

ILLINOIS POLLUTION CONTROL BOARD

August 15, 1996

IN MATTER OF:)
)
PETITION OF COMMONWEALTH) AS 96-9
EDISON COMPANY FOR AN ADJUSTED) (Adjusted Standard - Land)
STANDARD FROM 35 ILL. ADM. CODE)
PARTS 811 and 814)

OPINION AND ORDER OF THE BOARD (by R.C. Flegal):

This matter comes before the Board upon a "Petition for Adjusted Standards from Certain Regulations Governing Existing Landfills" filed by Commonwealth Edison Company (Edison) on April 1, 1996. The petition applies to Edison's Joliet/Lincoln Quarry Site (Lincoln Quarry or the Site).

The requested modifications apply to the following standards governing non-hazardous solid waste landfill operations: (1) the standard prescribing a leachate collection and management system; (2) the groundwater monitoring requirements for certain inorganic and organic constituents; (3) the standards for location of monitoring wells; (4) the zone of attenuation standards applicable to the Site; (5) the standard prescribing final cover for the Main Quarry; and (6) miscellaneous additional standards that Edison asserts factually do not apply to the mode of operation conducted at the Site.

The Board's responsibility in this matter arises from the Environmental Protection Act (Act) (415 ILCS 5/1 et seq.). The Board is charged therein to "determine, define and implement the environmental control standards applicable in the State of Illinois" (Act at Section 5(b)) and to "grant . . . an adjusted standard for persons who can justify such an adjustment" (Act at Section 28.1(a)). More generally, the Board's responsibility in this matter is based on the system of checks and balances integral to Illinois environmental governance: the Board is charged with the rulemaking and principal adjudicatory functions, and the Illinois Environmental Protection Agency (Agency) is responsible for carrying out the principal administrative duties.

The Act also provides that "the Agency shall participate in [adjusted standard] proceedings". (415 ILCS 28.1(d)(3).) On May 3, 1996 the Agency filed a response and recommended that the instant requested adjusted standard be granted¹.

¹ Edison's April 1, 1996 petition for adjusted standard will be cited as (Pet. at __) and the Agency's May 3, 1996 response will be cited as (Res. at __).

Edison waived hearing in this matter pursuant to 35 Ill. Adm. Code 106.705(j). No other person requested a hearing, and accordingly no hearing was held.

Based upon the record before it and upon review of the factors involved in the consideration of adjusted standards, the Board finds that Edison has demonstrated that grant of an adjusted standard in the instant matter is warranted for 35 Ill. Adm. Code 814.302(b)(1), 811.319(a)(2), 811.319(a)(3), 811.318(b)(5), 811.320(c), and 811.314.

NATURE OF THE FACILITY AND DISCHARGE

The Lincoln Quarry, or Site, is located 1/4 mile south of the Des Plaines River in incorporated Will County, southwest of the City of Joliet and adjacent to two of Edison's coal-fired generating stations, Joliet Stations 9 and 29. (Pet. at 2.) The Site is comprised of former dolomite quarries that are now divided into three units: the Main Quarry, the North Quarry, and the West Filled Area. (*Id.*) Although the Joliet Stations generate fly ash, bottom ash, and slag as byproducts of the coal burning process, this petition only concerns the handling of bottom ash and slag. Fly ash is shipped off-site for disposal.

Edison deposited bottom ash and slag into the West Filled Area prior to 1975. The West Filled Area has since been leveled and vegetated. Since 1975 Edison has deposited the bottom ash and slag into the Main Quarry, which was permitted as a landfill for coal combustion wastes in 1976. The bottom ash and slag are mixed with water from the Des Plaines River (River) and then sluiced into the Main Quarry. Edison maintains the water level in the Main Quarry between 549 feet and 555 feet above sea level, approximately 20 to 30 feet below the adjacent groundwater table. The difference in water level generates a hydraulic gradient that is directed into the Main Quarry. That is, the groundwater flows into the Main Quarry from the surrounding aquifer. From the Main Quarry the water drains by gravity into the North Quarry settling pond and finally the sluicing water is pumped back into the River (under NPDES permit #IL0002216). (Pet. at 3.)

BACKGROUND

As required under 35 Ill. Adm. Code 814.103, Edison notified the Agency that it would be closing the Lincoln Quarry by September 18, 1997. (Pet. at 3-4.) However, due to the unanticipated capacity, Edison now believes that it can receive ash wastes from the Joliet Stations well beyond the expected useful life of those Stations. (*Id.*) As a result, Edison amended its notification to extend the closure date of the coal combustion waste monofill at the Lincoln Quarry beyond September 18, 1997.

As a result of Edison's closure extension, it was required to show that the Lincoln Quarry would satisfy the standards applicable to existing landfills under 35 Ill. Adm. Code 814, Subpart C. (Pet. at 4.) However, Edison states that as its mandatory application for

significant modification indicated, Lincoln Quarry cannot satisfy some of these standards. (*Id.*)²

In the instant adjusted standard, Edison argues that the generally applicable standards at issue cannot rationally apply to the operations in the Main Quarry. In addition, it claims that such compliance would require structural modifications to the Main Quarry which are technically and economically impracticable for what amounts to a questionable environmental benefit. (Pet. at 5.)

ADJUSTED STANDARD PROCEDURE

The Illinois Environmental Protection Act at Section 28.1 (415 ILCS 5/28.1 (1994)) provides that a petitioner may request, and the Board may impose, an environmental standard that is different from the standard that would otherwise apply to the petitioner as the consequence of the operation of a rule of general applicability. Such a standard is called an adjusted standard. The general procedures that govern an adjusted standard proceeding are found at Section 28.1 of the Act and within the Board's procedural rules at 35 Ill. Adm. Code Part 106.

The standards from which Edison seeks modification do not specify a level of justification or other requirement for an adjusted standard for this matter. Therefore, Sections 28.1(c)(1) through (c)(4) of the Act are relevant in this proceeding. Petitioner has the burden of proving the following for an adjusted standard from a rule of general applicability:

1. factors relating to that petitioner are substantially and significantly different from the factors relied upon by the Board in adopting the general regulation applicable to the petitioner;
2. the existence of those factors justifies an adjusted standard;
3. the requested standard will not result in environmental or health effects substantially and significantly more adverse than the effects considered by the Board in adopting the rule of general applicability; and
4. the adjusted standard is consistent with any applicable federal law.

