ILLINOIS POLLUTION CONTROL BOARD
October 18, 1989

| | | |
|---|---|---|
| IN THE MATTER OF: | ) | |
| | ) | |
| PROPOSED SITE-SPECIFIC RULE | ) | |
| CHANGE FOR REILLY CHEMICAL | ) | R88-9 |
| CORPORATION, GRANITE CITY | ) | (Rulemaking) |
| FACILITY: 35 ILL. ADM. | ) | |
| CODE 307.1102 | ) | |

ADOPTED RULE. FINAL ORDER.

OPINION AND ORDER OF THE BOARD (by M. Nardulli):

This matter comes before the Board on a Petition for Site-Specific Rule Change filed on behalf of the Reilly Industries, Inc.'s, Granite City Facility.[1] The petition was filed with the Board on March 8, 1988. Presently, the concentration of mercury in the wastewater discharge from the Reilly Chemical Corporation's Granite City facility is governed by the effluent standards for mercury in 35 Ill. Adm. Code Section 307.1102. Section 307.1102(a) limits the concentration of mercury in any discharge to a publicly owned, or publicly regulated, sewer system to 0.0005 milligrams per liter, subject to the averaging rule contained in 35 Ill. Adm. Code 304.104(a). The existing exceptions to the standard established by Section 307.1102(a) are laid out in the subsequent paragraphs of Section 307.1102. The Petitioner petitions the Board to further amend 35 Ill. Adm. Code Section 307.1102.

On April 27, 1989, the Board proposed the requested rule for Second First Notice. The proposed rule was published in the Illinois Register on May 19, 1989 (Volume #13, Issue #20, p. 7530). Three public comments were received by the Board during First Notice, two were from the Department of Commerce and Community Affairs stating that this proposed rule will have no effect on small business. The other was from the Administrative Code Division of the Secretary of State's Office. The recommendations of the Administrative Code Division have been adopted in the amendments for Second Notice.

On July 13, 1989 the Board proposed the rule, substantively unchanged from Second First Notice, for Second Notice. The proposed rule was sent to the Joint Committee on Administrative Rules ("JCAR") on July 24, 1988. The Second Notice Period began

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[1]Since this rulemaking was initiated, petitioner has changed its name from Reilly Tar and Chemical Corporation" to "Reilly Industries, Inc."

on July 25, 1989 and ended September 8, 1989. On August 3, 1989, the Board received JCAR's "General Problems or Questions Concerning Proposed Rulemaking." JCAR asked that the Board "explain why it has not named the Reilly Tar and Chemical Corporation, Granite city Facility, specifically in Section 307.1102(g), as Reilly, not any other coal tar facility, is seeking the site-specific relief?" No other public comments were received during the Second Notice period.

After discussions between JCAR and the Board, an agreement to modify the proposed rule was reached. On September 1, 1989, the Board received JCAR's "Certification Of No Objection To Proposed Rulemaking." The Board's Final Notice Proposal is consistent with the above-referenced agreement.

## BACKGROUND

The petitioner, Reilly Industries, Inc. ("Reilly") operated under a variance from 35 Ill. Adm. Code 307.103 as it applies to Reilly's discharge from Reilly's Granite City plant until August 31, 1989. The variance was granted to allow Reilly time to seek a site-specific rule through this proceeding. Since the record from PCB 88-47, Reilly Tar and Chemical Corporation v. Illinois Environmental Protection Agency, was incorporated into this proceeding (R. 9), the Board finds it useful to reiterate some of its earlier statements.

Reilly distills coal tar, which is a by-product of coke production at its refinery in Granite City. Its products include: coal tar pitch; creosote oil, a pesticide used to treat railroad ties, utility poles, etc; and pipeline coatings, used on underground gas and oil transmission pipelines. Reilly employs about 50 persons at the Granite City plant.

Reilly batch processes the total production of coal tar from Granite City Steel. The distillation process removes various amounts of creosote oil to produce various grades of pitch. At the start of distillation water contained in the coal tar is first removed in a separate distillation cut. Wet scrubbers prevent particles of creosote oil from polluting the air. Wet scrubber water is recirculated until the creosote oil concentration is about 50%, at which point the mixture goes to an oil-water separator. This separated water becomes part of the wastewater produced.

