

ILLINOIS POLLUTION CONTROL BOARD
February 8, 1990

IN THE MATTER OF:)
)
THE PETITION OF BORDEN CHEMICALS)
AND PLASTICS OPERATING LIMITED)
PARTNERSHIP (FORMERLY BORDEN) R86-14
CHEMICAL COMPANY) FOR A SITE-) (Rulemaking)
SPECIFIC RULE CHANGE REGARDING)
WASTEWATER DISCHARGES INTO AN)
UNNAMED TRIBUTARY OF LONG)
POINT SLOUGH)

PROPOSED RULE

FIRST NOTICE

OPINION AND ORDER OF THE BOARD (by B. Forcade):

This matter comes to the Board on a petition for site-specific rulemaking filed March 31, 1986. The original petition was filed by Borden Chemical Company, but the petitioner's name was subsequently changed to Borden Chemicals and Plastics Operating Limited Partnership. (See Order of August 4, 1988; hereinafter the petitioner will be referred to as "Borden"). The merit hearing was held December 10, 1986 in Springfield. The Department of Energy and Natural Resources ("DENR") filed the Economic Impact Statement ("EcIS") on October 17, 1988. A hearing was held on the EcIS on January 10, 1989. Final comments were filed by Borden and the Illinois Environmental Protection Agency ("Agency") on February 22, 1989.

The present petition relates to Borden's Illiopolis, plant, which is one of more than 50 plants operated by Borden. The facility is located in a rural area one mile west of Illiopolis, Illinois. The plant primarily produces polyvinyl chloride resins, polyvinyl acetate emulsions, and polyvinyl chloride plastic film. The plant presently employs approximately 300 people.

The wastewater effluent from Borden's plant contains elevated levels of total dissolved solids ("TDS") and chloride. This is largely due to wastewater from the air pollution control equipment which Borden installed to comply with the National Emission Standards for Hazardous Air Pollutants ("NESHAPS") promulgated for vinyl chloride pursuant to Section 301(a) of the Clean Air Act. The emission control system became operational on October 21, 1978, and was installed at a cost of \$15 million. This wastewater is commingled with other sources of plant wastewater prior to discharge. The plant discharges approximately 800,000 gallons of effluent a day. The maximum TDS concentration may be as high as 2500 mg/l; the average is usually below 1200 mg/l. The average chloride concentration is usually less than 700 mg/l. These concentrations do not violate any

technology-based effluent limitations, but the discharge may cause water quality violations for TDS and chlorides in the receiving waters.

Borden discharges its effluent into an unnamed tributary which drains into Long Point Slough about one and one-half miles downstream of the discharge. Long Point Slough flows into the west branch of the Old River less than a mile from the confluence with the unnamed tributary. The east branch of Old River is blocked by a levee, but the west branch carries flows downstream to its confluence with the Sangamon River.

The unnamed tributary is approximately four feet wide. It has been channelized in the past and no meandering or natural movement has occurred in recent years. For the most part, the ditch is overgrown with grasses, trees, and other vegetation. During dry weather, Borden's 800,000 gallons per day of effluent constitute 90-95% of the tributary flow. During wet weather, flows increase substantially due to agricultural runoff from pastures adjacent to the tributary.

Like the unnamed tributary, Long Point Slough receives a majority of its dry weather flow from industrial wastewater. The Illiopolis sewage treatment plant also discharges into the Slough several kilometers upstream of its confluence with the unnamed tributary. The Slough ranges from 3 to 5 meters wide and varies in depth from a few centimeters to several meters. The banks along the Slough are heavily vegetated.

The primary regulation affecting today's proceeding is 35 Ill. Adm. Code 302.208. That regulation provides that concentrations of TDS in the waters under consideration here shall not exceed 1000 mg/l and concentrations of chloride shall not exceed 500 mg/l. The other regulatory provision of concern is 35 Ill. Adm. Code 304.105 which provides that no effluent shall, alone or in combination with other sources, cause a violation of any applicable water quality standard. Data supplied by Borden show violations of both TDS and chloride water quality standards in the unnamed tributary downstream of Borden's discharge or in Long Point Slough downstream of the confluence with the unnamed tributary (Petition, Exhibit A, Table 1). These data clearly show a conflict between the existing water quality and the existing water quality standards, and show that the conflict is related to Borden's discharges. After reviewing the situation, Borden believes the most appropriate remedy for this conflict is to amend the existing regulatory language to reflect existing conditions.

