

Ohio EPA
Concepts for Rule Development
Flowchart of Proposed Ground Water Assessment and
Corrective Actions Programs in the Draft OAC 3745-506 Rules

(August 13, 2010)

Footnotes to Flow Chart of Ground Water Assessment & Compliance Concepts

The following text is intended to provide further detail regarding the conceptual *Flowchart of Proposed Ground Water Assessment and Corrective Actions Programs in the Draft OAC 3745-506 Rules*.

Key concepts used in this document:

Ground Water Assessment Standards (GWAS) – The GWAS would be determined for detection and assessment parameters prior to implementation of the detection monitoring program under the draft OAC 3745-506 rules. GWAS would be tabulated in rule as generic standards using health-based [maximum contaminant levels (MCL), US EPA Regional Screening Levels (RSL)] and nuisance-based standards [secondary maximum contaminant levels (SMCL), aesthetic advisories] for a majority of the parameters (currently 133 out of 248). Most of the remainder of the GWAS would be based on background concentrations.

For non-naturally occurring parameters with no tabulated GWAS (e.g. volatile and semi-volatile organics, pesticides), the owner or operator (O/O) would have the option of declaring the background for the non-naturally occurring parameter as “not present” and thus voluntarily setting the background-based GWAS at less than the lowest practical quantitation limit (PQL) available to the O/O. This option would relieve the O/O from having to use ground water sampling to establish background for non-naturally occurring parameters that are assumed to not be present in the ground water.

The O/O could also propose an alternative to the generic, tabulated GWAS based on elevated background concentrations. The O/O may also have the opportunity to propose an alternative GWAS *after* implementation of the detection monitoring program based on sampling results for parameters not previously sampled (i.e. Appendix II parameters). The director may also assign a different GWAS using a director’s action.

It should also be noted that GWAS would not be required for the ground water quality parameters calcium, magnesium, potassium, specific conductance and total alkalinity since they are non-hazardous and do not have any kind of health-based or nuisance-based protection standard.

Hazardous parameters – These are chemical compounds or elements or those of a class of chemical compounds or elements that have been shown in scientific studies to have toxic, carcinogenic, mutagenic, or teratogenic effects on humans or other life

forms as a dissolved species (similar to RCRA definition found in 45 FR 74889; November 12, 1980 and 52 FR 25942; July 9, 1987; http://waste.custhelp.com/cgi-bin/waste.cfg/php/enduser/std_adp.php?p_faqid=477). These include volatile and semi-volatile organic compounds, herbicides, pesticides, various metals, cyanide and nitrate/nitrite. The hazardous parameters would be listed in rule and would be similar to current OAC 3745-27-10 Appendix II parameter list, but would also include nitrate/nitrite, plus several organic compounds and metals unique to the construction and demolition debris (C&DD) parameter list.

Non-hazardous parameters – These are the parameters ammonia, calcium, chloride, iron, magnesium, manganese, pH, potassium, sodium, specific conductance, sulfate, total alkalinity and total dissolved solids. It should be noted again that calcium, magnesium, potassium, specific conductance, and total alkalinity would not have a GWAS.

Applicable Parameters -- Not all of the parameters may be applicable to different types of landfills to be regulated by draft OAC Chapter 3745-506. The parameters applicable to each different type of landfill would be clearly identified in the rules.

Potential Sources of Contamination (PSC) - When ground water monitoring is required for a facility, the PSC for that type of facility would be defined in the applicable program chapter. For all facilities this would include the disposal limits. Other potential sources of contamination may be named in rule or ordered by the director. For example, if the rules allow outdoor storage of waste materials for recycling and salvaging purposes, the storage area may be defined as a PSC; or if it is discovered that a leachate storage tank or force main was leaking into the ground for a number of years, the leachate tank or force main may be determined to be a PSC for the facility.

Director's Authority – The director could with cause order the facility into the ground water assessment program and/or corrective actions program, or order the O/O to conduct interim corrective actions to address known or potential ground water contamination coming from potential sources of contamination at the solid waste facility.

Explanation of Flow Chart Boxes

Box 1: Statistically Significant Increase Confirmed by Resample.

Box 1A – If a statistically significant increase (SSI) over background occurs in a downgradient ground water monitoring well and is confirmed by resample (if prescribed in the statistical plan), there are two general options available to the O/O as detailed below: make a demonstration that the SSI was a false positive and remain in detection monitoring (proceed to **Box 1B**) or enter the ground water assessment program (proceed to **Box 2**).

