

ILLINOIS POLLUTION CONTROL BOARD  
January 10, 2002

IN THE MATTER OF: )  
)  
PETITION OF RHODIA, INC., THORN ) AS 01-9  
CREEK BASIN SANITARY DISTRICT, ) (Adjusted Standard – Water)  
TAKASAGO CORPORATION (U.S.A.) and )  
CONSUMERS ILLINOIS WATER )  
COMPANY FOR AN ADJUSTED )  
STANDARD FROM 35 ILL. ADM. CODE )  
302.208 AND 304.105 )

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

This matter comes before the Board on a Petition for Adjusted Standard filed on April 30, 2001 by Rhodia, Inc. (Rhodia) and the Thorn Creek Basin Sanitary District (TCBSD) for the proposed expansion of Rhodia's silica manufacturing plant in Chicago Heights, Cook County. On August 27, 2001, Rhodia and TCBSD filed an "Amended Petition for Adjusted Standard" (Am. Pet.). In the amended petition, Rhodia requests that the Board adopt an adjusted standard from Sections 302.208 and 304.105 of the Board's rules (35 Ill. Adm. Code 302.208, 304.105) as they relate to the discharge of sulfate and total dissolved solids (TDS). The adjusted standard is requested for discharges from TCBSD's treatment plant to Thorn Creek and the Little Calumet River. Am. Pet at 1.

The Board's responsibility in this matter arises from the Environmental Protection Act (Act) (415 ILCS 5/1 *et seq.* (2000)). The Board is charged to "determine, define and implement the environmental control standards applicable in the State of Illinois" (415 ILCS 5/5(b) (2000)) and to "grant . . . an adjusted standard for persons who can justify such an adjustment" (415 ILCS 5/28.1(a) (2000)).

Petitioners have waived hearing in this matter. Am. Pet. at 30. No other person has requested a hearing, and accordingly none has been held.

For the reasons outlined below, the Board finds that petitioners have met the requirements for an adjusted standard and grants petitioners relief from Section 304.105 of the Board's regulations. The Board finds that petitioners' request for relief from Section 302.208 of the Board's regulations is unnecessary.

**BACKGROUND**

The Rhodia Chicago Heights facility has been in operation since 1902 under various owners. Rhône-Poulenc Basic Chemicals, Inc. became the owner in December 1987 and the name was changed to Rhône-Poulenc Basic Chemicals Co. in September 1989. In 1998, the name of the company changed to Rhodia, Inc.

Rhodia and TCBSD sought relief from the same Board regulations in an adjusted standard proceeding seven years ago. At that time, the Rhodia was known as the Rhône-Poulenc Basic Chemicals Co. *In re* Petition of Rhône-Poulenc Basic Chemicals Company and TCBSD, AS 94-7 (June 23, 1994, and Aug. 11, 1994). In docket AS 94-7, the Board approved an adjusted standard allowing petitioners to increase loadings of sulfate and TDS into Thorn Creek and the Little Calumet River. *Id.* In this docket, petitioners again seek to increase loading of sulfate and TDS from the levels that the Board approved in 1994. Am. Pet at 5.

In a related matter, the Board has allowed increased loadings of TDS in Deer Creek and part of Thorn Creek. *In re* NutraSweet Company and Consumers Illinois Water Company, AS 89-3 (Feb. 28, 1991). The NutraSweet Company (NutraSweet) facility in University Park which was at issue in AS 89-3 is now owned by Takasago Corporation (U.S.A) (Takasago). Takasago recently petitioned for another adjusted standard, but the Board deemed the request for relief unnecessary and did not grant the petition. *In re* Takasago Corporation (U.S.A.), AS 00-4 (Apr. 20, 2000).

### **PROCEDURAL HISTORY**

After the April 30, 2001 initial petition, petitioners filed a certificate of publication on May 4, 2001 showing that the petition was published in the *Star* newspapers on May 3, 2001.<sup>1</sup> On June 7, 2001, the Board issued an order directing petitioners to publish a new notice because the May 3 notice stated that petitioners were seeking relief from 35 Ill. Adm. Code 302.209 and 304.104. On June 20, 2001, petitioners filed a certificate of publication with the Board showing the corrected notice published in the *Star* newspapers on June 14, 2001.

On July 26, 2001, the Board issued an order in which it determined that there were certain informational deficiencies in the April 30 petition. Those deficiencies included topics such as the impact of docket AS 89-3, water pollution control equipment at Rhodia's facility, characterization of Total Maximum Daily Load limits, economic hardship, loading measurements, impacts on the Calumet Filtering Plant, the Illinois Environmental Protection Agency's (Agency) Targeted Watershed Approach Report, and Ecosystem Partnership Areas. Petitioners filed an August 27, 2001 amended petition addressing the deficiencies from the Board's July 26 order. Petitioners also included a request for trade secret determination regarding Rhodia's production costs, market prices, and market share for its silica finished product.

On September 20, 2001, the Board determined that the information in the amended petition was a trade secret. In that order, the Board also determined that any potential relief that it may provide in this docket may affect Takasago and Consumers Illinois Water Company

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<sup>1</sup> The *Star* publishes newspapers in the suburbs south of Chicago including editions for Chicago Heights, Hazel Crest-Country Club Hills, Homewood-Flossmoor, Matteson-Richton Park, Park Forest, and Crete-University Park.

(CIWC). As a result, the Board added Takasago and CIWC as petitioners.<sup>2</sup> The Board also extended the deadline for the Agency to file its recommendation.

The Agency timely filed its recommendation on November 30, 2001, and recommended that the Board grant petitioners the requested relief in this matter with respect to 35 Ill. Adm. Code 302.208 but not 35 Ill. Adm. Code 304.105. Rec. at 1, 11. On December 4, 2001, CIWC filed a statement in support of the relief requested by Rhodia and Thorn Creek. The Board did not receive any pleadings from Takasago.