² Edison originally filed a site-specific rulemaking with the Board, R94-30, which was subsequently withdrawn after negotiations with the Agency determined that Edison no longer needed relief from the groundwater quality standards. (Pet. at 5.)

REQUESTED ADJUSTED STANDARDSection 814.302(b)(1)

Edison requests an adjusted standard from the rule-of-general applicability at 35 Ill. Adm. Code 814.302(b)(1), which states:

- b) Units regulated under this Subpart shall be subject to the following standards:
 - 1) The unit must be equipped with a system which will effectively drain and collect leachate and transport it to a leachate management system.

Leachate is defined in the regulations as a “liquid which has been or is in direct contact with a solid waste”. (35 Ill. Adm. Code 810.103.) Under this definition, Edison handles approximately 8.5 million gallons of leachate per day through its current gravity flow system. According to Edison this is a high volume of leachate, as compared to an average landfill which handles approximately 1000 gallons per acre per day. (Pet. at 50.) It is this substantial daily water inflow at Edison’s inward-gradient landfill that justifies its current tailored leachate collection and management system.

Under the present regulations Edison would be required to drain, collect and transport the approximately 8.5 million gallons per day of sluice water, groundwater, and precipitation, all which flow directly or indirectly to the Main Quarry. (Pet. at 49.) Under the proposed adjusted standard Edison would manage the water through its current gravity-flow drainage system. This system includes drainage pipes which draw water from the Main Quarry into the North Quarry and a pumping station which discharges that water from the North Quarry into the River. (Pet. at 62.) This system captures all but 101,400 gallons per day, or 1.2% of the water volume reaching the Site. (*Id.*) According to Edison, installing any alternative leachate collection and management system to capture only the incremental water would “result in little, if any, discernible environmental benefit”. (Pet. at 63.) The cost of using the gravity-flow system would be \$150,000 per year at present value, including capital costs to replace slag lines and pumps, and operating costs for the pumps. (*Id.*)

Any additional compliance system which Edison puts in place would address the incremental water which bypasses its present gravity-flow system. Furthermore, Edison claims that any alternative or additional leachate system would simply change the path of the leachate, but it would still flow to the same destination. Specifically, the leachate which would under the proposed adjusted standard flow from the bedrock directly into the River, would instead flow first to its leachate management system and then discharge into the River.

(Pet. at 63-64.) According to Edison there are no known wells or other known environmental receptors in the region of the Site. (Pet. at 63.)

Edison examined various alternatives to its current gravity-flow system (Pet. at 51-62) and found those leachate collection and management systems to be “prohibitively expensive and present significant technological challenges”. (Pet. at 51).

Initially Edison evaluated the traditional leachate collection systems and found them to be incompatible with its current operating practices. Edison sluices its ash waste into the Main Quarry and operates the Quarry as a surface impoundment. (Pet. at 51.) A traditional leachate system requires restricting the amount of water that reaches the waste. Specifically, Edison examined and rejected two traditional landfill methods to collect leachate: (1) an underdrainage system located beneath the waste and above a low permeability bottom liner in newer landfills, and (2) leachate recovery wells drilled into the waste from the top of existing or older landfills.

First, the underdrainage system could be installed either above the existing waste to collect and manage leachate for future waste placement, or below the existing waste. Installing it above the current waste would not effectively address the groundwater which would continue to enter the Main Quarry and migrate downgradient after flowing through the waste. (Pet. at 52.) Edison could install the underdrainage system, which would involve removing the existing waste, lining the fractured dolomitic rock base and walls of the Main Quarry, and installing a low-permeability layer and leachate collection system. (Pet. at 52.) Edison detailed the specifics of removing the ash, and cited the problems associated with relocating the wet ash into not-yet constructed settling basins, including extensive dewatering at the Quarry throughout the installing period, dredging the settling basin, and the possibility of having to store the large volume of ash offsite. (Pet. at 52-56.) Once all of the ash was finally removed, Edison would install a three-phase leachate control system consisting of a groundwater gradient control layer, a low-permeability liner system, and a leachate system on the sides and bottom of the Quarry bedrock. Any new ash deposited into the Quarry would have to be under dry, and not wet, ash handling practices. When considering an underdrainage system, Edison is unclear of the potential environmental harms. For example risks associated with handling dry ash at the Site such as increased worker exposure to ash waste, increased truck traffic between the settling basin and the Main Quarry, and dust generated by dumping the dry ash into the dry Quarry. (Pet. at 56.)

Second, Edison examined the possibility of installing leachate recovery wells drilled into the waste from the top of the landfill, at or near the downgradient boundary of the disposal cell to pump leachate from the waste into a leachate management system. (Pet. at 57-59.) Edison found such pumping wells not technically viable for the Site due to the fact it uses a wet disposal method. Under the current wet disposal system, 8.6 million gallons per day of sluice water, precipitation, and groundwater saturate the ash in the Main Quarry. It would be impossible for Edison to remove such a large amount of leachate daily through collection wells. (Pet. at 57.) Additionally, Edison believes such placement of the well would create a localized inward hydraulic gradient which, through pumping, would draw additional sluice

water, precipitation, and groundwater through the ash to the well, increasing the amount of leachate in the Main Quarry and suspended sediments which flow from the Main to the North Quarry. (*Id.*)

Edison found that converting its system to dry ash collection, to take advantage of leachate recovery wells would create a series of other associated difficulties. Those difficulties include converting several other surrounding wells, adding additional wells, and maintaining the water level below the River level. (Pet. at 58-59.) Both wet and dry systems face significant obstacles to any installation of collection wells, such as dewatering the ash and using barges to access the north wall of the Quarry for well installation.

Edison also examined a variety of other more advanced leachate management technologies and likewise found them to be “technologically impracticable and cost prohibitive at the Lincoln Quarry Site”. (Pet. at 59-62.) Those technologies included a leachate collection trench, which proved to be prohibitively expensive to install, and a downgradient drainage gallery tunnel, with drain holes to accumulate leachate seepage from fractures and joints in rock walls, which may not even be technically feasible. (Pet. at 60-62.)