Box 1B - If the O/O thinks that the SSI is due to an alternate source (i.e. non-landfill contamination, natural variation, error in sampling, analysis, statistics) and thus a

false positive, the owner or operator may submit a false positive demonstration report to Ohio EPA and send a copy to the approved board of health showing that the SSI was not due to a release from the limits of potential sources of contamination, but rather a specific, alternate source.

The false positive demonstration report would be required to contain all relevant sampling and analysis data and document one or more of three general causes for the false positive causing the SSI:

- A contaminant source other than a PSC at the facility
- Error in the sampling, laboratory analysis or statistical analysis
- Natural variation in ground water quality

The false positive demonstration report would need to contain the following information depending on the reason given for the false SSI:

- 1) Alternate source of contamination: The report would discuss how the parameter concentrations are more representative of the alternate source of contamination instead of from the PSC. A comparison of leachate chemistry and alternate source chemistry to impacted well ground water quality would be provided. Additional ground water quality data beyond Appendix I and II supporting the alternate source conclusion (Cl/Br, tritium, etc.) are another option that may be provided for evaluation to the Ohio EPA. Tentative identification of the alternate source, estimated extent of the ground water contamination from the alternate source, and discussion of what ground water quality impacts would be expected from the alternate source would be provided.
- 2) Error in sampling: The qualified ground water scientist (QGWS) would document the sampling error using field data that support the sampling error determination.
- 3) Error in laboratory analysis: A letter from the lab or a laboratory certification report that identifies the analysis error would be submitted with supporting information included within the letter or report. Any QA/QC data that indicates where the error most likely occurred would also be submitted.
- 4) Error in statistical analysis: The error or inappropriate statistical procedure would be identified, along with an explanation of why the statistical method or procedure is not valid for the data set, and identification of the proper statistical analysis would also be submitted.
- 5) Natural variability: Various site specific data that may be supplemented by appropriate regional data from within one mile of the landfill. This would include such data as the following:
 - a. Historical ground water data values and ranges supporting natural variability.

- b. Pre-waste ground water quality data (if it exists) and upgradient data or GW data from other wells clearly not impacted that may support the argument for natural variability.
- c. Documentation that confirms the lack of a similar trend/SSI in other indicator parameters.
- d. The absence of the detection of non-naturally occurring organic compounds.
- e. Similar variation in concentration in other parameters that may be due to seasonal recharge events or other fluctuations.
- f. A comparison may also be made of the standard deviation for the parameter in the well in question relative to the standard deviation observed in other wells.

Box 1C – To be eligible to remain in detection monitoring after a verified SSI, the owner or operator would have to submit a complete demonstration that meets the rule requirements no later than 120 days after the SSI. If that was not done, the facility would be required to enter the ground water assessment program per **Box 2**. If a complete demonstration that meets the rule requirements was submitted then proceed to **Box 1D**.

Box 1D – Did the director of Ohio EPA disapprove the false positive demonstration in writing within 60 days after the date the false positive demonstration was received by Ohio EPA? If “Yes,” the facility would be required to enter the ground water assessment program per **Box 2**. If “No,” the facility may remain in detection monitoring per **Box 1E** without waiting for anything in writing from Ohio EPA.

- **Box 2: Initiate Assessment: Sample relevant wells for Appendix II.** The assessment program remains largely self-implementing (director’s approval is not necessary). However, several items would require director’s authorization. These items are described below.

Summary of Deadlines between SSI and beginning Assessment Monitoring

Day 0 – sample withdrawn, SSI occurs.

Day 75 – O/O notifies Ohio EPA of SSI.

Day 120 – deadline to submit Alternate Source Demonstration

Day 180 – if director doesn’t disapprove Alternate Source Demo then return to detection. This is also the deadline to submit the 1-of-m false positive demonstration.

Day 210 – deadline to submit Assessment Plan and begin assessment monitoring if 1-of-m wasn’t successful and Alternate Source Demonstration was disapproved.

Upon entering assessment, a facility owner or operator would submit a ground water quality assessment monitoring plan that describes how the assessment program would be capable of assessing and characterizing the rate and extent and the concentration of the release.

