

ILLINOIS POLLUTION CONTROL BOARD
November 16, 2000

AMEREN ENERGY GENERATING)
COMPANY,)
)
Petitioner,)
)
v.) PCB 01-16
) (Variance - NPDES)
ILLINOIS ENVIRONMENTAL)
PROTECTION AGENCY,)
)
Respondent.)

OPINION AND ORDER OF THE BOARD (by N.J. Melas):

This matter is before the Board pursuant to a petition for variance (petition) filed by Ameren Energy Generating Company (Ameren) on July 28, 2000. Pursuant to Section 35(a) of the Environmental Protection Act (Act), the Board is charged with the responsibility of granting variances from Board regulations whenever immediate compliance with Board regulations would impose an arbitrary or unreasonable hardship on the petitioner. 415 ILCS 5/35(a) (1998). The Illinois Environmental Protection Agency (Agency) is required to appear in hearings on variance petitions. 415 ILCS 5/4(f) (1998). The Agency is also charged with the responsibility of investigating each variance petition and making a recommendation to the Board as to the disposition of the petition. 415 ILCS 5/37(a) (1998).

Ameren is seeking a variance from the general use water quality standard for total boron at 35 Ill. Adm. Code 302.208(g) and from the applicable effluent standard at 35 Ill. Adm. Code 304.105. The variance is for its Grand Tower Power Station (station), near Grand Tower in Jackson County, Illinois, which discharges to an unnamed tributary ditch (ditch) of the Mississippi River (Mississippi). Pet. at 1-2.¹ Ameren has waived its right to a hearing in this matter, and no hearing is required pursuant to the Board's rules. Pet. at 16; 35 Ill. Adm. Code 104.124 and 104.160(c). On September 25, 2000, the Agency filed its recommendation in response to the petition. The Agency recommends that the Board grant the petition subject to certain conditions. Rec. at 1.

In a variance proceeding, the burden is on the petitioner to present proof that immediate compliance with Board regulations would cause an arbitrary or unreasonable hardship which outweighs public interest in compliance with the regulations. Willowbrook Motel v. IPCB, 135 Ill. App. 3d 343, 349, 350, 481 N.E.2d 1032, 1036, 1037 (1st Dist. 1977). Pursuant to Section

¹ The petition for variance will be cited as "Pet. at ___," and the Agency's recommendation will be cited as "Rec. at ___."

35(a) of the Act, the Board finds that Ameren has presented adequate proof that immediate compliance with the Board regulations for which relief is being requested would impose such a hardship. The Board therefore grants Ameren's variance petition.

BACKGROUND

Prior Adjusted Standard Petition

Ameren (then known as Central Illinois Public Service Company) originally filed this request for regulatory relief on October 22, 1999, but filed it as an adjusted standard. In the adjusted standard petition, petitioner sought permanent relief from the water quality standard for boron at Section 302.208(g) of the Board's regulations and the applicable effluent standard for boron at Section 304.105. Petitioner also indicated that need for the requested relief would only be necessary through mid-2001 (see below). On November 29, 1999, the Agency filed a recommendation in which it advised the Board to grant petitioner's proposed adjusted standard. However, the Board subsequently filed an order which requested that petitioner either consider a sunset provision for its adjusted standard petition or refile its petition as a variance. See In re Petition of Central Illinois Public Service Company (December 16, 1999), AS 00-7. On January 18, 2000, petitioner filed a notice of withdrawal of its adjusted standard petition. The Board accepted the notice of withdrawal as a motion to dismiss and closed the AS 00-7 docket. See In re Petition of Central Illinois Public Service Company (February 3, 2000), AS 00-7.

The Station

The station is a steam-electric generating power plant that began operation in 1924. Ninety-eight employees currently work at the station, and it is staffed at all times. The station is on the east bank of the Mississippi and west of the 625-foot Fountain Bluff. It is an area subject to a flood zone ordinance. Pet. at 4.

