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STATE OF ILLINOIS
Pollution Control Board

BEFORE THE POLLUTION CONTROL BOARD
OF THE STATE OF ILLINOIS

IN THE MATTER OF:	)	
	)	**AS01-9**
Petition of RHODIA, INC. and THORN CREEK	)	(Adjusted Standard - Water)
BASIN SANITARY DISTRICT for an Adjusted	)	
Standard from 35 Ill. Adm. Code	)	
302.208 and 304.105	)	

NOTICE OF FILING

TO: Clerk, Illinois Pollution Control Board
State of Illinois Center
100 West Randolph Street
Suite 11-500
Chicago, IL 60601

Illinois Environmental
Protection Agency
1021 N. Grand Avenue East
Springfield, IL 62794-9276

Illinois Department of Natural Resources
524 South Second Street
Springfield, IL 62701-1787

PLEASE TAKE NOTICE that on Monday, August 27, 2001, we filed the attached **Amended Petition for Adjusted Standard** with the Clerk of the Illinois Pollution Control Board, a copy of which is herewith served upon you.

Respectfully submitted,

RHODIA, INC. AND THORN CREEK
BASIN SANITARY DISTIRCT

By: _____
One of Its Attorneys

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STATE OF ILLINOIS)
)
COUNTY OF COOK)

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302.208 and 304.105	)	

AMENDED PETITION FOR ADJUSTED STANDARD

Rhodia, Inc. ("Rhodia") and the Thorn Creek Basin Sanitary District (TCBSD), by their attorneys, hereby petition the Board for an Adjusted Standard, pursuant to 35 Ill. Adm. Code 104.400 *et seq.* and Section 28.1 of the Illinois Environmental Protection Act (Act). Rhodia and TCBSD request that the Board grant an adjusted standard from 35 Ill. Adm. Code 302.208 and 35 Ill. Adm. Code 304.105 as they apply to the discharge of total dissolved solids and sulfates to TCBSD from Rhodia's proposed expansion of the silica plant at its Chicago Heights facility and to the discharge of total dissolved solids and sulfates from TCBSD's treatment plant to Thorn Creek and from Thorn Creek into the Little Calumet River.

By Order dated July 26, 2001, the Board requested certain specific additional information to be included in an amended petition. That information is included herein. This Amended Petition references the Exhibit 1 that was submitted with Rhodia's original Petition on April 30, 2001. Original and additional attachments to respond to the Board's Order are submitted with this Amended Petition.

Parties to the Proceedings

Rhodia owns and operates a plant at 1101 Arnold Street, Chicago Heights, Cook County, which manufactures inorganic phosphate chemicals primarily for food use and precipitated silica to be used in the tire and toothpaste markets. The plant currently has a wastewater discharge to TCBSD. Rhodia proposes to expand its silica plant, which manufactures silica through the reaction of liquid sodium silicate and sulfuric acid. The wastewater from this plant expansion is also proposed to be discharged to TCBSD. The TCBSD treatment plant discharges to Thorn Creek approximately 10.1 miles upstream of its confluence with the Little Calumet River.

The production of silica generates a waste stream that has elevated levels of total dissolved solids (TDS) and sulfates. The discharge to TCBSD is projected to contribute to excursions from the water quality standards for TDS and sulfates in Thorn Creek and the Little Calumet River as set forth in Section 302.208. Rhodia and TCBSD request an adjusted standard from Section 304.105 and Section 302.208. The specific information required to be set forth in a petition for adjusted standard pursuant to 35 Ill. Adm. Code 104 is set forth below.

Section 104.406(a): Standard from Which Relief is Sought

Rhodia and TCBSD request an adjusted standard from both 35 Ill. Adm. Code 304.105 and 302.208 as they apply to the water quality standards for TDS and sulfates applicable to effluent discharges from TCBSD's sewage treatment plant to Thorn Creek and from Thorn Creek into the Little Calumet River. While there are no specific effluent standards for TDS, Section 304.105 prohibits effluent discharges that cause or contribute to violations of applicable water quality standards. Section 302.208(e) requires that concentrations of 1000 mg/L of TDS and 500 mg/L of sulfates shall not be exceeded in Thorn Creek or the Little Calumet River[1]. The effective date

[1] The portion of Thorn Creek between its confluence with Deer Creek and the USGS Gaging Station located on Thorn Creek approximately 15 miles downstream of the discharge point from the Consumers Illinois Water

of this regulation is May 17, 1979. An adjusted standard was granted to Rhodia[2] and TCBSD in 1994 for the same stream reaches for which Rhodia and TCBSD request the current adjusted standard. Thus, with respect to Rhodia and TCBSD, the water quality standards applicable for TDS and sulfates for the subject stream reaches are as set forth in Exhibit 1 at 2-11. (In re Petition of Rhone-Poulenc Basic Chemicals Co., AS No. 94-7 (Adjusted Standard), 1994 Ill. ENV LEXIS 743 (June 23, 1994) and In re Petition of Rhone-Poulenc Basic Chemicals Co., AS No. 94-7 (Adjusted Standard), 1994 Ill. ENV LEXIS 1030 (August 11, 1994) (Supplemental Opinion and Order))

The water quality standards requested for Thorn Creek in this Petition are 2,650 mg/L of TDS for the stream reach between TCBSD's discharge point and the confluence with Deer Creek (Reach #1), 2,620 mg/L from the confluence with Deer Creek to the USGS Station 05536275 in Thornton (Reach #2), and 2,360 mg/L for the portion of Thorn Creek between the USGS Station 05536225 in Thornton and the confluence of Thorn Creek with the Little Calumet River (Reach #3). The requested water quality standard for Reach #1 and Reach #2 of Thorn Creek is 1,350 mg/L and 1,340 mg/L of sulfates, respectively. For Reach #3 it is 1,160 mg/L. For the Little Calumet River from its confluence with Thorn Creek to the Calumet-Sag Channel (Reach #4), less relief is required. Based upon projected maximum levels, a water quality TDS limit of 2,020 mg/L and a sulfate limit of 1,000 mg/L in Reach #4 would provide the relief needed for this plant addition, while still being protective of the environment.

Company in University Park, Illinois is subject to an adjusted standard granted to Consumers Illinois Water Company, which establishes a TDS standard of 2,100 mg/L (Board Proceeding, AS89-3)

2 Then known as Rhone-Poulenc Basic Chemicals.

The requested relief is shown below in table form:

Parameter	Reach #1	Reach #2	Reach #3	Reach #4
TDS	2,650 mg/L	2,620 mg/L	2,360 mg/L	2,020 mg/L
Sulfate	1,350 mg/L	1,340 mg/L	1,160 mg/L	1,000 mg/L

Section 104.406(b): Nature of Regulation of General Applicability

The primary purpose of the regulations involved in this Petition is to protect aquatic life and to safeguard the quality of waters of the state for crop irrigation and public water supply purposes. There are no effluent standards for TDS or sulfates. The Board once adopted an effluent standard of 3,500 mg/L TDS, (R70-18, 3 PCB 419, January 7, 1972) which the Board repealed after recognizing that the treatment processes for TDS are very expensive, consume large amounts of energy, and produce dry salts, which still must be disposed of. (R76-21, September 24, 1981). Regulation of TDS discharges was left to the application of water quality standards for TDS, chlorides and sulfates. Id. These water quality standards were set in 1972, in part by reference to then-current studies of the toxicity of the contaminants to aquatic life.

The Board's water quality standards have been approved by U.S. EPA and are consistent with the requirements of the Clean Water Act. Thus, in a sense, these standards exist pursuant to Section 303(a) of the Clean Water Act. Petitioners do not believe that the water quality standards involved in this proceeding were adopted in whole or in part to implement the other laws specified in Section 106.705(b): the Safe Drinking Water Act, the Comprehensive Environmental Response, Compensation, and Liability Act, the Clean Air Act, or the state programs concerning the Resource Conservation and Recovery Act, Underground Injection Control, or the National Pollutant Discharge Elimination System (NPDES).

Section 104.406(c): Specified Level of Justification

The regulations of general applicability from which Rhodia and TCBSD seek an adjusted standard do not specify a level of justification for adjusted standards.

Section 104.406(d): Facility and Process Descriptions

The Rhodia Chicago Heights plant is located at 1101 Arnold Street. The facility has been in operation since 1902 when it was Victor Chemical Works. Stauffer Chemical Company bought Victor Chemical in 1959. Rhone-Poulenc Basic Chemicals, Inc. purchased the Basic Chemicals Division of Stauffer Chemical Company in December 1987. The name was officially changed to Rhone-Poulenc Basic Chemicals Co. in September 1989. In 1998, the name of the company was changed again to Rhodia, Inc. The facility currently employs 279 people and manufactures inorganic phosphate chemicals and precipitated silica. Most of the inorganic phosphate manufacturing processes involve the chemical reaction of phosphoric acid with either soda ash or slaked lime. Wastewaters that fluctuate in pH and total suspended solids are generated in both processes. The precipitated silica manufacturing process involves reacting sodium silicate with sulfuric acid to produce silica. Wastewaters generated in this process contain total dissolved solids and sulfates. All process wastewaters are discharged to TCBSD.

Water Pollution Control Equipment. Process-generated water is separated from the product by high-quality filtration equipment employing a cloth media, a water wash, and either pressure or vacuum to de-water the product (depending on the product). All of the recyclable filtrate is routed to a recovery tank and re-used in the reactor. The remaining filtrate and wash water are routed to the effluent handling system. This system consists of two 20,000-gallon water storage tanks, an analysis section, and an adjustment section. The primary effluent tank is used to accumulate surges in the effluent and dampen the peaks in the flow. The secondary tank

is used as a safeguard to control spills and contain reacted material that may not meet product specifications. See Diagram at Attachment D to this Amended Petition.

All effluent is continuously monitored for pH and Total Suspended Solids (TSS). These values are displayed on a Distributed Control System (DCS), which is monitored by the process control room operator. When a reading exceeds a set point,[3] an alarm immediately notifies the operator of the condition. The operator then looks at the appropriate area on the DCS control screen to determine the type of excursion and determine the corrective actions. If the pH is high or low, the operator initiates the pH adjustment loop to add neutralizing agents to the effluent stream. If the total suspended solids concentration is high, the operator immediately begins to search for the cause and eliminates it, or diverts the stream to the secondary effluent tank until the problem is corrected. If the situation worsens, a hard-wired interlock automatically stops all effluent flow from the unit and recirculates it to the primary effluent tank.

