

ILLINOIS POLLUTION CONTROL BOARD

April 7, 2016

IN THE MATTER OF: )  
)  
PETITION OF SALINE COUNTY ) AS 16-1  
LANDFILL, INC. FOR AN ADJUSTED ) (Adjusted Standard – Land)  
STANDARD )

OPINION AND ORDER OF THE BOARD (by J.A. Burke):

Saline County Landfill, Inc. (SCL) seeks an adjusted standard from groundwater requirements for its landfill southeast of Harrisburg in Saline County. The landfill is on an abandoned coal strip mine. Acid mine drainage from the mine interferes with groundwater analysis by masking landfill leachate impacts on groundwater. To better identify landfill leachate impacts, SCL asks to modify groundwater requirements in 35 Ill. Adm. Code 811.Subpart C.

The Board grants SCL an adjusted standard, subject to conditions. The Board modifies constituents that SCL must analyze in groundwater. SCL’s landfill differs from landfills addressed by the general rule, making it difficult to identify when landfill leachate causes groundwater contamination.

The Board also sets a revised maximum allowable predicted concentration for chromium because SCL cannot currently determine this using background chromium levels. Further, the Board sets revised groundwater quality standards for ammonia, chloride, and chromium because SCL cannot establish background concentration for these constituents representative of the geologic units underlying the landfill.

The adjusted standard will not result in environmental or health effects more adverse than the general rule. The Board finds that SCL provided sufficient justification for this adjusted standard under Section 28.1 of the Environmental Protection Act (Act), 415 ILCS 5/28.1 (2014). The Board declines to grant relief for SCL’s remaining requests relating to setting “groundwater protection standards” for organic and inorganic constituents because SCL does not justify these alternate concentrations. SCL may submit a new petition satisfying the Board’s concerns raised below.

**PROCEDURAL BACKGROUND**

SCL petitioned the Board for an adjusted standard from 35 Ill. Adm. Code 811.Subpart C groundwater requirements. The Board conducts adjusted standard proceedings under Section 28.1 of the Act and Section 104, Subpart D of the Board’s procedural rules. 415 ILCS 5/28.1 (2014); 35 Ill. Adm. Code Section 104.Subpart D. SCL sequentially numbered its petition in the upper right corner of each page and the Board cites these page numbers (“Pet. at \_\_”). SCL published notice of the petition in *The Daily Register* on July 28, 2015. See 415 ILCS 5/28.1(d)(1) (2014) and 35 Ill. Adm. Code 104.408(a), 104.410.

The Illinois Environmental Protection Agency (IEPA) recommends that the Board grant the adjusted standard. Recommendation (Rec.) at 32. IEPA provided the Board with a detailed analysis. SCL gave a draft petition to IEPA in December 2011. *Id.* at 5. IEPA and SCL discussed the petition and exchanged information. *Id.* Responding (SCL Resp.) to IEPA's recommendation, SCL clarified two points in its request.

The hearing officer issued questions to SCL to clarify technical concerns. SCL answered the questions on December 8, 2015. SCL continued numbering from the last page of its initial filing so the Board continues to use "Pet. at \_\_\_" when citing SCL's answers. IEPA commented on SCL's answers (IEPA Resp.) on February 23, 2016.

The Board did not receive any request to hold a public hearing and did not hold a hearing. The Board did not receive any public comments.

### **FACILITY DESCRIPTION**

The landfill is along County Highway 5, five miles southeast of Harrisburg in Saline County. Pet. at 18, 35. The landfill occupies 20.5 acres within a 166-acre parcel. *Id.* at 35. The Saline River South Branch flows along the west side of the site. *Id.* at 37.

The operator received developmental and operating permits in 1983. Pet. at 18. The 1983 unit (Unit 1) comprises 15.8 acres and is unlined. *Id.* at 36, 39. The operator later installed a leachate removal system with five vertical extraction wells and expanded to include 15 additional wells. *Id.* at 36. The groundwater monitoring system now consists of 24 monitoring wells and 12 piezometers. *Id.* at 40, Fig. 3. SCL must meet background groundwater quality at 100 feet from the landfill edge (the zone of attenuation).

In 2000, the operator constructed two lateral expansions with composite liner and granular drainage blanket leachate collection systems. Pet. at 36. The landfill ceased accepting waste in 2005 and initiated closure in 2006. *Id.* at 36, 42. In 2006 and 2007, the operator installed the final cover of compacted clay overlain with low density polyethylene and vegetation. *Id.* at 40. SCL currently is conducting post-closure activities such as mowing, leachate removal, landfill gas management, and monitoring. *Id.* at 42.

IEPA identifies the landfill as facility number 1658080001 with permit 1996-147-LFM. Rec. at 2; *see also* Pet. at App. G. A second 58-acre landfill (Unit 2) north of Unit 1 received a permit but was not constructed. Pet. at 42. IEPA approved closure of this unit in 2014. *Id.*

The landfill is on a former coal strip mine that operated between 1959 and 1965. Pet. at 19. Surficial deposits consist primarily of minespoil with lacustrine deposits along the western edge of the mine. *Id.* at 36. Minespoil thickness ranges from 37.1 to 134.8 feet and elevation ranges from 360 to 425 feet above mean sea level. *Id.* Lacustrine deposits range from 31.8 to 42.7 feet thick and are 358 feet above mean sea level. *Id.*

Bedrock underlies minespoil at the site. Pet. at 19. The uppermost bedrock is shale ranging from 3.3 to 30.5 feet thick. *Id.* The top of the shale ranges in elevation from 290 to 345 feet above mean sea level. *Id.* During studies in 2009 and 2010, groundwater elevations ranged between 357 and 367 feet above mean sea level. *Id.* at 37. Thus, groundwater rises through shale into minespoil.

The landfill is inside the mine's south edge. Pet. at 120. Groundwater flows from southeast toward west and northwest. *Id.* at 120, 161. Thus, the upgradient well is between the south boundary of the landfill and the mine high wall, 200 feet inside the mine high wall. *Id.* at 120. Because the upgradient well is close to the mine high wall, SCL cannot use the upgradient well to determine background groundwater quality. *Id.* Groundwater monitored at that well is unlikely to reflect minespoil geochemistry because the well is too close to the mine high wall. *Id.* at 120-121. Additional upgradient monitoring wells would not help because such wells also would be too close to the mine high wall. *Id.* at 121.

Minespoil leaches acid and causes acidic groundwater at the site. Minespoil banks, ranging from 10 to 50 feet, contain overburden soil and rock removed during mining. Pet. at 19. Minespoil weathered over time and exposed fine-grained iron sulfide. *Id.* at 119. As a result, sulfuric acid forms byproduct known as acid mine drainage which impacts groundwater. *Id.* at 19, 119. Groundwater acidity varies greatly across the site. *Id.* at 19. Shallow groundwater ranges from slightly alkaline (pH of 7.5) to very acidic (pH of 3.0). *Id.* at 119-120. Acidic groundwater causes other constituents to dissolve. *Id.* at 19. For example, limestone and dolomite are highly soluble in acid and release metals when dissolved. *Id.* at 120.

In addition, upward flowing brine impacts groundwater in shale bedrock and hydraulically connected minespoil that has been found in southern Illinois near the landfill. Pet. at 20, 33, 121-123. This groundwater tends to have high concentrations of total dissolved solids and chloride. *Id.* at 21. One study estimates that chloride concentrations in shale bedrock near the landfill averages 80 milligrams per liter (mg/L) compared to the 16.4 mg/L background level developed for the landfill. *Id.*

### **CURRENTLY APPLICABLE REGULATION**

SCL seeks relief from groundwater requirements in 35 Ill. Adm. Code 811.Subpart C. These regulations apply to nonhazardous waste landfills. Adopted in 1990, these rules integrate groundwater standards with landfill design, operation, monitoring, and reporting requirements. Development, Operating and Reporting Requirements for Non-Hazardous Waste Landfills, R88-7, slip op. at 2 (Aug. 17, 1990). The Board's landfill regulations are intended to prevent groundwater contamination. Groundwater standards are based on background quality of groundwater. *Id.* The Illinois Appellate Court upheld these rules, except for two provisions not at issue. Waste Management of Illinois, Inc. v. Pollution Control Board, 231 Ill. App. 3d 278 (1st Dist. 1992).