The station's two electric generating units, which have a combined capacity of 200 megawatts, currently burn pulverized coal. Pet. at 4. Each unit's principal equipment consists of coal-burning boilers and turbine generators. The station takes in water from the Mississippi through a condenser system, and the water is used in the boilers and generators. The coal used to power the boilers is stored in a coal yard on the premises. Coal consumption at the station has averaged just under 300,000 tons per year in recent years. Pet. at 5.

The coal combustion process in the boilers produces waste fly ash and waste bottom ash. Ameren exhausts some of the fly ash pursuant to an air permit granted by the Agency. Ameren mixes the remaining fly and bottom ash with transport water drawn from the Mississippi and then transports the mixture to the station's ash pond system. The ash pond system is south of the station, and a 20-foot levee separates it from the Mississippi. Pet. at 5, 7.

In the ash pond system, Ameren sluices fly ash and bottom ash to different cells. In these cells, Ameren either mixes or collects the two types of ash. During the last five years, the station has generated an average of 24,106 tons of fly ash annually and 6,057 tons of bottom ash annually. The Illinois Department of Transportation uses the collected bottom ash for road

cinders, and Ameren sells the collected fly ash as a manufacturing agent in cement kilns. Pet. at 5, 7. Ameren estimates that, over the past three years, it has used 90% of the fly ash in a beneficial manner. Pet. at 9.

Bottom ash and fly ash are also mixed in the pond cells. About 270,000 tons of fly ash remains in the pond system. Boron is a mineral found in coal, and it leaches from the fly ash into the transport water. The transport water is then discharged as effluent at Outfall 002. Ameren's discharges from Outfall 002 have flowed to the ditch since the early 1970s. The average discharge is 822,000 gallons per day (gpd). Pet. at 7-8.

The Station's Permit

On August 1, 1998, the station's current five-year National Pollutant Discharge Elimination System (NPDES) permit (1998 permit) went into effect (NPDES IL 0000124). The 1998 permit dictates effluent limits from Outfall 002 at the station. Although the distance between Outfall 002 and the Mississippi has remained about 600 feet, the 1998 permit designates the receiving stream for the effluent as the ditch, while the prior NPDES permit for the station designated the receiving stream as the Mississippi. The ditch has a 7Q10 flow of zero and no mixing is possible.² Thus, the 1998 permit ties the effluent limit for total boron at Outfall 002 to the general use water quality standard for boron at Section 302.208(g) of the Board's regulations, which is 1.0 mg/L. Pet. at 5-7, Exh. A; Rec. at 5.

The 1998 permit requires that Ameren monitor the level of boron in the effluent from the station's Outfall 002. Ameren has not been able to consistently meet the boron limit, as levels of boron in the effluent from Outfall 002 have ranged from 0.42 mg/L to 2.43 mg/L from the effective date of the 1998 permit to September 1999. Just prior to the effective date of the 1998 permit, Ameren had a boron reading of 5.7 mg/L. Pet. at 5-6, Exh. B; Rec. at 5.

Change in the Station's Fuel Source

Ameren intends to change the fuel source at the station from coal to natural gas. Ameren has already purchased the necessary equipment for the change but still needs to install it. Ameren anticipates that the station will be repowered during the spring of 2001, and the new equipment will be operational during the summer of 2001. Ameren has notified the Agency of the change in the fuel source and has also applied for the necessary permits. The switch to natural gas will enable Ameren to retire most of the system currently used to handle coal. Pet. at 8, 16.

² The United States Environmental Protection Agency (USEPA) defines 7Q10 as "the lowest stream flow for seven consecutive days that would be expected to occur once in 10 years". Terms of Environment: Glossary, Abbreviations and Acronyms EPA 175-B-92-001, September 1992. Both USEPA and the Board use the 7Q10 concept to describe low stream flows. See also 35 Ill. Adm. Code 302.103.

The station's new "CTs" consist of two combined cycle combustion turbines, duct burners, and associated equipment. The CTs will lead to a decrease in both air and water pollution. The station will no longer produce bottom ash and fly ash as waste. Even though the station will continue to discharge effluent into the ash pond system, the absence of coal should lead to a decrease in boron levels in the effluent from Outfall 002. Ameren claims it is considering the removal and sale of the remaining 270,000 tons of wet fly ash, which remains in the pond system. Ameren and LaFarge, Inc., a cement manufacturer with a facility in Joppa, Illinois, have begun to discuss the feasibility of this operation. If the operation is feasible, there would be further boron reductions in the station's effluent. Pet. at 7-9, 16-17.