Proposed Expansion. The proposed expansion to Rhodia's facility is to its Silica Plant, which produces precipitated silica. Rhodia has proposed this expansion at its Chicago Heights plant because the plant is ideally located relative to both the raw materials necessary for the silica process and the receiving market. The proposed expansion to the silica plant will increase annual TDS discharges by 65% over the original design capacity. A block flow diagram for the proposed expansion is set forth at Figure 2-4 of Exhibit 1.

Multiple grades of silica are produced, and will continue to be produced at higher volumes in the expansion. The process begins neutralizing the sodium silicate solution with sulfuric acid in agitated reactors to produce precipitated silica. Once the reaction is complete, the silica is removed from the solution via filtration. Filtrate from the operation, which contains

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3 The alarm points are set within permit ranges to give operators time to correct the deviation before a permit excursion occurs.

approximately 4% of dissolved sodium sulfate, is diverted to the mother liquor tank. The filter cake is then washed with water and squeezed to remove residual sodium sulfate, and the filtrate is directed to a 20,000 gallon equalization tank. The TDS concentration of these streams declines toward 0 percent sodium sulfate by the end of each filtration cycle.

Table 2-3, which has been revised to include additional information requested by the Board, sets forth the projected discharge loadings. Table 2-3 is attached to this Amended Petition as Attachment E. On an annual average, the expanded process will discharge 0.84 million gallons per day containing 137,400 lbs/day of TDS. On a monthly basis, the flow will average 1.1 million gallons per day, with 144,200 lbs/day of TDS. The peak daily TDS discharge is projected to be 151,700 pounds.

TCBSD. TCBSD operates a wastewater treatment plant (WWTP) with a design average flow of 15.9 mgd and design maximum flow of 40.25 mgd. The WWTP is located in Chicago Heights, Illinois, and provides wastewater treatment for approximately 100,000 people from the Chicago Heights, Park Forest, Homewood, South Chicago Heights, Steger, and Crete communities. The WWTP has 39 employees, 6 of whom are part time. The treatment plant was originally constructed in 1933 and has undergone a number of construction projects including an expansion to accept flows from the Homewood Regional Plant.

The TCBSD WWTP has been cited as an exemplary treatment plant based on its overall efficiency and environmental control by both an independent engineering team of the Agency and the Central States Water Pollution Control Association. The WWTP represents a $40 million investment, including an on-site laboratory and computer monitoring and control. A schematic of the physical/biological WWTP is presented in Figure 2-3 of Exhibit 1. From the sewers, the influent passes through bar screens prior to being pumped to the surface through grit

chambers followed by primary sedimentation. From primary treatment, the wastewater flows through a conventional plug-flow activated sludge process, followed by a second-stage biological aeration process and tertiary clarifiers for nitrification. The wastewater is then filtered, and seasonal chlorination added followed by post aeration and seasonal dechlorination. The fully treated effluent is then discharged to Thorn Creek. Excess flow is diverted through separate excess flow clarifiers, which is then recombined with the complete treatment effluent.

The current dry weather flow through the WWTP is 11.6 mgd based upon the average of the lowest three months in 1998. This is 4.3 mgd below the design average flow of 15.9 mgd. Thus, the treatment plant has available capacity for future growth. The TCBSD WWTP serves 861 industrial and commercial users in addition to the 31,000 residential connections. This industrial and commercial sector accounts for 2.7 percent of the users and 29 percent of the influent flowrate based upon 1999 values. The major industrial users are manufacturing facilities, including steel manufacturing and stamping facilities. Among the industrial users besides Rhodia are Ford Motor Company, Calumet Industries, Chicago Heights Steel, Rohm & Haas, and Alpharma.

There are three stream reaches on Thorn Creek and a fourth reach on the Little Calumet River that will be impacted by the proposed expansion, under peak loading and low flow conditions. Reach #1 is from the WWTP to the merger with Deer Creek. Reach #2 continues from the merger with Deer Creek to the USGS Station at Thornton, while Reach #3 is from the USGS Station to the merger with the Little Calumet River. The fourth reach is from the Thorn Creek confluence with the Little Calumet River to the Calumet-Sag Channel.

TMDL Limits. No TMDL has been prepared, nor is any study underway, for Thorn Creek or the Little Calumet River. Reach #2, #3, and #4 of Thorn Creek are on the 303(d) list.

Reach #2 and #3 of Thorn Creek are listed as highly impaired for nutrients and pathogens, but slightly impaired for salinity. To the best of Rhodia's knowledge, this listing is without consideration of the previously granted adjusted standard. In addition, the existing water quality data does not indicate that the stream is impacted at these levels. Work done by Huff & Huff shows uses of the stream are not impaired. The Little Calumet River from the Calumet to the Calumet-Sag Channel is listed as highly impaired for several constituents, but is not listed for salinity. The Little Calumet upstream of its confluence with Thorn Creek is listed as highly or moderately impaired for several constituents, but only slightly impaired for salinity. On the 305(b) list, the Little Calumet River from Thorn Creek to the Calumet-Sag Channel is listed as impaired for a number of constituents, but not for total dissolved solids or sulfates. From the confluence with Thorn Creek upstream the Little Calumet River is listed as impaired for a number of constituents, but not for total dissolved solids or sulfates. Reaches 2 and 3 of Thorn Creek are listed for total dissolved solids and sulfates, and Reach 1 is listed for a number of constituents, but not total dissolved solids or sulfates. An Exhibit with stream segments and the relevant 303(d) listings is attached to this Amended Petition as Attachment F.

Section 104.406(e): Cost of Compliance and Compliance Alternatives

In order to comply with the regulation of general applicability and the existing adjusted standard, some form of pretreatment by Rhodia for TDS removal would be necessary. The expanded silica plant wastewater design characteristics lend themselves to selected demonstrated and proven TDS/sodium sulfate removal and disposal strategies. Although the sulfate removal processes discussed below are technically feasible, even the most economical solution for sodium sulfate removal to comply with water quality standards would result in significant cost penalties to Rhodia. For example, in the evaporation process the cost of steam alone required to

dehydrate the sodium sulfate solution would result in a finished product cost above current market price for granular sodium sulfate. This cost, together with the cost of initial and working capital and annual operating fixed costs would place Rhodia in a non-competitive price position for its silica finished product. Rhodia is submitting the additional cost information requested by the Board for this Amended Petition separately, and claims trade secret and confidentiality protection for this information.

Taking into consideration the flow and variability of the wastewater stream, Rhodia considered the following technologies for pretreatment:

(1) Electrodialysis;
(2) Single/Multiple Effect Evaporation;
(3) Evaporation with Mechanical Vapor Recompression (MVR);
(4) Reverse Osmosis followed by Evaporation with MVR;
(5) Calcium Chlroide treatment followed by Evaporation with MVR; and
(6) Biological Process Reduction of sulfates to elemental sulfur

Vendors informed Rhodia that Electrodialysis (in its various forms) has almost never been found to be practical in the United States industrial chemical industry, especially for as dilute a feed as Rhodia has. Any evaporation scheme would require multiple effects (increasing cost) or falling film technology, and much more steam that the plant is capable of providing. Biological sulfate ion reduction to elemental sulfur was not found to be practical because the process uses an organic compound and air to create carbonate ions that replace the sulfate ions. Although this reduces sulfates, it does not appreciably reduce the TDS going to the stream.

Rhodia, therefore, evaluated the remaining technologies:

(1) Falling film evaporation with MVR;
(2) Reverse Osmosis followed by Evaporation with MVR; and
(3) Calcium Chloride Treatment with falling film evaporation with MVR.

A brief process description of the technologies evaluated follows.

Falling Film Evaporation with MVR (Alternative 1)

This technology produces dry sodium sulfate from a dilute aqueous solution. This is achieved by concentrating and subsequently crystallizing the sodium sulfate out of the process liquor. A single falling film evaporator is employed. The feed is pumped to the top of the evaporator and falls through steam-heated tubes. The feed stream is thus concentrated to a point where it can be cooled to precipitate the sodium sulfate crystals in the forced feed crystallizer. The water vapor from the evaporator and crystallizer is compressed by a large compressor and routed to the shell side of the falling-film tubes to become the heating steam. This is an efficient use of energy and that would keep the plant from needing to provide a new boiler. The crystallization outlet stream is sent to a centrifuge and the cake is sent to a dryer. A simplified process flow diagram for Alternative 1 is presented in Attachment A.

Reverse Osmosis followed by Evaporation with MVR (Alternative 2)

This technology also produces dry sodium sulfate from a dilute aqueous solution by concentrating and subsequently crystallizing the sodium sulfate out of the process liquor. Again, for energy conservation reasons, both evaporator and crystallizer vessels are used. This process is even more energy efficient since it performs a four-fold concentration with a reverse osmosis (RO) unit, thus reducing the evaporation requirement. However, the RO unit has very strict inlet requirements concerning foreign material, which is residual silica in this case. Thus, magnesium/caustic pre-treatment and high-tech filtration are accomplished to remove the affects of foreign material before evaporation begins. Evaporation, crystallization, centrifugation and drying are accomplished much the same as in Alternative 1, with the first two steps being smaller because of the RO unit. A simplified process flow diagram for Alternative 2 is presented in Attachment B.

Calcium Chloride Treatment – Falling Film Evaporation – MVR (Alternative 3)

This technology employs a lime treatment of the feed stream to increase the effectiveness of crystallization/precipitation. The evaporation through drying steps are accomplished much the same as in Alternatives 1 and 2.

A simplified process flow diagram for Alternative 3 is presented in Attachment C.

Cost Summary of Compliance Alternatives

Each of the alternatives evaluated produces a dry sodium sulfate stream requiring ultimate disposition or possible disposal. For the purpose of this analysis, however, disposal costs were not included since sodium sulfate is a commodity chemical with some resale value. A summary comparison of the demonstrated sodium sulfate removal systems discussed above is presented in the following Table. It contains critical process and technical considerations and provides a summary including estimated capital and annualized capital and operating costs for the three alternatives studied.

