.

13. **Response to Specific Comment 21.** This comment has been partially addressed. Section 1.5, Page 18, Paragraph 2, states that additional soil samples will be collected at locations where field observations indicate that the uppermost native soil is contaminated. However, the text should be revised to state that an addendum to the sampling plan will be submitted to EPA if additional soil samples are collected during Phase I. The text should be revised accordingly.

14. **Response to Specific Comment 22.** Several inconsistencies are still present between Table 1-1 and the work plan. Specific inconsistencies are discussed in the response to Specific Comment 6 on the work plan, which is included in Enclosure 1. Table 1-1 and the work plan should be revised to resolve any inconsistencies between them.

15. **Response to Specific Comment 23.** This comment has been partially addressed. However, several inconsistencies are still present in Table 1-2. These inconsistencies are discussed below.

    Table 1-2 presents the DQLs for 2-chloro-1,3 butadiene; chloromethane; and 1,1-dichloroethene. However, the December 1995 EPA Region 5 DQL document does not list DQLs for these

compounds. Therefore, a footnote should be added to Table 1-2 to identify the source of these DQLs.

The December 1995 EPA Region 5 DQL document states that if Method 8260B is used instead of Method 8260, reporting limits (RL) for water analysis can either satisfy or be close to EPA DQLs for the following compounds: 1,2-dibromo-3-chloropropane; 1,2-dibromomethane; 1,2-dichloroethane; 1,1,1,2-tetrachloroethane; 1,1,2,2-tetrachloroethane; and 1,1,2-trichloroethane. Table 1-3 should be revised to state that the RLs for water analysis for the compounds specified above is 1 microgram per liter (μg/L) if the most recently promulgated method is used. Therefore, the QAPP should be revised to specify Method 8260B instead of Method 8260 so that lower RLs can be achieved for these compounds.

16. **Response to Specific Comment 24.** Several deficiencies are still present in Table 1-3. According to the December 1995 EPA Region 5 DQL document, lower RLs for water analysis could be achieved if alternative methods other than Method 8270 are used for some compounds. These compounds, RLs, and methods are listed in the table below.

Parameter	Lower RL (μg/L)	Method
Benzo(a)anthracene	0.13	8310
Benzo(b)fluoranthene	0.18	8310
Benzo(k)fluoranthene	0.17	8310
Benzo(g,h,i)perylene	0.76	8310
Benzo(a)pyrene	0.23	8310
Bis(2-ethylhexyl)phthalate	2.7	8061A
Dibenzo(a,h)anthracene	0.3	8310
1,4-Dichlorobenzene	0.07/1.0	8021B/8260B
3,3'-Dimethylbenzidine	10	8210C
Hexachlorobenzene	0.056	8121
Hexachlorobutadiene	0.014	8121
Hexachloroethane	0.016	8121

Parameter	Lower RL (μg/L)	Method
Indeno(1,2,3-cd)pyrene	0.43	8310
2-Nitroanaline	10	8131
n-Nitrosodimethylamine	1.5	8070A
n-Nitrosodi-n-propylamine	4.6	8070A

The QAPP should be revised to use the methods listed above so that lower RLs can be achieved. SOPs for these methods should also be provided.

17. **Response to Specific Comment 25.** Several deficiencies still exist in Table 1-4. The December 1995 EPA Region 5 DQL document does not list DQLs for arochlor compounds. However, Table 1-4 lists DQLs for arochlor compounds. The table should be revised to indicate the source of these DQLs. In addition, lower RLs for water analysis can be achieved for heptachlor epoxide and toxaphene by using Method 8081A. Table 1-4 should be revised to list RLs of 0.32 and 0.86 μg/L for heptachlor expoxide and toxaphene, respectively.

18. **Response to Specific Comment 26.** No PRLs for soil and water analyses are listed in Table 1-5 for parathion. Although DQLs for parathion are not listed in the December 1995 EPA Region 5 DQL document, Table 1-5 should be revised to list the PRL for this compound.

19. **Response to Specific Comment 34.** This comment has been partially addressed. Figure 2-1 still contains names of personnel whose responsibilities are not discussed in text. For example, Bryan Kline is listed in Figure 2-1, but his responsibilities are not discussed in text. Also, the names of the drilling and ground penetrating radar subcontractors are shown in Figure 2-1, but their responsibilities are not discussed in text. The text should be revised to include a discussion of Mr. Kline's and the subcontractors' responsibilities. In addition, the following personnel are discussed in text but are not shown in Figure 2-1: Ken Ives, Albert Ellis, Bobby Ghrist, June Fischer, Stephen Grant, and Dorothy Walden. Figure 2-1 should be revised to show the names of these personnel and their corresponding responsibilities.

20. **Response to Specific Comment 36.** This comment has been partially addressed. The QAPP states that a completeness objective of 80 percent or more for soil samples and 90 percent for water samples using Method SW-846 is expected. A sufficient number of samples should be collected to make 80 and 90 percent meaningful parameters. For example, if only three samples are collected from a SWMU and only two of the three sample results are valid, the completeness objective would be only 67 percent. The QAPP should be revised to address this deficiency.

21. **Response to Specific Comment 41.** This comment has not been addressed. A footnote to Table 3-3 states that a minimum 10 percent recovery of the surrogate compound is used as an action limit. However, Table 3-3 also indicates that the acceptable range for surrogate recovery is 24 to 150 percent. This discrepancy should be resolved.

22. **Response to Specific Comment 42.** This comment has not been addressed. Table 3-6 shows that arsenic will be analyzed for using SW-846 Method 7060. This table should be revised to show that arsenic will be analyzed for using SW-846 Method 7060A, which is the most recently promulgated method.

23. **Response to Specific Comment 44.** This comment has been partially addressed. Inconsistencies and deficiencies still exist in Section 4.0 of the QAPP and sections of the work plan, which are referenced in the QAPP. Specific comments are provided below.

    Section 4.0 of the QAPP still incorrectly references sections of the work plan. Field blank collection is actually discussed in Section 5.2.5.1.3 of the work plan, field duplicate collection is discussed in Section 5.2.5.1.1 of the work plan, matrix spike/matrix spike duplicate collection is discussed in Section 5.2.5.1.2 of the work plan, and trip blank preparation is discussed in Section 5.2.5.1.4 of the work plan. Section 4.0 of the QAPP should be revised to correctly reference sections of the work plan.

    Section 5.2.5.1.4 of the work plan should be revised to state that trip blanks will be included in every cooler or shipping container with aqueous samples for volatile organic compound (VOC) analysis.

Footnote 2 from Table 4-2 should define the holding time as beginning from the time of sample collection and not as beginning from the time of sample receipt. In addition, the reference to Footnote 6 in Row 4, Column 1 of Table 4-2 should be deleted because Footnote 6 does not apply to metals. Table 4-2 should be revised accordingly.

Finally, the order in which sample parameters will be collected is not specified in Section 4.0 of the QAPP or Section 5.0 of the work plan. The text in the QAPP and the work plan should be revised to specify the order of sample parameter collection.

24. **Response to Specific Comment 46.** This comment has been partially addressed. The text in Section 6.1.3 of the work plan states that field and trip blanks will have unique identification numbers. However, examples of the unique identification numbers should be provided, and the text in Section 6.1.3 in the work plan should be revised accordingly. In addition, the text in Section 6.1.3 of the work plan should be further revised to explain how the sample identification scheme will indicate sample depth and matrix.

25. **Response to Specific Comment 47.** This comment has been partially addressed. Section 5.2, Page 4, Paragraph 1, of the QAPP states that laboratory custody procedures for Rust Environment and Infrastructure, Inc., are included in Appendix A (SOP No. GT-001). However, this information is not included in Appendix A. The QAPP should be revised to include this information.

26. **Response to Specific Comment 49.** This comment has been partially addressed. Table 6-1 should be revised to provide the number of standards for Method 8280. In addition, Table 6-1 describes the frequency of initial calibration verification for Methods 8080a and 8270B as "as needed." Table 6-1 should be revised to explicitly state what is meant by "as needed" by providing a quantitative frequency and should specify the conditions under which verification would be performed.

27. **Response to Specific Comment 52.** This comment has been partially addressed. Table 7-1 shows that sulfide will be analyzed for by Method 376.1. However, Table 8-1 shows that sulfide will be analyzed for by SW-846 Method 9030. This discrepancy should be resolved.

28. **Response to Specific Comment 56.** This comment has been partially addressed. Table 8-1 identifies storage blanks, method blanks, laboratory control samples, and blank spike/blank spike duplicate samples as internal quality control checks. However, these samples are not discussed in Section 8.2. Therefore, Section 8.2 should be revised to explain the purpose of these samples and how they will be prepared. Also, Table 8-1 also references Method 9030, which is not identified elsewhere in the QAPP. This discrepancy should be resolved. In addition, Table 8-1 does not specify internal QC checks for Method 8141 (organophosphorus pesticides), Method 300 (chloride), and Method 376.1 (sulfide). Table 8-1 should be revised accordingly to include this information.

29. **Response to Specific Comment 60.** Table 11-1 still contains several inconsistencies and deficiencies that are discussed below.

Table 11-1 shows that the Perkin-Elmer 3030B and 460AA spectrophotometers will be used during the RFI. However, the analytical methods for which these instruments will be used is not identified. Therefore, Table 11-1 should be revised to identify the analytical methods for which these instruments will be used.

Table 11-1 shows that Method 8240B will be used during the RFI. However, this method will not be used during this project and should be deleted from Table 11-1. Table 11-1 should be revised accordingly.

Table 11-1 shows that the Spectronic 21 Spectrophotometer will be used during the RFI. However, the analytical methods for which this instrument will be used is not identified. Table 11-1 should be revised to identify the analytical methods for which this instrument will be used.

Dioxins and furans will be analyzed for during the RFI using Method 8280. However, Table 11-1 does not specify the types of equipment that will be used to perform the analysis. Table 11-1 should be revised to identify the equipment that will be used to analyze for dioxins and furans.

ENCLOSURE 3

EXPERT HYDROGEOLOGIST TECHNICAL REVIEW COMMENTS ON APPENDIX C OF THE MAY 1996 RCRA FACILITY INVESTIGATION WORK PLAN CHEMICAL WASTE MANAGEMENT VICKERY, OHIO

(Three Pages)

EXPERT HYDROGEOLOGIST TECHNICAL REVIEW COMMENTS ON APPENDIX C OF THE MAY 1996 RCRA FACILITY INVESTIGATION WORK PLAN CHEMICAL WASTE MANAGEMENT VICKERY, OHIO

A PRC Environmental Management, Inc. (PRC), expert hydrogeologist reviewed the second revision of the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) work plan dated May 1996 for technical adequacy in relation to hydrogeological issues and to verify that U.S. Environmental Protection Agency (EPA) comments related to hydrogeologic issues made on the first revision of the work plan dated August 1995 have been addressed. EPA's comments on the original work plan and the first revision were issued to Chemical Waste Management Vickery, Ohio (CWM-Vickery), on July 26, 1995, and February 27, 1996, respectively. The responses discussed below do not adequately address the previous comments dated February 27, 1996. CWM-Vickery has adequately addressed all EPA comments dated July 26, 1995. Comments that CWM-Vickery has addressed adequately are not discussed below. Also, because new text has been inserted into the latest revision of the work plan, additional comments that identify new issues in the May 1996 version of the work plan are presented below.

SPECIFIC COMMENTS

1. **Response to New General Comment 1.** The text states that the purpose of the RFI Phase I work plan "is specifically focused on determining if releases have actually occurred." However, the approach outlined in the work plan does not appear capable of determining if a release to groundwater has occurred for the reasons discussed below.

   Glacial deposits in the U.S. are commonly weathered and oxidized to a depth of 20 to 30 feet below ground surface (bgs). As a consequence, they contain an abundance of nearly vertical fractures or macropores that permit rather rapid transfer of water from the ground surface to the water table and below. In this zone of active groundwater circulation, the water is relatively young compared to groundwater in unweathered glacial till. Below the weathered zone, the permeability of glacial deposits tends to rapidly decrease, water movement is very slow, and the water is approximately 10,000 years old.

   At the CWM-Vickery facility, the upper 20 to 25 feet of glacial material appears to be weathered, and groundwater movement is more rapid in the upper 20 to 25 feet of these deposits than it is in the deeper glacial deposits, as indicated by the decrease of hydraulic heads with depth and the

equipotential lines on the vertical flow nets presented in Figure 4-24, which are roughly parallel to land surface and closely spaced below a depth of about 20 feet bgs. These lines indicate a very low permeability below 20 feet bgs. Tritium data also indicate young water in the upper 20 feet. Finally, according to a March 1982 Golder Associates report, shear strength increases significantly at a depth of about 25 feet bgs, indicating that the glacial till below 25 feet bgs may not be as weathered as the till located in the upper 25 feet. This evidence indicates that the upper 20 to 25 feet of the glacial material is more permeable than the underlying unconsolidated sediments.

At the CWM-Vickery facility, both vertical and horizontal water movement are most rapid in the upper 20 to 25 feet of glacial material. If a release has occurred, the contamination is most likely located in these surficial deposits and probably at a depth of less than 25 feet bgs. The likelihood of detecting surface-origin contamination in the underlying bedrock aquifer is slight. To determine if a release has occurred at CWM-Vickery, shallow wells screened in the lacustrine deposits at a depth of about 20 feet bgs should be sampled. The placement of these wells or the selection of existing wells should be based on an examination of lacustrine water-level maps showing flow lines. The wells should be placed along flow lines that originate at the central part of a solid waste management unit (SWMU) or area of concern (AOC).

Water-level maps of lacustrine deposits indicate the presence of a groundwater mound, the crest of which trends roughly north-northwest through the central part of the closure cell. Flow lines extend generally east, north, and west from the divide. Several lacustrine monitoring wells lie on both sides of the divide and include monitoring wells L-17, L-18, L-19A, and L-25. If samples from these wells are not contaminated, the possibility exists that the lacustrine deposits have not been significantly impacted. Analytical data from monitoring wells are not available at this time to make this determination.

The groundwater quality investigation portion of the RFI work plan is quite limited. Only five wells are proposed for monitoring the entire facility. In addition, these wells are all bedrock wells, which are probably not contaminated based on geologic conditions at the facility, and it is not likely that they would indicate a surface release. Therefore, the work plan should be revised to include groundwater samples collected from lacustrine-screened monitoring wells in order to determine if groundwater has been impacted by facility operations and to confirm existing groundwater data that will be validated as part of the Phase I RFI.

GENERAL COMMENT ON NEW APPENDIX C TEXT

1. The work plan lacks a complete generalized description of the hydrogeologic system and the manner in which it functions. The generalized discussion should be revised to specify details such as precipitation data, water level fluctuations, groundwater movement, and groundwater quality. For example, water level fluctuations in till wells and lacustrine wells are very similar, and it is unclear if the similarity reflects the quality of the database or direct interaction between the two units. Section 3.0 of the work plan should be revised to include a discussion that summarizes information presented in Appendix C of the work plan.

SPECIFIC COMMENTS ON NEW APPENDIX C TEXT

1. **Figure 4-24.** With some exceptions, the vertical flow nets presented in Figure 4-24 in Appendix C represent a reasonable explanation of the groundwater flow system at the facility. However, the vertical flow nets should be constructed as closely as possible along flow lines, and the data should be based on wells of different depths with short screens. Secondly, the equipotential lines must bend upward starting at a depth of about 20 feet to reflect horizontal flow in the zone of higher permeability. Presently, the flow nets indicate that all groundwater flows vertically downward through a zone of very low permeability. However, the fact that a horizontal flow component in the zone of higher permeability exists is based on the annual fluctuation of water levels shown in hydrographs for both the till and lacustrine wells. Figure 4-24 should be revised accordingly.

2. **Hydrographs.** Appendix C presents hydrographs showing water level fluctuations at the facility. The hydrographs present data from 1986 to mid-1995. However, Table 3 in Appendix C presents precipitation data for 1995. In order to adequately compare precipitation data to water level fluctuations, additional precipitation data should be included in Appendix C that extend back to at least 1986. In addition, the vertical scale on the hydrographs reads "concentrations." The vertical scale on the hydrographs should be changed to accurately reflect the information presented.

EXPERT HYDROGEOLOGIST TECHNICAL REVIEW COMMENTS ON APPENDIX C OF THE MAY 1996 RCRA FACILITY INVESTIGATION WORK PLAN CHEMICAL WASTE MANAGEMENT VICKERY, OHIO

A PRC Environmental Management, Inc. (PRC), expert hydrogeologist reviewed the second revision of the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) work plan dated May 1996 for technical adequacy in relation to hydrogeological issues and to verify that U.S. Environmental Protection Agency (EPA) comments related to hydrogeologic issues made on the first revision of the work plan dated August 1995 have been addressed. EPA's comments on the original work plan and the first revision were issued to Chemical Waste Management Vickery, Ohio (CWM-Vickery), on July 26, 1995, and February 27, 1996, respectively. The responses discussed below do not adequately address the previous comments dated February 27, 1996. CWM-Vickery has adequately addressed all EPA comments dated July 26, 1995. Comments that CWM-Vickery has addressed adequately are not discussed below. Also, because new text has been inserted into the latest revision of the work plan, additional comments that identify new issues in the May 1996 version of the work plan are presented below.

SPECIFIC COMMENTS

1. **Response to New General Comment 1.** The text states that the purpose of the RFI Phase I work plan "is specifically focused on determining if releases have actually occurred." However, the approach outlined in the work plan does not appear capable of determining if a release to groundwater has occurred for the reasons discussed below.

   Glacial deposits in the U.S. are commonly weathered and oxidized to a depth of 20 to 30 feet below ground surface (bgs). As a consequence, they contain an abundance of nearly vertical fractures or macropores that permit rather rapid transfer of water from the ground surface to the water table and below. In this zone of active groundwater circulation, the water is relatively young compared to groundwater in unweathered glacial till. Below the weathered zone, the permeability of glacial deposits tends to rapidly decrease, water movement is very slow, and the water is approximately 10,000 years old.

   At the CWM-Vickery facility, the upper 20 to 25 feet of glacial material appears to be weathered, and groundwater movement is more rapid in the upper 20 to 25 feet of these deposits than it is in the deeper glacial deposits, as indicated by the decrease of hydraulic heads with depth and the equipotential lines on the vertical flow nets presented in Figure 4-24, which are roughly parallel to land surface and closely spaced below a depth of about 20 feet bgs. These lines indicate a very low

permeability below 20 feet bgs. Tritium data also indicate young water in the upper 20 feet. Finally, according to a March 1982 Golder Associates report, shear strength increases significantly at a depth of about 25 feet bgs, indicating that the glacial till below 25 feet bgs may not be as weathered as the till located in the upper 25 feet. This evidence indicates that the upper 20 to 25 feet of the glacial material is more permeable than the underlying unconsolidated sediments.

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Water-level maps of lacustrine deposits indicate the presence of a groundwater mound, the crest of which trends roughly north-northwest through the central part of the closure cell. Flow lines extend generally east, north, and west from the divide. Several lacustrine monitoring wells lie on both sides of the divide and include monitoring wells L-17, L-18, L-19A, and L-25. If samples from these wells are not contaminated, the possibility exists that the lacustrine deposits have not been significantly impacted. Analytical data from monitoring wells are not available at this time to make this determination.

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example, water level fluctuations in till wells and lacustrine wells are very similar, and it is unclear if the similarity reflects the quality of the database or direct interaction between the two units. Section 3.0 of the work plan should be revised to include a discussion that summarizes information presented in Appendix C of the work plan.

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Rust Environment & Infrastructure Inc.

A Rust International Company
3220 Tillman Drive, Suite 300
Bensalem, PA 19020

Phone 215.633.4500
Fax 215.633.4575

RECEIVED
MAY 9 - 1996
OFFICE OF RCRA
WASTE MANAGEMENT DIVISION
EPA REGION V

FEDERAL EXPRESS

May 8, 1996

U. S. Environmental Protection Agency
Region 5
Attn.: Mr. Thomas Matheson HRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Subject: **Addendum to Response to Comments**
RCRA Facility Investigation (RFI) Workplan
Vickery Facility, Chemical Waste Management, Inc.
EPA I.D. # OHD020273819

Dear Mr. Matheson:

It has become evident that we have provided Figure 2-4 and did not provide instructions for the replacement of Figure 7-1 for the Workplan. Figure 2-4 should have been designated Figure 2-5. Enclosed is replacement Figure 2-5. Please replace this figure and Figure 7-1 in all of your Workplan's. Additionally, detailed replacement instructions are provided below for the appendices of the Quality Assurance Project Plan (QAPjP).

Appendix A

In the original QAPjP binder please replace:
SOP 13.1 with 13.2
SOP 13.34
SOP 13.0
ETC SOPs 420301 and 411901

In the original QAPjP binder please add:
SOP 11.62
SOP 11.55
All of the Rust Geotech. Laboratory SOPs
All of the Field Methods SOPs

Appendix B

Please remove Appendix B from the original QAPjP binder and place the SOP for GP Environmental Standard Chain of Custody Procedures in front of the Core Laboratories, Inc. Quality Assurance Plan in the newly provided binder.

When completed with the replacement process, the original QAPjP binder should only have Appendix A and the newly provided binder should have Appendices B and C.

We apologize for any inconvenience this may have caused. If you have any questions please feel free to call me at 215.633.4562.

Sincerely,

Rust Environment & Infrastructure Inc.

Richard S. Zweig, P.G.
Project Manager

cc: w/attachments: Edwin Lim - OEPA DHWM Columbus
Chuck Hull - OEPA NWDO Bowling Green
CWM Vickery Information Repository
Micheal Curry - CWM Vickery

Chemical Waste Management, Inc.

3956 State Route 412
Vickery, Ohio 43464
419/547-7791

FEDERAL EXPRESS

May 1, 1996

U.S. Environmental Protection Agency
Region V
Attn: Mr. Thomas Matheson HRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Subject: Response to Comments - RCRA Facility Investigation (RFI) - Workplan
Vickery Facility, Chemical Waste Management, Inc.
EPA I.D. #OHD020273819

Dear Mr. Matheson:

In response to your letter dated February 27, 1996 received February 29, 1996, attached are our comments together with the amended pages for four (4) copies of the revised Workplan and the revised Quality Assurance Project Plan. Please would you place the replacement pages, figures, and tables in your binders as listed. Appendices C, D, and E for the Workplan and Appendices A, B, and C for the Quality Assurance Project Plan are provided in separate binders.

Copies have been sent to the Ohio Environmental Protection Agency as requested and a copy will be placed in the CWM Vickery Information Repository. Should you have any questions regarding this matter, please contact Michael Curry or Steve Lonneman at (419) 547-7791.

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

Sincerely,

CHEMICAL WASTE MANAGEMENT, INC.

F.G. Nicar
General Manager

FGN/tr
Attachments

Printed on recycled paper.

cc w/attachments: Edwin Lim - OEPA DHWM Columbus
Chuck Hull - OEPA NWDO Bowling Green
CWM Vickery Information Repository

Chemical Waste Management, Inc.

3956 State Route 412
Vickery, Ohio 43464
419/547-7791

RECEIVED
MAR 1 2 1996
OFFICE OF RCRA
WASTE MANAGEMENT DIVISION
EPA, REGION V

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 602 174 438

March 8, 1996

United States Environmental Protection Agency
Region 5
Attention Mr. Thomas Matheson - DRP-8J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Re: Notice of Deficiency (NOD) - Chemical Waste Management, Inc. (CWM) Vickery Facility
RCRA Facility Investigation (RFI) Workplan OHD 020 273 819

Dear Mr. Matheson:

I received your Notice of Deficiency for the CWM Vickery Facility dated February 27, 1996, with Region 5's new Data Quality Level (DQL) Table enclosed. Your comments, which were thorough and extensive, have been reviewed by ourselves and by our consultant, Rust Environmental and Infrastructure, Inc. and there are some areas where we have some concerns.

I believe that these areas of concern need some discussion in order to clarify the direction in which the work plan revision needs to proceed. I would therefore request a meeting with yourself and your team to discuss some aspects of the comments at your earliest convenience. In addition I would also request an extension of the time for the submission of a response to your letter based on the outcome of the anticipated meeting.

I believe a meeting would be in the best interest of all and look forward to your response.

Sincerely,
CHEMICAL WASTE MANAGEMENT, INC.

F.G.Nicar
General Manager

Printed on recycled paper.

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

February 27, 1996

REPLY TO THE ATTENTION OF:
DRP-8J

CERTIFIED MAIL: P 219 367 703
RETURN RECEIPT REQUESTED

Fred G. Nicar, General Manager
Chemical Waste Management, Inc.
Vickery Facility
3956 State Route 412
Vickery, Ohio 43464

RE: Notice of Deficiency (NOD)
Chemical Waste Management, Inc. Vickery Facility (CWM-Vickery)
RCRA Facility Investigation (RFI) Workplan
OHD 020 273 819

Dear Mr. Nicar:

The United States Environmental Protection Agency (U.S. EPA) has reviewed CWM-Vickery's RFI Workplan and RFI Workplan Quality Assurance Project Plan (QAPP) dated August 1995 and has determined the documents to be deficient.

Enclosed are the deficiencies identified by the U.S. EPA in CWM-Vickery's RFI Workplan and QAPP. CWM-Vickery shall adequately respond to these deficiencies within 30 days after receipt of this letter. All documents and letters submitted by CWM-Vickery must include its **U.S. EPA Identification number**, which for this facility is **OHD 050 273 819**. The modified RFI Workplan and QAPP shall be prepared in accordance with the following editorial protocol or convention:

1. Old language is overstruck.

2. New language is capitalized.

Recycled/Recyclable • Printed with Vegetable Oil Based Inks on 100% Recycled Paper (40% Postconsumer)

3. Page headers must indicate date of submission.

4. If any significant changes are necessary, pages shall be renumbered, table of contents revised, and complete sections provided as required.

5. An itemized list of all replacement pages, sections, tables, etc., that are to be replaced in the modified submission, shall be provided.

In addition to four copies of the modified submission required by the U.S. EPA, please send one copy of each to:

Edwin Lim
Ohio EPA, DHWM
P.O. Box 1049
1800 WaterMark Drive
Columbus, OH 43266-0149

Chuck Hull
Ohio EPA, NWDO
347 N. Dunbridge Rd.
Bowling Green, OH 43402

Also enclosed is Region 5's new Data Quality Level (DQL) Table, which shall be used by CWM-Vickery in its revisions to the RFI Workplan and QAPP.

If you have any questions regarding what information is required, please contact me at (312) 886-7569.

Sincerely,

Thomas Matheson

Thomas Matheson, Corrective Action Project Manager
Waste Management Branch

Enclosures

cc: Ed Lim, OEPA
Chuck Hull, OEPA/NWDO

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 5
DEFICIENCY COMMENTS ON THE
CHEMICAL WASTE MANAGEMENT, INC VICKERY FACILITY
RFI WORKPLAN
DATED AUGUST 1995

RFI WORK PLAN DEFICIENCIES

The United States Environmental Protection Agency (U.S. EPA), conducted a technical review of the revised Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) Phase I work plan for the Chemical Waste Management-Vickery, Inc. (CWM-Vickery), facility in Vickery, Ohio. The revised RFI work plan, dated August 1995, was prepared by RUST Environment and Infrastructure, Inc. (RUST), for CWM-Vickery. The U.S. EPA reviewed the revised RFI work plan to determine whether CWM-Vickery addressed previous U.S. Environmental Protection Agency (EPA) comments dated June 26, 1995, on the original RFI work plan, dated April 1995. In this review, The U.S. EPA does not discuss general and specific EPA comments that CWM-Vickery adequately addressed. Also, the U.S. EPA has noted several new general and specific comments on the revised RFI work plan. The U.S. EPA's comments are provided below.

GENERAL COMMENTS

1. Comment on Response to General Comment 1. This comment has been partially addressed. CWM-Vickery does not believe installing groundwater monitoring wells and conducting groundwater sampling is warranted until release determinations for all the solid waste management units (SWMU) at the facility have been completed during the Phase I RFI. Groundwater data and release information exists for some SWMUs and provides a basis for further groundwater investigation. However, CWM-Vickery's approach to completing the groundwater investigation during the Phase II RFI is feasible. By waiting until all soil data from the Phase I RFI is available, CWM-Vickery's placement and location of groundwater monitoring wells should be more effective. However, the data collected during the Phase II RFI could be inconclusive and could lead to a possible Phase III RFI. The Phase I RFI work plan shall be revised to state that the groundwater investigation will be completed during the Phase II RFI.

2. Comment on Response to General Comment 2. This comment has been partially addressed. However, the text in Section 5.4, page 32, paragraph 4 states that the potable water supply will be analyzed for target compound list (TCL) and target analyte list (TAL) parameters. The text in this section needs to be revised to indicate that the potable water supply will be analyzed instead for Appendix IX parameters. The Phase I RFI work plan shall be revised globally to replace TCL and TAL parameters with Appendix IX parameters.

3. Comment on Response to General Comment 4. This comment has been partially addressed. The text first states that continuous split-spoon sampling will be conducted, but later states that split-spoon sampling will be conducted at 5-foot intervals. This discrepancy shall be resolved. Also, the text shall clarify that during field screening the sample "from each borehole" with the highest volatile organic compound (VOC) reading will be sent off site to a laboratory for analysis. Finally, the text shall state how the field screening data will be used for terminating boreholes.

4. Comment on Response to General Comment 10. This comment has not been addressed. The text shall be revised to state that the groundwater pathway will be evaluated during the Phase II RFI.

SPECIFIC COMMENTS

1. Comment on Response to Specific Comment 10. This comment has been partially addressed. The text shall provide a contingency plan for the disposal of decontamination water in the event that the injection well system cannot accept the decontamination water.

2. Comment on Response to Specific Comment 11. This comment has not been adequately addressed. The text in Section 5.7.2, page 39, paragraph 1 states that augers will be advanced to a depth of 2 feet below ground surface (bgs) and then a split-spoon sampler will be driven from 0 to 2 feet bgs in order to collect a surface soil sample. The text in this section needs to be revised to indicate how samples will be collected from undisturbed soil.

3. Comment on Response to Specific Comment 12. This comment has been partially addressed. However, the text shall clarify that the sample with the highest VOC reading "from each borehole" will be sent off site to a laboratory for analysis.

4. Comment on Response to Specific Comment 15. This comment has been partially addressed. The text shall be revised to state that 34 soil samples will be collected (to correspond to the 34 sample locations shown on Figure 5-7).

5. Comment on Response to Specific Comment 17. This comment has not been addressed. The response refers to two letters from the Ohio Environmental Protection Agency (OEPA) included in Appendix A regarding the clean closure of SWMU Group B. However, both of these letters state that closure "does not relieve CWM of any corrective action responsibilities that may be required." The text must document that no contamination migrated outside of the unit that underwent clean closure or the text shall be revised to include analytical results of soil samples for SWMU Group B.

6. Comment on Response to Specific Comment 26. This comment has not been adequately addressed. The text shall provide additional information regarding the depth of the underground piping in order to determine if the depths where samples will be collected can adequately assess if contamination from the underground piping has impacted the soils beneath the SWMU.

7. Comment on Response to Specific Comment 47. This comment has not been addressed. The text shall be revised to state that the objective of determining the nature and extent of groundwater contamination will be completed during the Phase II RFI.

NEW GENERAL COMMENT

1. The facility shall design its RFI to provide data to: 1) Identify areas of contamination (contamination is defined as any sampling result that exceeds the Region 5 DQL for the specific compound, or exceeds an accepted background level for metals trigger level), and 2) determine the extent of the contamination.

The data collected in the RFI will be utilized in a quantitative risk assessment that will determine unacceptable risks.

The facility may divide the RFI into two phases, if appropriate. The first phase will be a "release assessment" activity where CWM-Vickery will determine if contamination is present. Known "hot spots" shall be addressed during Phase I activities. To have suitable data for the quantitative risk assessment, the data collected must be of appropriate quality and the method detection level must be low enough to be used in the quantitative risk assessment. The Region 5 DQLs or the facility's health-based action levels (subject to Region 5 approval) shall be used to determine the analytical method for analysis of each contaminant. Following the collection of all Phase I data, the facility shall submit the data to the U.S. EPA. The data will be included in a document that will identify those areas that CWM-Vickery proposes to be studied under the second phase of the RFI. CWM-Vickery shall develop a RFI Workplan and associated QAPP that entails all activities to be undertaken in Phase I.

Phase II will determine the extent of contamination, based on the results of the Phase I Report. Phase II will investigate all locations where contamination is identified. CWM-Vickery shall develop a Phase II RFI Workplan and QAPP entailing all activities associated with Phase II. Specific project objectives and DQLs will be identified for each location where contamination is identified in Phase I. The workplan and QAPP shall provide for groundwater, surface water, soils and sediment sampling (depending on media contaminated) to determine the extent of contamination. At the end of Phase II, CWM-Vickery shall submit the results of the Phase II investigation. The data from Phase I and Phase II are then used to develop the RFI Report for the CWM-Vickery facility. CWM-Vickery shall use the data collected in both Phase I and Phase II to undertake a quantitative risk assessment. The results of this quantitative risk assessment will be used in determining the need for a corrective measure study.

Should CWM-Vickery attempt to use previous data for portions of the Phase I activities and U.S. EPA determines that data is unacceptable, CWM-Vickery must then collect the necessary data under Phase II. This will include both determination of contamination presence and extent. Should CWM-Vickery propose to use historical data, CWM-Vickery must perform data validation and shall identify explicit methodologies in the QAPP. In addition to performing analytical data validation, the facility must also provide information on

sampling protocols used during collection of the data, as well as any field notes or other such information indicating CWM-Vickery followed the appropriate protocol in collecting, preserving, storing, and shipping of the samples. The use of historical data is not encouraged for RFI purposes.

2. The text in some sections of the revised Phase I RFI work plan discusses a total of 53 SWMUs. However, other sections of the revised Phase I RFI work plan discuss a total of 52 SWMUs. In addition, Table 4-1 of the revised Phase I RFI work plan only lists 52 SWMUs. The text and table need to be globally revised to correct this inconsistency.

3. The potential for groundwater contamination is not adequately addressed in the RFI work plan. The hydraulics of the groundwater flow system have not been adequately characterized. The lack of subsurface information and groundwater data makes it exceedingly difficult to evaluate the work plan. Groundwater hydrographs, water-level maps, precipitation records, and water-level measurements are essential to characterizing the hydraulics of the groundwater flow system and shall be provided in the RFI, therefore, CWM-Vickery shall identify how it will characterize the hydrogeology at the facility in the RFI workplan.

4. The revised RFI work plan does not adequately address how CWM-Vickery will investigate the impact of fractures on groundwater flow rates in the glacial till. The presence of fractures in subsurface materials complicates the groundwater flow system. Fractures form major pathways for rapid fluid migration and are not easily detected in cuttings or cores from monitoring wells, which provide an infinitely small sample of an exceedingly large area. Furthermore, laboratory tests of cores consisting of unconsolidated or semi-unconsolidated fine-grained materials nearly always provide hydraulic conductivity values several orders of magnitude smaller than values determined from aquifer tests and do not adequately characterize the effect of fractures on hydraulic conductivity values. Glacial till is generally fractured to depths of 20 to 30 feet below ground surface, and the flow rate in this zone is relatively rapid and water is relatively young. Fractures also may play a major role in deeper glacial deposits that represent an earlier glacial advance.

   The work plan shall be revised to indicate how the effects of fractures on groundwater flow will be determined. One method to determine the effect of

fractures on the groundwater flow system is by means of vertical flow nets, which are based on cluster wells. The work plan shall be revised to include the installation of a series of such wells along a flow line downgradient from selected areas of concern (AOC) and solid waste management units (SWMU). Such vertical flow nets would indicate a general downward gradient, but the spacing of the equipotential lines should be relatively far apart and roughly vertical in the more permeable zones and much closer together and roughly parallel to land surface in the deeper zones of very low permeability. If the till above the bedrock has a very low permeability, this situation should be evident on the flow nets.