Nevertheless, until the repowering is complete, Ameren claims that it may continue to periodically exceed the general use water quality standard and the applicable effluent standard for boron. Pet. at 9-10, 17.

THE REQUESTED VARIANCE AND AGENCY RECOMMENDATION

Ameren's instant petition seeks relief from the general use water quality standard for total boron at 35 Ill. Adm. Code 302.208(g) which is 1.0 mg/L. Ameren requests that the Board set the water quality standard at 4 mg/L for the ditch. Ameren also requests an exemption from the effluent standard at 35 Ill. Adm. Code 304.105 which applies to the effluent discharged from Outfall 002 at the station. Pet. at 2. Section 304.105 of the Board's regulations provides that "no effluent shall, alone or in combination with other sources, cause a violation of any applicable water quality standard."

Ameren requests that the Board grants the variance for a three-year period from the date of the order or September 1, 2003, whichever is later. Pet. at 3. The Agency agrees with the requested duration. Rec. at 8.

COMPLIANCE WITH FEDERAL LAW

In accordance with Section 35 of the Act, the Board may grant variances only where they are consistent with federal law. 415 ILCS 5/35 (1998).

The Board adopted the general use water quality standard for boron in order to implement the requirements of the federal Clean Water Act (33 U.S.C. §§ 1251 *et seq.* (1998)). Ameren claims that granting the requested adjusted standard will not violate federal law. Pet. at 3. The Agency agrees that Ameren's variance petition is consistent with federal law. The Agency states that it will forward the petition, the Agency's response, and the instant order to USEPA for formal approval. Rec. at 8.

ENVIRONMENTAL IMPACT

When deciding to grant or deny a variance petition, the Board is required to balance the petitioner's hardship in complying with Board regulations against the impact that the requested variance will have on the environment. Monsanto Co. v. IPCB, 67 Ill. 2d 276, 292, 367 N.E.2d 684, 691 (1977).

Ameren claims that the proposed variance would not change the existing conditions in the ditch. The ditch is not used for irrigation, and it is not used as a public water supply. Furthermore, the ditch has insufficient flow, is too shallow, and is too narrow to support any aquatic life. The only use of the ditch is for draining the effluent from the station and from nonpoint discharges such as farmland. Pet. at 3, 13-14, 16, Lynn Affidavit.

Ameren also states that the discharge will have a "negligible impact on the overall water quality" of the Mississippi. Ameren conducted modeling which indicates that the concentration of boron drops substantially between the levels measured in the ditch and the levels measured in the Mississippi immediately downstream of the confluence. In addition, no municipalities use the Mississippi as a source for drinking water for at least 30 miles down river. Pet. at 14-15, Bollinger Affidavit.

Ameren also claims that, based on a USEPA water quality report, the boron in the concentrations measured at Outfall 002 will not result in acute or chronic toxicity. Pet. at 14. The Agency agrees that no acute or chronic toxicity will occur at a boron concentration of 4 mg/L. Rec. at 6.

HARDSHIP

In consideration of a variance, the Board is required, pursuant to Section 35(a) of the Act, to determine whether the petitioner has presented adequate proof that it would suffer an arbitrary or unreasonable hardship if required to comply with the Board's regulation at issue. 415 ILCS 5/35(a) (1998). In order to comply with the Board's regulations at 35 Ill. Adm. Code, Ameren would have to treat the boron in the station's effluent.

Before examining boron treatment options, the Board will also examine the technology that Ameren will use to change the fuel source from coal to natural gas at the station. As stated previously, Ameren claims that the switch to natural gas will lead to a decrease in boron levels in the Outfall 002 effluent.

Thomas Hollenkamp, a Supervising Engineer with Ameren, estimates that the switch to natural gas could cost approximately \$170 million, including the cost for the turbine units (\$94 million), site preparation and construction (\$53 million), engineering (\$9.3 million), and natural gas supply construction (\$2 million). Pet. at 9, Hollenkamp Affidavit.

