State of Ohio Environmental Protection Agency

# Concepts for Rule Development
# Ground Water Assessment and Compliance Monitoring Programs



## *What is this document?*

This document contains concepts related to possible changes to the ground water assessment requirements.

## *Why is this concept document being published?*

This document is being published to provide information to the interested parties so they can review the information, provide comments to Ohio EPA, and prepare for a public meeting with Ohio EPA on the topic of ground water assessment requirements.

## *Is this document the law?*

The information in this document does not represent actual rule language. It is not enforceable. This document contains generalized concepts that are for discussion purposes only.

## *How were the concepts developed?*

Ohio EPA has been evaluating comments and information from interested parties received about draft ground water assessment rules found in Chapter 3745-506 of the administrative code. During a ground water rule public meeting in March of 2009, some interested parties indicated that they felt Ohio EPA was not understanding or addressing their concerns adequately.

Ohio EPA has spent time since March gathering additional information, re-evaluating the comments, and developing these concepts as a communication tool. Ohio EPA hopes that the interested parties will find this document useful for understanding changes to the ground water assessment requirements that agency is contemplating due to information received from the interested parties.

Some of the specific concerns raised by interested parties that are addressed by these concepts include:

- Residents living in the vicinity of landfills have expressed concerns about making sure their drinking water is protected from releases of parameters from landfills, and that timely assessments and corrective actions are taken.
- The regulated community has raised concerns that assessments sometimes take too long; they want to avoid unnecessary assessment activities that don't have a bearing

on corrective actions; and they want to avoid taking corrective actions when it is not necessary.

- The regulated community has raised concerns about using background for non-hazardous parameters or the method detection limit for hazardous parameters as the standard for determining when the extent of a release from a landfill, because this can delay entering into corrective actions or compliance monitoring.

- The regulated community has expressed concerns that, at times, there is inconsistent application of the standards for what constitutes an adequate rate, extent, and concentration delineation.

## *What are the concepts?*

This is a summary of the 13 major concepts. Additional information about the concepts is found in the attached flow chart and footnotes.

1. Ohio EPA's landfill rules are focused on preventing releases of contaminants to ground water. The ground water rules are focused on detecting releases should they occur, assessing the release, and correcting the release from a landfill. The goals for the rules are to protect public health and the environment and to prevent water pollution and the contribution to water pollution.

2. If during assessment it is determined that the landfill is not the source of the contamination then the facility will be returned to ground water detection monitoring.

3. If a release occurs a preliminary assessment will focus on determining:

    a. If the parameters exceed protection standards.

    b. If the parameters have moved past the facility boundary or discharge to surface water.

    c. How fast the parameters are moving.

    This is called a "preliminary REC." "REC" stands for "rate, extent, and concentration." The rule would include clear criteria for what determines an adequate preliminary REC.

4. Source controls will be required to reduce the amount of leachate or gas pressure inside the landfill.

5. If any hazardous parameters are above protection standards then a corrective action will be required.

6. If any parameters exceed the protection standards and are at the facility boundary or discharge to surface water then corrective actions will be required.

7. If any parameters are at the facility boundary or discharge to surface water but none of them exceed protection standards, corrective actions will be required unless compliance monitoring is approved by the director.

8. If none of the parameters cross the facility boundary and none of them exceed protection standards then compliance monitoring will be required unless the owner or operator voluntarily does a corrective action.

9. If corrective actions are required then additional work to provide more specific description of the rate, extent, and concentration of the parameters will be needed. This is called "Full REC." This will be required unless the director finds that the preliminary REC also met the requirements for a Full REC. The rule would include clear criteria for what determines an adequate Full REC. These would address:

    a. Sufficient assessment wells would be required to make sure that all areas of the release that exceed the PS have been identified.

    b. Sufficient assessment wells with results sufficiently near or less than the PQL (or background if background is higher than the PQL) would be needed to allow an appropriately informed professional judgment to be made that all things considered, including the protection standards, the extent of the release has been identified adequately.