On November 30, 2001, the Agency filed its recommendation (Rec.) to the Amended Petition. The Agency recommended that the Board grant an adjusted standard from Section 302.208 of the Board's regulations but determined that the requested adjusted standard from Section 304.105 was unnecessary. Rec. at 1.

On December 4, 2001, CIWC filed a statement in support of the relief that Rhodia and TCBSD are seeking. On December 5, 2001, petitioners filed a motion for expedited review with the Board that the Board granted in a December 20, 2001 order.

## **NATURE OF THE FACILITIES, DISCHARGES, AND RECEIVING STREAMS**

### **Rhodia**

Rhodia owns and operates a facility located at 1101 Arnold Street in Chicago Heights. The facility employs 279 people. At the facility, Rhodia manufactures inorganic phosphate chemicals which are primarily used in food. Rhodia also manufactures multiple grades of precipitated silica at the facility. The precipitated silica product is used in tires and toothpaste. Rhodia is proposing to expand its Chicago Heights silica plant. Am. Pet at 2, 5, 6.

Rhodia neutralizes sodium silicate solution with sulfuric acid in agitated reactors to produce precipitated silica. Silica is removed from the solution by filtration. The filtrate (4% dissolved sodium sulfate) is sent to the mother liquor tank. The filter cake is washed with water and squeezed to remove residual sodium sulfate. The filtrate is then sent to a 20,000 gallon equalization tank. The TDS concentration in these streams declines by the end of each filtration cycle, and Rhodia discharges a monthly average of 82,000 lbs./day TDS. Am. Pet. at 6-7, att. E (table 2-3) and at exh. 1 (2-8 – 2-10).

Rhodia has proposed expanding its Chicago Heights silica plant because it is located close to both the raw materials and the receiving market. The proposed expansion will increase annual discharges of TDS by 65%. Am. Pet at 6.

A comparison of the discharges from the current silica plant and the projected discharges once the expansion is complete are as follows:

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<sup>2</sup> Although the Board added Takasago and CIWC as petitioners, there is very little in the current record about Takasago and CIWC. From this point forward, unless the Board specifically mentions Takasago or CIWC, its use of the term "petitioners" shall only include Rhodia and TCBSD.

<u>Parameter</u>	<u>Annual Average</u>	<u>Monthly Average</u>	<u>Daily Maximum</u>
<u>Existing plant discharge</u>			
Flow, gallons per day:	590,000	620,000	760,000
Sulfate, lbs. per day:	43,500	50,000	103,640
TDS, lbs. per day:	66,000	82,000	146,853
<u>Discharge after proposed expansion</u>			
Flow, gallons per day:	840,000 to 940,000	1,100,000	1,100,000
Sulfate, lbs. per day:	92,750	97,500	102,638
TDS, lbs. per day:	137,375	144,200	151,725

Am. Pet. at 7, att. E (table 2-3).

### **TCBSD**

The discharge from Rhodia's facility, including the discharge from the proposed silica plant expansion, is sent to TCBSD's wastewater treatment plant (WWTP) in Chicago Heights. Am. Pet. at 2. TCBSD is the principal discharger to Thorn Creek. Industrial users such as Rhodia contribute high levels of TDS to TCBSD that passes through the treatment process unaltered. Rec. at 6.

TCBSD's WWTP was built in 1933, has been expanded since then, and represents a \$40 million investment. It has been cited as an exemplary treatment plant by both the Agency and the Central States Water Pollution Control Association. It provides wastewater treatment for approximately 31,000 residential connections in the south suburbs of Chicago. It also provides treatment for 861 industrial and commercial users. In 1999 these users accounted for 29% of the WWTP's influent flow rate and included Ford Motor Company, Calumet Industries, Chicago Heights Steel, Rohm & Haas, and Alpharma. Rhodia is the principal industrial discharger. The WWTP employs 39 people, including 6 part-time employees. Am. Pet. at 7, 8; Rec. at 6.

The WWTP has a design average flow of 15.9 million gallons per day (mgd) and design maximum flow of 40.25 mgd. Incoming wastewater passes through bar screens and is then pumped to the surface through grit chambers followed by primary sedimentation. The wastewater then flows through a conventional plug-flow activated sludge process. It then undergoes second-stage biological aeration process. The wastewater is sent to tertiary clarifiers for nitrification. It is then filtered, and seasonal chlorination is added which is followed by post aeration and seasonal dechlorination. The effluent is then discharged to Thorn Creek. Excess flow is diverted to excess flow clarifiers which is then recombined with the complete treatment effluent. Am. Pet. at 7-8 and at exh. 1 (2-5 - 2-6, fig. 2-3).

TCBSD's discharge is permitted pursuant to National Pollution Discharge Elimination System (NPDES) permit No. IL 0027723, issued on September 29, 1995, and modified on September 4, 1996. The permit expired on September 30, 2000 but is currently being renewed. Rec. at 3. The Agency states that if the Board grants petitioners' requested relief, the Agency will submit the adjusted standard to the United States Environmental Protection Agency (USEPA) for approval and incorporate the adjusted standard into TCBSD's NPDES permit. Rec. at 4, 10.

### **Thorn Creek**

Thorn Creek extends 19.5 miles from its headwaters to its confluence with the Little Calumet River. The TCBSD outfall is 10.1 miles upstream from the confluence with the Little Calumet River, the confluence with Deer Creek is 8.1 miles upstream, and the United States Geologic Survey (USGS) Gauging Station at Thornton is 4.2 miles upstream. Am. Pet. at exh. 1 (2-3, 2-5).

### **Little Calumet River**

The Little Calumet River begins in Indiana and flows into Illinois where it merges with Thorn Creek and then with the Calumet-Sag Channel. The distance on the Little Calumet River between the Thorn Creek confluence and the Calumet-Sag Channel is 8.8 miles. Am. Pet. at exh. 1 (2-12).