COMPARISON OF SODIUM SULFATE REMOVAL SYSTEMS

	Alternative 1	Alternative 2	Alternative 3
Undesirable Constituents		Silica > 25 ppm	Silica > 25 ppm
Impact on Plant	-	Dispose Silica	Dispose Silica
Capital Cost	$6 Million	$4 Million	$4.2 Million
Total Annual Cost	$915k	$600k	$670k
Total Annual Cost/ [A/] Ton of Production	$32	$21	$24
Treatment Cost as a Percentage Product Cost	6.2%	3.8%	4.4%

Cost/1000 gallon water treated	$11.90	$7.78	$8.70
% of Cost of direct [B/] discharge to TCBSD	1190%	778%	870%

Alternative 1 = **Falling film evaporation with MVR**

Alternative 2 = **Reverse Osmosis followed by Evaporation with MVR**
Alternative 3 = **Calcium Chloride Treatment – Falling Film Evaporation**

A/ Based on New Production Capacity

B/ TCBSD charges the Chicago Heights plant $1.00/1000 gallons treated.

As set forth in Attachment A, Alternative 1 would require more than 11 times the normal cost to discharge to the WWTP and would add 6 percent to the cost of the product silica. Alternatives 2 & 3 are more economical, although they would still cost about 8 times the normal WWTP cost and would add approximately 4 percent to the cost of the product silica. See Attachments B and C.

Treatment Options at TCSBD facility. Treatment of dissolved solids requires concentration of the solids into a smaller stream, followed by either disposal or reuse of the concentrated stream in the original process. Evaporation and reverse osmosis are the two established technologies, and both require the handling of a concentrated waste stream. Rhodia's analysis for treatment on-site found reverse osmosis followed by evaporation to be the low cost on site option at $4 million dollars capital, and $600,000 annual costs. This equated to $7.78 per 1000 gallons treated. If the entire effluent from the TCSBD is treated, this would equate to the treatment of 15 to 20 million gallons per day, or approximately 20 times the quantity treated if Rhodia treated the TDS. The reverse osmosis costs are a function of flow rate, while the evaporator would be a function of the concentrate stream. Assuming the evaporator costs are the

same as Rhodia's evaporator, but the reverse osmosis costs increases by the 0.6 power of the flow and the reverse osmosis represents 50 percent of the costs at Rhodia, then, such as system at TCSBD would be as follows:

Capital:

RO $2 million (20)^0.6=	$12 million
Evaporator	= $ 2 million
Total	= $14 million

Clearly, if TDS and sulfates are required to be removed, it is more cost-effective to remove them near the source. In addition to the above costs, disposal costs at TCSBD would be significant, because of the other contaminants present in the wastewater.

Although technically feasible, even the most economical solution for sodium sulfate removal to comply with water quality standards would result 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.

Section 104.406(f): Proposed Adjusted Standard

As described earlier, Rhodia and TCBSD seek modification of the existing adjusted standard as an adjusted standard from the generally applicable water quality standards for TDS and sulfates for that portion of Thorn Creek downstream of TCBSD's discharge to the confluence of Thorn Creek with the Little Calumet River (Reaches #1, #2 and #3) and from that point to the confluence with the Little Calumet River with the Calumet-Sag Channel (Reach #4). The adjusted standards sought for TDS are: 2,650 mg/L in Reach #1; 2,620 mg/L in Reach #2; and 2,360 mg/L in Reach #3 of Thorn Creek and 2,020 mg/L in the Little Calumet River (Reach #4). The requested standards for sulfates are 1,350 mg/L in Reach #1; 1,340 mg/L and Reach #2;

and 1,160 mg/L in Reach #3 of Thorn Creek, and 1,000 mg/L in the Little Calumet River (Reach #4).

Rhodia and TCBSD propose that the Board adopt the following language to effectuate the requested relief:

(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 it's merger with Deer Creek and the USGS Gaging 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 Gaging 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 302.208 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 sulfates 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 sulfates shall be modified to the new adjusted standard. The water quality standard for sulfates found at 35 Ill. Adm. Code 302.208 shall not apply to this portion of Thorn Creek.

(6) The water quality standard for sulfates shall be 1,340 mg/L for that portion of Thorn Creek between Thorn Creek's confluence with Deer Creek and the USGS Gaging Station 05536275 in Thornton. The existing adjusted standard, which already exists for this portion of Thorn Creek of 1,000 mg/L sulfates shall be modified to the new adjusted standard. The water quality standard for sulfates found at 35 Ill. Adm. Code 302.208 shall not apply to this portion of Thorn Creek.

(7) The water quality standard for sulfates shall be 1,160 mg/L for that portion of Thorn Creek from the USGS Gaging 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 sulfates shall be modified to the new adjusted standard. The water quality standard for sulfates found at 35 Ill. Adm. Code 302.208 shall not apply to this portion of Thorn Creek.

(8) The water quality standard for sulfates 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 sulfates shall be modified to the new adjusted standard. The water quality standard for sulfates 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 sulfates 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.

In order to comply with the proposed adjusted standard, Rhodia would direct the wastewaters from the expanded silica plant to TCBSD for treatment. Since TCBSD has adequate capacity to handle these wastewaters, there is no significant capital cost. The annual operating costs are the cost of treatment. TCBSD projected 2000 charges of $1.00/1000 gallons of wastewater treated. Since Rhodia's annual average discharge is projected to be 75,000,000 gallons, the operating costs (and annual costs) would be approximately $600,000 per year.

Section 104.406(g): Impact Comparison Between Compliance and Proposed Standard

Rhodia and TCBSD retained Huff & Huff, Inc. to perform an environmental assessment of the impact of the TDS and sulfates anticipated to be discharged from TCBSD. The results of Huff & Huff's study are presented in a report entitled "Environmental Assessment for the Proposed Increase in Total Dissolved Solids Discharge from the Thorn Creek Basin Sanitary District" (Exhibit 1). Huff & Huff's assessment included a review of Rhodia's proposed silica production processes as well as the existing treatment processes and influent and effluent flows at TCBSD's WWTP. Huff & Huff also reviewed the flows and water quality of Thorn Creek from its headwaters in Monee to its confluence with the Little Calumet River as well as the Little Calumet River from that point to its confluence with the Calumet-Sag Channel. With these data, Huff & Huff was able to model the projected water quality for TDS and sulfates in the various reaches of Thorn Creek and the Little Calumet River. Huff & Huff then reviewed available acute toxicity data to determine whether the projected water quality would be anticipated to result in any acute toxicity, and it retained SF Analytical to perform chronic toxicity testing using Thorn Creek stream water spiked with various levels of TDS and sulfates to determine whether any chronic toxicity would be anticipated. The TDS and sulfate sources included both synthetic sodium sulfate and Rhodia's silica plant wastewater.

Huff & Huff also performed a biological assessment of Thorn Creek. This included the sampling of macroinvertebrates and fish in Thorn Creek both upstream and downstream of TCBSD outfall. Using these data along with other existing data on the stream quality, Huff & Huff was able to establish a Macroinvertebrate Biotic Index (MBI) as well as the Index of Biotic Integrity (IBI) for Thorn Creek.[4] This information was then used to assess the existing and potential quality of Thorn Creek as an aquatic resource.

Based on these studies, Huff & Huff concluded that Thorn Creek, from upstream of the TCBSD's outfall to downstream of the Butterfield Creek confluence can be classified as a "fair" quality stream with classifications between a "limited" and a "moderate" aquatic resource, common classifications for urban streams. (Exhibit 1 at 91-92). The IBI and MBI values for the stream reaches did not change after the increase in TDS discharge that occurred when the existing Rhodia silica plant went on-line in October 1995.

The Board requested information on the proposed adjusted standard and the Illinois EPA's targeted potential for improvement as it affects Thorn Creek and the Little Calumet River. The characterization of Thorn Creek as a "limited" to "moderate" aquatic resource with "fair" water quality was based on the stream macroinvertebrate and fish surveys conducted both before and after the existing Rhodia Silica Plant went on-line. This is supported by the IEPA and IDNR biological stream characterization of a limited aquatic resource.[5] The 2000 Illinois Annual Water Quality Report assessed Thorn Creek "fair" water quality and the Little Calumet River as "poor" water quality.

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[4] MBI values are used by the Illinois Environmental Protection Agency to assess stream water quality. These values range from 0 to 11, with 0 representing the best water quality and 11 the worst. (Exhibit 1 at 62). IBI values are also used by the Illinois Environmental Protection Agency to assess stream quality and are based upon the fish assemblage at a given site. Values of this index range from 0 to 60, with 60 representing the best stream quality and 0 the worst. (Exhibit 1 at 62).

[5] Bertrand, W.A., R.L. Hite, and D. Day. 1996. Biological Stream Characterization (BSC): Biological Assessment

Huff & Huff concluded that given its proximity to urban areas, there is limited potential for future improvements in the aquatic community in Thorn Creek. Similar conclusions were drawn by Michael Ander of Dames & Moore (1990) during an environmental impact study of Deer Creek. (Exhibit 1 at 115). Deer Creek, a tributary of Thorn Creek, was stated as having limited potential uses due to the limited amount of water and habitat available. The Agency noted a similar water quality classification in its annual water quality report. (IEPA 1992). Id. The quality of the Little Calumet River was classified in that same report as a non-support waterway, a lower quality than in Thorn Creek.

Huff & Huff determined that there would be an impact upon Thorn Creek and the Little Calumet River caused by Rhodia's proposed discharge, i.e. TDS and sulfate levels will increase. A summary of the projected peak concentrations by Reach is set forth below:

Parameter	Reach #1	Reach #2	Reach #3	Reach #4
TDS	2,650	2,620	2,360	2,020
Sulfate	1,350	1,340	1,160	1,000

(See Table 7-3 of Exhibit 1 at 111).

While the concentrations of TDS and sulfates are projected to increase in certain areas of Thorn Creek and the Little Calumet River, those increases are not anticipated to have any adverse environmental impact based upon the toxicity testing completed. In adopting the water quality standards for TDS and sulfates, the Board focused on three potential areas of adverse impacts: aquatic life, crop irrigation, and public water supplies. The Huff & Huff report addresses each of these areas, and Huff & Huff concludes that crop irrigation and public water supply uses do not exist and that there will be no adverse impact upon aquatic life. Therefore,

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of Illinois Stream Quality through 1993. IEPA/BOW/96-058.

there should be no adverse environmental impact upon any of these uses from Rhodia's proposed discharge.