5. Although aquifer tests are mentioned in the work plan, information concerning the testing methodology is missing. Aquifer tests shall be conducted using discharging well methods. The well yield does not need to be large (probably in the range of 1 gallon per minute). This approach will provide realistic information on the aquifer system.

NEW SPECIFIC COMMENTS

The comments provided below refer to specific sections of the revised RFI Phase I work plan. Referenced sections of the revised RFI Phase I work plan are identified by section, page, and paragraph, as appropriate. When paragraphs are cited, the first complete paragraph on a page is designated as "Paragraph 1." If comments are made on a paragraph that carries over from a previous page, the incomplete paragraph is designated as "Paragraph 0."

Several additional deficiencies, inconsistencies, and discrepancies were identified regarding the information presented in Section 5.0 of the revised RFI Phase I work plan and they are summarized below.

1. 0Section 4.0, Page 16, Paragraph 0. The text in this section states that if no hazardous constituents are detected in soil, the possible presence of hazardous constituents in groundwater will not be investigated. However, although no contaminants were detected in soil samples at selected SWMUs and AOCs, it is not guaranteed that groundwater contamination has not or will not occur. To determine if groundwater is contaminated, groundwater samples shall be

collected immediately downgradient of the SWMUs and AOCs.

2. Section 4.0, Page 16, Paragraph 0. Past history indicates releases to surface water, therefore CWM-Vickery shall investigate the impact of these releases to offsite surface water receptors.

3. Section 4.0, Pages 17 - 19, Bulleted Items. A quantitative risk assessment will be conducted after all data is collected from Phase I and Phase II. Based on the results of the quantitative risk assessment, any area that presents an unacceptable risk to human health or the environment will require corrective action. Unacceptable risk is the trigger for corrective measure studies. CWM-Vickery shall revise its RFI Workplan accordingly.

4. Section 5.0, Page 20, Paragraph 1. CWM-Vickery shall revise the text to state the results of the Phase I investigation will be used to determine the areas of the facility that require additional study during the Phase II investigation. Phase II activities will be required at all locations where contamination is identified. Information from both phases will be used to conduct a quantitative risk assessment. The results of the quantitative risk assessment will determine the necessity for corrective action at the facility.

5. Section 5.1, Page 21, Paragraph 1. CWM-Vickery shall sample both the residual materials in the SWMUs, as well as the soil below the SWMUs to characterize the nature of the releases. Many of the SWMUs have been dredged and backfilled, therefore to accurately characterize the nature any release, the soils underlying the SWUM shall be analyzed.

6. Section 5.1, Page 22, Bullet 3. The text states that the sampling and analysis program is summarized in Table 1-1 of the quality assurance project plan (QAPP). However, several discrepancies were identified in the information presented in Table 1-1 of the QAPP and Section 5.0 of the revised work plan. These discrepancies are discussed in the QAPP specific comment No. 15 found in Enclosure 2. The text shall be revised to address these discrepancies.

7. Section 5.2.5.1.3, Page 29. The text states that field blank samples will be collected only from the sampling devices used to collect groundwater and

surface water. However, no surface water samples are to be collected during Phase I of the RFI. The text shall be revised to address this inconsistency.

8. Section 5.9. The text in several places in this section states that soil samples at the grid node locations will be collected using the procedures outlined in Section 5.7.1 and soil samples collected at selected locations will be collected using the procedures outlined in Section 5.7.2. However, soil sampling procedures at grid node locations and at selected locations are described in Sections 5.7.1.1 and 5.7.1.2, respectively. The text shall be revised to address these inconsistencies. In addition, the text in Section 5.9.4 states that grid node samples from SWMU Group D will be collected using procedures described in Section 5.7.2, which describes surface soil sampling procedures. The text in this section shall be revised to state that samples from grid node locations at SWMU Group D will be collected in accordance with procedures outlined in Section 5.7.1.1.

9. Section 5.9.6, Page 49, Paragraph 2. The text in this section discusses soil sampling procedures to be used at SWMU Group F. The text has been revised to state that surface soil samples will be collected, while the text in the original work plan stated that soil samples would be collected at the groundwater interface below the SWMU. The rationale for this change in sampling depths needs to be explained.

10. Section 5.9.6, Page 49, Paragraph 3. The text in this section discusses SWMU Group F and states that historical reports of spills around Filtered Acid Tank (FAT) 3 exist. However, FAT 3 is not included as a SWMU in Group F. The text shall be revised to address this inconsistency.

11. Section 5.11, Page 65, Paragraph 2. The text states any groundwater samples that need to be filtered will be filtered according to the facility's groundwater sampling plan for the Part B Permit. However, the text does not specify the target parameters for which filtered samples are to be collected and analyzed. Also, no filtered samples shall be collected during the RFI. The text shall be revised to address this issue.

12. Tables 5-1 through 5-4. These tables are not referenced in the text. Either the

work plan shall be revised to reference these tables in the appropriate sections or these tables shall be deleted. Also, Table 5-3, which summarizes sample containers, preservatives, and holding times, is incomplete. For example, the containers, preservatives, and holding time requirements for herbicides, dioxins and furans, sulfide, soil pH, soil geophysical parameters, and fecal coliform are not specified. Therefore, if the tables will be reference in the work plan, then Table 5-3 shall first be revised and completed accurately and then it shall be incorporated by reference in Section 5.0 of the work plan.

13. **Section 7.1, Page 78 Paragraph 4, Bullet 1.** The bullets list the objectives of the RFI, however, the first bullet states "Well construction and well integrity;" as an objective. This bullet does not identify an objective. CWM-Vickery shall revise this bullet to adequately state an objective that may be associated with well construction and well integrity (perhaps to determine well construction and well integrity).

14. **Section 7.1, Page 79, Paragraph 0.** CWM-Vickery states additional groundwater and surface water sampling will not be performed during the RFI because it is currently monitoring groundwater and surface water on a quarterly basis. The U.S. EPA has determined CWM-Vickery has not adequately characterized potential groundwater and surface water contamination, pursuant to the corrective action permit requirements. CWM-Vickery shall undertake groundwater and surface water sampling during the RFI to collect all data the U.S. EPA deems necessary to adequately characterize the groundwater and surface water affected by activities at CWM-Vickery. CWM-Vickery shall revise its RFI work plan to state groundwater and surface water sampling will occur during the RFI.

End of RFI Workplan Deficiency Comments

REVIEW COMMENTS ON THE AUGUST 1995, RCRA FACILITY INVESTIGATION, PHASE I QUALITY ASSURANCE PROJECT PLAN CHEMICAL WASTE MANAGEMENT-VICKERY, INC. VICKERY, OHIO

RFI QAPP DEFICIENCIES

The United States Environmental Protection Agency (U.S. EPA), conducted a technical review of the revised Resource Conservation and Recovery Act (RCRA) facility investigation (RFI), Phase I quality assurance project plan (QAPP) for the Chemical Waste Management-Vickery, Inc. (CWM-Vickery) facility in Vickery, Ohio. The revised RFI QAPP, dated August 1995, was prepared by CWM-Vickery's consultant, Rust Environmental and Infrastructure, Inc. (RUST).

The U.S. EPA reviewed the revised RFI QAPP to determine whether CWM-Vickery addressed previous U.S. EPA comments, dated May 23, 1995, on the original RFI QAPP dated April, 1995.

The RFI QAPP contains various deficiencies, inaccuracies, and inconsistencies. Because these deficiencies, inaccuracies, and inconsistencies are so extensive, only examples of these issues are presented in the general and specific review comments below. The RFI QAPP shall be thoroughly revised in accordance with the U.S. EPA Region 5 Model RCRA QAPP (model QAPP) dated May 1993.

GENERAL COMMENTS

1. The QAPP does not clearly explain what criteria will be used to determine if contamination is present. For example, text in Section 1.4.2 states that analytical results may be compared with U.S. EPA Region 5 data quality levels (DQL) for general information purposes. However, for several analytical parameters, the proposed analytical reporting limit (RL) is higher than the DQL. Therefore, it is not clear how the results will be compared to the DQLs. CWM-Vickery shall define contamination as **any sampling result that exceeds the Region 5 DQL for the specific compound, or exceeds an accepted background level for metals.** CWM-Vickery shall revise its QAPP to define contamination as the above. The QAPP shall also be revised to clearly explain how the analytical results will be used with respect to the DQLs or employ

analytical methods with lower reporting limits. Specific comments 16 through 19 also apply here and shall be addressed.

2. The QAPP presents contradictory and deficient information regarding the matrixes to be sampled. For example, Section 1.0 of the QAPP states that during Phase I of the RFI, only soil and sediment samples will be collected from the solid waste management units (SWMU) and areas of concern (AOC). However, the text in Section 1.4.1 states that one groundwater sample will also be collected from the capillary drainage layer that underlines the Toxic Substances Control Act (TSCA) closure cell. The QAPP shall be revised to consistently discuss the sampling matrixes. Also, the QAPP shall explain why groundwater samples are to be collected only from the capillary drainage layer that underlines the TSCA closure cell. Specific comments 3, 5, 7, and 8 also apply here and shall be addressed.

3. The QAPP does not fully justify why the project target parameters were selected. For example, text in Section 1.1.2 states that groundwater samples from the capillary drainage layer that underlines the TSCA closure cell are to be analyzed for dioxins. However, analysis for dioxins is not proposed for soil or sediment samples. The QAPP shall be revised to present justification for the project target parameters that were selected. Specific comments No. 15 (bullet 6) and 22 also apply here and shall be addressed.

4. The QAPP references Section 5.0 of the RFI work plan (RFI WP) for sampling procedures. However, several discrepancies exist between the RFI WP and the QAPP. Examples of these discrepancies are included in Specific comments 15 and 37 and shall be resolved.

5. The QAPP has several deficiencies regarding project organization. For example, the QAPP does not specify the project and quality assurance (QA) managers for the laboratories that will analyze samples for fecal coliform, dioxins, furans, and geophysical parameters. The QAPP shall be revised to identify responsible personnel for all laboratories that will be used to analyze samples during the RFI. Specific comments 23, 24, and 25 also apply here and shall be addressed.

6. Some sections of the QAPP contain generic information that has been copied verbatim from the model QAPP and do not appear to be applicable to this project. These sections shall be revised to contain project-specific information. Specific comments 11, 28, 36, and 45 also apply here and shall be addressed.

7. The RFI QAPP presents several deficiencies, inconsistencies, and discrepancies regarding some of the analytical methods used to determine the target parameters. For example, the QAPP presents two different methods to be used for sulfide analysis: Methods for Chemical Analysis of Water and Waste (MCAWW) 376.1 and SW-846 9030. Also, the QAPP specifies that soil samples will be analyzed for fecal coliform by Standard Method 9222D, which is only appropriate for aqueous samples. In addition, the QAPP specifies that soil pH will be determined by American Society for Testing and Materials (ASTM) method D4927, which is used for elemental analysis of lubricant and additive components. The QAPP shall be revised to address these inconsistencies, discrepancies, and deficiencies. Specific comments 21, 33, and 43 also apply here and shall be addressed.

8. All references to "Region V" shall be globally replaced by "Region 5".

SPECIFIC COMMENTS

The comments provided below refer to specific sections of the QAPP. Referenced sections of the QAPP are identified by section, page, and paragraph, as appropriate. When paragraphs are cited, the first complete paragraph on a page is designated as "Paragraph 1." If comments are made on a paragraph that carries over from a previous page, the incomplete paragraph is designated as "Paragraph 0."

1. <u>Title and Signature Page</u>. In order to comply with the requirements of the model QAPP, this page shall include the names of all individuals who must approve the QAPP. Therefore, this page shall be revised to also include the names of all laboratory quality assurance (QA) managers, and not only the name of the G.P. Environmental Services (GP) QA manager. In addition, all dated signatures shall be present except for those of U.S. EPA personnel. Therefore, this page shall be revised to include the signatures of the CWM-Vickery project manager and the Pace QA manager.

2. Table of Contents. The list of appendixes at the end of the list of contents shall identify the contents found in the appendix (for example, titles of individual standard operating procedures (SOP) contained in the appendixes).

3. Section 1.1.1, Page 2 of 16, Paragraph 3. The text in this section states that the SWMUs and AOCs are underlain by clayey lacustrine and glacial till soils which, based on several years of semiannual and quarterly groundwater monitoring, have substantially limited the migration of hazardous waste constituents to the subsurface. However, no background groundwater monitoring data is provided to substantiate this statement. The QAPP shall be revised to provide background groundwater monitoring data and provide explicit methodology for undertaking data validation for the data it intends to use in the RFI.

4. Section 1.1.1, Page 2 of 16, Paragraph 4, Bullet 1. The text states a qualitative risk assessment will be used during the Phase I RFI and a quantitative risk assessment may be undertaken, if necessary. A quantitative risk assessment will be undertaken after all data is collected from both phases of the RFI. It is this quantitative risk assessment that will determine the need for a Corrective Measures Study. CWM-Vickery shall revise its QAPP accordingly.

5. Section 1.1.1, Page 3 of 16, Bullets 1 through 3. See above comment.

6. Section 1.1.1, Page 3 of 16, Bullet 2. The text states that in order to characterize the effectiveness of the clean closure of former SWMUs located underneath the TSCA closure cell, one groundwater sample will be collected from the capillary drainage layer. However, analytical results for one sample do not provide any information on reproducibility or statistical significance of the results. Therefore, the text shall be revised to specify that a higher number of groundwater samples will be collected in order to obtain meaningful results.

7. Section 1.1.2, Page 4 of 16, Bullet 3. The text defines surface soil as 0 to 24 inches, however, surficial soil may extend below 24 inches based on site specific conditions. Land use, including excavation/construction, installation of underground piping or other utilities, will determine the depth of surficial soils for sampling. To receive a representative surficial soil sample, CWM-Vickery

must identify and collect undisturbed soil that is unaffected by land use activities. Therefore, CWM-Vickery shall revise its QAPP and sampling plan to state a representative surficial soil, which may extend greater that 24 inches, will be collected.

8. Section 1.1.2, Page 4 of 16, Bullet 4. The text states that deeper subsurface sampling will be conducted to assess the vertical extent of contaminant migration. However, the text does not specify that any groundwater sampling will be conducted to determine the degree of contaminant migration. The text shall be revised to specify that groundwater sampling will be conducted.

9. Section 1.1.2, Page 4 of 16, Paragraph 3. First, the text states that the groundwater sample from the capillary drainage layer will be analyzed for Appendix IX dioxin. However, the term "dioxin" (singular) is vague and inaccurate. The text shall be revised to state that the groundwater sample will be analyzed for Appendix IX dioxins and furans. Also, the text shall be revised to explain the rationale for not analyzing soil and sediment samples for dioxins and furans.

   Second, the text states that soil samples will be analyzed for pH. However, no pH measurements are proposed for the groundwater sample. Because pH is critical for interpreting the characteristics of contaminants in groundwater, the text shall be revised to specify that pH analysis will be conducted for groundwater sampling.

   Finally, during groundwater sampling, several parameters need to be monitored to verify that a representative groundwater sample is collected. These parameters include groundwater pH, turbidity, specific conductivity, dissolved oxygen, and temperature. The text shall be revised to specify the field measurements to be taken to verify that a representative groundwater sample is collected.

10. Section 1.1.2, Page 5 of 16, Paragraph 0. The text states that if results from the Phase I RFI indicate hazardous waste constituents are present in soils or sediments at the site, the Phase I report will propose conducting a groundwater investigation during the Phase II RFI, if appropriate. The Phase I data may indicate preferable locations to place groundwater wells, however, CWM-Vickery will undertake a groundwater investigation.

11. Section 1.1.2, Page 5 of 16, Paragraph 0. The text in Section 1.1.1 states that during Phase I, groundwater sampling will be conducted at the TSCA closure cell, however, in other places in the QAPP, it states no groundwater sampling will occur. The QAPP shall be revised to address this discrepancy of undertaking the groundwater investigation during Phase I or Phase II.

12. Section 1.1.2, Page 5 of 16, Paragraph 0. The procedures for determining contaminant action levels in soil shall be discussed. Because the contaminant trigger levels in soil have not been specified, the appropriateness of the proposed analytical methods cannot be evaluated. For example, it is unclear if the laboratory RLs are lower than the soil action levels or if DQLs will be used as trigger levels. The text shall be revised to address this deficiency.

13. Section 1.3.3, Pages 10 and 11 of 16, Bullet 1. The text states that before the mid-1980s, most of the SWMUs at the facility did not have adequate secondary containment and releases to the soil were not uncommon. The text also states that these releases probably impacted the soil but had little effect on the groundwater because of the low permeability of the clay soil and because many of the releases were immediately treated and the contaminated soil was removed. However, no groundwater monitoring data are provided to support these statements. Also, text in Section 3.2.1 of the RFI WP states that in some locations in the Great Plains of the U.S., deposits of clay have vertical fractures. These fractures may enhance migration of contaminants to groundwater. CWM-Vickery shall provide how it plans to investigate the effects of vertical fracturing on groundwater quality, how the permeability of the soil will be stated quantitatively, and other data, such as rainfall data and the results of confirmatory sampling will be provided.

14. Section 1.3.3, Page 11 of 16, Bullet 1. The text states that former unlined impoundments potentially have had the greatest impact on the groundwater at the site. However, during the Phase I RFI, no groundwater sampling is planned except for groundwater sampling of the capillary drainage layer at the TSCA closure cell. The QAPP shall be revised to also include groundwater sampling at the SWMUs and AOCs at the site.

15. Section 1.3.3, Page 11 of 16, Bullet 2. The text states that releases of liquid hazardous wastes occurred to both Little Raccoon Creek and Meyers Ditch. The text also recommends analyzing stream bed sediments to characterize this

medium. Although collecting one sample from Meyers Ditch is specified (see Section 5.10.8, Page 63, Paragraph 3 of the RFI WP), collecting samples of Little Raccoon Creek sediment is not specified in the QAPP. The QAPP states that "subsequent testing of the creek [Little Raccoon Creek] water showed little contamination present." However, this statement implies that a water sample was collected but that no sediment sample was collected. Further, the trigger levels, to which the data were compared, are not provided. The QAPP shall provide further information to justify why a sediment sample was not collected from Little Raccoon Creek; otherwise, the creek shall be specified as a sampling location in the QAPP and in the RFI.

The text also states that other releases have occurred to the surface water, one as recently as April 1993. The name of the surface water body that received the "other releases" shall also be specified, and, if it is other than Meyers Ditch or Little Raccoon Creek, sampling of this surface water body shall also be specified.

16. Section 1.4, Page 12 of 16. The text in this section is generic and has been copied verbatim from the model QAPP dated May 1993. This generic text shall be deleted and replaced by project-specific information.

17. Section 1.4.1, Page 12 of 16, Paragraph 2. The text states that 53 SWMUs exist at the site. However, Table 1-1 does not show SWMUs 10 and 53. This discrepancy shall be resolved and the text or table shall be revised appropriately.

18. Section 1.4.1, Page 12 of 16, Paragraph 2. The text states that "Constituent and concentration data will be used qualitatively to assess whether unreasonable health risks are associated with the releases and to establish action levels for determining the need for further investigation. . .." Phase II activities will be undertaken at all locations where any sampling result exceeded either a DQL for a specific compound or an accepted background level for metals that was identified during the Phase I investigation. Risk will be evaluated after all data from both phases of the RFI are collected and the results of this quantitative risk assessment will determine the need for corrective measures. CWM-Vickery shall revise its QAPP accordingly.

19. Section 1.4.1, Page 12 of 16, Paragraph . CWM-Vickery shall also collect and analyze for Appendix IX parameters, the soils below the residual materials where clean closure has not be certified.

20. Section 1.4.2, Page 14 of 16, Paragraph 2. The text states that analytical results may be compared with the DQLs for general information purposes. The text shall be revised to specify the expected outcome of such a comparison. For example, the text shall explain how the DQLs will be used as trigger levels. In addition, because Table 1-1 shows that several samples are to be collected from each of the nine groups of SWMUs, it is not clear how the analytical results from the various locations will be evaluated to determine if contamination is present in each of the SWMUs and SWMU groups. For example, 32 samples are to be collected from Group A SWMUs. However, the text does not explain whether these analytical results will be used to determine the presence of contamination. The text shall be revised to specify the process that will be used to interpret the results.

21. Section 1.5, Page 15 of 16, Paragraph 1. The text states that additional soil samples may be collected at locations where field observations indicate that the uppermost layer of native soil is contaminated. The text shall be revised to explain if the additional soil samples are to be collected as part of Phase I RFI activities. Also, the text shall explain if an addendum to the sampling plan will be prepared before additional samples are to be collected.

22. Table 1-1. Several deficiencies, inconsistencies, and inaccuracies were identified in Table 1-1 and they are discussed below.

- Table 1-1 shows that for group A SWMUs, eight selected-location samples will be collected for each analyte of concern. However, Figure 5-7 in the RFI WP shows that 10 selected-location soil samples will be collected. This discrepancy shall be resolved and the figure or table shall be revised accordingly.

- Table 1-1 shows that group B includes SWMUs 4, 5, 7, 11, 12, 17, and 18. However, Section 5.9.2 of the RFI WP shows that group B includes SWMUs 4, 5, 7, 10, 11, 17, 18, and 53. This discrepancy shall be resolved and the text or table shall be revised accordingly.

- Table 1-1 shows that for group C SWMUs, five selected-location soil samples will be collected for each analyte of concern. However, Figure 5-8 of the RFI WP shows only three selected-location soil samples will be collected. This discrepancy shall be resolved and the text or table shall be revised accordingly.

- Table 1-1 shows that one sample will be collected from SWMU 42 of group I. However, Section 5.9.9.5 of the RFI WP states that two soil samples will be collected from this SWMU. This discrepancy shall be resolved and the text or table shall be revised accordingly.

- Table 1-1 shows that samples from SWMU 42 will be analyzed for polychlorinated biphenyls (PCB), metals, soil pH, and geotechnical parameters. However, text in Section 5.9.9.5 of the RFI WP states that soil samples collected within this SWMU will be analyzed for benzene, toluene, ethylbenzene, and xylene (BTEX), carcinogenic polyaromatic hydrocarbons (PAH), PCBs, and metals. This discrepancy shall be resolved and the text or table shall be revised accordingly.

- Table 1-1 shows that for SWMUs 41 and 42, soil samples will not be analyzed for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), pesticides, herbicides, metals (SWMU 41 only), cyanide, and sulfide. Table 1-1 shall be revised to include the above-mentioned analyses or the reasons for not including these analyses shall be explained.

- Table 1-1 shows that 22 investigative samples will be collected from AOC A. However, text in Section 5.10.1 and Figure 5-26 of the RFI WP both indicate that 30 investigative samples will be collected. This discrepancy shall be resolved and the text or table shall be revised accordingly.

- Table 1-1 shows that two investigative samples will be collected from AOC C. However, text in Section 5.10.3 and Figure 5-23 of the RFI WP both indicate that one soil sample will be collected.

This discrepancy shall be resolved and the text or table shall be revised accordingly.

- Table 1-1 shows that seven investigative soil samples will be collected from AOC H. However, text in Section 5.10.8 of the RFI WP states that in addition to soil samples, sediment samples will be collected along the Meyers Ditch, which is located in AOC H. This discrepancy shall be resolved.

- Table 1-1 indicates that soil samples will be collected from all SWMUs and AOCs (except for group B SWMUs). However, Section 5.7 of the RFI WP discusses collection of surface, subsurface, and sediment samples. Table 1-1 shall be revised to indicate the exact matrix of samples and to specify if the soil samples will be surface or subsurface samples. The approximate depth interval from which samples will be collected shall also be specified.

23. Table 1-2. For several VOCs listed in Table 1-2, the GP groundwater or soil RL is significantly higher than its respective DQL. These compounds include the following: benzene; bromodichloromethane; carbon tetrachloride; chloroform; chloromethane; dibromochloromethane; 1,2-dibromo-3-chloropropane; 1,2-dibromoethane; trans-1,4 dichloro-2-butene; and so forth. Because the RLs listed for these compounds are higher than the respective DQLs, it is unclear how the analytical results can be compared to the DQLs. Also, for several of these compounds, the RL is higher than the EPA Region 5 lowest practical quantitation limit (PQL). For example, the lowest PQL for acrolein in soil is 7 micrograms per kilogram (μg/kg) and for groundwater is 5 μg/L. However, the proposed soil RL is 20 μg/kg and the proposed groundwater RL is 20 μg/L. Because the proposed analytical method for these compounds may not be acceptable for achieving the lowest PQLs, an alternative method that can achieve the lowest PQLs shall be considered.

24. Table 1-3. The title of Table 1-3 states "...Appendix IX volatile organics by Method 8270B." However, Method 8270B is used to analyze for SVOCs, which are the parameters listed in Table 1-3. The title of Table 1-3 shall be revised accordingly.

Also, for several SVOCs presented in Table 1-3, the groundwater or soil RL listed is significantly higher than its respective DQL. These SVOCs include the following: aramite, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and so forth. Because the RLs listed for these compounds are higher than its respective DQLs, it is unclear how the analytical results can be compared to the DQLs. Also, for several of these compounds, the RL is higher than the EPA Region 5 lowest PQL. For example, Table 1-3 shows that for 4-nitrophenol the soil RL is 1,650 μg/kg and the groundwater RL is 50 μg/L. However, the lowest soil PQL for this compound is 470 μg/kg and the lowest groundwater PQL is 10 μg/L. Therefore, an alternative method that can achieve the lowest PQLs shall be considered for these compounds.

25. Table 1-4. For several compounds presented in Table 1-4, the groundwater RLs listed are significantly higher than their respective DQL. These compounds include the following: aldrin, endosulfan sulfate, toxaphene, Aroclor 1248, and so forth. Because the RLs listed for these compounds are higher than the DQLs, it is unclear how the analytical results can be compared to the DQLs. Also, for several of the compounds, the RL is higher than the lowest PQL. For example, Table 1-4 shows that for hexachlorophene, the groundwater RL is 50 μg/L. However, the lowest PQL is 10 μg/L. Therefore, an alternative analytical method that can achieve the lowest PQLs for these compounds shall be considered.

    Also, the compounds chlordane and Aroclor have been spelled incorrectly as "chlorodane" and "Arochlor," respectively. Table 1-4 shall be corrected.

26. Table 1-5. For famphur and methyl parathion, the groundwater RLs listed are significantly higher than their respective DQLs. Therefore, the analytical results for these compounds cannot be compared to the DQLs. Also, the groundwater RLs of famphur (20 μg/L) and methyl parathion (1.2 μg/L) are higher than the lowest PQLs of 10 and 0.5 μg/L respectively. For these compounds, an alternative analytical method that can achieve the lowest PQLs shall be considered.

27. Table 1-6. The compound dinoseb has been spelled incorrectly as "dinosab." Table 1-6 shall be corrected.

28. Table 1-7. Table 1-7 shows that sulfide will be analyzed by MCAWW Method 376.1. However, Table 8-1 shows that sulfide is to be analyzed by SW-846 Method 9030. Also, SW-846 Method 9030A is the most recently promulgated method for sulfide analysis and shall be used instead of SW-846 Method 9030. These inconsistencies shall be corrected.

29. Table 1-8. Although dioxins and furans are included in the list of Appendix IX compounds, Table 1-8 shows that the only parameter to be analyzed for is dioxin. However, it is not clear to what compound the term "dioxin" is referring. Table 1-8 shall be revised to include all dioxins and furans specified in Appendix IX. If some compounds are to be excluded, a detailed justification for doing so shall be provided.

30. Section 2, Page 1 of 7, Paragraph 1. CWM-Vickery shall change "U.S. EPA RCRA Project Coordinator" to U.S. EPA RCRA Project Manager"

31. Section 2.2, Page 1 of 7, Paragraph 3. See above comment.

32. Figure 2-1. CWM-Vickery shall change Region V to Region 5 and "RCRA Project Coordinator" to "RCRA Project Manager".

33. Section 2.4, Pages 3 through 6 of 7. The text shall be revised to specify the laboratory that will perform the fecal coliform analysis of soil samples. Also, the text only discusses the responsibilities of the GP laboratory personnel. The text shall be revised to include a discussion of the responsibilities of personnel of the other laboratories as well.

34. Figure 2-1. Figure 2-1 includes names of personnel whose responsibilities were not discussed in text. For example, the name of Bryan Kline is shown in Figure 2-1 but his responsibilities are not discussed in text. Also, the text discusses the responsibilities of GP laboratory personnel. However, the names of these personnel are not included in Figure 2-1. In addition, Figure 2-1 shows the names of subcontractors whose duties were never mentioned in the text. Figure 2-1 shall therefore be revised to include all personnel discussed in text.

35. Section 3.1, Page 1 of 4, Paragraph 1. The text states that no formalized assessment of precision for field VOC measurements is planned because VOCs will be "lost" as part of the initial measurement. Because this statement is vague and confusing, the text shall be revised to explain how VOCs will be lost during the initial measurement.

36. Section 3.3, Page 2 of 4. This section provides a total laboratory completeness objective of 95 percent for all samples analyzed by SW-846. This approach could result in incomplete data for a particular SWMU or AOC. Therefore, individual completeness objectives shall be established for each SWMU and AOC. Also, a sufficient number of samples shall be collected to make completeness a meaningful parameter. For example, for SWMU group E, Table 1-1 indicates that a total of three samples will be collected. If only two of the three sample results were valid, the completeness would be only 67 percent, and the objective would not be met. Therefore, the completeness objective shall be modified, or the number of samples to be collected shall be increased. The QAPP shall be revised to address this situation.

37. Section 3.5, Page 3 of 4. The text in this section is copied verbatim from the model QAPP. This text is generic and does not explain how comparability of results will be assessed during the RFI. The text shall be revised to provide project-specific information.

38. Section 3.6, Page 3 of 4, Paragraphs 2 and 3. The text states that field blanks will consist of deionized water placed in sample containers at the site using the same decontaminated equipment that will be used to collect the samples. The text also states that trip blanks will consist of deionized water. However, deionized water is not of adequate quality for blank samples. Analyte-free water, such as high performance liquid chromatography (HPLC) grade water shall be used instead. The text shall be revised to include these changes.

39. Section 3.6, Page 4 of 4, Paragraph 1. The text states that a matrix spike and laboratory duplicate will be analyzed for inorganic parameters. However, Table 1-1 shows that a matrix spike/matrix spike duplicate (MS/MSD) will be collected and analyzed for metals, cyanide, and sulfide. This discrepancy shall be resolved.

40. Table 3-2. Table 3-2 lists phenol as a surrogate compound. However, according to Method 8270B, phenol-d6 is the correct name of the surrogate compound. Therefore, this table shall be revised.

41. Table 3-3. A footnote to Table 3-3 states that a minimum 10 percent recovery of the surrogate compound is used as an action limit. However, Table 3-3 indicates that the acceptable range for surrogate recovery is from 24 to 150 percent. This discrepancy shall be resolved.

42. Table 3-6. Table 3-6 shows that arsenic will be analyzed for using SW-846 Method 7060. This table shall be revised to show that arsenic will be analyzed for using SW-846 Method 7060A, which is the most recently promulgated method.

43. Table 3-7. Table 3-7 presents only accuracy objectives for most of the listed dioxins and furans. Precision objectives are specified only for 2,3,7,8-tetrachlorodibenzodioxin. Table 3-7 shall be revised to include precision objectives for all dioxins and furans listed in the table.

44. Section 4.0, Page 1 of 1. This section references certain relevant sections of the RFI WP. Therefore, these sections were reviewed and specific comments are provided below.

- Text in Section 4.0 references Sections 5.2.6.1, 5.2.6.1.1, 5.2.6.1.2, and 5.2.6.1.3 of the RFI WP. However, these sections could not be found in the RFI WP. The text of the QAPP shall be revised to reference the appropriate sections of the RFI WP.

- Text in Section 4.0 references Section 5.7 of the RFI WP for soil and sediment sampling procedures. The text shall be revised to also reference Section 5.11 for groundwater sampling procedures. Also, the text in Section 5.11 discusses collection of filtered groundwater samples. The text shall be revised to explain for what analytes filtered groundwater samples will be collected.

- Although Section 4 references several sections of the RFI WP, not all the necessary information has been included by reference. The following items are missing:

    1. Sample containers:
        a. The type and size of container to be used to collect soil and groundwater samples for each analyte
        b. The number of containers required for each analysis
        c. Specific chemical and temperature preservation conditions and holding time requirements

    2. The order in which analytical parameter samples will be collected for each matrix

    3. Sample packaging and shipping procedures to be used as part of the field chain-of-custody procedures

This section shall be revised to include all of the missing information. Also, a table shall be included to summarize the information regarding sample containers (see Items 1a through 1c). If the information is included in the RFI WP, specific reference shall be made to the RFI WP.

45. Section 5.0. Most of the text presented in this section has been copied verbatim from the model QAPP. As a result, some extraneous information has been included in this section. For example, item (f), that appears in Section 5.1 on page 3 of 4, discusses collection of split samples by a government agency. However, this QAPP does not include collection of split samples. Also, it is unclear to what government agency the text is referring. The text in Section 5.0 shall be revised to include only project-specific information and all extraneous information shall be deleted.

46. Section 5.1, Page 2 of 4, Paragraph 4. The text in item "b" states that all bottles used to collect samples will be identified by using sample tags or labels. The text shall be revised to specify whether sample tags or labels or both will be used to identify the sample bottles.

The text also states that the sample numbering system is presented in Section 6.0 of the RFI WP. However, the text in Section 6.1.3 of the RFI WP that discusses sample identification does not specify the sample numbering system to be used for duplicate, field blank, and trip blank samples. The text shall be revised to specify the numbering system to be used for these samples. Also, the numbering system proposed for the investigative samples does not adequately describe the type of samples to be collected. For example, the samples are to be identified according to their corresponding SWMU, AOC, and sampling grid location. However, samples are to be collected from both sample grid nodes and random locations. Therefore, the numbering system shall be revised to specify the exact location where each sample will be collected. In addition, the sample identification number shall be revised to indicate whether the sample matrix is surface or subsurface soil, or sediment.

47. Section 5.2, Page 4 of 4. The text states that GP laboratory custody procedures are included in Appendix B of the QAPP. The QAPP shall be revised to also include the custody procedures of all laboratories that will analyze samples collected during the RFI. Therefore, the QAPP shall include laboratory custody procedures of Pace, Inc., and Rust laboratories as well.

48. Section 5.3, Page 4 of 4. This section shall be revised to include a list of items that will be included in the final evidence files. The model QAPP requires that the files contain at a minimum: field logbooks, field data and deliverables, photographs, drawings, soil boring logs, laboratory data deliverables, data validation reports, data assessment reports, progress reports, and all custody documentation.

49. Section 6.2, Page 2 of 3. The text states that GP laboratory calibration procedures can be found in its standard operating procedure (SOP), which are included in Appendix A of the QAPP. However, other laboratories will also analyze samples collected during the RFI. Therefore, the QAPP shall be revised to discuss the instrument calibration procedures to be used by other laboratories as well. Also, the QAPP shall be revised to include a table that summarizes instrument calibration procedures. The table shall specify the following: reference method, instrument, number of standards of initial calibration, acceptance criteria, and frequency of calibration. Table 6 in the model QAPP is an example of the calibration summary table.

50. Section 7.0, Page 1 of 2. This section shall be revised to specify which laboratory will analyze the soil samples for fecal coliform.

51. Section 7.2, Page 1 of 2. The text states that samples will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, sulfide, and chloride. However, the text in Section 1.1.2 indicates that chloride is not a contaminant of concern. Text in Section 1.1.2 also states that dioxins are contaminants of concern. The QAPP shall be revised to consistently discuss the contaminants of concern.

52. Table 7-1. Several inconsistencies and deficiencies were identified regarding this table and they are discussed below.

- Table 7-1 shows that soil extraction for SVOCs will be conducted by Method SW-846 3550 and arsenic will be analyzed for by Method SW-846 7060. Table 7-1 shall be revised to indicate that soil extraction of SVOCs and arsenic analyses will be conducted by Methods SW-846 3550A and 7060A, respectively, because these are the most recently promulgated methods.