10. There will be a 2-year time limit for completing assessment. If more time is appropriate the director can approve an extension.

11. An assessment report submitted for director's action will be required no later than at the end of the 2-year assessment period. The report will include:

    a. Proposed protection standards for each parameter (MCL, SMCL, health based advisories, or background, whichever is higher. If none of those standards exist then another standard can be proposed)

    b. List of possible source controls and proposed source controls.

    c. The preliminary REC results, including whether the parameters have reached the facility boundary or are discharging to surface water.

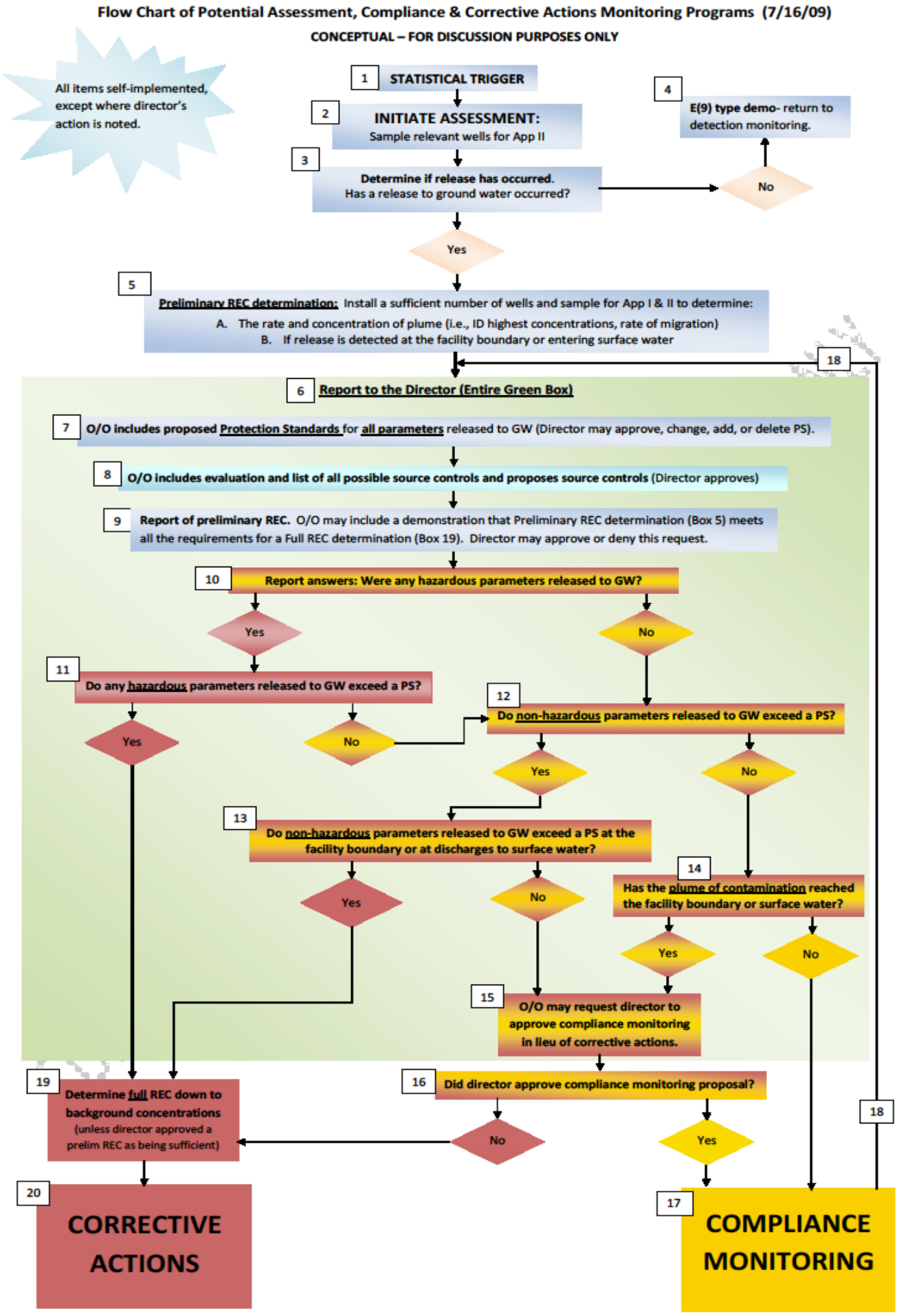
    d. A request to enter compliance monitoring if appropriate