As an alternative to compliance with Section 814.302(b)(1) Edison proposes to operate a leachate collection system at the Lincoln Quarry Site which assures that the water level in the Main Quarry is maintained below the natural watertable level, assures that the leachate is discharged to the Des Plaines River through Edison’s NPDES-permitted outfall, and assures that Edison has properly complied with all effluent limitations in the NPDES permit. (Pet. at 12.)

The Board finds that, given the configuration of Edison’s Site, and the need to handle almost 8.5 million gallons of water per day, it is impracticable to require compliance with 35 Ill. Adm. Code 814.302(b)(1). The Quarry configuration, including the differences in the flow regime, mode of operations, and waste characteristics, are substantially different from the factors upon which the Board relied in adopting this general regulation. Moreover, the adjusted disposal system proposed by Edison does not appear to result in any environmental or health effects substantially more adverse than those considered by the Board in initially adopting Section 814.302(b)(1).

Section 811.319(a)(2) and Section 811.319(a)(3)

Edison requests an adjusted standard from the rule-of-general applicability at 35 Ill. Adm. Code 811.319(a)(2), which states:

- 2) Criteria for Choosing Constituents to be Monitored
 - A) The operator shall monitor each well for constituents that will provide a means for detecting groundwater

contamination. Constituents shall 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 Board has established for the constituent a public or food processing water supply standard, at 35 Ill. Adm. Code 302, the Board has established a groundwater quality standard under the Illinois Groundwater Protection Act (Ill. Rev. Stat. 1991, ch. 111 1/2, par. 7451 et seq. [415 ILCS 55/1 et. seq.]), or the constituent may otherwise cause or contribute to groundwater contamination.
- B) One or more indicator constituents, representative of the transport processes of constituents in the leachate, may be chosen for monitoring in place of the constituents it represents. The use of such indicator constituents must be included in an Agency approved permit.

Along with subsection (a)(2) above, Edison requests an adjusted standard from 35 Ill. Adm. Code 811.319(a)(3), which states:

3) Organic Chemicals Monitoring

The operator shall monitor each existing well that is being used as a part of the monitoring well network at the facility within one year of the effective date of this Part, and monitor each new well within the three months of its establishment. The monitoring required by this subsection shall be for a broad range of organic chemical contaminants in accordance with the procedures described below:

- A) The analysis shall be at least as comprehensive and sensitive as the tests for:
 - i) The 51 organic chemicals in drinking water described at 40 CFR 141.40 (1988), incorporated by reference at 35 Ill. Adm. Code 810.104; and
 - ii) Any other organic chemical for which a groundwater quality standard or criterion has been adopted pursuant to Section 14.4 of the Act or

Section 8 of the Illinois Groundwater Protection Act.

- B) At least once every two years, the operator shall monitor each well in accordance with subsection (a)(1)(A).
- C) The operator of a MSWLF unit shall monitor each well in accordance with subsection (a)(1)(A) on an annual basis.

Edison argues that the concerns which underlie the monitoring requirements in the Board's landfill regulations do not apply to the Lincoln Quarry. Consequently, Edison requests that the Board limit the groundwater monitoring requirements applicable to the Site. Edison claims that the groundwater monitoring program was established to ensure that constituents from landfill wastes do not migrate into and degrade the groundwater. This migration is especially important when the wastes within the landfill vary significantly (i.e. municipal landfill), or where the waste constituent or the constituent migration pathways are poorly characterized. (Pet. at 65-66.)

However, Edison asserts that an adjusted standard is warranted because it has operated the Lincoln Quarry as a coal combustion waste monofill for over 20 years, and has fully characterized the ash waste and groundwater constituents derived from that waste (the composition of combustion wastes deposited at the site has remained generally consistent, although the specific percentages of each constituent in the ash varies somewhat). (Pet. at 65-66.) Accordingly this should eliminate the Board's primary concerns regarding characterizing the groundwater composition or impact on the environment of leachate from the landfill. (*Id.*)

Edison also claims the Board's requirement of broad based organic and inorganic constituent monitoring is not necessary at the Site because studies show no organic parameters, or volatile or semi-volatile organic compounds in the groundwater sampling. (Pet. at 65-67.) The ash samples contained primarily silicon, iron, aluminum, calcium, potassium, magnesium, sulfur, sodium, barium, and boron. (Pet. at 66.) Edison argues that it is economically unreasonable to require it to monitor groundwater for organic and inorganic constituents that could have no environmental impact. As stated, there are no organic constituents in its coal combustion waste. (Pet. at 67.)

The cost for organic groundwater sampling and testing for all the regulatorily required parameters would cost approximately \$46,000 per year, as compared to the \$1,000 per year ash sampling proposed in Edison's petition for adjusted standard which would sufficiently examine the organic composition of its combustion waste to predict whether this waste could impact the groundwater. (*Id.*) According to Edison, the cost to analyze the groundwater for the regulatory parameters regarding inorganic constituents would cost approximately \$28,600 per year, versus the proposed testing at \$16,640 per year cost to analyze only the potentially impacted parameters plus alkalinity. (Pet. at 68.)

Edison's proposed adjusted standard would waive the organic constituent requirement of 35 Ill. Adm. Code 811.319, and would only require Edison to annually sample for semi-volatile organic compounds which could remain in the bottom of ash and slag, and report these results to the Agency, and to institute sample of the semi-volatile organic constituents if necessary. (Pet. at 14 and 68.) Edison feels it is unnecessary to sample for volatile organic compound because they are destroyed in the combustion process.

Edison's proposed adjusted standard also limits the frequency of the groundwater sampling for inorganic constituents. Edison proposes to quarterly monitor the inorganic constituents of which it has detected statistically significant increases over background concentrations in downgradient wells. (Pet. at 68-69.) The other inorganic constituents regulated within 35 Ill. Adm. Code 811.319(a)(2), those whose parameters were not detected in the groundwater or were found not to have a statistically significant increase in parameter concentrations over background levels, would be sampled annually simply to verify that the groundwater composition remains constant. (Pet. at 68-71.) Specifically, Edison proposes to sample, on an annual basis, all constituents for which the Board has established Class II groundwater standards; if a statistically-significant increase in any of the concentrations is shown, then Edison proposes to add those parameters in the sampling mode prescribed at Section 811.391(a)(1). (Pet. at 13.)