Section 811.319(a) requires landfill operators to implement a monitoring program to detect constituents in groundwater leaching from the landfill. This monitoring is called detection monitoring and the rules set criteria for selecting monitored constituents. The Board adopted

Section 811.319(a) in the R88-7 proceeding. The Board amended the rule in 2007 to add fourteen constituents to Section 811.319(a)(2)(A)(ii). Proposed Amendments to Solid Waste Landfill Rules, R7-8 (Oct. 4, 2007). The Board intended this list to detect constituents attributable to landfill leachate and not background groundwater. Slip op. at 8-9. SCL seeks to change constituents analyzed in detection monitoring.

Section 811.319(b) requires landfill operators to implement additional monitoring to confirm that the landfill caused constituents detected in groundwater. This monitoring is called assessment monitoring and the rules set a procedure for this monitoring. The Board adopted Section 811.319(b) in the R88-7 proceeding. Using authority to adopt rules identical in substance to federal rules, the Board later amended the rule to add requirements from 40 C.F.R. § 258.55. [Resource Conservation and Recovery Act] RCRA Subtitle D Amendments, R93-10 (Sept. 15, 1993; Supp. Dec. 16, 1993). SCL seeks to change the constituents analyzed in assessment monitoring.

Section 811.320(a) addresses groundwater quality standards for landfills. Groundwater quality is maintained at background concentration for each constituent. A landfill operator must meet background quality at the edge of the zone of attenuation, which extends 100 feet from the landfill edge or property boundary, whichever is closer. 35 Ill. Adm. Code 811.320(c). Section 811.320(d) sets the method for determining background concentration. A landfill operator may petition the Board for alternate groundwater quality standards by justifying the request under Section 811.320(b). The Board adopted these provisions in the R88-7 proceeding. The Board also has explained that Section 811.320(a), and not the groundwater quality standards of Part 620, apply to landfills covered by Part 811. RCRA Subtitle D Amendments, R93-10, slip op. at 8 (Dec. 16, 1993).

Section 811.325 describes how to select a remedy to address groundwater contamination. The Board adopted this section in the identical-in-substance rulemaking incorporating federal requirements from 40 C.F.R. § 258.57. RCRA Subtitle D Amendments, R93-10 (Sept. 15, 1993; Supp. Dec. 16, 1993). Section 811.325(e), corresponding to 40 C.F.R. § 258.57(e), requires IEPA to determine that remediation is not required when: (i) groundwater is contaminated by multiple sources and cleanup of landfill contamination will not significantly reduce risk; (ii) contaminated groundwater is not used as drinking water and not hydraulically connected to drinking water; (iii) remediation is not technically feasible; or (iv) remediation would result in unacceptable cross-media impact. 35 Ill. Adm. Code 811.325.

IEPA asserts that it will not make determinations under Section 811.325(e) and argues that regulations do not specify how IEPA should make such a determination. Rec. at 27. Rather, IEPA uses background groundwater quality to determine pollutant concentrations triggering corrective action. *Id.* SCL's proposal establishes site-specific standards that could be used to assess potential risks to determine the need for, and scope of, corrective action. *Id.* at 28.

### **BOARD DISCUSSION**

SCL's landfill sits on an abandoned coal strip mine with acid mine drainage impacting groundwater. The landfill also sits on saline formations where upwelling brine impacts

groundwater. These background conditions mask landfill leachate's impact on groundwater making it difficult, if not impossible, to develop background concentrations in groundwater.

SCL, therefore, requests relief from the Board's landfill groundwater regulations. SCL requests two areas of relief. First, SCL prescribes alternative protocols for groundwater monitoring and analysis. Second, SCL proposes alternate maximum allowable predicted concentrations and alternate groundwater quality standards. These alternate standards are triggers to assess the need for, and to implement, corrective action.

### **Legal Standard**

The Board may grant an adjusted standard if SCL adequately justifies its request. 415 ILCS 5/28.1(a) (2014); 35 Ill. Adm. Code 104.428(a). In addition, the Board may impose conditions necessary to accomplish the purposes of the Act. *Id.* Once granted, SCL must comply with the adjusted standard, instead of the general rule. 415 ILCS 5/28.1(a) (2014); 35 Ill. Adm. Code 101.202, 104.400(a).

SCL must prove its request complies with the Act. 415 ILCS 5/28.1(a) (2014); 35 Ill. Adm. Code 104.428(a). For SCL's requested relief relating to groundwater monitoring and alternate maximum allowable predicted concentrations, SCL must demonstrate that it meets the four statutory factors in 415 ILCS 5/28.1(c) (2014). For SCL's requested alternate groundwater quality standards, SCL must demonstrate that it meets the four factors in 35 Ill. Adm. Code 811.320(b)(4). The Board considers each set of factors together with SCL's requested relief.

### **Groundwater Monitoring and Analysis**

SCL seeks changes to the constituents monitored and analyzed in groundwater. Pet. at 11. Adjustments to Sections 811.319(a) and (b) are necessary to accommodate SCL's request. Section 811.319(a) requires landfill operators to implement a detection monitoring program and sets frequency, term, and constituents for monitoring. 35 Ill. Adm. Code 811.319(a). Section 811.319(b) requires assessment monitoring to confirm when landfill leachate caused groundwater contamination. 35 Ill. Adm. Code 811.319(b). Both subsections require SCL to develop lists of monitored constituents. SCL seeks to remove constituents affected by acid mine drainage or not present in landfill leachate. Pet. at 22. Thus, requested monitoring focuses on organic constituents attributable to landfill leachate rather than acid mine drainage. *Id.* at 49. SCL includes inorganic constituents to the extent they characterize landfill leachate without interference from acid mine drainage. *Id.*

For the Board to grant this relief, SCL must meet four statutory factors. 415 ILCS 5/28.1(c) (2014); 35 Ill. Adm. Code 104.426(a). The Board below finds that SCL has met the statutory factors, and then analyzes the specific relief.

### **Statutory Factors Justifying an Adjusted Standard**

**Substantially Different Factors (Section 28.1(c)(1)).** The Board finds that SCL's landfill is substantially different from the landfills the Board considered in adopting the general

rule. SCL's landfill is on a former coal mine where acid mine drainage impacts groundwater. Groundwater is highly acidic and quality varies significantly between monitoring wells. Pet. at 31, citing Pet. App. A, Fig. 6, 7. Acidic groundwater causes other constituents to dissolve and be released into groundwater. For example, acidic conditions cause higher levels of heavy metals because metals are soluble in acid. *Id.* Conducting typical monitoring and analysis fails to identify when landfill leachate, and not acid mine drainage, caused groundwater contamination. *Id.* at 32. In developing the current rule, the Board relied on reports which did not consider acidic conditions. *Id.* at 31-32. IEPA guidance documents also did not mention whether any landfills were within strip-mined areas. *Id.* at 32; Rec. at 6. The Board did not anticipate the effect of strip mining or regional salinity when it promulgated general landfill rules.

**Justification of Adjusted Standard (Section 28.1(c)(2)).** Conditions at SCL's site make it difficult to identify when landfill leachate causes groundwater contamination. Pet. at 34. Accordingly, the Board finds that SCL justifies an adjusted standard from groundwater requirements. IEPA also agrees that the request is justified. Rec. at 6. Three site conditions justify developing site-specific groundwater protocols.

First, acid mine drainage influences inorganic constituents in groundwater at the landfill. SCL calculated background concentrations in groundwater using interwell data and intrawell data. Pet. at 42. However, SCL could not discern the impact of landfill leachate compared to acid mine drainage. *Id.* at 42-43. For example, acid mine drainage elevates levels of sulfate, iron, manganese, and zinc. *Id.* at 43. Elevated levels may require corrective action even if not caused by the landfill. Acidic groundwater renders it difficult, if not impossible, to use the Board's groundwater rules at the landfill.

Second, site hydrogeology makes it difficult to use current rules to monitor groundwater at the landfill. SCL cannot use upgradient wells to develop background concentrations. Pet. at 43. Upgradient wells are close to the mine high wall. *Id.* Saturated minespoil acts as a basin near the wells. *Id.* This physical layout makes characterizing background conditions from upgradient monitoring well data impossible. *Id.*

Third, groundwater flows upward, bringing mineralized groundwater and brine. Pet. at 43. This upward flow is concentrated in areas where fractures, such as the Wabash Valley Fault, provide a vertical path for groundwater. *Id.* Upwelling brine mixes with shallow groundwater near fracture lines. *Id.* at 44. These fractures make it difficult to analyze landfill impacts on groundwater. *Id.* This groundwater tends to have high concentrations of total dissolved solids and chloride. *Id.* at 21.

