RRD OPERATIONAL MEMORANDUM NO. 2
FREQUENTLY ASKED QUESTIONS
February 2005

OPERATIONAL MEMORANDUM (OpMemo) NO. 2 CONTACTS:

Questions on the applicability of the OpMemo to specific site conditions should be directed to the MDEQ project managers or to Patty Brandt, brandtp@michigan.gov 517-373-4710.

Questions regarding the applicability of OpMemo 2 to Baseline Environmental Assessments may be directed to Rhonda Klann, klannr@michigan.gov 989-686-8025 extension 8302 or, Jeanne Schlaufman, schlaufmanj1@michigan.gov 734-953-1527.

Questions regarding MDEQ Laboratory Standard Operations Procedure #213 for Fine and Coarse Lead Soil Sampling may be directed to Sandra Gregg, greggs@michigan.gov 517-335-9800.

GENERAL APPLICABILITY OF THE OPMEMO

The OpMemo provides direction for response activities pursuant to Part 201, corrective action pursuant to Part 213, and site assessments pursuant to Part 211. The answers provided in this document apply to all programs unless specified otherwise. Terms defined in the OpMemo have the same meaning when used in this document.

How will this new OpMemo affect projects that are ongoing (e.g., investigation or monitoring) as of the date that this OpMemo becomes effective?

OpMemo No. 2 contains the MDEQ's published list of analytical target detection limits (TDLs) for certain hazardous substances and available analytical methods that are capable of achieving the target detection limits in accordance with R 299.5203(l). The effective date of the OpMemo was extended to February 1, 2005, to allow 90 days for laboratories to prepare and sampling plans to be adjusted for changes in methods and detection limits.

OpMemo No. 2 also designates consistent collection, sampling, and analysis protocols for certain substances and circumstances. While other protocols may be acceptable, the OpMemo designates protocols that are acceptable without further MDEQ approval. While RRD recommends discussions with RRD project managers prior to the use of other protocols, nothing in the Operational Memorandum prohibits a party from undertaking response actions without prior approval. However such action does not relieve the person of liability for further response actions if upon review the MDEQ determines further actions are required.

The TDLs are established under rule provisions. Achieving the TDLs is critical for Part 211 site assessment and Part 201 and Part 213 site investigation activities where the objective is the characterization of the nature and extent of contamination and or compliance with cleanup objectives. The sampling and analysis specifications identify acceptable protocols to facilitate gathering the information necessary for the department to determine compliance with applicable

provisions of Part 201, Part 211, and Part 213. The representativeness of data from previously conducted investigation or monitoring activities may require verification if protocols other than those contained in the OpMemo were used.

Is this OpMemo applicable to due diligence performed as part of the BEA process?

The OpMemos were developed with the emphasis on the statutory requirements to define the nature and extent of contamination at a Part 201 or Part 213 facility, to determine relevant exposure pathways, compliance with applicable criteria, and appropriate response actions to remediate an existing release. Part 201 defines a BEA as "an evaluation of environmental conditions which exist at a facility at the time of purchase, occupancy, or foreclosure that reasonably defines the existing conditions and circumstances at the facility so that in the event of a subsequent release, there is a means of distinguishing the new release from existing contamination." This is not the same objective as the OpMemo.

Data collected for due diligence, and BEAs must be capable of supporting the conclusions that are being drawn from the sample results. Generally, a data set is collected for these purposes to provide answers to the following fundamental questions:

1) Is the property a facility?
2) Are the hazardous substances the new owner/operator will use already present on the property?
3) How will a new release be differentiated from existing contamination?

When a data set is collected to determine whether a property is a facility, or whether any hazardous substances that may be utilized by the owner/operator in the future are currently present on the property, it must be representative of the conditions at the site and be compared to generic residential criteria. The data do not need to define the nature and extent of a release or determine whether an existing release has been remediated. However, if the data used to make these determinations do not follow the protocols in Op Memo 2, and evidence of contamination is found in the future, the data may or may not be sufficient to support the defense from liability. For example, if a party is investigating a former service station property and does not look for oxygenates, metals or PCBs and these compounds are found to be present in the future, reliance on liability protection through due diligence or a BEA may be jeopardized. Data collected to differentiate a new release from existing contamination must be sufficient to support the methodology established in the BEA, which is entirely different from other purposes discussed, and must be tailored to meet the specific needs of that BEA. Data used to evaluate compliance with Due Care obligations should follow Op Memo 2 guidelines. Additionally, if different protocols are used, it may affect a party's ability to use the data for other purposes.

TARGET DETECTION LIMITS (TDLs) & DESIGNATED METHODS (ATTACHMENT 1)

If a party has historically sampled for a compound using the previous TDLs, must ongoing sampling be revised to meet the current TDLs?

If monitoring is on-going to determine compliance with cleanup criteria current TDLs must be met for new samples.

Table 1, Footnote 13 for lead soil sampling references the MDEQ Laboratory SOP #213, is this document available?

It is posted on the MDEQ Web at:
http://www.deq.state.mi.us/documents/deq-rrd-OpMemo_2_SoilFractionsPrepForLead.pdf

The MDEQ Lab SOP #213 seems to indicate reference sample analysis for both Standard Reference Materials (SRMs) is necessary. Can you clarify this?