- Table 7-1 shows that sulfide will be analyzed for by MCAWW Method 376.1. However, Table 8-1 shows that sulfide will be analyzed for by Method SW-846 9030. This discrepancy shall be resolved.

- Table 7-1 shall be revised to specify the SW-846 reference method for extraction and cleanup of polychlorinated dibenzo-p-dioxins and dibenzofurans.

- Table 7-1 shows that fecal coliform analyses will be conducted by Standard Method No. 9222D. However, Table 7-1 does not specify any laboratory SOP for this method. Also, this method is not suited for soil analyses. Table 7-1 shall be revised to specify an appropriate method for fecal coliform analyses.

53. Table 7-2. Table 7-2 shows that soil pH will be analyzed by ASTM Method D4927. However, this method analyzes for elemental lubricants and additive components by wavelength-dispersive x-ray fluorescence spectroscopy. Table 7-

2 shall be revised to specify the correct method to be used to perform soil pH analyses.

54. Section 8.2, Page 1 of 2. This section includes text that has been copied verbatim from the model QAPP. For example, the text does not discuss the quality control (QC) requirements for each analytical procedure, but it presents a generic list of QC procedures that may or may not be applicable. The text shall be revised to include only project-specific information.

55. Section 8.2, Page 2 of 2. The text states that the RUST project manager may choose to perform sample reanalysis beyond holding times with the understanding that the results will be qualified. However, if samples are reanalyzed when their holding times have been exceeded, invalid results are generated. Therefore, because reanalyzing samples is not acceptable for this RFI, this statement shall be deleted.

56. Table 8-1. Table 8-1 presents control limits for analytical methods to be performed only by the GP laboratory. Table 8-1 shall be revised to include control limits and corrective actions for all methods that will be used to analyze the samples. Several inconsistencies and deficiencies were identified for Table 8-1 and they are summarized below.

- Table 8-1 does not list control limits and corrective actions for analytical Methods SW-846 8141A, 8280A, and 9080, for Standard Method 9222D; and the ASTM methods presented in Table 7-2. Table 8-1 shall be revised to include control limits and corrective actions for these methods.

- Table 8-1 shows that Methods SW-846 700 series analyses will be used for metals. This table shall be revised to indicate that Methods SW-846 7000 series will be used for metals analyses.

- Table 8-1 includes several control samples that are not described in text. These samples include storage and method blanks, and laboratory control samples. These quality control samples and the purpose of analyzing for them shall also be described in Section 8.0 of the QAPP.

- Text in the acceptance criteria column of Table 8-1 references Table 3 for acceptance criteria for MS/MSD samples and surrogate results for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide analyses. However, Table 3 is not included in the QAPP. The text shall be revised to reference the appropriate table in the QAPP.

- The corrective actions proposed in Table 8-1 when MS/MSD results are outside control limits are to either (1) recalibrate the instruments and reanalyze the samples or (2) reanalyze the samples and report the reanalyzed results. However, in order to determine sample matrix effects on the analytical procedure, a blank spike and blank spike duplicate (BS/BSD) sample shall be analyzed before the above-mentioned corrective actions are taken. Table 8-1 shall therefore be revised to include BS/BSD sample analyses. Also, a description of the BS/BSD samples shall be included in the appropriate sections of the QAPP.

- The terms "EQL" and "CRDL" are used in Table 8-1. However, these terms were not defined in the QAPP. A footnote shall be added to Table 8-1 to define these terms.

57. Section 9.0. Section 9.0 contains generic information that was copied verbatim from the model QAPP. For example, the text discusses data reduction, validation, and reporting for chemical analyses only. However, Section 9.0 shall be revised to include project-specific information and to also discuss data reduction, validation, and reporting procedures for biochemical and geophysical analyses that are to be performed.

58. Section 9.1.2, Page 1 of 5. The text states that the laboratory section supervisor will issue notebooks. However, Section 2.0 of the QAPP does not identify the laboratory section supervisor. The supervisor's name shall be added to the QAPP.

59. Section 11.0. This section discusses preventive maintenance procedures for the GP laboratory equipment. This section shall be revised to discuss preventive

maintenance procedures for equipment in all laboratories that will be used to analyze samples collected during the RFI.

60. Table 11-1. This table shall be revised to include preventive maintenance procedures for analytical equipment that will be used by all other laboratories, in addition to GP.

    Also, Table 11-1 shall be revised to include a column that specifies the analytical method for which each equipment shown will be used.

61. Section 12. This section discusses the precision and accuracy only for chemical analyses. This section shall be revised to also discuss precision and accuracy determinations of the biochemical and geophysical analyses to be performed as part of the RFI.

62. Section 12.1, Page 1 of 2. This section discusses calculation of precision based on MS/MSD sample analyses. However, Section 3.0 of the QAPP states that precision for inorganic parameters will be determined by analyzing samples and sample duplicate samples. Therefore, this section shall be revised to discuss how the precision for inorganic analytes will be calculated.

63. Section 13, Page 1 of 3 Paragraphs 1 and 2. CWM-Vickery shall replace "U.S. EPA RCRA Project Coordinator" to "U.S. EPA RCRA Project Manager"

64. Section 13.1, Page 2 of 3 Paragraphs 1 and 2. See comment above.

65. Section 13.2, Page 2 of 3. This section discusses laboratory corrective actions to be taken by the GP QA manager. This section shall be revised to specify corrective actions to be taken by the QA managers of all laboratories that will be used to analyze samples collected during the RFI.

END OF QAPP DEFICIENCY COMMENTS

PRC Environmental Management, Inc.
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Chicago, IL 60601
312-856-8700
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PRC

September 25, 1995

Mr. Tom Matheson
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604

Subject: **Expert Hydrogeologist Review of the August 1995 "RCRA Facility Investigation (RFI) Work Plan" for Chemical Waste Management, Vickery, Ohio EPA Contract No. 68-W4-0007, Work Assignment No. R05021**

Dear Mr. Matheson:

Enclosed are one hard copy and one disk copy of the expert hydrogeologist review comments on the above-referenced document prepared by Dr. Wayne Pettyjohn, expert hydrogeologist subcontractor to PRC Environmental Management, Inc. (PRC).

The document reviewed does not adequately characterized the hydrogeology at the facility. If your have any questions or comments, please call me at (312) 946-6465.

Sincerely,

Jennifer Force
Project Manager

Enclosures (2)

cc: Bernie Orenstein, EPA Region 5 (letter only)
Ed Schuessler, PRC (letter only)

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ENCLOSURE 1

REVIEW COMMENTS ON THE
AUGUST 1995 RCRA FACILITY INVESTIGATION
PHASE I WORK PLAN
CHEMICAL WASTE MANAGEMENT - VICKERY, INC.
VICKERY, OHIO

(Two Pages)

REVIEW COMMENTS ON THE
AUGUST 1995 RCRA FACILITY INVESTIGATION
PHASE I WORK PLAN
CHEMICAL WASTE MANAGEMENT - VICKERY, INC.
VICKERY, OHIO

General Comments

1. The potential for groundwater contamination is not adequately addressed in the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) work plan. Although previous reports describing the geology and hydrogeology of the site were not reviewed, it appears that the hydraulics of the groundwater flow system have not been adequately characterized. The lack of subsurface information and groundwater data makes it exceedingly difficult to evaluate the work plan. Groundwater hydrographs, water-level maps, precipitation records, and water-level measurements are essential to characterizing the hydraulics of the groundwater flow system and should be provided in the work plan.

2. The RFI revised work plan does not appear to adequately address the impact of fractures on groundwater flow rates in the glacial till. The presence of fractures in subsurface materials complicates the groundwater flow system. Fractures form major pathways for rapid fluid migration and are not easily detected in cuttings or cores from monitoring wells, which provide an infinitely small sample of an exceedingly large area. Furthermore, laboratory tests of cores consisting of unconsolidated or semi-unconsolidated fine-grained materials nearly always provide hydraulic conductivity values several orders of magnitude smaller than values determined from aquifer tests and do not adequately characterize the effect of fractures on hydraulic conductivity values. Glacial till is generally fractured to depths of 20 to 30 feet below ground surface, and the flow rate in this zone is relatively rapid and water is relatively young. Fractures also may play a major role in deeper glacial deposits that represent an earlier glacial advance.

   The work plan should be revised to indicate how the effects of fractures on groundwater flow will be determined. One method to determine the effect of fractures on the groundwater flow system is by means of vertical flow nets, which are based on cluster wells. The work plan

should be revised to include the installation of a series of such wells along a flow line downgradient from selected areas of concern (AOC) and solid waste management units (SWMU). Such vertical flow nets would indicate a general downward gradient, but the spacing of the equipotential lines should be relatively far apart and roughly vertical in the more permeable zones and much closer together and roughly parallel to land surface in the deeper zones of very low permeability. If the till above the bedrock has a very low permeability, this situation should be evident on the flow nets.

3. Although aquifer tests are mentioned in the work plan, information concerning the testing methodology is missing. Aquifer tests should be conducted using discharging well methods. The well yield does not need to be large (probably in the range of 1 gallon per minute). This approach will provide realistic information on the aquifer system.

Specific Comment

1. **Section 4.0, Page 16, Paragraph 0**. The text in this section states that if no hazardous constituents are detected in soil, the possible presence of hazardous constituents in groundwater will not be investigated. However, although no contaminants were detected in soil samples at selected SWMUs and AOCs, it is not guaranteed that groundwater contamination has not or will not occur. To determine if groundwater is contaminated, groundwater samples should be collected immediately downgradient of selected SWMUs and AOCs.

PRC Environmental Management, Inc.
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Chicago, IL 60601
312-856-8700
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September 19, 1995

Mr. Tom Matheson
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604

Subject: **Review Comments on the August 1995 "RCRA Facility Investigation (RFI) Phase I Work Plan" and "Quality Assurance Project Plan" (QAPP) for Chemical Waste Management-Vickery, Inc., Vickery, Ohio Contract No. 68-W4-0007, Work Assignment No. R05021**

Dear Mr. Matheson:

PRC Environmental Management, Inc. (PRC), has enclosed one paper copy and one disk copy of its technical review comments on the above-referenced documents. PRC's written comments on the August 1995 revised Phase I RFI Work Plan and the revised QAPP are included in Enclosures 1 and 2, respectively.

PRC reviewed these documents for overall technical adequacy and to ensure that previous U.S. Environmental Protection Agency (EPA) comments dated June 26, 1995, on the April 1995 RFI Phase I Work Plan were addressed. In general, the revised RFI work plan contains numerous inconsistencies and fails to address comments made on the April 1995 work plan. The QAPP also contains numerous inconsistencies, deficiencies, and inaccuracies.

If you have any questions or comments, please call me at (312) 946-6465.

Sincerely,

Jennifer Force
Project Manager

Enclosures (3)

cc: Bernie Orenstein, EPA Region 5 (letter only)
Ed Schuessler, PRC (letter only)
Rick Hersemann, PRC
Chriso Petropoulou, PRC

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ENCLOSURE 1

REVIEW COMMENTS ON THE
AUGUST 1995, RCRA FACILITY INVESTIGATION,
PHASE I WORK PLAN
CHEMICAL WASTE MANAGEMENT-VICKERY, INC.
VICKERY, OHIO

(Five Pages)

REVIEW COMMENTS ON THE
AUGUST 1995, RCRA FACILITY INVESTIGATION,
PHASE I WORK PLAN
CHEMICAL WASTE MANAGEMENT-VICKERY, INC.
VICKERY, OHIO

PRC Environmental Management, Inc. (PRC), conducted a technical review of the revised Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) Phase I work plan for the Chemical Waste Management-Vickery, Inc. (CWM-Vickery), facility in Vickery, Ohio. The revised RFI work plan, dated August 1995, was prepared by RUST Environment and Infrastructure, Inc. (RUST), for CWM-Vickery. PRC reviewed the revised RFI work plan to determine whether CWM-Vickery addressed previous U.S. Environmental Protection Agency (EPA) comments dated June 26, 1995, on the original RFI work plan, dated April 1995. In this review, PRC does not discuss general and specific EPA comments that CWM-Vickery adequately addressed. Also, PRC has noted several new general and specific comments on the revised RFI work plan. PRC's comments are provided below.

GENERAL COMMENTS

1. **Comment on Response to General Comment 1**. This comment has been partially addressed. CWM-Vickery does not believe installing groundwater monitoring wells and conducting groundwater sampling is warranted until release determinations for all the solid waste management units (SWMU) at the facility have been completed during the Phase I RFI. Groundwater data and release information exists for some SWMUs and provides a basis for further groundwater investigation. However, CWM-Vickery's approach to completing the groundwater investigation during the Phase II RFI is feasible. By waiting until all soil data from the Phase I RFI is available, CWM-Vickery's placement and location of groundwater monitoring wells should be more effective. However, the data collected during the Phase II RFI could be inconclusive and could lead to a possible Phase III RFI. The Phase I RFI work plan should be revised to state that the groundwater investigation will be completed during the Phase II RFI.

2. **Comment on Response to General Comment 2**. This comment has been partially addressed. However, the text in Section 5.4, page 32, paragraph 4 states that the potable water supply will be analyzed for target compound list (TCL) and target analyte list (TAL) parameters. The text in this section needs to be revised to indicate that the potable water supply will be analyzed instead for Appendix IX parameters. The Phase I RFI work plan should be revised globally to replace TCL and TAL parameters with Appendix IX parameters.

3. **Comment on Response to General Comment 4**. This comment has been partially addressed. The text first states that continuous split-spoon sampling will be conducted, but later states that split-spoon sampling will be conducted at 5-foot intervals. This discrepancy should be resolved. Also, the text should clarify that during field screening the sample "from each borehole" with the highest volatile organic compound (VOC) reading will be sent off site to a laboratory for analysis. Finally, the text should state how the field screening data will be used for terminating boreholes.

4. **Comment on Response to General Comment 10**. This comment has not been addressed. The text should be revised to state that the groundwater pathway will be evaluated during the Phase II RFI.

SPECIFIC COMMENTS

1. **Comment on Response to Specific Comment 10**. This comment has been partially addressed. The text should provide a contingency plan for the disposal of decontamination water in the event that the injection well system cannot accept the decontamination water.

2. **Comment on Response to Specific Comment 11**. This comment has not been adequately addressed. The text in Section 5.7.2, page 39, paragraph 1 states that augers will be advanced to a depth of 2 feet below ground surface (bgs) and then a split-spoon sampler will be driven from 0 to 2 feet bgs in order to collect a surface soil sample. The text in this section needs to be revised to indicate how samples will be collected from undisturbed soil.

3. **Comment on Response to Specific Comment 12**. This comment has been partially addressed. However, the text should clarify that the sample with the highest VOC reading "from each borehole" will be sent off site to a laboratory for analysis.

4. **Comment on Response to Specific Comment 15**. This comment has been partially addressed. The text should be revised to state that 34 soil samples will be collected (to correspond to the 34 sample locations shown on Figure 5-7).

5. **Comment on Response to Specific Comment 17**. This comment has not been addressed. The response refers to two letters from the Ohio Environmental Protection Agency (OEPA) included in Appendix A regarding the clean closure of SWMU Group B. However, both of these letters state that closure "does not relieve CWM of any corrective action responsibilities that may be required." The text must document that no contamination migrated outside of the unit that underwent clean closure or the text should be revised to include analytical results of soil samples for SWMU Group B.

6. **Comment on Response to Specific Comment 26**. This comment has not been adequately addressed. The text should provide additional information regarding the depth of the underground piping in order to determine if the depths where samples will be collected can adequately assess if contamination from the underground piping has impacted the soils beneath the SWMU.

7. **Comment on Response to Specific Comment 47**. This comment has not been addressed. The text should be revised to state that the objective of determining the nature and extent of groundwater contamination will be completed during the Phase II RFI.

NEW GENERAL COMMENT

1. The text in some sections of the revised Phase I RFI work plan discusses a total of 53 SWMUs. However, other sections of the revised Phase I RFI work plan discuss a total of 52 SWMUs. In addition, Table 4-1 of the revised Phase I RFI work plan only lists 52 SWMUs.

The text and table need to be globally revised to correct this inconsistency.

NEW SPECIFIC COMMENTS

The comments provided below refer to specific sections of the revised RFI Phase I work plan. Referenced sections of the revised RFI Phase I work plan are identified by section, page, and paragraph, as appropriate. When paragraphs are cited, the first complete paragraph on a page is designated as "Paragraph 1." If comments are made on a paragraph that carries over from a previous page, the incomplete paragraph is designated as "Paragraph 0."

Several additional deficiencies, inconsistencies, and discrepancies were identified regarding the information presented in Section 5.0 of the revised RFI Phase I work plan and they are summarized below.

1. **Section 5.1, Page 22, Bullet 3**. The text states that the sampling and analysis program is summarized in Table 1-1 of the quality assurance project plan (QAPP). However, several discrepancies were identified in the information presented in Table 1-1 of the QAPP and Section 5.0 of the revised work plan. These discrepancies are discussed in the QAPP specific comment No. 15 found in Enclosure 2. The text should be revised to address these discrepancies.

2. **Section 5.2.5.1.3, Page 29**. The text states that field blank samples will be collected only from the sampling devices used to collect groundwater and surface water. However, no surface water samples are to be collected during Phase I of the RFI. The text should be revised to address this inconsistency.

3. **Section 5.9**. The text in several places in this section states that soil samples at the grid node locations will be collected using the procedures outlined in Section 5.7.1 and soil samples collected at selected locations will be collected using the procedures outlined in Section 5.7.2. However, soil sampling procedures at grid node locations and at selected locations are described in Sections 5.7.1.1 and 5.7.1.2, respectively. The text should be revised to address these inconsistencies. In addition, the text in Section 5.9.4 states that grid node samples from

SWMU Group D will be collected using procedures described in Section 5.7.2, which describes surface soil sampling procedures. The text in this section should be revised to state that samples from grid node locations at SWMU Group D will be collected in accordance with procedures outlined in Section 5.7.1.1.

4. **Section 5.9.6, Page 49, Paragraph 2**. The text in this section discusses soil sampling procedures to be used at SWMU Group F. The text has been revised to state that surface soil samples will be collected, while the text in the original work plan stated that soil samples would be collected at the groundwater interface below the SWMU. The rationale for this change in sampling depths needs to be explained.

5. **Section 5.9.6, Page 49, Paragraph 3**. The text in this section discusses SWMU Group F and states that historical reports of spills around Filtered Acid Tank (FAT) 3 exist. However, FAT 3 is not included as a SWMU in Group F. The text should be revised to address this inconsistency.

6. **Section 5.11, Page 65, Paragraph 2**. The text states any groundwater samples that need to be filtered will be filtered according to the facility's groundwater sampling plan for the Part B Permit. However, the text does not specify the target parameters for which filtered samples are to be collected and analyzed. Also, no filtered samples should be collected during the RFI. The text should be revised to address this issue.

7. **Tables 5-1 through 5-4**. These tables are not referenced in the text. Either the work plan should be revised to reference these tables in the appropriate sections or these tables should be deleted. Also, Table 5-3, which summarizes sample containers, preservatives, and holding times, is incomplete. For example, the containers, preservatives, and holding time requirements for herbicides, dioxins and furans, sulfide, soil pH, soil geophysical parameters, and fecal coliform are not specified. Therefore, if the tables will be reference in the work plan, then Table 5-3 should first be revised and completed accurately and then it should be incorporated by reference in Section 5.0 of the work plan.

ENCLOSURE 2

REVIEW COMMENTS ON THE
AUGUST 1995, RCRA FACILITY INVESTIGATION, PHASE I
QUALITY ASSURANCE PROJECT PLAN
CHEMICAL WASTE MANAGEMENT-VICKERY, INC.
VICKERY, OHIO

(19 Pages)

REVIEW COMMENTS ON THE
AUGUST 1995, RCRA FACILITY INVESTIGATION, PHASE I
QUALITY ASSURANCE PROJECT PLAN
CHEMICAL WASTE MANAGEMENT-VICKERY, INC.
VICKERY, OHIO

PRC Environmental Management, Inc. (PRC), conducted a technical review of the revised Resource Conservation and Recovery Act (RCRA) facility investigation (RFI), Phase I quality assurance project plan (QAPP) for the Chemical Waste Management-Vickery, Inc. (CWM-Vickery) facility in Vickery, Ohio. The revised RFI QAPP, dated August 1995, was prepared by CWM-Vickery's consultant, Rust Environmental and Infrastructure, Inc. (RUST).

PRC reviewed the revised RFI QAPP to determine whether CWM-Vickery addressed previous U.S. Environmental Protection Agency (EPA) comments, dated May 23, 1995, on the original RFI QAPP dated April, 1995.

The RFI QAPP contains various deficiencies, inaccuracies, and inconsistencies. Because these deficiencies, inaccuracies, and inconsistencies are so extensive, only examples of these issues are presented in the general and specific review comments below. The RFI QAPP should be thoroughly revised in accordance with the EPA Region 5 Model RCRA QAPP (model QAPP) dated May 1993.

GENERAL COMMENTS

1. The QAPP does not clearly explain what criteria will be used to determine if contamination is present. For example, text in Section 1.4.2 states that analytical results may be compared with EPA data quality levels (DQL) for general information purposes. However, for several analytical parameters, the proposed analytical reporting limit (RL) is higher than the DQL. Therefore, it is not clear how the results will be compared to the DQLs. The QAPP should be revised to clearly explain how the analytical results will be used with respect to the DQLs or employ analytical methods with lower reporting limits. Specific comments 16 through 19 also apply here and should be addressed.

2. The QAPP presents contradictory and deficient information regarding the matrixes to be sampled. For example, Section 1.0 of the QAPP states that during Phase I of the RFI, only soil and sediment samples will be collected from the solid waste management units (SWMU) and areas of concern (AOC). However, the text in Section 1.4.1 states that one groundwater sample will also be collected from the capillary drainage layer that underlines the Toxic Substances Control Act (TSCA) closure cell. The QAPP should be revised to consistently discuss the sampling matrixes. Also, the QAPP should explain why groundwater samples are to be collected only from the capillary drainage layer that underlines the TSCA closure cell. Specific comments 3, 5, 7, and 8 also apply here and should be addressed.

3. The QAPP does not fully justify why the project target parameters were selected. For example, text in Section 1.1.2 states that groundwater samples from the capillary drainage layer that underlines the TSCA closure cell are to be analyzed for dioxins. However, analysis for dioxins is not proposed for soil or sediment samples. The QAPP should be revised to present justification for the project target parameters that were selected. Specific comments No. 15 (bullet 6) and 22 also apply here and should be addressed.

4. The QAPP references Section 5.0 of the RFI work plan (WP) for sampling procedures. However, several discrepancies exist between the RFI WP and the QAPP. Examples of these discrepancies are included in Specific comments 15 and 37 and should be resolved.

5. The QAPP has several deficiencies regarding project organization. For example, the QAPP does not specify the project and quality assurance (QA) managers for the laboratories that will analyze samples for fecal coliforms, dioxins, furans, and geophysical parameters. The QAPP should be revised to identify responsible personnel for all laboratories that will be used to analyze samples during the RFI. Specific comments 23, 24, and 25 also apply here and should be addressed.

6. Some sections of the QAPP contain generic information that has been copied verbatim from the model QAPP and do not appear to be applicable to this project. These sections should be revised to contain project-specific information. Specific comments 11, 28, 36, and 45 also apply here and should be addressed.

7. The RFI QAPP presents several deficiencies, inconsistencies, and discrepancies regarding some of the analytical methods used to determine the target parameters. For example, the QAPP presents two different methods to be used for sulfide analysis: Methods for Chemical Analysis of Water and Waste (MCAWW) 376.1 and SW-846 9030. Also, the QAPP specifies that soil samples will be analyzed for fecal coliforms by Standard Method 9222D, which is only appropriate for aqueous samples. In addition, the QAPP specifies that soil pH will be determined by American Society for Testing and Materials (ASTM) method D4927, which is used for elemental analysis of lubricant and additive components. The QAPP should be revised to address these inconsistencies, discrepancies, and deficiencies. Specific comments 21, 33, and 43 also apply here and should be addressed.

SPECIFIC COMMENTS

The comments provided below refer to specific sections of the QAPP. Referenced sections of the QAPP are identified by section, page, and paragraph, as appropriate. When paragraphs are cited, the first complete paragraph on a page is designated as "Paragraph 1." If comments are made on a paragraph that carries over from a previous page, the incomplete paragraph is designated as "Paragraph 0."

1. **Title and Signature Page**. In order to comply with the requirements of the model QAPP, this page should include the names of all individuals who must approve the QAPP. Therefore, this page should be revised to also include the names of all laboratory quality assurance (QA) managers, and not only the name of the G.P. Environmental Services (GP) QA manager. In addition, all dated signatures should be present except for those of EPA personnel. Therefore, this page should be revised to include the signatures of the CWM Vickery project manager and the Pace QA manager.

2. **Table of Contents**. The list of appendixes at the end of the list of contents should identify the contents found in the appendix (for example, titles of individual standard operating procedures (SOP) contained in the appendixes).

3. **Section 1.1.1, Page 2 of 16, Paragraph 3**. The text in this section states that the SWMUs and AOCs are underlain by clayey lacustrine and glacial till soils which, based on several years of semiannual and quarterly groundwater monitoring, have substantially limited the migration of hazardous waste constituents to the subsurface. However, no background groundwater monitoring data is provided to substantiate this statement. The QAPP should be revised to provide background groundwater monitoring data.

4. **Section 1.1.1, Page 3 of 16, Bullet 2**. The text states that in order to characterize the effectiveness of the clean closure of former SWMUs located underneath the TSCA closure cell, one groundwater sample will be collected from the capillary drainage layer. However, analytical results for one sample do not provide any information on reproducibility or statistical significance of the results. Therefore, the text should be revised to specify that a higher number of groundwater samples will be collected in order to obtain meaningful results.

5. **Section 1.1.2, Page 4 of 16, Bullet 4**. The text states that deeper subsurface sampling will be conducted to assess the vertical extent of contaminant migration. However, the text does not specify that any groundwater sampling will be conducted to determine the degree of contaminant migration. The text should be revised to specify that groundwater sampling will be conducted or it should explain the reasons for not conducting groundwater sampling and should provide data to justify that groundwater sampling is not needed.

6. **Section 1.1.2, Page 4 of 16, Paragraph 3**. First, the text states that the groundwater sample from the capillary drainage layer will be analyzed for Appendix IX dioxin. However, the term "dioxin" (singular) is vague and inaccurate. The text should be revised to state that the groundwater sample will be analyzed for Appendix IX dioxins and furans. Also, the text should be revised to explain the rationale for not analyzing soil and sediment samples for dioxins and furans.

   Second, the text states that soil samples will be analyzed for pH. However, no pH measurements are proposed for the groundwater sample. Because pH is critical for interpreting the characteristics of contaminants in groundwater, the text should be revised to specify that pH analysis will be conducted for the groundwater sample.

Finally, during groundwater sampling, several parameters need to be monitored in order to verify that a representative groundwater sample is collected. These parameters include groundwater pH, turbidity, specific conductivity, and temperature. The text should be revised to specify the field measurements to be taken to verify that a representative groundwater sample is collected.

7. **Section 1.1.2, Page 5 of 16, Paragraph 0**. The text states that if results from the Phase I RFI show that hazardous waste constituents are present in soils or sediments at the site, the Phase I report will propose conducting a groundwater investigation during the Phase II RFI, if appropriate. If not, the text states that groundwater sampling will be unnecessary. However, text in Section 1.1.1 states that during Phase I, groundwater sampling will be conducted at the TSCA closure cell. The QAPP should be revised to address this discrepancy.

   Also, the procedures for determining contaminant action levels in soil should be discussed. Because the contaminant action levels in soil have not been specified, the appropriateness of the proposed analytical methods cannot be evaluated. For example, it is unclear if the laboratory RLs are lower than the soil action levels or if DQLs will be used as action levels. The text should be revised to address this deficiency.

8. **Section 1.3.3, Pages 10 and 11 of 16, Bullet 1**. The text states that before the mid-1980s, most of the SWMUs at the facility did not have adequate secondary containment and releases to the soil were not uncommon. The text also states that these releases probably impacted the soil but had little effect on the groundwater because of the low permeability of the clay soil and because many of the releases were immediately treated and the contaminated soil was removed. However, no groundwater monitoring data are provided to support these statements. Also, text in Section 3.2.1 of the RFI work plan (WP) states that in some locations in the Great Plains of the U.S., deposits of clay have vertical fractures. These fractures may enhance migration of contaminants to groundwater. The QAPP should be revised to provide groundwater monitoring data that show the releases had no impact on groundwater quality. In addition, the permeability of the soil should be stated quantitatively, and other data, such as rainfall data and the results of confirmatory sampling, should be provided.

9. **Section 1.3.3, Page 11 of 16, Bullet 1**. The text states that former unlined impoundments potentially have had the greatest impact on the groundwater at the site. However, during the Phase I RFI, no groundwater sampling is planned except for groundwater sampling of the capillary drainage layer at the TSCA closure cell. The QAPP should be revised to also include groundwater sampling at the monitoring wells at the site.

10. **Section 1.3.3, Page 11 of 16, Bullet 2**. The text states that releases of liquid hazardous wastes occurred to both Little Raccoon Creek and Meyers Ditch. The text also recommends analyzing stream bed sediments to characterize this medium. Although collecting one sample from Meyers Ditch is specified (see Section 5.10.8, Page 63, Paragraph 3 of the RFI WP), collecting samples of Little Raccoon Creek sediment is not specified in the QAPP. The QAPP states that "subsequent testing of the creek [Little Raccoon Creek] water showed little contamination present." However, this statement implies that a water sample was collected but that no sediment sample was collected. Further, the action levels, to which the data were compared, are not provided. The QAPP should provide further information to justify why a sediment sample was not collected from Little Raccoon Creek; otherwise, the creek should be specified as a sampling location in the QAPP and in the RFI.

    The text also states that other releases have occurred to the surface water, one as recently as April 1993. The name of the surface water body that received the "other releases" should also be specified, and, if it is other than Meyers Ditch or Little Raccoon Creek, sampling of this surface water body should also be specified.

11. **Section 1.4, Page 12 of 16**. The text in this section is generic and has been copied verbatim from the model QAPP dated May 1993. This generic text should be deleted and replaced by project-specific information.

12. **Section 1.4.1, Page 12 of 16, Paragraph 2**. The text states that 53 SWMUs exist at the site. However, Table 1-1 does not show SWMUs 10 and 53. This discrepancy should be resolved and the text or table should be revised appropriately.

13. **Section 1.4.2, Page 14 of 16, Paragraph 2**. The text states that analytical results may be compared with the DQLs for general information purposes. The text should be revised to specify the expected outcome of such a comparison. For example, the text should explain whether the DQLs will be used as action levels. In addition, because Table 1-1 shows that several samples are to be collected from each of the nine groups of SWMUs, it is not clear how the analytical results from the various locations will be evaluated to determine if contamination is present in each of the SWMUs and SWMU groups. For example, 32 samples are to be collected from Group A SWMUs. However, the text does not explain whether these analytical results will be used individually or whether a statistical estimate, such as the mean or 95 percent upper confidence limit, will be used to determine the presence of contamination. The text should be revised to specify the process that will be used to interpret the results.

14. **Section 1.5, Page 15 of 16, Paragraph 1**. The text states that additional soil samples may be collected at locations where field observations indicate that the uppermost layer of native soil is contaminated. The text should be revised to explain if the additional soil samples are to be collected as part of Phase I RFI activities. Also, the text should explain if an addendum to the sampling plan will be prepared before additional samples are to be collected.

15. **Table 1-1**. Several deficiencies, inconsistencies, and inaccuracies were identified in Table 1-1 and they are discussed below.

    - Table 1-1 shows that for group A SWMUs, eight selected-location samples will be collected for each analyte of concern. However, Figure 5-7 in the RFI WP shows that 10 selected-location soil samples will be collected. This discrepancy should be resolved and the figure or table should be revised accordingly.

    - Table 1-1 shows that group B includes SWMUs 4, 5, 7, 11, 12, 17, and 18. However, Section 5.9.2 of the RFI WP shows that group B includes SWMUs 4, 5, 7, 10, 11, 17, 18, and 53. This discrepancy should be resolved and the text or table should be revised accordingly.

- Table 1-1 shows that for group C SWMUs, five selected-location soil samples will be collected for each analyte of concern. However, Figure 5-8 of the RFI WP shows only three selected-location soil samples will be collected. This discrepancy should be resolved and the text or table should be revised accordingly.

- Table 1-1 shows that one sample will be collected from SWMU 42 of group I. However, Section 5.9.9.5 of the RFI WP states that two soil samples will be collected from this SWMU. This discrepancy should be resolved and the text or table should be revised accordingly.

- Table 1-1 shows that samples from SWMU 42 will be analyzed for polychlorinated biphenyls (PCB), metals, soil pH, and geotechnical parameters. However, text in Section 5.9.9.5 of the RFI WP states that soil samples collected within this SWMU will be analyzed for benzene, toluene, ethylbenzene, and xylene (BTEX), carcinogenic polyaromatic hydrocarbons (PAH), PCBs, and metals. This discrepancy should be resolved and the text or table should be revised accordingly.

- Table 1-1 shows that for SWMUs 41 and 42, soil samples will not be analyzed for volatile organic compounds (VOC), semivolatile organic compounds (SVOC), pesticides, herbicides, metals (SWMU 41 only), cyanide, and sulfide. Table 1-1 should be revised to include the above-mentioned analyses or the reasons for not including these analyses should be explained.

- Table 1-1 shows that 22 investigative samples will be collected from AOC A. However, text in Section 5.10.1 and Figure 5-26 of the RFI WP both indicate that 30 investigative samples will be collected. This discrepancy should be resolved and the text or table should be revised accordingly.

- Table 1-1 shows that two investigative samples will be collected from AOC C. However, text in Section 5.10.3 and Figure 5-23 of the RFI WP both indicate

that one soil sample will be collected. This discrepancy should be resolved and the text or table should be revised accordingly.

- Table 1-1 shows that seven investigative soil samples will be collected from AOC H. However, text in Section 5.10.8 of the RFI WP states that in addition to soil samples, sediment samples will be collected along the Meyers Ditch, which is located in AOC H. This discrepancy should be resolved.

- Table 1-1 indicates that soil samples will be collected from all SWMUs and AOCs (except for group B SWMUs). However, Section 5.7 of the RFI WP discusses collection of surface, subsurface, and sediment samples. Table 1-1 should be revised to indicate the exact matrix of samples and to specify if the soil samples will be surface or subsurface samples. The approximate depth interval from which samples will be collected should also be specified.

16. **Table 1-2**. For several VOCs listed in Table 1-2, the GP groundwater or soil RL is significantly higher than its respective DQL. These compounds include the following: benzene; bromodichloromethane; carbon tetrachloride; chloroform; chloromethane; dibromochloromethane; 1,2-dibromo-3-chloropropane; 1,2-dibromoethane; trans-1,4 dichloro-2-butene; and so forth. Because the RLs listed for these compounds are higher than the respective DQLs, it is unclear how the analytical results can be compared to the DQLs. Also, for several of these compounds, the RL is higher than the EPA Region 5 lowest practical quantitation limit (PQL). For example, the lowest PQL for acrolein in soil is 7 micrograms per kilogram (μg/kg) and for groundwater is 5 μg/L. However, the proposed soil RL is 20 μg/kg and the proposed groundwater RL is 20 μg/L. Because the proposed analytical method for these compounds may not be acceptable for achieving the lowest PQLs, an alternative method that can achieve the lowest PQLs should be considered.

17. **Table 1-3**. The title of Table 1-3 states "...Appendix IX volatile organics by Method 8270B." However, Method 8270B is used to analyze for SVOCs, which are the parameters listed in Table 1-3. The title of Table 1-3 should be revised accordingly.