A TDS water quality limit of 2,100 mg/L was supported for Reach #2 in NutraSweet/CIWC's Adjusted Standard in part because of the Limited Aquatic Resource Classification of Thorn Creek, and in consideration of the low level of toxicity of TDS. A biological assessment performed in support of the NutraSweet/CIWC petition concluded a TDS water quality level of 3,000 mg/L would not cause any undue stress to the aquatic life (Dames & Moore, 1981). (Exhibit 1 at 115). This opinion was supported by the Agency (Studer, Hearing Testimony in AS89-3, 1990). Id.

Based upon the modeling work conducted by Huff & Huff, under worst case conditions the TDS level during operation of Rhodia's proposed expanded silica plant is projected to reach 2,650 mg/L and the sulfate level is projected to reach 1,350 mg/L in Thorn Creek. (Table 7-3 of Exhibit 1 at 111). No impact on the current aquatic community in Thorn Creek would be expected from these levels based upon Huff & Huff's review of available acute and chronic toxicity data and the bioassays conducted. (See Chapter 5 of Exhibit 1). This conclusion with respect to TDS is also supported by the biological assessment in the Nutrasweet/CIWC adjusted standard proceeding (AS 89-3).

Due to lack of literature regarding chronic toxicity levels on sodium sulfate, a chronic toxicity bioassay was conducted. The bioassay used Thorn Creek water, downstream of the WWTP discharge, to evaluate the effects of increasing levels of sodium sulfate on the water flea (Ceriodaphnia dubia) and the fathead minnow (Pimephales promelas). The Thorn Creek water was initially analyzed for sulfate and then spiked with sodium sulfate to obtain seven targeted levels of sulfate. The targeted levels are percentages of the projected peak water quality sulfate

concentration of 1,350 mg/L. The sulfate levels, based on the test conducted with Thorn Creek water spiked with Rhodia silica plant wastewater are as follows (see, Exhibit 1 at 59):

Measured Sulfate Level, mg/L	% of Projected Peak Effluent Sulfate	Measured TDS Level, mg/L
817	60%	1870
1079	80%	2180
1190	88%	2310
1332	99%	2530
1365	101%	2690

During the chronic toxicity bioassay tests, no chronic toxicity was observed in either the waterflea or fathead minnow up to the highest sulfate concentration tested; 1,365 mg/L (with an associated TDS value of 2,690 mg/L). The 1,365 mg/L sulfate level is 101% of the projected peak sulfate level anticipated. Based upon these results along with the literature regarding acute toxicity, there will be no acute or chronic toxicity impact upon aquatic life in Thorn Creek or the Little Calumet River from the proposed Rhodia expansion project. Furthermore, the request for an adjusted standard to allow Rhodia to expand its silica plant at its Chicago Heights facility is consistent with historical water quality levels and will not degrade the quality of the aquatic community in Thorn Creek.

Huff & Huff also concludes that there would be no adverse impacts upon crops. The areas surrounding Thorn Creek from TCBSD's outfall to the merger with the Little Calumet River are limited to forest preserves and developed areas. No known owners/operators conduct crop irrigation in the basin. No commercial crops are grown, and no evidence of water withdrawal from Thorn Creek for irrigation of crops was observed during the stream study performed by Huff & Huff. (Exhibit 1 at 109).

Huff & Huff further concludes that there would be no adverse impact upon public water supplies. Communities along Thorn Creek downstream of TCBSD's outfall all derive their water supply from Lake Michigan, including Chicago Heights, Flossmoor, Harvey, Glenwood, Homewood, South Holland, Thornton, Calumet City, Dolton, and Lansing. Most water supply wells have been capped and taken out of service in these communities. Based upon this investigation, Rhodia's proposed expansion project will not increase the TDS in any public water supply. (Exhibit 1 at 109-10).

Compliance with rule of general applicability would result in cross-media impacts. For example, pretreatment of TDS would produce dry sodium sulfate that would have to be disposed on land if it could not be sold, creating the potential for land pollution and for water pollution should it leach from a landfill to groundwater. Also, pretreatment would necessitate increased energy consumption, which not only would deplete energy resources, but also potentially would result in air pollution from the generation of the necessary energy. Thus, while TDS and sulfate levels in Thorn Creek and the Little Calumet River would increase under the proposed adjusted standard, no adverse environmental impact would result, whereas if compliance with the generally applicable standards were to be required, there might be some adverse cross-media impacts.

Impacts of Adjusted Standard on Other Facilities

The Board requested information on the proposed adjusted standard as it impacts to other facilities: the adjusted standard obtained by Nutrasweet in PCB 89-3, and the Thornton Quarry Retention Project at the Calumet Filtering Plant.

Nutrasweet. Petitioners request for relief will have no impact whatsoever on Nutrasweet or its Adjusted Standard on Deer Creek. Nutrasweet's adjusted standard provides for a TDS

water quality standard of 2,100 mg/L. Petitioners are proposing to increase TDS Reach #2 to 2,620 mg/L, which would include downstream of Nutrasweet's tributary, Deer Creek. To the extent that Nutrasweet is compliant in Deer Creek with its Adjusted Standard of 2,100 mg/L TDS, compliance in Reach #2 will not be an issue for Nutrasweet. The Deer Creek tributary at 2,100 mg/L TDS can only reduce TDS levels when it is mixed with Thorn Creek and Thorn Creek is above 2,100 mg/L TDS. Nutrasweet's TDS contribution was factored into Petitioner's requested relief.

Impact on Thornton Quarry Retention Project. The Thornton Quarry Water Retention Project is a three-phase plan to reduce flooding and combined sewer overflow (CSO) discharges to streams within the Calumet River watershed. The Transitional Reservoir, expected to be in operation in 2002, is the first phase of the project. This 9,600 acre-feet reservoir will collect floodwater from Thorn Creek. The collected water will then be fed to the Calumet Water Reclamation Plant (WRP) along with the normal treatment plant influent for treatment and then discharged to the Little Calumet River. This section of the Little Calumet River 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.

The parameters of concern for this Rhodia/Thorn Creek Environmental Assessment are TDS and sulfates, both of which are present in dissolved form. Therefore, there will be no suspended solids loading concern for the Calumet WRP associated with Petitioner's request. The Calumet WRP's NPDES permit does not have effluent limits set for TDS or sulfates, as water quality impacts have not historically been identified. The proposed increase in TDS and sulfates will therefore not cause a violation of the NPDES permit.

The only remaining issue is the potential of the Calumet WRP to cause a water quality violation in the Little Calumet River as a result of this requested relief. Based on reservoir modeling conducted for the project, Thorn Creek floodwaters will overflow to the Transitional Reservoir at creek flows greater than 1,500 cfs (970 mgd). At this flow rate, the increase in TDS and sulfate concentrations due to the proposed Rhodia plant expansion are expected to be 11 mg/L and 7 mg/L, respectively. This is based on the following loading assumptions used in the Environmental Assessment:

Condition	TDS	Sulfate
Existing Rhodia Average Loading	66,000 lbs/d	45,300 lbs/d
Projected Peak Rhodia Loading	151,725 lbs/d	102,638 lbs/d
Incremental Increase	85,725 lbs/d	57,338 lbs/d
Thorn Creek Conc. Increase Due to Project (Based on 1500 cfs)	11 mg/L	7 mg/L

Given that the overflow of Thorn Creek water will occur only during flood conditions, the TDS and sulfate levels in the streams are not expected to reach the levels of the water quality standards. The anticipated increase of 11 mg/L TDS and 7 mg/L sulfate, which will occur when Rhodia is operating at peak capacity simultaneously with the flood conditions is not expected to cause a water quality violation in the Little Calumet River.

Rhodia Community Advisory Panel and Thorn Creek Ecosystem Partnership. The Board requested further information on the Thorn Creek Ecosystem Partnership. Thorn Creek Basin Sanitary District is a member of the Thorn Creek Ecosystem Partnership and has been active in that organization for the past two years. Together with other Thorn Creek Basin Industries, Rhodia created a Community Advisory Panel (CAP) in the spring of 1998. This panel was formed to address the need for community outreach and discussion within the Chicago

Heights portion of the Thorn Creek Area Assessment. In addition to the local businesses, the CAP consists of representatives from the Sierra Club, Thorn Creek Ecosystem Partnership, South Suburban Citizens Opposed to Pollute your Environment (SSCOPE), Citizens for a Better Environment, and other special interest groups. During the past three years, Rhodia has participated in discussions related to air, water, and land issues with this group. Rhodia also presented the Adjusted Standard Petition to the CAP prior to submission to the Illinois EPA and the Board.

Subsequent to the Board's Order requesting additional information, Rhodia obtained the Illinois Department of Natural Resources publication "Thorn Creek Area Assessment". Contacts made as a result of reviewing this report confirmed that a Thorn Creek Ecosystem Partnership does exist and, in fact, some members of the Partnership also participate in the Rhodia CAP. Rhodia contacted Professor Karen D'Arcy of the Thorn Creek Ecosystem Partnership and spoke to her about joining the group. On August 10, 2001, Rhodia became an active member of the Thorn Creek Ecosystem Partnership.

Section 104.406(h): Justification

As noted under Section 104.406(c) of this petition, the regulations of general applicability from which Rhodia and TCBSD seek adjusted standards do not specify levels of justification for adjusted standards. Section 28.1(c) of the Act allows the Board to grant adjusted standards in the absence of a specified level of justification if the Board determines, based upon adequate proof by the petitioner that:

(1) factors relating to the petitioner are substantially different from the factors relied upon by the Board in adopting the 1general 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.

See also 35 Ill. Adm. Code 301.108(c).

The factors relating to Rhodia and TCBSD are substantially different from the factors relied upon by the Board in adopting the general regulation. As discussed above, in adopting the general regulations, the Board was concerned over potential adverse impacts upon aquatic life, crop irrigation and water supplies. Based upon the Huff & Huff report, no such adverse impacts are anticipated should the requested relief be granted. Further, the levels of TDS that already exist in some areas of Thorn Creek are higher than the water quality standard levels set in the general regulation and the projected levels of TDS are within the historical variability of TDS levels in Thorn Creek. The Board recognized in deciding to repeal the previously established effluent standard for TDS of 3,500 mg/L, that the treatment processes for TDS are very expensive, consume large amounts of energy, and may produce concentrated brines that must be disposed of. Those high costs have been documented in this petition. Finally, the regulation of general applicability was adopted based on the protection of aquatic life in a receiving stream that does not already contain high background levels of TDS. Thus, an adjusted standard for TDS and sulfates in Thorn Creek is justified.