**Environmental and Health Effects (Section 28.1(c)(3)).** The Board finds that the adjusted standard will not result in environmental or health effects more adverse than the general rule. As to environmental effects, the adjusted standard will not adversely impact groundwater quality. While the Board allows changes to groundwater protocols, the landfill remains subject to groundwater quality standards at the edge of the zone of attenuation. Further, identifying landfill impacts has been difficult because data is masked by acid mine drainage and upward movement of brine. Thus, the adjusted standard is more effective than the general rule in identifying contaminant releases attributable to the landfill. As to health effects, groundwater in

the area is Class IV groundwater, meaning that groundwater cannot be used as drinking water. The adjusted standard, therefore, will not result in any impact on health more adverse than the current regulation. IEPA does not object to SCL's statements on the impact of SCL's requested adjusted standard on the environment. Rec. at 6.

**Consistency with Federal Law (Section 28.1(c)(4)).** The Board finds that the adjusted standard is consistent with federal law. The Board adopted Part 811 Subpart C to implement federal RCRA Subtitle D. Correlations between federal and Illinois rules are found in Board notes throughout Part 811. In addition, Part 811 Appendix B provides a section by section correlation between RCRA Subtitle D regulations (40 C.F.R. Part 258) and the Board's landfill regulations. Further, federal regulations, incorporated into Board regulations, allow Illinois to approve alternate groundwater protocols. *Compare, e.g.* 40 C.F.R. § 258.55(b) to 35 Ill. Adm. Code 811.319(b)(5)(E). IEPA does not identify any inconsistency between SCL's requested adjusted standard and federal law. Rec. at 25, 31.

**Detection Monitoring Constituents (35 Ill. Adm. Code 811.319(a)(2)(A))**

Section 811.319(a) requires SCL to implement a monitoring program to detect constituents in landfill leachate. SCL seeks an adjusted standard to Section 811.319(a)(2)(A), to tailor monitored constituents to those needed to distinguish landfill leachate from acid mine drainage. Specifically, SCL adds four constituents and deletes one other.

Section 811.319(a)(2)(A)(ii) lists fourteen constituents which must be monitored for detection in groundwater. SCL proposes detection monitoring for seventeen constituents. Pet. at 48, 52, 95 (Table 4), 795. The following list shows SCL's proposed changes compared to Section 811.319(a)(2)(A)(ii). SCL's proposed additions are underlined and deletion is stricken. SCL also proposes to monitor pH as a field condition. *Id.*

Ammonia – Nitrogen (dissolved)	Lead (dissolved)
Arsenic (dissolved)	Magnesium (dissolved)
<u>Barium (total)</u>	Mercury (dissolved)
<u>Bicarbonate alkalinity</u>	Nitrate (dissolved)
Boron (dissolved)	<u>Potassium (total)</u>
<del>Cadmium (dissolved)</del>	<u>Sodium (total)</u>
Chloride (dissolved)	Sulfate (dissolved)
Chromium (dissolved)	Total dissolved solids
Cyanide (total)	Zinc (dissolved)

IEPA concurs with SCL's constituents for detection monitoring. Rec. at 8-23; IEPA Resp. at 1. IEPA also recommends continued pH monitoring as a field parameter. *Id.* at 19. Responding to IEPA, SCL withdrew its request to monitor specific conductance. SCL Resp. at 1.

As to adding constituents to detection monitoring, the Board finds that these constituents characterize landfill leachate and are useful to detect leachate releases. SCL analyzed data from January 2005 through April 2011 to evaluate landfill leachate and acid mine drainage impacts on groundwater. SCL developed box plots identifying indicator constituents for landfill leachate.

Pet. 127-128, 165-225. IEPA agrees that these plots indicate that the added constituents (barium, bicarbonate alkalinity, potassium, and sodium) have higher concentrations in leachate compared to groundwater. Rec. at 19-24. These constituents also are not sensitive to acid mine drainage. *Id.* Thus, monitoring these constituents is helpful to detect when landfill leachate contaminates groundwater.

As to deleting cadmium, landfill leachate is not a significant cadmium source. Pet. at 131. Cadmium concentrations in leachate and lacustrine units are generally below the reporting limit. Accordingly, landfill leachate appears not to be a significant source. *Id.* Further, acid mine drainage at the site significantly impacts cadmium concentrations in groundwater. *Id.* IEPA explains that cadmium is detected in higher concentrations as pH levels are more acidic. Rec. at 9, 10. Monitoring data show that cadmium concentrations in leachate tend to be significantly lower than groundwater in minespoil. Pet. at 131, 172-175. Reviewing the data, IEPA concludes that it cannot identify changes in cadmium concentrations attributable to the landfill and monitoring cadmium will result in false positive detections. Rec. at 11. The Board, therefore, finds that SCL justifies deleting cadmium from detection monitoring.

As to monitoring pH, the Board finds that pH should be monitored as a field condition and need not be included in the Board's order. Based on the box plot analysis, pH of landfill leachate is slightly more alkaline than shallow bedrock wells. Pet. at 138. Because landfill releases are buffered by acidic conditions from mine drainage, pH is not useful in detecting releases of leachate. *Id.* However, pH is useful to characterize groundwater conditions. *Id.* IEPA agrees that pH should be monitored as a field parameter. Rec. at 19. The Board finds that pH should be monitored as a field parameter under Section 811.318(e)(6). There is no need to include pH in detection monitoring under Section 811.319(a)(2)(A)(ii).

In sum, the Board finds that SCL's proposed constituent list is appropriate for detecting groundwater contamination from landfill leachate. The Board grants SCL relief from Section 811.319(a)(2)(A) and specifies alternate requirements in Condition 1.

### **Detection Monitoring Analysis (35 Ill. Adm. Code 811.319(a)(4)(A))**

The Board's detection monitoring rules require SCL to analyze groundwater data to confirm whether an increase in constituent concentration is attributable to the landfill. *See* 35 Ill. Adm. Code 811.319(a)(4). SCL must analyze whether any constituent: (1) exceeds the maximum allowable predicted concentration within the zone of attenuation; or (2) exceeds the groundwater quality standard beyond the zone of attenuation. *See* 35 Ill. Adm. Code 811.319(a)(4)(A)(ii), (iv). These analyses are statistical comparisons between the monitored concentration and the standard. In addition, for inorganic constituents, Board rules require SCL to determine whether monitored concentrations show progressive increase over eight consecutive monitoring events. *See* 35 Ill. Adm. Code 811.319(a)(4)(A)(i). Such analysis is a trend analysis.

For acid mine drainage constituents (magnesium, sulfate, total dissolved solids, and zinc), SCL proposes performing only trend analysis and exempting these constituents from statistical analysis. Pet. at 795-796. SCL explains that these constituents are impacted significantly by acid mine drainage. Pet. at 48, 142. Minespoil leaches acid and causes acidic groundwater at the

site. Sulfides in minespoil oxidize and form sulfuric acid. *Id.* at 127. Acidic groundwater causes minerals to dissolve and metals to leach into groundwater. *Id.* As such, the Board agrees with IEPA and SCL that these constituents cannot be used to detect contamination from landfill leachate. *See Rec.* at 8-23; IEPA Resp. at 1. However, these constituents are helpful in characterizing acid mine drainage. Under these circumstances, the Board exempts these constituents from statistical analysis but continues to require trend analysis. *See Petition of City of Collinsville*, AS 15-3 (Feb. 4, 2016) (Board granted an adjusted standard allowing a landfill subject to Part 620 standards at the property boundary to use trend analysis instead of comparing to background levels for acid mine drainage constituents).

For ammonia and chloride, SCL asks to exempt them from statistical comparison to the maximum allowable predicted concentration within the zone of attenuation. *Pet.* at 796. SCL's analysis of groundwater monitoring data shows that the maximum allowable predicted concentrations for ammonia and chloride are not representative of concentrations in groundwater impacted by acid mine drainage. *Id.* at 128-132. Ammonia concentrations are heavily influenced by bacteria in minespoil rather than landfill leachate. *Id.* at 129. Chloride concentrations are influenced by upwelling brine in the region. *Id.* at 131-132. Accordingly, the Board also exempts ammonia and chloride from statistical analysis. In addition, as discussed below, these constituents are required to comply with alternate groundwater quality standards at and beyond the edge of the zone of attenuation. Thus, the statistical comparison to the groundwater quality standard will be to the alternate standard for these constituents.

For chromium, SCL asks that statistical comparisons be to an alternate standard for both the maximum allowable predicted concentration and the groundwater quality standard. *Pet.* at 807-808. Due to the well's close proximity to the mine high wall, chromium concentrations from the upgradient well do not represent background. *Id.* at 808. As such, these concentrations cannot be used to determine background concentration of chromium. As discussed below, the Board sets alternate standards for chromium both within and beyond the zone of attenuation. Thus, the statistical comparisons will be to the alternate standards for chromium.