Also, for several SVOCs presented in Table 1-3, the groundwater or soil RL listed is significantly higher than its respective DQL. These SVOCs include the following: aramite, benzo(a)anthracene, benzo(b)fluoranthene, benzo(k)fluoranthene, and so forth. Because the RLs listed for these compounds are higher than its respective DQLs, it is unclear how the analytical results can be compared to the DQLs. Also, for several of these compounds, the RL is higher than the EPA Region 5 lowest PQL. For example, Table 1-3 shows that for 4-nitrophenol the soil RL is 1,650 μg/kg and the groundwater RL is 50 μg/L. However, the lowest soil PQL for this compound is 470 μg/kg and the lowest groundwater PQL is 10 μg/L. Therefore, an alternative method that can achieve the lowest PQLs should be considered for these compounds.

18. **Table 1-4**. For several compounds presented in Table 1-4, the groundwater RLs listed are significantly higher than their respective DQL. These compounds include the following: aldrin, endosulfan sulfate, toxaphene, Aroclor 1248, and so forth. Because the RLs listed for these compounds are higher than the DQLs, it is unclear how the analytical results can be compared to the DQLs. Also, for several of the compounds, the RL is higher than the lowest PQL. For example, Table 1-4 shows that for hexachlorophene, the groundwater RL is 50 μg/L. However, the lowest PQL is 10 μg/L. Therefore, an alternative analytical method that can achieve the lowest PQLs for these compounds should be considered.

    Also, the compounds chlordane and Aroclor have been spelled incorrectly as "chlorodane" and "Arochlor," respectively. Table 1-4 should be corrected.

19. **Table 1-5**. For famphur and methyl parathion, the groundwater RLs listed are significantly higher than their respective DQLs. Therefore, the analytical results for these compounds cannot be compared to the DQLs. Also, the groundwater RLs of famphur (20 μg/L) and methyl parathion (1.2 μg/L) are higher than the lowest PQLs of 10 and 0.5 μg/L respectively. For these compounds, an alternative analytical method that can achieve the lowest PQLs should be considered.

20. **Table 1-6**. The compound dinoseb has been spelled incorrectly as "dinosab." Table 1-6 should be corrected.

21. **Table 1-7**. Table 1-7 shows that sulfide will be analyzed by MCAWW Method 376.1. However, Table 8-1 shows that sulfide is to be analyzed by SW-846 Method 9030. Also, SW-846 Method 9030A is the most recently promulgated method for sulfide analysis and should be used instead of SW-846 Method 9030. These inconsistencies should be corrected.

22. **Table 1-8**. Although dioxins and furans are included in the list of Appendix IX compounds, Table 1-8 shows that the only parameter to be analyzed for is dioxin. However, it is not clear to what compound the term "dioxin" is referring. Table 1-8 should be revised to include all dioxins and furans specified in Appendix IX. If some compounds are to be excluded, a detailed justification for doing so should be provided.

23. **Section 2.3, Page 3 of 7**. The text should be revised to mention the name of Willie Harris as the EPA quality assurance manager.

24. **Section 2.4, Pages 3 through 6 of 7**. The text should be revised to specify the laboratory that will perform the fecal coliform analysis of soil samples. Also, the text only discusses the responsibilities of the GP laboratory personnel. The text should be revised to include a discussion of the responsibilities of personnel of the other laboratories as well.

25. **Figure 2-1**. Figure 2-1 includes names of personnel whose responsibilities were not discussed in text. For example, the name of Bryan Kline is shown in Figure 2-1 but his responsibilities are not discussed in text. Also, the text discusses the responsibilities of GP laboratory personnel. However, the names of these personnel are not included in Figure 2-1. In addition, Figure 2-1 shows the names of subcontractors whose duties were never mentioned in the text. Figure 2-1 should therefore be revised to include all personnel discussed in text.

26. **Section 3.1, Page 1 of 4, Paragraph 1**. The text states that no formalized assessment of precision for field VOC measurements is planned because VOCs will be "lost" as part of the initial measurement. Because this statement is vague and confusing, the text should be revised to explain how VOCs will be lost during the initial measurement.

27. **Section 3.3, Page 2 of 4**. This section provides a total laboratory completeness objective of 95 percent for all samples analyzed by SW-846. This approach could result in incomplete data for a particular SWMU or AOC. Therefore, individual completeness objectives should be established for each SWMU and AOC. Also, a sufficient number of samples should be collected to make completeness a meaningful parameter. For example, for SWMU group E, Table 1-1 indicates that a total of three samples will be collected. If only two of the three sample results were valid, the completeness would be only 67 percent, and the objective would not be met. Therefore, the completeness objective should be modified, or the number of samples to be collected should be increased. The QAPP should be revised to address this situation.

28. **Section 3.5, Page 3 of 4**. The text in this section is copied verbatim from the model QAPP. This text is generic and does not explain how comparability of results will be assessed during the RFI. The text should be revised to provide project-specific information.

29. **Section 3.6, Page 3 of 4, Paragraphs 2 and 3**. The text states that field blanks will consist of deionized water placed in sample containers at the site using the same decontaminated equipment that will be used to collect the samples. The text also states that trip blanks will consist of deionized water. However, deionized water is not of adequate quality for blank samples. Analyte-free water, such as high performance liquid chromatography (HPLC) grade water should be used instead. The text should be revised to include these changes.

30. **Section 3.6, Page 4 of 4, Paragraph 1**. The text states that a matrix spike and laboratory duplicate will be analyzed for inorganic parameters. However, Table 1-1 shows that a matrix spike/matrix spike duplicate (MS/MSD) will be collected and analyzed for metals, cyanide, and sulfide. This discrepancy should be resolved.

31. **Table 3-2**. Table 3-2 lists phenol as a surrogate compound. However, according to Method 8270B, phenol-d6 is the correct name of the surrogate compound. Therefore, this table should be revised.

32. **Table 3-3**. A footnote to Table 3-3 states that a minimum 10 percent recovery of the surrogate compound is used as an action limit. However, Table 3-3 indicates that the acceptable range for surrogate recovery is from 24 to 150 percent. This discrepancy should be resolved.

33. **Table 3-6**. Table 3-6 shows that arsenic will be analyzed for using SW-846 Method 7060. This table should be revised to show that arsenic will be analyzed for using SW-846 Method 7060A, which is the most recently promulgated method.

34. **Table 3-7**. Table 3-7 presents only accuracy objectives for most of the listed dioxins and furans. Precision objectives are specified only for 2,3,7,8-tetrachlorodibenzodioxin. Table 3-7 should be revised to include precision objectives for all dioxins and furans listed in the table.

35. **Section 4.0, Page 1 of 1**. This section references certain relevant sections of the RFI WP. Therefore, these sections were reviewed and specific comments are provided below.

- Text in Section 4.0 references Sections 5.2.6.1, 5.2.6.1.1, 5.2.6.1.2, and 5.2.6.1.3 of the RFI WP. However, these sections could not be found in the RFI WP. The text of the QAPP should be revised to reference the appropriate sections of the RFI WP.

- Text in Section 4.0 references Section 5.7 of the RFI WP for soil and sediment sampling procedures. The text should be revised to also reference Section 5.11 for groundwater sampling procedures. Also, the text in Section 5.11 discusses collection of filtered groundwater samples. The text should be revised to explain for what analytes filtered groundwater samples will be collected.

- Although Section 4 references several sections of the RFI WP, not all the necessary information has been included by reference. The following items are missing:

1. Sample containers:
   a. The type and size of container to be used to collect soil and groundwater samples for each analyte
   b. The number of containers required for each analysis
   c. Specific chemical and temperature preservation conditions and holding time requirements

2. The order in which analytical parameter samples will be collected for each matrix

3. Sample packaging and shipping procedures to be used as part of the field chain-of-custody procedures

This section should be revised to include all of the missing information. Also, a table should be included to summarize the information regarding sample containers (see Items 1a through 1c). If the information is included in the RFI WP, specific reference should be made to the RFI WP.

36. **Section 5.0**. Most of the text presented in this section has been copied verbatim from the model QAPP. As a result, some extraneous information has been included in this section. For example, item (f), that appears in Section 5.1 on page 3 of 4, discusses collection of split samples by a government agency. However, this QAPP does not include collection of split samples. Also, it is unclear to what government agency the text is referring. The text in Section 5.0 should be revised to include only project-specific information and all extraneous information should be deleted.

37. **Section 5.1, Page 2 of 4, Paragraph 4**. The text in item b states that all bottles used to collect samples will be identified by using sample tags or labels. The text should be revised to specify whether sample tags or labels or both will be used to identify the sample bottles.

The text also states that the sample numbering system is presented in Section 6.0 of the RFI WP. However, the text in Section 6.1.3 of the RFI WP that discusses sample identification

does not specify the sample numbering system to be used for duplicate, field blank, and trip blank samples. The text should be revised to specify the numbering system to be used for these samples. Also, the numbering system proposed for the investigative samples does not adequately describe the type of samples to be collected. For example, the samples are to be identified according to their corresponding SWMU, AOC, and sampling grid location. However, samples are to be collected from both sample grid nodes and random locations. Therefore, the numbering system should be revised to specify the exact location where each sample will be collected. In addition, the sample identification number should be revised to indicate whether the sample matrix is surface or subsurface soil, or sediment.

38. **Section 5.2, Page 4 of 4**. The text states that GP laboratory custody procedures are included in Appendix B of the QAPP. The QAPP should be revised to also include the custody procedures of all laboratories that will analyze samples collected during the RFI. Therefore, the QAPP should include laboratory custody procedures of Pace, Inc., and Rust laboratories as well.

39. **Section 5.3, Page 4 of 4**. This section should be revised to include a list of items that will be included in the final evidence files. The model QAPP requires that the files contain at a minimum: field logbooks, field data and deliverables, photographs, drawings, soil boring logs, laboratory data deliverables, data validation reports, data assessment reports, progress reports, and all custody documentation.

40. **Section 6.2, Page 2 of 3**. The text states that GP laboratory calibration procedures can be found in its standard operating procedure (SOP), which are included in Appendix A of the QAPP. However, other laboratories will also analyze samples collected during the RFI. Therefore, the QAPP should be revised to discuss the instrument calibration procedures to be used by other laboratories as well. Also, the QAPP should be revised to include a table that summarizes instrument calibration procedures. The table should specify the following: reference method, instrument, number of standards of initial calibration, acceptance criteria, and frequency of calibration. Table 6 in the model QAPP is an example of the calibration summary table.

41. **Section 7.0, Page 1 of 2**. This section should be revised to specify which laboratory will analyze the soil samples for fecal coliforms.

42. **Section 7.2, Page 1 of 2**. The text states that samples will be analyzed for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, sulfide, and chloride. However, the text in Section 1.1.2 indicates that chloride is not a contaminant of concern. Text in Section 1.1.2 also states that dioxins are contaminants of concern. The QAPP should be revised to consistently discuss the contaminants of concern.

43. **Table 7-1**. Several inconsistencies and deficiencies were identified regarding this table and they are discussed below.

- Table 7-1 shows that soil extraction for SVOCs will be conducted by Method SW-846 3550 and arsenic will be analyzed for by Method SW-846 7060. Table 7-1 should be revised to indicate that soil extraction of SVOCs and arsenic analyses will be conducted by Methods SW-846 3550A and 7060A, respectively, because these are the most recently promulgated methods.

- Table 7-1 shows that sulfide will be analyzed for by MCAWW Method 376.1. However, Table 8-1 shows that sulfide will be analyzed for by Method SW-846 9030. This discrepancy should be resolved.

- Table 7-1 should be revised to specify the SW-846 reference method for extraction and cleanup of polychlorinated dibenzo-p-dioxins and dibenzofurans.

- Table 7-1 shows that fecal coliform analyses will be conducted by Standard Method No. 9222D. However, Table 7-1 does not specify any laboratory SOP for this method. Also, this method is not suited for soil analyses. Table 7-1 should be revised to specify an appropriate method for fecal coliform analyses.

44. **Table 7-2**. Table 7-2 shows that soil pH will be analyzed by ASTM Method D4927. However, this method analyzes for elemental lubricants and additive components by wavelength-dispersive x-ray fluorescence spectroscopy. Table 7-2 should be revised to specify the correct method to be used to perform soil pH analyses.

45. **Section 8.2, Page 1 of 2**. This section includes text that has been copied verbatim from the model QAPP. For example, the text does not discuss the quality control (QC) requirements for each analytical procedure, but it presents a generic list of QC procedures that may or may not be applicable. The text should be revised to include only project-specific information.

46. **Section 8.2, Page 2 of 2**. The text states that the RUST project manager may choose to perform sample reanalysis beyond holding times with the understanding that the results will be qualified. However, if samples are reanalyzed when their holding times have been exceeded, invalid results are generated. Therefore, because reanalyzing samples is not acceptable for this RFI, this statement should be deleted.

47. **Table 8-1**. Table 8-1 presents control limits for analytical methods to be performed only by the GP laboratory. Table 8-1 should be revised to include control limits and corrective actions for all methods that will be used to analyze the samples. Several inconsistencies and deficiencies were identified for Table 8-1 and they are summarized below.

- Table 8-1 does not list control limits and corrective actions for analytical Methods SW-846 8141A, 8280A, and 9080, for Standard Method 9222D; and the ASTM methods presented in Table 7-2. Table 8-1 should be revised to include control limits and corrective actions for these methods.

- Table 8-1 shows that Methods SW-846 700 series analyses will be used for metals. This table should be revised to indicate that Methods SW-846 7000 series will be used for metals analyses.

- Table 8-1 includes several control samples that are not described in text. These samples include storage and method blanks, and laboratory control

samples. These quality control samples and the purpose of analyzing for them should also be described in Section 8.0 of the QAPP.

- Text in the acceptance criteria column of Table 8-1 references Table 3 for acceptance criteria for MS/MSD samples and surrogate results for VOCs, SVOCs, pesticides, PCBs, herbicides, metals, cyanide, and sulfide analyses. However, Table 3 is not included in the QAPP. The text should be revised to reference the appropriate table in the QAPP.

- The corrective actions proposed in Table 8-1 when MS/MSD results are outside control limits are to either (1) recalibrate the instruments and reanalyze the samples or (2) reanalyze the samples and report the reanalyzed results. However, in order to determine sample matrix effects on the analytical procedure, a blank spike and blank spike duplicate (BS/BSD) sample should be analyzed before the above-mentioned corrective actions are taken. Table 8-1 should therefore be revised to include BS/BSD sample analyses. Also, a description of the BS/BSD samples should be included in the appropriate sections of the QAPP.

- The terms "EQL" and "CRDL" are used in Table 8-1. However, these terms were not defined in the QAPP. A footnote should be added to Table 8-1 to define these terms.

48. **Section 9.0**. Section 9.0 contains generic information that was copied verbatim from the model QAPP. For example, the text discusses data reduction, validation, and reporting for chemical analyses only. However, Section 9.0 should be revised to include project-specific information and to also discuss data reduction, validation, and reporting procedures for biochemical and geophysical analyses that are to be performed.

49. **Section 9.1.2, Page 1 of 5**. The text states that the laboratory section supervisor will issue notebooks. However, Section 2.0 of the QAPP does not identify the laboratory section supervisor. The supervisor's name should be added to the QAPP.

50. **Section 11.0**. This section discusses preventive maintenance procedures for the GP laboratory equipment. This section should be revised to discuss preventive maintenance procedures for equipment in all laboratories that will be used to analyze samples collected during the RFI.

51. **Table 11-1**. This table should be revised to include preventive maintenance procedures for analytical equipment that will be used by all other laboratories, in addition to GP.

    Also, Table 11-1 should be revised to include a column that specifies the analytical method for which each equipment shown will be used.

52. **Section 12**. This section discusses the precision and accuracy only for chemical analyses. This section should be revised to also discuss precision and accuracy determinations of the biochemical and geophysical analyses to be performed as part of the RFI.

53. **Section 12.1, Page 1 of 2**. This section discusses calculation of precision based on MS/MSD sample analyses. However, Section 3.0 of the QAPP states that precision for inorganic parameters will be determined by analyzing samples and sample duplicate samples. Therefore, this section should be revised to discuss how the precision for inorganic analytes will be calculated.

54. **Section 13.2, Page 2 of 3**. This section discusses laboratory corrective actions to be taken by the GP QA manager. This section should be revised to specify corrective actions to be taken by the QA managers of all laboratories that will be used to analyze samples collected during the RFI.

Chemical Waste Management, Inc.
Response to Notice of Deficiencies (NODs)
RFI Phase I RFI Work Plan

RESPONSE TO GENERAL COMMENT

Comment 1

The Phase I RFI Work Plan is presented with the intent of determining if releases have occurred from each of the SWMUs or AOCs. The soil, sediment and groundwater sampling program proposed in this Phase I RFI Work Plan is conducted in order to phase the RFI work so that the field investigation can be adapted based on information gathered from each phase. The installation of groundwater monitoring wells is not warranted at this time until we determine if there has been a release. The monitoring well data gathered in groundwater monitoring wells on the site should assist in this assessment. Conducting an investigation such as this in a phase manner actually decreases the time it takes to get to corrective action because the investigation is built on information gathered during the previous phase. This leads to better decisions to drive the project to completion. This is the full intent of CWM Vickery with the preparation and submission of this Phase I RFI Work Plan.

Comment 2

Appendix IX parameters have been inserted as requested. Refer to Tables 1-4 through 1-8 in the Quality Assurance Project Plan (QAPjP).

Comment 3

Two additional figures have been added to the Phase I RFI Work Plan. Figure 2-6 represents the surface drainage patterns before the Surface Water Management Plan was implemented. Figure 2-7 represents the present Surface Water Management Plan.

Comment 4

The Phase I RFI Work Plan has been revised to include continuous cores as a way of determining the location of different interfaces in the subsurface. Section 5.7.1 describes the subsurface sampling procedures which will be utilized during this Phase I RFI.

Comment 5

Figures 2-3 and 2-4 were revised to present the locations of the groundwater monitoring wells presently used during the quarterly and semi-annual sampling at the CWM Vickery facility. The groundwater flow for the three units presently monitored on site (lacustrine, till and bedrock) can

be found in the Report on Current Conditions in Figures 4-9 through 4-23. These potentiometric contour maps present the groundwater surface from 1994 through 1993.

Comment 6

Additional text has been added to the Phase I RFI Work Plan in Section 3.2.2 Site Glacial Geology which further details the geologic and hydraulic properties of the Glacial Till.

Comment 7

Section 3.2.2 Site Glacial Geology has been revised to include a consistent analysis of the hydraulic properties of the Glacial Till and Lacustrine soils underneath the facility.

Comment 8

Section 3.2.2 Site Glacial Geology has been revised to include a discussion of fractures in the Glacial Till and Lacustrine soils underneath the facility.

Comment 9

Section 3.3.3 Groundwater Flow in the Surficial Deposits has been revised to include a discussion on the vertical flow rates within the Glacial Till and Lacustrine soils underneath the facility.

Comment 10

Section 4.0 of the Phase I RFI Work Plan describes the project objectives for this work. The Phase I RFI at the CWM Vickery facility will be specifically focussed on determining if releases have actually occurred. This will be done by determining if soils adjacent to the SWMUs and AOCs have indications of hazardous waste or hazardous waste constituents.

RESPONSE TO SPECIFIC COMMENTS

Comment 1

The injection wells are presented in Figure 2-2 Existing Facility.

Comment 2.

An additional figure (Figure 2-3) has been provided in order to present the former locations of the surface impoundments.

Comment 3

The text has been revised to discuss the hydraulic properties of the bedrock geology. This is

presented in Section 3.2.1.

Comment 4

The text has been revised to discuss the radius of influence of the truck wash well. This is presented in Section 3.3.2.

Comment 5

The natural flow direction within the bedrock has been included in this section of text.

Comment 6

The text has been revised to provide backup information on the travel time through the glacial soils to the bedrock. No isotope data has been found to exist for the facility.

Comment 7

The text in section 5.2.5.1.2 has been revised accordingly.

Comment 8

The text in section 5.2.5.1.1 has been revised accordingly.

Comment 9

The section titled "Rinsate Blanks" has been changed to "Field Blanks". Field Blanks will be collected only for the same matrix being sampled. Therefore, field blanks will not be collected for the soil and sediment samples. This will be done for every 1 for 10 samples collected. Section 5.2.5.1.3. describes the collection of Field Blanks.

Comment 10

Section 5.5 has been divided into three sections discussing the decontamination area, procedures and how Investigation Derived Wastes (IDW) will be handled during the Phase I RFI.

Comment 11

Section 5.7 has been revised to provide a detailed discussion regarding the soil sampling procedures which will be used during the Phase I RFI. These soil sampling procedures are divided further to discuss procedures on the collection of subsurface soil samples, surface soil samples and sediment samples. The VOC fraction of the soil sample will be collected using the non-conventional method described in section 5.7.1 and 5.7.2.

Comment 12

The procedures for headspace screening using a PID is described in Section 5.7.1.2.

Comment 13

Borehole abandonment procedures are described in Section 5.8.

Comment 14

The borehole abandonment procedures are described in Section 5.8. The text that describes the procedures that will be followed during this Phase I RFI on handling of IDW is presented in Section 5.5.3.

Comment 15

Two soil sampling locations on the grid-nodes have been moved into SWMU 3 and SWMU 8 as they were located just outside the approximate boundary of the SWMUs.

Comment 16

Soil sample collection procedures and the basis for laboratory analysis have been revised and are discussed in Section 5.7.1. If no VOCs are detected during the field screening, the sample will be collected based on visual criteria. Additionally, discrete samples will only be collected for laboratory analysis.

Comment 17

Approval of certification letters are provided in Appendix A of the Phase I RFI Work Plan.

Comment 18

21 sampling locations are presented in this SWMU Group. 18 soil samples will be collected as grid-node samples and will be collected based on the procedures described in Section 5.7.1.1. 3 selected locations and 2 additional grid-node samples located within SWMU 9, will be collected based on the procedures described in Section 5.7.1.2. The sampling described for this SWMU Grouping is sufficient to determine if the SWMUs have had a release to the adjacent soils.

Comment 19

The soil sampling procedures are presented in Section 5.7.1.

Comment 20

This bullet has been removed from the text. The soil sampling procedures for this SWMU Group is presented in Section 5..7.1.

Comment 21

All grid-node locations will be sampled as described in Section 5.7.1.1. The figure has been revised accordingly.

Comment 22

The reference to the clay cap has been removed from the text.

Comment 23

As described in the text, the casing failures in the abandoned injection wells occurred at depths greater the 2,000 feet below ground surface. Therefore, these failures will not be related to any groundwater contamination. However, the surface soil samples proposed will provide data on the possibility of surface spillage at the times of operation.

Comment 24

As corrected in the ROCC, the contaminants were released to floor drains not holes, which led to the Sluice Pit and ultimately disposed in the Surface Impoundments.

Comment 25

The text and figures have been revised accordingly.

Comment 26

Surface soil sample will be collected around this SWMU in order to determine if a release has occurred. The underground piping in the area around the building will be investigated using the GPR as described in the text for AOC 9.

Comment 27

The text has been revised accordingly.

Comment 28

Surface soil samples around this SWMU Group are being collected for the intended use of

identifying releases to the surface soils.

Comment 29

Twelve soil samples will be collected at the grid node locations using the procedures outlined in Section 5.7.1.1. This sampling scheme will be used to identify if the remediation efforts conducted during the closing of this SMWU was adequate.

Comment 30

The text has been revised accordingly.

Comment 31

The text has been revised accordingly to indicate that four subsurface soil samples will be collected.

Comment 32

The text has been revised to indicate that three surface soil samples will be collected in each direction of surface run-off.

Comment 33

The text has been revised to indicate that two soil samples will be collected at one location. One will be a surface soil sample and the other will be a subsurface soil sample.

Comment 34

The base of the vaults are unknown and will be investigated in the field. Additionally, another soil sample has been added to the sampling program to investigate the second series of three vaults. Refer to Section 5.9.9.6 for a description of sampling at this SWMU.

Comment 35

The text has been revised accordingly to include samples at both SWMUs.

Comment 36

A figure (Figure 5-21) has been added to the Phase I RFI Work Plan. The number of soil samples is referenced in Section 5.10.1.

Comment 37

The figure has been updated to show the approximate locations of the areas noted in the text.

Comment 38

The text has been revised to include a discussion on sources of surface water entering the AOC.

Comment 39

Figure 5-25 and 5-26 have been added to the Phase I RFI Work Plan to depict Transfer Pipe spill release areas and sediment sample locations.

Comment 40

Figure 5-28 has been added to the Phase I RFI Work Plan to depict the possible locations of the abandoned underground piping.

Comment 41

Section 5.10.8 has been revised to describe sampling procedures.

Comment 42

The text has been deleted. A section of text has been added to describe the groundwater sampling from the capillary drain in for characterization of SWMU Group B.

Comment 43

The figure has been revised accordingly.

Comment 44

The figure has been revised accordingly.

Comment 45

The figure has been revised accordingly.

Comment 46

This table is deleted from the Phase I RFI Work Plan. They have been replaced by Table 1-1 in the QAPjP.

Comment 47

The soil sampling in this Phase I RFI Work Plan has been proposed in order to determine if releases from the SWMUs or the AOCs have taken place. Groundwater sampling is not warranted until

releases have been confirmed. The soil sample results will determine if the groundwater sampling network already in place at the facility will need to be expanded.

Comment 48

The criteria for the review of existing data is summarized within the QAPjP.

Comment 49

The Phase I RFI Work Plan has been revised to include Figure 7-1 and Appendix B - Resumes.

Comment 50

Figure 7-2 has been included.

Comment 51

The text has been revised accordingly.

Comment 52

Table 7-1 has been revised to include only the schedule for Phase I RFI activities.

Comment 53

The text has been revised to include a discussion on the Public Information Committee. This Committee has a responsibility to disseminate information to the public.

Comment 54

The information the repository will handle is included in Section 8.3. The facility contact is identified in Section 8.3.

Comment 55

The text has been revised accordingly.

NEW GENERAL COMMENTS

Comment 1

All efforts have been made to accurately state if the closures were approved and, if so, which agency was the approving agency.

Comment 2

Page 2-1 presents an explanation in the text.

Comment 3

Updated unit descriptions have been provided for the following SWMUs: 17, 18, 19, 24, 25, 26, 28, 32, 34, 36, 38, 39, 40, 46, 47, 48 and 49.

Comment 4

Changes to the text have been made accordingly within SWMUs 12, 13, 14, 15, 17, 18 and 19.

Comment 5

SWMU #53 - Closure Cell has been added as requested.

NEW GENERAL COMMENTS

Comment 1

The discrepancy has been resolved and in 1964 the first surface impoundment was constructed to specifically impound the wastes separated from the oils. Please refer to page 2-1.

Comment 2

See page 2-3 and 2-4 for additional text.

Comment 3

Additional information is provided on page 4-14.

Comment 4

Additional information is provided on page 5-3.

Comment 5

A discussion of the analytical results are provided on page 5-51 and 5-55.

Comment 6

Page 5-67 has been modified accordingly.

Comment 7

Page 5-81 has been modified accordingly.

Comment 8

A unit description of the horizontal holding tank is provided on page 5-88.

Comment 9

The waste flowed through drains in the floor to the sluice pit as described on page 5-95.

Comment 10

This was a previous error. The "unknown" has been stricken from the text within the description of each of these SWMUs.

Comment 11

The text has been modified to provide clarity. SWMU 39 or old FAT-2 containment is presently vacant but has been used in the past to provide secondary containment for FAT-2, which was moved to Pump House 4.

Comment 12

The text has been modified accordingly.

Comment 13

The text has been modified. The casing failure occurred at a depth of greater than 2,000 feet. No possible impact to groundwater occurred.

Comment 14

Table 5-1 has been modified.

Comment 15

Figure 5-1 has been modified to include note 2 which specifies which table names the SWMUs.

Chemical Waste Management, Inc.

3956 State Route 412
Vickery, Ohio 43464
419/547-7791

FEDERAL EXPRESS

August 21, 1995

U.S. Environmental Protection Agency
Region V
Attn: Mr. Thomas Matheson HRP-8J
77 W. Jackson Blvd.
Chicago, IL 60604-3590

Subject: Response to Comments - RCRA Facility Investigation (RFI) - Workplan
Vickery Facility, Chemical Waste Management, Inc.
EPA I.D. #OHD020273819

Dear Mr. Matheson:

In response to your letter dated June 26, 1995 received June 30, 1995, attached are our comments together with the amended pages for four (4) copies of the revised Workplan, comprising of new cover page and table of contents, new page 1, new sections 2 thru 9, new QAPjP, new and revised drawings, and new table 7-1, together with a binder for the new QAPjP. Please replace the amended pages and sections as directed in the index to replacement pages.

Copies have been sent to the Ohio Environmental Protection Agency as requested and a copy will be placed in the CWM Vickery Information Repository. Should you have any questions regarding this matter, please contact Michael Curry or Steve Lonneman at (419) 547-7791.

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

Sincerely,

CHEMICAL WASTE MANAGEMENT, INC.

F.G. Nicar
General Manager

FGN/tr
Attachments

Printed on recycled paper.

cc w/attachments: Edwin Lim - OEPA DHWM Columbus
Chuck Hull - OEPA NWDO Bowling Green
CWM Vickery Information Repository

JUN 26 1995

HRP-8J

CERTIFIED MAIL: P 847 326 244
RETURN RECEIPT REQUESTED

Fred G. Nicar, General Manager
Chemical Waste Management, Inc.
Vickery Facility
3956 State Route 412
Vickery, Ohio 43464

RE: **Notice of Deficiency (NOD)**
Chemical Waste Management, Inc. Vickery Facility (CWM-Vickery)
RCRA Facility Investigation (RFI) Workplan
OHD 020 273 819

Dear Mr. Nicar:

The United States Environmental Protection Agency (U.S. EPA) has reviewed CWM-Vickery's RFI Workplan prepared by RUST Environment & Infrastructure for the Chemical Waste Management facility in Vickery, Ohio, dated April 1995 and has determined it to be deficient. The U.S. EPA comments on the deficiencies of RFI Workplan have been divided into two sections: RFI Workplan comments and Quality Assurance Project Plan (QAPP) comments.

CWM-Vickery shall respond to both sets of comments by August 22, 1995. The modified RFI Workplan shall be prepared in accordance with the following editorial protocol or convention:

1. Old language is overstruck.

2. New language is capitalized.

3. Page headers must indicate date of submission.

4. If any significant changes are necessary, pages should be renumbered, table of contents revised, and complete sections provided as required.

5. An itemized list of all replacement pages, sections, tables, etc. that are to be replaced in the modified submission,shall be provided.

In addition to four copies of the modified submission required by the U.S. EPA, please send one copy of each to:

Edwin Lim Ohio EPA, DHWM P.O. Box 1049 1800 WaterMark Drive Columbus, OH 43266-0149	Chuck Hull Ohio EPA, NWDO 347 N. Dunbridge Rd. Bowling Green, OH 43402	CWM-Vickery Information Repository

If you have questions please contact me at (312) 886-7569.

Sincerely,

Thomas Matheson, Corrective Action Project Manager
RCRA Permitting Branch

cc: Ed Lim, OEPA/CO
Chuck Hull, OEPA/NEDO

HRP-8J:MATHESON:twm:6/01/95:6-7596: F:\USER\TMATHESO\CWMVICK\RFIWP_1.LTR

CONCURRENCE REQUESTED FROM RPB			
OTHER STAFF	RPB STAFF	OHIO SECTION CHIEF	RPB BRANCH CHIEF
	6/26/95		

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 5
COMMENTS ON THE CHEMICAL WASTE MANAGEMENT - VICKERY, INC.
RFI WORKPLAN
DATED APRIL 1995

The U.S. EPA has conducted a technical review of the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) Workplan for the Chemical Waste Management - Vickery, Inc. (CWM-Vickery), facility in Vickery, Ohio. The RFI workplan, dated April 1995, was prepared by RUST Environment & Infrastructure, Inc. (RUST), for CWM Vickery. The U.S. EPA reviewed the RFI Workplan for technical quality, accuracy, and conformance with the CWM-Vickery Federal RCRA permit Attachment II (RCRA Corrective Action Scope of Work) and U.S. EPA RFI guidance documents. The U.S. EPA's general and specific comments on the RFI Workplan are provided below.

Comments are presented below generally by section number, page number, and paragraph number. When paragraphs are cited, the first complete paragraph on a page is designated "Paragraph 1." If comments are made on a paragraph that carries over from a previous page, the incomplete paragraph is designated "Paragraph 0."

GENERAL COMMENTS

1. The approach for conducting the RFI includes reviewing existing groundwater and surface water data, in addition to collecting soil samples during Phase I of the RFI. Based on the analytical results and the review of existing data, monitoring wells may need to be installed and a Phase II investigation may need to be conducted. Groundwater sampling appears to be warranted for some solid waste management units (SWMU) and areas of concern (AOC), because the existing groundwater monitoring well network does not monitor SWMUs 12, 13, 14, 15, 17, and 21 through 52 or AOCs B, C, D, E, F, and H. The proposed approach will potentially lead to a Phase III investigation if all RFI objectives for determining the rate and extent of contamination are to be met. This approach will also delay the schedule for completing the RFI. CWM-Vickery should evaluate the existing data and revise the workplan accordingly in order to meet the objectives of the RFI and to complete the RFI in a timely manner.

2. The RFI workplan proposes analyzing samples for target compound list (TCL) and target analyte list (TAL) parameters. However, the workplan does not include a table listing the TCL and TAL parameters. Because this investigation is an RFI, samples should be analyzed for the parameters listed in Appendix IX of 40 Code of Federal Regulations (CFR) Part 264. The workplan should be revised globally to insert Appendix IX for TCL and TAL parameters. A table listing the appropriate parameters, the analytical methods for each parameter, and the detection limits for each parameter should be included in the workplan.

3. The RFI workplan does not include a figure that clearly identifies the surface water drainage patterns near all SWMUs and AOCs. The workplan should include a figure that identifies SWMU and AOC locations and uses arrows to indicate surface water flow directions. This information would be helpful in identifying potential sampling locations at SWMUs and AOCs and for determining potential off-site receptors.

4. The RFI workplan proposes collecting soil samples every 5 feet from the top of the SWMU to the termination of the borehole. However, at some SWMUs, the top of the SWMU, the depth of the clay fill and natural soil interface, or the depth to the groundwater interface in the lacustrine unit is not known with certainty. At SWMUs where the top of the SWMU, the clay and natural soil interface, or the groundwater interface is not known, continuous split-spoon soil sampling techniques should be used from the top of the borehole to determine from where the first investigative samples will be collected. The text should be revised accordingly, to include a contingency for continuous split-spoon soil sampling techniques. The text should also describe how the field screening program will be used for terminating boreholes.

5. The RFI workplan does not include a figure that shows the locations of the SWMUs and AOCs in relation to the monitoring wells that are included in the quarterly groundwater sampling efforts. The workplan should include a figure that clearly presents the locations of all SWMUs, AOCs, and monitoring wells at the facility. The direction of groundwater flow should also be presented in this figure. This information would be helpful in identifying groundwater data gaps.

6. The workplan only calls for soil sampling, but does not provide for groundwater sampling or evaluation. In the workplan, the glacial till is assumed to totally eliminate any downward migration of contaminants. The data that validate this assumption are presented in the Report on Current Conditions (ROCC) but are not included in the workplan. These data should be added to the workplan or appropriate sections of the ROCC should be referenced in the workplan to clarify the assumptions about the glacial till.

7. After reviewing the ROCC, the assumption of the continuous nature of the upper till may be valid. However, statements made in the workplan about the hydraulic properties are contradictory and, in some places, may be incorrect. In Section 3.2.2 (pages 8 and 9), the permeability of the upper till is given twice as 1×10^{-8} to 1×10^{-9} cm/sec (paragraphs 3 and 7), while in paragraph 4, permeability is given as 8.6×10^{-8} cm/sec (almost 10^{-7}) and as 2.4×10^{7} cm/sec in paragraph 2 of Section 3.3.3 (page 10). The workplan should be revised to state consistent and accurate hydraulic properties.

