ILLINOIS POLLUTION CONTROL BOARD
February 28, 1991

IN THE MATTER OF:	)	
	)	
PETITION OF THE NUTRASWEET	)	AS 89-3
COMPANY AND CONSUMERS ILLINOIS	)	(Adjusted Standard)
WATER COMPANY FOR AN ADJUSTED	)	
STANDARD FROM 35 ILL. ADM.	)	
CODE 304.105 OR 302.208,	)	

STEVEN J. GOLDBERG OF THE NUTRASWEET COMPANY, AND LEE CUNNINGHAM AND JEFFREY C. FORT OF, GARDNER, CARTON & DOUGLAS, APPEARED ON BEHALF OF PETITIONERS.

JOSE GONZALES, ASSISTANT COUNSEL, APPEARED ON BEHALF OF THE ILLINOIS ENVIRONMENTAL PROTECTION AGENCY.

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

This matter comes before the Board on a petition filed on June 30, 1989 by The NutraSweet Company and Consumers Illinois Water Company ("NSC" and "CIWC" or collectively as "Petitioners") for an adjusted standard from the Board's water quality standard for total dissolved solids ("TDS") found at 35 Ill. Adm. Code 302.208 and from the requirement of 35 Ill. Adm. Code 304.105, that no effluent shall, alone or in combination with other sources, cause a violation of any applicable water quality standard.

Section 302.208 provides that the concentration of TDS shall not exceed 1,000 mg/l. Petitioners seek an adjusted water quality standard of 2,100 mg/l for NSC's TDS discharges to CIWC and for CIWC's discharge of TDS, from the point of discharge from CIWC to Deer Creek, to the confluence of Deer Creek with Thorne Creek and downstream in that part of Thorne Creek to the "USGS" gaging station. CIWC's TDS effluent discharge to Deer Creek would be limited to 2,100 mg/l as a daily maximum and 1,675 mg/l as a monthly average. The Illinois Environmental Protection Agency ("Agency") supports the requested relief. Additionally, in comments filed on May 2, 1990 the Agency agreed that monitoring requirements and limits on NSC's discharges to CIWC should be addressed through modification of NSC's operating permit which expires December 29, 1993. Accordingly, the Agency requests that the Board order the reopening of the NSC permit to reflect the proposed adjusted standard.

Procedural History

This matter initially came before the Board in a 1983 variance proceeding in PCB 83-73. See Opinion and Order, December 29, 1983. NSC and CIWC are now operating under a subsequent variance from 35 Ill. Adm. Code 304.105 as it applies to the TDS standard of 35 Ill. Adm. Code 302.208, granted by the Board in PCB 88-84 on December 15, 1988. The variance granted in 1988 was conditioned upon NSC's filing a site-specific rulemaking petition by July 1, 1989; applying for any construction permits by December 31, 1990; and completing installation by December 31, 1991. This variance will expire on December 29, 1993.

On June 30, 1989 NSC and CIWC filed a motion requesting the Board to accept the subject petition for either an adjusted standard or a site-specific rulemaking. On July 26, 1989 the Agency filed a response declining to take a substantive position on the advisability of the adjusted standard form of relief. On July 27, 1989, the Board granted the request to allow the matter to move forward as an adjusted standard proceeding. On August 29, 1989, the Agency filed a response, which raised various issues but did not make a recommendation on the requested relief. On January 3, 1990 an amended petition was filed. Hearing was held on March 28, 1990. On April 30, 1990, NSC and CIWC filed final comments and corrections to the transcript of hearing. The Agency filed its final comments on May 2, 1990, in large measure supporting the requested relief.

On December 18, 1990 NSC and CIWC filed for an extension of the date to apply for construction permits in PCB 88-84. On December 20, 1990, the Board granted that modification of the internal deadline in the variance, extending the date to apply for construction permits until May 9, 1991. NCS anticipates that if, after the Board's decision in this adjusted standard proceeding, construction should be required, that construction could be completed consistent with the variance deadline of December 31, 1991.