### **STANDARD AND PROPOSED LANGUAGE OF ADJUSTED STANDARD**

The water quality limits for sulfate and TDS are at Section 302.208 of the Board's regulations. Petitioners request an adjusted standard from the water quality standards at Section 302.208 of the Board's regulations (35 Ill. Adm. Code 302.208). This Section provides:

- g) Concentrations of the following chemical constituents shall not be exceeded except in waters for which mixing is allowed pursuant to Section 302.102.

<u>Constituent</u>	<u>Unit</u>	<u>STORET Number</u>	<u>Standard</u>
		***	
Sulfate	mg/L	00945	500.
		***	
TDS	mg/L	70300	1,000.

where mg/L = milligram per liter

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."

In docket AS 89-3, the Board set new limits for loadings in Deer Creek and in Thorn Creek. The relief provided in docket AS 89-3 that affects Thorn Creek is relevant in the matter now before the Board. Specifically, the Board set a new water quality standard for TDS of 2,100 mg/L in Thorn Creek between the confluence with Deer Creek and USGS Gauging Station 05536275. The Board determined that the TDS water quality standards at 35 Ill. Adm. Code 302.208 did not apply to this stretch of Thorn Creek. The Board also determined that the TDS effluent standard at 35 Ill. Adm. Code 304.105 did not apply to effluent from NutraSweet and CIWC so long as the TDS in the effluent from CIWC did not exceed a maximum daily composite concentration of 2,100 mg/L and a monthly average composite concentration of 1,675 mg/L. The Board also limited discharges from NutraSweet to CIWC to 11,000 kg/day as a maximum daily composite and 6,000 kg/day as a monthly average. *In re NutraSweet Company and Consumers Illinois Water Company*, AS 89-3 (Feb. 28, 1991), slip op. at 11.

In docket AS 94-7, the Board granted the relief to petitioners such that “35 Ill. Adm. Code 304.105 does not apply to discharges from TCBSD’s wastewater treatment plant located at mile 10.1 of Thorn Creek as regards TDS or sulfate provided that TCBSD’s discharges do not cause or contribute to TDS or sulfate instream concentrations that are greater than” the following:

<u>Reach</u>	<u>Sulfate limit in mg/L</u>	<u>TDS limit in mg/L</u>
Thorn Creek from the TCBSD discharge to USGS Gauging Station 05536275 at Thornton	1,000	2,100
Thorn Creek from USGS Gauging Station 05536275 to Thorn Creek’s confluence with the Little Calumet River	850	1,900
Little Calumet River from the Thorn Creek confluence to the Calumet-Sag Channel	750	1,700

*In re* Petition of Rhône-Poulenc Basic Chemicals Company and TCBSD, AS 94-7 (Aug. 11, 1994), slip op. at 2.

The TDS limit in dockets AS 89-3 and AS 94-7 for the portion of Thorn Creek between the Deer Creek confluence and USGS Gauging Station 05536275 is the same – 2,100 mg/L – even though the relief in docket AS 89-3 was from Sections 302.208 and 304.105 of the Board’s regulations while the relief in docket AS 94-7 was only from Section 304.105.

In this case, petitioners propose the following: (Note that Reach 1 and 2 below correspond to the first row above, Reach 3 below corresponds to the second row above, and Reach 4 below corresponds to the third row above. Any further mentions of reaches will refer to those listed below.)

<u>Reach</u>	<u>Sulfate limit in mg/L</u>	<u>TDS limit in mg/L</u>
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Reach 1: Thorn Creek from the TCBSD WWTP discharge to the confluence with Deer Creek	1,350	2,650
Reach 2: Thorn Creek from the confluence with Deer Creek to USGS Gauging Station 05536275 at Thornton	1,340	2,620
Reach 3: Thorn Creek from USGS Gauging Station 05536275 to Thorn Creek's confluence with the Little Calumet River	1,160	2,360
Reach 4: Little Calumet River from the Thorn Creek confluence to the Calumet-Sag Channel	1,000	2,020

Am. Pet at 3-4, 8, 14-15.

The exact language of petitioners' proposed adjusted standard is:

- (1) The water quality standard for TDS shall be 2,650 mg/L for that portion of Thorn Creek between TCBSD's discharge point and Thorn Creek's confluence with Deer Creek. The existing adjusted standard which already exists for this portion of Thorn Creek of 2,100 mg/L TDS shall be modified to the new adjusted standard. The water quality standard for TDS found at 35 Ill. Adm. Code 302.208 shall not apply to this portion of Thorn Creek.
- (2) The water quality standard for TDS shall be 2,620 mg/L for that portion of Thorn Creek between its merger with Deer Creek and the USGS Gauging Station 05536275 in Thornton. The existing adjusted standard, which already exists for this portion of Thorn Creek of 1900 mg/L TDS shall be modified to the new adjusted standard. The water quality standard for TDS found at 35 Ill. Adm. Code 302.208 shall not apply to this portion of Thorn Creek.
- (3) The water quality standard for TDS shall be 2,360 mg/L for that portion of Thorn Creek between the USGS Gauging Station 05536275 in Thornton and Thorn Creek's confluence with the Little Calumet River. The existing adjusted standard, which already exists for this portion of Thorn Creek of 1,900 mg/L TDS shall be modified to the new adjusted standard. The water quality standard for TDS found at 35 Ill. Adm. Code 302.2008 shall not apply to this portion of Thorn Creek.
- (4) The water quality standard for TDS for that portion of the Little Calumet River from the confluence with Thorn Creek to the Calumet-Sag Channel shall be 2,020 mg/L. The existing adjusted standard, which already exists for this portion of the Little Calumet River of 1,700 mg/L TDS shall be

modified to the new adjusted standard. The water quality standard for TDS found at 35 Ill. Adm. Code 302.208 shall not apply to this portion of the Little Calumet River.