8. The values of 1×10^{-8} to $1. \times 10^{-9}$ cm/sec are extremely low, below most values reported for Wisconsinan Age glacial tills. There is no reference to where the extremely low values came from nor how they were measured, and if they are laboratory or field values. If such values were real, there should be discussion of possible fractures, which in material of this low conductivity would be highly likely.

9. The report also makes a statement of 100-year travel time through the till to the bedrock aquifer below. The March 1995 review of the ROCC addressed this issue and the till permeability values, but it appears the suggested changes were not made. The report and workplan should incorporate these changes.

10. The workplan should provide for an evaluation of "the nature and extent of releases, if any" (page 1 of the workplan). It clearly leaves out any evaluation of groundwater pathways. If there are sources in the sediment, there will be a groundwater pathway. The plan should address the whole problem.

SPECIFIC COMMENTS

The comments provided below refer to specific sections of the RFI workplan. Comments are presented below generally by section number, page number, and paragraph number. When paragraphs are cited, the first complete paragraph on a page is designated Paragraph 1. If comments are made on a paragraph that carries over from a previous page, the incomplete paragraph is designated Paragraph 0.

1. **Section 2.1, Page 4, Paragraph 3**. A map should be referenced that indicates the locations of the injection wells.

2. **Section 2.1, Pate 4, Paragraph 4**. A map should be referenced that identifies the locations of the 12 surface impoundments.

3. **Section 3.2.1, Page 7, Paragraph 3**. There is no discussion of the hydraulic characteristics for the bedrock geology, while in the glacial geology, there is some discussion included. The hydraulic properties are mentioned only in Section 3.3.2. Section 3.2.1 should also discuss hydraulic properties.

4. **Section 3.3.2, Page 10, Paragraph 1**. The text states that pumping the on-site truck wash well produces a radial flow pattern in the bedrock aquifer; however, the text does not include the radius of influence for the truck wash well. Also, the workplan does not include a figure that shows the direction of groundwater flow. The workplan should be revised to include this information.

5. **Section 3.3.2, Page 10, Paragraph 2**. This paragraph discusses the natural groundwater flow direction and gradient conditions in the bedrock aquifer. The text in this paragraph should be revised to include the direction of natural groundwater flow in the bedrock aquifer.

6. **Section 3.3.3, Page 10, Paragraph 4**. Apparently, the 100-year travel time here is based on a calculation in the ROCC. Are there any isotope or other supporting data to back up this claim?

7. **Section 5.2.5, Page 19, Paragraph 1**. This section discusses collection of quality control (QC) samples during the Phase I RFI field effort; however, matrix spike/matrix spike duplicate (MS/MSD) samples are not included in this discussion. However, EPA guidance requires that one MS/MSD sample be collected for every 20 investigative samples for each matrix. Therefore, the text and tables should be revised accordingly to include MS/MSD samples.

8. **Section 5.2.6.1.1, Page 19, Paragraph 4.** This section states that duplicate analyses will be performed for one out of every 20 investigative samples for each matrix. However, EPA guidance requires that duplicate samples be collected for one out of every 10 investigative samples for each matrix. Therefore, the text and tables should be revised accordingly.

9. **Section 5.2.6.1.2, Page 20, Paragraph 1.** The text states that rinsate blanks will be submitted at the rate of one for every 20 investigative samples for each matrix that is being sampled. However, EPA guidance requires that rinsate samples be collected for one out of every 10 investigative samples for each matrix. Therefore, the text and the tables should be revised accordingly.

10. **Section 5.5, Page 23, Paragraph 1**. The text discusses the area where equipment decontamination will be conducted and how decontamination derived liquids will be managed. However, no discussion is presented to describe the specific decontamination procedures that will be used or the frequency during which equipment will be decontaminated. The text needs to be revised to include a discussion of the decontamination procedures that will be used during the RFI field effort. Because, the text states that decontamination water will be disposed of in the injection well system, the text should also provide documentation indicating that the injection well system can accept the decontamination water under the facility's underground injection control (UIC) permit.

11. **Section 5.7.1, Page 24, Paragraph 2**. The text discusses procedures that will be used to collect subsurface soil samples; however, the sampling procedures to be used for collecting the volatile organic compound (VOC) aliquot for subsurface soils are not discussed. The text should be revised to specify the sampling procedures that will be used to collect the VOC sample. In accordance with comments made during the pre-quality assurance project plan (QAPP) meeting on January 17, 1995, nonconventional sampling methods will be proposed to minimize the loss of VOCs during the sampling event.

12. **Section 5.7.1, Page 24, Paragraph 2**. The text in this paragraph states that all samples will be screened using a photoionization detector (PID); however, the screening procedures that will be used are not specified. It is unclear whether the PID readings will be taken from the split-spoon samples, the mixing bowl, or a headspace screening jar. The text needs to be revised to include a detailed discussion of the PID screening procedures that will be used.

13. **Section 5.7.1, Page 24, Paragraph 4**. According to the text, soil cuttings will be put back into the borehole after the borehole has been completed. However, the text in this section should be revised to state that cuttings will not be put into the borehole, but instead that boreholes will be grouted through the augers using a tremie pipe after the borehole is completed. The text should also be revised to state that soil cuttings will be placed in drums and will be properly disposed.

14. **Section 5.7.1, Page 24, Paragraph 4**. This paragraph alludes to the methods used for borehole abandonment. The workplan should include a section that discusses borehole abandonment procedures in detail. Also, the management and disposal of investigation derived waste needs to be discussed in the text.

15. **Section 5.8.1, Page 26, Paragraph 2.** The text states that 32 soil samples will be collected from the former surface impoundments and refers to Figure 5-7. According to Figure 5-7, not all grid blocks within SWMUs 3 and 8 are proposed for sample collection. Based on the grid blocks, two additional soil samples need to be collected at SWMU 3 and two additional soil samples need to be collected at SWMU 8. The text and Figure 5-7 should be revised accordingly or documentation should be provided indicating why the grid blocks were omitted.

16. **Section 5.8.1, Page 27, Paragraph 1.** The text states that based on the results of the field screening, one soil sample will be collected from each borehole to be analyzed for VOCs and semivolatile organic compounds (SVOC). The text does not state the field screening criteria that will be used to select which sample will be submitted to the laboratory, such as the highest reading per borehole. Also, the text does not state the procedure to be used to collect soil samples if during the field screening, no VOCs are detected in any samples collected from a borehole. The text should be revised to provide more detail on the field screening criteria to be used for collecting soil samples. Finally, the text states that all samples collected from the borehole will be composited and sent to the laboratory for metal and pesticide/polychlorinated biphenyl (Pest/PCB) analyses. However, soil samples should not be composited from different depths, because if contamination is present, the compositing could dilute the sample concentrations to below levels of concern. Also, the exact depth from which the contamination occurred would not be able to be determined without conducting additional sampling. The text should be revised to indicate that discrete soil samples will be collected for metal and Pest/PCB analyses at the same interval as the samples to be analyzed for VOCs and SVOCs.

17. **Section 5.8.2, Page 28, Paragraph 0.** The text states that no soil samples will be collected from SWMU Group B because the units have been clean closed. Clean closure sampling is not always adequate for corrective action activities. The text must document that no contamination migrated outside of the unit that was clean closed. The text should be revised to propose that soil samples be collected if this documentation does not exist.

18. **Section 5.8.3, Page 28, Paragraph 2.** The text states that 26 soil samples are proposed to be collected for SWMU Group C and refers to Figure 5-8. According to Figure 5-8, two grid blocks were omitted east of SWMU 9. The text and Figure 5-8 should be revised accordingly or documentation should be provided to indicate why the two grid blocks were omitted.

19. **Section 5.8.3, Page 28, Paragraph 3**. This paragraph discusses collecting soil samples from SWMU Group C. The text indicates that soil samples will be collected at depths beginning at the former top elevation of the surface impoundments; however, the text in paragraph 1 states that SWMU 19, which is included in SWMU Group C, was located above or adjacent to the surface impoundments. Therefore, the text should be revised to state that samples will be collected at depths corresponding to the top of SWMU 19.

20. **Section 5.8.3, Page 29, Bullet 2**. The text in this bullet states that if evidence indicates that waste from the surface impoundments has migrated to a depth greater than 2 feet below the depth of the surface impoundments, the field sampling program will be modified to characterize the subsurface soil until field screening does not indicate the existence of any contaminants. This contingency should be added to sampling discussions for other SWMU groups and AOCs.

21. **Section 5.8.4, Page 30, Paragraph 2.** The text states that 32 soil samples are proposed to be collected for SWMU Group D and refers to Figure 5-9. According to Figure 5-9, one grid node was omitted from an area southwest of SWMU 12. The text and Figure 5-9 should be revised accordingly or documentation should be provided indicating why the grid node was omitted.

22. **Section 5.8.4, Page 30, Paragraph 3**. The text in this paragraph indicates that soil samples will be collected from SWMU Group D at an approximate depth of 2.5 feet below the clay cap/*in situ* soil interface. However, Section 5.2 of the report on current conditions indicates that soil from SWMU Group D was excavated and backfilled with clean fill. Therefore, samples should be collected from below the clean fill and natural soil interface. The text should be revised accordingly.

23. **Section 5.8.5, Page 31, Paragraph 2.** The text discusses soil sampling that is proposed for the three injection wells that may have leaked diesel fuel into adjacent soil as a result of casing failures. The text proposes collecting soil samples from above the groundwater interface and downgradient of each injection well. The text does not state the depths at which the casing failures occurred. However, the casing failures may have occurred at depths greater than 13 feet below ground surface (bgs), which is the approximate depth of the water table. If so, the proposed sampling depth will not define the rate and extent of contamination at these three injection wells. The text should provide additional justification for the proposed soil sample locations and depths. Also, if applicable, the text should explain why groundwater samples are not being collected from the geological formations that correspond to the locations where the casing failures occurred.

24. **Section 5.8.7, Page 34, Paragraph 5**. The text in this section discusses the soil sampling that will be conducted to characterize contamination at SWMU 27. The text states that two surface soil samples will be collected; however, the text in this section and in Section 5.2 of the report on current conditions states that in 1985, a spill occurred at

this SWMU and released contaminants through holes in the floor. Therefore, subsurface soil samples should be collected beneath the floor of this SWMU in order to define the rate and extent of contamination. The text should be revised to include collection of subsurface soil samples from SWMU 27.

25. **Section 5.8.7, Page 34, Paragraph 5.** The text states that two soil samples will be collected from SWMU 27 and that three soil samples will be collected from SWMU 30. However, Figure 5-12 shows only four soil sample locations around SWMUs 27 and 30. Figure 5-12 should be revised to be consistent with the text in Section 5.8.7.

26. **Section 5.8.7, Page 35, Paragraph 2.** The text in this section states that surface soil samples will be collected at SWMU 29; however, SWMU 29 formerly had underground pipes that led to the sluice pit. Therefore, to characterize contamination at SWMU 29, soil samples should be collected at a depth just below the depth of the former underground pipes and not at the surface. The text in the section needs to be revised accordingly.

27. **Section 5.8.7, Page 35, Paragraph 2.** The text in this section discusses soil sampling at SWMU 29; however, the discussion does not include the number of soil samples that will be collected. Therefore, the text should be revised to include the number of soil samples that will be collected.

28. **Section 5.8.8, Page 36, Paragraph 2.** The text proposes to collect surface soil samples from around each of the four active injection wells. The text does not explain how surface soil samples will be used to define the rate and extent of contamination from an injection well. In addition to the injection wells themselves, pipelines, transfer lines, and storage tanks that may be potential sources of spills at each injection well should be identified in the workplan and investigated during the RFI. Also, the text does not explain why groundwater samples are not being collected at the injection wells. The text should be revised to provide the rationale for proposed surface soil and, if applicable, groundwater sampling at the four active injection wells.

29. **Section 5.8.9.1, Page 37, Paragraph 3.** The text in this paragraph discusses the collection of soil samples at SWMU 15. The text indicates that samples will be collected from grid nodes and from random locations; however, the text does not clearly state how many samples will be collected from each sampling location or the depths from which the samples will be collected. The text in this section should be revised to clearly indicate how many samples will be collected from each sampling location and at what depths those samples will be collected.

30. **Section 5.8.9.2, Page 38, Paragraph 1.** The text in this paragraph discusses the collection of soil samples from SWMU 20. The text states that one soil sample will be collected from below the base of the

concrete vault; however, the text does not provide the depth of the concrete vault, the total depth of the borehole, or the depth at which the sample will be collected. Therefore, the text should be revised to include this information.

31. **Section 5.8.9.3, Page 38, Paragraph 4.** The text states that one subsurface soil sample will be collected in each direction around the unit. This would indicate that a minimum of four subsurface soil samples will be collected. However, Figure 5-16 shows only one soil sampling location. The text, tables, and Figure 5-16 should be revised to indicate that a minimum of four subsurface soil samples will be collected from around SWMU 28.

32. **Section 5.8.9.4, Page 39, Paragraph 1.** The text states that one surface soil sample will be collected in the direction of surface water runoff. However, Figure 5-17 indicates that surface water runoff flows radially from SWMU 41. The text, tables, and Figure 5-17 should be revised to indicate that a minimum of four surface soil samples will be collected from around SWMU 41.

33. **Section 5.8.9.5, Page 39, Paragraph 3.** The text states that one surface soil sample will be collected to confirm that no residual contamination remains at SWMU 42. However, Figure 5-18 indicates that two surface soil samples will be collected. The report on current conditions indicates that SWMU 42 was an aboveground tank. To confirm that no residual contamination remains, both surface and subsurface soil samples should be collected. The text, tables, and Figure 5-18 should be revised to include both surface and subsurface soil samples at SWMU 42.

34. **Section 5.8.9.6, Page 40, Paragraph 1.** This paragraph states that one soil sample will be collected from beneath the base of the vault in the downgradient direction of groundwater flow at SWMU 43. However, the total depth of the borehole and the depth of the vault are not indicated. Also, Figure 5-19 indicates that five vaults are found at SWMU 43. Additional soil samples should be collected to characterize soil conditions downgradient of all five vaults. The text, tables, and Figure 5-19 should be revised to include the additional soil samples to be collected at SWMU 43. The depth of each vault and the proposed depths for sample collection should also be included.

35. **Section 5.8.9.7, Page 40, Paragraph 3.** The text in this paragraph describes collection of soil samples from SWMUs 44 and 45. The text states that the sample collected from SWMU 45 will be used to determine if contamination exists at SWMU 44; however, this practice is not acceptable because the SWMUs are located about 500 feet apart. Samples should be collected either from off the asphalt surface in the direction of surface water flow or from downgradient of SWMU 44, depending upon the type of release that may have occurred. The text should be revised accordingly.

36. **Section 5.9.1, Page 41, Paragraph 1**. This section describes the method for collecting soil samples at AOC A. A figure should be included in this section to show the location of the maintenance tanks. The figure and the text should clearly indicate from which maintenance tanks samples will be collected under the RFI.

37. **Section 5.9.2, Page 41, Paragraph 3.** The text states that two soil samples will be collected at AOC B from locations where seven roll-off boxes and 100 small drums were formerly stored. However, the text does not indicate the size of these areas and Figure 5-21 does not show their locations. The size of these areas should be indicated in the text and in Figure 5-21 in order to evaluate whether two soil samples are adequate to characterize these areas.

38. **Section 5.9.5, Page 43, Paragraph 1.** The text states that AOC E collects surface water runoff and no samples are proposed to be collected. The text does not state from what parts of the facility the surface water comes and whether or not the surface water may be contaminated. The text should be revised to provide documentation that contaminated surface water runoff cannot enter AOC E. If this documentation does not exist, surface water or sediment sampling should be proposed for AOC E.

39. **Section 5.9.8, Page 44, Paragraph 2.** The text states that one sediment sample will be collected from Meyers Ditch to characterize the sediments for past releases that migrated to Meyers Ditch from aboveground pipelines. To characterize the extent of sediment contamination in Meyers Ditch, additional sediment sampling should be proposed in the text and tables. Also, a figure should be included to show the proposed sampling locations for AOC H to evaluate whether one soil sample is adequate per transfer pipeline leak location.

40. **Section 5.9.9, Page 44, Paragraph 5**. The text in this section describes collection of soil samples at AOC I. A figure should be included and referenced in this section to show the approximate location of the underground piping.

41. **Section 5.9.9, Page 45, Paragraph 2**. The text in this section describes collecting soil samples from AOC I. The text states that two grab samples will be collected from each test pit that uncovers buried lines; however, the rationale for the proposed sample locations and sample depths is not given. Therefore, the text should be revised to include the rationale for locations where soil samples will be collected.

42. **Section 5.10, Pages 45 - 52** . This section, a review of groundwater quality, provides only a description of the monitoring system. There are no results or discussion of groundwater quality. This section provides little benefit to the report.

43. **Figure 5-21**. This figure presents the proposed soil sampling locations at AOC B. The figure should be revised to indicate the physical boundaries of AOC B.

44. **Figure 5-22**. This figure presents the proposed soil sampling locations at AOC C. The figure should be revised to indicate the physical boundaries of AOC C.

45. **Figure 5-23**. This figure presents the proposed soil sampling locations at AOC F. The figure should be revised to indicate the physical boundaries of AOC F.

46. **Tables 5-1 and 5-2**. Tables 5-1 and 5-2 do not include duplicate, rinsate, or MS/MSD samples that will be collected during the RFI. Tables 5-1 and 5-2 should be revised to include duplicate, rinsate, and MS/MSD samples. Also, the tables should be revised to include the additional samples that were recommended above in Specific Comments 3, 4, 5, 11, 12, 13, 14, 17, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31, 32, 33, 34, 35, and 37.

47. **Section 7.1, Page 58, Paragraph 4, Bullet 2**. The text states that one of the objectives of the RFI is to determine the nature and extent of groundwater contamination, if any. However, the workplan only proposes to review existing groundwater data at this time. The current groundwater monitoring network at the facility does not provide data for all SWMUs and AOCs at the facility (see General Comment 1). Thus, the existing data will not determine the nature and extent of groundwater contamination at these SWMUs and AOCs. The workplan, as written, does not meet this RFI objective. To fill these groundwater data gaps, CWM-Vickery should have previously evaluated the existing groundwater data, determined data gaps, and proposed additional monitoring wells as part of the RFI. CWM-Vickery's approach is delaying the RFI process and will lead to Phase II and Phase III investigations. The workplan should be revised to include groundwater sampling at all SWMUs and AOCs where data gaps exist.

48. **Section 7.2, Page 60, Paragraph 0**. The text in this section states how existing groundwater data will be evaluated; however, the text does not include well construction or well integrity as a criterion for evaluation. The text should be revised accordingly.

49. **Section 7.4, Page 61, Paragraph 1**. The text states that the overall project management organization for this RFI is shown in Figure 7-1. However, Figure 7-1 is not included in the workplan. Also, the workplan does not include the resumes of all key staff, including technicians, who will be working on the RFI. Finally, the workplan does not include any information on subcontractors who will be working on the RFI. The workplan should be revised to include descriptions of the work experience and resumes of all key staff and subcontractors who will be working on the RFI. Also, Figure 7-1 should be included in the workplan.

50. **Section 7.5, Page 62, Paragraph 1**. The text states that all daily site activities will be recorded on a daily report form that is shown as Figure 7-2. However, Figure 7-2 is not included in the workplan. Figure 7-2 should be included in the workplan.

51. **Section 7.6, Page 63, Paragraph 1**. The text states the Rust Project Manager will prepare and submit status reports to the CWM Project Manager on a monthly basis, but fails the identify U.S. EPA Corrective Action Project Manager as receiving the monthly report. CWM-Vickery shall revise the text to clearly state that the U.S. EPA Corrective Action Project Manager shall receive monthly status reports from the CWM Project Manager.

52. **Table 7-1.** The schedule in Table 7-1 does not include a time frame for a Phase II investigation that may include monitoring well installation and groundwater sampling. Table 7-1 should be revised to include a time frame for groundwater sampling as part of a Phase I or II investigation.

53. **Section 8.0, Page 64, Paragraph 1.** The public involvement plan does not include any information on public notices that will be issued or public meetings that will be held during key points in the RFI process. Also, the plan does not explain the mechanism that will be used to distribute fact sheets to the public. The text should be revised to include information on the public notices that will be issued and the public meetings that will be held during key points in the RFI process. Also, the text should be revised to include the mechanism that will be used for distributing fact sheets to the public.

54. **Section 8.3, Page 65, Paragraph 1**. The text states that all U.S EPA approved reports pertaining to the RFI will be in the repository. The information repository shall include, at a minimum, all correspondence, draft documents and reports, sampling results, copies of news releases and clippings referring to the site, fact sheets, public involvement plan, and any other relevant material pertaining to the corrective action process at CWM-Vickery. The existence of the repository shall be publicized by CWM-Vickery. The repository shall be updated by sending new or revised documents as they are generated. This section should also identify a facility contact responsible for the information repository.

55. **Section 9.1, Page 67, Bullet 1.** The text states "Information will be provided on the nature and horizontal and vertical extent." The text should state that information will be provided on the nature and horizontal and vertical extent of contamination to soil, groundwater, surface water, sediment, and air from the facility. Also, the text should discuss the potential impact to all receptors. The text should be revised accordingly.

END OF RFI WORKPLAN COMMENTS

TECHNICAL REVIEW COMMENTS ON THE QUALITY ASSURANCE PROJECT PLAN FOR THE RCRA FACILITY INVESTIGATION AT THE CWM-VICKERY FACILITY

The U.S. EPA, reviewed the quality assurance project plan (QAPP) for the Resource Conservation and Recovery Act (RCRA) facility investigation (RFI) at the Chemical Waste Management facility in Vickery, Ohio, (CWM-Vickery). The QAPP was prepared by CWM-Vickery's consultant, Rust Environment & Infrastructure, Inc. (Rust), and was submitted to the U.S. Environmental Protection Agency (EPA) Region 5 in April 1995.

The QAPP contains extensive deficiencies, inaccuracies, and inconsistencies. Because these deficiencies, inaccuracies, and inconsistencies are so extensive, only examples of these issues are presented in the general and specific review comments provided below. These examples should not be considered the only portions of the QAPP that need revision. The QAPP should be thoroughly revised in accordance with the U.S. EPA Region 5 Model RCRA QAPP (Model QAPP) dated May 1993. The QAPP should be revised to be a stand-alone, project-specific document, except that the field sampling plan (FSP) may be used to present sampling procedures (see Section 4 of the Model QAPP). In addition to the Model QAPP and FSP, U.S. EPA's comments that were discussed during the pre-QAPP meeting on January 17, 1995, and the U.S. EPA letter discussing proposed SWMU/AOC grouping and project objectives, dated April 1995, were used to evaluate the adequacy of the QAPP.

GENERAL COMMENTS

1. The project objectives presented in Section 1 of the QAPP do not contain sufficient details. Because of this, it is difficult to evaluate the adequacy of the proposed sampling and analysis program. Individual project objectives should be presented for each solid waste management unit (SWMU) group and area of concern (AOC). These objectives should clearly identify each sample matrix to be investigated, field parameters, laboratory parameters, specific action levels to which results will be compared and actions to be taken based on these comparisons.

2. Section 1 of the QAPP proposes collecting only soil and sediment samples and does not provide adequate rationale for not collecting groundwater samples. This approach seems to be inadequate for accomplishing the overall project objectives of verifying and further defining the nature and extent of contamination, as stated in Section 1 of the QAPP. As discussed during the pre-QAPP meeting, the QAPP must state whether it is an objective to determine the extent of the groundwater plume or to merely confirm the existence of the plume. In either case, the QAPP should be revised to include groundwater sampling or to thoroughly explain how the project objectives will be accomplished without collecting groundwater samples.

3. The QAPP does not clearly or logically describe the proposed phased approach to the RFI. Although Section 1.1.2 briefly describes proposed Phase II activities, this phase is not specifically addressed in other sections of the QAPP. For example, it is not clear whether the sampling

and analytical quality control (QC) procedures described in the QAPP apply to all RFI phases or just to Phase I. The revised QAPP should clearly describe and justify the respective QAPP elements that apply to each phase of the RFI, and should further explain whether a separate QAPP will be submitted for Phase II or if the QAPP under review is applicable to both phases.

In addition, Section 1.1.2, page 3 of 14, paragraph 3 states that additional RFI Phase II activities may include installing additional monitoring wells and conducting a detailed groundwater investigation. It appears that the need for collecting additional groundwater data during Phase II will be based on a review of existing groundwater data gathered during Phase I. However, reviewing existing data is not a field activity that is covered by a QAPP. Existing data should be reviewed <u>before</u> Phase I activities to determine whether additional groundwater data should be collected <u>during</u> Phase I. This determination should be discussed in the QAPP.

The QAPP also includes treatability studies and pilot testing as possible Phase II activities. However, these activities typically provide data that is used for corrective measures and is typically beyond the scope of an RFI.

4. The QAPP does not clearly explain the intended use of RFI data. For example, Section 1.4.2, page 12 of 14, paragraph 2 indicates that "data shall be compared to background soil levels, or to measured detection limits and other (low level) health based criteria." However, the QAPP does not quantitatively identify detection limits, background soil levels, and other low-level, health-based criteria. These action levels should be identified for each target analyte and sample medium. The revised QAPP should describe the process used to determine background soil levels and should reference the source of any "health based criteria" that will be used for this RFI. This information should be provided to demonstrate that background soil levels will represent appropriate action levels for this project. The QAPP should also specify how comparisons of RFI data with all action levels or data quality levels will affect decisions regarding future corrective actions at specific SWMUs and AOCs.

The intended use of existing groundwater data is not addressed. As discussed during the pre-QAPP meeting, after existing groundwater data is validated, its intended use must be addressed. In particular, the QAPP should quantitatively identify groundwater action levels and compare existing groundwater data with these action levels. If existing groundwater data is inadequate for determining corrective actions, then the revised QAPP should describe in detail how and where additional groundwater data will be collected.

In addition, the QAPP should demonstrate that the data quality will be sufficient for the data's intended use. To demonstrate this, the QAPP should show that the type and amount of QC (such as reporting limits, QC check samples, control limits, and data deliverables) applied to

groundwater and soil data will be adequate for the intended use of the data. For example, a greater amount of QC should be applied to data collected for risk assessment purposes than to data collected for screening purposes.

5. The QAPP proposes to use existing data along with data generated during the RFI to make decisions about further corrective actions at the facility. For example, Section 1.1.2, page 3 of 14, paragraph 2 states that Phase I RFI data will be evaluated in conjunction with existing data to determine whether additional investigation is necessary. However, the QAPP contains no quantitative summary of the existing data. The QAPP should include a summary of existing data and a discussion of the level of QC associated with data collection. Moreover, CWM-Vickery should demonstrate that the level of QC associated with any existing data that will be used for corrective action decision making is equivalent to the level of QC associated with the data that will be generated during the RFI.

6. The Model QAPP provides generic language, but clearly states that generic language should be deleted and replaced with pertinent, site-specific information. The CWM-Vickery QAPP includes large sections of generic language that is taken verbatim from the Model QAPP. However, much of this generic verbatim text is not applicable to the CWM-Vickery RFI. Examples of inapplicable generic text that is used in the CWM-Vickery QAPP include the following:

   - Table of Contents. The header listed in the table of contents of the CWM-Vickery QAPP labels the document as the "Region 5 Model QA Project Plan" dated May 1993.

   - Section 1.4, Page 11 of 14, Paragraph 1. Generic language copied in this paragraph refers to "RI/FS activities," but the CWM-Vickery QAPP is for RFI activities.

   - Section 1.5.2, Page 13 of 14, Paragraph 4. This entire paragraph is copied verbatim from the Model QAPP and states that maps showing surface water sampling locations and locations of monitoring and residential wells to be sampled are included in the QAPP. However, surface water and groundwater from monitoring wells and residential wells are not matrices that are to be sampled during the CWM-Vickery RFI.

   - Section 3.6, Page 5 of 5, Paragraph 1. Generic language copied in this paragraph discusses collection of aqueous matrix spike and matrix spike duplicate (MS/MSD) samples, but no aqueous samples are proposed to be collected for the RFI.

   - Section 6.2, Page 2 of 2, Paragraph 1. The text refers to the "Appendix to this Model QAPjP."

- In several locations throughout the document, generic language that is copied verbatim from the Model QAPP refers to standard operating procedures (SOP) and their contents. The appendix to the CWM-Vickery QAPP does not include SOPs, but instead includes site-specific practices (SSP). The text should be revised to use consistent terminology.

7. Many SOPs consist of photocopies of specific SW-846 Methods such as Methods 8080A, 8270A, 8260A, and 6010A, and the 7000 series for metals. As stated in item 3 of the "Dos and Don'ts to Facilitate QAPP Approval" of the Model QAPP, this practice is not acceptable. The QAPP should include text that details sample preparation and analysis SOPs demonstrating how CWM Riverdale National Laboratory will implement each project-specific method. These SOPs should contain all 14 elements listed in the Model QAPP, "Guideline for the Preparation of Standard Operating Procedures." These elements include method detection limits and precision and accuracy control limits that CWM Riverdale National Laboratory is capable of achieving for each project-specific parameter and sample medium.

   In addition, the SSPs do not include all of the information referred to in the text when a reference to an SOP is made. In particular, the following references to SOPs and their contents were specified in the CWM-Vickery QAPP based on generic text that was copied verbatim from the Model QAPP, but the referenced information was not included in the SSPs:

   - Section 3.1.3, Page 1 of 5. Precision control limits
   - Section 3.2.3, Page 2 of 5. Accuracy control limits
   - Section 6.2, Page 2 of 2. Calibration procedures, calibration frequency, acceptance criteria, and the conditions that will require recalibration
   - Section 7.1, Page 1 of 1. Sample preparation, cleanup, and analysis
   - Section 8.1, Page 1 of 2. Minimum laboratory QC requirements
   - Section 11.1, Page 1 of 1, Paragraph 1. This paragraph states verbatim from the Model QAPP that field equipment for this project includes thermometers, pH meters, and conductivity meters, and later lists spare parts needed for these instruments; however, the only field equipment discussed in the FSP and elsewhere in the QAPP is a photoionization detector (PID).
   - Section 13.2, Page 3 of 3. Conditions that automatically trigger corrective actions or optional procedures

8. As specified in the Model QAPP, Revision 0 should be identified on the title page and on each page header throughout the document.

SPECIFIC COMMENTS

The comments provided below refer to specific sections of the QAPP. Referenced sections of the QAPP are identified by section, page, paragraph, and line number, as appropriate. When paragraphs are cited, the first complete paragraph on a page is designated as "Paragraph 1." If comments are made on a paragraph that carries over from a previous page, the incomplete paragraph is designated as "Paragraph 0." When line numbers are cited, they refer to the line numbers of the paragraph cited.

1. **Title and Approval Page**. To comply with the requirements of the Model QAPP, this page should include the names of all individuals who will approve the QAPP, such as the Rust project manager and quality assurance (QA) officer and the CWM Riverdale National Laboratory QA manager. In addition, all dated signatures should be present except for those of EPA personnel.

2. **Table of Contents**. The list of appendixes at the end of the table of contents should identify the contents found in the appendix (for example, titles of individual SOPs contained in the appendixes). Following the list of appendices, a list of tables or figures should be presented. After these lists, a complete list of recipients of the QAPP should be provided.

3. **Section 1.1.1, Page 2 of 14, Paragraph 2, Bullets 1 and 2**. The project objectives state that data will be compared to state and federal regulatory criteria and provide examples of criteria that may used to conduct the comparison. However, specific criteria for individual parameters are not provided. The objectives should refer to a table that provides action levels for each target parameter.

4. **Section 1.1.1, Page 2 of 14, Paragraph 2, Bullet 1**. This bullet states that an objective of data collection will be to "verify and further define the nature and extent of contamination in previously identified on-site and off-site areas." However, the QAPP and FSP do not discuss any off-site sampling activities. This objective should be revised accordingly.

5. **Section 1.1.1, Page 2 of 14, Paragraph 2, Bullet 2**. This bullet states that one of the objectives of data collection is to determine the nature and extent of contamination in previously uninvestigated areas. However, it is not clear where these areas are located in relation to areas that have been investigated. The revised QAPP should include a figure that (1) identifies and distinguishes areas that were previously investigated from areas that were not, and (2) shows the locations of all SWMUs and AOCs within these areas.

6. **Section 1.1.2, Page 3 of 14, Paragraph 0, Bullet 1**. This bullet states that surface soil samples will be collected from depths of 0 to 18 inches, but the FSP states that surface soil samples will be collected from depths of 0 to 2 feet. This discrepancy should be resolved and the text revised accordingly.

7. **Section 1.1.2, Page 3 of 14, Paragraph 1**. This paragraph refers to "a limited number of samples" that will be analyzed for soil physical parameters. The exact number of samples to be analyzed for these parameters and the criteria used for selecting samples for these analyses are not discussed further in the QAPP or in the FSP. The text should be revised to include this information.

8. **Section 1.1.2, Page 3 of 14, Paragraph 2**. This paragraph states that Phase I data will be evaluated qualitatively and statistically in conjunction with existing data to determine the need for additional investigation. This paragraph should include details on what statistical procedures will be used to evaluate data and what results will trigger the need for additional investigation. Also, the text should state that data will be evaluated "quantitatively" rather than "qualitatively."

9. **Section 1.2.1, Page 4 of 14, Paragraph 3**. This section briefly discusses the location of the CWM-Vickery facility. The Model QAPP calls for further information that was not presented, including the location of streets, rivers, and property bordering the facility, as well as the proximity of nearby large cities. This information should be provided; or, if it is provided in the RFI Workplan, the specific section of the workplan should be referenced.

10. **Section 1.3.1, Pages 5 and 6 of 14**. This section discusses the general history of the CWM-Vickery facility and refers to approvals granted to inject waste into subsurface wells and to construct a Toxic Substances Control Act (TSCA) closure cell. The text should specify the agency that granted these approvals and should include the date when the approval was granted.

    This section refers to site features including injection wells and surface impoundments. A site layout figure that shows the locations of these features should accompany this section.

    This section discusses the disposal of wastes in injection wells, surface impoundments, and a TSCA closure cell, and the closure of surface impoundments. This section should also discuss the types of wastes previously disposed of and the cleanup levels applied during closure of the surface impoundments.

11. **Section 1.3.1, Page 6 of 14, Paragraphs 1 and 3**. Paragraph 1 states that all of the 12 surface impoundments were closed between 1979 and 1992. However, paragraph 3 specifies that the Ohio Environmental Protection Agency (OEPA) certified five surface impoundments to be

clean-closed. The revised QAPP should include the dates of closure of the other seven surface impoundments and whether OEPA approved the closures.

12. **Section 1.3.1, Page 6 of 14, Paragraph 2**. This paragraph states that landfarming activities and operation of an oil recovery facility were used to treat, store, and dispose of wastes. This paragraph should also discuss whether these units were permitted. If so, the agency granting the permit, the permit number, and the date when the permit was issued should be provided. If these units have been closed, this paragraph should discuss the closure and whether it was approved.

13. **Section 1.3.2.1, Page 7 of 14, Paragraph 1**. This paragraph refers to a permit issued in December 1981. The text should state the type of permit issued and the issuing agency.

14. **Section 1.3.2.1, Page 7 of 14, Paragraph 2**. The text states that "most of the parameters" were found to be below federal drinking water standards during a statistical analysis of groundwater quality data. The text should state specifically for what parameters analyses were performed.

15. **Section 1.3.2.2, Page 8 of 14, Paragraph 0**. This paragraph states that the results of additional and continuing studies from a 1983 geological review were to be presented when they were available. Due to the amount of time that has elapsed since the 1983 review, these results should be available and should be briefly discussed in text. Documents containing the complete results should also be referenced. If results are still unavailable, this should be stated clearly and the reason the results are not available should be explained.