Edison argues that its proposed monitoring plan, eliminating organic chemical monitoring of groundwater and focusing primarily on inorganic monitoring of those potentially impacted parameters at the Site, provides environmental protection comparable to the Board's generally applicable standards. (Pet. at 69-71.) It reasons that "[i]f those [organic] constituents are absent, eliminating the monitoring requirement for those constituents would have no environmental impact". (Pet. at 70.) Edison also observes that, because of the consistency and predictability of the groundwater concentrations of parameters attributable to the Site, "if previous monitoring results did not detect a particular inorganic constituent in Site groundwater, it is improbable that that constituent would appear in future sampling events". (Pet. at 70.) As for those inorganic parameters which have been detected at the Site, Edison claims that the "groundwater concentrations should remain constant or decrease over time as the leachable concentrations of those parameters in the ash decreases". (Pet. at 70.)

Edison's proposed monitoring plan, given the frequency and type of groundwater monitoring, appears to be adequate to justify the grant of an adjusted standard. The Site presents factors substantially and significantly different from the factors the Board considered in adopting the landfill groundwater monitoring requirements with regard to choosing the constituents to be monitored and organic chemical monitoring. Given the absence of organic chemicals and consistency of constituents for almost 20 years in this monofill, the concerns which underlie the monitoring requirements in the Board's landfill regulations are not present at the Lincoln Quarry. The Board accordingly believes Edison has demonstrated that the instant groundwater monitoring requirements, Section 811.319(a)(2) and Section 811.319(a)(3), warrant an adjustment suitable to the Site. The Board also finds that Edison's

proposed alternative standards provide environmental protection comparable to that contemplated under the rule of general applicability.

Section 811.318(b)(3) and Section 811.318(b)(5)

Edison requests an adjusted standard from the rule-of-general applicability at 35 Ill. Adm. Code 811.318(b)(3), which states:

b) Standards for the Location of Monitoring Points

- 3) Monitoring wells shall be established as close to the potential source of discharge as possible without interfering with the waste disposal operations, and within half the distance from the edge of the potential source of discharge to the edge of the zone of attenuation downgradient, with respect to groundwater flow, from the source.

Edison also requests an adjusted standard from 35 Ill. Adm. Code 811.318(b)(5), which states:

- 5) A minimum of at least one monitoring well shall be established at the edge of the zone of attenuation and shall be located downgradient with respect to groundwater flow and not excluding the downward direction, from the unit. Such well or wells shall be used to monitor any statistically significant increase in the concentration of any constituent, in accordance with Section 811.320(e) and shall be used for determining compliance with an applicable groundwater quality standard of Section 811.320. An observed statistically significant increase above the applicable groundwater quality standards of Section 811.320 in a well located at or beyond the compliance boundary shall constitute a violation.

Edison claims that due to physical constraints at the Lincoln Quarry, it is unable to install the large number of groundwater monitoring wells required in the above regulations. Specifically, if the Board grants Edison its request to adjust the zone of attenuation for the Site, Edison will be unable to install a well at the edge of the adjusted zone. (Pet. at 72.)

Edison argues that the landfill conditions relied upon the Board in adopting these regulations are not the conditions which exist at Edison's Site. First, the landfill regulations assume a lined landfill located in a porous media, where groundwater flow rates and physico-chemical processes of soil attenuation are consistent and the entire site can be easily modeled with limited flow volumes. (Pet. at 73-75.) In contrast, the Site is located in fractured dolomitic rock. The type of limited groundwater monitoring required in the regulations would

not present an accurate picture of the constituent transport. On the whole, the groundwater flow rates through the rock at the Site are very slow; however, flow rates within individual fractures and bedding planes can be very rapid. (*Id.*) As a result of this widely divergent ground formation, Edison believes an accurate representation of the Site's water bearing material can only be achieved through a large-scale modeling process, unlike that required in Section 811.318.

Secondly, Edison argues that due to the terrain surrounding the Site, it would be technically impracticable and economically unreasonable to install a groundwater monitoring system which would comply with the Board's landfill regulations. (Pet. at 76-78.) For instance, there are physical obstacles (screening berms and security fencing) and natural environmental barriers (sheer vertical dolomite faces and deep ponds) within 100 feet downgradient of the Main Quarry boundary. Most significantly Edison explains that there exists a narrow strip of land between the Main and North Quarries which provides insufficient access for well drilling equipment and personnel safety to install a network of wells. Regardless of the physical constraints preventing well installation, Edison claims that any constituent migration or groundwater flow data would not likely be accurate. (Pet. at 76-77.) Due to the quarrying and other land use activities which have altered the natural groundwater flow patterns, and differences in the hydraulic gradients between the Main and North Quarries, any wells installed in this area would give atypical information regarding the entire Site. (*Id.*) Given the unlikelihood the required wells will provide meaningful monitoring data, Edison argues that it should not be required to expend capital to install such wells.

Lastly, Edison states that if the adjusted zone of attenuation is granted, it would be technically impracticable to install wells at the edge of the zone. The adjusted zone of attenuation boundary is contiguous with the northern-most property boundary and is located at, or sometimes beyond, the banks of the Des Plaines River. Because of its proximity to the River and subsequent mixing of groundwater and River water, installing monitoring wells in this area would not provide reliable data regarding the pertinent constituents, nor allow access for drill equipment or personnel. (Pet. at 77.)

According to Edison, it would be required to install 30 new groundwater monitoring wells to comply with the Board's regulations, at an estimated total cost of \$300,000. (Pet. at 77.) Edison proposes to install a groundwater monitoring network, which instead of placing wells at or near the locations prescribed by the Board's regulations, will place the wells beyond the regulatory 100-foot standard and within the North Quarry. Specifically, Edison will continue to use ten existing wells³ at the Site.

³ The pre-existing wells are: upgradient wells 92-2S and 92-2D in the South Quarry, and downgradient wells: nested wells R08S and R08D northwest of the Quarry, nested wells 92-5S and 92-5D north of the Main Quarry, nested wells G20S and R16D northeast of the Quarry, well 93-9 north of the Quarry, and well 93-11 northwest of the Quarry.

