

## Ohio EPA

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

(11/9/2009)

### ***What is this document?***

This document contains concepts related to possible changes to the ground water assessment requirements. This document has been revised based on comments received from interested parties during the interested party comment period and public meeting that occurred in September of this year.

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

This document is being published to provide information to the interested parties so they can understand the overall ground water assessment concepts that have been developed that will be used to guide rule development. This document is being published with edit marks visible so interested parties can see the changes that occurred due to the comments received.

### ***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 compliance monitoring or the corrective actions program. 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.
- The regulated community has expressed concerns on the timeliness of reviews by Ohio EPA.

In September of ~~this year~~2009, Ohio EPA published the generalized concepts for public comment and held a public meeting to explain the concepts and gather additional comments.

Four questions were identified by the interested parties as priorities during the comment period and meeting. These are:

1. What are the details on how non-hazardous parameters will be handled during the assessment process?
2. What are the details on how surface water will be handled during the assessment process?
3. What are the criteria for a successful preliminary rate extent and concentration (REC) determination?
4. What are the criteria for a successful full REC?

Ohio EPA is creating detailed ground water assessment concepts to address these four questions as well as for the entire ground water assessment process. The detailed concepts will be shared with interested parties for public comment soon.

## ***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 a release should it 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 and prevent nuisance.
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.~~ Continue to include all of the OAC 3745-27-10 (E)(9) demonstrations for returning to detection monitoring (see 08/2006 Draft OAC Rule 3745-506-500(O))
3. ~~If a release occurs a~~ The assessment program will include a preliminary assessment that 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~~ specific criteria for what determines an adequate preliminary REC.

During the preliminary assessment PQLs will be used rather than MDLs. MDLs and estimated values will still need to be reported. Background will be used if it is higher than the PQLs.

All discussions in these concepts regarding parameters at the facility boundary or discharging to surface water are to be interpreted as parameters that are associated with the release.

4. A review of ~~Source-source~~ controls will be required that will include an evaluation of the engineering components and landfill site management that could be changed to reduce possible sources of contamination to ground water. This would include evaluating possible adjustments that could improve the effectiveness of cap, temporary covers and surface water management within the limits of waste placement; and the effectiveness of the operations of the leachate management system and the gas collection system and other operational practices. ~~the amount of leachate or gas pressure inside the landfill.~~ Proposed source controls would be included in the assessment report discussed in concept 8 below.

~~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.~~

~~8-5. \_\_\_\_\_ If none of the parameters in the release cross-exceed protection standards at the facility boundary and none of them exceed protection standards and do not discharge to surface water then self-implemented compliance monitoring will be required unless the owner or operator voluntarily does a corrective action.~~

~~9-6. \_\_\_\_\_ If entrance into the corrective actions program are is 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 specific 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, distance, the distance to facility boundary and the extent of the release has been identified adequately.~~

~~a. Clearly define portions of the release that exceed protection standards~~

~~b. Adequately define the limits of the release where protection standards are not exceeded (assuming no crossing of facility boundary or discharges to surface water per preliminary REC).~~

~~Clarification based on comments: the terms "sufficient," "clearly," and "adequately," are used here to communicate the intent of the concept. During the development of rule language, every attempt will be made to avoid using such terms in favor of specific criteria.~~

~~10-7. \_\_\_\_\_ There will be a 2-year time limit for completing assessment. Ohio EPA chose the 2-year time frame based on studying the length of time assessments have been taking. For assessments that had been completed, the average time for completion was 959 days and the median was 642 days, so two years (730 days) is somewhere in the middle. The average time for those assessments not yet completed was 3662 days and running. One of the goals of this rule making effort is to revise the ground water assessment~~

requirements to reduce the amount of time needed to complete assessments and make it easier to successfully complete assessments. In addition, some sites are very complex hydrogeologically and are likely to need more than two years. Taking all of this into account is why the concept includes the 2-year time frame, which is representative of completed assessments historically and allows for more time with director's approval. ~~can approve an extension.~~

41.8. \_\_\_\_ 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, or other health based advisories standard, 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; identify portions of the release that exceed protection standards; provide adequate understanding of the extent of the release; and identify the gradient.
- 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.

42.9. \_\_\_\_ 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 prior to the 2-year deadline.

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

11. If any hazardous parameters in the release are above protection standards then entering the corrective action program will be required.

12. If any parameters in the release exceed the protection standards at the facility boundary or discharge to surface water then entering the corrective actions program will be required.