16. **Section 1.3.2.3**. This section presents a summary of hydrogeological conditions; however, the information presented is inconsistent or deficient in some places. Examples of such inconsistencies and deficiencies include the following:

    - Bullet 1 states that the site is underlain by 40 to 50 feet of lacustrine clay and glacial till overburden. Bullet 3 states that the "confined aquifer and potentiometric surface is about 10 ft. to 15 ft. below ground surface." These statements present conflicting information regarding the depth of the confined aquifer.

    - Bullet 3 states that the water table in the overburden "is close" to the ground surface and that the overburden has a "very low" hydraulic conductivity. Both the depth to the water table and the hydraulic conductivity should be quantified.

    These inconsistencies and deficiencies in the text should be resolved. In addition, a cross-sectional drawing should be provided to further clarify the site hydrogeology.

17. **Section 1.3.2.3, Page 9 of 14, Paragraph 1**. This paragraph states that the groundwater flow in the overburden is "generally downward." Text on the previous page states that the overburden is generally 40 to 50 feet thick and that the water table in the overburden is close to the ground surface; therefore, it seems likely that the groundwater in the overburden would have a horizontal component to its flow direction. This horizontal direction should be stated or its absence should be further explained.

18. **Section 1.3.3, Pages 9 and 10 of 14**. The introductory paragraph to this section states that it will discuss target compounds; however, no target compounds are specifically identified. In particular, "a VOC" is referred to in paragraph 2 on page 10, and "hazardous waste" and "waste pile leachate" are referred to in paragraph 3 on page 10. The specific volatile organic compounds (VOC) and the hazardous constituents in the waste and leachate should be stated.

19. **Section 1.3.3, Page 9 of 14, Paragraph 2, Bullet 1**. This paragraph discusses releases of liquid wastes to soil and groundwater and states that the releases had little effect on the groundwater because of the low permeability of the clay soil and because many of the releases were immediately treated with lime and the contaminated soil was removed. The rationale for stating that the releases had little effect on soil is not adequately supported by data. The permeability of the soil should be stated quantitatively, and other data, such as rainfall data and the results of confirmatory sampling, should be provided.

20. **Section 1.3.3, Page 10 of 14, Paragraph 0, Bullet 2**. This paragraph discusses several large releases of liquid hazardous waste to both Little Raccoon Creek and Meyers Ditch and refers to "other releases" to surface water. The text also recommends analyzing stream bed sediments to characterize this medium. Although collecting one sample from Meyers Ditch is specified in the FSP, collecting samples of Little Raccoon Creek sediment is not specified in the QAPP or the FSP. The QAPP states that "subsequent testing of the creek [Little Raccoon Creek] water showed little contamination present." However, this statement implies that a water sample was collected but a sediment sample was not collected. Further, the action levels to which the data were compared are not provided. The QAPP should provide further information to justify why a sediment sample was not collected from Little Raccoon Creek; otherwise, this should be specified as a sampling location in the FSP. In addition, the name of the surface water body that received the "other releases" should also be specified, and, if other than Meyers Ditch or Little Raccoon Creek, sampling of this surface water body should also be specified.

21. **Section 1.4, Page 11 of 14, Paragraph 5**. This paragraph states that soil and sediment samples will be collected "at several of the SWMUs and all of the AOCs." These SWMUs and AOCs should either be listed in the text or the text should reference Table 5 of the QAPP. In addition, the FSP should be referenced for more information on the SWMUs comprising each SWMU group and the AOCs.

This paragraph also states that sediment and soil samples will be analyzed for target compound list (TCL) and target analyte list (TAL) compounds using appropriate EPA methods, and that the list of compounds is included in Tables 1 through 4 in Appendix A. However, these tables are not found in Appendix A. The individual analytes, their method detection limits (MDL), and the corresponding EPA analytical methods and laboratory-specific SOPs should be provided in the appendix. The rationale for including these analytes as parameters for this project should also be provided.

22. **Section 1.4.2.1, Page 12 of 14**. This table in this section identifies the field parameter as "quantitative screening with photoionization detector," but does not indicate the parameter that will be measured by the PID. This section should state that the PID will measure organic vapors. In addition, Table 5 in Appendix A of the QAPP states that the PID will be used for qualitative screening of soil samples. The PID measures organic vapors but does not provide a direct quantitative measurement of individual VOC concentrations in soils. Therefore, the text should be revised so that it is consistent with Table 5 in Appendix A, which correctly states that the PID will be used for qualitative screening of soil samples.

23. **Sections 1.4.2.1 and 1.4.2.2, Page 12 of 14**. Both of these sections list soil as the only sample matrix, but sediment is discussed as another sample matrix on the preceding page of the QAPP and in the FSP. Although these are considered to be the same medium for analytical purposes in the laboratory, they are distinct sample matrices for the RFI. Therefore, sediment should be included as a separate sample matrix in these sections.

24. **Section 1.4.2.2, Page 12 of 14**. Pesticides and polychlorinated biphenyls (PCB) are not included in the list of parameters in this section. However, paragraph 1 on page 3 of 14, Section 1.1.2, states that samples will be analyzed for pesticides and PCBs among other analytes; and Table 5 of Appendix A includes pesticides and PCBs as a laboratory parameter. In addition, Section 1.1.1 includes TSCA rules for PCBs as an example of pertinent federal regulatory criteria, and Section 1.3.1 discusses a TSCA closure cell located at the site. Lastly, Appendix A includes an analytical method for pesticides and PCBs. Therefore, this section should include pesticides and PCBs as laboratory parameters or their omission should be explained.

25. **Section 1.4.3, Page 13 of 14, Paragraph 1**. This section states that analytical data quality level 3 will be used for this project. As stated during the pre-QAPP meeting in January 1995, all references to data quality objective (DQO) levels should be deleted because EPA has determined that they are no longer relevant.

    This paragraph also states that the main purpose of data collection is to determine the existence of contamination that remains from past releases on site. However, Section 1.4.1 states that a confirmational level of data quality is needed for the purpose of risk assessment,

evaluation of remedial alternatives, and establishment of cleanup levels. The last statement is more consistent with the purpose of the RFI stated in Section 1.1.1. All references to analytical data quality and data purposes should be revised to be consistent.

26. **Section 1.5.2, Page 13 of 14, Paragraph 4**. This paragraph states that some of the proposed sampling locations could be changed depending on the nature of encountered field conditions. The text should be revised to provide examples of such conditions.

27. **Section 1.6.1, Page 14 of 14, Paragraph 2**. This paragraph provides dates during which field activities are scheduled to begin. The text should reflect that the beginning of field activities is contingent upon EPA approval of the RFI workplan. This section also refers to a task bar chart that was submitted with the QAPP; however, this figure was not included in the QAPP. This figure should be provided.

28. **Section 2.1, Page 1 of 7, Paragraph 2**. This paragraph refers to an organization chart that is "in Section 5.0 of Figure 7-1 of the RFI Workplan"; however, this figure was not included in Section 5.0 or any other section of the RFI. An organization chart that includes the names of and lines of authority between key project personnel should be included in Section 2.1 of the revised QAPP.

29. **Section 2.2, Page 1 of 7, Paragraph 4**. This section states that the CWM-Vickery project manager will report directly to the EPA Region 5 RCRA Permit Writer (RPW)/RCRA Project Coordinator (RPC)/State Project Manager. This text is taken verbatim from the Model QAPP. If the CWM-Vickery manager will not be reporting to the state project manager, therefore, reference to the state project manager should be deleted.

30. **Section 2.4, Page 3 of 4**. An address of the laboratory, where the RFI samples will be sent, shall be provided.

31. **Section 2.4, Page 4 of 7, Paragraph 2, Bullet 4**. This bullet states that the CWM Riverdale National Laboratory QA officer will determine whether to implement laboratory corrective actions. The text should clarify whether the QA officer is also responsible for formally approving corrective actions.

32. **Section 2.4, Page 4 of 7, Paragraph 2, Bullet 7**. This bullet states that the laboratory's QA officer is responsible for signing the title page of the QAPP. Signing the title page indicates that the signee approves of the QAPP; therefore, the text should also mention that the laboratory QA officer is responsible for approving the QAPP.

33. **Section 2.5, Page 6 of 7, Paragraph 1; and Page 7 of 7, Paragraph 1**. These paragraphs discuss the responsibilities of the on-site laboratory manager and lab staff. The headings to these paragraphs end with the phrase "[if applicable]" as shown in the Model QAPP. It should already be established whether an on-site laboratory will be used. Based on the

laboratory parameters to be analyzed for, it does not seem likely that an on-site laboratory will be used. If this is the case, then these paragraphs should be deleted along with the reference to field laboratory staff in the first bullet at the top of page 6 of 7. If, however, an on-site laboratory will be used, the phrase "[if applicable]" should be deleted from the headings to these paragraphs and the text should state the laboratory parameters that will be analyzed for at the on-site laboratory.

34. **Section 3.0**. This section, which discusses QA objectives, does not provide a project-specific description of QA objectives. As noted in the general comments, this section also contains extensive generic text from the Model QAPP. In addition, QA objectives for sediment samples are not discussed in Section 3.0. This section should provide QA objectives for all project-specific field and laboratory target parameters and sample matrices.

35. **Section 3.1.2, Page 1 of 5, Paragraph 3**. This paragraph states that field duplicates will be collected at a frequency of one duplicate per 10 analytical samples. However, the FSP states that the frequency of collecting field duplicates will be one for every 20 analytical samples. This discrepancy should be resolved and the text should be revised accordingly.

36. **Section 3.1.2, Page 1 of 5, Paragraph 3; and Section 3.2.2, Page 2 of 5, Paragraph 2**. These sections discuss field precision and accuracy through the collection and measurement of QA/QC samples to be analyzed in the laboratory. These sections should also discuss the assessment of precision and accuracy for field screening instruments, such as the PID.

37. **Section 3.1.3, Page 1 of 5, Paragraph 4**. This paragraph states verbatim from the Model QAPP that precision in the laboratory will be assessed through the calculation of relative percent difference (RPD) and relative standard deviation (RSD) for three or more replicate samples. The text should state the specific laboratory parameters for which RPD will be used and for which RSD will be used to assess precision. If RSD is not being used, then the number of replicate samples should be changed from three or more to two because RPD requires only two replicate samples.

38. **Section 3.1.3, Page 1 of 5, Paragraph 4; and Section 3.2.3, Page 2 of 5, Paragraph 3**. These paragraphs state that precision and accuracy control limits are provided in Appendix A. However, Appendix A contains only general information on precision and accuracy control limits in the form of photocopied pages from SW-846. Project-specific precision and accuracy control limits for each target analyte should be clearly identified in these sections.

39. **Section 3.2.2, Page 2 of 5, Paragraph 3**. This paragraph states that accuracy in the field is assessed through the use of field and trip blanks. These blanks are aqueous samples that are not typically used to assess accuracy of soil sample collection due to the incomparability of

the different matrices. This discussion of field and trip blanks should either be deleted or their applicability to soil samples should be explained. If deleted, the discussion of field and trip blanks in Section 3.6 should also be deleted.

40. **Section 3.2.3**. This section states that laboratory accuracy will be assessed through analysis of matrix spike (MS) samples or standard reference materials (SRM). The QAPP should specify which analyses will use MSs and which analyses will use SRMs.

41. **Section 3.3**. This section defines both field and laboratory completeness as "the number of valid measurements obtained from all measurements taken during the project." This definition is incorrect in both instances and should be revised to state that field and laboratory completeness is the number of valid measurements obtained from all measurements planned to be taken in the field and laboratory, respectively.

42. **Section 3.3.2, Page 2 of 5, Paragraph 5**. This section states that field completeness is the amount of valid measurements obtained from all measurements taken in the project and refers to a formula for completeness that is presented in Section 12 of the QAPP. The numerator of this formula represents the "number of valid measurements." The text should explain what criteria will be used to determine the validity of a field measurement.

43. **Sections 3.3.2 and 3.3.3, Pages 2 and 3 of 5**. These sections provide total field and laboratory completeness objectives of 90 and 95 percent, respectively. This approach could result in incomplete data for a particular SWMU or AOC. Therefore, individual completeness objectives should be established for each SWMU and AOC. Also, a sufficient number of samples should be collected to make completeness a meaningful parameter. For example, for SWMU Group E, the FSP indicates that a total of three samples will be collected. If only two of the three sample results were valid, the completeness would be only 67 percent, and the objective would not be met. Therefore, the completeness objective should be modified, or the number of samples to be collected should be increased. The QAPP should be revised to reflect this requirement.

44. **Section 3.4.3, Page 3 of 5, Paragraph 3, Lines 1 and 2**. These lines state that representativeness in the laboratory will be ensured by analyzing and assessing field duplicate samples. The QAPP should explain how analytical results for field duplicates, which are generally used to assess the combined precision of sampling and analyses, can be used to assess the representativeness of data generated in the laboratory.

45. **Section 3.6, Page 5 of 5, Paragraph 3**. This paragraph states that the numbers of duplicate and field blank samples to be collected are listed in the FSP. However, the numbers of these samples to be collected are

not listed in the FSP. The FSP does not discuss field blanks and only provides the sampling frequency for field duplicates. The QAPP and the FSP should be revised so these documents are consistent and the numbers of duplicate and field blank samples are clearly presented. Also, will aqueous VOA samples be collected?

46. **Section 4.0**. This section lists in bulleted format the types of information that can be found in the FSP. In accordance with the Model QAPP, each bullet should provide the subsection of the FSP where the information can be found.

47. **Section 4.0, Page 1 of 1, Bullet 2**. This bullet indicates that obtaining contaminant-free sample containers is discussed in the FSP. However, the discussion in the FSP lacks specific information required by the Model QAPP. The FSP should include the following information: detailed procedures used to prepare contaminant-free sample containers, the criteria that the containers must meet, how the criteria are verified, and the frequency of verification.

48. **Section 4.0, Page 1 of 1, Bullet 8**. This bullet indicates that sampling equipment decontamination procedures are discussed in the FSP. However, the only discussion of decontamination in the FSP pertains to the decontamination area and does not adequately address procedures to be used to decontaminate sampling equipment. The text should be revised to discuss the procedures for decontaminating sampling equipment.

49. **Section 4.0, Page 1 of 1, Bullets 12 and 13**. These bullets indicate that the FSP discusses the soil sampling order and the sediment sampling order. The Model QAPP explains that the sampling order is the order of "analytical parameter sample fraction collection." The FSP states that only sample fractions will typically be collected from the most sensitive to least sensitive parameters. The FSP should state the order in which samples for specific analytes will be collected.

50. **Section 5.1, Page 2 of 5, Paragraph 4**. This paragraph discusses field custody procedures and refers to a chain-of-custody record and a chain-of-custody form. The text should reference Figure 5-1 of the FSP, which shows a chain-of-custody record form.

51. **Section 5.1, Page 3 of 5, Item e, Lines 1 and 2**. The text states that samples will be dispatched to the appropriate laboratory for analysis. This statement should be clarified by identifying CWM Riverdale National Laboratory as the appropriate laboratory.

52. **Section 5.1, Page 3 of 5, Item e, Lines 5 and 6**. These lines state that custody seals will be attached to the cooler. These lines should also state that the field team leader or a designee will sign the custody seals before they are attached to the cooler.

53. **Section 5.2, Page 4 of 5, Paragraph 1**. This paragraph states that laboratory custody procedures are provided in CWM Riverdale National Laboratory procedures (in Appendix A) and in following sections, but they are only provided in Appendix A. The reference to following sections should be deleted from the text.

54. **Section 5.3, Page 4 of 5, Paragraph 2**. This paragraph discusses the final evidence files, but does not specify the length of time during which files will be maintained. According to the Model QAPP, the length of time during which the files will be maintained should be specified in this section. It should also be stated that the file will be offered to the U.S. EPA prior to its disposal.

55. **Section 6.0**. This section, which discusses calibration procedures, should include a table similar to Table 6 in the Model QAPP. The table should summarize calibration standards and frequency, acceptance criteria, and corrective actions for each field and laboratory measurement and for each sample matrix.

56. **Section 6.2, Page 2 of 2, Paragraph 1**. For calibration procedures and analytical methods, this paragraph refers to "method Nos. 92-02, 8080A, 8150A, 8270A, 8260 for organic compounds analysis and method Nos. 6010A, 7740, 7060A, 7471A, 7841, 7421 for metals analysis." The following comments pertain to this statement.

    - Except for CWM method 92-02, these methods are all SW-846 methods. According to the Model QAPP, laboratory-specific SOPs are required for all analyses and should be included in the appendixes to the QAPP (see general comment 7). This section should reference these SOPs and discuss any deviations from the SOPs that may occur during the CWM-Vickery RFI.

    - Any references to EPA SW-846 methods should be clearly identified as such to differentiate them from CWM methods and SOPs.

    - The text should present the laboratory parameters analyzed for by each SOP and corresponding EPA methods.

    - EPA SW-846 methods 8150A, 8270A, and 8260 have been updated to methods 8150B, 8270B, and 8260A, respectively, in SW-846 Update II promulgated in September 1994. Wherever appropriate, these updated methods should be referred to in this QAPP and employed by the CWM Riverdale National Laboratory.

57. **Section 7.0**. This section is deficient because it lacks project-specific information specified in the Model QAPP, for both field and laboratory concerns. The following comments and the bulleted comments in specific comment 60 apply to Section 7.0:

- The text of this section should state all analytical parameters; the corresponding laboratory-specific SOPs for sample preparation, sample analyses, and confirmatory analysis (if applicable); and the approved EPA methods upon which the SOPs are based. This information should be summarized in tables similar to the example tables provided in Section 7 of the Model QAPP.

- The text should provide a brief explanation of how the method detection limit study, was conducted, and should reference a QAPP appendix for documentation of the study.

58. **Section 8.0**. To clarify the proposed QC program, this section, which discusses internal QC checks, should include a table summarizing the types, frequencies, acceptance criteria, and corrective actions associated with all QC checks for each analysis and sample matrix.

59. **Section 8.1, Page 2 of 2, Paragraph 0**. This paragraph states that any samples that are analyzed and are found to be in nonconformance with the QC criteria will be reanalyzed by the laboratory if sufficient volume is available. The text should also state that reanalysis will occur if sample holding times are not exceeded.

60. **Section 9.1, Page 1 of 5, Paragraph 2**. This paragraph refers to results forms for field data; however, examples of these forms are not provided. Examples of these forms should be included in the revised QAPP or the FSP.

    This paragraph states that the field manager is identified "in Section 5.0 of the RFI Workplan at Figure 7-1." However, this figure was not found and the field manager was not identified in the RFI workplan. This individual should be identified and the missing figure should be provided. In addition, a field team leader is discussed in Section 2, but a field manager is not discussed. If these positions refer to the same job title, consistent terms should be used in Sections 2.0 and 9.0. If these job titles represent different individuals, then the field manager's responsibilities should either be discussed in Section 2.0 or not be included in Figure 7-1.

61. **Section 9.1.1, Page 1 of 5, Paragraph 2**. This paragraph states verbatim from the Model QAPP that a mobile gas chromatograph (GC) will not be used until a later phase of the study. The potential Phase II activities highlighted in Section 1.1.2 do not specifically reference a mobile GC. Only if it is an intent to address Phase II of the RFI under scope of this QAPP, the purpose of the mobile GC should be clearly stated in the revised QAPP. If this is not the case, the reference to the GC should be deleted from this section.

62. **Section 9.2.1, Page 2 of 5**. This section discusses procedures used to evaluate field data; however, checking calibration of the PID used to generate field data and the quantity of field data that will be evaluated are not addressed. This section should discuss checking PID calibration and performing other QC checks as part of field data validation. This section should also state that 100 percent of the field data will be validated.

63. **Section 9.2.2, Page 3 of 5, Paragraph 1**. This paragraph references EPA guidelines for reviewing organic data. The review and validation of inorganic data should also be addressed because metals were identified as laboratory parameters in Section 1.4.2.2. This paragraph also states that the results of all QC checks for VOCs shall be validated by the data validator. The name of individuals performing data validation should be identified.

64. **Section 9.3.1, Page 3 of 5**. This section refers to report sheets for field data reporting. Examples of these report sheets should be included in the QAPP or FSP.

65. **Section 10.1.1.1, Page 1 of 3, Paragraph 2**. This paragraph states that the QA officer will perform internal field audits. The text should identify whether the individual referred to is the CWM-Vickery QA Officer or the Rust QA Officer.

66. **Section 10.1.1.3, Page 1 of 3**. This section, which discusses internal field audit procedures, should specify that EPA will be notified immediately of all nonconformances with the QAPP and FSP that affect data quality and that such notifications will be made before corrective actions are implemented.

67. **Section 10.1.1.3, Page 2 of 3, Paragraph 0**. This paragraph states that the field audit checklist for this project is submitted with the QAPP; however, this checklist was not found in the QAPP. This checklist should be submitted and the text should be revised to state its location in the QAPP.

68. **Section 10.2.1.2, Page 2 of 3**. This section, which discusses the frequency of internal laboratory audits, states that system and performance audits will be performed on an annual and quarterly basis, respectively. It would be advisable for CWM to perform both system and performance audits at the beginning of the Phase I RFI to ensure that any problems are identified and corrected early in the project. The revised QAPP should state that system and performance audits will be conducted during the first month of the RFI.

69. **Section 10.2.1.3, Page 3 of 3, Paragraph 1**. This paragraph states that the laboratory audit checklist for this project was submitted with the QAPP, but it was not found in the QAPP. This checklist should be submitted and the text should be revised to state its location in the QAPP.

70. **Section 11.2, Page 1 of 1, Paragraph 2**. This paragraph discusses laboratory instrument preventive maintenance. Tables similar to Tables 7 and 8 in the Model QAPP should be provided to summarize the maintenance requirements and frequencies for key analytical instruments or equipment. These tables should also be referenced in this section.

71. **Section 12.0**. Sections 3.1.2 and 3.2.3 refer to this section for equations that will be used to calculate precision in terms of RSD and accuracy using SRM, respectively. However, the equations for these calculations are not provided in this section. If RSD and SRMs will be used to evaluate data for this project, then the equations that will be used to calculate RSD and accuracy using SRMs should be provided.

72. **Section 12.2, Page 1 of 2, Paragraph 2**. This paragraph states that spiked samples will be prepared by choosing a sample at random from each sample shipment received at the laboratory. However, Section 3.6 states that MS/MSDs will be designated and collected in the field. Therefore, the text should be revised to consistently state that samples to be spiked will be designated in the field.

73. **Section 13.3, Page 3 of 3, Paragraph 5**. This paragraph refers to the Rust data assessor, who is not identified in this section or in Sections 2.0 or 9.2.2. The text should be revised to identify this individual.

74. **Section 14.1, Page 1 of 2, Paragraph 3**. This paragraph states that QA reports can be made by telephone to the appropriate individuals when corrective action needs to be implemented immediately. The text should also state that the EPA RPW/RPC will be one of the individuals who is notified.

75. **Section 14.3, Page 2 of 2, Paragraph 5**. This paragraph refers to a project organization chart that was not provided (see specific comment 29). A project organization chart should be provided.

The following specific deficiencies pertain to Appendix A:

76. The pages of the appendix are not in proper sequence. All pages of the appendix should be numbered and thoroughly checked to ensure that they are in the correct order upon submittal.

77. Appendix A contains several SOPs that do not apply to this project such as SSP No. 100-14 titled "Site Specific Practice for TC-86-02 Solvent Method for Incineration," and SSP No. 100-7 titled "Appendix 1 Site Specific Screen for TC-86-02 Solvent Screen." In addition, a photocopy of SW 846 Method 8150A for herbicide analyses is included, yet the QAPP does not identify herbicides as an analytical parameter. Appendix A should be thoroughly checked and all extraneous SOPs should be deleted.

78. Appendix A contains photocopies of SW 846 Method 6010A for metals analysis and photocopies of some 7000 Series Methods for thallium,

arsenic, selenium, and lead. Because Methods 6010A and 7000 Series Methods are both applicable to these four metals, the QAPP must distinguish between when Methods 6010A and when 7000 Series Methods will be used.

79. SSP No. 92-02 titled "Solvents Analysis Using Gas Chromatography" does not identify detection limits, QC acceptance criteria, calibration acceptance criteria, and corrective action. In addition, Section 7.5 of this SSP states that a single point calibration will be used. However, Section 6.2 of the QAPP states that calibrations will consist of 3 to 5 points. This SSP should be revised to include the above information and to reflect the use of 3 to 5 point calibration procedures.

88. An SOP should be proposed for endrin ketone, which is a target compound listed in Table 1. (Note that although SW-846 method 8270 does not include this compound on its target list, it happens to be included on the method 8270A (Final Update 1 to SW-846) target list.)

89. The following compounds were spelled incorrectly in Table 2 of the QAPP: 1,3 dichlorobenzene; 2,4 dimethylphenol, acenaphthylene, 4-chlorophenylphenyl ether, pentachlorophenol, fluoranthene. Corrections should be made.

80. Table 5 in Appendix A summarizes the sampling and analysis program; however, this table does not include the sampling and analysis to be conducted at AOCs described in the FSP. AOC sampling and analysis requirements should be added to Table 5.

81. The first column of Table 5 has the heading "SWMU," but the sampling and analysis activities summarized in the table pertain to SWMU <u>groups</u>. After AOCs are added to the table, the heading for the first column should be changed to "SWMU Groups and AOCs." The sixth and seventh columns have the headings "matrix duplicate" and "matrix spike," respectively; however, Section 3.6 of the QAPP uses the term "field duplicates" and also states that matrix spikes will be referred to as "MS/MSD samples" because they are collected in duplicate. These column headings should be changed to correspond to the terminology used in Section 3.6.

82. In the field parameter column of Table 5, "qualitative screening with photoionization detector," is listed as the field parameter for all SWMU groups; however, this does not state a field parameter. The entries in this column should be revised to also state that the PID measures organic vapors.

83. Table 5, which is subheaded "Field QA/QC Samples," indicates that samples in addition to investigative samples are required for "matrix spike" samples. However, Section 3.6 of the QAPP states that soil MS/MSD samples require no extra sample volume for VOCs or extractable organics, and Sections 12.1 and 12.2 state that spike samples are selected from sample shipments at the laboratory. If the table is to

include only field samples, then either the "matrix spike" samples should be deleted from the table, or the text in Sections 3.6, 12.1, and 12.2 should be revised accordingly. If the table is to include QA/QC samples both collected in the field and prepared in the laboratory, then the table subheading should be revised to read "QA/QC Samples" and the samples listed in the table should be clearly identified as to whether they are collected in the field or prepared in the laboratory.

84. According to Table 5, the number of "matrix duplicate" and "matrix spike" samples to be collected for metals is greater than the number required for other laboratory parameters. However, Section 3.6 provides only one sampling frequency for field duplicates (1 every 10 investigative samples) and one sampling frequency for MS/MSD samples (1 every 20 investigative samples) for all laboratory parameters. Therefore, in Table 5, the number of "matrix duplicate" samples should be the same for all laboratory parameters, as should the number of "matrix spike" samples; otherwise, the text should discuss the reasons for proposing different QA/QC sampling frequencies for the different laboratory parameters. Table 5 also indicates that "matrix duplicate" and "matrix spike" samples have the same sampling frequency; however, these two distinct types of QA/QC samples have different sampling frequencies according to Section 3.6. The numbers in Table 5 should be consistent with the text in Section 3.6. It should also be noted that for a QA/QC sampling frequency of 1 every 10 investigative samples, a QA/QC sample should be collected for every 10 or fewer investigative samples which requires rounding-up the number of QA/QC samples for the remaining fraction of 10 investigative samples. For example, the 32 investigative samples to be collected at SWMU Group A require four, not three, matrix duplicate samples.

85. Table 5 provides four different values for the number of QA/QC samples to be collected for the four groups of laboratory parameters, but provides only one value for the number of investigative samples to be collected for each SWMU group. Table 5 should present a consistent approach for both investigative and QA/QC samples as to whether one sample will be considered to include the total sample volume for all four laboratory parameter groups or whether these will be considered four distinct samples.

86. Table 5 lists 25 as the number of investigative samples to be collected for SWMU Group C; however, the FSP states that 26 samples will be collected for this SWMU group. This discrepancy should be resolved.

87. Table 5 states that trip, field, and "rinse" blanks are to be collected. "Rinsate" blanks, which are described in the FSP, are also aqueous samples. As previously stated in specific comment 43, aqueous trip and field blanks are typically not required for soil samples. Therefore, these samples should be deleted from Table 5. If, however, these

samples are required due to atypical circumstances, these circumstances should be explained in the text and rinsate blanks should be added to the discussion of QA/QC samples in Section 3.6. Table 5 should also clearly identify the number of each type of blank to be collected instead of only showing the total of all three types of blanks.

90. Apparently, no SOP was provided for the analysis of cyanide. SOPs should be presented for each site specific target parameter.

END OF QAPP COMMENTS

PRC Environmental Management, Inc.
233 North Michigan Avenue
Suite 1621
Chicago, IL 60601
312-856-8700
Fax 312-938-0118

PRC

May 31, 1995

Mr. Tom Matheson
U.S. Environmental Protection Agency Region 5
77 West Jackson Boulevard
Chicago, IL 60604

Subject: **Expert Hydrologist Review of the April, 1995, "RCRA Facility Investigation (RFI) Work Plan" for Chemical Waste Management, Vickery, Ohio**
EPA Contract No. 68-W4-0007, Work Assignment No. R05021

Dear Mr. Matheson:

Enclosed are one hard copy and one disk copy of hydrogeologic technical review comments on the above-referenced document prepared by Dr. Keros Cartwright, expert hydrologist subcontractor to PRC Environmental Management, Inc. (PRC).

The document reviewed has numerous deficiencies that need to be addressed to accurately describe the hydrogeology at the facility. If you have any questions or comments, please call me at (312) 856-8786.

Sincerely,

Mary Wojciechowski

Mary Wojciechowski
Project Manager

MW/car

Enclosures (2)

cc: Bernie Orenstein, EPA Region 5 (letter only)
Ed Schuessler, PRC (letter only)

contains recycled fiber and is recyclable

ENCLOSURE

TECHNICAL REVIEW COMMENTS ON THE RFI WORK PLAN FOR CHEMICAL WASTE MANAGEMENT, INC. VICKERY, OHIO

TECHNICAL REVIEW COMMENTS ON THE RFI WORK PLAN FOR CHEMICAL WASTE MANAGEMENT, INC. VICKERY, OHIO

General Comments

After reviewing the RCRA Facility Investigation (RFI) Work Plan for the Chemical Waste Management Facility at Vickery, Ohio, dated April, 1995, the work plan appears to be significantly lacking.

The work plan only calls for soil sampling, but does not provide for groundwater sampling or evaluation. In the work plan, the glacial till is assumed to totally eliminate any downward migration of contaminants. The data that validate this assumption are presented in the "Current Conditions Report" but are not included in the work plan. These data should be added to the work plan or appropriate sections of the current conditions report should be referenced in the work plan to clarify the assumptions about the glacial till.

After reviewing the "Current Conditions Report," the assumption of the continuous nature of the upper till probably is valid. However, statements made in the work plan about the hydraulic properties are contradictory and, in some places, may be incorrect. In Section 3.2.2 (pages 8 and 9), the permeability of the upper till is given twice as 1×10^{-8} to 1×10^{-9} cm/sec (paragraphs 3 and 7), while in paragraph 4, permeability is given as 8.6×10^{-8} cm/sec (almost 10^{-7}) and as 2.4×10^{7} cm/sec in paragraph 2 of Section 3.3.3 (page 10). The work plan should be revised to state consistent and accurate hydraulic properties.

The values of 1×10^{-8} to $1. \times 10^{-9}$ cm/sec are extremely low, below most values reported for Wisconsinan Age glacial tills. There is no reference to where the extremely low values came from nor how they were measured, and if they are laboratory or field values. If such values were real, there should be discussion of possible fractures, which in material of this low conductivity would be highly likely.

The report also makes a statement of 100-year travel time through the till to the bedrock aquifer below. The previous review of the "Current Conditions Report" addressed this issue and the till permeability values, but it appears the suggested changes were not made. The report and work plan should incorporate these changes.

The work plan should provide for an evaluation of "the nature and extent of releases, if any" (their words on page 1 of the work plan). It clearly leaves out any evaluation of groundwater pathways. If there are sources in the sediment, there will be a groundwater pathway. The plan should address the whole problem.

Specific Comments

Section 3.2.1. There is no discussion of the hydraulic characteristics for the [illegible] while in the glacial geology, there is some discussion in [illegible] only in Section 3.3.2. Section 3.2.1 should also [illegible]

Section 3.3.3. The 100-year travel time here is b[illegible] Report." Are there any isotope or other supportin[illegible]

Section 5.10. This section, a review of groundwa[illegible] monitoring system. There are no results or discuss[illegible] little benefit to the report.

May 19 TL
Surface water Sample
taken

March 3, 1995 - lth
Prog. objection Bart
on 2/17/95
Proposed Grouping of Sum. us

Chemical Waste Management, Inc.

3956 State Route 412
Vickery, Ohio 43464
419/547-7791

FEDERAL EXPRESS

April 20, 1995

United States Environmental Protection Agency
Region V
Attention: Mr. Thomas Matheson HRP - 8J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Subject: RCRA Facility Investigation (RFI) Workplan for Vickery Facility - Final Federal Permit, Chemical Waste Management, Inc. - EPA ID. No. OHD 020 273 819

Dear Sir:

In accordance with paragraph VI of the Hazardous Waste Management Permit, EPA Identification Number OHD 020 273 819 dated October 24, 1994, enclosed are three (3) copies of the RFI workplan for the Vickery Facility.

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

Should you have any questions regarding this matter, please contact Michael Curry or Steve Lonneman at (419) 547-7791.

Sincerely,

CHEMICAL WASTE MANAGEMENT, INC.

F.G.Nicar
General Manager

FGN/tr

Attachments

Printed on recycled paper.

cc w/ attachments: Edwin Lim Ohio EPA, DHWM Columbus
Chuck Hull Ohio EPA, NWDO Bowling Green

APR. 13 1995

HRP-8J

CERTIFIED MAIL: P 188 573 074
RETURN RECEIPT REQUESTED

Michael Curry, Engineering Manager
Chemical Waste Management, Inc.
Vickery Facility
3956 State Route 412
Vickery, Ohio 43464

RE: Chemical Waste Management, Inc. Vickery Facility (CWM-Vickery)
RCRA Facility Investigation (RFI) SWMU/AOC Grouping & Project Objectives
OHD 020 273 819

Dear Mr. Curry:

Enclosed are the United States Environmental Protection Agency (U.S. EPA) comments on CWM-Vickery's February 17, 1995, "Proposed Grouping of SWMUs and Project Characterization Objectives." CWM-Vickery shall respond to these comments within 30 days after receipt of this letter.

In addition to two copies of the modified submission required by the U.S. EPA, please send one copy of each to:

Edwin Lim Ohio EPA, DHWM P.O. Box 1049 1800 WaterMark Drive Columbus, OH 43266-0149	Chuck Hull Ohio EPA, NWDO 347 N. Dunbridge Rd. Bowling Green, OH 43402	CWM-Vickery Information Repository

If you have questions please contact me at (312) 886-7569.

Sincerely,

Thomas Matheson
Corrective Action Project Manager
RCRA Permitting Branch

Enclosure

cc: Ed Lim, OEPA/CO
Chuck Hull, OEPA/NEDO

HRP-8J:MATHESON:twm:3/2/95:6-7596: F:\USER\TMATHESO\CWMVICK\PROJ_OBJ.LTR

CONCURRENCE REQUESTED FROM RPB			
OTHER STAFF	RPB STAFF	OHIO SECTION CHIEF	RPB BRANCH CHIEF
4/13/95 PB	4/13/95	[illegible]	

U.S. ENVIRONMENTAL PROTECTION AGENCY, REGION 5
COMMENTS ON THE CHEMICAL WASTE MANAGEMENT - VICKERY, INC.
PROPOSED GROUPING OF SWMU'S AND PROJECT CHARACTERIZATION OBJECTIVES SUMMARY
DATED FEBRUARY 17, 1995

During the pre-QAPP meeting of January 17, 1995, between CWM-Vickery and the U.S. EPA, it was agreed that CWM-Vickery would outline its intended objectives for the RFI prior to submitting the draft RFI Workplan and associated quality assurance project plan (QAPP). During this review, no attempt was made to determine the appropriateness of lumping certain SWMUs together.