Edison claims that although it cannot install all of the regulatorily required wells, it can “establish a network of groundwater monitoring wells that protects the environment” (Pet. at 72), and which comprehensively and accurately depicts constituent migration at the Site. Edison states that the River is the only significant environmental receptor for groundwater at the Site. To accurately determine the groundwater flow to the River; Edison believes it is necessary to install monitoring wells under the North Quarry (as proposed in its adjusted standard request), as opposed to 100 feet from the Main Quarry (as required in the regulations) or as opposed to the northern boundary line of the proposed adjusted standard. (Pet. at 78-80.) Only by installing wells under the North Quarry can Edison measure the water that bypasses its pumping system and flows directly into the River. If the wells were placed under or near the Main Quarry, it would primarily measure the groundwater which is flowing to the North Quarry due to pumping. Edison argues that its proposed network of monitoring wells satisfies the Board’s environmental objectives of monitoring environmentally relevant constituent flow at the Site. (Pet. at 80.)

The Board finds that Edison has presented sufficient justification for an adjusted standard from Sections 811.318(b)(3) and Section 811.318(b)(5). The conduits present in such fractures provide for groundwater flow quite distinct from the flow in homogenous porous media. Such a significantly different groundwater flow regime was not the type considered by the Board in adopting the rule of general applicability. The Board acknowledges that a altered groundwater monitoring network may be required. Indeed the physical location of the Site with relation to the River in addition to the unique widely divergent ground formation at the Quarries, justify an adjusted standard.

Section 811.320(c)

Edison requests an adjusted standard from the rule-of-general applicability at 35 Ill. Adm. Code 811.320(c), which states:

- c) Determination of the Zone of Attenuation
 - 1) The zone of attenuation, within which concentrations of constituents in leachate discharged from the unit may exceed the applicable groundwater quality standard of this Section, is a volume bounded by a vertical plane at the property boundary or 100 feet from the edge of the unit, whichever is less, extending from the ground surface to the bottom of the uppermost aquifer and excluding the volume occupied by the waste.
 - 2) Zones of attenuation shall not extend to the annual high water mark of navigable surface waters.

- 3) Overlapping zones of attenuation from units within a single facility may be combined into a single zone for the purposes of establishing a monitoring network.

As alternative to compliance with Section 811.320(c), Edison proposes a zone of attenuation that is 100 feet from the edge of the Lincoln Quarry on the upgradient side and at the property boundary on the downgradient side. (Pet. at 14.) Edison believes this proposed zone of attenuation, coupled with the proposed monitoring well location standards discussed above, and an agreement with the Agency to establish a groundwater management zone (GMZ) at the Site, will be consistent with the Board's current definitions and regulations. (*Id.*)

The proposed zone is supported twofold: first, it places "all relevant site features that potentially contribute to elevated constituent concentrations in groundwater within a single zone of attenuation for the Site"; and the zone will be contiguous with the GMZ. (Pet. at 86.) The Agency has agreed to designate the Lincoln Quarry Site from the waste boundary to the site boundary as a GMZ (apparently to address exceedences of background concentrations).

Edison states two reasons to justify a modification from the landfill standards relating to the zone of attenuation. First, Edison argues that the Board did not consider water flow conditions like those present at the Site in defining the generally applicable zone of attenuation. (Pet. at 81-83.) Specifically, Edison claims the Site consists of fractured rock, where, unlike in the Board's models, groundwater flow rates vary considerably. Accordingly the "degree to which attenuation and hydrodynamic dispersion can occur under these conditions depends upon the existence, number, properties, and relationship between discontinuities in the rock mass". (Pet. at 82.) Edison argues that the "geochemical processes of attenuation are of little or no significance at Lincoln Quarry because there is little interaction between the chemical constituents and the rock mass". (*Id.*)

Second, Edison argues that retaining the zone of attenuation at the 100 foot boundary would cause it to incur tremendous expense for minimal environmental benefit. (Pet. at 83-85.) Groundwater degradation over background concentrations already exists beyond the Main Quarry⁴ due to disposal of flyash in the West Quarry and lack of attenuation. Therefore groundwater downgradient of the Site beyond the 100-foot zone of attenuation will continue to exceed the Board's non-degradation standard (particularly for boron and sulfate) regardless of whether Edison takes additional precautions. (Pet. at 83-84.) As a result, Edison believes it is "technically impracticable to establish the zone of attenuation as required by the generally applicable standards". (Pet. at 83.)

Edison examined several different options to bring the Quarry into partial or complete compliance with groundwater standards at the edge of the zone of attenuation. The options

⁴ Ammonia, arsenic, boron, cadmium, chloride, fluoride, manganese, molybdenum, pH, potassium, selenium, sodium, sulfate, total dissolved solids, total organic carbon and zinc.

considered include: converting the facility from sluiced to dry disposal and constructing a new landfill on the existing ash designed in compliance with the standards in Section 811; closing the landfill and contracting for off-site ash disposal at existing facilities; closing the landfill and the generating stations; or closing the landfill and constructing a new off-site landfill for ash disposal. (Pet. at 84.) According to Edison each of these compliance alternatives present severe adverse economic and/or social impacts for limited, if any, environmental benefit. (*Id.*, see also Exhibit 12)

Edison notes that none of the compliance alternatives studied would address the groundwater impacts from prior waste operations which account for exceedences at the edge of the zone of attenuation. Edison believes those constituent concentrations would either remain constant or decrease over time, but would not decrease significantly immediately. (Pet. at 85.) Therefore, Edison would still need to request an adjusted zone of attenuation. If it desired to reduce the existing concentrations it could excavate the waste currently in the Main Quarry and West Filled Area (at a cost estimate \$65-187 million) or install a leachate/groundwater collection system. Edison believes neither option is economically reasonable.

Edison claims that the proposed zone of attenuation extension will adequately protect the environment. (Pet. at 86-88.) It claims that the only environmental receptor affected by the increase in the zone of attenuation is the River. The current constituent concentrations in groundwater have “no discernible impact on water quality in the Des Plaines River”. (Pet. at 86.) Additionally, the contribution of constituents attributable to groundwater discharges which enter the River are indistinguishable from natural incremental deviations which are normally expected. Edison claims that “current discharges from the Site have no impact on River concentrations of constituents”. (Pet. at 87.)