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

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

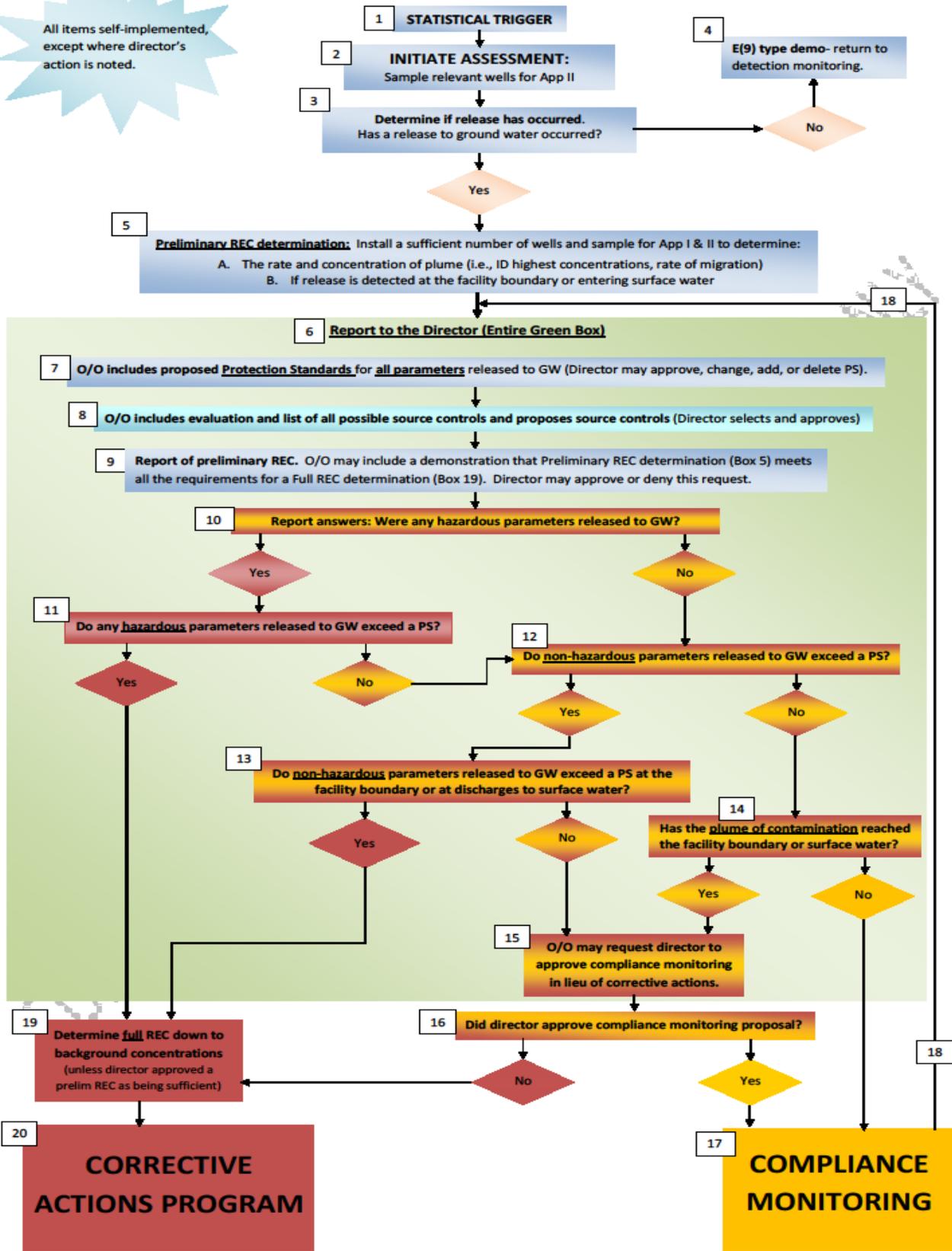
15. New concept due to comments – A waiting period for complying with self-implemented plans will be placed in rule. Ohio EPA will review the plans and notify the O/O whether the plan must be revised to comply with rule. The O/O must quickly revise and submit a compliant plan. Failure to do so will then become a violation. If the revised plan does not comply with the rules it will be a violation.
- a. If Ohio EPA does not send review comments to the O/O within the waiting period, the O/O must implement the plan. If at a later time Ohio EPA sends notice to the O/O that the plan does not comply with the rules no violation for implementing a non-compliant plan will exist; however, the O/O will be required to quickly revise, submit, and implement a plan that complies with the rules. Failure to do so will result in a violation.
  - b. If the O/O implements a plan during the waiting period that does not comply with the rules, a violation will be cited.

CONCEPTUAL – FOR DISCUSSION PURPOSES ONLY

**Flow Chart of Potential Assessment, Compliance & Corrective Actions Monitoring Programs (08/26/09)**

**CONCEPTUAL – FOR DISCUSSION PURPOSES ONLY**

All items self-implemented, except where director's action is noted.