The requested standard will not result in environmental or health effects substantially more adverse than the effects considered by the Board in adopting the rule of general applicability. That rule was adopted to protect aquatic life. Thorn Creek is classified as a Moderate to Limited Aquatic Resource. (Exhibit 1 at 91-92). A biological assessment of Thorn Creek done in

support of the NutraSweet/CIWC petition concluded a TDS water quality level of 3,000 mg/L would not cause any undue stress to the aquatic life (Dames & Moore, 1981). Id. This opinion was supported by the Agency. (Studer testimony in AS89-3, 1990).

Based upon modeling conducted by Huff & Huff, under worst case conditions the TDS level is expected to reach 2,650 mg/L and sulfate to reach 1,350 mg/L in Thorn Creek and lower in the Little Calumet River. (Exhibit 1 at 111). Thus, based on the Moderate to Limited Aquatic Resource classification, the previous work by Dames & Moore (1990) and the stream surveys conducted by Huff & Huff, no impact on the current aquatic community in Thorn Creek or the Little Calumet River is expected. Id.

The adjusted standard is consistent with federal law in that under 40 C.F.R. 131.4, "states are responsible for reviewing, establishing and revising water quality standards." These standards are to be protective of the designated uses. 40 C.F.R. 131.5(b). As stated above, the adjusted standard would be protective of the present and potential uses, of Thorn Creek.

In addition, granting this adjusted standard is consistent with Section 27(a) of the Act, taking into account the existing physical conditions, the character of the area involved, including the character of surrounding land uses, which have been described herein, the zoning classification of the area as industrial, and the nature of the existing receiving body of water, and the technical infeasibility and economic unreasonableness of reducing TDS and sulfates.

In summary, Petitioners' justification for the proposed adjusted standards is that the granting of the requested adjusted standard will not result in any significant adverse environmental or health effects, while the cost of compliance is high and could be associated with adverse cross-media impacts. As noted above, the purpose of the regulation from which

Petitioners seek adjusted standards is primarily to protect aquatic life. Such purpose will still be served if the requested adjusted standards are granted by the Board.

Section 104.406(i): Consistency with Federal Law and Federal Procedural Requirements

1. Consistency with Federal Law.

Rhodia and TCBSD believe that the granting of the requested adjusted standard would not be inconsistent with or violate any provisions of the Clean Water Act. As explained above, the requested relief is predicated solely upon potential exceedances of the TDS water quality standard and the standard for sulfates. There are no applicable federal or state TDS or sulfate effluent standards. Under Federal law:

> A water quality standard defines the water quality goals of a water body, or portion thereof, by designating the use or uses to be made of the water and by setting criteria necessary to protect the uses. States adopt water quality standards to protect public health or welfare, enhance the quality of water and serve the purposes of the Clean Water Act (the Act). "Serve the purposes of the Act" (as defined in sections 101(a)(2) and 303(c) of the Act) means that water quality standards should, wherever attainable, provide water quality for the protection and propagation of fish, shellfish and wildlife and for recreation in and on the water and take into consideration their use and value of public water supplies, propagation of fish, shellfish, and wildlife, recreation in and on the water, and agricultural, industrial, and other purposes including navigation.

40 C.F.R. 131.2. Under 40 C.F.R. 131.4 "states are responsible for reviewing, establishing and revising water quality standards." In turn, pursuant to 40 C.F.R. 131.5, "EPA is to review and to approve or disapprove the State-adopted water quality standards." These standards are to be protective of the designated uses (§131.5(b)) and, where those uses are not protected, this must be supported by "appropriate technical and scientific data and analyses." (§131.5(d)). A State is allowed to remove a designated use, which is not an existing use, if it "can demonstrate that attaining the designated use is not feasible" because of several enumerated causes. (§131.10(g)).

Rhodia and TCBSD believe that the granting of this adjusted standard will not impair any beneficial existing use of the receiving stream. This has been established by the Huff & Huff study which has been made part of this Petition.

Even if the Board were to find that some use is impaired, Petitioners believe that one or more of the requirements for federal approval have been met as set forth under §131.10(g) as follows:

(1) Naturally occurring pollutant concentrations prevent the attainment of the use; or

(2) Natural, ephemeral, intermittent or low flow conditions or water levels prevent the attainment of the use, unless these conditions may be compensated for by the discharge of sufficient volume of effluent discharges without violating State water conservation requirements to enable uses to be met; or

(3) Human caused conditions or sources of pollution prevent the attainment of the use and cannot be remedied or would cause more environmental damage to correct than to leave in place; or

(4) Dams, diversions or other types of hydrologic modifications preclude the attainment of the use, and it is not feasible to restore the water body to its original condition or to operate such modification in a way that would result in the attainment of the use; or

(5) Physical conditions related to the natural features of the water body, such as the lack of a proper substrate, cover, flow, depth, pools, riffles, and the like, unrelated to water quality, preclude attainment of aquatic life protection uses; or

(6) Controls more stringent than those required by sections 301(b) and 306 of the Act would result in substantial and widespread economic and social impact.

Most particularly, the portion of Thorn Creek referred to as Reach #2 is impacted by TDS discharges from Consumers Illinois Water Company at its University Park facility. Consumers

Illinois Water Company, which discharges to Deer Creek, is allowed, pursuant to an existing adjusted standard, to discharge TDS to a maximum of 2,100 mg/L. Elevated TDS levels exist downstream of Deer Creek's merger with Thorn Creek to the USGS Station 05536275 in Thornton. The Board established an adjusted standard for that portion of Thorn Creek in part because these levels of TDS could not be remedied.

2. Federal Procedural Requirements

Pursuant to U.S. EPA's current position on whether a hearing is required, Rhodia and TCBSD do not believe that a hearing is necessary where an authorized states follow approved state procedures, those procedures are federally acceptable.

Rhodia and TCBSD understand that U.S. EPA's present position is that the fulfillment of the state requirements for notice and hearing is all that is required and that if the state allows for waiver of the hearing requirement, hearing can be waived without conflict with federal laws. 35 Ill. Adm. Code 104.406(j) allows for waiver of hearing.

Section 104.406(j): Hearing Waived

Rhodia and TCBSD hereby waive hearing in this matter pursuant to Section 104.406.

Section 104.406(k): Supporting Documents

Supporting documents cited in this Amended Petition are submitted with the original Petition and additional documents responsive to the Board's Order dated July 26, 2001 are appended hereto.

WHEREFORE, Rhodia, Inc. and the Thorn Creek Basin Sanitary District request the Board to grant an adjusted standard from 35 Ill. Adm. Code 304.105 and 35 Ill. Adm.

Code 302.208 as they apply to proposed discharges of TDS and sulfate from Rhodia's proposed expansion of its silica plant to TCBSD's sewer system and from TCBSD's treatment plant to Thorn Creek.

Respectfully submitted,

One of Their Attorneys

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Chicago, Illinois 60610-4795
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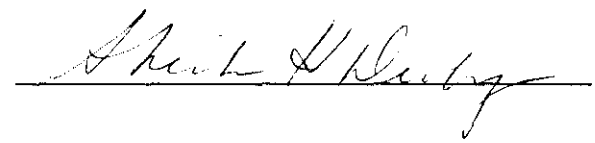
CH02/22141379.1

CERTIFICATE OF SERVICE

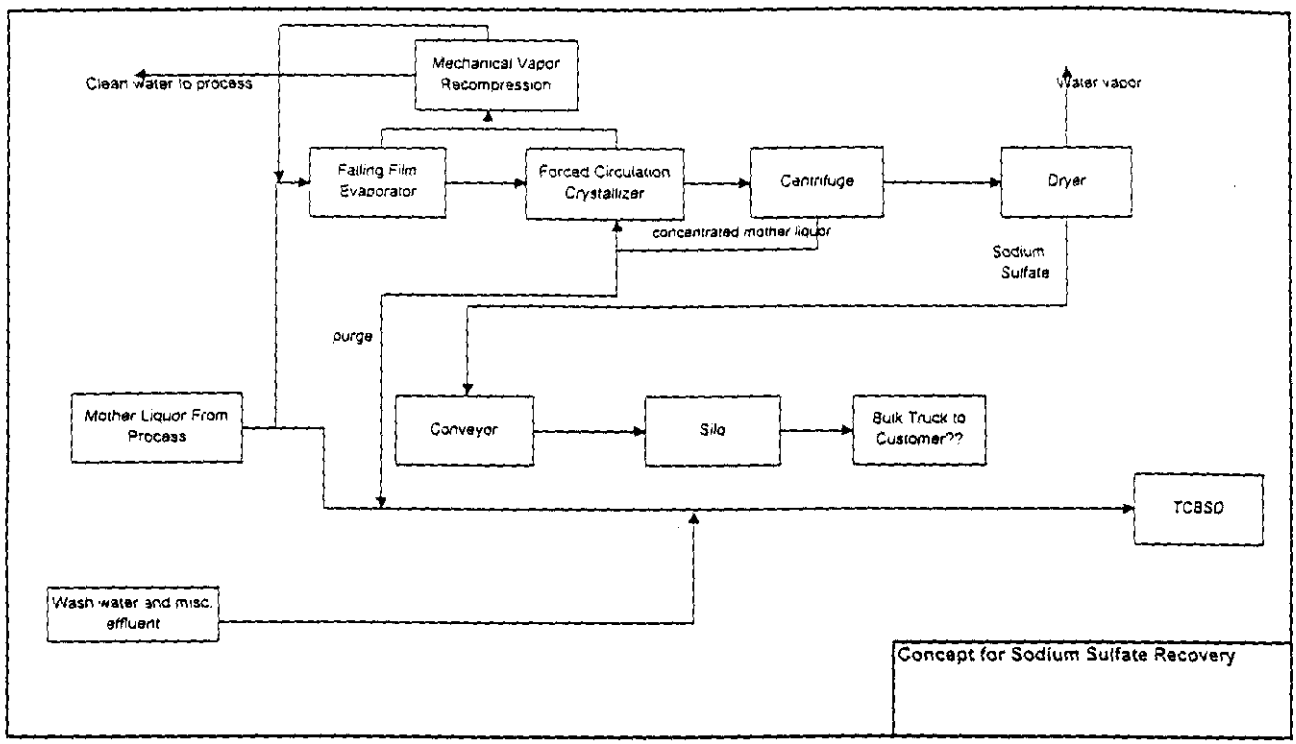
The undersigned certifies that a copy of the foregoing **Notice of Filing and Amended Petition for Adjusted Standard** was filed by hand delivery with the Clerk of the Illinois Pollution Control Board and served upon the parties to whom said Notice is directed by first class mail, postage prepaid, by depositing in the U.S. Mail at 321 North Clark Street, Chicago, Illinois on Monday, August 27, 2001.