Background

NSC's facility is located in University Park, Will County, Illinois. It was acquired by NSC in 1982 and employs over 200 people with an average payroll of over $7 million. The facility manufactures aspartame, a low-calorie sweetener, marketed as "NutraSweet". The manufacturing process involves the chemical reaction of two amino acids and purification of the product. The process requires the use of inorganic acids and organic anhydrides and neutralization by caustic soda. Wastewaters are created, which are high in TDS and which are pretreated by NSC prior to discharge to the treatment plant of CIWC. CIWC is a privately owned utility company situated on Deer Creek, which also supplies water and sewer services to the Village of University Park.

NSC maintains a 460,000 gallon equalization basin for treatment of boiler blow-down, condenser cooling water, soft

water regeneration, and backwash. Boiler blow-down and regeneration backwash from Zeolite water softening are the primary sources of the TDS discharge. The major constituents of the TDS are sulfates, which arise naturally from raw water usage; chloride, which results from the raw water and from water softening by NSC; calcium; magnesium; and sodium.

Under the variance granted in PCB 88-84, the TDS concentration of CIWC's discharge to Deer Creek may not exceed 2,100 milligrams per liter ("mg/l") as a daily composite and 1,675 mg/l as a monthly average. NSC's TDS discharge to CIWC may not exceed 11,100 kilograms per day ("kg/day") as a daily composite and 6,000 kg/day as a monthly average.

NSC's average discharge flow to CIWC during 1988 was 0.124 MGD (0.317 MGD maximum). This includes an average of approximately 4,473 kg/day of TDS (11,785 kg/day maximum). Petitioners have indicated that for the period from January 22, 1988 to June 25, 1988, the water quality standard of 1,000 mg/l for TDS (found at 35 Ill. Adm. Code 302.208) was exceeded on 11 separate occasions at Gage #4, a point approximately 1.3 miles downstream of CIWC's point of discharge. Pet., Exhibit E; Ag. Response, p.3 (August 29, 1989). On each of those 11 dates, background TDS levels at Gage #1, 1000 feet upstream of CIWC's discharge, were below the regulatory standard. For 1988 the average TDS level at Gage #4 was 1200 mg/l, which would fall below the level permitted under the Board's variance.

In 1989 TDS discharge from NSC to CIWC averaged approximately 10,408 pounds per day ("ppd"), with a maximum of 25,382 ppd. Additionally, NSC hauls over 15,000 gallons per day of high TDS wastes off-site for disposal.

NSC's discharges and pretreatment in the equalization basin are governed by Permit No. 1988-EP-1686, which the Agency issued on December 30, 1988. The permits contains terms and conditions regarding load limits and monitoring requirements based on the variance granted by the Board in PCB 88-84 on December 15, 1988. Those conditions would remain in effect through December 29, 1993, the date on which NSC's permit expires. Ag. Final Comments, p.1 (May 2, 1990).

The affected receiving stream is Deer Creek, which has been characterized in the record as an intermittent stream with a 7-day, 10-year low flow of 0 cubic feet per second. (7Q10=0). Agency Response, p.5, Aug. 29, 1989. The discharge from CIWC enters Deer Creek approximately 14 miles upstream of its confluence with Thorne Creek. Pet. at p.2. The affected stretch of water is estimated to be approximately 15 miles in length. Transcript ("Tr.") at pp. 25-27. Deer Creek is more fully described as follows:

> Above the plant Deer Creek is an intermittent stream; below it is perennial. It meanders east and north through suburban areas of Will and Cook Counties. At the Lincolnshire Golf

> Course it is dammed to form a shallow, 18-acre lake called Deer Lake. About 14 miles downstream from the CIWC discharge Deer Creek joins Thorne Creek, a tributary of the Little Calumet River. Deer Creek is a low gradient stream, dropping only a small distance for each mile of stream length. It has been channelized for short distances near East Chicago Heights.
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> Pet. at p.8, Ag. Response, p.4 (August 29, 1989)

Additionally, the stream has been characterized as follows: "a poor quality stream and the biota are very tolerant organisms". Tr. at pp. 87-90. Testimony of Michael Ander, Senior Ecologist, Dames & Moore, Park Ridge, Illinois. See also testimony attached to transcript as Exhibit 2.