Borden proposes the following regulatory language be added to the Board's rules:

Section 304.211	Discharges from Borden Chemical Company into an unnamed tributary of Long Point Slough
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- a) This section applies to effluent from Borden Chemical Company's Illiopolis Plant which is discharged to a tributary of Long Point Slough in Sangamon County, Illinois.
- b) The total dissolved solids and chloride standards of Rule 302.208 shall not apply to waters of an unnamed tributary of Long Point Slough, which tributary begins approximately 15,050 feet above the confluence of such tributary with Long Point Slough and ends with said confluence, and in Long Point Slough from said confluence to the confluence of Long Point Slough with Old River.
- c) Borden's effluent shall not cause the water quality in the unnamed tributary or in Long Point Slough to exceed a monthly average concentration level of 2,200 mg/l for total dissolved solids.
- d) Borden's effluent shall not cause the water quality in the unnamed tributary or in Long Point Slough to exceed a monthly average concentration level of 700 mg/l for chloride.
- e) Borden's effluent shall not cause the water quality in the unnamed tributary or in Long Point Slough to exceed a daily maximum concentration level of 2,500 mg/l for total dissolved solids.
- f) Borden's effluent shall not cause the water quality in the unnamed tributary or in Long Point Slough to exceed a daily maximum concentration level of 800 mg/l for chloride.

(Borden's Supplemental Submission, January 30, 1987, p. 8)

DISCUSSION

The Board must evaluate Borden's request to determine whether compliance with the existing standards is technically feasible and economically reasonable. If it is not, the Board must evaluate the economic, technical and environmental factors that would influence adopting the proposed regulatory language. At the outset, the Board must note that Borden, the Agency, and the DENR all generally support adoption of amended regulatory language to provide relief to Borden.

There is no question that it is technically feasible for Borden to comply with existing regulatory standards. Borden's sole assertion is that such compliance is not economically reasonable. According to water quality models, Borden would have to reduce their TDS and chloride concentrations by about 28 percent in order to achieve compliance with the water quality limits. (EcIS, p. 2). No in-plant process changes were identified which would allow such reductions; however, six "add-on" wastewater treatment technologies were identified in the EcIS. A summary of those alternatives studied in the EcIS follows.

The first control alternative is to use reverse osmosis with landfilling of the resulting brine. This process is a membrane-separation technique in which a semi-permeable membrane allows water permeation while acting as a highly selective barrier to the passage of dissolved, colloidal and particulate matter. The process would be most effective if placed at the end of the incinerator/scrubber and zeolite regeneration. By cleaning the wastestream from only these two processes, 10 percent of the total flow would be treated while 56 percent of the TDS and 74 percent of the chlorides would be removed from the final effluent. The above process would generate about 18,000 gallons per day of brine waste material. The first control alternative involves solidification of this material followed by landfilling. The cost of this option over a 30 year period (capital costs plus operation and maintenance costs) is estimated at \$1,198,655.

The second control alternative involves the same reverse osmosis process followed by deepwell injection of the brine waste. This proved to be the least expensive option considered, with an estimated 30 year cost of \$877,483.

The third control alternative involved the same reverse osmosis process along with electro dialysis (one of the most widely used methods of treating brackish waters). Again, a brine waste would result which would have to be disposed of by some method. The landfilling option would have a total 30 year estimated cost of \$1,486,568, making this the most expensive alternative considered.

The fourth control alternative is the same as the third (reverse osmosis along with electro dialysis), however, the resulting brine waste would be deepwell injected. Estimated 30 year costs are \$1,305,000.