    e. A request to find that the Preliminary REC meets the requirements of the Full REC if appropriate.

12. If the report is submitted well before the 2-year deadline then Ohio EPA will have the opportunity to review and provide comments for revisions, if needed, before the final submittal at the 2-year deadline.

13. If compliance monitoring is being conducted, then an updated report will be submitted to the director twice a year to evaluate whether corrective actions are needed or compliance monitoring can be continued.

14. Natural attenuation would still be one of the corrective actions that could be considered.


Flow Chart of Potential Assessment, Compliance & Corrective Actions Monitoring Programs (7/16/09)
CONCEPTUAL – FOR DISCUSSION PURPOSES ONLY
All items self-implemented, except where director's action is noted.
1 STATISTICAL TRIGGER
2 INITIATE ASSESSMENT: Sample relevant wells for App II
3 Determine if release has occurred. Has a release to ground water occurred?
No
4 E(9) type demo- return to detection monitoring.
Yes
5 Preliminary REC determination: Install a sufficient number of wells and sample for App I & II to determine:
A. The rate and concentration of plume (i.e., ID highest concentrations, rate of migration)
B. If release is detected at the facility boundary or entering surface water
18
6 Report to the Director (Entire Green Box)
7 O/O includes proposed Protection Standards for all parameters released to GW (Director may approve, change, add, or delete PS).
8 O/O includes evaluation and list of all possible source controls and proposes source controls (Director approves)
9 Report of preliminary REC. O/O may include a demonstration that Preliminary REC determination (Box 5) meets all the requirements for a Full REC determination (Box 19). Director may approve or deny this request.
10 Report answers: Were any hazardous parameters released to GW?
Yes
No
11 Do any hazardous parameters released to GW exceed a PS?
Yes
No
12 Do non-hazardous parameters released to GW exceed a PS?
Yes
No
13 Do non-hazardous parameters released to GW exceed a PS at the facility boundary or at discharges to surface water?
Yes
No
14 Has the plume of contamination reached the facility boundary or surface water?
Yes
No
15 O/O may request director to approve compliance monitoring in lieu of corrective actions.
16 Did director approve compliance monitoring proposal?
No
Yes
18
19 Determine full REC down to background concentrations (unless director approved a prelim REC as being sufficient)
20 CORRECTIVE ACTIONS
17 COMPLIANCE MONITORING

## *Footnotes to Flow Chart of Ground Water Assessment Concepts*

The following text is intended to provide further detail regarding the conceptual "Flow Chart of Potential Assessment & Compliance Monitoring Programs" drafted by Ohio EPA.

**Box. 4. Return to detection monitoring -** If at any time during assessment it is determined that the landfill is not the source of the contamination, the Owner/Operator (O/O) could request to be returned to detection monitoring (continue to include all of the OAC 3745-27-10 (E)(9) demonstrations for returning to detection monitoring).