Regulatory Framework

The Board's authority to grant an adjusted standard is found in Section 28.1 of the Act. Section 28.1(a) provides that the Board may grant such relief if the adjusted standard is consistent with the site-specific rulemaking provisions of Section 27(a). Thus, the Board is to consider the technical feasibility and economic reasonableness of measuring or reducing the particular pollution. Under Section 27(a) the Board is also to "take into account the existing physical conditions, the character of the area involved, including the character of surrounding land uses, zoning classifications, the nature of the existing air quality, or receiving body of water." Section 28.1(b) authorizes the Board to specify within a rule of general applicability the level of justification necessary to support the grant of an adjusted standard. Since the Board's water regulations do not so specify, Section 28.1(c) is applicable to the petition here. That Section further describes the petitioner's burden of proof as follows:

> c. If a regulation of general applicability does not specify a level of justification required of a petitioner to qualify for an adjusted standard, the Board may grant individual adjusted standards whenever the Board determines, upon adequate proof by petitioner, that:
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> 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 that petitioner;
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> 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.

Section 28.1(c) of the Act.

The Board's procedural rules at 35 Ill. Adm. Code 106.701 et seq. also provide specific rules for the adjusted standard proceeding.

Proposed Adjusted Standard

Petitioners request an adjusted standard from both Section 304.105 and Section 302.208 consistent with the variance granted in PCB 88-84. NSC requests an adjusted standard for TDS from Section 304.105 to allow a maximum discharge limit of 11,100 kg/day and 6,000 kg/day as a monthly average. CIWC requests an adjusted standard for TDS to allow a maximum daily discharge of 2,100 mg/l and 1,675 mg/l as a monthly average. Petitioners also seek an adjusted standard from the TDS water quality standard in Section 302.208 (1,000 mg/l). Petitioners request that the adjusted standard be established at 2,100 mg/l to reflect CIWC's requested effluent standard, since the current water quality standard must be the same as CIWC's maximum daily effluent limit because Deer Creek has a "7Q10" of zero.

NSC also requests that the load limits and monitoring continue to be imposed through the permitting process and not as part of the adjusted standard.

Agency Recommendation

At hearing the Agency expressed its support for the grant of the adjusted standard. Tr. at pp. 10-11. Additionally, in its Final Comments filed May 2, 1990, the Agency agreed with the Petitioners that the monitoring requirements and limits on the flows from NSC could be imposed pursuant to permit conditions, but the Board must condition relief on reopening the permit to reflect the terms and conditions of the adjusted standard. The Agency also stated that federal review necessitates fashioning relief from the water quality standard of Section 302.208 to avoid a federally impermissible de facto revision of the water quality standard. See Ag. Response, pp. 57 August 29, 1989, citing the Mobil Oil, John Deere, and Marathon Petroleum cases; see also Borden Chemicals, R86-14, Opinion and Order, November 29, 1990.

At hearing Dean Studer, an environmental protection engineer with the Agency referred to Mr. Ander's testimony in stating that the requested 2100 mg/l TDS standard is below the 3000 mg/l TDS level necessary for the protection of aquatic life in the affected stream. Mr. Studer indicated that the proper approach would be for the Board to grant an adjusted standard, subject to conditions specified by the Agency, from the TDS standard of 35 Ill. Adm. Code 302.208. Mr. Studer states that a 2100 mg/l TDS water quality standard and daily maximum effluent limitation and 1675 mg/l monthly effluent limitation should be easily attainable by CIWC, and these were approved by the Board in the variance case in PCB 88-84. However, he also stated that although instream monitoring requirements for CIWC should no longer be necessary, the Agency may require through the NPDES permit process that the monitoring frequency for CIWC be increased from the currently required 3 times/week on a composite basis to 5 times/week. Tr. at pp. 97-98. The Agency's chief concern is that the fairly rapid fluctuations in the TDS concentrations in NSC's wastestream may cause problems in CIWC's treatment process. In particular, "spikes" in TDS concentrations may pass through CIWC and be discharged to waters of the State. Continued monitoring of TDS by NSC may alleviate this problem by identifying the cause of the unusual fluctuation in TDS levels. Tr. at p.98.