CH01/12149405.1

Exhibit A

ALTERNATIVE 1



Sales 28500 ton/year

Configuration / Ref. Drawing		P-C Treatment - Alt. 1
Price - Installed	US$	$6,000,000
Footprint	L x W x H	
Power	kW	750
Oner Duty	MMBTU/h	0.35

Major Equipment

OOM Total Installed Cost

$6,000,000 $ 4,800,000 to $8,400,000

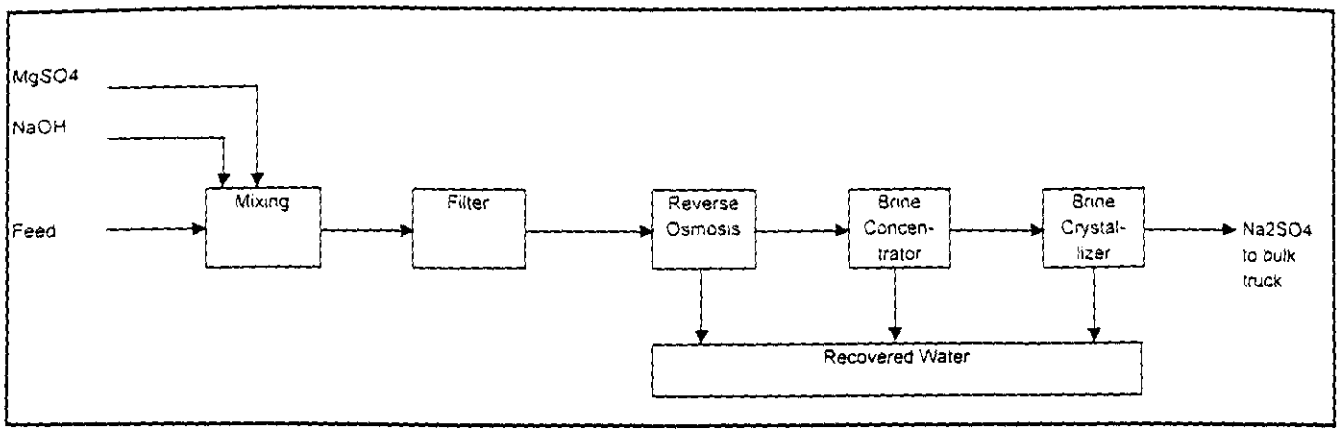
Annual Operating Costs

		$k/year
Falling Film Evaporator (Brine Conc)	Power	329
Forced Circulation Crystallizer (Brine XL)	Maint	180
MVR Compressor	Depre.	400
2 Condensate pumps	Gas	7
2 Evaporator feed pumps	Sulf sales	-
2 Evaporator discharge pumps	Total	915
Purge pump	$/mt	32
Conveyor	$/mt above 23000	166
Dryer		

Estimates are ODM based on evaporation rates above and similar units built previously

Exhibit B

ALTERNATIVE 2



Sales 28500 ton/year

Configuration / Ref. Drawing		P-C Treatment - Alt. 1
Price - Installed	US$	$6,000,000
Footprint	L x W x H	
Power	kW	750
Drier Duty	MMBTU/h	0.35

Major Equipment

OOM Total Installed Cost

$6,000,000 $ 4,800,000 to $8,400,000

Falling Film Evaporator (Brine Conc)
Forced Circulation Crystallizer (Brine XL)
MVR Compressor
2 Condensate pumps
2 Evaporator feed pumps
2 Evaporator discharge pumps
Purge pump
Conveyor
Dryer

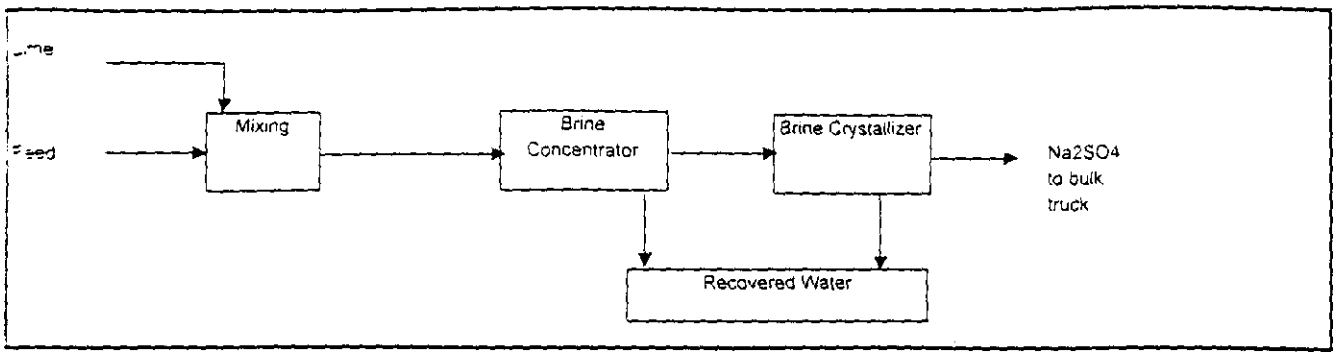
Annual Operating Costs

	$k/year
Power	329
Maint	180
Depre.	400
Gas	7
Sulf sales	-
Total	915
$/mt	32
$/mt above 23000	166

Estimates are OOM based on evaporation rates above and similar units built previously

Exhibit C

ALTERNATIVE 3



Sales *28500 ton/year*

Configuration / Ref. Drawing		P-C Treatment - Alt. 1
Price - Installed	US$	$6,000,000
Footprint	L x W x H	
Power	kW	750
Oner Duty	MMBTU/h	0.35

Major Equipment

OOM Total Installed Cost

$6,000,000 $ 4,800,000 to $8,400,000

Falling Film Evaporator (Brine Conc)
Forced Circulation Crystallizer (Brine XL)
MVR Compressor
2 Condensate pumps
2 Evaporator feed pumps
2 Evaporator discharge pumps
Purge pump
Conveyor
Dryer

Annual Operating Costs

	$k/year
Power	329
Maint	180
Depre.	400
Gas	7
Sulf sales	-
Total	915
$/mt	32
$/mt above 23000	166

Estimates are OOM based on evaporation rates above and similar units built previously

Exhibit D

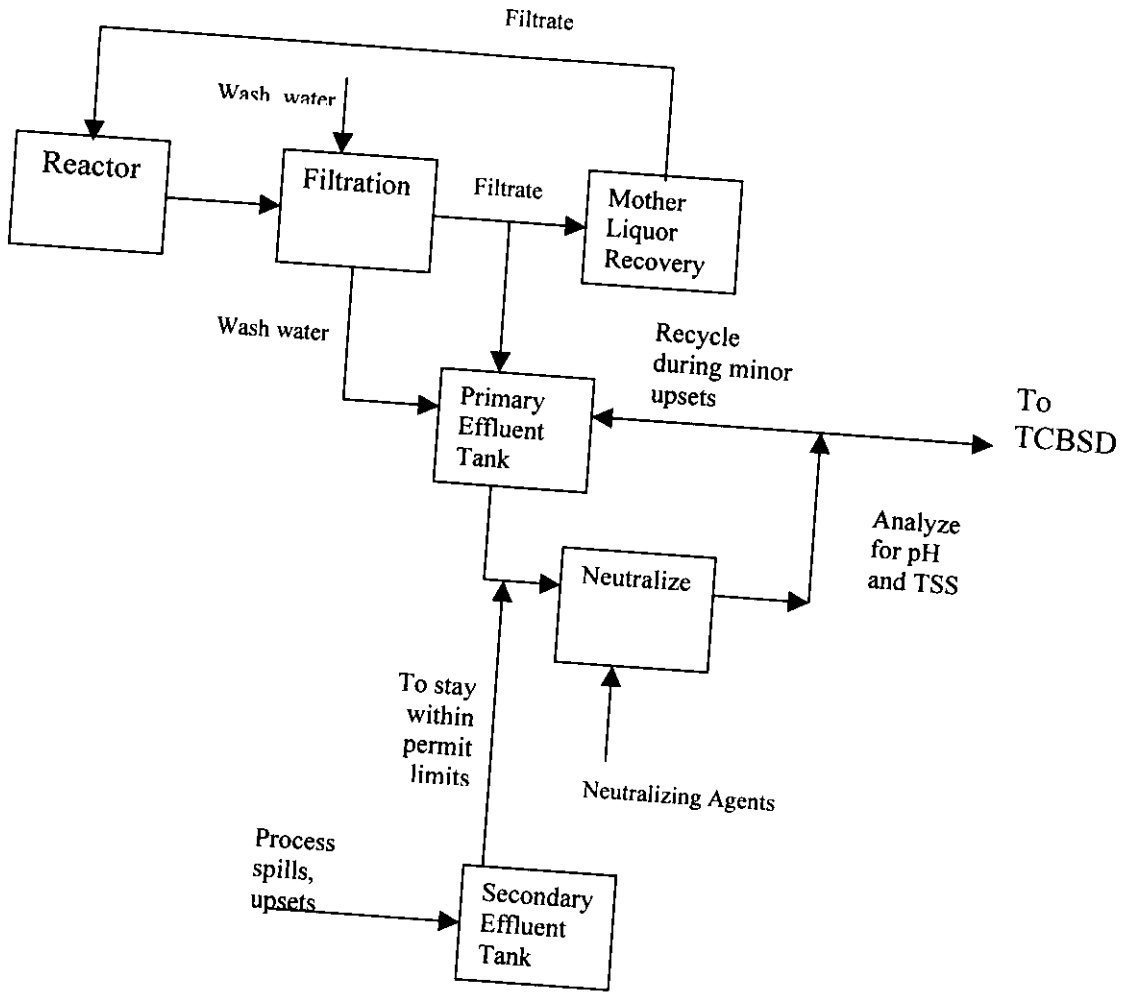

Filtrate
Wash water
Reactor
Filtration
Filtrate
Mother Liquor Recovery
Wash water
Recycle during minor upsets
Primary Effluent Tank
To TCBSD
Analyze for pH and TSS
Neutralize
To stay within permit limits
Neutralizing Agents
Process spills, upsets
Secondary Effluent Tank