Only one SRM is needed for analysis. The SOP has been revised to include the following description of the current MDEQ Designated Reference Samples:

> All sites, those expected to have soils contaminated with lead bearing materials and those not expected to have soils contaminated with lead bearing materials, are required to use National Institute of Standards & Technology, Standard Reference Material, NIST SRM 2586 as the designated reference sample.

Can other SRMs be used?

Other SRMs cannot be used. The SRM chosen is at the regulatory level of 400 ppm and was the only SRM identified with widespread use. Widespread use adds to the validity of the SRM simply because of the numerous results that are obtained. Additionally, the MDEQ has determined this SRM is traceable and similar information is not available regarding others.

Additional questions regarding the necessity of fine and coarse lead sampling are contained under the heading Sample Collection (Attachment 5).

Table 1, Footnote 21, indicates Selected Ion Monitoring (SIM) analyses must be conducted when no detections are found in the full scale mode. Could you clarify this?

Selected ion monitoring refers to a mode of analysis. SIM analysis allows a GC/MS to be selectively tuned or programmed to detect only specific compounds. This focuses all of the instrument's sensitivity and allows the instrument to achieve lower detection levels, often 10 to 1000 times lower.

To clarify the direction regarding the use of SIMs the footnote has been revised to read:

> Achieving the TDL is critical for site assessment and site investigation activities where the objective is the characterization of the nature and extent of contamination. If GC/MS methods (8260B and 8270C) can not meet the TDL, alternate methods must be used to achieve the TDL. All contaminants identified in the site characterization which exceed generic residential cleanup criteria are contaminants of concern. Once the contaminants of concern are identified at a facility, methods and TDLs can be used to target those specific contaminants. For situations where reporting limits are elevated refer to the previous discussion regarding the use of elevated reporting limits (page 3).

Some methods in Attachment 1 and Attachment 4 have different revision numbers. Which methods are to be used?

The most recent revisions should be used. Attachment 1 designates the available analytical methods the MDEQ has determined capable of achieving the TDLs. Methods in the table of Attachment 4 are listed primarily to clarify the type of method used for environmental samples and preservation used for associated contaminants.

Method 300.1 is listed for chloride and sulfate. Is method 300.0 acceptable?

Attachment 1 (page 2) provides a list of alternative acceptable analytical methods for which prior written approval for their use is not required. Method 300.0 is a method promulgated for use under the Federal Safe Drinking Water Act, and prior written approval is not required.

The method for cyanide is listed as 9019B. Should this reference be 9010B?

This is a typo error. Method 9010B is the correct method and the document has been corrected.

Can method 8270 be used to report 1, 2, 4-Trichlorobenzene?

Method 8270 should not be used to report 1,2,4-Trichlorobenzene. The U.S. EPA has indicated that 1,2,4-Trichlorobenzene results from Method 8270 are lower than results compared to Method 8260, and attributes the difference in the results to volatilization of the contaminant during processing.

Can method SM 4500 for ammonia also be used for waters?

Yes. Method SM 4500 (Standard Methods SM 4500) is promulgated for use under the Federal Clean Water Act and can be used without prior written approval. SM 4500 has several ammonia methods, each specifying the type of matrix and water sources that can be utilized for each method. The methods can be used for those matrix and water sources.

The methods in Standard Methods are severely lacking in quality control specifications and should not be used without including the quality control necessary to validate the data. One of the more recent methods proposed for use by the Clean Water Act that has the required quality control and can be used as a template for quality control applicable to other methods, is: METHOD 350.1, DETERMINATION OF AMMONIA NITROGEN BY SEMI-AUTOMATED COLORIMETRY, Edited by James W. O'Dell, Inorganic Chemistry Branch, Chemistry Research Division, Revision 2.0, August 1993, ENVIRONMENTAL MONITORING SYSTEMS LABORATORY, OFFICE OF RESEARCH AND DEVELOPMENT, U.S. ENVIRONMENTAL PROTECTION AGENCY, CINCINNATI, OHIO 45268

How will the regulators use estimated (J) values when the applicable criterion is lower than the estimated value?

This question implies a situation where the TDL is greater than the risk based criterion. In such a situation Attachment 1, page 2, states that laboratories should report results below the TDL down to the laboratories limits of detection, if concentrations are detected. Appropriate codes must be used to indicate that the results are below the TDL. The results will be interpreted as provided in R 299.5742.

Will reporting of "J" flagged values (estimated concentrations greater than the MDL, but less than the TDL) be acceptable when matrix interference requires that samples be diluted?

Such values should be "J" flagged. Appropriate codes must be used to indicate that the results are below the TDL. The determination that interferences are present may indicate that the sample is contaminated to the extent that no reliable determinations can be made as to whether cleanup criteria are met.

SOIL LEACHING METHODS (ATTACHMENT 2)

When is soil leaching testing required?

Leach testing is <u>not</u> required to demonstrate compliance with applicable criteria if soil concentrations do not exceed the applicable generic groundwater protection criteria. If concentrations exceed applicable soil criteria, additional leach testing may be conducted on select soil samples to determine the potential of contaminants in the soils to leach to groundwater above the most restrictive groundwater criteria.