In a March 29, 1985 quarterly progress report, Reilly's mercury concentration by wastestream was reported as follows (Pet. Appendix B-5):

SOURCES AND QUANTITIES OF MERCURY
PRESENT IN WASTEWATER AT RTCC'S GRANITE CITY PLANT

| | Sources | Hg Concentration (mg/l) | Volume of Wastewater (gal/wk) | Mercury Load (g/wk) | Percent of Total |
|---|---|---|---|---|---|
| I. | Water Decantation | | | | |
| | A. Tar Storage | 0.006 | 750 | 0.017 | 0.08 |
| | B. Front End Oil Storage | 0.008 | 9,000 | 0.273 | 1.25 |
| | C. #1 Creosote Oil Storage | 0.081 | 5,250 | 1.612 | 7.40 |
| II. | Stormwater (tank 100) | 0.003 | 53,700 | 0.611 | 2.80 |
| III. | Wet Scrubbers | 0.012 | 1,500 | 0.068 | 0.31 |
| IV. | Wet Distillate Cut | 0.129 | 39,300 | 19.214 | 88.16 |
| V. | Miscellaneous Water | NA* | 50,000 | | |
| | Total | | | 21.795 | 100 |

*Not analyzed.

The discharge limit for mercury in 35 Ill. Adm. Code 307.103 is 0.0005 mg/l (0.5 ppb). Reilly's discharge limit is 0.035 mg/l, subject to the averaging rule of 35 Ill. Adm. Code 304.104(a). The City's NPDES effluent limit is 0.0005 mg/l. Reilly asserts that the mercury is present in the coal tar, regardless of source, and is known to occur naturally in coal.

Reilly's pretreatment system, constructed in 1983, consists of the following:

> An industrial wastewater pretreatment facility consisting of a 50,000 gallon primary settling tank, a 100,000 gallon primary settling tank, two settling pans with oil skimmers, a 50,000 gallon flow equalization tank with mechanical mixing, three 250,000 gallon bio-oxidation tanks, two 2,800 gallon rectangular clarifiers, and all necessary pumping, piping and appurtenances designed to treat wastewater from a coal tar pitch and creosote oil manufacturing operation with the discharge of (30,000 gpd DAF; 45,000 gpd DMF; 300 PE) and tributary to the Granite City Sewer Treatment Plant. (Agency Rec. p. 3)

On February 22, 1985, Reilly commenced discharging to the City's treatment plant. Prior to that time, Reilly had discharged to a lagoon, which is undergoing RCRA closure. The RCRA closure plan requires that a maximum of about 43,000 gpd of contaminated groundwater be removed and treated through the pretreatment facility. The Agency noted that the 43,000 gpd, when added to the 26,000 gpd from process and stormwater (when it rains) exceeds the hydraulic capacity of the facility, thus reducing its effectiveness. Reilly, however, asserts that the system over the years has exceeded the predicted efficiency and is able to effectively treat the 70,000 gpd being fed to it. (Agency Rec. p.4, Pet. p. 4)

During the time of Reilly's discharge, the City's treatment plant effluent did not exceed 0.0005 mg/l in 1986 (Appendix A, p. A-1). However, in 1987 and through April, 1988 the Agency compared three apparent excursions of the City's treatment plant effluent with Reilly's discharge (Pet. Table 9, Agency Rec. p. 4,5) as follows:

| Discharge Monitoring Report | Granite City mg/l | Reilly mg/l | (Table 9) |
|---|---|---|---|
| Feb. 1987 | 0.00084 | 0.007 | |
| Oct. 1987 | 0.0017 | 0.0022 | 10/2 |
| | | 0.0078 | 10/9 |
| | | 0.0039 | 10/16 |
| | | 0.0089 | 10/23 |
| | | 0.0069 | 10/30 |
| Jan. 1988 | 0.0130 | 0.0014 | 1/8 |
| | | 0.0016 | 1/15 |
| | | 0.0038 | 1/22 |
| | | 0.0211 | 1/29 |

There is no firm correlation between discharges from Reilly and excess discharges by Granite City. The Board also references the PCB 84-82 Opinion, which notes that the City exceeded its mercury effluent limit a number of times between October 1981 and June 1984, all prior to the time Reilly started discharging to the City's treatment plant.