The plan would provide a detailed description of the investigatory approach to be followed during the assessment and any proposed method for gathering additional hydrogeologic information that may be necessary. Criteria would be included that would be used to determine if additional assessment activities are warranted. The assessment plan would include provisions for installing at least one ground water monitoring well at the facility boundary in the direction of down gradient ground water flow to verify whether the release has crossed the facility boundary.

The O/O would be required to follow the plan and sample the assessment ground water monitoring system for all of the parameters in the monitoring list equivalent to Appendix II of OAC 3745-27-10 or a similar list as specified for the type of facility.

Not later than 135 days after the date required to notify Ohio EPA of an SSI (i.e., 210 days from the SSI), the O/O would be required to sample all monitoring wells located in the same flow paths and geologic units as the wells that had the initial SSI and analyze the samples for all the assessment parameters found in the parameter lists similar to the current Appendix I and II. The sampling for Appendix II parameters would include background wells in the same geologic units.

Not later than 75 days after commencing this sampling (i.e., 285 days from the SSI), the O/O would sample the monitoring wells not previously sampled during assessment that are screened within the same geologic units as the monitoring wells that had the initial SSI. These samples from the same geologic units are to be analyzed for each waste-derived or C&DD-derived parameter detected in the affected or background monitoring wells that were sampled.

Not later than 75 days after sampling the monitoring wells (i.e., 360 days after the initial SSI) and not later than 75 days after each subsequent semiannual sampling event and each annual sampling event, an O/O would submit a notification to the Ohio EPA identifying all waste-derived or C&DD-derived constituents that have been detected in the ground water.

Box 3: Determine if release has occurred: Has a release to GW occurred? The draft rules would give a facility O/O several options for determining if a release has occurred. The rules would allow the use of statistics, a simple evaluation of the data using professional judgment, or determining if a PQL had been exceeded where background is less than the PQL.

Statistics would not be required in assessment, but would be an option. In some cases, using statistics to evaluate the expanded parameter list used during assessment may be unnecessary and an impediment to moving ahead with

assessing and potentially remediating ground water contamination. Therefore, Ohio EPA sees no benefit to *requiring* statistics in assessment.

If a release has occurred, an O/O would be required to continue to conduct a ground water assessment program that is capable of assessing and characterizing the rate and extent and the concentration of the release of waste-derived or C&DD-derived constituents from potential sources of contamination to ground water. An O/O would be required to undertake source control activities necessary to prevent the continued release of waste-derived or C&DD-derived constituents from potential sources of contamination to ground water.

If it is determined that a release has not occurred, the draft rules would allow for the O/O to return to detection ground water monitoring for the facility. See the following section (**Box 4**) for more information.

Box 4: (E) (9) type demo: Return to detection monitoring. There are several different ways for a facility to return to detection monitoring. An O/O may submit a written request to reinstate the ground water detection program. The director may approve reinstatement of the ground water detection program if the director determines that the O/O has demonstrated any of the following:

- a) Concentrations of all waste-derived or C&DD-derived constituents at all wells within the ground water assessment program are at or below background concentrations for two consecutive sampling events. The statistical analysis methods described in the statistical analysis plan submitted with the assessment plan would need to be used; or
- b) A source other than a potential source of contamination at the facility caused the ground water contamination; or
- c) The O/O may show that the statistically significant change between background data and the analytical results occurred due to an error in one or a combination of the following:
 - Sampling or reporting of sampling of the ground water monitoring wells.
 - Chemical analysis or reporting of chemical analysis of the ground water samples.
 - Statistical analysis or reporting of statistical analysis of the chemical analytical data.
- d) Finally, the O/O may show that the statistically significant change between background data and the analytical results resulted from natural variation in ground water quality.

Any such demonstrations would need to follow the requirements set forth in **Box 1B**.

Box 5. Preliminary rate, extent, and concentration (REC) determination. The focus at this stage is on identifying and characterizing:

- a) The contaminants released to ground water.
- b) The location of the highest concentrations of contaminants horizontally and vertically, including where any GWAS is exceeded.
- c) The rate of migration of the contaminants.
- d) Whether the contaminants have reached the facility boundary or are discharging to surface water.

It would be necessary to install additional monitoring wells outward and downgradient from the impacted well to make the REC determination. Factors that may affect the number of wells necessary for the Preliminary REC are: possible source locations, hydrogeology, and existing detection well spacing.