If a site-specific leach test indicates soils will not likely leach above generic groundwater criteria is it classified as a Tier 1 or Tier II Part 213 closure?

Assuming the leach test is conducted consistent with the specifications provided in this Attachment, a Part 213-closure would be classified a Tier 2 closure based on the site specific leach testing.

What is the "20X rule" referenced in the requirement that TCLP must be used to determine if a waste is characteristically hazardous?

TCLP must be used to determine if there may be Part 111 implications that must be addressed. The Attachment 2 reference to "based upon the 20X rule" (page 2) has been removed from the document because there may be various reasons for considering waste may be characteristically hazardous. There is a 20X rule of thumb for dilution in analysis for determining whether a material that is 100 percent solid has the potential to leach constituents above the TCLP regulatory hazardous thresholds. The 20X dilution provisions are included in the TCLP method (Section 2.2).

A 25 gram coring device to sample volatiles for TCLP is referenced, is there such a device? If not, can multiple coring devices be used?

EnCore™ and others make such a sampling device. Multiple coring devices may be used to collect the 25 gram sample.

Additional questions and answers regarding volatile sampling are contained under the heading Methanol Preservation (Attachment 6).

SAMPLE PRESERVATION, HANDLING, AND HOLDING TIMES (ATTACHMENT 4)

Attachment 4 (page 9) for Chromium VI includes a reference to dry and high moisture soil, for which there are separate holding times. How do we determine what is a dry soil?

Saturated soil and sediment should be treated as high moisture soils. If you are uncertain whether the soil is saturated, then treat it as dry soil.

SAMPLE COLLECTION (ATTACHMENT 5)

SOILS

Laboratories indicate that they can analyze total lead samples and if the totals do not exceed criteria, fine and coarse fraction sampling is not necessary, is that acceptable?

Testing the total sample and comparing to direct contact or soil particulate inhalation criteria is not appropriate. To address lead contamination in Michigan, various governmental agencies were called upon to take action to ensure that steps were being taken to reduce lead poisoning. The State of Michigan's Childhood Lead Poisoning Prevention: A Call to Action directed the MDEQ to review the most recent toxicological and other pertinent data to determine if the current Part 201 residential cleanup criterion is protective and to determine the most appropriate method of soil sampling. The MDEQ as part of the charge to determine the most appropriate method of soil sampling for lead reviewed existing studies and data. EPA's review of lead data from CERLA sites demonstrated that the lead concentrations in the fine fraction often exceed the lead concentrations in the total soil samples. A similar review of Michigan specific data demonstrated the same. The fine fraction is also the portion of the soil most likely to adhere to skin or be inhaled. A potential for the coarse fraction to contain a higher concentration than the fine or total sample also exists. Therefore, the MDEQ Laboratory's standard operating procedure states that both fine and coarse fractions are required to be tested for lead concentrations where lead exposures are evaluated for MDEQ regulatory programs.

The original version of SOP #213 allowed for a "total" analysis and a "fine" analysis with the coarse fraction calculated from the difference. The current version requires analysis of both the fine and coarse fractions with a calculation for total. What was the technical reason for the change?

Sieving the entire sample, weighing and analyzing both the fine and coarse fractions, and reconstructing the total soil concentration using weighted averages is considered more representative of the actual concentrations. To sample for total lead and calculate the coarse

fraction could underestimate or overestimate values by using a select portion of the sample or using a separate sample for the total analysis.

How are laboratories to know when the lead protocols for fine and coarse sample are required?

The OpMemo states that for response actions under Part 201 and Part 213, the fine and coarse fractions must be analyzed separately unless the direct contact and particulate inhalation criteria have been appropriately documented to be not applicable. If the laboratories do not receive any indication of the requirements for the facility, they will need to contact the client and obtain those requirements.

If I indicate I need analysis of the "Michigan 10" metals will the labs automatically do fine and coarse lead samples?

No, the specific lead tests for fine and coarse sampling must be requested from the laboratory. The Michigan 10 metals list is not intended for site investigation and should not be the default for metal analysis. Metal analysis requests should be developed based on site specific conditions.

Are both fine and coarse fractions needed for borings at depth?

It is necessary to analyze both the fine and coarse fractions because the direct contact and particulate inhalation pathways both apply throughout the soil column because of the potential for subsurface soils to be brought to the surface.

Is it necessary to do fine and coarse fractions for verification sampling?

It is necessary to compare the fine and coarse fractions in verification samples for direct contact criteria and particulate soil inhalation criteria.

GROUNDWATER

The OpMemo implies that low flow sampling is to be used for all groundwater sampling unless it can be demonstrated that an alternate method (e.g., properly conducted bailing that purges three well volumes before sampling) produces comparable data. Does this reflect RRD's position regarding groundwater sampling; i.e., is low flow sampling to be used all the time?

The OpMemo provides a sample collection protocol that if documented to have been properly conducted will allow RRD to accept the sample results as representative of site conditions without further justification. Low flow sampling methods are preferred because the method provides the most representative, consistent and defensible groundwater sampling data. The specification of low flow sampling does not preclude the use of other protocols, but does set the expectation that when other groundwater sample collection methods are used they will require further documentation to determine the results are representative of site conditions. Some sampling methods, while acceptable for one situation, may not be acceptable for others. It is important to consider the purpose of the sampling event when determining sample methods to be used. Parties considering the use of alternative groundwater sampling protocols are strongly advised to consult with RRD project managers in advance.