## ***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. The flow chart itself will be revised as detailed concepts are created and the comments from interested parties are further considered.

1. **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 (The rules would~~ continue to include all of the OAC 3745-27-10 (E)(9) demonstrations for returning to detection monitoring (see 08/2006 Draft OAC Rule 3745-506-500(O)). In addition the agency is looking to improve the efficiency and consistency of review of demonstrations for returning to detection monitoring in order to prevent the O/O from having to enter into assessment when an acceptable demonstration has been timely received by the agency.

**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 or near surface water. 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 ~~/ or~~ background if higher than the PQL 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 plumerelease between the source area and facility boundary, but only enough wells to determine the highlighted-underlined 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 O/O must enter the corrective actions program. If the O/O qualifies for self-implemented compliance monitoring then the approach described in concept 15 would apply to the review of the compliance monitoring proposal.

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)]. Ohio EPA may establish PS in rule where possible so the O/O will know the PS to use during assessment. Ground water protection standards would ~~be include drawn from~~ MCLs (if an MCL has been promulgated); other health ~~advisory-based~~ standards and secondary MCLs. If background concentrations exceed the ~~standards~~PS, 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.

The proposed PS would be evaluated need director's approval prior to being used by the O/O as part of the assessment report identified in Box 6. The director could approve the PS, Rather than deny the PS, the director could approve or approve the PS with conditions that change, add to, or delete a PS included in the report. It is anticipated that the rules will provide clear direction for what the PS should be for each parameter, and the options for acceptable alternatives. If there would be any concern

over the acceptability of the PS, the owner or operator would have the opportunity to discuss the proposed choices of PS with Ohio EPA staff prior to submitting the assessment report.

**Box 8. Possible source controls.** The report identified in **Box 6** should include an evaluation of the engineering components and landfill site management that could be changed to reduce possible sources of ground water contamination. 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 adjustments to such items as: cap, temporary covers, surface water management within the limits of waste placement, the gas collection system, operations of leachate management system, and changes to other operational practices.~~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 Full 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 I and II parameters (plus ~~ammonia and nitrate/nitrite~~)<sup>1</sup>; ~~but would not include Appendix I parameters 64-78.~~ If “yes,” proceed to **Box 11**; if “no,” skip to **Box 12**.

- The hazardous parameters would include: VOCs, SVOCs, pesticides & herbicides, heavy metals, and nitrate/nitrite.
- The non-hazardous parameters would include Appendix I parameters 64-78, such as: Chloride, Sodium, Potassium, Calcium, Magnesium, Iron, Manganese, Sulfate, TDS, and Ammonia, etc.

<sup>1</sup> 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.

As requested by the interested parties, Ohio EPA is evaluating the function during assessment of non-hazardous parameters that do not have any health based standards, advisories, or SMCLs but are included in Appendix I.

**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 O/O 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 non-hazardous 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 O/O 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 plumerelase reached the facility boundary or surface water?** The report would provide the information necessary to demonstrate whether the contaminant plumerelase 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 O/O 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 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 plumerelase underlies those adjacent properties, consistent with the existing OAC

3745-27-10 rules.

Ohio EPA DDAGW and DSIWM are working with DSW to provide detailed concepts for how releases of contaminated ground water to surface water would be handled during assessment activities. This information will be provided as part of the detailed concepts discussed in the last paragraph of page 2.

**Box 15. O/O may request compliance monitoring in lieu of entering the corrective actions program.**

If ~~the~~ facility O/O is at this point in the process, the ~~y have~~ O/O has a confirmed a release of contaminants to ground water that has either: 1) exceeded PS for non-hazardous parameters; or, 2) it has reached the facility boundary and/or surface water discharge. Therefore, the default response is for the facility O/O to enter the corrective actions program; however, the facility O/O 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 request for compliance monitoring ~~proposal~~.

**Box 16. Did director approve a compliance monitoring plan?** If the director approved the compliance monitoring plan proposal, the ~~facility O/O~~ may enter the compliance monitoring program (**Box 17**). If the director does not approve the compliance monitoring proposal, the ~~facility O/O~~ 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 entering the corrective actions program 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 Compliance monitoring~~ becomes 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 ve 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 release 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 the corrective actions program 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.

Note: the term “sufficient” is used here to communicate the intent of the concept. During the development of detailed concepts and rule language to implement this concept, every attempt would be made to avoid using words such as “sufficient” in favor of specific criteria.

If the director does not approve the compliance monitoring plan, the facility O/O 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 entering the corrective actions program.

**Box 20. Corrective actions program.** Most likely involving “active” remediation, but a “no-action monitor only” - 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 obvious 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 plumerelease 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).