The Preliminary REC is not intended to determine the full extent of the release between the source area and facility boundary, but only enough wells to determine the information required in a) through d) above. The Preliminary REC may require additional wells to be installed laterally between existing detection monitoring wells, deeper than existing detection wells, and downgradient of the wells where the SSI occurred. Wells at the facility boundary and near surface waters would also be needed to determine if the contaminants have reached the facility boundary or surface waters.

It should be noted that due to the lack of established GWAS for calcium, magnesium, potassium, specific conductance and total alkalinity, the O/O would not be required to determine the extent of these parameters in the release, but rather only the highest concentrations and the rate of migration, as applicable to the specific program. This would only be necessary if one of these five parameters was determined to be part of the release.

Box 6. Preliminary 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, the extent of any areas where GWAS are exceeded, the rate of movement, and indicating whether contaminants have made it to the facility boundary or are discharging to surface waters. The report would contain all the information and answer the questions indicated in **Boxes 7 through 16**, and the director would take action on the content of the report, as described in **Boxes 7 through 17**. The rules would include deadlines for completion of assessment activities as follows:

SCENARIO	DEADLINE*					
	Submit Prelim REC Report	Self-implement into Compliance Monitoring	Request Director's Approval for Compliance Monitoring	Submit Compliance Monitoring Plan	Submit Full REC Report	Submit Corrective Action Plan
"Self-implementing" Track to Compliance Monitoring (no haz >GWAS, facility boundary not crossed, no surface water discharge)	≤730 days after assessment plan is due	≤910 days after assessment plan is due	N/A	≤90 days after entering compliance monitoring program	N/A	(if O/O fails to or elects not to enter compliance monitoring program) ≤910 days after assessment plan is due
Release crossing facility boundary w/no haz >GWAS and not discharging to surface water	≤730 days after assessment plan is due	N/A	≤730 days after assessment plan is due	≤90 days after entering compliance monitoring program	(only if request to use Preliminary REC is not approved) ≤1000 days after assessment plan is due	≤910 days if Full REC is not required. ≤1180 days if Full REC is required. Number of days is from date the assessment plan is due if compliance monitoring was not approved
Release w/no haz >GWAS but is discharging to SW	≤1000 days after assessment plan is due	N/A	≤1000 days after assessment plan is due	≤90 days after entering compliance monitoring program	(only if request to use Preliminary REC is not approved) ≤1270 days after assessment plan is due	≤1180 if Full REC not required. ≤1450 days if Full REC required. Number of days is from date the assessment plan is due if compliance monitoring was not approved
Release includes haz >GWAS	≤730 - 1000 days after assessment plan is due, depending on if discharging to surface water	N/A	N/A	N/A	(only if request to use Preliminary REC is not approved) ≤1000 - 1270 days after assessment plan is due, depending if discharging to surface water	≤910 - 1450 days after assessment plan is due, depending on if discharging to surface water and if Full REC required.

*Please also note that the rules would allow the O/O to make a request to the director for an extension of these deadlines.

Box 7. Request to consider the Preliminary REC as fulfilling the requirements for the Full REC. The report identified in **Box 6** could include a request to the director to approve an included demonstration that the requirements for a Full REC (**Box 20**) have already been met in the Preliminary REC. If the director approves the demonstration that the Preliminary REC has adequately characterized the release the O/O would not be required to conduct additional activities for the Full REC determination prior to entering corrective actions.

It should be noted here that if the facility qualifies for the self-implementing track of compliance monitoring in accordance with **Box 14**, a demonstration that the Preliminary REC met the requirements for a Full REC is not necessary because the facility is only required to conduct a Preliminary REC and successfully complete the determinations in **Boxes 1 through 13** prior to entering self-implemented compliance monitoring.

Box 8. Possible source controls. The report identified in **Box 6** would include an evaluation of the engineering components and landfill facility management that could be changed to reduce possible sources of ground water contamination. This is because the O/O would not have a permit or authorization to continue discharging contaminants to ground water. Source controls are intended to prevent further discharges to ground water.

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 the leachate management system, and changes to other operational practices. 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. The director could approve, delete, change or require additional source controls.

Box 9. Ground water assessment standards. The report identified in **Box 6** would include a table listing the applicable GWAS for all parameters that a GWAS is required. The table would compare the GWAS to the concentrations of the parameters being assessed. The parameters and their concentration being above or below GWAS in conjunction with the extent of the release would be used to determine the requirements and options for entering the compliance monitoring program or corrective actions program, and would be taken into account when identifying possible source controls.