In order to adequately address U.S. EPA's concerns, it is highly recommended that the QAPP writer consult with his laboratory representatives before resubmitting this QAPP.

Group A:

Soils Matrix:

For SWMUs lumped together as "Group A", (as well as all other groupings where the soil matrix will be sampled), the rationale for the chosen grid spacing should be provided in the QAPP. Although the rationale can be provided later, without clear presentation of the sampling objective, it will be difficult to determine whether or not the rationale for sampling locations is appropriate.

It is unclear which of the indicated sampling locations will be subjected to field and/or laboratory confirmatory analyses.

The references to the old Superfund DQO "levels" should be entirely deleted because they are no longer relevant. However, CWM has revealed they intend apparently not to provide "CLP-like" data packages. Notice that level IV data would not be used for any purpose. (QAS ordinarily required "Level IV" packages wherever risk assessment was an issue.)

It is unclear how the data usages for field screening pertain to any of the possible objectives discussed for this group, or how it may be used as a basis for selecting sampling points for confirmatory analyses. The target compounds and associated reporting limits are not provided and are not related to any particular objective. The purpose of the field screening is not identified. The U.S. EPA cannot evaluate whether the approach is reasonable until we understand why field screening data is needed.

Laboratory samples will be analyzed for some groupings of compounds, but the specific constituents are not mentioned. Nor was there any indication of the specific objectives associated with the laboratory data. Methods must be selected to allow sufficient sensitivities to be achieved such that the data will be usable for some known purpose.

Depending on the specific sampling technique, sampling for VOCs using a split spoon may cause unintended losses of volatile hazardous constituents to the atmosphere. CWM-Vickery shall propose (nonconventional) sampling methods to minimize losses of VOCs during the sampling event if it happens to be an objective to determine the "extent" of contamination.

The overall objectives sound paradoxical. CWM-Vickery intends to use soil data to identify the extent of contamination, if any, by using data collected to identify "hot spots". However, these actually can be viewed as two contrasting kinds of objectives. Hot spots may be identified, but not necessarily characterized, using insensitive data. Questions of extent are supposed to be addressed through consideration of risk assessment, which is what the Region 5 Data Quality Level table was designed for. The DQLs may be useful in identifying the "extent" of contamination through risk assessment, but may not be the most effective set of target levels to apply to a hot spot screening survey.

A risk assessment will most likely be founded on the (cumulative) presence of any evidence of contamination, not simply through direct comparison to Region 5 DQLs for constituents identified in soil. Also, the "extent" of contamination which is ultimately defined analytically, may not coincide with borders thought to be of minimal or insubstantial human health (or ecological) risks. However, without comparing in tabular format, how the intended target levels compare with projected laboratory reporting limits, it is impossible for the U.S. EPA to determine the feasibility of CWM-Vickery's proposed objective which is to identify "extent" by using data to identify "hot spots".

Groundwater Matrix:

Groundwater is intended to be "characterized" through the review of existing data. Highly sensitive data may be required in order to meet some of the Region 5 groundwater DQLs, as a prelude to the risk assessment. The regulatory levels that are needed in order to make valid comparisons, assuming data can be validated, were not provided. It is stated that the groundwater data will be evaluated to ensure that the data is valid for the use intended, but the intended use is never clearly stated.

CWM-Vickery must answer the following: 1) Is it an objective to determine the "extent" of the plume, or merely confirm the existence of a plume? 2) What regulatory levels are needed for groundwater in order to be able to use data for the RFI, assuming existing data can be considered "valid"? and 3) Even if it is "valid", is it usable for an "intended" purpose?

Group B:

Soil Matrix:

Only a review of existing groundwater data has been proposed.

Groundwater Matrix:

Refer to the comments under **Groundwater Matrix** for Group A.

Group C:

Soil Matrix:

Similar comments as those presented for the **Soil Matrix** investigation of Group A also apply to group C. CWM-Vickery must answer the following questions: 1) What are the field and laboratory target parameters, 2) how is field data supposed to pertain, if at all, to decisions to be made concerning selection of sampling points for samples that will be sent to the laboratory, and 3) how do the laboratory reporting limits compare to the target levels that are pertinent to the project? To allow for easier comparison, these specific objectives should be tabulated. Analytical (field) and laboratory methods cannot be selected until the specific objectives have been defined. Also see the comments under **Soil Matrix** referring to defining the "extent" of contamination through use of "hot spot" surveys. CWM-Vickery shall further define this objective.

Groundwater Matrix:

See the comments under **Groundwater Matrix** for Group A.

Group D:

Soil Matrix:

For the soil matrix, analogous comments applied to Group A also apply to this Group of SWMUs. For sake of brevity, these comments shall not be repeated here. Note that for this Group, there is a stated risk assessment purpose for data collection, although it is referred to as a "possible" risk assessment. What are the intentions for soil data usages?

Groundwater Matrix:

For the groundwater matrix, similar approaches are being attempted as is the case for other SWMU groupings, so please refer to previous comments concerning the groundwater matrix.

Group E:

Soil Matrix:

Only VOCs and metals shall be analyzed for Group E. Apparently no field screening shall be performed, because there are no associated objectives for field screening presented. Note that there are more appropriate means for sampling VOCs to minimize losses to the atmosphere, especially if the overall objective is to determine the extent of contamination. Refer to Group A comments for other general deficiencies concerning the soil matrix.

Groundwater Matrix:

The groundwater matrix apparently is not a concern for the grouping of SWMUs.

Group F:

Soil Matrix:

Refer to comments provided for Group A. An additional target parameter for Group F happens to be "phenols". Which phenols, specifically, are needed and what target levels are required for each specific constituent? How is this list of phenols different in any way from those already on the SVOC target list? Why not simply do a more complete 8270 scan here? In any case, without specific project objectives tabulated for this SWMU, it is difficult to determine what the data needs are. There are different methods available for determining "phenols". Some of these methods can provide data having greater sensitivities than others. However, it is not clear how sensitive the data should, be for this SWMU. The QAPP writer needs to discuss such matters with the laboratory representatives before submitting a draft QAPP.

Groundwater Matrix:

Refer to the comments provided for Group A.

Group G:

Soil Matrix:

It is stated that soil data (may) be used for risk assessment purposes. Many of the previously applied comments apply to this group.

Groundwater Matrix:

See previous comments presented for the groundwater matrix for Group A.

Group H:

Soil Matrix:

Refer to Group A comments. VOCs and metals (only) are of concern, but the specific constituents were not presented with any indication of required target levels or proposed reporting limits. Risk assessment quality data may be needed. Using the split spoon sampling procedure may not be consistent with the goal of producing data for risk assessment purposes or data which will be required for determining the extent of contamination.

Groundwater Matrix:

Why is groundwater not a concern with this group?

Group I:

Soil Matrix:

These SWMUs shall be considered independent of one another for sampling/RFI purposes. A possible need for data is for risk assessment evaluation. Refer to previous comments concerning sampling of the soil matrix. CWM-Vickery shall present its rationale for the grid spacing in the QAPP. Additionally:

For SWMU # 28, data is apparently required for both risk assessment purposes as well as for determining whether any residual contamination exists. The specific objectives for addressing these kinds of overall objectives must be presented. Analytical sensitivities that are required in order to meet these overall objectives should be tabulated and compared with laboratory reporting limits. It may be the case that the search for residual contamination can be accomplished with relatively insensitive data, or with a shorter target parameter list, and that a phased approach may be necessary.

Groundwater Matrix:

See comments under Group A.

END OF COMMENTS

Chemical Waste Management, Inc.

3956 State Route 412
Vickery, Ohio 43464
419/547-7791

RECEIVED
APR 14 1995
OFFICE OF RCRA
WASTE MANAGEMENT DIVISION
EPA, REGION V

April 11, 1995

United States Environmental Protection Agency
Region 5
Attention Mr. Thomas Matheson HRP - 8J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Subject: Chemical Waste Management, Inc. Vickery Facility (CWM-Vickery)
RCRA Facility Investigation (RFI) SWMU/AOC Grouping & Project Objectives
OHD 020 273 819

Dear Mr. Matheson:

This is to confirm that we received your letter Ref HRP-8J dealing with the above subject today. In accordance with our telephone conversation we will proceed to submit the workplan for CWM Vickery's RFI by the due date (April 22) as requested and, as agreed, will wait to respond to your letter until comments on the RFI workplan are received when a response will be submitted to both sets of comments.

Sincerely,
CHEMICAL WASTE MANAGEMENT, INC.

M.F.R.Curry
Engineering/Transportation Manager

cc: Edwin Lim Ohio EPA, DHWM Columbus
Chuck Hull Ohio EPA, NWDO Bowling Green
Richard Zweig Rust E&I Bensalem
Agency Correspondence File

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Chemical Waste Management, Inc.

3956 State Route 412
Vickery, Ohio 43464
419/547-7791

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 228 284 800

April 5, 1995

United States Environmental Protection Agency
Region V
Attention Mr. Thomas Matheson HRP - 8J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Subject: Response to Comments - RCRA Facility Investigation (RFI) - Report on Current Conditions - Vickery Facility, Chemical Waste Management, Inc.
EPA ID. No. OHD 020 273 819

Dear Mr. Matheson:

In response to your letter dated March 3, 1995 received March 8, 1995, attached are our comments together with four (4) copies of the revised Current Conditions Report. The changes were such that it was considered more appropriate to submit a complete revised copy rather than various sections and individual pages with old and new language.

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

Printed on recycled paper

Copies have been sent to the Ohio Environmental Protection Agency as requested and a copy will be placed in the CWM Vickery Information Repository. Should you have any questions regarding this matter, please contact Michael Curry os Steve Lonneman at (419) 547 - 7791.

Sincerely,

CHEMICAL WASTE MANAGEMENT, INC.

F.G.Nicar
General Manager

Attachments

cc w/attachments: Edwin Lim Ohio EPA, DHWM Columbus
Chuck Hull Ohio EPA, NWDO Bowling Green
CWM Vickery Information Repository
Michael Curry
Agency Correspondence File

cc w/o attachments: Steve Lonneman
Sandy Clark
Bob Heitman, Rust E&I (Bensalem)
Richard Zweig, Rust E&I (Bensalem)

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5

DATE: February 28, 1995

SUBJECT: Comments Concerning CWM's (Vickery) Draft Project Objectives for RFI Work Plan

FROM: Allen A. Debus, IL/MN/WI Section

TO: Thomas Matheson, OH Section

During our preQAPP meeting of January 17, 1995, it was agreed that CWM would attempt to outline its intended objectives for the RFI prior to submitting the draft QAPP. This outline, dated February 17, was reviewed per your request.

Although Mr. Curry states quite hopefully that he is moving in the "right direction", presently, this does not seem to be the case. In order to adequately address U.S. EPA's specific concerns, it is highly recommended that the QAPP writer consult with his laboratory representatives before resubmitting this QAPP.

During this quick review, I did not attempt to make any determinations as to the appropriateness of lumping certain SWMUs together. No opinions concerning CWM's selections for groupings are provided here.

Group A:

For SWMUs lumped together as "Group A", (as well as all other groupings where the soil matrix will be sampled), the rationale for the chosen grid spacing should be provided in the QAPP. Although the rationale can be provided later on, without clear presentation of the sampling objective, it will be difficult to determine whether or not the rationale for sampling locations is appropriate.

It is unclear which of the indicated sampling locations will be subjected to field and/or laboratory (confirmatory) analyses. It is unclear whether the RCRA Project Officer (you) would concur with the rationale for ending the borehole at a 13 foot depth.

The references to the old Superfund DQO "levels" should be entirely deleted because they are no longer relevant. However, interestingly, CWM has revealed that they intend apparently not to provide "CLP-like" data packages. Notice that level IV data would not be used for any purpose. (QAS ordinarily required "Level IV" packages wherever risk assessment was an issue.)

It is unclear how the data usages for field screening pertain to any of the possible objectives discussed for this group, or how it may be used as a basis for selecting sampling points for confirmatory analyses. The target compounds and associated reporting limits are not provided and are not related to any particular objective. We do know that field screening will be performed, but for what purpose? We cannot evaluate whether the approach is reasonable until

we understand why field screening data is needed.

Laboratory samples will be analyzed for some groupings of compounds, but the specific constituents are not mentioned. Nor was there any indication of the specific objectives associated with the laboratory data. Methods must be selected to allow sufficient sensitivities to be achieved such that the data will be usable for some known purpose.

Depending on the specific sampling technique, sampling for VOCs using a split spoon may cause unintended losses of volatile hazardous constituents to the atmosphere. CWM should be advised to propose (nonconventional) sampling methods to minimize losses of VOCs during the sampling event if it happens to be an objective to determine the "extent" of contamination.

The overall objectives sound paradoxical. They intend to use soil data to identify the extent of contamination (if any) by using data collected to identify "hot spots". However, these actually can be viewed as two contrasting kinds of objectives. Hot spots may be identified (but not necessarily characterized) using insensitive data. Questions of extent are supposed to be addressed through consideration of risk assessment, which is what the Region 5 Data Quality Level table was designed for. The DQLs may be of utility in identifying the "extent" of contamination through risk assessment, but may not be the most effective set of target levels to apply to a hot spot screening survey.

Risk assessment will most likely be founded on the (cumulative) presence of any evidence of contamination, not simply through direct comparison to Region 5 DQLs for constituents (respectively) identified in soil. Also, the "extent" of contamination (which is ultimately defined analytically, may not coincide with borders thought to be of minimal or insubstantial human health (or ecological) risks. However, without comparing (in tabular format) how the intended target levels compare with projected laboratory reporting limits, it is impossible for the U.S. EPA to determine the feasibility of their proposed objective which is to identify "extent" by using data to identify "hot spots".

For the groundwater matrix, groundwater is intended to be "characterized" through the review of existing data. (Highly sensitive data may be required in order to meet some of the Region 5 groundwater DQLs, as a prelude to the risk assessment.) Is it an objective to determine the "extent" of the plume, or merely confirm the existence of a plume? The regulatory levels that are needed in order to make valid comparisons, assuming data can be validated, were not provided. It is stated that the groundwater data will be evaluated to ensure that the data is valid for the use intended, but the intended use is never clearly stated.

Group B:

Only a review of existing groundwater data has been proposed. Refer to comments for groundwater data previously stated For Group A.

Group C:

Similar comments as those presented for the soil matrix investigation of Group A also apply to group C. For sake of brevity, such comments shall not be

repeated here. Does the RCRA project officer concur with rationale for why boreholes should be terminated at two feet below the maximum depth of the ponds. Most critically, what are the field and laboratory target parameters, how is field data supposed to pertain (if at all) to decisions to be made concerning selection of sampling points for samples that will be sent to the laboratory, and how do the laboratory reporting limits compare to the target levels that are pertinent to the project? Such specific objectives should be tabulated, allowing easier comparison. Analytical (field) and laboratory methods cannot be selected until the specific objectives have been defined. Also see comment referring to proposal for defining "extent" of contamination through use of "hot spot" surveys, previously mentioned for Group A. This objective should be further defined.

What regulatory levels are needed for groundwater in order to be able to use data for the RFI, assuming existing data can be considered "valid"? Even if it is "valid", is it usable for an "intended" purpose?

Group D:

For the soil matrix, analogous comments applied to Group A also apply to this Group of SWMUs. For sake of brevity, these comments shall not be repeated here. Note that for this Group, there is a stated risk assessment purpose for data collection, although it is referred to as a "possible" risk assessment. What are the intentions for soil data usages?

or the groundwater matrix, similar approaches are being attempted as is the case for other SWMU groupings, so please refer to previous comments concerning the groundwater matrix.

Group E:

Only VOCs and metals shall be analyzed for Group E. Apparently no field screening shall be performed, because there are no associated objectives for field screening presented. Note that there are more appropriate means for sampling VOCs to minimize losses to the atmosphere, especially if the overall objective is to determine the extent of contamination. Refer to Group A comments for other general deficiencies concerning the soil matrix.

The groundwater matrix apparently is not a concern for the grouping of SWMUs.

Group F:

Refer to comments provided for Group A for the soil and groundwater matrices. An additional target parameter for Group F happens to be "phenols". Which phenols, specifically, are needed and what target levels are required for each specific constituent? How is this list of phenols different in any way from those already on the SVOC target list? Why not simply do a more complete 8270 scan here? In any case, without specific project objectives tabulated for this SWMU, it is difficult to determine what the data needs are. There are different methods available for determining "phenols". Some of these methods can provide data having greater sensitivities than others. However, it is not clear how sensitive the data should be for this SWMU. The QAPP writer needs to discuss such matters with the laboratory representatives before

resubmitting this QAP.

Group G:

It is stated that soil data (may) be used for risk assessment purposes. Many of the previously applied comments apply to this Group.

See previous comments presented for the groundwater matrix.

Group H:

Refer to Group A comments. VOCs and metals (only) are of concern, but the specific constituents were not presented with any indication of required target levels or proposed reporting limits. Risk assessment quality data may be needed. Using the split spoon sampling procedure may not be consistent with the goal of producing data for risk assessment purposes or data which will be required for determining the extent of contamination.

Group I:

These SWMUs shall be considered independent of one another for sampling/RFI purposes. A (possible) need for data is for risk assessment evaluation. Refer to previous comments concerning sampling of the soil matrix, and review of existing groundwater data. A rationale for the grid spacing should be presented in the QAPP. Then additionally:

For SWMU # 15, does the RCRA project officer concur with proposed rationale for terminating the boreholes at a two foot depth?

For SWMU # 28, data is apparently required for both risk assessment purposes as well as for determining whether any residual contamination exists. The specific objectives for addressing these kind of overall objectives must be presented. Analytical sensitivities that are required in order to meet these overall objectives should be tabulated and compared with laboratory reporting limits. It may be the case that the search for residual contamination can be accomplished with relatively insensitive data, or with a shorter target parameter list, and that a phased approach may be necessary.

cc: Al Alwan, QAS
Dave Payne, CASS
Mario Mangino. RPB

Attachment

Chemical Waste Management, Inc.

3956 State Route 412
Vickery, Ohio 43464
419/547-7791

RECEIVED
FEB 21 1995
OFFICE OF RCRA
WASTE MANAGEMENT DIVISION
EPA, REGION V

February 17, 1995

United States Environmental Protection Agency
Region 5
Attention Mr. Thomas Matheson HRP - 8J
77 West Jackson Boulevard
Chicago, Illinois 60604-3590

Subject: Chemical Waste Management, Inc. - Vickery Facility - Corrective Active Items - Final Federal Permit - EPA ID No. OHD 020 273 819

Dear Mr. Matheson:

Further to your letter of January 19, 1995, as requested, I enclose CWM Vickery's proposals for the grouping of SWMUs and AOCs together with the rational for the groupings. Also included are the specific project objectives together with the associated DQLs.

I hope that this is the direction in which we should be moving and we welcome your comments. Please do not hesitate to contact myself or Steve Lonneman at (419)-547-7791 or Richard Zweig at (215)-633-4562.

Sincerely,
CHEMICAL WASTE MANAGEMENT, INC.

M.F.R.Curry
Engineering Manager

Attachments

Printed on recycled paper.

Proposed Grouping of SWMUs and Project Characterization Objectives Summary

Introduction

The following grouping of Solid Waste Management Units (SWMUs) identified within the Report on Current Conditions was developed in preparation of the Quality Assurance Project Plan (QAPP) for the RCRA Facility Investigation. Included with the proposed SWMU groupings are project characterization objectives summarizing some of the levels of effort anticipated to characterize the proposed groupings. These groups of SWMUs were determined using locale, logistics, operational unit and interactive similarities.

The project characterization objectives are derived using history of the unit and to some extent, what is expected in each of the groups of SWMUs. The sampling locations and parameters which are presented are basic and will be expanded on during the drafting of the RFI Work Plan.

SWMU Groupings and Objectives

GROUP A

SWMU #1 - Pond 1
SWMU #2 - Pond 2
SWMU #3 - Pond 3
SWMU #8 - Pond 9 and Wet Well
SWMU #16 - Temporary Waste Pile Area

Rationale for Grouping:

These SWMUs are grouped together due to the inclusion within a larger SWMU (i.e. SWMU # 16 is the SWMU which sits around the perimeter of the other SWMUs).

Matrix: Soil

Soil sampling will be performed using a systematic sampling scheme based on a 150-foot center grid. Additional random samples will be collected from within the boundaries of the former ponds

across the longitudinal axis in 75-foot increments.

The above proposed soil sampling effort combines into the following number of samples:

21 soil sampling locations using the systematic sampling grid
16 soil sampling locations based on random sampling located in the former ponds.

Sample location depths:

Soil samples will be collected at the above locations at depths from the former elevation of the pond at 3 foot increments to 13 feet below the former elevation of the pond.

Rationale for sampling depths:

- There was a clay cap placed above the area when the Closure Cell was completed. This clay cap surface was placed at different elevations to promote surface drainage off the Closure Cell. Since the amount of clay material placed above the area is variable (more clay closer to the Closure Cell) the depth to the actual top elevation of the former ponds are variable from the surface. Soil sampling will begin at the interface of clay and in-situ soil, which is presumed to be at the former elevation of the ponds.
- The three foot increments chosen for sampling was used to give a sufficient number of data points to fully characterize the SWMUs.
- The thirteen foot total depth was chosen based on the bottom elevation of the deepest pond plus an additional two foot buffer.

Level I and III DQLs will be used for evaluation of the samples. Field screening will be performed on soil samples collected at each of the locations. Only three samples per borehole will be sent to the laboratory for analysis.

The soil samples sent to the laboratory will be analyzed for the Appendix IX VOCs, SVOCs, PCB/Pesticides, and Metals.

The overall objective of this sampling program will be to characterize the environmental setting of the entire SWMU Group Area. The Data Quality Levels chosen will be used to propose a next phase

of sampling. This initial phase is intended to identify the extent of contamination, if any, by using data collected to identify "Hot Spots" using graphical analysis (i.e., isoconcentration maps).

Matrix: Groundwater

Characterization of groundwater in the area around this group of SWMUs will be made using existing information from monitoring wells. Analytical data gathered within the groundwater monitoring wells of the groundwater monitoring network are extensive. This data will be evaluated according to the QAPP to make certain the data is valid for the use intended. This validation process will include, at a minimum, the determination of the following historical information:

- Laboratory completing the analysis
- Method used
- Compound analyzed
- Detection and reporting limit
- Type of sampling plan explaining how the samples were collected
- Type of data (i.e., raw, etc - What type of deliverable package)
- Who evaluated the data.

All of this historical information will be tabulated.

GROUP B

SWMU # 4 - POND 4
SWMU # 5 - POND 5
SWMU # 7 - POND 7
SWMU # 10 - POND 11
SWMU # 11 - POND 12
SWMU # 17 - LEACHATE RETENTION POND
SWMU # 18 - W-TANKS

Rationale for Grouping:

These SWMUs are grouped together due to their clean closed status. These units were clean closed by the facility and certified by the OEPA.

Matrix: Soil

No soil sampling is proposed for this grouping of SWMUs due to the certified clean closed status of each of them. The certification documents are in the facility record if needed for reference.

Matrix: Groundwater

Characterization of groundwater in the area around this group of SWMUs will be made using existing information from monitoring wells. Analytical data gathered within the groundwater monitoring wells of the groundwater monitoring network are extensive. This data will be evaluated according to the QAPP to make certain the data is valid for the use intended. This validation process will include, at a minimum, the determination of the following historical information:

- Laboratory completing the analysis
- Method used
- Compound analyzed
- Detection and reporting limit
- Type of sampling plan explaining how the samples were collected
- Type of data (i.e., raw, etc - What type of deliverable package)
- Who evaluated the data.

All of this historical information will be tabulated.

GROUP C

SWMU # 6 - PONDS 6E AND 6W
SWMU # 9 - POND 10
SWMU # 19 - FORMER DRUM STORAGE

Rationale for Grouping:

These SWMUs are grouped together due to the proximity and overlapping of the units. The former ponds were associated with each other in the facility's historical record. As for the former drum storage pad, this unit overlaps each of the ponds to some extent.

Matrix: Soil

Soil sampling will be performed using a systematic sampling scheme based on a 100-foot center grid. Additionally, random soil sampling will be performed within each grid area.

The above proposed soil sampling effort will combine to a total of 39 soil sampling locations.

Sample location depths:

Soil samples will be collected at the above locations at depths from the former elevation of the pond at 3 foot increments to 2 feet below the maximum depth of the ponds.

Rationale for sampling depths:

- There was a clay cap placed above the ponds when the Closure Cell was built. During the building of a trench around the Closure Cell, they found the outline of Pond 6. Instead of building the trench they put clay above the area and graded to promote sheet flow off of the Closure Cell. Since the amount of clay will be variable across the entire area the depth to the top of the former pond will vary. Soil sampling will begin at the interface of the clay and in-situ soil, which is presumed to be at the former elevation of the ponds.
- The three foot increments chosen for sampling was chosen to give a sufficient number of data points to fully characterize the SWMUs.
- The two feet below maximum depth of the ponds was chosen due to the in-situ clayey soils which is known to exist in this area. It is presumed that any leaking of waste into the ponds would not migrate more than two feet below the depth of the pond.

Level I and III DQLs will be used for the evaluation of the samples. Field screening will be performed on soil samples collected at each of the locations. Only three samples per borehole will be sent to the laboratory for analysis.

The soil samples sent to the laboratory will be analyzed for the Appendix IX VOCs, SVOCs, PCB/Pesticides and Metals.

The overall objective of this sampling program will be to characterize the environmental setting of the entire SWMU Group Area. The Data Quality Levels chosen will be used to propose a next phase

of sampling. This initial phase is intended to identify the extent of contamination, if any, by using data collected to identify "Hot Spots" using graphical analysis (i.e., isoconcentration maps.)

Matrix: Groundwater

Characterization of groundwater in the area around this group of SWMUs will be made using existing information from monitoring wells. Analytical data gathered within the groundwater monitoring wells of the groundwater monitoring network are extensive. This data will be evaluated according to the QAPP to make certain the data is valid for the use intended. This validation process will include, at a minimum, the determination of the following historical information:

- Laboratory completing the analysis
- Method used
- Compound analyzed
- Detection and reporting limit
- Type of sampling plan explaining how the samples were collected
- Type of data (i.e., raw, etc - What type of deliverable package)
- Who evaluated the data.

All of this historical information will be tabulated.

GROUP D

SWMU # 12 - NORTH LANDFARM
SWMU # 13 - EAST LANDFARM
SWMU # 14 - SOUTH LANDFARM

Rationale for Grouping:

These SWMUs are grouped together due to the similar manner in which they were utilized during operation.

Matrix: Soil

Soil sampling will be performed using a systematic sampling scheme based on a 100-foot center grid. Additionally, random soil sampling will be performed within each grid area.

The above proposed soil sampling effort combines into the following number of samples:

	Systematic Grid	Random	Total
SWMU #13	12	6	18
SWMU #14	11	5	16
SWMU #15	16	13	29
Total Samples	39	24	**63**

Sampling location depths:

Soil samples will be collected at approximately 2.5 feet below the clay cap/natural soil interface. This soil depth was chosen as the approximate "tilled" depth used during the operation of the unit.

The soil samples collected within this group of SWMUs will be analyzed for VOC, SVOC, PCBs and Metal constituents with the intention of using the data for possible risk assessment purposes. Therefore methods used to analyzed each of the above type of constituents will be completed in accordance with RCRA Correction Action Guidance, Human Health Data Quality Levels for RFI Projects memorandum dated June 28, 1994.

The objective to sampling within these SWMUs is to determine the extent of contamination, if any exists.

Matrix: Groundwater

Characterization of groundwater in the area around this group of SWMUs will be made using existing information from monitoring wells. Analytical data gathered within the groundwater monitoring wells of the groundwater monitoring network are extensive. This data will be evaluated according to the QAPP to make certain the data is valid for the use intended. This validation process will include, at a minimum, the determination of the following historical information:

- Laboratory completing the analysis
- Method used
- Compound analyzed
- Detection and reporting limit
- Type of sampling plan explaining how the samples were collected
- Type of data (i.e., raw, etc - What type of deliverable package)
- Who evaluated the data.

All of this historical information will be tabulated.

GROUP E

SWMU # 50 - INJECTION WELL 1A
SWMU # 51 - INJECTION WELL 1
SWMU # 52 - INJECTION WELL 3

Rationale for Grouping:

These SWMUs are grouped together due to the similar manner in which they were utilized during operation.

Matrix: Soil

One judgmental soil sample will be collected downgradient of surface water flow in the area of the SWMU, or in a location where evidence of contamination exists or once existed in the historical record. The sample will be collected in the uppermost zone (lacustrine).

The soil sample will be collected using a split spoon to drive from the surface to a depth of two feet. A VOC sample will be collected 6 inches under the surface. An additional sample will be collected for analysis of metals at the two foot depth. The intended use of the data will be for possible risk assessment purposes. Therefore methods used to analyzed each of the above type of constituents will be completed in accordance with RCRA Correction Action Guidance, Human Health Data Quality Levels for RFI Projects memorandum dated June 28, 1994.

The objective to sampling within these SWMUs is to determine the extent of contamination, if any exists due to the past operation of the units.

GROUP F

SWMU # 31 - FILTERED ACID TANK (FAT) 2
SWMU # 32 - PUMP HOUSE 2
SWMU # 33 - FILTERED ACID TANK (FAT) 6
SWMU # 34 - PUMP HOUSE 6
SWMU # 35 - FILTERED ACID TANK (FAT) 5
SWMU # 36 - PUMP HOUSE 5
SWMU # 37 - FILTERED ACID TANK (FAT) 4
SWMU # 38 - PUMP HOUSE 4
SWMU # 39 - OLD FILTERED ACID TANK 2
SWMU # 40 - FORMER PUMP HOUSE 2

Rationale for Grouping:

These SWMUs are grouped together due to the similar manner in which they were utilized during operation.

Matrix: Soil

One judgmental soil sample will be collected in the downgradient direction of surface water flow in the area of the SWMU or in a location where evidence of contamination either exists or once existed in the historical record. The soil sample will be collected in the uppermost zone (lacustrine). The intent of the sampling is to document if any contamination exists due to the past operation of the units.

The soil sample will be collected using a split spoon sampler to drive from the surface to a depth of two feet. A VOC sample will be collected 6 inches under the surface. An additional sample will be collected for analysis of Phenols and metals at the two foot depth. The intended use of the data will be for possible risk assessment purposes. Therefore methods used to analyzed each of the above type of constituents will be completed in accordance with RCRA Correction Action Guidance, Human Health Data Quality Levels for RFI Projects memorandum dated June 28, 1994.

The objective to sampling within these SWMUs is to determine the extent of contamination, if any exists.

Matrix: Groundwater

Characterization of groundwater in the area around this group of SWMUs will be made using existing information from monitoring wells. Analytical data gathered within the groundwater monitoring wells of the groundwater monitoring network are extensive. This data will be evaluated according to the QAPP to make certain the data is valid for the use intended. This validation process will include, at a minimum, the determination of the following historical information:

- Laboratory completing the analysis
- Method used

- Compound analyzed
- Detection and reporting limit
- Type of sampling plan explaining how the samples were collected
- Type of data (i.e., raw, etc - What type of deliverable package)
- Who evaluated the data.

All of this historical information will be tabulated.

GROUP G

SWMU # 21 - TRUCK UNLOADING BUILDING
SWMU # 22 - SAND INTERCEPTORS
SWMU # 23 - V-TANKS
SWMU # 24 - CAUSTIC GAS SCRUBBER
SWMU # 25 - T-TANKS
SWMU # 26 - T-TANK PUMP HOUSE
SWMU # 27 - LEAF FILTER PRESS BUILDING
SWMU # 29 - FILTER PRESS BUILDING
SWMU # 30 - FAT A AND B

Rationale for Grouping:

These SWMUs are grouped together due to the interaction with each other during the treatment process.

Matrix: Soil

Judgmental soil samples will be collected in areas biased towards spill potential. Analytical parameters will be chosen based on the constituents processed in each of the SWMUs. These analytical parameters will be presented in detail within the RFI Work Plan. A description of this for each SWMU follows:

1. Truck Unloading Building:
   One surface soil sample will be collected in front of each bay door. Total samples collected will be four. Soil samples will be collected just under the surface of the asphalt.

2. Sand Interceptors (aka, Grit Filters):
   One soil sample will be collected from this SWMU at a depth at the base of the chamber. The depth of the chamber is documented at 6 feet. Therefore one soil sample will be collected at 6 feet in the downgradient direction of flow to document the integrity of the chamber.

3. V-tanks:
   Soil samples will be collected in locations biased towards transfer lines leading to the T-tank Facility. Additional soil samples will be collected in the downgradient direction at the depth of the base of the sump.

4. Caustic Scrubber:
   No soil sampling is proposed in the area of the caustic scrubber, due to the type of unit.

5. T-tanks:
   No soil sampling is proposed in the area of the T-tanks. This unit was built with secondary containment resulting in the potential of contamination to be minimal.

6. T-tank Pump House:
   No soil sampling is proposed in the area of the T-tank Pump House. This unit is within a building and built recently resulting in the potential of contamination to be minimal.

7. Leaf Filter Press Building:
   Surface soil sampling will be conducted in area biased toward potential contamination. As documented within the historical record, This SWMU had a release in 1985. It is anticipated that two surface soil samples will be collected at a depth less than two feet around this SWMU.

8. Plate Filter Press Building:
   Surface soil sampling will be conducted in areas biased towards the former underground pipes which led to the sluice pit. All soils were reported to be excavated, however a sample will be collected to verify previous excavation activities. Additional soil samples will be collected in areas of potential contamination.

9. FAT A & B:
   Two soil surface soil samples will be collected in areas biased to the potential of contamination and outside the containment berm. Three soil samples are projected, one in each accessible direction around the containment.

All soil samples will be collected using a split spoon sampler to drive to the required sampling depth. The intended use of the data will be for possible risk assessment purposes. Therefore, methods used to analyzed each of the constituent which will be performed within the scope of work will be completed in accordance with RCRA Correction Action Guidance, Human Health Data Quality Levels for RFI Projects memorandum dated June 28, 1994.

The objectives to sampling the SWMUs within this grouping is to determine the extent of contamination, if any exists.

Matrix: Groundwater

Characterization of groundwater in the area around this group of SWMUs will be made using existing information from monitoring wells. Analytical data gathered within the groundwater monitoring wells of the groundwater monitoring network are extensive. This data will be evaluated according to the QAPP to make certain the data is valid for the use intended. This validation process will include, at a minimum, the determination of the following historical information:

- Laboratory completing the analysis
- Method used
- Compound analyzed
- Detection and reporting limit
- Type of sampling plan explaining how the samples were collected
- Type of data (i.e., raw, etc - What type of deliverable package)
- Who evaluated the data.

All of this historical information will be tabulated.

GROUP H

SWMU # 46 - INJECTION WELL 2
SWMU # 47 - INJECTION WELL 4
SWMU # 48 - INJECTION WELL 5
SWMU # 49 - INJECTION WELL 6

Rationale for Grouping:

These SWMUs are grouped together due to the similar manner of operation.

Matrix: Soil

Surface soil sampling around each of the injection wells will be completed in areas biased to potential contamination. A historical search in the operating record will be completed to assist in the location of the soil samples. It is anticipated that two soil samples will be collected for each of the SWMUs.

Soil samples will be collected using a split spoon sampler to drive from the surface to a depth of two feet. A VOC sample will be collected 6 inches under the surface. An additional sample will be collected for analysis of metals at the two foot depth. The intended use of the data will be for possible risk assessment purposes. Therefore methods used to analyze each of the above type of constituents will be done so in accordance with RCRA Correction Action Guidance, Human Health Data Quality Levels for RFI Projects memorandum dated June 28, 1994.