**Box 5. Preliminary rate, extent, and concentration (REC) determination –** The focus at this stage is on identifying the contaminants, understanding the location of the highest concentrations of contaminants horizontally and vertically, the rate of migration of the contaminants, and whether the contaminants have reached the facility boundary or surface water that is hydraulically connected to ground water. This may require additional wells to be installed laterally between existing detection monitoring wells, vertically below existing detection wells, and downgradient of the well(s) that triggered, in addition to installation of well(s) at the facility boundary. The number of, location and spacing of wells necessary for the preliminary REC would be further determined by the following:

a. Based on possible source locations, hydrogeology, and existing detection well spacing, additional lateral and/or vertical wells may be needed.

b. PQL/background would be the standard for analytical results that would be used for making the determinations highlighted above.

c. The preliminary REC is NOT intended to determine the full extent of the plume between the source area and facility boundary, but only enough wells to determine the highlighted items above.

**Box 6. Assessment report to the director –** Once the preliminary REC is completed, the O/O would submit a report to the director describing the contaminants, concentrations, rate of movement, and indicating whether contaminants have made it to the facility boundary or are discharging to surface waters. The report should contain all the information and answer the questions indicated in **Boxes 7 through 13**, and the director would take action on the content of the report, as described in **Boxes 7 through 13**.

The rules would include deadlines for completion of assessment, submittal and approval of a compliance monitoring proposal, etc., as follows:

1) Completion and submittal to Ohio EPA of the REC and assessment report - 730 days after initial statistical trigger initiating assessment.

2) Completion and submittal to Ohio EPA of either a corrective actions plan or compliance monitoring plan - 180 days after assessment report is due.

3) Director's approval of a compliance monitoring proposal (if required per **Box 15**) – 180 days after assessment report is due (i.e. if director's approval of a compliance monitoring proposal is not received by the O/O within this time frame then the facility must enter corrective actions.

Please also note that it is intended that the rule would allow the O/O to make a request to the director for an extension of these deadlines.

**Box 7. Protection standards -** The report identified in **Box 6** should include proposed ground water protection standards, and if needed surface water protection standards [together referred to in this document as protection standards (PS)]. Ground water protection standards would include MCLs (if an MCL has been promulgated), health advisory standards and secondary MCLs. If background concentrations exceed the standards, background may be used as the PS, unless the director determines that a lower level is necessary to protect human health and the environment or cleanup is in connection with an area-wide remedial action under other authorities.

PS would need director's approval prior to being used by the O/O. Rather than deny the PS, the director could approve the PS with conditions that change, add to, or delete a PS included in the report.

**Box 8. Possible source controls –** The report identified in **Box 6** should include an evaluation of all sources at the facility and all practicable source control measures. Source controls are intended to address the likely source (leachate and/or gas) of the statistically significant increase once a release is confirmed. Source control may require more than what an O/O is already required to do for typical operations. These would NOT include actions aimed at removing contaminants from the ground water, but rather preventing or reducing contaminants from getting into the ground water.

**Box 9. Request to consider the Preliminary REC as fulfilling the requirements for the Full REC -** The report identified in **Box 6** could include a demonstration that the requirements for a full REC **(Box 19)** have been met along with a request that the director approve the demonstration. If the director approves this demonstration the O/O would not be required to conduct additional activities for the REC determination.

**Box 10. Any hazardous parameters released to GW? -** The report identified in **Box 6** should include a detailed description of any hazardous parameters that have been released to ground water at the facility. For the purposes of this conceptual document, "hazardous" may be defined as all Appendix II parameters (plus ammonia and nitrate/nitrite)[1]. If "yes," proceed to **Box 11**; if "no," skip to **Box 12**.

**Box 11. Do any hazardous parameters released to GW exceed a PS?** The report identified in **Box 6** should include a comparison of any hazardous parameters released to ground water with the corresponding PS. The PS may include standards for potential sensitive environmental receptors when ground water discharges to surface water. If concentrations of hazardous parameters released to ground water do exceed a PS, the facility would be required to go into the corrective actions program **(Box 20)**. If a request to accept the preliminary REC as meeting the requirements of a full REC was not granted by the director, then a full REC would need to be completed.