The first two boron treatment options involve pumping waste water through a synthetic membrane that concentrates boron into a reject stream and leaves a purified effluent stream. The reject stream would still require further treatment before disposal. Ameren determined that the first two options were economically unreasonable.

Options three and four involve demineralizers. Demineralizers function much like the synthetic membranes in options one and two, but the waste water is pumped through a resin instead of a membrane. Again, there would still be a need to treat the resulting reject stream. Ameren considered options three, four, and five to be technologically “uncertain.” Pet. at 8-13, 16, Clayton Affidavit.

The boron treatment options are:

1. Reverse osmosis (RO). Ameren would need to construct an RO treatment facility. In order to meet the boron limit, Ameren would have to send at least 50% of the waste stream to the RO facility. The capital cost of such an RO unit would be \$270,000. If Ameren keeps installation costs (associated piping, power supplies, alarm systems, labor, laser, utilities) to a minimum, the total would run between \$340,000 and \$620,000. The RO process would yield a boron-laced reject stream (or brine stream). Ameren estimates that, at a cost of \$1 per gallon, treatment of the reject stream could be as high as \$40 million per year. Ameren could add an evaporator to the RO treatment facility to reduce offsite treatment costs, but an evaporator would have a capital cost of \$500,000. Pet. at 10-11.
2. Electrodialysis reversal (EDR). Capital costs for an EDR treatment facility would be \$375,000, and installation costs would likely exceed \$468,000. The advantage of EDR over RO is that the reject stream is more concentrated and has a smaller volume. However, disposal of a reject stream at \$1 per gallon could cost \$25 million per year. Adding an evaporator to the EDR would again reduce offsite treatment costs but would add the same capital and installation costs as the RO option. Pet. at 11-12, Clayton Affidavit.
3. Leasing demineralizer units (DUs) to treat on a predictive basis. DUs use deionization to remove boron and other dissolved solids from the waste stream. Costs would vary according to the number of days per year in which Ameren would expect an exceedance of the boron limit. Leasing a DU at \$2,500 per day and assuming 90 days of expected boron exceedances would cost Ameren about \$225,000 per year. Ameren determined that leasing a DU would be too technologically uncertain. Pet. at 12, Clayton Affidavit.
4. Installation of a DU. Ameren states that the capital cost of a DU would be \$300,000. If kept to a minimum, installation costs would total \$375,000. The DU’s boron complexing resin would result in easily disposable boric acid crystals instead of a reject stream. However the resin also produces waste hydrochloric acid and sodium hydroxide. Pet. at 12-13, Clayton Affidavit.
5. Installation of piping to route the discharge from Outfall 002 directly to the Mississippi. This option would entail capital costs of only \$85,000 but involves potential problems. The eastern bank of the Mississippi fluctuates. Ameren also claims that accessing the pipe for maintenance or sampling would sometimes be impossible. Pet. at 13.

The Agency agrees that requiring Ameren to comply with the boron limit for a short time span would pose an arbitrary and unreasonable hardship on Ameren. Rec. at 7.

DISCUSSION

Over the past several years, the Board has provided adjusted standards from boron limits to electric utilities that burn coal and have ash pond effluent. In each case, the Board determined that the options for treating boron (several of which are similar to the options that Ameren discussed) were either technologically unfeasible or economically unreasonable. In addition, the Board found that there would be no environmental harm to the receiving waters accepting the untreated ash pond effluent. In each matter the Board set a boron limit which was, at least in part, higher than 4 mg/L. See *In re Illinois Power Co. (Baldwin Plant)* (May 2, 1996), AS 96-1; *In re City of Springfield Office of Public Utilities* (December 1, 1994), AS 94-9; *In re Southern Illinois Power Cooperative (Marion Power)* (July 1, 1993), AS 92-10.

The Board acknowledges that the analysis for an adjusted standard is structurally different than that for a variance. The Board also notes that the adjusted standard petitions were for facilities in other areas with different receiving waters. Nevertheless, the adjusted standard analyses regarding effect on the environment and consistency with federal law are similar to the instant case. The Board finds that Ameren's requested variance will not harm the environment and will be consistent with federal law.