- (5) The water quality standard for sulfate(s) shall be 1,350 mg/L for that portion of Thorn Creek between TCBSD's discharge point and Thorn Creek's confluence with Deer Creek. The existing adjusted standard, which already exists for this portion of Thorn Creek of 1,000 mg/L sulfate(s) shall be modified to the new adjusted standard. The water quality standard for sulfate(s) found at 35 Ill. Adm. Code 302.208 shall not apply to this portion of Thorn Creek.
- (6) The water quality standard for sulfate(s) shall be 1,340 mg/L for that portion of Thorn Creek between Thorn Creek's confluence with Deer Creek and the USGS Gauging Station 05536275 in Thornton. The existing adjusted standard, which already exists for this portion of Thorn Creek of 1,000 mg/L sulfate(s) shall be modified to the new adjusted standard. The water quality standard for sulfate(s) found at 35 Ill. Adm. Code 302.208 shall not apply to this portion of Thorn Creek.
- (7) The water quality standard for sulfate(s) shall be 1,160 mg/L for that portion of Thorn Creek from the USGS Gauging Station 05536275 in Thornton to Thorn Creek's confluence with the Little Calumet River. The existing adjusted standard, which already exists for this portion of Thorn Creek of 850 mg/L sulfate(s) shall be modified to the new adjusted standard. The water quality standard for sulfate(s) found at 35 Ill. Adm. Code 302.208 shall not apply to this portion of Thorn Creek.
- (8) The water quality standard for sulfate(s) for that portion of the Little Calumet River from the confluence of Thorn Creek with the Calumet-Sag Channel shall be 1,000 mg/L. The existing adjusted standard, which already exists for this portion of the Little Calumet River of 750 mg/L sulfate(s) shall be modified to the new adjusted standard. The water quality standard for sulfate(s) found at 35 Ill. Adm. Code 302.208 shall not apply to this portion of the Little Calumet River.
- (9) The requirements of 35 Ill. Adm. Code 304.105, as that section relates to the water quality standards for TDS and sulfate(s) of 35 Ill. Adm. Code 302.208, shall not apply to the effluent discharges from the facilities of Rhodia and the Thorn Creek Basin Sanitary District, provided that the water quality standards established in this adjusted standard are met. Am. Pet. at 15-16.

#### **ADJUSTED STANDARD PROCEDURE**



In both a general rulemaking and a site-specific rulemaking, the Board is required to take the following factors into consideration: the existing physical conditions, the character of the area involved, including the character of the surrounding land uses, zoning classifications, the nature of the receiving body of water, and the technical reasonability and economic reasonableness of measuring or reducing a particular type of pollution. 415 ILCS 5/27(a) (2000). The general procedures that govern an adjusted standard proceeding are found at Section 28.1 of the Act and the Board's procedural rules at 35 Ill. Adm. Code 104 Subpart D. Section 28.1 also requires that the adjusted standard procedure be consistent with Section 27(a).

Petitioners seek an adjusted standard from regulations of general applicability. These regulations do not specify a level of justification that is required for a petition to qualify for an adjusted standard. In determining whether an adjusted standard should be granted from a regulation of general applicability where no level of justification is specified, the Board must consider, and petitioners have the burden to prove, the factors at Section 28.1(c) of the Act (415 ILCS 5/28.1(c) (2000)):

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;
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.

In granting an adjusted standard, the Board may impose conditions that may be necessary to accomplish the purposes of the Act. 415 ILCS 5/28.1(a) (2000).

## **DISCUSSION**

Petitioners are requesting relief from both Sections 302.208 and 304.105 of the Board's regulations. The Agency recommended that the Board grant petitioners an adjusted standard from Section 302.208, but deny an adjusted standard from Section 304.105. The Agency states that providing petitioners relief from Section 304.105 is unnecessary if the Board provides relief from Section 302.208. Rec. at 1, 11. For the reasons outlined below, the Board finds that, consistent with Board precedent, the better and more accurate course is to grant petitioners relief from Section 304.105 as opposed to Section 302.208.

### **Adjusted Standard from Section 304.105 as Opposed to Section 302.208**

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." In

other words, Section 304.105 applies the requirements from Section 302.208 to dischargers such as the petitioners unless an adjusted standard is granted.

In AS 89-3, the Board granted NutraSweet and CIWC relief from both Sections 302.208 and 304.105 of the Board's regulations. *In re NutraSweet Company and Consumers Illinois Water Company*, AS 89-3 (Feb. 28, 1991), slip op. at 11.

The Board then began to structure relief differently in those dockets where petitioners had requested relief from Sections 302.208 or those dockets where petitioners, such as the petitioners herein, requested relief from both Sections 302.208 and 304.105. The Board granted relief from Section 304.105 only in two 1994 dockets. See *In re Rhône-Poulenc Basic Chemicals Company, Thorn Creek Basin Sanitary District*, AS 94-7 (June 23, 1994), slip op. at 18-19 and *In re City of Springfield, Office of Public Utilities*, AS 94-9 (Dec. 1, 1994), slip op. at 10-11. The Board held that "the relief that is being asked of the Board [from Section 302.208] could have the effect of giving other dischargers located on these streams the same relief given to Rhône-Poulenc and TCBSD, even though other dischargers have not made (and may well not be able to make) the same demonstrations." *Rhône-Poulenc*, slip op. at 19.

The Board will apply the rationale from *Rhône-Poulenc* herein. Provided that petitioners meet the requirements of Section 28.1(c) of the Act, the adjusted standard will be granted from Section 304.105 and will be provided only up to the concentration limits proposed by petitioners.

The Board declines, in this case, to grant petitioners an adjusted standard from Section 302.208 since such relief is unnecessary. There are no practical consequences for petitioners in providing an adjusted standard pursuant to Section 304.105 as opposed to Section 302.208. Provided that petitioners can prove an adjusted standard from Section 304.105, petitioners will be exempt from causing or contributing to water quality violations up to the proposed concentration limits in the instant petition. See *Rhône-Poulenc* (June 23, 1994), slip op. at 19.