The objective of the sampling within these SWMUs is to determine the extent of contamination, if any exists.

GROUP I

SWMU # 15 - OIL RECLAMATION FACILITY
SWMU # 20 - LAB WASTE TANK
SWMU # 28 - SLUICE PIT
SWMU # 41 - PCB STORAGE AREA
SWMU # 42 - MAINTENANCE WASTE OIL TANK (CLOSED)
SWMU # 43 - SANITARY WASTEWATER TREATMENT PLANT
SWMU # 44 - TRUCK UNLOADING FACILITY CESSPIT
SWMU # 45 - MAINTENANCE BUILDING CESSPIT

Introduction:

The above grouping of SWMUs are considered to be independent of each other. Therefore, these SWMUs will be described individually, with separate sampling and analytical recommendations. The sampling and analytical recommendations are provided below:

SWMU #15 - Oil Reclamation Facility

Matrix: Soil

Soil sampling within this SWMU will be completed based on a systematic grid at 100-foot centers. Additional random soil sampling will be conducted within each grid.

The above proposed soil sampling effort combines into the following number of sampling locations:

12 soil sampling locations using the systematic sampling grid.
6 soil sampling locations based on random sampling located with the grid.

Sample location depths:

Soil samples will be collected at the above locations at the fill/natural soil interface to a depth of two feet.

Rationale for sampling depths:

- Remediation of spills within the operating record have been documented. These remediation efforts involved the excavation of grossly contaminated soils to the temporary waste pile. However, some residual contamination may exist.
- If residual contamination exists in the SWMU, it will most likely be located at the fill/natural soil interface. Soil samples will be collected at this interface to determine if the soil excavated during the remediation were adequate.
- The two foot depth below the fill/natural soil interface should be sufficient to determined extent of vertical contamination, due to the type of soils which are natural in the area of the facility (i.e., lacustrine soils with high clay content).

Samples collected from this SWMU will be analyzed for constituents with the intentions of using the data for possible risk assessment purposes. Therefore, methods used to analyzed for each of the required constituents will be done so in accordance with RCRA Correction Action Guidance, Human Health Data Quality Levels for RFI Projects memorandum dated June 28, 1994.

The objective to sampling within this SWMU is to determine if any residual contamination exists.

Matrix: Groundwater

Characterization of groundwater in the area of this SWMU will initially be made by using existing information from monitoring wells. Analytical data gathered during the collection of samples from the groundwater monitoring network are extensive. This data will be evaluated according to the QAPP to make certain the data is valid for the use intended. This validation process will include determination of the following historical information:

- Laboratory completing the analysis
- Method used
- Compound analyzed
- Detection limit and reporting limit
- Type of sampling plan explaining how samples were collected
- Type of data (i.e. raw, etc - What type of deliverable package)
- Who evaluated the data.

All of this historical information will be tabulated.

<u>SWMU # 20 - Lab Waste Tank</u>

Matrix: Soil

Two soil samples will be collected from the base of the concrete vault in the downgradient direction of groundwater. Soil sampling locations may have to be modified in the field due to the proximity of other structures in the area of this SWMU.

Samples collected from this SWMU will be analyzed for constituents with the intentions of using the data for possible risk assessment purposes. Therefore, methods used to analyzed for each of the required constituents will be done so in accordance with RCRA Correction Action Guidance, Human Health Data Quality Levels for RFI Projects memorandum dated June 28, 1994.

Matrix: Groundwater

Characterization of groundwater in the area of this SWMU will initially be made by using existing information from monitoring wells. Analytical data gathered during the collection of samples from the groundwater monitoring network are extensive. This data will be evaluated according to the QAPP to make certain the data is valid for the use intended. This validation process will include determination of the following historical information:

SWMU #41 - PCB Storage Area

Matrix: Soil

Surface soil samples will be collected within the SWMU in the direction of surface water flow. Two samples will be collected in locations biased towards the most probable location of contamination.

Soil samples will be collected at 6 inches below the surface to 2 feet, depending on compounds sampled.

Samples collected from this SWMU for laboratory analysis will be analyzed for constituents with the intentions of using the data for possible risk assessment purposes. Therefore, methods used to analyze each of the required constituents will be done so in accordance with RCRA Correction Action Guidance, Human Health Data Quality Levels for RFI Projects memorandum dated June 28, 1994.

The objective to sampling within this SWMU is to determine if any residual contamination exist and if it does to what extent (vertical and horizontal).

Matrix: Groundwater

Characterization of groundwater in the area of this SWMU will initially be made by using existing information from monitoring wells. Analytical data gathered during the collection of samples from the groundwater monitoring network are extensive. This data will be evaluated according to the QAPP to make certain the data is valid for the use intended. This validation process will include determination of the following historical information:

- Laboratory completing the analysis
- Method used
- Compound analyzed
- Detection limit and reporting limit
- Type of sampling plan explaining how samples were collected
- Type of data (i.e. raw, etc - What type of deliverable package)
- Who evaluated the data.

All of this historical information will be tabulated.

SWMU #42 - Maintenance Waste Oil Tank (Closed)

Matrix: Soil

This SWMU was removed. In order to confirm no contamination exists, surface soil samples will be collected. One soil sample will be collected in the center of the former location of the tank and the other sample will be biased towards the most probable location of contamination.

- Laboratory completing the analysis
- Method used
- Compound analyzed
- Detection limit and reporting limit
- Type of sampling plan explaining how samples were collected
- Type of data (i.e. raw, etc - What type of deliverable package)
- Who evaluated the data.

All of this historical information will be tabulated.

SWMU # 28 - Sluice Pit

Matrix: Soil

Soil samples will be collected in each direction around the SWMU. Four soil samples will be collected at the base of the steel box.

Samples collected from this SWMU for laboratory analysis will be analyzed for constituents with the intentions of using the data for possible risk assessment purposes. Therefore, methods used to analyze each of the required constituents will be done so in accordance with RCRA Correction Action Guidance, Human Health Data Quality Levels for RFI Projects memorandum dated June 28, 1994.

The objective to sampling within this SWMU is to determine if any residual contamination exists and if it does to what extent (vertical and horizontal).

Matrix: Groundwater

Characterization of groundwater in the area of this SWMU will initially be made by using existing information from monitoring wells. Analytical data gathered during the collection of samples from the groundwater monitoring network are extensive. This data will be evaluated according to the QAPP to make certain the data is valid for the use intended. This validation process will include determination of the following historical information:

- Laboratory completing the analysis
- Method used
- Compound analyzed
- Detection limit and reporting limit
- Type of sampling plan explaining how samples were collected
- Type of data (i.e. raw, etc - What type of deliverable package)
- Who evaluated the data.

All of this historical information will be tabulated.

Soil samples will be collected at 6 inches below the surface to 2 feet, depending on constituents sampled.

Samples collected from this SWMU for laboratory analysis will be analyzed for constituents with the intentions of using the data for possible risk assessment purposes. Therefore, methods used to analyze each of the required constituents will be completed in accordance with RCRA Correction Action Guidance, Human Health Data Quality Levels for RFI Projects memorandum dated June 28, 1994.

The objective to sampling within this SWMU is to determine if any residual contamination exist and if it does to what extent (vertical and horizontal).

Matrix: Groundwater

Characterization of groundwater in the area of this SWMU will initially be made by using existing information from monitoring wells. Analytical data gathered during the collection of samples from the groundwater monitoring network are extensive. This data will be evaluated according to the QAPP to make certain the data is valid for the use intended. This validation process will include determination of the following historical information:

- Laboratory completing the analysis
- Method used
- Compound analyzed
- Detection limit and reporting limit
- Type of sampling plan explaining how samples were collected
- Type of data (i.e. raw, etc - What type of deliverable package)
- Who evaluated the data.

All of this historical information will be tabulated.

<u>SWMU # 43 - Sanitary Wastewater Treatment Plant</u>

Matrix: Soil

One soil sample will be collected from the base of the vault in the downgradient direction of groundwater.

The sample collected from this SWMU will be analyzed for constituents documented to be used in the SWMU, with the intentions of using the data for possible risk assessment purposes. Therefore, methods used to analyzed for each of the required constituents will be done so in accordance with RCRA Correction Action Guidance, Human Health Data Quality Levels for RFI Projects memorandum dated June 28, 1994.

Matrix: Groundwater

Characterization of groundwater in the area of this SWMU will initially be made by using existing information from monitoring wells. Analytical data gathered during the collection of samples from

the groundwater monitoring network are extensive. This data will be evaluated according to the QAPP to make certain the data is valid for the use intended. This validation process will include determination of the following historical information:

- Laboratory completing the analysis
- Method used
- Compound analyzed
- Detection limit and reporting limit
- Type of sampling plan explaining how samples were collected
- Type of data (i.e. raw, etc - What type of deliverable package)
- Who evaluated the data.

All of this historical information will be tabulated.

SWMU # 44 and 45 - Truck Unloading Facility and Maintenance Building Cesspits

Matrix: Soil

One soil sample will be collected from the base of each cesspits in the downgradient direction of groundwater.

The sample collected from each of these SWMUs will be analyzed for the constituents documented to be within the SWMUs, with the intentions of using the data for possible risk assessment purposes. Therefore, methods used to analyzed for each of the required constituents will be done so in accordance with RCRA Correction Action Guidance, Human Health Data Quality Levels for RFI Projects memorandum dated June 28, 1994.

Matrix: Groundwater

Characterization of groundwater in the area of this SWMU will initially be made by using existing information from monitoring wells. Analytical data gathered during the collection of samples from the groundwater monitoring network are extensive. This data will be evaluated according to the QAPP to make certain the data is valid for the use intended. This validation process will include determination of the following historical information:

- Laboratory completing the analysis
- Method used
- Compound analyzed
- Detection limit and reporting limit
- Type of sampling plan explaining how samples were collected
- Type of data (i.e. raw, etc - What type of deliverable package)
- Who evaluated the data.

All of this historical information will be tabulated.

AGENDA

1/17/95
9-12 AM

1. Personal Introductions - (Michael Curry)

2. a. Overview of Site (Michael Curry)
   b. History/Background (Michael Curry)
   c. Areas of Interest (Richard Zweig)

3. Project Objectives (Richard Zweig)

4. Types of Investigations (Richard Zweig)

5. Laboratory/Analysis (Richard Zweig/Michael Curry - BEC Labs)

6. QAPP (BEC Labs)

7. Risk Assessment (Ecological, Human Health, etc.)

8. Other .....

Chemical Waste Management, Inc.
3956 State Rt. 412
Vickery, Ohio 43464
419/547-7791

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 738 360 201

January 24, 1989

Mr. James Saric
U.S. Environmental Protection Agency
Region V
230 S. Dearborn Street
Chicago, IL 60604

Re: Investigation at Hole SS-10
Final Report

Dear Mr. Saric:

On February 10, 1988, Chemical Waste Management's (CWM) Vickery, Ohio Facility submitted a plan for further investigation of Hole SS-10.

Attached is a report on the final results of that investigation. The results indicate that the organic results previously detected are the result of dragdown during the original installation. In keeping with the intent of paragraph 18 of the Consent Decree, CWM will shortly submit plans for plugging of all remaining SS holes and wells.

Should you have any questions, please feel free to call.

Sincerely,

CHEMICAL WASTE MANAGEMENT, INC.

Kirk A. Stemple
Technical Manager

KAS/tr
Attachment

cc w/att: Timothy Fishbaugh-OEPA NWDO
Timothy Krichbaum-OEPA CDO

cc wo/att: Charles Hull-OEPA NWDO
Jeffrey Steers-OEPA NWDO
James Durrett-Golder Associates
John Clerici-Golder Associates
David Coker-CWM

RECEIVED
JAN 30 1989
OFFICE OF RCRA
Waste Management Division
U.S. EPA, REGION V

CONVERSATION RECORD

TIME	DATE
2:00	6/9/88

TYPE
☐ VISIT ☐ CONFERENCE ☒ TELEPHONE
☒ INCOMING
☐ OUTGOING

Location of Visit/Conference:

NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU	ORGANIZATION (Office, dept., bureau, etc.)	TELEPHONE NO:
Mary Zdanowicz	ETC	201/225-5600

ROUTING	
NAME/SYMBOL	INT

SUBJECT
Account person for CWM-Vickery

Chemical Waste Management, Inc. - Vickery

SUMMARY
I asked Mary if ETC had stamped "preliminary" on the April 1988 sample results for Chemical Waste Management, Inc. - Vickery. Mary stated that on occassion, ETC will send out reports or more often partial reports that are marked preliminary. This may mean that the QA/QC has been performed in the lab but not yet checked by the QA/QC department. When I described the April 1988 sample results to Mary and explained that results for previous sampling events would arrive first marked "preliminary" and then arrive a couple of months later without the "preliminary" stamp, Mary stated that it sounded more like Chemical Waste Management had placed the "preliminary" stamp on the reports. I asked Mary whether the April 1988 sample results were considered preliminary by ETC or has the QA/QC been checked? She stated that it would take some research to answer the questions and that she felt uncomfortable discussing the matter without first consulting, Kirk Stemple or someone in the corporate office since Kirk was out this week. She said she would do the best she could.

ACTION REQUIRED

NAME OF PERSON DOCUMENTING CONVERSATION	SIGNATURE	DATE
Craig Liska	Craig J. Liska	6/10/88

ACTION TAKEN

SIGNATURE	TITLE	DATE

Chemical Waste Management, Inc.
3956 State Rt. 412
Vickery, Ohio 43464
419/547-7791

February 10, 1988

RECEIVED
FEB 16
U.S. EPA, REGION V
WASTE MANAGEMENT DIVISION
OFFICE OF THE DIRECTOR

CERTIFIED MAIL
RETURN RECEIPT REQUESTED
P 741 310 595

Ohio Environmental Protection Agency
Northwest District Office
1035 Devlac Grove Drive
Bowling Green, Ohio 43402
Attention: Mr. Jeffrey Steers

Dear Mr. Steers,

Attached is a revised plan for the investigation of Hole SS-10 in response to your comments of September 11, 1987. Hole SS-10 is one of 18 holes installed pursuant to the CWM/OEPA Consent Decree, Section IX (18)(A) through (D). Please note that the proposed investigation includes three shallow sample holes and one monitoring well. Previous correspondence from Chemical Waste Management (CWM) was apparently misunderstood and your response indicated the explorations should include four monitoring wells. Because of the misunderstanding, we have had our consultant, Golder Associates, review the situation at SS-10 and prepare the attached plan.

As is pointed out in Golder Associates' plan, the past identification of volatile organics at SS-10 is believed to be a localized situation which resulted from minor past spills and/or leaks in the gravel roadway. Because of the installation procedures required by OEPA for the SS series holes, these liquids entered SS-10 as it was being drilled and there was no permitted mechanism for effectively removing them. Thus, as pointed out by Golder Associates, the reported detection of organics from Hole SS-10 are believed to have been caused by the near surface water entering the borehole and are not a reflection of potential groundwater quality at the deeper level sampled by SS-10. The proposed program is designed to confirm this situation.

We apologize for any confusion which may have resulted from the previous correspondence on this matter, but believe the program proposed by our consultant is better focused and investigates the conditions surrounding SS-10, providing better information to understand the situation than would be available from the program previously proposed by CWM.

Should you have any additional questions or comments, please feel free to give me a call at (419) 547-7791.

Sincerely,

CHEMICAL WASTE MANAGEMENT, INC.

Kirk A. Stemple

Kirk A. Stemple
Technical Manager

KAS/kt

Attachment

cc/Charles Hull, OEPA/NWDO, w/attachment
Dave Coker
Craig Liska, USEPA, w/attachment
File

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: AUG 19 1983

RECEIVED
AUG 30 1983
WASTE MANAGEMENT BRANCH

SUBJECT: Chemical Waste Management - Vickery, Ohio Facility
Site Investigation Update - August 18, 1983

FROM: Michael J. Walker
Assistant Regional Counsel

TO: Legal File

Since the settlement conference scheduled for August 16, 1983 with CWM, U.S. EPA and OEPA had been cancelled at the request of OEPA, Jeffrey Miller requested the opportunity to speak with me concerning a few matters that they planned to discuss at the August 16 meeting. Meeting with Mr. Miller and myself were Kathy Trent, site environmental specialist, and Lee Archambeau, General Manager of the Vickery facility. Please Note: Issues requiring immediate action are underlined.

1. Miller reported that dioxin, 2,3,7,8-tetra-chloro-p-dioxin (TCDD) had been identified at the site at levels as high as 18 ppb. These dioxins were found in the sludges and liquids of ponds four and five. No hard copy of the analysis was available athough the presence of dioxin has been factored into the Risk Assessment. A copy of the Risk Assessment section on Dioxin is attached to this memorandum. Miller asked that Karl Bremer call George Vander Velde to discuss the status of EPA's dioxin analysis. Miller said that the OEPA has agreed for the time being that they will not release this data to the public.

2. Trent reported that during the removal of PCB contaminated soil and gravel in the n/w corner of the oil recovery area, CWM discovered that a mixture of oil and water was seeping into the excavated area. Further investigation discovered that there was a 10,000 gallon buried tank filled with PCB contaminated oil and water and an old API separator. In addition, they have discovered various buried transfer pipelines which run to ponds 4, 5 and 6. Beginning on September 6, 1983, CWM would like to begin to excavate this area to remove the contaminated soil, gravel and pipelines. A copy of their proposal is included with this memorandum marked Attachment 2. U.S. EPA needs to react to this proposal and to determine whether we want to have personnel at the site to collect samples during the removal operations.

3. Archambeau presented their proposal for decontaminating the oil storage tanks. This basically seems to involve physical removal of remaining sludges from the tanks by pump or squeegee and then a solvent capable of meeting solubility requirements of 40 CFR §761.43 would be used to flush the contaminated tanks. If after circulating the solvent through the tank the solvent contains less than 50 ppm PCBs, the tank would be considered clean. If the PCB level is higher than 50, the solvent would be removed for incineration at Emelle and the process would be repeated using clean solvent. U.S. EPA needs to comment on this proposal as quickly as possible.

4. Archambeau reported that they have been experiencing "pressure anomalies" in injection well #3, and therefore have terminated its operation pending further testing. In addition, CWM has reached a verbal agreement with OEPA concerning retention of an independent consultant to investigate the integrity of the injection wells. The major concern of CWM at this time concerns the regulation of injection wells by U.S.EPA and OEPA. CWM would like assurances that the planned investigations will satisfy both U.S. EPA and OEPA requirements. Given the current state of federal UIC regulations and state primacy, this appears to be a legitimate request. I request that the technical assignees for this case, either Karl Bremer or Dan Banaszek contact personnel in the Water Division, UIC program to determine what federal interests need to be considered here. I belive this issue warrants a written response.

5. Miller reported that CWM may have found a buyer for the 400,000+ gallons of waste oils containing less than 50 ppm PCB. If needed for the customer, CWM will be asking U.S.EPA to comment on the acceptability of this oil for use in a high efficiency boiler by referencing EPA's own analytical work. We should be sure we have the analysis and tank identification numbers available for sample confirmation.

6. Miller requested that CWM and U.S. EPA jointly pursue a final resolution to the status of the 135,000 gallons of material in tank W-8. He requested that we get the lab people together or on a conference telephone call to resolve this matter since it appears to be strictly a GCMS question.

7. Walker initiated a discussion of the proposed consent decree and levels of decontamination by indicating that U.S EPA had reviewed the six principal options and sub-options and that option 1B, which combined further removal of PCB contaminated liquids to Emelle with some on-site disposal, was generally worth pursuing. We also discussed various consent agreements and cleanup proposals, including Aerovox, (Mass.) Cornell, (Mass.) Metal Bank,(Pa.) and Westignhouse (Ind). I tried to distinguish the regulatory difference between "historic" contamination and activities, such as dilution, that take place after the effective date of the regulations. Miller inquired as to whether "historic" PCBs were any less dangerous than PCBs spilled after 1978. This is an issue that we are confronting nearly every day and one which we must address directly in the current efforts to define a consistent "how clean is clean" policy. I will raise this issue to David Hannemann in Pesticides & Toxic Substances.

8. Regarding CWM's position that all data is entitled to treatment as either confidential business information under TSCA, trade secrets, or information voluntarily submitted incident to settlement negotiations, I advised Miller that EPA was in the process of concluding this review and that it appeared as though most material would probably be protected. I explained that it was likely that the Wall Street Journal might consider a law suit to obtain access to the information. I will explore a compromise position with WSJ.

9. All parties agreed that negotiations proceeding to a Consent Decree must be resumed in earnest. CWM and U.S. EPA will call OEPA to establish a negotiation session in Columbus, Ohio in the next two weeks.

Attachments

cc: Schaefer	Constantelos	Wrich
Ullrich	Stringham	Bremer
Andersen	Banaszek	
Grimes	Brossman	

Attachment 1

APPENDIX D

POSSIBLE RISKS POSED BY TCDD

After the risk assessment of PCBs presented in this report was completed, trace quantities (up to 18 ppb) of 2,3,7,8-tetrachloro-p-dioxin (TCDD) were reported as having been identified in sludges from lagoons 4 and 5. In many respects, the biological effects of TCDD and PCBs are similar but TCDD is roughly 100,000 times more potent than PCB mixtures of the type found in sludges at the OLD site (Parkinson and Safe 1981). But, the intrinsic hazard posed by TCDD at concentrations of 5-18 ppb are somewhat greater than those posed by PCBs at concentrations around 100 ppm. However, this difference is at least partially offset by the fact that TCDD is less volatile than PCBs, is more strongly adsorbed to surfaces, and is less liable to move in groundwater. Hence the risk posed by TCDD at the level recorded at the OLD site are probably of the same order of magnitude as those posed by PCB. With appropriate changes, the conclusions drawn in this report about the risks posed by PCBs are equally applicable to TCDD.

Attachment 2

Chemical Waste Management Inc.

August 15, 1983

MEMORANDUM

TO: George Vander Velde

FROM: Kathy Trent Kathy

SUBJECT: Proposed Sampling Plan
Oil Recovery Facility,
Vickery, Ohio

I. Problem Identification

On July 21, 1983, the Operations Manager was instructed to initiate removal of soil and gravel material in the northwest corner of the oil recovery facility as part of the remedial program. The USEPA had contended that the soil in this area was contaminated. Results from E.T.C. indicated a 60 ppm level of PCB's. It was decided to remove the material for disposal off-site to Emelle. The soil and gravel was stockpiled on a viscreen liner and covered with viscreen. A clay berm surrounding the stockpile is in place until this material is removed to Emelle.

From July 25 through July 27 a water-oil mixture was noted seeping into the excavated area. The seepage was considered to be coming from the area underlying the reactor tanks and an unused buried separation tank and leach bed. Operations requested that the Technical Manager investigate the possibility that the seepage was generated from the separation tank.

Samples were collected and analyzed from the separation tank and leach pipe. The on-site lab reported PCB concentrations as follows:

Separation Tank

27.7 ppm Arachlor 1254
78.0 ppm Arachlor 1232

Leach Pipe

295 ppm Arachor 1254
310 ppm Arachor 1242

This information prompts further investigation and clarification of possible PCB contamination in the following areas due to probable interconnections through buried french drains and processing patterns:

Reactors
Wet Well
Oil Separation Tank
Leach Bed
Concrete Pit
Buried Transfer Lines

All of the above items are depicted on the attached figures which involved the past and recent use of the oil recovery facility.

The methodology employed in oil recovery required incoming oil to either be directly off loaded into storage tanks or to be refined through heat processing in the reactors. The reactors would separate the oil and water with the oil being transferred in the past from the reactors through the oil separation tank and finally into storage. The aqueous portion was isolated by the reactors and separation tank for pumping into a concrete pit. When sufficient water, oil and acid bottoms were collected the pit was pumped through buried PVC lines laid in gravel french drains for discharge into closed Pond 6 East in 1977, to Pond 4 from 1977 to 1980 and to Pond 5 from 1980 to the present. Separation tank use was reported discontinued in 1978 because of inadequacy.

Presently, the 10,000 gallon fiberglass tank is reported near full. The tank is laid on a 12-inch concrete pad overlaying 12 feet of gravel surrounded by a french drain and piping to the reactors.

The lines connecting the separation tank to the reactors and concrete pit are reportedly capped.

Currently, water and acid bottoms from the reactors are piped directly for discharge into the concrete pit for later pumping into Pond 5.

The reactors rest on footers overlaying a 12' x 4' concrete pad with a sump to collect overflow and spillage. The sump drains through a buried pipe and gravel french drain for discharge to the wet well.

The wet well has been used as a deposit for reactor sludges and reactor overflow if necessary. Periodically, due to rainfall, the wet well has been drawn down by pumping the aqueous level through a buried pipeline in a gravel french drain which connects to the line leaving the concrete pit and discharging to Pond 5.

In summary, the oil recovery facility use of reactors, concrete pit, wet well, separation tank and buried transfer lines are recommended for PCB sampling to clarify any contamination.

II. Sampling Plan

On Thursday, August 12, we met with Larry Brannika of Dames and Moore to review the above situation and to request assistance in developing a systematic sampling plan with the objective of clarifying any PCB contamination related to the oil recovery facility processing activities.

A phased approach to sampling is recommended due to the number of buried lines, drains, and tank.

A. Sample Location Identification

Use of geophysical mapping is potentially recommended to identify buried lines and the extent of gravel french drains. This would allow direct sampling of known pipelines minimizing areas where surface and ground water problems could occur. The use of this mapping is being reviewed by Dames and Moore for applicability.

B. Visual Appearance

Buried lines transferring waste will be uncovered using a systematic approach beginning at one end and alternating with the other end until every 20 to 30 feet is inspected for leakage. Any leakage or evidence of past leakage will be noted for sampling. The presence of oilly substances will indicate a sample should be taken.

C. Sample Collection

When visually noted, a soil sample will be collected. The separation tank, reactor and leach bed areas may require sampling vertically as well as horizontally. This will be determined during actual sampling.

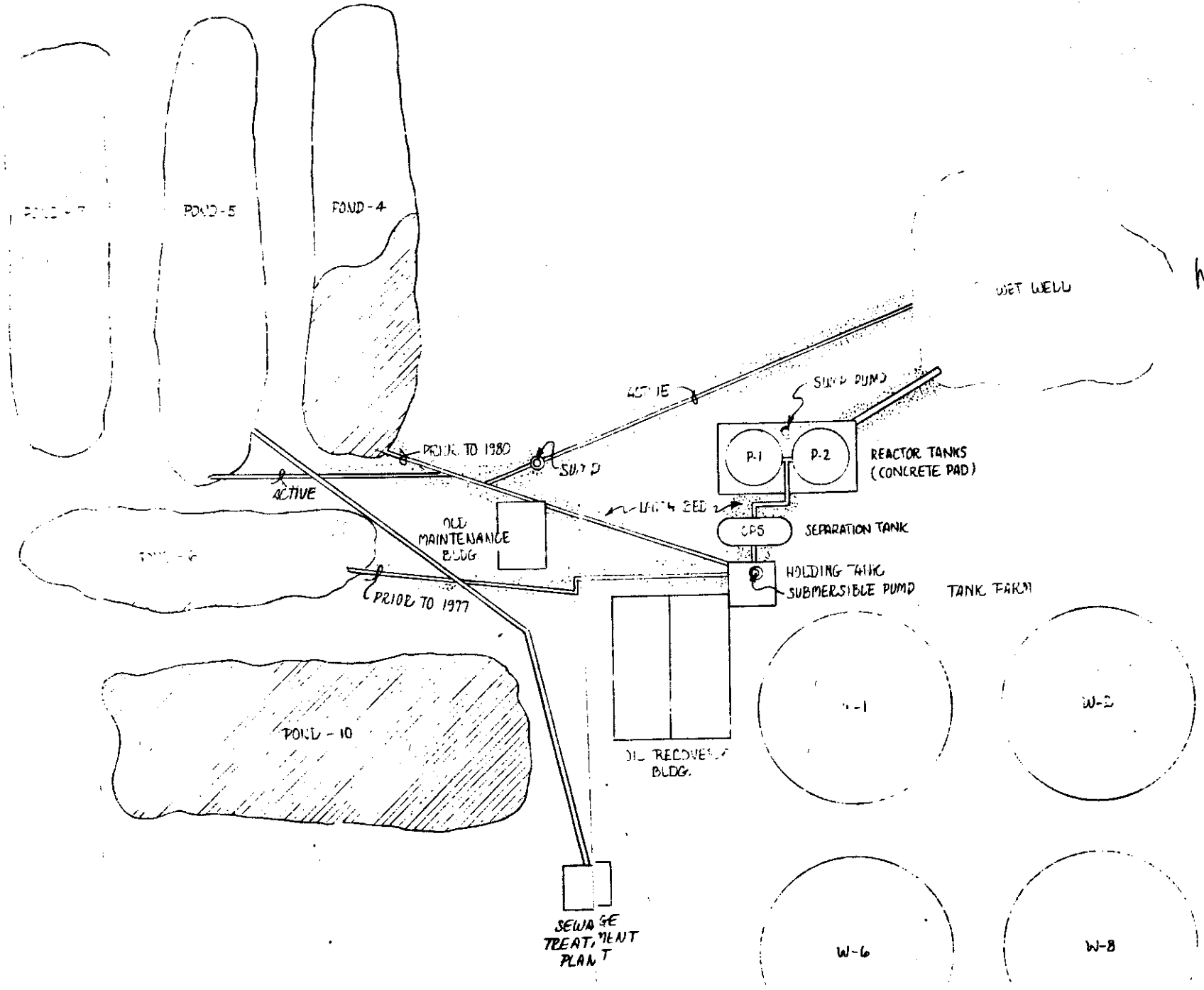
Summary

At this time, the oil recovery facility and processing lines may require additional sampling for PCB contamination based on results of the separation tank in this area. A formal sampling plan is being prepared by Dames and Moore for submittal to CWMI and the Agency for consideration.

KT/kb

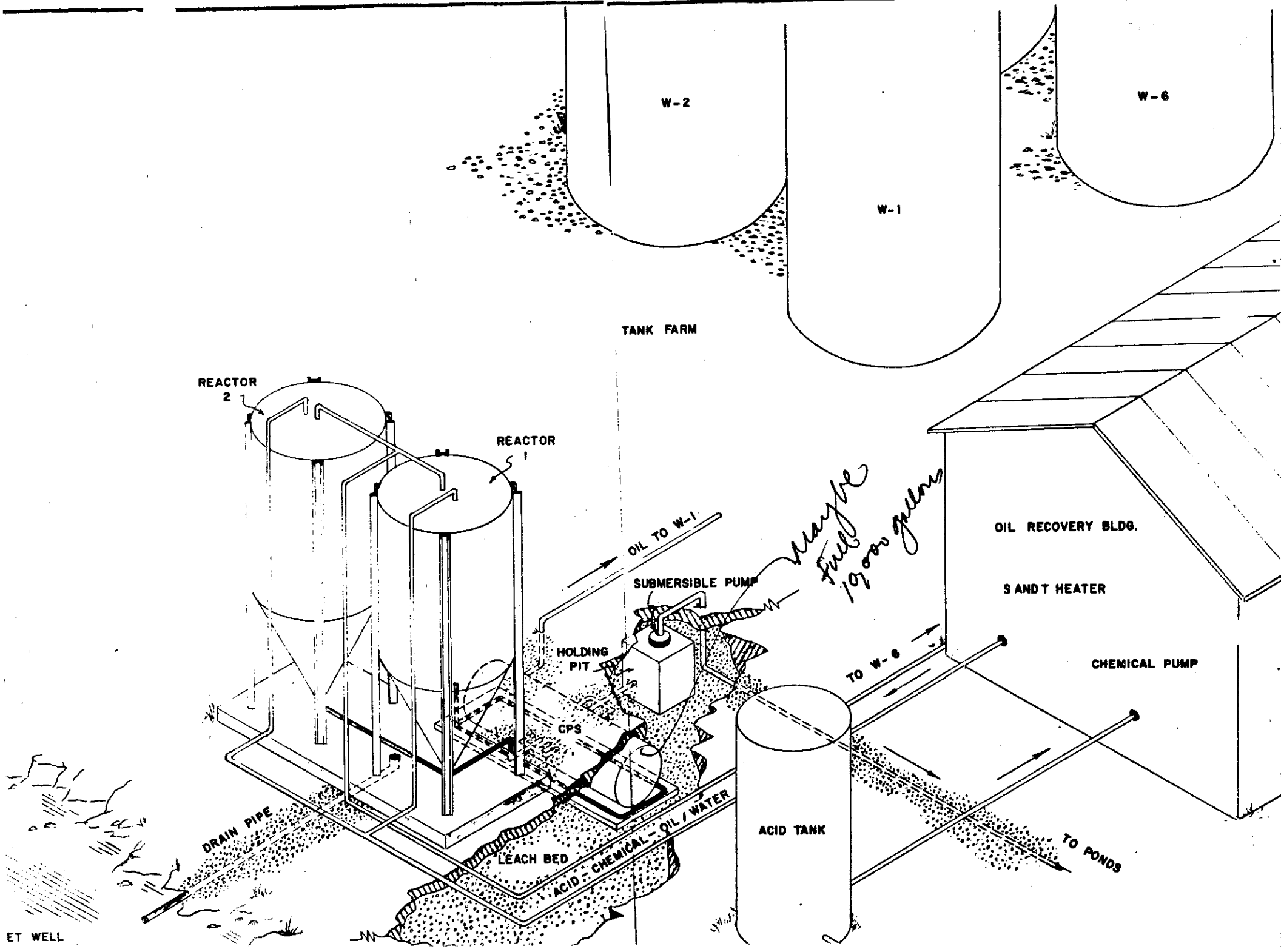
Enclosure

cc: Jeff Miller
Lee Archambeau



higher gradient interconnection

P-1 to #5 via OPS


W-2
W-1
W-6
TANK FARM
REACTOR 2
REACTOR 1
OIL TO W-1
SUBMERSIBLE PUMP
maybe full 10,000 gallons
HOLDING PIT
CPS
OIL RECOVERY BLDG.
S AND T HEATER
CHEMICAL PUMP
TO W-6
DRAIN PIPE
LEACH BED
ACID - CHEMICAL - OIL / WATER
ACID TANK
TO PONDS
ET WELL

Attachment 3

Chemical Waste Management Inc.

DECONTAMINATION PROCEDURE FOR O.L.D.

Step 1 Remove as much as possible of the remaining sludge bottoms from the contaminated tank by pump or squeegee. The removed sludge bottoms are to be stored in a designated storage tank until transportation and disposal can be arranged at Emelle. Contaminated clothing, boots, gloves, etc., from this activity shall be placed in a container for disposal as PCB Items.

Step 2 A solvent capable of meeting the solubility requirements of 40 CFR §761.43 will be used to flush the contaminated tanks. The solvent will be obtained from noncontaminated on-site reserves utilizing either Tank C or Tank W-13. Place approximately 8,000 gallons of the solvent in Tank B. Run a line from Tank B to a pump. From the pump, run a line with a rotating head power washer into the tank to be decontaminated.

Step 3 Run a "return line" from the tank sump back to Tank B.

Step 4 Circulate the solvent until a 30% equivalent volume of the tank has been flushed through the tank.

Step 5 Analyze the rinse solvent for PCB's. If the solvent has less than 50 ppm PCB's (based on the detection limit of 10 ppm) the tank will be considered decontaminated and the solvent will be used to decontaminate additional tanks by repeating the same procedure. If the solvent contains 50 ppm or greater PCB's, place the solvent in the designated PCB storage tank. Dispose of solvent for Emelle and repeat process using 8,000 more gallons of clean rinse solvent and repeat the flushing.

NOTE: Any exterior surfaces requiring decontamination will be swabbed with an appropriate solvent. Any contaminated rags, clothing, etc., used in the decontamination project will be disposed of as per 40 CFR §761.10.

KT/dw
8/17/83