Box 10. Do any hazardous parameters released to GW exceed a GWAS? The report identified in **Box 6** would include a list of any hazardous parameters that have been released to ground water at the facility and whether the concentrations exceed GWAS. This could be accomplished by using the table required in **Box 9** and adding a column/row showing the parameter concentrations and/or applicable statistic for each parameter to be compared to the GWAS.

If the answer to this question is “yes,” proceed to **Box 20** where the facility would be required to conduct a Full REC (unless relieved of doing a Full REC in accordance with **Box 7**) and move into the corrective actions program. If no hazardous parameters were released to ground water or the concentrations or applicable statistic of hazardous parameters does not exceed the GWAS (“no” response) then proceed to **Box 11**.

Box 11. O/O would be required to evaluate BOTH facility boundary & surface water.

The O/O would be required to evaluate whether the release is discharging to surface water per **Box 12** and whether the release to ground water has reached the facility boundary per **Box 13**. Options for entering compliance monitoring are contingent upon the results of investigating *both* of these items.

Box 12. Is the release discharging to surface water? The report identified in **Box 6** would provide the information necessary to demonstrate whether the release has reached a potential ground water discharge to surface water. The report would demonstrate using various hydrogeologic data whether the monitored significant zone of saturation or aquifer system discharges to surface water within the facility.

This determination would be accomplished primarily using ground water data. Therefore, it may be necessary to install monitoring wells near the surface water body to demonstrate the presence or absence of hydraulic connection between ground water and surface water, as well as to determine potential contaminant concentrations in ground water at the discharge area.

If it is determined that ground water is not discharging to surface water within the facility or that parameters are not detected above background concentrations in wells monitoring discharge to surface water then the surface water evaluation is complete.

Before it can be determined if the facility is eligible for the self-implementing version of compliance monitoring the evaluations at the facility boundary found in **Box 13** would need to be completed.

If parameters are detected above background concentrations in wells monitoring discharge to surface water and contaminant concentrations are consistent with what would be expected in the release, then proceed to **Box 15**.

Box 13. Has the release reached the facility boundary? The report would provide the information necessary to demonstrate whether the release has reached the facility boundary. It may be necessary to install more than one monitoring well at the facility boundary to make this demonstration. If parameters are not detected above background concentrations in wells monitoring the facility boundary and the release is not discharging to surface water at the facility then proceed to **Box 14**, remembering that at this point it has already been determined that no hazardous parameters exceed the GWAS.

If parameters *are* detected above background concentrations in wells monitoring the facility boundary and concentrations are consistent with what would be expected in the release (“yes” option under **Box 13**) then proceed to **Box 16**.

Additionally, if the release underlies adjacent property owner’s land, the O/O would be required to notify those landowners of the release and its characteristics, consistent with the existing OAC 3745-27-10 rules.

In some cases, the O/O of the facility owns or controls land immediately adjacent to the facility boundary. It may be possible to change the facility’s authorizing documents such that the facility boundary extends beyond the extent of the release of contaminants. If this

can be accomplished through proper authorizations, then the new facility boundary can be used to determine if self-implemented compliance monitoring (**Box 14**) a possibility.

Box 14. Self-implementing compliance monitoring. If a facility qualifies for self-implementing compliance monitoring, the release at the facility would be required to have the following characteristics:

- a) No hazardous parameters exceed a GWAS per **Box 10**;
- b) The release has not reached surface water (per **Box 12**) or the facility boundary (per **Box 13**), but rather is confined to within the facility.

Therefore, by rule the O/O would not need the director's approval to enter into the compliance monitoring program. However, in accordance with **Box 8**, source controls approved by the director would be required to be implemented in accordance with **Box 8**. If the O/O fulfills these obligations, a Full REC in accordance with **Box 20** is not necessary, nor is the director's approval necessary (**Box 7**) to avoid a Full REC. The O/O may skip to **Box 18** and the facility may enter into self-implementing compliance monitoring.