**Box 12. Do any non-hazardous parameters released to GW exceed a PS? –** The report identified in **Box 6** should include a comparison with the corresponding PS of any non-hazardous parameters released to ground water anywhere within or beyond the facility boundary. If "yes," proceed to **Box 13**; if "no," skip to **Box 14**.

**Box 13. Do any non-hazardous parameters released to GW exceed a PS at the facility boundary or in surface water? –** The report should provide the information necessary to demonstrate whether the contaminant concentrations exceed PS at the facility boundary and/or discharges to surface water within the facility boundary. If the answer to this question is "yes," the facility must proceed towards the corrective actions program (skip to **Box 19**). If the answer to this question is "no," the O/O may include in the report a request to the Director to approve a compliance monitoring proposal (skip to **Box 15**).

**Box 14. Has the plume reached the facility boundary or surface water? –** The report would provide the information necessary to demonstrate whether the contaminant plume has reached the wells that monitor the facility boundary or monitor for discharges to surface water. If parameters are not detected above background concentrations in wells monitoring the facility boundary/surface water (and all parameters are below the PS) then the facility could enter compliance monitoring (**Box 17**). If parameters are detected above background concentrations in wells monitoring the facility boundary/surface water ("yes" option) then the O/O may include in the



[1] Since nitrate has an MCL, and since ammonia can be oxidized in some plumes to form nitrate, ammonia and nitrate would be included in the list of hazardous parameter for the purpose of determining an answer to the question in Box 10.

report a request to the Director to approve a compliance monitoring proposal (**Box 15**) as long as none of the parameters exceed a protection standard.

Additionally, the O/O would still be required to notify adjacent landowners if the plume underlies those adjacent properties, consistent with the existing OAC 3745-27-10 rules.

**Box 15. O/O may request compliance monitoring in lieu of corrective actions. –**

If a facility is at this point in the process, they have a confirmed release of contaminants to ground water that has reached the facility boundary and/or surface water discharge. Therefore, the default response is for the facility to enter corrective actions; however, the facility could enter compliance monitoring by director's approval. The O/O may include in the report a request to the Director to approve a compliance monitoring proposal, along with any information supporting the compliance monitoring proposal.

**Box 16. Did director approve a compliance monitoring plan? –** If the director approved the compliance monitoring plan proposal, the facility may enter the compliance monitoring program (**Box 17**). If the director does not approve the compliance monitoring proposal, the facility must enter the corrective actions program (skip to **Box 19**).

However, please note that if the director does not approve the compliance monitoring proposal at this stage, the O/O may avoid corrective actions by addressing any deficiencies in the original compliance monitoring proposal and re-submitting the proposal to the director if the deadline for receiving an approval from the director has not yet passed (see Box 6 for appropriate deadlines).

**Box 17. Compliance monitoring -** Would become part of the assessment program. Compliance monitoring going through the "no" response to the question in **Box 14** requires director's approval of PS per **Box 7** and source controls per **Box 8**, but does not require director's approval of a compliance monitoring proposal or plan. A compliance monitoring proposal going through **Box 16** does require director's approval.

**Box 18 Semi-annual determination and report in compliance monitoring –** The semi-annual report containing the determination of rate, extent and concentration as part of compliance monitoring would be required for all compliance wells, but this determination would be consistent with the REC determination made during the initial assessment (i.e. the semi-annual determination would be made using data from existing compliance monitoring wells, unless significant changes in the release of

contamination has occurred in the interim and additional wells are needed to determine a new REC to adequately define the release).

Additionally, if new contaminants are detected in the plume and/or the extent and/or rate of migration increases, the O/O may be required (via **Box 18**) to revisit the process and again report to the director per **Box 6** with a revised demonstration and potentially a new request to conduct compliance monitoring or if applicable, go into corrective actions if protection standards are exceeded or if the release crosses the facility boundary or surface water discharge occurs.

**Box 19: Full REC Determination -** The concept for what would be a "full rate, extent, and concentration" determination includes two standards:

1. Sufficient assessment wells would be required to make sure that all areas of the release that exceed the PS have been identified. This would require that if any well has results that exceed a PS, then additional wells stepping out/down would be needed until all wells have results below the PS.