The Board distinguishes the relief provided in this docket from the relief that it provided in *Abbott Laboratories* in 1999. Originally the Board followed its rationale from *Rhône-Poulenc* in granting Abbott Laboratories (Abbott) an adjusted standard from Section 304.105 and not Section 302.208. However, upon reviewing a motion for reconsideration from the Agency, the Board reversed itself and granted Abbott an adjusted standard from Section 302.208 and not 304.105. The Board explained its reversal, noting that Abbott was the only NPDES-permitted discharger along the river at issue there. It followed that no other discharger would be entitled to the relief that the Board was providing Abbott. *In re Abbott Laboratories*, AS 99-5 (May 6, 1999, and July 8, 1999).

### **Zoning**

Petitioners state that the area in which Rhodia is located is zoned industrial. Am. Pet at 27.

### **Technical Feasibility and Economic Reasonableness**

Sodium sulfate, a basic salt, is the material that is at the heart of petitioner's adjusted standard request. Treatment is difficult because water must be removed from sodium sulfate – sodium sulfate cannot be precipitated out of water. Rec. at 7.

TCBSD cannot remove sodium sulfate with its biological treatment processes. Consequently, petitioners primarily examined treatment processes that could be performed at the Rhodia facility. Rec. at 7.

Petitioners state that in order to comply with either the regulations of general applicability or the adjusted standard that the Board provided in docket AS 94-7, Rhodia would have to install a pretreatment system to remove sodium sulfate. Such treatment requires concentration of the salts into a smaller stream followed by disposal off-site or reuse of the concentrated salts. Petitioners state that while sulfate removal processes are technically feasible, the costs of these processes would make Rhodia a non-competitive producer of its finished silica. Am. Pet at 9-10, 13, 27; Rec. at 7-8.

### **Rhodia's Treatment Options**

Rhodia considered the following technologies for pretreatment:

**Electrodialysis.** Rhodia's vendors said that various forms of electrodialysis have almost never been a practical means to reduce sulfate. Among other problems, the plant is not capable of producing the steam required for the process. In addition, electrodialysis does not reduce TDS in effluent. Rhodia did not give this alternative further consideration. Am. Pet. at 10.

**Biological Sulfate Ion Reduction to Elemental Sulfur.** Rhodia found that this process was not practical because it employs an organic compound and air to create carbonate ions that replace sulfate ions. There is sulfate reduction, but it has no effect on TDS in the effluent. Again, Rhodia did not give this alternative further consideration. Am. Pet. at 10.

**Falling Film Evaporation with Mechanical Vapor Recompression (MVR).** The sodium sulfate in the process liquor is concentrated and subsequently crystallized by using a single falling film evaporator. The feed is pumped to the top of the evaporator and then falls through steam-heated tubes. The feed stream is concentrated to the point where it can be cooled to precipitate sodium sulfate crystals in a forced feed crystallizer. Water vapor from the evaporator and the crystallizer is compressed and sent to the shell side of the falling film tubes to be used as heating steam. The crystallization outlet stream is sent to a centrifuge and then the resulting cake is sent to a dryer. This process produces a dry sodium sulfate from a dilute aqueous solution. Energy use is efficient in this process and the plant would not require a new boiler. Am. Pet at 11, att. A.

A dry sodium sulfate stream is a byproduct of this process and it has some resale value. Petitioners did not include the resale value in their cost summaries. Am. Pet at 12.

Petitioners estimated that this alternative would require a capital cost of \$6 million and annual costs of \$915,000. Treatment costs now run about \$1.00 per 1,000 gallons of effluent

treated. Under this alternative, it would cost \$11.90 to treat 1,000 gallons of wastewater. This alternative would also add 6.2% to the production cost for the silica. Am. Pet. at 12-13, att. A.

**Reverse Osmosis Followed by Evaporation with MVR.** This technology also produces a dry sodium sulfate from a dilute aqueous solution by crystallizing sodium sulfate out of the process liquor. The evaporation, crystallization, centrifugation, and drying processes are similar to the previous alternative. There is also a dry sodium sulfate stream byproduct. A reverse osmosis unit is used for concentration that makes the process more energy efficient than the previous alternative. However, the reverse osmosis unit can let in little foreign material which means that magnesium/caustic pretreatment and high-tech filtration are required. Am. Pet. at 11, att. B.

Petitioners estimated that this alternative would require a capital cost of \$4 million and annual costs of \$600,000. Under this alternative, it would cost \$7.78 to treat 1,000 gallons of wastewater. This alternative would also add 3.8% to the production cost for the silica. Am. Pet. at 12-13

**Calcium Chloride Treatment.** This process involves treating the feed stream with lime for more effective crystallization and precipitation. The evaporation, crystallization, centrifugation, and drying are similar to falling film evaporation and reverse osmosis processes. Again, there is a dry sodium sulfate stream byproduct. Am. Pet at 12, att. C.

Petitioners estimated that this alternative would require a capital cost of \$4.2 million and annual costs of \$670,000. Under this alternative, it would cost \$8.70 to treat 1,000 gallons of wastewater. This alternative would also add 4.4% to the production cost for the silica. Am. Pet. at 12-13.

### **Overall Cost**

Petitioners claim that it is much more cost effective to remove sodium sulfate near the source, namely at the Rhodia plant. However, petitioners state that even pretreatment at Rhodia results in “significant cost penalties to Rhodia. Such significant cost penalties would result in a non-competitive price for its silica in an increasingly competitive market.” Am. Pet at 12-14.

The Board previously adopted an effluent standard of 3,500 mg/L for TDS but later repealed it because the treatment processes for TDS were very expensive, energy intensive, and produced dry salts which required disposal. See *In re Effluent Criteria*, R70-8, *In re Water Quality Standards*, R71-14, *In re Water Quality Standards Revisions for Interstate Waters (SWB 14)*, R71-20 (Jan. 6, 1972), slip op. at 19 (adoption); *In re Amendments to Chapter 3: Water Pollution (Effluent Standards)*, R76-21 (Sept. 24, 1981), slip op. at 32-33 (repeal).