Box 15. (from Box 12) Is the release causing unacceptable impacts to surface water? If it is determined from **Box 12** that the release is discharging to surface water, the O/O would be required to determine the level of impact to the surface water body (**Box 15**). The O/O would be required to conduct ground water *and* surface water sampling to demonstrate what level of impact to surface water is occurring. The O/O would be required to also apply to the Ohio EPA Division of Surface Water (DSW) for a permit for the discharge of contaminants to surface water to determine whether the release is causing unacceptable impacts to surface water. At a minimum, the discharge to surface water could not cause a violation of the biological and chemical-specific criteria found in the Ohio Administrative Code (OAC) 3745-1.

If DSW determines that the discharge to surface water is not causing a violation of the biological and chemical-specific criteria contained in or developed pursuant to OAC 3745-1 and issues an NPDES or other permit for the discharge of contaminants to surface water or DSW determines in writing that a permit is not necessary, the O/O may conclude that the release is not causing unacceptable impacts to surface water (the "no" option under **Box 15**), and proceed to **Box 16** regarding surface water issues.

If DSW determines that the discharge to surface water is causing a violation of the biological and chemical-specific criteria contained in or developed pursuant to OAC 3745-1 or does not issue an NPDES or other permit for the discharge of contaminants to surface water due to unacceptable contaminant concentrations being discharged to surface water or the permitted trigger levels for contaminants released to surface water are exceeded, (the "yes" option under **Box 15**), then proceed to **Box 20** where the facility would be required to conduct a Full REC (unless relieved in accordance with **Box 7**) and move into the corrective actions program per **Box 21**.

Please note that regardless of the results of the surface water discharge evaluation, the O/O would have to also proceed to **Box 13** for an evaluation of whether the release has reached the facility boundary.

Box 16. O/O may request director to approve 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 either reached the facility boundary or surface water.

Therefore, the default requirement is for the facility to enter corrective actions. However, the facility could enter compliance monitoring if approved by the director. A request to the director for authorization to enter compliance monitoring would need to be included in the report (**Box 6**), along with information supporting the compliance monitoring request.

If the O/O is using an NPDES or other permit to demonstrate that the release is not causing unacceptable impacts to surface water, the O/O would be required to include and discuss the surface water sampling plan used to demonstrate compliance with the permit.

Box 17. Did the director approve a compliance monitoring plan? If the director approved the request to enter compliance monitoring, the facility may enter the compliance monitoring program (**Box 18**). If the director does not approve the compliance monitoring request, the facility would be required to enter the corrective actions program (skip to **Box 20**).

However, please note that if the director does not approve the compliance monitoring request at this time, the O/O may revise and resubmit the request that resolves deficiencies in the original compliance monitoring request if the deadline for submitting a request to the director has not yet passed (see fourth column of the table in the discussion of **Box 6** for appropriate deadline).

Box 18. Compliance monitoring. Compliance monitoring would be part of the ground water assessment program. The O/O would be required to create and implement a compliance monitoring plan in accordance with the rules. If compliance monitoring is self-implementing as described in **Box 14**, the compliance monitoring plan would be required to comply with the rule requirements but does not need to be approved by the director.

If the compliance monitoring plan requires approval by the director prior to implementation (**Box 17**), then the compliance monitoring plan would be required to comply with the rule requirements and would also be subject to director's terms and conditions if it were to be approved.

The compliance monitoring program would include an evaluation of the wells needed to satisfy compliance monitoring program objectives. This may result in the compliance monitoring well network being different (having fewer wells) from the assessment well network. A criterion for whether to use an assessment well in the compliance monitoring program would be whether the monitoring well in question is necessary to make the updated Preliminary REC determinations in the semi-annual assessment reports (**Box 19**) that will be required during the compliance monitoring program.

Although the compliance monitoring program is contained in the assessment program, once a facility obtains compliance monitoring status for an SSI event, many assessment activities related to that SSI are likely to no longer be needed as long as the compliance

monitoring program continues to demonstrate that the status of the release of contaminants has not changed to the point that additional assessment work is needed to re-evaluate the REC of the release.

Box 19 Semi-annual determination and report during compliance monitoring. The semi-annual report (**Box 6**) containing the determination of rate, extent and concentration as part of the ground water assessment program would be required for all compliance wells, but this determination would need to 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. If little has changed regarding the REC of the release of contaminants, then the semi-annual report (**Box 6**) simply reconfirms this fact using the compliance monitoring data.