One underlying problem has been the tests for total mercury, which can be uncertain at such low levels in a complex matrix such as Reilly's, where organo-mercury compounds are present. Reilly searched for, and feels it has found, a laboratory that can give reliable results; however, Reilly asserts that the results are still questionable from a statistical standpoint. The Agency agrees that the tests are complicated by the organo-mercury compounds; however, the Agency believes that the Standard Methods For Examination of Waste and Wastewater, 14th Edition does contain

methods to eliminate interferences and suggests that Reilly's statistical variability is probably caused by the variability of the raw material and batch operations. The Agency noted that both Reilly and the City have programs to improve testing accuracy.

## TECHNICAL FEASIBILITY AND ECONOMIC REASONABLENESS

Among the factors considered by the Board in reviewing a request for a site-specific rule is whether compliance with the general rule is technically feasible and economically reasonable. Central Illinois Light Co. v. Illinois Pollution Control Board, 511 N.E. 2d 269, 271, 110 Ill. Dec. 434, 436 (1987), Proposed Amendments to 35 Ill. Adm. Code 212.209, Village of Winnetka Generating Station, R86-41 (November 3, 1988). As required by the Board order in PCB 88-47, Reilly has evaluated methods of reducing the concentration of mercury in its effluent. At hearing, Reilly reviewed a number of technologies that it has investigated. These technologies include modification of the clarifiers, filtration, coagulation, adsorption in powdered activated carbon and synthetic resins, chemical reaction and ultrafiltration. Reilly maintained that some of these technologies proved ineffective in reducing the mercury concentration of the Reilly refinery effluent to levels below the 0.003 mg/l limit while other technically feasible alternatives are not economically reasonable for Reilly's Granite City operation.

Mr. Roder, a senior research chemist for Reilly testified as to Reilly's experiments with various means of operating its clarifiers. The system is presently operating with the two clarifiers in parallel and one of the clarifiers being equipped with baffles (R. 67). Mr. Roder testified that mercury concentration in the effluent could be reduced by 5% to 10%, or approximately 1.5 ppb, by baffling the second clarifier and removing a large amount of sludge from each clarifier on a daily basis (R. 76). The cost of installing the baffles would be approximately $7,500 (R. 70) and the additional operating cost would be about $118,000 per year (R. 76). Mr. Roder also testified that an increase in the volume or number of clarifiers would not substantially increase the removal of mercury (R. 99).

Reilly performed coagulating tests on the influent and effluent of the clarifiers with alum and some polymeric coagulants. While coagulation was a viable method for reducing solids, including mercury, in lab tests it was not practical in plant operations because the precipitate could not be recycled back into the stills. Consequently, this waste sludge, which would include mercury, would need to be incinerated or landfilled (R. 80). Mr. Roder estimated that the cost of incinerating the sludge would be over $500,000 and the cost of landfilling would be over $180,000 (R. 81).

Powder activated carbon was considered for use as a scavenger but in plant test it actually resulted in a lowering of the efficiency of the clarifiers because it caused the solids to flocculate and float instead of settling out (R. 82). Filtration was also tried but proved operationally inefficient (R. 88). Further, Mr. Roder also testified that it would not be beneficial to combine some or all of these changes to the clarifiers to reduce mercury because the resulting reduction in mercury would not be the sum of the expected gains from each method employed individually (R. 87).

At the suggestion of the Agency, Reilly attempted to treat the water decantation and the process water from the stills, which are the two high mercury streams, separately. However, attempts to use coagulation and precipitation and/or filtration on these streams did not reduce the mercury concentration in effluent (R. 93).

In laboratory experiments, two methods were found to be effective in reducing the level of mercury. These methods were ultrafiltration and ion exchange. However, both methods are very expensive and experimental in nature. Ultrafiltration would require a $500,000 capital investment and an annual expenditure of over $1,900,000 for the incineration of the side stream waste (R. 86). Further, ultrafiltration is not a proven technology in operations with low concentration metals. It is unknown whether a performance level below 0.003 mg/l could be reliably maintained on a plant scale (R. 104-105). To test ultrafiltration on a plant scale would require the construction of the entire process at the Reilly plant (R. 84).

Similarly, ion exchange is an unproven technology that cannot be tested on a plant scale without constructing and implementing the entire process at the Granite City plant. The cost for construction of the ion exchange system is estimated at over $500,000 (R. 104). Ion exchange would also produce side waste stream of sludge that would need to be landfilled or incinerated at an annual cost of well over $1,000,000 per year (R. 104).