Technical Feasibility and Economic Reasonableness

At hearing Mr. Andrew J. Quick, Manager of Environmental Engineering for NSC testified regarding the effectiveness and cost of several compliance alternatives investigated by NSC. He discussed the findings of two studies conducted in 1985 and 1986 by Environmental Resource Management ("ERM"), attached as Exhibits F and G to the petition.

In the first study, ERM concluded that to achieve compliance NSC would need to use electrodialysis or ion exchange, requiring NSC to pretreat its entire effluent for inorganics removal. The pretreatment would include: 1) equalization and neutralization; 2) nutrient supplementation and aerobic biological treatment; 3) gravity clarification and filtration; and 4) dissolved air floatation, aerobic digestion and belt filtration. This would involve major expenditures, with capital costs for pretreatment alone of nearly 2 million dollars and with annual costs of approximately $500,000. ERM considered other options and found evaporation-crystalization and hauling for disposal would be the most cost-effective option.

In the second study, ERM analyzed eight treatment alternatives to minimize NSC's overall wastewater treatment and disposal costs and for NSC to pretreat its wastes or for CIWC to expand its plant capabilities. These alternatives included varying requirements for expansion of the CIWC treatment plant, for pretreatment facilities owned by CIWC, and for pretreatment facilities owned by NSC.

The capital cost of the preferred option recommended by ERM

would be nearly 3.4 million dollars with total annual costs in excess of 4 million dollars. Other options involved costs as high as 6 million dollars per year.

A follow-up pilot plant study of the option recommended by ERM found that capital costs, in 1986 dollars, would be 3.5 million dollars and annual operating expenses would be 1.65 million dollars. On the basis that the costs to comply were unreasonable, ERM recommended that NSC seek site-specific relief. Tr. at pp. 23-26, and Tr. Exhibit 1.

The Agency also pointed out that although the NSC reports indicate that four technologies are available to achieve compliance with the water quality standards for TDS, each method produces a wastestream with another disposal problem. The Agency notes that reverse osmosis, electrodialysis, ion exchange, and vapor compression evaporation each generate a highly concentrated brine solution requiring disposal. Additionally, the first three methods involve extensive pretreatment due to the concentrations of organics and solvents in NSC's discharge, and membranes utilized in these three processes are easily fouled by organic chemicals. The Agency also noted the significant costs related to these compliance alternatives. Ag. Response, pp. 9-10 (August 29, 1989)

Environmental Impact

As an initial matter, Mr. Quick of NSC testified that "(t)he TDS discharges from NSC to CIWC have never caused any upset to CIWC's biological treatment process. Further, since NSC's discharges in accordance with the requested adjusted standard will remain at or near present levels, there is no significant potential for future upsets." Tr. at p.21. (emphasis added). See also testimony of Dennis Conwell of CIWC, Tr. at pp.63-64. Mr. Quick also testified that NSC's discharges have never caused CIWC to exceed 2100 milligrams per liter in their discharge of TDS to Deer Creek. Tr. at p.35. This is a key consideration in the Board's evaluation of the environmental impact of CIWC's discharge to Deer Creek as the Board's decision is premised on future discharges essentially duplicating historical information.