Is low flow sampling going to be required even for routine monitoring, where acquisition of data for assessment of long-term trends does not generally warrant the same level of accuracy and precision as would be critical for proper plume delineation, compliance monitoring or verification sampling?

On a case-by-case basis it may be determined that another method can be substituted for part of a sampling program even if the method is not demonstrated to produce comparable results. For example, if site conditions warrant, it may be acceptable to allow samples to be collected with an alternative method to document decreasing concentrations if the sample results are not

necessary to document compliance with criteria for a relevant pathway. It would not be acceptable to utilize the samples obtained by an alternative method to demonstrate compliance with criteria without additional justification. Prior consultation with a RRD project manager is advised.

What is RRD's position on the use of Geoprobe groundwater sampling results to make a determination if the site is a "Facility"? Similarly, what about the use of alternate groundwater sample collection devices like the Simul-Probe sampler?

Data collected to determine whether a property is a facility must be representative of the conditions of the site. These data do not need to be capable of defining the nature and extent of the release or determining that an existing release has been remediated. However, the use of different protocols may affect a party's ability to use the data for other purposes.

Additional questions regarding applicability of the OpMemo to BEAs are contained under the headings General Applicability and Petroleum Site Characterization.

Are Geoprobe or Simul-Probe methods of groundwater sampling acceptable for site characterization without a demonstration of comparability to standard low flow methodology?

Samples collected with Geoprobe and Simul-probe methods should be used for field investigative purposes and for selecting locations for monitor well placement. Geoprobe/Simul-probe data can be useful for site characterization, however, permanently installed monitor wells allow for repeatability of sampling; geophysical logging; determining aquifer hydraulic characteristics, which are major components of proper site characterization.

Will low flow sampling be required for groundwater sampling utilizing Geoprobing groundwater profiling equipment and/or screened augers?

Generally groundwater characterization objectives, such as to determine compliance with applicable criteria may differ from the objectives of profiling contamination utilizing a geo-probe, "casing pull back", or screened auger. For example, if the characterization objectives are to profile the contamination for the purpose of optimal well screen placement, or screening for the presence or absence of contamination, low flow sampling is not required; however the low flow sampling for collection of samples for comparison to generic cleanup criteria is required unless other methods can be shown to produce similarly representative results.

The Geoprobe is commonly used to collect groundwater samples from borings using a milled slot steel screen or retractable screen device. Because of the small diameter of the Geoprobe drive rods and space occupied by the peristaltic pump tubing inside the rods, it is typically not possible to also lower a water level measuring probe inside the Geoprobe rods during the groundwater purging process. Since a person cannot quantitatively monitor the drawdown inside the rods during the purging, it would seem to prohibit the ability to document that low flow sampling was performed or attempted. Will such samples be considered valid if reviewed by RRD?

The collection of groundwater samples from the borings alone would not be considered representative for samples collected for comparison to generic cleanup criteria. However, in accordance with rule provisions, the GSI pathway may be determined to be not relevant without the installation of permanent monitoring wells if sufficient information is available otherwise. Sufficient information may be provided with an adequate geo-probe investigation, if temporary monitoring wells that allow low flow sampling (i.e., 2") are utilized. The same type of investigation could provide sufficient information for the other groundwater pathways.

When only stab/hand auger/geoprobe points are used for soil and groundwater sample collection for Initial Assessment Report (IAR) investigations and nothing is found in the soils or groundwater, is that acceptable for a Part 213 closure, or do they need to go

back, install permanent wells and low flow sample prior to submission of a Closure Report?

The OpMemo's emphasis is on the statutory requirements to define the nature and extent of the contamination at a Part 201 or Part 213 facility to determine relevant pathways, compliance with applicable criteria, and appropriate response actions to remediate an existing release. The question poses a scenario where the initial site investigation indicates there is no soil or groundwater contamination above applicable criteria. It may not be necessary to install permanent wells and perform low flow sampling if sufficient information regarding the history of the facility is documented, consistent with the provisions of Section 21308a of the NREPA, to determine that the data gathered are an adequate demonstration that the release did not and will not contribute to a groundwater plume that requires additional delineation of the extent of contamination. Specific documentation should include, at a minimum, the following:

- groundwater flow direction has been determined and sample locations are appropriately downgradient and at an appropriate depth to intercept likely contamination.
- no contamination is found in the soil above applicable criteria and the source is abated (tank and soil excavation, etc.) with verification (VSR) samples below applicable criteria
- groundwater samples collected from temporary or stab borings are below all relevant groundwater criteria
- no aesthetic (e.g., odor) impact remains

What if the well fails the low flow assumptions, i.e., there is not enough sampling depth to maintain sufficient water levels above and below the pump intake, stabilization does not occur before the water is lowered below the well screen, or the well is purged dry?

Low flow must be used when possible. The method referenced for low flow discusses options when re-charge is very slow. When these options are not practical, the RRD project manager should be contacted, preferably during the sampling plan development for acceptable options.