### **Compliance with the Proposed Adjusted Standard**

In order to comply with the proposed adjusted standard, Rhodia would direct wastewater from its expanded facility to TCBSD for treatment. There is no capital cost since TCBSD

already has the capacity to handle the wastewater. Its operating costs (and annual costs) would be \$600,000 per year. Am. Pet. at 17.

### **Board's Conclusion**

The Board agrees with the Agency that petitioners explored all conceivable options. The Board also agrees with the Agency that none of the compliance options are technically feasible or economically reasonable. Rec. at 7, 8.

### **Existing Physical Conditions/Impact on the Environment**

Petitioners hired Huff & Huff to perform an environmental assessment of those reaches of Thorn Creek and the Little Calumet River that will be impacted by the proposed adjusted standard. Huff & Huff's assessment is dated November 2000. See Am. Pet. at exh. 1. Huff & Huff reviewed the existing Rhodia's proposed expansion, Rhodia's existing treatment process and the influent and effluent flows at TCBSD's WWTP. It reviewed the flows and water quality of both Thorn Creek and the Little Calumet River. Huff & Huff then modeled the projected water quality for sulfate and TDS for these streams factoring in the proposed expansion and adjusted standard. It then tested projected water quality to determine if it would result in any acute or chronic toxicity. Am. Pet. at 17 and at exh. 1 (7-1, 7-4, 7-10, 7-11, 7-15).

### **Water Quality**

The Agency classifies water bodies into designated use categories based on water quality conditions. Designated uses include use for public water supply, propagation of fish, recreational use, etc. Water quality conditions describe the degree to which a water body attains designated uses. Water quality is either good, fair, or poor. A "good" water body attains all designated uses, "fair" meets some designated uses, and "poor" meets no designated uses. Streams are also have three classifications – full, partial, and nonsupport. Am. Pet. at exh. 1 (6-5).

The Agency has monitored the Little Calumet River and has issued water quality reports. Huff & Huff reviewed reports issued at various times since 1988, including the Agency's 2000 Water Quality Report. In the 2000 report, the Agency rated Thorn Creek as partial support for overall use and aquatic life. Am. Pet. at exh. 1 (6-5 – 6-7).

Macroinvertebrate monitoring for Thorn Creek had been performed prior to docket AS 94-7, and one of the conditions from the AS 94-7 docket required the petitioners to perform monitoring. Huff & Huff provided a summary of a 1999 macroinvertebrate monitoring study and compared it to other monitoring studies from 1988, November 1992, and September 1997. Am. Pet. at exh. 1 (6-2, app. E).

The Macroinvertebrate Biotic Index (MBI) is used to evaluate macroinvertebrates and the Index of Biotic Integrity (IBI) is used to evaluate the fish community. Am. Pet. at 18. Sampling locations both upstream and downstream of the TCBSD discharge on Thorn Creek have similar average MBI values among the various studies reflecting "fair" stream conditions. The same is true for IBI scores which also reflect "fair" conditions upstream and downstream of the TCBSD

discharge. Such ratings indicated that both Thorn Creek and the Little Calumet River were limited aquatic resources. Am. Pet. at exh. 1 (6-11, 6-21, 6-28, 8-2).

The various monitoring studies show that neither the MBI nor the IBI values have “not significantly changed” since the increase in the TDS discharge after the Board approved the adjusted standard in docket AS 94-7. Am. Pet. at exh. 1 (6-28, 8-2).

### **Effect on Aquatic Life**

The compound of concern in Rhodia’s discharge is sodium sulfate. Toxicity values of sodium sulfate are used to gauge TDS toxicity and the sulfate component of sodium sulfate is used to gauge sulfate toxicity. Am. Pet. at exh. 1 (5-1). Huff & Huff estimated that there would be no impact on the current aquatic community (fish and macroinvertebrates) in Thorn Creek or the Little Calumet River based on a literature review and data from acute and chronic toxicity bioassays. Am. Pet. at 20-21, 27, exh. 1 (5-1 – 5-10). The bioassays employed Thorn Creek water collected downstream of TCBSD that were spiked with synthetic sodium sulfate or effluent from Rhodia. Tests were conducted on *Ceriodaphnia dubia* (water flea) and *Pimephales promelas* (flathead minnow). No toxicity was observed even at 103% of the highest sodium sulfate concentration anticipated once the Rhodia expansion is complete. Am. Pet. at exh. 1 (5-11 – 5-12, 8-3 app. D).

### **Future Improvement**

Huff & Huff concluded that there is little chance of future improvements in the aquatic community in Thorn Creek given its proximity to urban areas. Am. Pet. at 19 and at exh. 1 (8-2). The Agency did not comment on Huff & Huff’s conclusion in its current recommendation. However, in its current Targeted Watershed Approach, the Agency listed Thorn Creek as having the potential to be classified as a “Highly Valued Aquatic Resource” even though its current classification is a limited aquatic resource. See Targeted Watershed Area ILHBD04 (visited Jan. 7, 2002) <<http://www.epa.state.il.us/water/targeted-watershed/mwa2map.html>><sup>3</sup>. The Agency reached the same conclusion in docket AS 94-7, disagreeing with Huff & Huff’s conclusion that Thorn Creek had limited potential for improvement. See In re Rhône-Poulenc Basic Chemicals Company, Thorn Creek Basin Sanitary District, AS 94-7 (June 23, 1994), slip op. at 12.

### **Board’s Conclusion**

Huff & Huff concluded that the proposed adjusted standard will not result in any adverse impact on the aquatic community in Thorn Creek and the Little Calumet River. Am. Pet. at 19, 27 and at exh. 1 (8-4). The Agency agrees with the findings in the Huff & Huff report. The Board and the Agency agree that granting the adjusted standard for sulfate and TDS will have no

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<sup>3</sup> For information on Thorn Creek, point the mouse to map area “HBD04”.

measurable adverse effect on aquatic life in Thorn Creek and the Little Calumet River. Rec. at 10.