Michael Andres, Senior Ecologist with Dames & Moore, Park Ridge, Illinois, testified on behalf of NSC and CIWC that the proposed adjusted standard would involve minimal environmental impact on Deer Creek. He testified as follows:

> My involvement with this matter began when NSC and CIWC, in connection with their original variance petition, asked Dames & Moore to conduct various stream studies on the Deer Creek area. After these studies were completed, we found that TDS levels in Deer Creek could exceed 3,000 mg/l, without causing undue stress to the aquatic life. The effluent and water quality data presented in NSC's and

CIWC's current Petition for Adjusted Standards clearly demonstrated that the TDS levels in Deer Creek are far below that level. Therefore, it is our opinion that the requested adjusted standards will not have adverse environmental effects upon aquatic life in the affected stream reach.

Dames & Moore has also investigated the potential impact of elevated TDS levels on irrigation and shallow wells near Deer Creek. ...we found that the induced recharge from Deer Creek and the resultant increase in TDS levels would have only a minor impact on the overall water quality in the regional aquifer. Moreover, that impact is well within the natural range of variability...At NSC's request, Dames & Moore recently reexamined this 1986 report, and confirmed these conclusions.

I have reviewed a water quality study prepared by Alpha Consultants, Ltd., dated October 17, 1986,...which is Attachment L to the petition. Of particular note are Alpha's findings that the TDS, chloride and sulfate mass loadings from NSC to the CIWC treatment plant were well within the variance limits, and the concentrations of those constituents in Deer Creek are well within the historical range of concentrations recorded since the early 1970's. Given these facts, I agree with Alpha Consultants' recommendation that the current environmental impact on Deer Creek water quality from NutraSweet operation is insignificant, and does not justify major capital expenditure...

...Dames & Moore conducted a field investigation of irrigation practices using water from Deer Creek...which is Attachment K to the petition...only two parcels of land were found to have been irrigated during 1983 and 1984. Moreover, on neither parcel did irrigation occur on more than 15 days per year. No one reported any problems...

This irrigation investigation was updated in a follow-up study...in November 1989. That study is Attachment P to the petition. At that time, no agricultural land in the Deer Creek area was being irrigated with Deer Creek water...We specifically found that, based on water balance calculations, Deer Creek meets water quality requirements for supplemental irrigation to sustain crop yield potential.

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(B)ased upon the potential use of Deer Creek for supplemental irrigation water, there will be no adverse impact on crops if the adjusted standards requested by NSC and CIWC are granted.

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As part of its November 1989 investigation on TDS levels in Deer Creek, Dames & Moore conducted a study to determine the stream reach which may be subject to excursions of the 1000 mg/l TDS water quality standard if CIWC is allowed to continue discharging at present levels...

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Based on this effort, the TDS load due to the CIWC discharge was predicted to be insignificant at the Thorne Creek USGS gaging station, 15 miles downstream of CIWC's discharge.

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...NSC and CIWC do not significantly contribute to any exceedances of the 1,000 mg/l TDS standard downstream of the USGS gaging station on Thorne Creek.

Mr. Ander summarized his conclusions with the following statements:

I do not believe that the granting of this adjusted standard will impair any present or potential beneficial use of Deer Creek for a number of reasons. One reason is that the raw water supplied to NSC from CIWC contains high concentrations of TDS (800-1,000 mg/l) which are naturally occurring pollutants. Second, Deer Creek is an intermittent stream above the CIWC treatment plant. Without the effluent volume entering the stream, Deer Creek would probably be intermittent for most of its length. The effluent water, therefore, provides the necessary streamflow to keep Deer Creek flowing year round and to provide the habitat that is available. Finally, Deer Creek is a very small stream, and as such, the diversity of potential uses is limited due to the limited amount of water and habitat available. Deer Creek is naturally intermittent for much of its length, and much

> of the biota is present by virtue of the discharge from the CIWC plant maintaining flows in the Creek.
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> (T)here will be little or no adverse environmental and health impact from NSC's and CIWC's discharges if the Board grants the requested adjusted standards. Further, the Board's granting of the relief requested will not impair any present or potential beneficial uses of the applicable stream segment.
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> Tr. Exhibit 2.