Exhibit E

Table 2-3

EXISTING AND PROJECTED LOADING FROM RHODIA SILICA PLANT

Parameter	Annual Average	**Monthly Average**	Daily Maximum
Existing Plant Discharage			
Flow mgd	0.59	**0.62**	0.76
TDS, lb/day	66,000	**82,000**	146,853
Sulfates lb/day	45,300	**50,000**	103,640
w/ Proposed Expansion			
Flow mgd	0.84 to 0.94	**1.1**	1.1
TDS, lb/day	137,375	**144,200**	151,725
Sulfates lb/day	92,750	**97,500**	102,638

Exhibit F

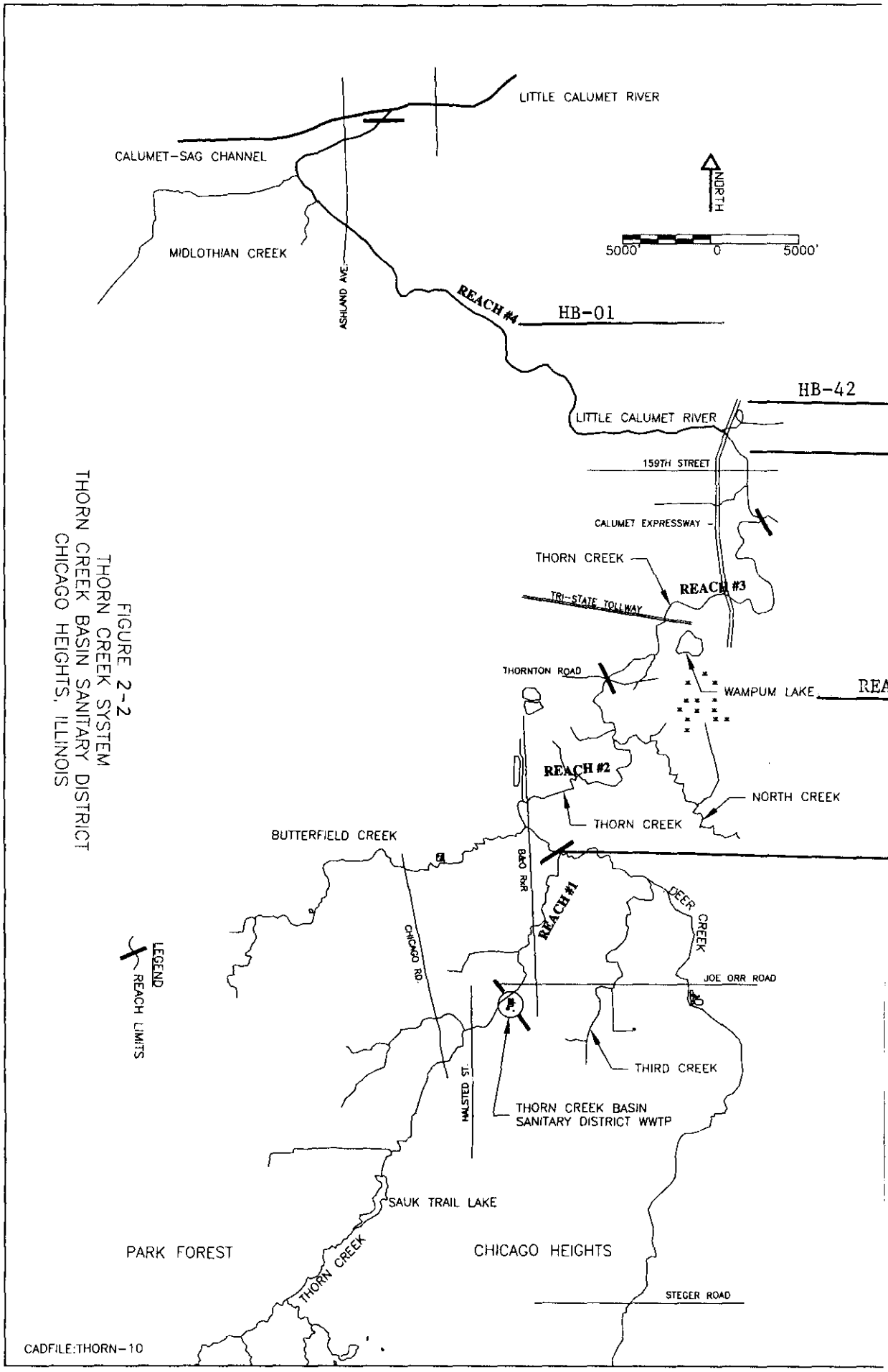


FIGURE 2-2
THORN CREEK SYSTEM
THORN CREEK BASIN SANITARY DISTRICT
CHICAGO HEIGHTS, ILLINOIS

ANNUAL ILLINOIS WATER QUALITY REPORT
(Clean Water Act, Section 305(b) Requirement)

APPENDIX TABLE A-1. WATERBODY SPECIFIC INFORMATION FOR RIVERS AND STREAMS IN THE GREAT LAKES/CALUMET WATERSHEDS 1988

Waterbody ID:	Segment ID:	Catalog Unit	Segment Name	Size in Miles	Cycle in Year	Key Sample Date	Assessment Type/Methods	Designated Uses	Causes of Impairment	Sources of Impairment
ILHA04	HA 04	07120003	Little Calumet R.N.	2.02	2000	01/01/1998	M/190, 191, 800	N20, P1, P44, X21	300, 410, 500, 550, 560, 580, 900, 910, 920, 1200, 1220, 1500, 1600	100, 200, 4000, 7000, 7100, 7400, 7550, 7600, 7700, 8500
ILHA04	HA 06	07120003	Little Calumet R.N.	5.6	2000	01/01/1990	E/150, 800	F1, F44, P20, X21	1600	100, 200, 4000, 7000, 7100, 7550, 7600
ILHBD04	HBD 04	07120003	Thorn Cr.	7.85	2000	01/01/1998	M/230, 700, 860	N42, P1, P20	300, 410, 500, 530, 720, 750, 900, 910, 920, 930, 1300, 1320, 1600, 2100	200, 4000, 7000, 7100, 7550, 7700, 8500
ILHBD04	HBD 05	07120003	Thorn Cr	11.25	2000	01/01/1994	M/860	P1, P20	900, 920, 1200, 1220, 1500, 1600	4000, 7000, 7350, 7400, 7550, 7700

Table 3-3. Guidelines for Listing Causes of Aquatic Life Use Impairment in Rivers and Streams for 305(b) Assessments

Code	Cause	Guidelines
0000	Cause Unknown	No identifiable cause based upon available information. (used with discretion)
0200	Pesticides	*See 3000 for triazine pesticides, see 0300 for organochlorine pesticides..*
0300	Priority Organics	From AWQMN water data: At least 1 violation of G. U. Standard in three years. From basin survey or facility survey water data: At least 1 violation of G. U. Standard. From sediment data: Concentrations of any organic compounds at highly elevated levels.[1] From fish advisory reports: Fish consumption restricted due to organic compounds.
0410	PCBs	From sediment data: Concentrations at highly elevated level (≥180 µg/kg).[1] From fish advisory reports: Fish consumption restricted due to PCBs.
0500 0510 0520 0530 0540 0550 0560 0570 0580 0500	Metals Arsenic Cadmium Copper Chromium Lead Mercury Selenium Zinc for all others, indicate specific metal in memo field	From AWQMN water data: At least 1 violation of G. U. Standard for any metal in three years. From basin survey or facility survey water data: At least 1 violation of G. U. Standard for any metal. From sediment data: Concentrations of any metal at highly elevated levels.[1] From fish advisory reports: Fish consumption restricted due to mercury.
0600	Ammonia (un-ionized; STORET code 612)	From AWQMN water data: At least 1 violation of G. U. Standard for ammonia in three years. From basin survey or facility survey water data: At least 1 violation of G. U. Standard for ammonia.

0700	Chlorine	If data on total residual chlorine is available: At least 1 violation of G. U. Standard for total residual chlorine.
0720	Cyanide	From AWQMN water data: Total cyanide exceeds 0.01 mg/l in at least 1 sample in three years.[2] From basin survey or facility survey water data: Total cyanide exceeds 0.01 mg/l in at least 1 sample.[2]
0750	Sulfates	From AWQMN water data: At least 1 violation of G. U. Standard for sulfates in three years. From basin survey or facility survey water data: At least 1 violation of G. U. Standard for sulfates.
0800	Other Inorganics (Fluoride)	From AWQMN water data: At least 1 violation of Fluoride G. U. Standard in three years. From basin survey or facility survey water data: At least 1 violation of Fluoride G. U. Standard.
0900	Nutrients	
0910	Phosphorus	From AWQMN water data: Total phosphorus exceeds 0.61 mg/l in at least 1 sample in three years.[2] From basin survey or facility survey water data: Total phosphorus exceeds 0.61 mg/l in at least 1 sample.[2] From Sediment data: Phosphorus in sediment exceeds 2,800 mg/kg (highly elevated).[1]
0920	Nitrogen	From AWQMN water data: Total ammonia-N exceeds 0.41 mg/l in 1 sample in three years.[2] (STORET code 610) From basin survey or facility survey water data: Total ammonia-N exceeds 0.41 mg/l in at least 1 sample.[2] (STORET code 610) From Sediment data: Kjeldahl nitrogen in sediment exceeds 4,680 mg/kg (highly elevated).[1] (STORET code 627)
0930	Nitrates	From AWQMN water data: Nitrate-N exceeds 7.8 mg/l in 1 sample in three years.[2] (STORET code 630) From basin survey or facility survey water data: Nitrate-N exceeds 7.8 mg/l.[2] (STORET code 630)
0990	Other	Not used.
1000	pH	From AWQMN water data: At least 1 violation of G. U. Standard for pH in three years. From basin survey or facility survey water data: At least 1 violation of G. U. Standard for pH.