What will RRD accept for documentation that another methodology is acceptable? Will site-specific data be required for comparison of low flow results with the result of the proposed alternate methodology, or will RRD accept references to scientific/technical studies that provide general support for the proposed alternate methodology?

Site specific data generally will be necessary to document the alternative methodology is representative. RRD experience with scientific or technical studies that provide general support for alternate methods has been that unacceptable variability in actual applications to differing site conditions preclude accepting them without further site specific justification.

How is data qualified if the low flow methodology can not be or was not used?

It is prudent to discuss options with the RRD project manager before the sampling event to establish the appropriate documentation that will be included in the applicable report. If that has not occurred the report will need to include adequate justification for RRD's concurrence of why the sampling conducted is representative.

The EPA low flow groundwater sampling procedures states that turbidity should be used as one of the standard field measurements to document groundwater stabilization. As the OpMemo discusses, the stabilization of turbidity can be difficult. In consideration of this potential problem, would <10 percent difference for three consecutive readings, or any value below 20 NTUs if the other field parameters have stabilized be acceptable?

Yes, turbidity less than 20 nephelometric turbidity units (NTUs) may be acceptable as long as all other field parameters have stabilized. The low flow, low-level mercury sampling protocol uses turbidity within ± 10 percent for three consecutive measurements conducted at 3 to 5 minute intervals.

Can a subset of the parameters be used for determining stabilization in the procedure for low-flow sampling?

The standard parameters used to determine when formation water is flowing are turbidity, pH, specific conductivity, oxidation-reduction (redox) potential, temperature and dissolved oxygen. Except for the options for turbidity, no subset of these parameters or deviation of stabilization will be accepted.

Are peristaltic pumps acceptable to use for low flow sampling? The U.S. EPA protocol referenced seems to indicate that these types of pumps are not favored due to the potential for degassing of volatiles from samples.

Peristaltic pumps will be acceptable for low flow sampling in circumstances when the site conditions are amenable to its use. The RRD recommends the use of a continuous flow pump to avoid the concerns of agitation for volatiles, and to allow sampling of groundwater depths greater than 20 feet. When peristaltic pumps are used and volatiles are a concern the sampling plan should assure drawdown rates and the pump intake placement minimize degassing potential. The use of inertial lift foot-valve type samplers is inappropriate.

Is Teflon/Teflon lined tubing required for low flow sampling systems? The referenced procedures imply this. Can less expensive tubing be used if it is discarded between sampling points?

Teflon or Teflon lined tubing is preferred if the tubing is intended to be reused because of its ease for decontamination. If tubing is intended to be disposed between sampling points the use of chemically inert disposable tubing is acceptable.

Why is low flow sampling and total analysis necessary for metals?

A low flow sampling technique for analysis of metals minimizes turbidity. When turbidity is minimized the sampler can reduce and or avoid the entrainment of suspended materials which are not representative of the actual mobile chemical constituents in the formation. Also, when filtering metal samples to obtain dissolved metals data, most of the naturally entrained colloidal particles in the groundwater are removed. This inappropriately results in a lower concentration of mobilized metals. Further explanation can be found in Ground Water Sampling for Metals Analyses by Robert W. Puls and Michael J. Barcelona, EPA/540/4-89/001, March 1989.

Why are total concentrations used for criteria compliance and dissolved concentrations for MNA determinations? STD previous guidance included only dissolved samples?

Groundwater criteria are based on total concentrations. It is correct that dissolved iron concentrations are necessary to document monitored natural attenuation (MNA). In an anaerobic natural attenuation process, the bacteria uptake ferrous iron (dissolved iron) more readily than ferric iron (particulate iron). Therefore, it is necessary to sample for both total iron and dissolved iron if MNA is the remedy for the site.

If filtering is necessary should the filtering occur in the field or at the lab?

Filtering should not be a fix for poor well construction or poor sampling techniques. If filtering is determined appropriate for sampling a specific well, the filtering should occur in the field prior to preservation and transportation. In-line filtration is recommended.

The OpMemo does not indicate a standard filter size (e.g., 0.45 microns)?

Attachment 5 states any necessary filtration should be accomplished using a filter with a large enough pore size to allow naturally suspended particles to pass through the filter, and that some preliminary testing may be required to determine the appropriate filter size. Historically a 0.45 micron filter has been used, but it may in many cases remove naturally suspended particles and conditions may require larger or smaller sized filters. In specific cases where the concentration of contaminants listed in R 299.5750 footnote (AA) is to be compared to groundwater contact

criteria, a sample should be collected for dissolved contaminant analysis and should be filtered, generally using a .45 or smaller filter (page 5).

For the contaminants that have groundwater contact criteria (GCC) based upon dermal absorption of the dissolved phase (R 299.5750 footnote (AA)), if concentrations from totals do not exceed GCC would dissolved samples be required? Can filtered samples be collected but not analyzed unless totals exceed the criteria?

Total samples may be used as a screening tool to determine if dissolved concentrations would be expected to exceed criterion. Subsequent analysis of filtered samples for dissolved concentrations can occur so long as holding times are not exceeded.

For the GCC contaminants where filtering is required, the OpMemo indicates that filters of appropriate materials should be used to ensure the filter does not absorb dissolved contaminants that are not attached to particles, and that glass filters with no binders are acceptable and recommended. Are glass filters available?