In sum, the Board grants an adjusted standard that exempts constituents from statistical analysis but requires trend analysis for these constituents. As discussed below, the Board sets alternate maximum allowable predicted concentrations and alternate groundwater quality standards. SCL will make required statistical comparisons to these alternate standards. The Board implements these adjustments in Conditions 2 through 5.

### **Assessment Monitoring Constituents (35 Ill. Adm. Code 811.319(b)(5)(A), (D))**

Section 811.319(b) requires SCL to confirm whether the landfill caused groundwater contamination using assessment monitoring. *See* 35 Ill. Adm. Code 811.319(b). For assessment monitoring, SCL monitors constituents listed in 40 C.F.R. Part 258, Appendix II and 35 Ill. Adm. Code 620.410. *See* 35 Ill. Adm. Code 811.319(b)(5)(D). SCL seeks to delete eight inorganic constituents from assessment monitoring: antimony, cadmium, cobalt, copper, nickel, silver, selenium, and thallium. *Pet.* at 48-49, 803-804. SCL's groundwater and leachate sampling data shows higher concentrations of these constituents are due to acid mine drainage rather than landfill leachate. *Id.* at 127-141. Accordingly, continued monitoring is unnecessary. *Id.* at 804.

IEPA agrees to removing these constituents from assessment monitoring. Rec. at 8-23; IEPA Resp. at 4-5.

The Board finds that assessment monitoring for these constituents will not provide useful information on the landfill's impact on groundwater. SCL's groundwater monitoring data indicates that landfill leachate is not a significant source of these constituents. Pet. at 131, 139-140; *see also* Pet. Attach. 1. Presence of these constituents in groundwater is likely due to leaching from minespoil which underlays the landfill. *Id.* at 804. Section 811.319(b)(5)(E) allows a landfill owner to request that constituents be exempt from assessment monitoring if the constituents are not reasonably expected to leach from landfill waste. The Board grants SCL an adjusted standard from Section 811.319(b)(5)(D) to remove these constituents from assessment monitoring as shown in Conditions 9 and 10.

In addition, SCL proposes to add four constituents to assessment monitoring: bicarbonate alkalinity, potassium, sodium, and pH. Pet. at 810-811. The Board finds that these constituents are useful to assess leachate releases and SCL may add them to assessment monitoring under Section 811.319(b) without a Board order. In addition, pH is monitored as a field condition and need not be included in the Board's order. Board relief from assessment monitoring of these constituents is unnecessary.

#### **Assessment Monitoring Analysis (35 Ill. Adm. Code 811.319(b)(3), (4))**

For assessment purposes, SCL monitors hundreds of constituents. *See* 35 Ill. Adm. Code 811.319(b)(5)(D). SCL must analyze whether any constituent attributable to the landfill: (1) exceeds the groundwater quality standard at or beyond the zone of attenuation; or (2) exceeds the maximum allowable predicted concentration within the zone of attenuation. *See* 35 Ill. Adm. Code 811.319(b)(3), (4). These analyses are statistical comparisons between the monitored level and the standard. SCL proposes to exclude constituents from statistical analysis and conduct only trend analysis for: chloride, chromium, iron, manganese, sulfate, total dissolved solids, zinc, and pH. Pet. at 810-811.

Above, the Board explains that groundwater concentrations of these constituents are impacted by site conditions (upwelling brine, site layout, or acid mine drainage): chloride, chromium, sulfate, total dissolved solids, and zinc. These constituents are not suitable for statistical analysis; however, the Board finds that continuing trend analysis for these constituents would be helpful in characterizing acid mine drainage impacts on groundwater.

For iron and manganese, SCL's sampling data shows that concentrations tend to be much greater in minespoil and shale than in landfill leachate. Pet. at 140-141. Therefore, elevated concentrations appear to be caused by acid mine drainage rather than landfill leachate. *Id.* After discussions between SCL and IEPA, SCL proposes to retain iron and manganese on the assessment monitoring list but exempt them from statistical analysis and detection monitoring. *Id.* at 803; IEPA Resp. at 2. The Board adopts this approach.

Implementing these findings requires three adjustments to 35 Ill. Adm. Code 811.319(b)(3) and (4). First, the Board excludes the following constituents from statistical

analysis for exceedances of the groundwater quality standard under Section 811.319(b)(3): iron, manganese, sulfate, total dissolved solids, and zinc. Second, the Board excludes the following constituents from statistical analysis for exceedances of the maximum allowable predicted concentration under Section 811.319(b)(4): chloride, chromium, iron, manganese, sulfate, total dissolved solids, and zinc. Third, the Board requires trend analysis for these constituents if monitoring results show progressive increases in concentration. This trend analysis is based on Section 811.319(a)(4)(B).

In sum, the Board grants adjusted standards to exempt constituents from statistical analysis but requires trend analysis. The Board implements these adjustments in Conditions 6 through 8.

### **Triggers for Corrective Action**

A primary goal of the Board's landfill rules is to prevent groundwater contamination. To accomplish this, a landfill must establish groundwater quality standards based on background concentrations. When landfill leachate causes an exceedance of such a standard beyond the zone of attenuation, the landfill must take corrective action. In addition, Board rules set up an early warning system to detect concentrations which may migrate and exceed a groundwater quality standard beyond the zone of attenuation. These standards are known as maximum allowable predicted concentrations and determined using contaminant transport modeling. The Board addresses both alternate maximum allowable predicted concentrations and alternate groundwater quality standards in considering SCL's requested relief.

### **Alternate Maximum Allowable Predicted Concentrations**

For monitored constituents, SCL is required to predict concentrations over time and space. This is done by collecting monitoring data and using transport modeling. *See* 35 Ill. Adm. Code 811.317, 811.318. The predicted values are used to establish maximum allowable predicted concentrations within the zone of attenuation. 35 Ill. Adm. Code 811.318(c). SCL proposes alternate concentrations called "groundwater protection standards" to apply within the zone of attenuation. Pet. at 11, 815. SCL seeks to replace maximum allowable predicted concentrations with "groundwater protection standards." *See, e.g., id.* at 823 ("[Groundwater protection standards] would define the effective remedial trigger concentration within the landfill's zone of attenuation.")

SCL justifies its proposal in two ways. First, SCL finds it difficult to establish background for inorganic constituents impacted by historic mining. Second, mostly for organics, SCL seeks to set concentrations for when cleanup is required under Section 811.325(e) and the cleanup target under Section 811.325(f).

**Inorganic Constituents.** Recall from the above discussion that SCL requests, and the Board grants, an adjusted standard identifying seventeen inorganic constituents subject to detection monitoring. Of these constituents, SCL proposes alternate numeric concentrations for chromium and cyanide within the zone of attenuation based on Class I groundwater quality standards. Pet. at 820, 828, 848. The Board grants the alternate maximum allowable predicted

concentration for chromium. However, the Board finds that SCL does not justify alternate concentrations for the remaining inorganic constituents.

For chromium, SCL cannot determine background levels and, therefore, cannot use background to determine maximum allowable predicted concentrations. SCL gives three reasons. First, SCL speculates that chromium data may be influenced by nickel-chromium alloy used in stainless steel for monitoring wells. Pet. at 133, 808. Acidic groundwater may corrode the well and release chromium. *Id.* at 808. Second, groundwater data shows that concentrations vary between geologic units. *Id.* at 133, 808. Average dissolved chromium in lacustrine is higher than in minespoil and shale (15-22 micrograms per liter ( $\mu\text{g/L}$ ) compared to below detection limit). *Id.* at 133. Third, the upgradient well does not represent background conditions. *Id.* at 808. The well is close to the mine high wall and does not represent groundwater in minespoil underlying the landfill.

As an alternative for chromium, the Board sets 0.1 mg/L as the maximum allowable predicted concentration. This value is the same as the Class I groundwater quality standard in 35 Ill. Adm. Code 620.410. Class I groundwater quality standards are set at levels protective of public health and the environment. IEPA recommends granting this alternative. Rec. at 28-29.