Edison also proclaims that the “proposed zone of attenuation does not impact any known or potential environmental receptors”. (Pet. at 88.) It states there will be no environmental impact on the area between the original and proposed zone, primarily because there are no current uses for impacted groundwater downgradient of the Site. (Pet. at 87-88.) In addition to current uses, the future use of this groundwater is also unlikely because Edison owns or controls most of the pertinent land, the impacted surrounding land is industrialized and unsuitable for residential development, and there exists an unimpacted, deeper aquifer to be used in the future.

The Board’s rule of general applicability at Section 811.320(c) is premised on the presence of an attenuating porous media, which differs from the fractured and jointed bedrock that occurs at the Lincoln Quarry Site. In this circumstance, and in light of the chemistry of the Lincoln Quarry waters and the local nature of the groundwater flow system, the Board believes that adjusting the downgradient zone of attenuation to the northern property is justified. Moreover, because Edison commits to controlling future use of the groundwater, it appears granting the requested adjusted standard will not result in environmental or health effects substantially more adverse than the effects considered by the Board in adopting the rule of general applicability.

Section 811.314

Edison requests an adjusted standard from the rule-of-general applicability at 35 Ill. Adm. Code 811.314, which states:

- a) The unit shall be covered by a final cover consisting of a low permeability layer overlain by a final protective layer constructed in accordance with the requirements of this Section.
- b) Standards for the Low Permeability Layer
 - 1) Not later than 60 days after placement of the final lift of solid waste, a low permeability layer shall be constructed.
 - 2) The low permeability layer shall cover the entire unit and connect with the liner system.
 - 3) The low permeability layer shall consist of any one of the following:
 - A) A compacted earth layer constructed in accordance with the following standards:
 - i) The minimum allowable thickness shall be 0.91 meter (3 feet);
 - ii) The layer shall be compacted to achieve a permeability of 1×10^{-7} centimeters per second and minimize void spaces.
 - iii) Alternative specifications may be utilized provided that the performance of the low permeability layer is equal to or superior to the performance of a layer meeting the requirements of subsections (b)(3)(A)(i) and (b)(3)(A)(ii).
 - B) A geomembrane constructed in accordance with the following standards:
 - i) The geomembrane shall provide performance equal or superior to the compacted earth layer described in subsection (b)(3)(A).

- ii) The geomembrane shall have strength to withstand the normal stresses imposed by the waste stabilization process.
 - iii) The geomembrane shall be placed over a prepared base free from sharp objects and other materials which may cause damage.
- C) Any other low permeability layer construction techniques or materials, provided that they provide equivalent or superior performance to the requirements of this subsection.
- 4) For a MSWLF unit, subsection (b)(3) notwithstanding, if the bottom liner system permeability is lower than 1×10^{-7} cm/sec. the permeability of the lower permeability layer of the final cover system shall be less than or equal to the permeability of the bottom liner system.
- c) Standards for the Final Protective Layer
- 1) The final protective layer shall cover the entire low permeability layer.
 - 2) The thickness of the final protective layer shall be sufficient to protect the low permeability layer from freezing and minimize root penetration of the low permeability layer, but shall not be less than 0.91 meter (3 feet).
 - 3) The final protective layer shall consist of soil material capable of supporting vegetation.
 - 4) The final protective layer shall be placed as soon as possible after placement of the low permeability layer to prevent desiccation, cracking, freezing or other damage to the low permeability layer.

Edison claims that the Board's generally applicable cover requirements do not apply to conditions at the Lincoln Quarry due to the mode of operation at the site. (Pet. at 88-94.) Edison examined the following environmental objectives in coming to that conclusion: minimization of water percolation and infiltration into the waste, control of water run-off from the cover, maximization of evapotranspiration, control of landfill gas and prevention of cover erosion, and minimization of maintenance.

For instance, minimizing water percolation and infiltration into the waste would not be accomplished with a Section 811.314 cover because the water reaching the Quarry comes from

natural groundwater flows, not infiltration or percolation. (Pet. at 90.) The objectives of the impermeable layer and the final cover include minimization of water percolation and infiltration into the waste as well as controlling landfill gas and control of the runoff water. At the Site the water infiltration through percolation is relatively small compared to the groundwater infiltration into the waste area. Given the fractured rock and dolomite at the Site, along with the difference in water level in the Quarry and the adjacent groundwater table, the natural groundwater flows from the south through the Quarry to the River. A landfill cover system would reduce, but not eliminate the amount of water which reaches the bottom ash and slag due to precipitation. (Pet. at 91.) Maximizing evapotranspiration is not a factor at the Site because the majority of the water reaches the waste through groundwater inflow and not precipitation. (Pet. at 92.) The effect of the very small additional amount leachate through precipitation on downgradient groundwater quality would be undetectable.

Because the wastes in the Quarry contain no organic constituents that might produce gases through decomposition, the type of cover system required in Section 811.314 is not necessary to control the gas. The waste at the Quarry contains only non-putrescible industrial wastes consisting of inorganic constituents, primarily oxides of silicon, aluminum, iron and calcium. (Pet. at 93.) Therefore, there is no need to control landfill gas because the coal combustion byproducts do not produce methane through decomposition as organic constituents.

Another environmental objective examined, the prevention of cover erosion and minimization of maintenance, would require significant upkeep and maintenance at the Site because of the hydraulic conditions, particularly the fact that pressures caused by groundwater flow into the landfill could degrade the required cap. (Pet. at 93-94.)

Edison argues that it would be technically impracticable and economically unreasonable to install a final cover system satisfying the generally applicable requirements for the Main Quarry. (Pet. at 94-98.) Edison examined the two alternatives which satisfy the Board's final cover requirements. First, the installation of a compacted earth low-permeability layer covered by three feet of soil. And second, the installation of a geomembrane liner covered by three feet of soil. Edison thoroughly examined the scenario of installing a cap using a wet closure and a dry closure with a total closure cost of \$20-28 and \$8 million respectively.

Lastly, Edison describes the proposed "Closure and Post-Closure Care Plan". (Pet. at 98-101.) Edison presents two possible options during closure, where the ash level in the Main Quarry is below and above the water level. If the ash level is below the water level for the groundwater table, Edison would close the landfill in its present "wet" condition. It would place a fence around the Site to prevent access and maintain the water at a level in the Quarry which supports the current inward hydraulic gradient. This would be the least costly alternative providing comparable environmental benefits. If the level of ash in the Main Quarry is above the natural groundwater table, Edison would install a two-stage cover system consisting of a "compacted clay layer that performs equivalently to two feet of compacted soil having a hydraulic conductivity of 1×10^{-7} cm/sec, overlain by at least four inches of topsoil.