There are manufacturers of glass filters with no binders, although the minimum pore size for many is 1 micron. If needed, a 0.45 micron pore size glass filter with no binder is available from Whatman GMF filter.

What is the standard method for abandoning groundwater monitoring devices?

The manner satisfactory to MDEQ for the abandonment of monitoring wells, piezometers, boreholes, and other monitoring devices that present potential for contaminant migration are the procedures as described in ASTM Standard D 5299-92 (Standard Guide for Decommissioning Ground Water Wells, Vadose Zone Monitoring Devices, Boreholes, and other Devices for Environmental Activities).

QUALITY ASSURANCE AND QUALITY CONTROL

Is QA/QC required to validate BEA data?

QA/QC data are needed to determine whether the analytical results are representative of site conditions. False positives, false negatives, and otherwise inaccurately reported concentrations are possible. In the case of a site assessment for BEAs or 'facility' determinations, it may be possible to use such data as it does not have to be capable of defining the nature and extent of contamination or determining that an existing release has been remediated. For data that will be used to differentiate a new release from existing contamination, QA/QC data will be necessary for comparison to future data sets. The future use of BEA data collected without QA/QC data would be very limited if the data can not be determined to be representative of site conditions, and may not be sufficient to support the defense from liability.

Additional questions regarding applicability of the OpMemo to BEAs are contained under the headings General Applicability and Petroleum Site Characterization.

Is the MS/MD QA/QC acceptable from a batch at the laboratory or must it be specific to a site?

The matrix spike/matrix spike duplicate QA/QC samples must be specific to the site. The matrix spike measures the ability of the laboratory and method to recover the correct concentration from the media being sampled. This could vary from site to site.

Do equipment blanks need to be collected if dedicated sampling equipment is used; e.g., where dedicated tubing has been installed for sampling with a peristaltic pump? Some clients have opted to go with dedicated equipment, in part, to avoid these associated costs.

No, if it is verified that all equipment that may come in contact with the sample is dedicated to the sample location then no equipment blank is necessary. However, equipment blanks are required when the equipment used for the collection of the samples are used, cleaned and then re-used, or simply re-used for the collection of other samples. With peristaltic pumps, unlike most other pumps that have metal parts that may come in contact with the sample, only the tubing comes into contact with the sample. When the tubing is dedicated to a sampling location there is no need for an equipment blank sample. When the tubing is used for one sample and then disposed, information that documents that the tubing is chemically inert will need to be included with the sampling results. Collecting equipment blank samples during a sample event can provide this information if it is not otherwise readily available.

Is RRD requiring the collection of field blanks for every project, every sampling event, or only when environmental conditions could potentially affect the samples? In addition, it seems that collection of field blanks is not warranted for all analytical parameters.

Field blanks are required for each matrix and each analytical group for every sampling event, unless waste containers or other high concentrations are being sampled. Minor ambient concentrations of contaminants can affect sample results, even if samples are handled properly at all times. Since all conclusions and recommendation for a facility rely on the data results, field blanks must be collected and analyzed for each sampling event to assure the quality and integrity of the data.

Will RRD be requesting information regarding QA/QC data (expiration dates, batch numbers, etc.) for containers, preservatives etc., from laboratories involved in projects as part of consultants reports?

Reports must contain standard laboratory reporting on the analysis results for the QA/QC samples (including recovery sheets) but don't typically need to include the documentation on expiration dates, batch numbers, etc., or field logs. However, if there is some other indication that there may be a concern, then all pertinent QA/QC information must be provided for MDEQ review. More direction on what QA/QC documentation must be provided within Part 213 reports, and what must be available if the MDEQ requests, is being developed.

Will RRD be requesting documentation of calibration for instrumentation as part of the consultants reporting process?

A brief description of the sampling methods used and instrument calibration should be included in the text of reports; however, other documentation does not necessarily need to be included. Other documentation, including field notes and instrument logs, must be available if requested by the MDEQ.

METHANOL PRESERVATION (ATTACHMENT 6)

Are the use of EnCore™ sampler or similar soil coring samplers no longer allowed?

RRD does not recommend the use of soil coring devices for collection and transportation of samples for initial site characterization where the objectives include establishing the contaminants of concern or for response activities where the objectives are to demonstrate final compliance with cleanup criteria. However, the EnCore™ sampler and similar soil coring devices may be used as long as the samples are immediately preserved in the field (methanol preservation or low level samplers). The RRD may accept results using the soil coring devices to transport samples to the laboratory, providing the requirements listed in Attachment 6 (page 3) are documented.

In reviewing options for evaluating the leachability of volatiles to groundwater, soil coring devices, while not an ideal solution, were determined the best available option. Using methanol preserved soil samples may overestimate volatile concentrations due to methanol being an aggressive extractant. Transporting the leaching solution to the field, or filling the soil jar with water would not ensure preservation. Using the soil coring device, transporting with proper precautions, and extracting the soil from the coring device directly into the leaching solution within 48 hours of collection is considered the best available option. Therefore, soil coring devices should be used for transporting samples to the laboratory for soil collected to determine volatiles leachable to groundwater. The requirements for transporting these samples are listed in Attachment 3, page 3.