The fourth control alternative employs electro dialysis instead of reverse osmosis. The resulting brine is solidified and landfilled for a total 30 year estimated cost of \$1,422,922.

The sixth and last control alternative involves electro dialysis followed by deepwell injection of the resulting brine waste. This option has an estimated 30 year cost of \$1,101,750.

All of the above costs from the EcIS have a 20% uncertainty factor. For example, the least expensive control option (#2, reverse osmosis/deepwell injection) has a cost range of \$701,986 - \$1,052,980, with a cost estimate of \$877,483.

At hearing, Borden took issue with the costs developed in the EcIS, claiming they were low by approximately one order of magnitude:

In all cases with respect to add-on treatment, the costs estimates contained in the EcIS were found to be approximately an order of magnitude lower than costs developed by Woodward-Clyde and, for that matter, lower than the costs developed in 1987 by Crawford, Murphy & Tilly as part of the merit hearing in this proceeding. The difference appeared to be a result of low unit cost estimates used in the EcIS and incomplete costing of all system components. Calculation of the cost of reverse osmosis and electro dialysis add-on technologies, for example, did not take into account the need for intermediate storage of 73,000 gallons of wastewater to be treated and the 18,250 gallons of brine from the reverse osmosis or the electro dialysis. Also missing from the estimates was a full costing of all the pretreatment units necessary to treat Borden's wastestream.

(January 10, 1989 Hearing, pp. 10-11)

Borden also asserted the EcIS assumption of 270 days of plant operation per year was incorrect in that the plant operates 365 days per year, and questioned the assumption that a Class V deep well would be adequate under the present regulatory framework rather than the more expensive Class I well. (January 10, 1989 Hearing, pp. 12-13, 16-17; See also Ex. 13).

The compliance costs reported in the EcIS ranged from \$877,483 to \$1,486,568. Borden's evaluation of the costs of the exact same alternatives ranged from \$17,733,000 to \$80,838,000. (Ex. 14).

In addition to the economic factors bearing on the requested regulatory change, are the environmental factors. Much of the information on environmental effects comes from the following sources; the "1984 Survey of Unnamed Ditch and Long Point Slough for the Borden Chemical Company" by the Academy of Natural Sciences of Philadelphia (Petition; Attachment A); the "Water Quality Assessment of a Major Portion of the Sangamon River Basin" Volume II, March 31, 1983 by the Agency (Ex. 2); various effluent and water quality sampling done by Borden (Petition;

Attachments C and D); two stream assessment surveys by the Agency (Exs. 5 & 6); and hearing testimony concerning these documents.

The above materials support, and the participants agree, that the impacted areas of concern extend, at most, from the point of discharge at the unnamed tributary to the point of confluence with the Sangamon River. Further, the stretch of the Old River included in this segment is so distant as to receive only minimal impact and then only during very low flow conditions. Clearly the primary areas of concern for the elevated TDS and chloride levels are the unnamed tributary and Long Point Slough.

The Academy of Natural Sciences of Philadelphia conducted a study of the impacted area in July and September of 1984. That study evaluated the chemical, physical and biological factors of significance at six sampling stations. The study evaluated the impact of more than just TDS and chlorides. The results of the Academy of Natural Sciences were cogently summarized as follows:

Results of the studies indicate that the chemical composition and physical characteristics of the water of the unnamed ditch and Lont [sic] Point slough are altered by the discharged effluent. Biological impacts, however, were most evident immediately downstream of the Borden plant outfall on the unnamed ditch, especially during the low-flow survey conducted in September. The low diversity of available habitat and the seasonal (intermittent) nature of the flow of water in the ditch strongly influenced the chemical, physical and biological character of the receiving bodies. The only demonstrable impacts on the biota of Long Point Slough were subtle changes in algal species composition and increased algal growth downstream of the unnamed ditch. The impacts observed during this study appear to result primarily from nutrient enrichment and toxicity of un-ionized ammonia. There is no indication that the concentrations of chlorides and total dissolved solids observed at the time of the study would alter the biota of the receiving streams.