Ameren is spending well over \$100 million to change the fuel source at the station to natural gas and, in the process, eliminate boron as a waste product. Ameren would incur additional arbitrary and unreasonable hardship if it is required to install any one of the boron treatment options. The Board notes that the switch to natural gas at the station, thereby eliminating some of the boron in the effluent, may take place before most of the treatment options could be installed. The Board agrees with Ameren and finds that leasing a DU is too technologically uncertain. And, although a new discharge pipe may allow Ameren to comply with its current permit, it does not decrease boron in the effluent.

The Board recognizes that, even after the switch to natural gas at the station, Ameren will still require a variance if the fly ash remains in the pond system.

CONCLUSION

The Board finds that, if the instant variance petition is not granted, Ameren will incur an arbitrary or unreasonable hardship. There are currently no viable compliance options for the treatment of boron which are available to Ameren. The variance will not violate federal or State laws, nor will it cause any environmental harm. The Board will therefore grant Ameren a variance from the general use water quality standard for boron at 302.208(g) and the applicable effluent standard at 35 Ill. Adm. Code 304.105.

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

ORDER

Ameren Energy Generating Company (Ameren) is hereby granted a variance from 35 Ill. Adm. Code 302.208(g) and 35 Ill. Adm. Code 304.105 subject to the following conditions:

1. Ameren is granted a partial variance from 35 Ill. Adm. Code 304.105. Pursuant to this grant, 35 Ill. Adm. Code 304.105 does not apply to levels of total boron in the effluent from Outfall 002 at Ameren's Grand Tower Power Station (station) near Grand Tower in Jackson County, Illinois which discharges to an unnamed tributary ditch (ditch) of the Mississippi River (Mississippi). Ameren is granted this variance from 35 Ill. Adm. Code 304.105 provided that the effluent from Outfall 002 does not cause or contribute to a concentration of 4 mg/L or greater of total boron in the ditch.
2. The general use water quality standard for total boron at 35 Ill. Adm. Code 302.208(g) does not apply to the ditch. Instead a 4.0 mg/L total boron water quality standard shall apply.
3. No other facilities with outfalls or discharges to the ditch will benefit from the relief provided in this order except for the station.
4. This variance shall expire on November 16, 2003.

IT IS SO ORDERED.

If petitioner chooses to accept this variance, within 45 days after the date of this opinion and order, petitioner shall execute and forward to:

Sanjay K. Sofat
 Division of Legal Counsel
 Illinois Environmental Protection Agency
 1021 North Grand Avenue East
 P.O. Box 19276
 Springfield, IL 62794-9276

a certificate of acceptance and agreement to be bound by all the terms and conditions of the granted variance. The 45-day period shall be held in abeyance during any period that this matter is appealed. Failure to execute and forward the certificate within 45 days renders this variance void. The form of the certificate is as follows:

I (We), _____, having read the opinion and order of the Illinois Pollution Control Board, in PCB 01-16, dated November 16, 2000, understand and accept the said opinion and order, realizing that such acceptance renders all terms and conditions thereto binding and enforceable.

Petitioner

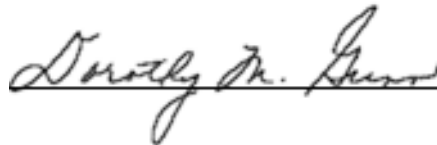
By: Authorized Agent

Title

Date

Section 41 of the Environmental Protection Act (415 ILCS 5/41 (1998)) provides for the appeal of final Board orders to the Illinois Appellate Court within 35 days of service of this order. Illinois Supreme Court Rule 335 establishes such filing requirements. See 172 Ill. 2d R. 335; see also 35 Ill. Adm. Code 101.246, Motions for Reconsideration.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above opinion and order was adopted on the 16th day of November 2000 by a vote of 7-0.

A handwritten signature in cursive script, reading "Dorothy M. Gunn", is written over a horizontal line.

Dorothy M. Gunn, Clerk
Illinois Pollution Control Board