Attachment 6 has requirements for confirming results when soil coring devises are used. Do these requirements apply to EnCore™ samplers and similar soil coring devices?

The documentation necessary for RRD to accept results from using soil coring devices applies to the EnCore™ sampler and any other similar soil coring sampling device that is used to transport samples to the laboratory. The US EPA has indicated they have not thoroughly evaluated the use of soil coring devices for suitability in transportation of samples to the laboratory. There is literature available that demonstrates suitability for use in specific situations and for specific compounds. However, uncertainty regarding the appropriateness for all instances requires the submission of specific documentation to show that the results are acceptable.

Can the syringe type samplers be used to collect samples for preservation in the field?

As previously stated this use is still allowed.

Can you clarify the use of sealed containers when performing low concentration analyses?

Attachment 6 (page 3) describes the requirements for the performing low concentration analyses. There are no requirements for the specific types of sealed containers, other than they must be appropriate for attachment directly to the instrumentation. Some laboratories may use vials and introduce the required chemicals into the vials without exposing the soil to the atmosphere, while others may use containers customized to fit onto the instruments directly without exposing the soil to the atmosphere. Either option is acceptable.

LOW LEVEL MERCURY SAMPLING (ATTACHMENT 7)

Protocols are included for the use of bladder and peristaltic pumps, when should bladder or peristaltic pumps be used?

Bladder pumps should be used when the depth to groundwater is greater than the depth that peristaltic pumps are effective.

What are the specifications for knowing whether the water from a well is formation water?

The standard parameters used to determine when formation water is flowing are turbidity, pH, specific conductivity, oxidation-reduction (redox) potential, and dissolved oxygen. The specifications are included on pages 8 (number 14) and page 10 (number 12).

What field quality control methods should be used?

Quality assurance and quality control protocols are provided on page 14.

PETROLEUM SITE CHARACTERIZATION (ATTACHMENT 8)

CHARACTERIZATION GENERALLY

NOTE: This attachment does not apply to Part 211 site assessments, former STD IM-3 remains guidance for such assessments.

Why has the list of potential contaminants of concern been expanded for petroleum site characterization?

Note: This document is being revised to better reflect the intent of identifying the minimum analytical requirements to identify contaminants of concern, and the designated analytical methods.

Audit results indicate that defining the nature and extent of contamination at leaking underground storage facilities is frequently deficient. As a first step in providing clear and concise guidance to assure adequate site characterization, the minimum analytical requirements to identify potential contaminants of concern have been expanded to reflect statutory requirements for defining the nature and extent of contamination. Volatile organic compounds (VOCs) have been added beyond BETX, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenze, naphthalene, 2- methylnaphthalene and MTBE. Analysis of these additional contaminants are necessary to adequately characterize known constituents of gasoline (e.g., oxygenates, trimethylbenzenes and propylbenzenes) and contaminants known to be commonly used at service stations to clean or service auto parts. PCBs were added for analysis of residuals oils because of the potential for their existence in hydraulic fluids, industrial cutting oils, and cooling oils.

Furthermore, groundwater contamination must be adequately characterized to assess reactions from the petroleum release that result in additional hazardous substances from the soil matrix contaminating groundwater (R 299.5716(3)). Analysis of metals has been expanded to address the concern that the biodegradation of petroleum contaminated plumes can result in the mobilization of metals from the soil matrix.

The initial site characterization will need to consider the potential contaminants of concern as minimum analytical requirements. All contaminants identified in the site characterization which exceed generic criteria are contaminants of concern. Once the contaminants of concern at a facility are known, methods can be targeted to those specific contaminants.

Is it acceptable to reduce the list of VOCs for a gas station and convenience store where no service station operations ever occurred?

Yes, but only under specific circumstances. Sampling may be reduced if sufficient documentation is provided regarding the history of the facility to demonstrate there is no likelihood of a petroleum release commingling with any release of non-petroleum VOCs. Reports in such instances must include documentation of the information that was the basis for limiting the analytical list.

Is the additional metal analysis required for work performed as part of a Phase I ESA, Phase II ESA and BEA process?

No. The additional groundwater metal characterization is specific to defining the nature and extent of the groundwater contamination, not the presence of contamination to determine if the property is a facility. However, if any of the additional metals are included in hazardous substances to be used in the future by the new owner or operator, then analyses of those metals used will be required to support the conclusion of the BEA.
Additional questions regarding applicability of the OpMemo to BEAs are contained under the headings General Applicability of the Guidance and Sample Collection.

Is GRO or DRO now required to be sampled?

No. The OpMemo states GRO and DRO analyses are not required and cannot be used to determine compliance with criteria or in making risk-based decisions. The analyses may be useful in evaluating releases and interpreting other data.

VOLATILE ORGANIC COMPOUNDS (VOCS) CHARACTERIZATION

Can you clarify which VOC parameters must be analyzed to assess the contamination at a former gasoline station?

Either the MDEQ Lab 8260 list or SW-846 8261 may be used for initial site investigation. Once the site is adequately characterized and the chemicals of concern are identified, methods can be used that target the specific contaminants.

METAL CHARACTERIZATION

Except for lead for leaded gasoline releases and lead, chromium, and cadmium for waste oil releases, what is the rationale for including the remaining metal parameters?