(Pet., Attachment A, p. i)

The Agency's 1985 Stream Assessment Survey reached similar conclusions:

The data from the present survey compared well with the results reported by ANSP. There was a definite shift in macroinvertebrate popula-

tions downstream of the Borden discharge toward the more pollution tolerant Chironomidae and Oligochata. From the Agency data it also appeared that the major impact upon the stream occurred in the vicinity of Station C-2, approximately 1.0 mile downstream. The ANSP did not collect a sample in this area. At Station C-3, approximately 2.8 miles downstream, the stream had almost returned to upstream conditions. There appeared to be little or no impact on Long Point Slough. (Ex. 5, p. 2)

The EcIS evaluated several environmental impacts. First, the report estimated that the levels of chloride and TDS would impact 25% of the spawning fish each year, killing a total of 128 fish for each of 30 years. The report stated that contamination from the waterways would enter underground water and contaminate six private wells associated with homesteads near the unnamed tributary and Long Point Slough. The report calculated 87.6 person-hours per year of discomfort from drinking contaminated water. The report also calculated that contamination of the Illicopolis public water supply with dissolved solids would result in \$37,278 of corrosion to metallic surfaces due to dissolved solids levels. The connection of chlorides in the drinking water to high blood pressure and cardiac disease was considered too tenuous to evaluate.

There was substantial testimony at hearing that the ditch would be a discharge point for the groundwater rather than the other way around. (January 10, 1989 Hearing, p. 17-21, 73-91). Woodward-Clyde Consultants prepared a short geology and hydrogeology report which concluded that Borden effluent is not entering local groundwater wells. (Ex. 13, pp. 23-27). The Agency did not embrace the concept of groundwater contamination from Borden's effluent.

Conclusions

The Board believes the economic information developed by Borden presents a more accurate estimate of the costs of compliance than the information presented in the EcIS. First, the Borden information seemed consistent from 1987 to 1989 with two separate consulting firms developing similar cost information. Second, the Borden information was developed using assumptions (plant operational days, pretreatment requirements, temporary storage capacities, etc.) that would appear to be better understood by Borden representatives than by the EcIS contractors. Third, the assumptions relied upon by Borden were stated at the January 10, 1989 hearing, and not refuted by witnesses testifying on behalf of the EcIS. And lastly, the Agency had the opportunity to review both sets of data and concluded that Borden's estimates were more likely accurate. (Agency final Comments, p. 3). Therefore, the Board finds that

the costs of compliance are likely to be from \$17,758,000 to \$80,842,000.

The Board also believes that the information on environmental effects developed by Borden and the Agency is more likely to be correct than the information presented in the EcIS. Both Borden and the Agency based their estimates of the effects on visual and scientific testing conducted by individuals skilled in that craft. The EcIS contractors did not purport to be skilled biologists or chemists. Further, the EcIS described consequences are premised on large volumes of effluent entering the underground water supply. This conclusion is premised on reading elevations from one USGS topological map, without any corroborating field work. (January 10, 1989 Hearing, p. 77). The Borden assertions are based on substantial technical evaluation, with supporting field work. The Board must conclude that substantial Borden effluent does not enter the underground water and that conclusions about well contamination are not well founded.

The Board also notes that the EcIS assertions about 128 fish killed per year from TDS and chlorides is at odds with the testimony of skilled biologists. They concluded after field investigations and literature reviews, that the "only" demonstrable impact was a shift in algal and macroinvertebrate species. That is in direct conflict with the EcIS assumptions of 25 per cent fish mortality. The Board must conclude that the assertion of fish mortality is not persuasively demonstrated.

In summary, the Board must agree with Borden (Petition pp. 24-26), the Agency (Final Comments, p. 3), and DENR (EcIS, p. 70) that the costs of compliance outweigh any environmental benefit presented in the record.

Further, the Board must conclude that it is technically feasible, but not economically reasonable for Borden to comply with the existing standards. Therefore, the Board will propose alternative regulatory language to provide relief to Borden.