The cap would be sloped at no less than a two percent grade and would be seeded to prevent erosion.” (Pet. at 100.)

Edison alleges that its proposed final cover standards in the request for adjusted standard will provide environmental benefits that are comparable to those obtained under the generally applicable final cover standards at a lower cost. (Pet. at 101-105.)

The Board agrees that Edison’s operation at the Site does not lend itself to compliance with the Section 811.314 final cover requirements. The required impermeable layer and final cover operate to minimize water percolation and infiltration into the waste, and to control landfill gas and runoff water. At the Edison Site water infiltration through percolation is relatively small compared to the groundwater infiltration into the waste area. It therefore appears that there would be no environmental benefit to installing cover pursuant to this section.

With regards to controlling landfill gas, Edison’s current discharges are only coal combustion byproducts with no organic constituents that might produce methane through decomposition. Therefore, there is no need to require control of landfill gas at the Quarry.

“Attachment A” Standards (Sections 811.105, 811.106, 811.107(a), 811.107(b), 811.107(i), 811.310, 811.311, 811.312, 811.313, 811.321, and 811.322)

Edison includes as part of its overall petition request that the Board find certain parts of the Board’s landfill regulations be found to not apply to the Site. For the purposes of discussion, these will be referred to the at the “Attachment A” standards, based on their presentation in Attachment A of Edison’s petition. (Pet. at 110, Attachment A.) The regulations at issue are 35 Ill. Adm. Code Section 811.105 (compaction of waste), 811.106 (daily cover), 811.107(a) (phasing of operations), 811.107(b) (working face), 811.107(i) (vector control), 811.310, 811.311, 811.312 (landfill gas monitoring and management system), 811.313 (intermediate cover), 811.321 (waste placement), and 811.322 (final slopes and stabilization).

The Board notes that Edison’s request regarding the Attachment A standards differs from its request regarding the main portion of the instant adjusted standard in that Edison does not seek to replace the Attachment A standards with alternate, site-specific standards. Rather, Edison requests that the Board “confirm that these standards do not apply to Lincoln Quarry” and to find that “Edison’s current management practices adequately satisfy the purposes behind these requirements”. (Pet. at 110.)

In addition, Edison’s request regarding the Attachment A standards differs from its request regarding the main portion of the instant adjusted standard in that Edison does not attempt to make the demonstrations required at Section 28.1(c) of the Act for any of the Attachment A requests.

AGENCY RESPONSE

The Agency believes that the factors relating to Edison with regards to the applicable standards are substantially and significantly different from the factors upon which the Board relied upon in adopting the regulations of general applicability. (Res. at 4.)

The Agency agrees that compliance with the applicable standards would be economically unreasonable and, with respect to some of the standards, technically infeasible for Edison to accomplish. (Res. at 3.) Moreover, the Agency states that it has “no basis for challenging Edison’s cost analyses”. (*Id.*)

The Agency agrees with Edison that granting the adjusted standard will not have an adverse impact on the environment and specifically will not result in environmental or health effects substantially and significantly more adverse than the effects considered by the Board when adopting the rule of general applicability. (Res. at 1-5.)

The Agency agrees with Edison that the Board may grant the adjusted standard consistent with applicable federal law. (Res. at 4-5.)

CONCLUSION

The Board finds that Edison has demonstrated that grant of the adjusted standard requested by Edison is warranted.

Regarding the request for adjusted standard from 35 Ill. Adm. Code 814.302(b)(1), 811.319(a)(2), 811.319(a)(3), 811.318(b)(5), 811.320(c), and 811.314, the Board finds that Edison has made the demonstrations required under Section 28.1(c) of the Act. In reaching this decision, the Board finds it noteworthy that Edison proposes and agrees to abide with a series of replacement standards. The Board believes these replacement standards will provide environmental protection at least equivalent to that which flows from the current regulations. The Board will accordingly condition grant of the adjusted standard upon Edison’s compliance with the replacement standards.

As regards the Attachment A parameters, the Board will grant Edison’s request that we determine “that these standards do not apply to Lincoln Quarry”. (cf. *In the Matter of Wood Energy*, AS 94-1 (October 6, 1994), esp. footnote 3). We will not grant an “adjusted standard” as such, since as we have noted above, Edison does not attempt to make the demonstrations required by Section 28.1(c) of the Act, and we do not wish to establish a precedent of acceptance of inadequate pleading in these cases. However, the Board believes that none of these standards are reasonably applicable to the circumstances encountered in the Lincoln Quarry disposal system. We will instead include in the order of adjusted standard a statement that the attachment A standards do not apply.

This opinion constitutes the Board's findings of fact and conclusions of law in this matter.

ORDER

Commonwealth Edison Company is hereby granted an adjusted standard for the Joliet/Lincoln Quarry Site with respect to the following regulations: 35 Ill. Adm. Code 814.302(b)(1), 811.319(a)(2), 811.319(a)(3), 811.318(b)(5), 811.320(c), and 811.314.

In addition, the following Board regulations do not apply to the Joliet/Lincoln Quarry Site: 35 Ill. Adm. Code 811.105, 811.106, 811.107(a), 811.107(b), 811.107(i), 811.310, 811.311, 811.312, 811.313, 811.321, and 811.322.

In lieu of the standards above the following shall apply.