The Board denies SCL's alternate maximum allowable predicted concentrations for the remaining sixteen inorganic constituents on the detection monitoring list. SCL did not propose "groundwater protection standards" for six constituents: ammonia, chloride, magnesium, sulfate, total dissolved solids, and zinc. Pet. at 848. These constituents (as well as iron and manganese) are impacted by acid mine drainage and exempt from statistical comparison to maximum allowable predicted concentrations. This exemption provides SCL the relief it seeks. *See, e.g., id.* at 818 (Using zinc as an example, SCL states "exempting the constituent [from statistical analysis] recognizes the limitations due to acidity-related leaching and also would provide relief within the zone of attenuation.") Thus, SCL does not justify alternate concentrations or "groundwater protection standards" for these constituents within the zone of attenuation.

For five constituents (arsenic, cyanide, potassium, sodium, and bicarbonate alkalinity), SCL has or will develop maximum allowable predicted concentrations and therefore does not justify an adjusted standard. SCL developed maximum allowable predicted concentrations for arsenic, cyanide, potassium, and sodium and these values are contained in its permit. Pet. at 97, 848. For bicarbonate alkalinity, SCL states that it plans to develop the concentration. *Id.* The Board finds no reason to grant an adjusted standard for these constituents which have maximum allowable predicted concentrations.

Additionally, as to cyanide, SCL changed its proposal in a table responding to Board questions but did not explain its revised request. SCL initially proposed cyanide concentrations the same as maximum allowable predicted concentrations found in its permit. Pet. at 97, referencing permit found at Pet. App. G. Groundwater data to date shows cyanide as less than the reporting limit, meaning below the practical quantification limit of 0.005 mg/L. *Id.* at 134, 151. However, while most leachate samples also are less than reportable limits, several samples collected from leachate were at reportable levels. *Id.* SCL now proposes a cyanide standard of 0.2 mg/L but does not explain this revision. *Id.* at 848. While this value is the same as the

Class I groundwater quality standard, SCL does not explain this higher value. The Board finds no justification to set cyanide concentration at 20 to 40 times higher than background.

For the remaining five constituents (barium, boron, lead, mercury, and nitrate), the Board finds no justification for an adjusted standard, as discussed below.

**Organic Constituents.** After SCL determines that the landfill caused contamination that needs to be remediated, Section 811.325 sets the procedure to select the remedy. 35 Ill. Adm. Code 811.325. Section 811.325(e) requires IEPA to determine that remediation is not necessary under four circumstances, including when groundwater is contaminated by non-landfill sources and cleanup of landfill contamination will not significantly reduce risk. 35 Ill. Adm. Code 811.325(e). Even if IEPA makes this determination, IEPA may require cleanup if it is technically practicable and reduces threats to human health or environment. 35 Ill. Adm. Code 811.325(f). These rules are identical in substance to 40 C.F.R. §§ 258.57(e) and (f).

IEPA asserts that it will not make determinations under Section 811.325(e). Rec. at 27. Rather, IEPA requires landfills to use background to determine whether cleanup is needed regardless of site-specific circumstances. *Id.* IEPA believes its approach is appropriately conservative because the landfill must restore groundwater to background quality. *Id.* IEPA cites to Section 811.319(a)(4)(A), which lists four triggers for when detection monitoring warrants additional investigation to confirm the source of constituent. One of these triggers is when a constituent exceeds a groundwater quality standard at or beyond the zone of attenuation. 35 Ill. Adm. Code 811.319(a)(4)(A)(iv).

SCL asserts that IEPA's interpretation presents a conflict between: (1) Section 811.325's use of risk-based triggers when non-landfill conditions degraded groundwater; and (2) IEPA's use of background to trigger cleanup. Pet. at 83; Rec. at 27-28. SCL proposes to resolve this conflict by setting numeric standards defining the risk to public health and environment. Pet. at 83, 95-96 (Tables 4 and 5). SCL calls these standards "groundwater protection standards." *Id.* SCL uses a combination of background and Class I groundwater quality standards from 35 Ill. Adm. Code 620.410 (which are the same or more stringent than federal maximum contaminant levels under the Safe Drinking Water Act). *Id.* at 83, 819, citing 40 C.F.R. § 258.55(h). Where no Class I groundwater quality standard has been set, SCL uses the reporting limit. *Id.* SCL explains that these values are needed to set a trigger for remedial action within the landfill. *Id.* at 820.

The Board disagrees that the rules present such a conflict. Under the rules discussed above, there are two routes to groundwater remediation at a landfill. First, if assessment data exceeds a groundwater quality standard at or beyond the zone of attenuation, the landfill must implement remedial action. 35 Ill. Adm. Code 811.319(b)(3). The second route is longer. If assessment data exceeds a maximum allowable predicted concentration within the zone of attenuation (the early warning system), the landfill must assess the impact beyond the landfill. 35 Ill. Adm. Code 811.319(b)(3), (c). If the landfill is impacting groundwater beyond its attenuation zone, the landfill must remediate. *Id.* Once remediation is needed, the landfill follows procedures in 35 Ill. Adm. Code 811.319(d), 324, 325, and 326 to design the cleanup.

IEPA's reliance on Section 811.319(a)(4)(A)(iv) is misplaced. This section requires additional investigation to confirm the source of constituent when a constituent exceeds a groundwater quality standard at or beyond the zone of attenuation. 35 Ill. Adm. Code 811.319(a)(4)(A)(iv). That standard is set under Section 811.320(a) at background, or other level determined by the Board. 35 Ill. Adm. Code 811.320(a). In other words, when monitoring data exceeds background at the edge of the landfill, the landfill is required to confirm that exceedance's source. 35 Ill. Adm. Code 811.319(a)(4)(A)(iv). This investigation is known as an alternative source demonstration. 35 Ill. Adm. Code 811.319(a)(4)(B). If the landfill cannot demonstrate that a non-landfill source caused the exceedance, the landfill must conduct assessment monitoring. *Id.* Thus, Section 811.319(a)(4)(A)(iv), when triggered, requires additional investigation, not necessarily remediation.

IEPA believes SCL's "groundwater protection standards" are consistent with background-based nondegradation standards for two reasons. Rec. at 28. First, these standards apply within the zone of attenuation as an alternative to maximum allowable predicted concentrations. The proposed "groundwater protection standard" for a large number of constituents is the constituent's maximum allowable predicted concentration derived from background. *Id.* at 29; *see also* Pet. at 848-850. Second, background concentrations remain as the compliance standard at and beyond the zone of attenuation. *Id.* For these reasons, IEPA states the "groundwater protection standards" do not impinge on nondegradation principles which apply at the edge of the zone of attenuation.

IEPA's premise is correct that the landfill must not degrade groundwater outside the landfill and must restore groundwater to background quality. However, Section 811.325(e) may be implemented consistent with this principle. Section 811.325(e) applies after the landfill completes detection and assessment analyses and confirms that the landfill is causing groundwater contamination at or beyond the zone of attenuation. When it is determined that the landfill is causing offsite groundwater contamination, Section 811.325 provides for selecting the remedy. Section 811.325(e) allows that remediation is not necessary when groundwater is contaminated by non-landfill sources and cleanup of landfill contamination will not significantly reduce risk. Implementing this provision does not further degrade groundwater quality if non-landfill sources have already degraded it. IEPA acknowledges that groundwater is already degraded and cannot be used beneficially. Pet. at 29. Accordingly, the Board sees no conflict in implementing detection and assessment monitoring procedures together with Section 811.325.

In addition, SCL has not explained how its proposed "groundwater protection standards" solve this perceived conflict for organic constituents as well as the remaining five inorganic constituents (barium, boron, lead, mercury, and nitrate). SCL's proposed "groundwater protection standards" replace maximum allowable predicted concentrations within the zone of attenuation. Exceedances of maximum allowable predicted concentrations trigger additional investigation as to offsite impacts. *See* 35 Ill. Adm. Code 811.319(a)(4)(A)(ii), 811.319(b)(4). Board rules do not necessarily require a landfill to remediate when background is exceeded within the zone of attenuation. Within this zone, Board rules set up an early warning system to detect concentrations which may migrate and exceed background beyond the landfill. Within the landfill, concentrations may be higher than background as long as modeling shows that groundwater meets background at the landfill's edge.

SCL notes that its “groundwater protection standards” are derived using 40 C.F.R. § 258.55(h), as directed by 40 C.F.R. § 258.55(d)(4). Pet. at 818-820. As explained above, implementing these federal provisions, SCL uses a combination of background and Class I groundwater quality standards. *Id.* at 819. Where no Class I groundwater quality standard has been set, SCL uses the reporting limit. *Id.* SCL appears to have followed the federal steps for deriving minimum federal standards. However, these federal steps are used to set triggers for corrective action and are analogous to Board rules explained above. SCL has not justified using these federal steps in place of Illinois standards, particularly if the federal standards are less stringent. Furthermore, the Board previously has held that groundwater quality standards set under Section 811.320(a), and not the groundwater quality standards of Part 620, apply to landfills covered by Part 811. RCRA Subtitle D Amendments, R93-10, slip op. at 8 (Dec. 16, 1993).