To determine if there is a leaded gasoline release sampling only for lead is appropriate, but to determine the nature and extent of any petroleum product release it is necessary to sample for additional metals. The need for additional metal characterization is not necessarily based upon an expectation that sufficient quantities are included within petroleum fractions, but on the basis that the chemical and biologic processes that lead to the breakdown of petroleum hydrocarbons can chemically transform naturally occurring minerals (e.g., arsenic, iron, manganese) in the soil and aquifer matrix to forms that are more mobile and/or more toxic than the original materials. For waste oil or used motor oil releases there may be sufficient quantities of these metals in the release to contaminate soil and groundwater and therefore the metals must be characterized.

If the rationale for adding the additional metal parameters is based on concerns regarding leaching due to changes in redox conditions, is metals analysis for soils required for characterization?

Soils analysis for the additional metal parameters may not be required depending on the historical use of the property and the potential for waste or used motor releases on the site. The need for metal analysis is based primarily upon the contaminants leaching from soil into groundwater due to conditions that result during biodegradation of the contamination. Metal analysis for soils alone would not provide any clear indication of the conditions necessary for leaching to occur under redox conditions, and so would not be required for characterization.

Can characterization of metal impacts at a facility be conducted separately from and parallel with characterization of hydrocarbon impacts?

Yes, in some cases, it may be acceptable to conduct the characterization separately.

What options are available for a facility that might otherwise be considered eligible for closure but the groundwater has not been characterized for metals?

Review of conditions on a site-by-site basis may allow closure without further metal characterization. If the groundwater pathways that would be affected by metal concentrations above generic criteria are not relevant or are otherwise restricted, further characterization would not be necessary. If relevant pathways exist, evaluation of the potential for metals leaching from soils due to the site conditions may result in a decision that further characterization is not required. The RRD project manager should be contacted to discuss options for sampling for redox potential or indicator metals based upon applicable specific conditions for the site.

OXYGENATES

There is some discussion about oxygenates in the new OpMemo No. 2. Is the inclusion of oxygenates other than MTBE due to new regulations?

Oxygenates are added to gasoline to increase octane ratings. To adequately characterize the nature and extent of the release known additives must be characterized. While MTBE is the prevalent oxygenate that has been found in wells throughout the country other oxygenates have been used in Michigan and sampling only for MTBE will not provide sufficient characterization. To determine whether specific oxygenates would <u>not</u> need to be characterized there would have

to be documented historical records of when the release occurred and of all suppliers use of oxygenates in order to demonstrate there was no potential for the contaminant to be released.

Oxygenates have specific preservation requirements. Does this mean separate samples must be taken when MTBE is requested?

There are several oxygenated ethers that require characterization including MTBE. According to the EPA, oxygenated ethers preserved in an aqueous solution will break down when exposed to high temperatures. Attachment 4, page 3, provides further information to address this issue. If high temperature purging is not used by the laboratory, acid preservation is appropriate and separate samples are not necessary. If high temperature purging is used, separate samples must be taken, one acid preserved and one basic preserved as described in Attachment 4. The MDEQ laboratory and the MDEQ contract laboratories do not use high temperature purging, so there currently are no changes in how RRD staff and its contractors should collect samples for oxygenates if these laboratories are being used. When other laboratories are being used, it should be determined what purging methods are being utilized by the laboratories in order to develop site specific sampling plans.

Regarding the high temperature for purging volatile organics, specifically for MTBE, what temperature is considered high temperature purging?

High temperature would be significantly higher than 40 degrees Centigrade.
SW846, Method 8260B states:

> 7.1.2.1 Traditionally, the purge-and-trap of aqueous samples is performed at ambient temperature, while purging of soil/solid samples is performed at 40 C, to improve purging efficiency.
>
> 7.1.2.2 Aqueous and soil/solid samples may also be purged at temperatures above those being recommended as long as all calibration standards, samples, and QC samples are purged at the same temperature, appropriate trapping material is used to handle the excess water, and the laboratory demonstrates acceptable method performance for the project. Purging of aqueous samples at elevated temperatures (e.g., 40 C) may improve the purging performance of many of the water soluble compounds which have poor purging efficiencies at ambient temperatures.

If the pH is > 11 for samples collected for analysis of the oxygenate ethers, i.e. MTBE and others, the purging efficiency of the early internal standard and surrogates goes way down. Could a client collect a water sample in an unpreserved vial and analyze it within seven days?

Samples must be preserved. Attachment 4 (page 3) states that samples collected for the analysis of volatile organic compounds must be acid preserved, and samples collected for oxygenates that will be analyzed with high temperature purging, preserved with TSP to ph > 11. Samples must then be stored and transported at 4° C. The intent is to not to use high temperature purging on acid preserved samples for analysis of the ether oxygenates, as the combination of acid and high temperatures can break down the ethers. (See http://nwql.usgs.gov/Public/pubs/MTBE.fact.sheet.html) Consistent with that intent, if a laboratory can demonstrate acceptable method performance for the oxygenate ethers using acid preserved volatile samples and analyses as routinely done (not high temperature purging), then it is unnecessary to collect separate samples for the oxygenates for preservation at pH > 11.