Reilly submitted confidential financial information in a post-hearing filing on October 7, 1989. By a Board order of October 20, 1988 the information was classified as "Not Subject to Disclosure." A review of this financial information will not be necessary in making a determination of the economic reasonableness of Reilly complying with the general rule. The determination of economic reasonableness will be based on the cost of compliance with respect to the environmental impact and not on the petitioner's ability to afford compliance.

In its post-hearing comments of February 14, 1989, the Agency estimated the cost of removal of an additional gram of mercury from Reilly's effluent would be from $1264/gram to $2537/gram depending

on the technology employed. The Agency also noted that there is no firm correlation between discharges from Reilly and exceedances from the Granite City Raw Water Treatment Plant. The concentration of mercury in the effluent from the Granite City treatment plant is reduced in two ways. First, the activated sludge plant reduces influent mercury by approximately 70% through incorporation in the sludge. Second, the mercury concentration of Reilly's effluent is heavily diluted at the Granite City treatment plant. Reilly's contribution to Granite City's effluent mercury concentration is 0.08 ug/l. This concentration is below commonly used detection limits even without any removal by Granite City. Further, the Granite City treatment plant has reported that Extraction Potential toxicity test for mercury in its sludge have been within required limits (Ex. A, p 4-3).

There is also no evidence of a correlation between the mercury discharge from Reilly's plant and a public health problem in either the Chain of Rock Canal or the Mississippi River downstream from the Granite City discharge point. The petitioner supplied data from the U.S. Geological Survey on mercury levels upstream and downstream of the Granite City discharge (Ex. A, tables 4-2 and 4-3). The survey shows that the contribution of mercury from Granite City does not appear to be measurable. The low concentration of mercury in the Mississippi is corroborated by the analysis of the intake of the Illinois-American Water Company located approximately four miles downstream from the Granite City discharge plant. The mercury concentration of water at the Illinois-American intake has been at or below 0.5 ug/l since Reilly began discharging in the Granite City treatment plant in 1984 (R. 124). The Agency also testified that fish testing for mercury in the fish tissue has not been done in the area for four years (R. 125). However, the historic results from fish testing show the mercury level in fish in the area to be below Food and Drug Administration guidelines.

A review of the Board's opinion in R70-5, in which the regulations designed to limit contamination of water and soil by mercury were adopted, reveals that the present standards for mercury concentrations in effluent were not directly related to a determinable health hazard limit. Testimony in the rulemaking indicated that any exposure to mercury could result in long-term neurological damage, chromosomal aberration and teratogenic effects in human beings. In the Matter of Mercury Standards Opinion, March 31, 1971, p. 3. The Board did not have the benefit of a federal standard to guide its rulemaking. As a result, the Board took a no-threshold approach to the problem and set the water quality standard at 0.0005 mg/l. The same standard was set for effluent to sewers and from treatment plants. The standard was established at 0.0005 mg/l because it was determined that this was the lowest concentration of mercury that could be accurately measured (Id). The opinion went on to address the use of mercury in various industries and to express the fact that variances and site-specific relief would need to be considered for various situations

(Id. at 4-7). While the opinion did not specifically address coal tar refining, this situation does appear to be of the type requiring special consideration.

## DECISION

In its comments of February 14, 1989, the Agency stated that it believes the Board can grant the site-specific relief for Reilly and Granite City from 35 Ill. Adm. Code Section 307.1102. The Agency based its decision on a balancing of the projected cost to reduce mercury with the lack of a measured effect on water quality or aquatic life. The Agency also states that Reilly's contribution to any increase in Granite City's allowable effluent limit of 0.0005 mg/l of mercury is not ascertainable. As a result, the Agency urges that the present effluent limit in 35 Ill. Adm. Code Section 304.126(a) be retained for the Granite City treatment plant.

The Board agrees with the Agency's recommendation. In light of the high incremental cost of reducing the concentration of mercury in Reilly's effluent with respect to the undetermined detrimental effect the higher concentration has on water quality or aquatic life, compliance with the general rule is economically unreasonable. This determination is enforced by the Board's opinion in R70-5 which explained that the general rule was established at the lowest measurable concentration and may require review and adjustment for individual situations when better information is available concerning the environmental impact of the presence of mercury. The Board also agrees there is no reason to adjust the allowable effluent limit of 0.0005 mg/l of mercury in 304.126(a) for Granite City's treatment plant.