The practical impact of SCL’s proposal to use higher Class I groundwater quality standards within the zone of attenuation is to set a higher (less stringent) trigger for additional investigation under Section 811.319(a)(4)(A)(ii) and Section 811.319(b)(4). SCL argues that using higher Class I standards is justified because remediating these constituents beyond drinking water levels to more stringent background levels would not improve groundwater quality. Pet. at 86, 831. Groundwater quality is highly degraded by historic mining such that remediating these constituents to background will not render groundwater potable. *Id.* Alternate maximum allowable predicted concentrations give SCL relief by setting higher Class I groundwater quality standards as triggers for assessing offsite impacts.

The Board grants this relief for chromium because SCL cannot determine a maximum allowable predicted concentration for chromium. However, SCL does not justify allowing this for other constituents not impacted by acid mine drainage. Based on the record, organics and five remaining inorganics are not significantly impacted by acid mine drainage. Thus, difficulties establishing background, such as for chromium, do not apply. Accordingly, SCL does not justify replacing maximum allowable predicted concentrations with higher Class I groundwater quality standards for organics, barium, boron, lead, mercury, and nitrate. The Board finds no justification for allowing SCL to choose to use higher Class I groundwater quality standards instead of maximum allowable predicted concentrations for these constituents.

SCL’s other rationale – that groundwater quality is highly degraded by non-landfill operations and remediating these constituents beyond drinking water levels to more stringent background levels does not improve quality – goes towards choosing a remedy under Section 811.325(e). SCL’s proposed changes to Sections 811.324, 811.325, and 811.326 purport to provide relief from remediation requirements. However, within the zone of attenuation, SCL appears to be seeking relief from conducting unnecessary alternative source demonstrations (35 Ill. Adm. Code 811.319(a)(4)(B)) and groundwater impact assessments (35 Ill. Adm. Code 811.319(c)). For organics and the five inorganics, SCL does not sufficiently justify relief from conducting these analyses or from setting “groundwater protection standards” as triggers for corrective action.

If SCL believes that alternate maximum allowable predicted concentrations are justified for organics or additional inorganics, beyond the relief granted in this order, SCL should file a new petition justifying such relief as to each constituent and proposing an order consistent with the format of the order below. As to organics in particular, SCL's proposal in the current petition appears overbroad in that SCL seeks relief for hundreds of constituents without justification. Pet. at 96-105 (SCL uses 1, 2 dichloroethene as a summary example. Pet. at 79, 823.). Further, SCL's request as to organics is speculative in that SCL has not explained which organic constituents impact groundwater outside the landfill's zone of attenuation and whether remediation is necessary as to specific constituents due to factors in Section 811.325(e) or (f).

**Summary.** The Board sets an alternate maximum allowable predicted concentration for dissolved chromium in Condition 11. The Board declines to set maximum allowable predicted concentrations or "groundwater protection standards" for the remaining inorganics on the detection monitoring list or for organic constituents.

### **Alternate Groundwater Quality Standards**

Section 811.320(a) requires SCL to maintain groundwater quality at background levels or a standard established by the Board under Section 811.320(b). See 35 Ill. Adm. Code 811.320(a) and (b). SCL asks the Board to set site-specific standards for ammonia, chloride, and chromium.<sup>1</sup> Pet. at 49, 808-809; SCL Resp. at 1. For the Board to grant this relief, SCL must meet four statutory factors. 415 ILCS 5/28.1(b) (2014); 35 Ill. Adm. Code 811.320(b)(4). The Board first considers these statutory factors and then analyzes the specific relief.

**Regulatory Factors Justifying Alternate Groundwater Quality Standards.** The rule outlines two justification levels for an alternate groundwater quality standard: one for groundwater serving as drinking water, and another for groundwater that cannot serve as drinking water. Because groundwater near the landfill is not potable, SCL seeks an adjusted standard using Section 811.320(b)(4). Pet. at 27, 33-34.

**Drinking Water Source (Section 811.320(b)(4)(A), (D)).** SCL demonstrates that groundwater is not presently used as drinking water. See 35 Ill. Adm. Code 811.320(b)(4)(A). Groundwater in lacustrine, minespoil, and hydraulically connected bedrock are not used as potable water. Pet. at 57, 844. The closest upgradient potable well is half a mile from the landfill. *Id.* This well was installed in 1900, is not hydraulically connected to the shallow minespoil deposits that the landfill is constructed upon, and may no longer be in service. *Id.*

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<sup>1</sup> The Board asked SCL whether it seeks adjusted groundwater quality standards for acid mine drainage constituents. See, e.g., Pet. at 817. For a landfill seeking to certify completion of post-closure care, the Board recently granted an adjusted standard for acid mine drainage constituents to meet existing concentrations at the property line rather than Class I groundwater quality standards. Petition of City of Collinsville, AS 15-03 (Feb. 4, 2016). However, SCL states that it does not seek adjusted groundwater quality standards for acid mine drainage constituents at or beyond the zone of attenuation. See, e.g., Pet. at 821 (SCL "does not believe that published potable water quality standards reflect appropriate Board adjusted groundwater quality standards."), see also Pet. at 817-818, 823.

Two downgradient wells, one half a mile and the other 4700 feet from the landfill, were not completed. *Id.* The Illinois State Water Survey and Illinois State Geologic Survey show the closest potable well is outside the strip mined area 1500 feet from the landfill and 2400 feet from the waste boundary. *Id.* at 67.

SCL also must demonstrate that groundwater cannot serve as drinking water. *See* 35 Ill. Adm. Code 811.320(b)(4)(D). SCL may rely on five factors: (i) water cannot be removed in usable quantities; (ii) recovering water for drinking is not technologically feasible or economically reasonable; (iii) it is economically or technologically impractical to render groundwater fit for human consumption; (iv) total dissolved solids in groundwater is more than 3000 mg/L and will not be used as a public water supply; or (v) total dissolved solids in the groundwater exceeds 10,000 mg/L. *Id.*

SCL uses the third, fourth and fifth factors to demonstrate that, because of previous coal strip mining, groundwater cannot be used for drinking water. *Pet.* at 846. Dissolved metals, total dissolved solids, and sulfate render groundwater at the site unfit for human consumption. *Id.* at 69, 846. Heavy metals tend to be elevated due to acid mine drainage. *Id.* at 67. Further, acidic mine drainage is expected to continue. *Id.* at 70. Treating groundwater to achieve potable or general resource groundwater quality standards by removing metals would be technically difficult and extremely expensive. *Id.* at 67-68.

As to total dissolved solids, the permitted interwell background concentration within the minespoil unit is 8,579 mg/L. *Pet.* at 58, 69-70, 846. Intrawell background concentrations in the minespoil unit can exceed 24,000 mg/L. *Id.* at 58, 846. The shale bedrock intrawell background level ranges up to 10,800 mg/L, and eight of the eleven shale monitoring wells have intrawell background concentrations exceeding 3,000 mg/L. *Id.* at 58, 70, 846.

As to sulfate, minespoil monitoring wells greatly exceed the Class I groundwater quality standard of 400 mg/L. *Pet.* at 58 (citing 35 Ill. Adm. Code 620.410), 846. Upper bedrock is hydraulically connected to minespoil, and ten of the eleven bedrock monitoring wells exceed the Class I standard. *Id.* Average sulfate concentrations in the shale bedrock wells are 800% higher, and in minespoil wells are 1700% higher. *Id.* at 70.

The Board finds it highly unlikely that the water from minespoil deposits or hydraulically connected bedrock will be used as drinking water. Concentrations of constituents associated with mining exceed the vast majority of Class I potable resource groundwater (35 Ill. Adm. Code 620.410) and Class II general resource groundwater criteria (35 Ill. Adm. Code 620.420). The Board finds that groundwater at the landfill is not used for drinking water and cannot serve as drinking water.

**Beneficial Uses (Section 811.320(b)(4)(B)).** SCL demonstrates that the alternate standard will not interfere with, or become injurious to, any present or potential beneficial uses for such waters. *See* 35 Ill. Adm. Code 811.320(b)(4)(B). Groundwater in minespoil and hydraulically connected bedrock is highly degraded due to previous strip mine activities. *Pet.* at 57, 845. As a result, groundwater is Class IV or “other groundwater” under 35 Ill. Adm. Code 620.240, meaning that groundwater cannot be used for beneficial uses such as drinking. *Id.* at

845. Accordingly, the Board finds that the requested adjusted standard will not interfere with any beneficial uses of groundwater at the site. IEPA agrees that previous coal strip mining degraded the groundwater such that it is not possible to use it for beneficial purposes. Rec. at 30.