### **Substantially Different Factors**

The Board adopted the water quality criteria for sulfate and TDS in order to sufficiently protect aquatic life and public water supplies. See *In re Effluent Criteria*, R70-8, *In re Water Quality Standards*, R71-14, *In re Water Quality Standards Revisions for Interstate Waters (SWB 14)*, R71-20 (March 7, 1972), slip op. at 7, 8. As discussed above, the proposed adjusted standards for sulfate and TDS will be protective of aquatic life in Thorn Creek and the Little Calumet River. Petitioners state that neither Thorn Creek nor the Little Calumet River is used for as a public water supply. Communities downstream of the TCBSD outfall all receive their water supply from Lake Michigan. Am. Pet at 19-20, 21. Thus, the factors related to petitioners are substantially different than those that the Board was concerned with when it adopted the water quality criteria for sulfate and TDS.

### **Consistency with Federal Law**

States must adopt water quality standards that protect the designated uses of interstate and intrastate waters. 33 U.S.C. § 1313(c) (2000); 40 C.F.R. § 122.44 (2000). The Board has adopted the water quality standards at 35 Ill. Adm. Code 302.208. States may also revise water quality standards. 40 C.F.R. § 131.4 (2000). Standards adopted in compliance with the Board's adjusted standard procedure that do not adversely affect the designated use are consistent with federal law. As discussed above, the proposed adjusted standard will not adversely affect aquatic life in Thorn Creek or in the Little Calumet River. The proposed adjusted standard is therefore consistent with federal law.

Section 303(d) of the Federal Water Pollution Control Act (Clean Water Act) requires that states identify waters in which effluent limitations are not stringent enough to attain applicable water quality standards. 33 U.S.C. § 1313(d) (2000). Portions of both Thorn Creek and the Little Calumet River are on the 303(d) list. Portions of Thorn Creek at issue herein are listed as highly impaired for nutrients and pathogens, but only slightly impaired for salinity. Petitioners claim that the Huff & Huff report shows that Thorn Creek is not impaired. The Little Calumet River is on the 303(d) list as well. It is listed as highly or moderately impaired for several constituents. Specifically, the Little Calumet River from the Calumet-Sag Channel to the Calumet River is not listed as impaired for salinity, and upstream of the Thorn Creek confluence it is listed as only moderately impaired for salinity. Am. Pet. at 9, app. F.

Section 305(b) of the Clean Water Act mandates that each state must provide USEPA with a description of the water quality for all navigable waters. 33 U.S.C. § 1315(b) (2000). Petitioners report that all of the listed segments of Thorn Creek and the Little Calumet River showed some impairment for various constituents, but only Reaches 2 and 3 of Thorn Creek were impaired for sulfate or TDS. Am. Pet at 9.

The Board notes that petitioners do not provide the date of the 303(d) or the 305(b) report that they cited.

### **Justification for Adjusted Standard**

As there is no specific level of justification required for an adjusted standard from 35 Ill. Adm. Code 304.105, the Board will review the justification for the proposed adjusted standard by using the criteria at Sections 27(a) and 28.1(c) of the Act. The Board agrees with the Agency and petitioners that the nature of the streams receiving effluent from TCBSD, the lack of adverse environmental or health effects from the increased loadings, the high cost and unfeasibility of treating sulfate and TDS, the lack of an effective alternative treatment method, and the consistency with federal law justifies granting petitioners' proposed adjusted standard from Section 304.105 of the Board's regulations. Am. Pet. at 26; Rec. at. 9-10.

### **Effect of the Proposed Adjusted Standard on Other Dischargers**

#### **Takasago and CIWC**

In docket AS 89-3, the Board granted the NutraSweet facility (now Takasago) and CIWC relief such that the water quality standard for TDS in Deer Creek and Reach 2 in Thorn Creek was set at 2,100 mg/L. *In re NutraSweet Company and Consumers Illinois Water Company*, AS 89-3 (Feb. 28, 1991), slip op at 11. The relief that Rhodia and TCBSD are seeking in the instant adjusted standard will have no effect on Deer Creek. Rhodia and TCBSD are seeking an adjusted standard of 2,620 mg/L TDS for Reach 2 in Thorn Creek. Section 304.105 of the Board's regulations states that no effluent shall, alone or in combination with other sources, cause a violation of any applicable water quality standard. Under the relief that the Board will grant Rhodia and TCBSD herein, their effluent cannot cause an exceedance of 2,620 mg/L in Reach 2.

The Board added Takasago and CIWC as petitioners to this docket in its September 20, 2001 order because it found that "the relief that it may provide to Rhodia and TCBSD in Reach 2 may affect the Takasago facility and CIWC." CIWC subsequently submitted a statement (stmt.) in support of the relief that Rhodia and TCSB are seeking. CIWC said that the requested relief "is consistent with current and projected future discharges to Deer Creek by CIWC" and that it "accommodates projected future growth of the Deer Creek discharge," but CIWC did not request any further regulatory relief for its discharges to Deer Creek or Reach 2 of Thorn Creek. Stmt. at 1. Takasago did not submit any pleadings.

#### **Calumet Water Reclamation Plant**

In its July 26, 2001 order, the Board requested that petitioners describe the impact of the requested adjusted standard on the Calumet Water Reclamation Plant (CWRP). The Metropolitan Water Reclamation District will divert flows from Thorn Creek as part of its Thornton Quarry Water Retention Project. The project will divert floodwater from Thorn Creek to a reservoir and then to the CWRP before being discharged to the Little Calumet River downstream of Reach 4 on the Little Calumet River.

Petitioners state that the CWRP discharges into the Little Calumet River which is a secondary contact water with a TDS water quality standard of 1,500 mg/L. There is no secondary contact water quality standard for sulfate. Am. Pet. at 23.