1100	Siltation	From Habitat data: Either transect data indicates substrate >34% silt/mud.[2] Or From AWQMN water data: Total suspended solids exceeds 116 mg/l in at least 1 sample in three years.[3] From basin survey or facility survey water data: Total suspended solids exceeds 116 mg/l in at least one sample.[3]
1200	Organic Enrichment, Low Dissolved Oxygen	From AWQMN water data: At least 1 violation of G. U. Standard for DO in three years. From basin survey or facility survey water data: At least 1 violation of G. U. Standard for DO.
1300	Salinity, Total Dissolved Solids, Chlorides	From AWQMN water data: At least 1 violation of G. U. Standard for TDS (conductivity >1667 μmho/cm) or chlorides in three years. From basin survey or facility survey water data: At least 1 violation of G. U. Standard for TDS (conductivity >1667 μmho/cm) or chlorides.
1400	Thermal Modifications	(Used only when a thermal point source is present. Check for exemption of temperature standard in receiving stream). From AWQMN water data: At least 1 violation of G. U. Standard for temperature in three years. From basin survey or facility survey water data: At least 1 violation of G. U. Standard for temperature.
1500	Flow Alterations	Documented site specific knowledge (unnatural flow alterations only, e.g., dams, water withdrawals, etc.)
1600	Habitat Alterations (Other than flow)	From Habitat data: SHAP bank stability score (metric #9) ≤8; or SHAP channel alteration score (metric #12) ≤4.[2]
1700	Pathogens	Documented site specific knowledge (used only when pathogens are a known cause of fish kills or are known to have other impacts on aquatic life).
1900	Oil and Grease	Documented site specific knowledge (used only when data is available to document the presence of this cause).
2000	Taste and Odor	Not used as a cause for aquatic life use impairment.
2100	Suspended Solids	From AWQMN water data: Total suspended solids exceeds 116 mg/l in at least 1 sample in three years.[3] From basin survey or facility survey water data: Total suspended solids exceeds 116 mg/l in at least one sample.[3]
2200	Noxious Aquatic Plants	Documented site specific knowledge.
2210	Excessive Algal Growth/Chlorophyll a	Documented site specific knowledge.
2600	Exotic Species	Introduced species excluding common carp.

3000	Pesticides (half life ≤90 days)	Preliminary water chemistry indicators (chronic value).[3] From Pesticide Monitoring Network water data: Pesticide exceeds chronic value in at least one sample.
3100	Atrazine	1.0 μg/l
3200	Cyanazine	30 μg/l
3300	Alachlor	100 μg/l
3400	Metolachlor	130 μg/l
3500	Metribuzin	800 μg/l
3600	Trifluralin	1.0 μg/l
3700	Butylate	50 μg/l

Table 3-4. Guidelines for Listing Sources of Aquatic Life Use Impairment in Rivers and Streams for 305(b) Assessments

Code	Source	Guidelines
0100	Industrial Point Source	Industrial point source discharge based upon FRSS, Agency effluent, DMR and/or other existing data.
0200	Municipal Point Source	Municipal point source discharge based upon FRSS, Agency effluent, DMR and/or other existing data
0400	Combined Sewer Overflow	Combined sanitary and storm sewer overflow based upon FRSS, Agency effluent, DMR and/or other existing data.
0500	Collection System Failure	Broken sanitary sewer line or overflow based upon FRSS, Agency effluent and/or other existing data.
0800	Wildcat Sewer	Wildcat sewer discharge based upon FRSS, Agency effluent and/or other existing data.
0900	Domestic Wastewater Lagoon	Non-municipal lagoon system based upon FRSS, Agency effluent, DMR and/or other existing data
1000	Agriculture	General agricultural related activities based upon satellite land use, actual observation and/or other existing data.
1050	Crop-Related Sources	
1100	Non-irrigated Crop Production	Non-irrigated crop production based upon satellite land use, actual observation and/or other existing data.
1200	Irrigated Crop Production	Irrigated crop production based upon satellite land use, actual observation and/or other existing data.
1300	Specialty Crop Production (e.g., Truck Farming, Orchards)	Truck farming, orchards, or horticultural areas based upon satellite land use, actual observation and/or other existing data.
1350	Grazing-Related Sources	
1400	Pasture Grazing	Riparian and/or upland pasture/land grazing based upon satellite land use, actual observation and/or other existing data.
1500	Range Grazing	Not used.
1600	Feed Lots - All Types	Open area feedlots based upon satellite land use, actual observation and/or other existing data.
1700	Aquaculture	Fish production facility based upon actual observation and/or other existing data.
1800	Animal Holding/Management Units	Animal holding buildings and impervious areas based upon satellite land use, actual observation and/or other existing data.
1900	Manure Lagoons	Accidental/intentional discharge from manure holding lagoons based upon actual observation and/or other existing data.
2000	Silviculture	General forest management related runoff based upon satellite land use, actual observation and/or other existing data.
3000	Construction	General construction related activities based upon actual observation and/or other existing data.
3100	Highway/road/bridge	Highway/road/bridge construction activities based upon actual observation and/or other existing data.
3200	Land Development	New residential/commercial construction activities based upon actual observation and/or other existing data.
4000	Urban Runoff/storm Sewers	Urban and storm sewer runoff based upon actual observation and/or other existing data.

5000	Resource Extraction	General mining activities based upon satellite land use, actual observation and/or other existing data.
5100	Surface Mining	Surface mining (e.g., coal, limestone) activities based upon satellite land use, actual observation and/or other existing data.
5200	Subsurface Mining	Subsurface coal mining activities based upon satellite land use, actual observation and/or other existing data.
5300	Placer Mining	Not used.
5400	Dredge Mining	Underwater mining (e.g., sand and gravel) activities based upon satellite land use, actual observation and/or other existing data.
5500	Petroleum Activities	Oil and gas production activities based upon satellite land use, actual observation and/or other existing data.
5600	Mill Tailings	Milling operations based upon satellite land use, actual observation and/or other existing data.
5700	Mine Tailings	Mine processing activities (e.g., gob piles) based upon satellite land use, actual observation and/or other existing data.
5800	Acid Mine Drainage	Low pH and iron deposition due to mine drainage based upon actual observation and/or other existing data.
5900	Abandoned Mining	Abandoned mining operations based upon actual observation and/or other existing data.
6000	Land Disposal	General land disposal activities based upon satellite land use, actual observation and/or other existing data.
6100	Sludge	Land application of sludge based upon actual observation and/or other existing data.
6200	Wastewater	Spray irrigation of wastewater based upon satellite land use, actual observation and/or other existing data.
6300	Landfills	Leachate and/or runoff from landfills based upon actual observation and/or other existing data.
6350	Inappropriate Waste Disposal/Wildcat Dumping	Illegal waste disposal sites based upon actual observation and/or other existing data.
6400	Industrial Land Treatment	Land application of industrial wastes based upon actual observation and/or other existing data.
6500	On-site Wastewater Systems (Septic Tanks, Etc.)	Septic system leachate or surface runoff based upon actual observation and/or other existing data.
6600	Hazardous Waste	Hazardous waste leachate or surface runoff based upon actual observation and/or other existing data.
6700	Septage Disposal	Disposal of septic tank sludge based upon actual observation and/or other existing data.

7000	Hydromodification	General alteration of channel habitat based upon actual observation and/or other existing data.
7100	Channelization	Straightening of stream meanders based upon actual observation and/or other existing data
7200	Dredging	Deepening or widening of stream channels based upon actual observation and/or other existing data.
7300	Dam Construction	Dam construction activities based upon actual observation and/or other existing data.
7350	Upstream Impoundment	Upstream impoundment based upon actual observation and/or other existing data.
7400	Flow Regulation/modification	Alteration of normal flow regimes (e.g., dams, channelization, impervious surfaces, water withdrawal, etc.) based upon actual observation and/or other existing data.
7500	Bridge Construction	Bridge construction activities (e.g., channelization, temporary road construction, etc.) based upon actual observation and/or other existing data.
7550	Habitat Modification	General alteration of riparian habitat based upon actual observation and/or other existing data
7600	Removal of Riparian Vegetation	Removal of riparian vegetation based upon actual observation and/or other existing data.
7700	Bank or Shoreline Modification/destabilization	Bank modification/destabilization activities (e.g., bank erosion, rip rap, loss of habitat, etc.) based upon actual observation and/or other existing data.
7800	Draining/filling of Wetlands	Draining/filling of wetlands based upon actual observation and/or other existing data
8100	Atmospheric Deposition	Atmospheric deposition of nutrients, minerals, etc., based upon actual observation and/or other existing data
8200	Waste Storage/Storage Tank Leaks	Leaks from above ground storage tanks based upon actual observation and/or other existing data.
8300	Highway Maintenance and Runoff	Salt and pesticide runoff from highways, roads and bridges based upon actual observation and/or other existing data.
8400	Spills (Accidental)	Accidental spills based upon actual observation and/or other existing data.
8500	Contaminated Sediments	High concentrations of metals and organic compounds in sediment based upon actual observation and/or other existing data.
8600	Natural Sources	Refer to footnote[1].
8700	Recreation and Tourism Activities	Turbulence and wave action resulting from boat usage and speed boat racing, golf course runoff, etc., based upon actual observation and/or other existing data
8900	Salt Storage Sites	Runoff from salt storage for winter highway maintenance based upon actual observation and/or other existing data.
9000	Source Unknown	No identifiable source based upon available information.

TABLE 1. Illinois 303(d) List and Priority Ranking

RANK	WSID	SCORE	WATERBODY SEGMENT	WATERBODY NAME	SIZE MILES/ ACRES	ASSESSMENT LEVEL	DESIGNATED USE	CAUSES	SOURCES
27	ILHB42	74	HB 42	Little Calumet R.S.	7.33	M23, 31	01D, 02, 04D, 05D	05M, 06S, 09H, 11M, 12H, 13S, 17H	04H, 30S, 32S, 40M, 70S, 71S, 72S, 76S
			HB 01	Little Calumet R.S.	8.58	E15	01N, 02, 04N, 05N	05M, 09H, 11H, 12M, 16M, 17H	02H, 04M, 30M, 32M, 40M, 70M, 71M, 72S
52	ILHBD04	25	HBD 04	Thorn Cr.	7.89	M23, 31	01R, 02, 04R, 05R	05S, 09H 10S, 13S, 16S, 17H	02M, 30S, 32S, 40M, 70S, 71S, 77S