In addition, the three alternate standards will not interfere with any beneficial groundwater uses. The chloride and chromium standards are set at Class I groundwater quality standards, meaning they are safe for drinking water. Pet. at 845. The ammonia standard will not adversely affect drinking water sources because ammonia absorbs to soil and forms immobile salts. Further, SCL's proposed ammonia standard is deemed protective of human health because it is based on the general use water quality standard. *Id.*

**Economic Impacts (Section 811.320(b)(4)(C)).** SCL demonstrates that the alternate standard is necessary for economic or social development. See 35 Ill. Adm. Code 811.320(b)(4)(C). SCL must provide information on regional economic impacts, social disbenefits (job loss or facility closing), and comparison between health and environmental benefits and implementation costs. *Id.*

To comply with groundwater monitoring rules, SCL installed: a gradient control system along the east side of the landfill; a retrofit leachate collection system in Unit 1; and a composite cover to reduce leachate. Pet. at 46, 69. SCL applied for permit modifications to address difficulties differentiating minespoil impacts from landfill impacts to groundwater. *Id.* at 46. SCL submitted seven permit applications to address groundwater exceedances including exceedances attributable to acid mine drainage. *Id.* SCL estimates the cost of these applications exceeds \$150,000. *Id.* While SCL finds it difficult to estimate the full cost of monitoring not tailored to the landfill, SCL concludes that there is no significant cost difference due to alternate groundwater quality standards. Rather, SCL intends to tailor groundwater monitoring to identify landfill impacts. *Id.* at 47. Further, SCL continues to control leachate and there is no economic benefit from avoiding corrective action or source control. *Id.* at 69.

SCL argues that alternate groundwater quality standards benefit the environment. Pet. at 54. Under the current standards, SCL has difficulty responding to exceedances because acid mine drainage masks impacts attributable to the landfill. *Id.* This slows corrective action. *Id.* SCL's proposal allows SCL to respond more quickly to landfill releases. *Id.* at 54, 845. The proposal also provides more accurate characterization of groundwater. *Id.* at 47. For example, the chloride standard will simplify SCL's efforts to discern brine upwelling from landfill impacts. *Id.* at 54. SCL's requests are further based on potable groundwater standards and general use standards, which are protective of public health and the environment. *Id.* at 845.

SCL notes that the most viable method for treating the wide assemblage of constituents detected from a landfill release is to transport the water to a publicly owned treatment works. Pet. at 55. SCL states that monitoring parameters indicative of landfill releases will allow SCL to better manage the volume of effluent sent offsite. *Id.*

**Ammonia.** SCL seeks an alternate groundwater quality standard of 15 mg/L for dissolved ammonia. Pet. at 11. SCL is unable to determine background groundwater quality due to significant variations in ammonia concentration in groundwater within the minespoil. *Id.* at

129. These variations are due to microbial activity catalyzed by acid mine drainage rather than landfill leachate. *Id.* Further, SCL cannot use the upgradient well to characterize background concentration because the well is too close to the mine high wall. *Id.* IEPA agrees that background cannot be determined from the upgradient well and recommends granting the alternate standard. Rec. at 8. Monitoring results show that increases in ammonia at the upgradient well are not solely due to the landfill. *Id.*

The Board, for two reasons, finds that SCL cannot establish background concentration for ammonia representative of the geologic units underlying the landfill. First, the upgradient well is too close to the mine high wall to be useful in characterizing background concentration for ammonia. Second, ammonia concentrations in minespoil groundwater are highly variable. Therefore, SCL justifies an alternate groundwater quality standard for ammonia.

The Board further finds that an alternate groundwater quality standard of 15 mg/L for dissolved ammonia is appropriate. This alternate standard is the same as the Board's general use water quality standard at Section 302.212. The general use standard is set at a level protective of aquatic life in Illinois waters. *See* 35 Ill. Adm. Code 302.202, 302.212. This standard ensures protection of aquatic life in hydraulically connected waters. Currently, Board rules do not provide a Class I groundwater quality standard for dissolved ammonia. However, groundwater underlying the landfill is not presently, and will not in the future, serve as drinking water. Therefore, the Board grants an alternate standard of 15 mg/L for dissolved ammonia in Condition 12.

**Chloride.** SCL seeks an alternate groundwater quality standard of 200 mg/L for dissolved and total chloride. Pet. at 11. SCL cannot establish representative background concentration for chloride due to the prior strip mine. *Id.* The alternate standard also is needed because the site experiences upward movement of briny groundwater, making it difficult to characterize chloride levels. *Id.* at 132, 807.

IEPA agrees that SCL is limited in developing chloride background levels for minespoil and shale units. Rec. at 12-13. IEPA explains that the upgradient minespoil well cannot be used to establish background. *Id.* at 12. Groundwater from the upgradient background well has limited contact time with minespoil. *Id.* Accordingly, chloride concentrations are lower than concentrations observed in downgradient wells. *Id.* IEPA recommends granting the alternate standard. *Id.* at 13.

The Board finds that SCL justifies an alternate groundwater quality standard for chloride because SCL cannot characterize background concentrations for chloride. The Board further finds that the alternate standard of 200 mg/L for dissolved and total chloride is appropriate. This standard is the same as the Class I groundwater quality standard at 35 Ill. Adm. Code 620.410, and, therefore, is protective of human health and the environment. The Board grants SCL an alternate groundwater quality standard for chloride in Condition 12.

**Chromium.** SCL seeks an alternate groundwater quality standard of 100 µg/L for dissolved and total chromium. Pet. at 808-809. SCL is unable to determine background

concentration for chromium due to site-specific conditions. IEPA recommends that the Board grant the requested standard. IEPA Resp. at 1, 4.

The Board finds that physical attributes and hydrogeology at the landfill make it difficult to establish representative background concentrations for chromium. Therefore, the Board finds that SCL justifies an alternate groundwater quality standard for chromium for four reasons. First, groundwater data shows that chromium concentrations vary across the landfill. Pet. at 133. SCL speculates that these variations may not be due to the landfill but rather due to stainless steel nickel-chromium alloy used to construct monitoring wells. *Id.* at 133, 808. Second, chromium concentrations vary between geologic units. *Id.* at 808. While average concentration in lacustrine ranges from 15 to 22 µg/L, concentrations in minespoil and shale are below detection limits. *Id.* at 133. Lacustrine does not exist along the upgradient side of the landfill used to determine background. *Id.* Third, the upgradient well cannot be used to determine background for chromium. *Id.* at 808. Groundwater flows from the mine high wall toward the landfill. Groundwater travels a very short distance through the minespoil to the upgradient well, while groundwater under the landfill follows a longer flow path. Accordingly, chromium concentrations in the upgradient well do not represent groundwater underlying the landfill. *Id.* Fourth, chromium in minespoil is susceptible to leaching if acidic conditions dissolve chromite or mafic minerals present in the minespoil. *Id.* at 808. SCL contends that the interwell total chromium concentration is significantly higher than dissolved chromium interwell concentrations, indicating acid leaching from minespoil and shale. *Id.*

Further, the Board finds that an alternate groundwater quality standard of 100 µg/L for dissolved and total chromium is appropriate and converts the units to 0.1 mg/L for consistency. This standard is the same as the Class I groundwater quality standard at 35 Ill. Adm. Code 620.410, and, therefore, is protective of human health and the environment. The Board grants SCL an alternate groundwater quality standard for chromium in Condition 12.

### **Section 27(a) of the Act**

In granting an adjusted standard, the Board is required to consider existing physical conditions, character of surrounding land uses, zoning classifications, nature of existing air quality or receiving water, and technical feasibility and economic reasonableness of measuring or reducing the particular type of pollution. 415 ILCS 5/28.1, 27(a) (2014). The Board must consider the record of the adjusted standard proceeding in light of these considerations but the Act does not set an evidentiary threshold that the petitioner must meet. *See Shell Oil Co. v. Pollution Control Board*, 37 Ill. App. 3d 264, 274, 346 N.E.2d 212, 221 (5th Dist. 1976) (“The requirement of section 27 is a flexible one and of necessity requires that a great deal of discretion be exercised by the Board.”). The Board carefully considered the information in this record in view of these factors and finds that the adjusted standard may be granted.