- 1) Edison shall dispose only bottom ash and slag from the combustion of coal in the Main Quarry.
- 2) Edison shall operate a leachate collection and management system at the Joliet/Lincoln Quarry Site that assures compliance with effluent limitations contained in an NPDES permit duly issued by the Illinois Environmental Protection Agency. The leachate collection and management system shall consist of:
 - a) A gravity flow drainage system that:
 - i) Channels supernatant liquid from the Main Quarry into the North Quarry; and
 - ii) Assures that the water level in the Main Quarry is maintained below the natural water table level.
 - b) A permitted point source discharge from the North Quarry to the Des Plaines River.
- 3) Groundwater Sampling.
 - a) Edison shall analyze groundwater from the monitoring well system at the Joliet/Lincoln Quarry Site, in accordance with the requirements of 35 Ill. Adm. Code 811.319(a)(1), for the following constituents:

Ammonia	Fluoride	Selenium	Total Organic
Arsenic	Manganese	Sodium	Carbon
Boron	Molybdenum	Sulfate	Zinc
Cadmium	pH	Total Dissolved	
Chloride	Potassium	Solids	

- b) Except for the constituents monitored in accordance with a), Edison shall sample its monitoring well system on an annual basis for all inorganic constituents for which the Board has established Class II groundwater standards under 35 Ill. Adm. Code 620.420(a).
 - i) If Edison detects, and confirms through replicate sampling, a statistically significant increase above applicable groundwater standards for any constituent monitored under this paragraph, Edison shall monitor that constituent in accordance with the requirements of paragraph a).
 - ii) If, after monitoring for five years in accordance with this paragraph, Edison does not detect a statistically significant increase above applicable groundwater standards for a constituent monitored under this paragraph 2), Edison may propose as a permit modification to discontinue monitoring for that constituent.
- 4) Waste Sampling.
 - a) At least once annually, Edison shall determine the semi-volatile organic constituent content of a representative sample of waste bottom ash and slag to be disposed at the Joliet/Lincoln Quarry Site.
 - b) The results of such sampling shall be submitted to the Agency within 30 days after Edison receives the analytical report.
 - c) If Edison detects one of the semi-volatile organic constituents listed under 35 Ill. Adm. Code 811.319(a)(3) in its ash samples, then Edison shall conduct confirmatory sampling and analysis.
 - d) If the sampling and analysis conducted under c) above confirms the presence of one or more of the listed semi-volatile organic constituents, then Edison shall monitor its groundwater monitoring well system for those constituents in accordance with the sampling and analysis plan contained in Volume II of Edison's Application for Significant permit Modification at Lincoln/Joliet Quarry Ash Landfill [IL 197809001] (May 1994).
- 5) Standards for Monitoring Well Locations.
 - a) In consultation with Edison, the Agency shall establish a monitoring well network for the Lincoln Quarry Site that achieves the monitoring objectives of part 811. The Agency shall not impose more stringent well location standards than the requirements in 35 Ill. Adm. Code 811.318(b).

- b) If any of the wells in the monitoring network established by the Agency fails or is rendered unusable, Edison shall request permission from the Illinois Environmental Protection Agency to replace the well with another well, located as close as practicable to the non-functioning well and sampling the same aquifer.
- 6) Zone of Attenuation.
- a) For purposes of this paragraph f), the zone of attenuation at the Joliet/Lincoln Quarry Site shall be defined as the volume bounded by a vertical plane extending from the ground surface to the bottom of the uppermost aquifer, excluding the waste, and located:
- i) 100 feet from the edge of Lincoln Quarry on the upgradient side with respect to groundwater flow; and,
- ii) At the property boundary on the downgradient side with respect to groundwater flow. If the property boundary extends beyond the annual high water mark of the Des Plaines River at any location, the zone of attenuation at that location will be reduced to satisfy the requirements of 35 Ill. Adm. Code 811.320(c)(2).
- This zone of attenuation is depicted on [Figure SAP-5, Volume II of Edison's Application for Significant Permit Modification, attached to Edison's petition for site specific relief.]
- b) Groundwater quality at or beyond the zone of attenuation for the Joliet/Lincoln Quarry Site shall be maintained at each constituent's background concentration.
- c) Nothing herein shall be construed to prohibit Edison from petitioning the Board for an adjustment of the groundwater quality standards applicable to the Site, in accordance with the procedures established in 35 Ill. Adm. Code 811.320(b).
- d) Compliance Determination.
- Any statistically significant increase above an applicable groundwater quality standard that is attributable to the facility and which occurs at or beyond the zone of attenuation within 100 years after closure of the last unit accepting waste within such a facility shall constitute a violation.
- 7) Final Cover.
- a) For purposes of b) and c) below, "maximum adjusted seasonal water table level" means the maximum predicted water table level in the vicinity of the

Joliet/Lincoln Quarry Site, determined at the time of closure, plus sufficient elevation to ensure the integrity of a cap.

b) Closure Below Water Table.

- i) If, at the time of closure, the level of settled ash in Lincoln Quarry is at or below the maximum adjusted seasonal water table level, no final cover is required for the Quarry and the Quarry shall be maintained as an impoundment.
- ii) Water levels in the Quarry shall be maintained at or below a maximum elevation of 570 feet above sea level.
- iii) A chain link fence no less than eight (8) feet in height, topped by a no less than three (3) strands of barbed wire, shall be installed around the Joliet/Lincoln Quarry Site to prevent access and shall be maintained in good condition at all times.

c) Closure Above Water Table.

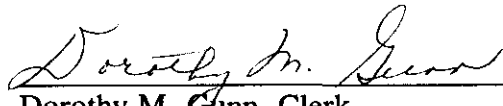
- i) If, at the time of closure, the level of settled ash in Lincoln Quarry is above the maximum adjusted seasonal water table level, Edison shall install a two-stage cover system, which shall consist of a compacted clay layer that performs equivalently to a 2 foot layer of compacted soil having a hydraulic conductivity of 1×10^{-7} cm/sec, overlain by at least four inches of topsoil. The cap shall be graded at no less than 2% grade and shall drain to a collection area located on the cap. Stormwater collecting on the cap shall be pumped to the North Quarry for settling prior to discharge pursuant to the facility's NPDES permit. The cap shall be seeded to prevent erosion.
- ii) Water levels in the Main Quarry shall be maintained at no more than 570 feet above sea level through use of a gravel drainage blanket underlying the stormwater collection area. Water collecting in the drainage blanket shall drain by gravity to the North Quarry for settling prior to discharge pursuant to the facility's NPDES permit.

Section 41 of the Environmental Protection Act (415 ILCS 5/41 (1994)) provides for the appeal of final Board orders within 35 days of the date of service of this order. The Rules of the Supreme Court of Illinois establish filing requirements. (See also 35 Ill. Adm. Code 101.246 "Motions for Reconsideration".)

IT IS SO ORDERED.

Board Member McFawn Concurred.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above opinion and order was adopted on the 15th day of August, 1996, by a vote of 6-0.



Dorothy M. Gunn, Clerk
Illinois Pollution Control Board