Consistency with Federal Law

The Agency has stated that the Clean Water Act, 33 U.S.C. 1251 et seq., and federal regulations at 40 CFR 131.3 require that the water quality standard for TDS for the affected water be changed. In such a circumstance federal review is required pursuant to Section 303(c) of the Clean Water Act and 40 CFR 131.5. The Agency has contacted USEPA in connection with satisfying federal requirements of the Clean Water Act and 40 CFR 131. See Agency Motion of August 8, 1989. See also Agency Response of August 29, 1989 at pp. 8-9. The Agency asserts that if relief is to be granted, federal regulations require the Board to adjust the water quality standard and not merely grant relief from 35 Ill. Adm. Code 304.105.

At hearing the Agency indicated that a response from USEPA has not been received, but that federal approval will require 1) a water quality standard, protective of stream uses and 2) a TDS effluent standard to be imposed upon CIWC.

Petitioners have indicated that relief may be granted consistent with federal law. The Board finds that the Agency and the Petitioners have provided an adequate basis for the Board's concluding that the adjusted standard may be granted consistent with federal law.

Conclusion

Based on the information before it, the Board finds that NSC and CIWC have provided adequate proof of economic unreasonableness, technical infeasibility, negligible environmental impact and the factors found in Section 28.1(c)1-4 of the Act to support the conclusion that the water quality standard for TDS found at 35 Ill. Adm. Code 302.208 should be adjusted for the receiving stream and that an adjusted standard from 35 Ill. Adm. Code 304.105 should be granted to allow an effluent discharge of up to 2100 mg/l of TDS.

This Opinion constitutes the Board's findings of fact and

conclusions of law in this matter.

ORDER

Pursuant to the authority of Section 28.1 of the Environmental Protection Act, the Board hereby adopts the following adjusted standard. This standard becomes effective on the date of this order.

1) The water quality standard for total dissolved solids shall be 2,100 mg/l for that portion of Deer Creek between the point of discharge from the facility of Consumers Illinois Water Company in University Park, Illinois and the confluence of Deer Creek with Thorne Creek, and for that portion of Thorne Creek between the confluence of Thorne Creek with Deer Creek and the USGS gaging station located on Thorne Creek approximately fifteen miles downstream of the point of discharge from the above-mentioned facility. The water quality standard for total dissolved solids found at 35 Ill. Adm. Code 302.208 shall not apply.

2) The requirements of 35 Ill. Adm. Code 304.105, as that section relates to the water quality standard for total dissolved solids of 35 Ill. Adm. Code 302.208, shall not apply to the effluent discharges from the facilities of Consumers Illinois Water Company and The Nutrasweet Company located in University Park, Illinois, so long as the total dissolved solids concentration in the effluent discharges from Consumers Illinois Water Company does not exceed a maximum daily composite concentration of 2,100 mg/l and a monthly average composite concentration of 1,675 mg/l and the discharge from The Nutrasweet Company to Consumers Illinois Water Company does not exceed 11,100 kg/day as a maximum daily composite and 6,000 kg/day as a monthly average.

3) The above adjusted standards granted to Consumers Illinois Water Company and The Nutrasweet Company shall be conditioned upon the revision of the Petitioners' National Pollutant Discharge Elimination System ("NPDES") permits consistent with these adjusted standards, including such load limits and monitoring requirements as proposed by the Agency in this proceeding. Consumers Illinois Water Company and The NutraSweet Company shall perform all monitoring requirments for the discharge of total dissolved solids and monitoring of the water quality in Deer Creek and Thorne Creek as may be required pursuant to their NPDES permits.

Section 41 of the Illinois Environmental Protection Act, Ill. Rev. Stat. 1989, ch. 111 1/2 , par. 1041, provides for appeal of final orders of the Board within 35 days. The Rules of the Supreme Court of Illinois establish filing requirements.

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 28th day of February, 1991, by a vote of 6-0.

Dorothy M. Gunn

Dorothy M. Gunn, Clerk
Illinois Pollution Control Board