### **CONCLUSION**

The Board finds that Saline County Landfill provided sufficient justification under Section 28.1 of the Act for an adjusted standard from groundwater regulations for its landfill. The Board therefore grants an adjusted standard subject to conditions. The Board: (1) modifies

constituents used for groundwater monitoring and analysis; and (2) sets revised maximum allowable predicted concentration for one constituent and revised groundwater quality standards for three constituents. The relief is effective as of the date of this order. This opinion constitutes the Board's findings of fact and conclusions of law.

### **ORDER**

Pursuant to Section 28.1 of the Act (415 ILCS 5/28.1) (2014), the Board grants Saline County Landfill, Inc. (SCL) (Permit 1983-9-DE/OP, Site 1658080001), southeast of Harrisburg on County Highway 5 in Saline County, an adjusted standard from the Board's landfill regulations (35 Ill. Adm. Code Part 811) as specified below.

#### **Detection Monitoring**

1. In lieu of 35 Ill. Adm. Code 811. 319(a)(2)(A), SCL must comply with the following:
  - A) SCL must monitor each well for constituents that will provide a means for detecting groundwater contamination as well as characterizing acid mine drainage impacts on groundwater. Constituents must be chosen for monitoring if they meet the following requirements.
    - i) The constituent appears in, or is expected to be in, the leachate; and
    - ii) The constituent is contained within the following list:
      - Ammonia – Nitrogen (dissolved)
      - Arsenic (dissolved)
      - Barium (total)
      - Bicarbonate Alkalinity (dissolved)
      - Boron (dissolved)
      - Chloride (dissolved)
      - Chromium (dissolved)
      - Cyanide (total)
      - Lead (dissolved)
      - Magnesium (dissolved)
      - Mercury (dissolved)
      - Nitrate (dissolved)
      - Potassium (total)
      - Sodium (total)
      - Sulfate (dissolved)
      - Total Dissolved Solids (TDS)
      - Zinc (dissolved)
    - iii) This is the minimum list for Municipal Solid Waste Landfill Facilities.

- iv) Any facility accepting more than 50% by volume non-municipal waste must determine additional indicator parameters based upon leachate characteristic and waste content.
2. The comparisons to the maximum allowable predicted concentration within the zone of attenuation under Section 811.319(a)(4)(A)(ii) and to the applicable groundwater quality standard at or beyond the zone of attenuation under Section 811.319(a)(4)(A)(iv) are not required for the following constituents being monitored to characterize potential acid mine drainage. The following constituents are subject to trend analysis under Section 811.319(a)(4)(A)(i).

Magnesium (dissolved)  
Sulfate (dissolved)  
Total Dissolved Solids (TDS)  
Zinc (dissolved)

3. The comparison to the maximum allowable predicted concentration within the zone of attenuation under Section 811.319(a)(4)(A)(ii) is not required for the following constituents. The following constituents are subject to trend analysis under Section 811.319(a)(4)(A)(i).

Ammonia –Nitrogen (dissolved)  
Chloride (dissolved)

4. The comparison to the maximum allowable predicted concentration within the zone of attenuation under Section 811.319(a)(4)(A)(ii) is to the alternate maximum allowable predicted concentration specified in Condition 11 for the following constituent.

Chromium (dissolved)

5. The comparison to the applicable groundwater quality standard at or beyond the zone of attenuation under Section 811.319(a)(4)(A)(iv) is to the adjusted groundwater quality standard specified in Condition 12 for the following constituents.

Ammonia –Nitrogen (dissolved)  
Chloride (dissolved)  
Chromium (dissolved)

### **Assessment Monitoring**

6. The statistically-based comparison to the applicable groundwater quality standard at or beyond the zone of attenuation under Section 811.319(b)(3) is not required for the following constituents being monitored to characterize potential acid mine drainage. The following constituents are subject to trend analysis under Condition 8.

Iron (dissolved and total)

Manganese (dissolved and total)  
 Sulfate (total)  
 Total Dissolved Solids (TDS)  
 Zinc (dissolved)

7. The statistically-based comparison to the maximum allowable predicted concentration within the zone of attenuation under Section 811.319(b)(4) is not required for the following constituents being monitored to characterize potential acid mine drainage. The following constituents are subject to trend analysis under Condition 8.

Chloride (total)  
 Chromium (total)  
 Iron (dissolved and total)  
 Manganese (dissolved and total)  
 Sulfate (total)  
 Total Dissolved Solids (TDS)  
 Zinc (dissolved)

8. If the concentration of a constituent listed in Conditions 6 or 7 shows a progressive increase over eight consecutive monitoring events, SCL must complete the following confirmation procedures:
- a. Confirm any observed increase by taking additional samples within 90 days after the initial sampling event and ensure that the increasing concentration trend exists. SCL will notify the Agency of any confirmed increase before the end of the next business day following the confirmation;
  - b. Determine the source of any confirmed increase, which may include, but shall not be limited to, natural phenomena, sampling or analysis errors, or an offsite source; and
  - c. Notify the Agency in writing of any confirmed increase. The notification must demonstrate a source other than the facility and provide the rationale used in such a determination. The notification must be submitted to the Agency no later than 180 days after the original sampling event. The notification must be filed for review as a significant permit modification pursuant to 35 Ill. Adm. Code 813.Subpart B.
  - d. If an alternative source demonstration described in Conditions 8(b) and (c) cannot be made, and the confirmed increase is attributable to the solid waste disposal facility, then SCL must determine the nature and extent of the groundwater contamination, including an assessment of the potential impact on the groundwater at the facility, and implement the remedial action in accordance with Section 811.319(d).
9. In lieu of Section 811.319(b)(5)(D), SCL will comply with the following:

Within 90 days after the initial monitoring in accordance with Section 811.319(b)(5)(A), SCL must monitor for the detected constituents listed in appendix II to 40 C.F.R. Part 258, incorporated by reference in 35 Ill. Adm. Code 810.104, and 35 Ill. Adm. Code 620.410 on a semiannual basis during the assessment monitoring. SCL must monitor all the constituents listed in appendix II to 40 C.F.R. Part 258 and 35 Ill. Adm. Code 620.410 on an annual basis during assessment monitoring, except for the following constituents:

Antimony (total)  
 Cadmium (total)  
 Cobalt (total)  
 Copper (total)  
 Nickel (total)  
 Silver (total)  
 Selenium (total)  
 Thallium (total)

10. In lieu of Section 811.319(b)(5)(G), SCL must comply with the following:

If the concentrations of all constituents in appendix II to 40 C.F.R. Part 258, incorporated by reference in 35 Ill. Adm. Code 810.104, and 35 Ill. Adm. Code 620.410, as modified in Condition 9, are shown to be at or below background values, using the statistical procedures in Section 811.320(e), for two consecutive sampling events, the owner or operator must notify the Agency of this finding and may stop monitoring the constituents.

**Maximum Allowable Predicted Concentration**

11. The following numerical concentrations are the maximum allowable predicted concentrations within the zone of attenuation for purposes of Sections 811.319.

Chromium (dissolved)	0.1 mg/L
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**Groundwater Quality Standard**

12. In lieu of Section 811.320(a)(1)(A), the following standards must be met at or beyond the edge of the zone of attenuation pursuant to Section 811.320(a)(1)(B):

Ammonia (dissolved)	15 mg/L
Chloride (dissolved and total)	200 mg/L
Chromium (dissolved and total)	0.1 mg/L

IT IS SO ORDERED.

Section 41(a) of the Environmental Protection Act provides that final Board orders may be appealed directly to the Illinois Appellate Court within 35 days after the Board serves the order. 415 ILCS 5/41(a) (2014); *see also* 35 Ill. Adm. Code 101.300(d)(2), 101.906, 102.706.

Illinois Supreme Court Rule 335 establishes filing requirements that apply when the Illinois Appellate Court, by statute, directly reviews administrative orders. 172 Ill. 2d R. 335. The Board's procedural rules provide that motions for the Board to reconsider or modify its final orders may be filed with the Board within 35 days after the order is received. 35 Ill. Adm. Code 101.520; *see also* 35 Ill. Adm. Code 101.902, 102.700, 102.702.

I, John T. Therriault, Clerk of the Illinois Pollution Control Board, certify that the Board adopted the above order on April 7, 2016, by a vote of 5-0.

A handwritten signature in black ink that reads "John T. Therriault". The signature is written in a cursive style with a long horizontal flourish extending to the right.

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John T. Therriault, Clerk  
Illinois Pollution Control Board