2. Sufficient assessment wells with results sufficiently near or less than the PQL (or background if background is higher than the PQL) would be needed to allow an appropriately informed professional judgment to be made that all things considered, including the protection standards, the extent of the release has been identified adequately. The adequacy of this portion of the assessment would be worked out on a case-by-case basis, but there would be deadlines in rule to make sure things keep moving along.

If the director does not approve the compliance monitoring plan, the facility may still avoid further REC activities if the director has approved the demonstration in accordance with **Box 9** that the preliminary REC has met the requirements for a full REC. However, if the director has not approved the REC demonstration in accordance with **Box 9** the O/O must determine the full REC in accordance with **Box 19** on the way to corrective actions.

**Box 20. Corrective actions program –** Most likely involving "active" remediation, but a "no action"- type corrective action (e.g. "monitored natural attenuation") would still be available for consideration in the corrective action program if appropriate.

## Additional Notes

- Statistics are not required in assessment, but certainly are an option. In some cases requiring statistics may actually be unnecessary and an impediment to the process of assessing, and potentially remediating ground water contamination. Therefore, Ohio EPA sees no benefit to *requiring* statistics in assessment.

- The assessment plan remains self-implementing (director's approval is not necessary at this stage). However, as mentioned above the protection standards and any requests to remain in compliance monitoring for releases at the facility boundary or discharging to surface water would need director's authorization.

- Ohio EPA is committed to offering technical assistance to the regulated community. O/O's and ground water consultants have specifically requested that prior to submittal of the report to the director in **Box 6**, and the determination of full rate and extent in **Box 19**, that they would be able to meet with DSIWM/DDAGW to get feedback on their approach and the completeness of their determination. It can be difficult for Ohio EPA to give a definitive answer at meetings of this type because the full review has not been completed. However, Ohio EPA should be able to offer technical assistance and guidance; and point out any obvious omissions or potential violations, which should offer some assurance to the O/O and GW consultants. The level of technical assistance that could be given would be related to the amount of detail presented at the meeting by the O/O and the consultants and the amount of time remaining before the rule deadlines. Ohio EPA does not want the availability of technical assistance meetings to result in delays in submittals required by rule.

- Because the determination of the extent of the plume using PQLs and background is a case-by-case determination relying on best professional judgment. There are times when the Ohio EPA reviewer and the GW consultant will disagree on the adequacy of the determination. While all such disagreements cannot be avoided, Ohio EPA is committed to ensuring that such disagreements are eliminated when they are caused by inconsistent interpretation and application of the rules by Ohio EPA staff. Three ideas for accomplishing this that are being implemented or considered are:

    - Including the district office DDAGW staff and management in rule development
    - Improving the frequency and scope of rule interpretation and application training across DSIWM/DDAGW
    - When the regulated community and the district office have disagreements that have lead to or may lead to an NOV, providing some avenue for the situation to be reviewed by others in DSIWM/DDAGW to ensure that the rules are being interpreted and applied in a consistent manner.

- The timing and deadlines for determinations and submittals under this assessment approach would need to be re-evaluated if it is the direction Ohio EPA decides to go.

- The compliance monitoring program under the future rules would include a re-evaluation of the wells needed to satisfy program objectives, which may result in the compliance monitoring well network being different from the assessment well network. The criteria for whether or not to retain an assessment well in the compliance monitoring program would be whether or not the monitoring well in question is necessary to make the future semi-annual REC determinations required in assessment/compliance monitoring.

**Other ideas being evaluated that came up during our discussions of these issues**

For detection monitoring we are looking at refocusing how the determinations for where detection monitoring wells are located. This includes taking into account such information as the site specific hydrogeology, flow paths, and likely sources within the landfill for a release (e.g., sumps and liner with leachate head).