If an NPDES permit, other permit was issued, or if director's terms and conditions were applied to the compliance monitoring program approval, then a demonstration of compliance with the NPDES permit, other permit, or terms and conditions would be also required in each semi-annual report described in **Box 6**.

If changes in the release of contamination have occurred in the interim, then additional wells may be needed to determine a new Preliminary REC to adequately define the current status of the release.

If new contaminants are detected, or GWAS are newly exceeded in the release, or the extent or rate of migration increases, or if the release newly reaches the facility boundary or starts discharging to surface water, it may require the status of the ground water monitoring at the facility to change to include an evaluation of surface water impacts (**Box 15**) or changing from self-implemented compliance monitoring to requiring director's approval to remain in compliance monitoring (**Box 16**) or being required to do a Full REC (**Box 20**) and enter into corrective actions (**Box 21**).

Box 20: Full REC Determination. This includes the same requirements as a Preliminary REC in **Box 5**, plus the additional requirement that the outer and lower extent of the release would be required to be defined down to background concentrations with isopleth maps, models, etc. using at least one or both of the following two approaches:

Approach 1 - Install and sample additional assessment wells outward (horizontally and possibly vertically) from the source area of the release such that concentrations of all contaminants* released to ground water are at or below background concentrations at all wells used to define the outermost and lowermost extent of the release.

Approach 2 - Install and sample additional assessment wells outward (horizontally and possibly vertically) from the source area of the release such that concentrations of all contaminants* released to ground water are below GWAS at all wells used to define the outermost and lowermost extent of the release and the extent of the release down to background concentrations can be estimated in consideration of the following information:

- a) The concentration gradient of each contaminant released to ground water, based on interpolation of results between the source area and wells installed at the

facility boundary and any other wells installed downgradient of the source area that were used to determine which portions of the release exceed the GWAS.

- b) In areas of the release where concentrations of contaminants are known to be below GWAS, the concentration gradient of each contaminant released to ground water, based on extrapolation of source area concentration gradients from the Preliminary REC and/or any additional work since.
- c) The rate of migration of each contaminant in ground water.
- d) Increased distance between the extrapolated extent of the release and the facility boundary generally allows greater flexibility for finding that the extrapolated extent of the release is valid for the purposes of corrective actions.
- e) In some cases, the O/O owns or controls land immediately adjacent to the facility boundary. In some circumstances, it may be possible to expand the facility boundary or to take into account the distance from the extrapolated extent of the release to the property boundary owned or controlled by the O/O that is beyond the facility boundary. If this is appropriate, increased distance between the extrapolated extent of the release and the property boundary of the land beyond the facility boundary that is owned or controlled by the facility O/O, may allow for greater the flexibility for finding that the extrapolated extent of the release is valid for the purposes of corrective actions.
- f) The threat to human and ecological receptors posed by the contaminants released to ground water. Hazardous contaminants or higher concentrations of contaminants in the source (e.g., leachate) generally present a greater threat to human health and the environment, a greater potential to cause nuisance, a greater potential to cause or contribute to water pollution or further degradation of ground water quality, and thus result in needing a more rigorous understanding of the actual extent of the release.

*Please note that neither approach applies to the five water quality parameters calcium, magnesium, potassium, specific conductance and total alkalinity. These five parameters will be analyzed but will not be used to determine if additional wells are needed.

The background concentration for released contaminants could be determined statistically. Also, background for non-detect contaminants would be the lowest PQL available to the O/O.

It should be noted that if the director does not approve the compliance monitoring request (**Box 17**) and the facility is thus required to enter the corrective actions program, the O/O may still avoid further REC activities if the director has approved the Preliminary REC demonstration identified in **Box 7**. However, if the director has not approved the Preliminary REC demonstration identified in **Box 7**, the O/O would be required to determine the Full REC.

Box 21. Corrective actions program. This will most likely involve 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

- Ohio EPA is committed to offering technical assistance to the regulated community. O/O's and ground water consultants have specifically requested to be able to meet with Ohio EPA prior to submittal of the report in **Box 6** to the director and prior to the determination of full rate and extent in **Box 20**. The purpose of meeting would be to get feedback on the approach and the completeness of the determinations. It can be difficult for Ohio EPA to give a definitive answer at meetings of this type because the full review of the documentation has not been completed. However, Ohio EPA should be able to offer technical assistance and guidance. 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 for final submittal of the assessment report identified in **Box 6** or for submitting the Full REC in **Box 20**.