The Board believes that the most appropriate characterization and placement of the regulatory language would be to style it as a Section in Part 304; Subpart B, and to characterize it as an exclusion from the applicability of the water quality violation provisions of Section 304.105 as it pertains to the TDS and chloride standards of Section 302.208, so long as the alternative standards are met. The language has been modified to address "Borden Chemicals and Plastics Operating Limited Partnership", rather than Borden Chemical Company. The Board believes the most appropriate limitations are the never-to-exceed values of 2,500 mg/l for TDS and 800 mg/l for chloride as suggested by Borden and supported by the Agency. The Board will not include monthly average water quality standard values; no other water quality standards adopted by the Board are set to monthly averages, and monitoring and enforcement techniques would seem tenuous at best.

Today's regulatory proposal is intended to apply from the point of Borden's discharge in the unnamed tributary, downstream to the confluence with the Sangamon River. It is intended to insulate Borden only while the water quality for TDS and chloride in that stretch of water remains below 2,500 mg/l and 800 mg/l respectively. If either one of those values is exceeded, Borden would be subject to enforcement, or additional permit controls.

ORDER

The Board hereby proposes for First Notice the following amendments to 35 Ill. Adm. Code, Subtitle C: Water Pollution, Chapter I, Pollution Control Board, Section 304.211, Discharges from Borden Chemicals and Plastics Operating Limited Partnership into an unnamed tributary of Long Point Slough. The Clerk of the Board is directed to file these proposed amendments with the Secretary of State.

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE C: WATER POLLUTION
CHAPTER I: POLLUTION CONTROL BOARD

PART 304
EFFLUENT STANDARDS

SUBPART B: SITE SPECIFIC RULES AND EXCEPTIONS
NOT OF GENERAL APPLICABILITY

Section	
304.201	Wastewater Treatment Plant Discharges of the Metropolitan Sanitary District of Greater Chicago
304.202	Chlor-alkali Mercury Discharges in St. Clair County
304.203	Copper Discharges by Olin Corporation
304.204	Schoenberger Creek: Groundwater Discharges
304.205	John Deere Foundry Discharges
304.206	Alton Water Company Treatment Plant Discharges
304.207	Galesburg Sanitary District Deoxygenating Wastes Discharges
304.208	City of Lockport Treatment Plant Discharges
304.209	Wood River Station Total Suspended Solids Discharges
304.210	Alton Wastewater Treatment Plant Discharges
<u>304.211</u>	<u>Discharges From Borden Chemicals and Plastics Operating Limited Partnership Into An Unnamed Tributary of Long Point Slough</u>
304.212	Sanitary District of Decatur Discharges
304.213	Union Oil Refinery Ammonia Discharge
304.214	Mobil Oil Refinery Ammonia Discharge
304.215	City of Tuscola Wastewater Treatment Facility Discharges
304.216	Newton Station Suspended Solids Discharges
304.219	North Shore Sanitary District Phosphorus Discharges

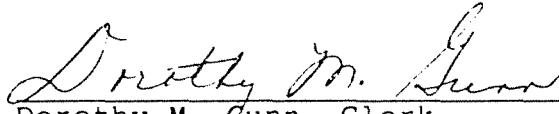
304.220 East St. Louis Treatment Facility, Illinois-
American Water Company

Section 304.211 Discharges from Borden Chemicals and Plastics
Operating Limited Partnership into an unnamed
tributary of Long Point Slough

- a) This section applies to effluent from Borden Chemicals and Plastics Operating Limited Partnership's Illiopolis Plant which is discharged to an unnamed tributary of Long Point Slough in Sangamon County, Illinois.
- b) Such discharges shall not be subject to Section 304.105 as it applies to the water quality standards for total dissolved solids and chloride of Section 302.208 in the unnamed tributary and Long Point Slough to the confluence with the Sangamon River so long as the concentration of total dissolved solids does not exceed 2,500 mg/l and so long as the concentration of chloride does not exceed 800 mg/l in those waters.

IT IS SO ORDERED

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above Opinion and Order was adopted on the 8th day of February, 1990, by a vote of 7-0.



Dorothy M. Gunn, Clerk
Illinois Pollution Control Board