The Agency also recommended that the Board state any site specific rule in this matter on a mass basis to provide for averaging of the variable mercury concentration and to fix the mercury loading at the present operation level of the plant. In response to this recommendation, Reilly proposed an amended rule which has been adopted by the Board. Additionally, after discussions with JCAR, the rule as proposed in the instant Final Notice specifically references Reilly Industries, Inc., Granite City Facility.

## ORDER

The Board hereby proposed the following amendment to 35 Ill. Adm. Code Section 307.1102. The Board directs the Clerk of the Board to submit the amendment to the Secretary of State's Office for Final Notice publication.

PART 307
SEWER DISCHARGE CRITERIA

SUBPART B: GENERAL AND SPECIFIC PRETREATMENT REQUIREMENTS

Section



SUBPART B: GENERAL SPECIFIC PRETREATMENT REQUIREMENTS

Section 307.1102 Mercury

a) Except as provided below, no person shall cause or allow the concentration of mercury in any discharge to a publicly owned or publicly regulated sewer system to exceed the following level, subject to the averaging rule contained in 35 Ill. Adm. Code 304.104(a):

| CONSTITUENT | STORET NUMBER | CONCENTRATION mg/l |
|---|---|---|
| Mercury | 71900 | 0.0005 |

b) It shall be an exception to subsection (a) if the discharge is to a publicly owned or publicly regulated sewer system which is required to meet a limitation less stringent than the 0.0005 mg/l mercury concentration in which case the discharge limitation shall be the same as that applicable to the publicly owned or regulated sewer system to which it discharges.

c) It shall be an exception to subsection (a) if all the following conditions are met:

1) The discharger does not use mercury; or, the discharger uses mercury and this use cannot be eliminated; or, the discharger uses mercury only in chemical analysis or in laboratory or other equipment and takes reasonable care to avoid contamination of wastewater; and,

2) The discharge mercury concentration is less than 0.003 mg/l, as determined by application of the averaging rules of 35 Ill. Adm. Code 304.104(a); and,

3) The discharger is providing the best degree of treatment consistent with technological feasibility, economic reasonableness and sound engineering

judgment. This may include no treatment for mercury; and,

4) The discharger has an inspection and maintenance program likely to reduce or to prevent an increase in the level of mercury discharges.

d) The discharge of wastes from medicinal or therapeutic use of mercury, exclusive of laboratory use, shall be exempt from the limitations of subsection (a) if all the following conditions are met:

1) The total plant discharge is less than 227 g (one half pound) as Hg in any year;

2) This discharge is to a public sewer system; and

3) The discharge does not, alone or in conjunction with other sources, cause the effluent from the sewer system or treatment plant to exceed 0.0005 mg/l of mercury.

e) No person shall cause or allow any discharge of mercury to a publicly owned or publicly regulated sewer system which, alone or in combination with other sources, causes a violation by the sewer treatment plant discharge of the water quality standard of 35 Ill. Adm. Code 302 for mercury applicable in the receiving stream.

f) For purposes of permit issuance the Agency may consider application of the exception of subsection (b) or (c) to determine compliance with this Section. The Agency may impose permit conditions necessary or required to assure continued application of the exception. When subsection (b) or (c) applies, the Agency may impose an effluent limitation in the permit which allows the discharge of a concentration of mercury greater than 0.0005 mg/l but not more than 0.003 mg/l.

g) The mercury standards of Section 307.1102 shall not apply to the Reilly Industries, Inc. Granite City which discharges to any publicly-owned treatment works which receives such a manufacturing facilities wastewater. The amount of mercury discharged by any such manufacturing facility shall not exceed a monthly average of 0.025 mg/l nor a maximum of 0.035 mg/l or 7.5 grams per day, subject to the Board's averaging rules during any one day.

IT IS SO ORDERED.

I, Dorothy M Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above Opinion and Order was adopted on the 18th day of October, 1989, by a vote of 7-0.

Dorothy M. Gunn

Dorothy M. Gunn, Clerk,
Illinois Pollution Control Board