Petitioners state that the sulfate or TDS at issue herein are dissolved. There will be no suspended solids loading concern for the CWRP. In addition, the CWRP's NPDES permit does not have effluent limits for sulfate or TDS. Am. Pet at 23. Petitioners also calculated that the diverted flows from Thorn Creek to the CWRP will not cause water quality violations in the Little Calumet River. Am. Pet. at 24.

### **Thorn Creek Ecosystem Partnership/Community Advisory Panel**

In its July 26, 2001 order the Board also requested that petitioners describe their involvement with the Thorn Creek Ecosystem Partnership (Partnership). The Partnership, as described by the Illinois Department of Natural Resources, is a cooperative process intended to merge natural resource stewardship with economic and recreational development. Petitioners indicated that the TCBSD was already a member of the Partnership. Rhodia joined the Partnership on August 10, 2001. Am. Pet. at 24-25.

Petitioners also stated that Rhodia and other Thorn Creek area industries created a Community Advisory Panel (CAP) in the spring of 1998 to address the need for community outreach and discussion within the Chicago Heights portion of Thorn Creek. Local businesses, the Partnership, and environmental groups also serve on the CAP. Rhodia has been active in the CAP for the past three years and presented its current adjusted standard petition to the CAP. Am. Pet. at 24-25.

### **Conditions on the Adjusted Standard**

In docket AS 94-7, both the Agency and the petitioners there agreed to several conditions on the adjusted standard. Those conditions included monthly average load limits, monitoring requirements, and that the adjusted standard be effective only so long as the new facility was operational. Neither the Agency nor the petitioners herein have agreed to any of the conditions from docket AS 94-7. Nevertheless, the Board will incorporate the condition that the relief provided here will only be effective only so long as Rhodia's expansion of the silica plant is operational. With respect to the other conditions from docket AS 94-7, TCBSD already monitors its effluent as a condition of its NPDES permit. The Board expects that there will be monitoring required in the new NPDES permit. The Agency monitors the water quality of Thorn Creek at the Thornton USGS station and also monitors the Little Calumet River. Should there be any violations of the NPDES permit or this adjusted standard, the Agency is able to initiate enforcement proceedings pursuant to Section 31 of the Act. See Am. Pet. at exh. 1 (3-1, 4-1, 6-23).

### **CONCLUSION**

The Board finds that petitioners have demonstrated that the factors surrounding petitioners' request for the adjusted standard from Section 304.105 of the Illinois Administrative Code are substantially and significantly different than the factors considered by the Board in adopting that rule. Further, due to the substantial costs associated with the compliance alternatives presented by petitioners, the Board is persuaded that the alternatives for compliance would be economically unreasonable and would not result in increased environmental protection. Therefore the Board will grant petitioners an adjusted standard from 35 Ill. Adm. Code 304.105.

The Board finds that it is unnecessary to grant petitioners an adjusted standard from the general use water quality standards at Section 302.208 of the Illinois Administrative Code.

This opinion constitutes the Board findings of fact and conclusions of law.

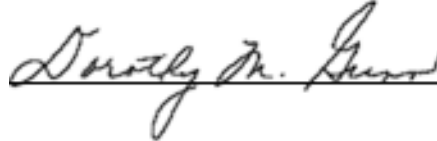
### **ORDER**

1. The Board hereby adopts the following adjusted standard, pursuant to the authority of Section 28.1 of the Environmental Protection Act.
2. The Board grants Rhodia, Inc. (Rhodia) and the Thorn Creek Basin Sanitary District (TCBSD) a partial adjusted standard from 35 Ill. Adm. Code 304.105. Pursuant to this grant, 35 Ill. Adm. Code 304.105 does not apply to effluent from TCBSD's wastewater treatment plant located at mile 10.1 of Thorn Creek for sulfate or Total Dissolved Solids (TDS) provided that this effluent does not cause or contribute to water quality concentrations that are greater than:
  - a. 2,650 mg/L for TDS and 1,350 mg/L for sulfate for that portion of Thorn Creek between TCBSD's discharge point and Thorn Creek's confluence with Deer Creek.
  - b. 2,620 mg/L for TDS and 1,340 mg/L for sulfate for that portion of Thorn Creek between its merger with Deer Creek and the USGS Gauging Station 05536275 in Thornton.
  - c. 2,360 mg/L for TDS and 1,160 mg/L for sulfate for that portion of Thorn Creek between the USGS Gauging Station 05536275 in Thornton and Thorn Creek's confluence with the Little Calumet River.
  - d. 2,020 mg/L for TDS and 1,000 mg/L for sulfate for that portion of the Little Calumet River from the confluence with Thorn Creek to the Calumet-Sag Channel.
3. The adjusted standard is effective when Rhodia commences operation of the expanded silica production plant at its Chicago Heights facility. Rhodia shall immediately notify the Agency of any production process changes or similar changes that eliminate the need for continued relief as provided herein. This adjusted standard terminates in the event that production process changes or other similar changes occur that eliminate the need for the relief provided herein.
4. Upon notification by the Agency that Rhodia and TCBSD are not complying with the conditions of this order, the Board will revoke this partial adjusted standard from 35 Ill. Adm. Code 304.105.

IT IS SO ORDERED.

Section 41(a) of the Environmental Protection Act provides that final Board orders may be appealed directly to the Illinois Appellate Court within 35 days after the Board serves the order. 415 ILCS 5/41(a) (2000); *see also* 35 Ill. Adm. Code 101.300(d)(2), 101.906, 102.706. Illinois Supreme Court Rule 335 establishes filing requirements that apply when the Illinois Appellate Court, by statute, directly reviews administrative orders. 172 Ill. 2d R. 335. The Board's procedural rules provide that motions for the Board to reconsider or modify its final orders may be filed with the Board within 35 days after the order is received. 35 Ill. Adm. Code 101.520; *see also* 35 Ill. Adm. Code 101.902, 102.700, 102.702.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, certify that the Board adopted the above opinion and order on January 10, 2002, by a vote of 6-0.

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

Dorothy M. Gunn, Clerk  
Illinois Pollution Control Board