

ILLINOIS POLLUTION CONTROL BOARD
August 4, 1988

REILLY TAR AND CHEMICAL CORP.)
)
 Petitioner,)
)
 V.) PCB 88-47
)
ILLINOIS ENVIRONMENTAL)
PROTECTION AGENCY,)
)
 Respondent.)

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

This matter comes before the Board upon a March 8, 1988 petition and an April 13, 1988 amended petition filed by Reilly Tar and Chemical Corporation (Reilly) and the City of Granite City (City) requesting a one year extension of its prior three year variance granted in PCB 84-82, until August 31, 1989, from 35 Ill. Adm. Code 307.103 as it relates to Reilly's mercury discharge to the City's sewer system. On July 11, 1988, the Illinois Environmental Protection Agency (Agency) filed its recommendation that variance be granted, subject to conditions. Hearing was waived and none was held.

Reilly distills coal tar, which is a by-product of coke making, at its refinery in Granite City. Its products include: coal tar pitch, used primarily as a binder for anodes and cathodes used in aluminum production; 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.

Reilly annually batch processes about 12-15 million gallons of coal tar obtained from various sources, one source being Granite City Steel, from which Reilly purchases their total production of coal tar. 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 is as follows (Pet. Appendix B-5):

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

<u>Source</u>	<u>Mercury (mg/l)</u>	<u>Volume of Wastewater (gal/week)</u>	<u>Mercury Load (g/week)</u>	<u>Percent of Total</u>
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 in its PCB 84-82 variance 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, pursuant to its present variance, 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	Reilly	(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 organic-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 organic-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.

COMPLIANCE EFFORTS

Reilly's pretreatment efforts have produced a discharge meeting all pretreatment requirements except for mercury. The pretreatment goal was to reduce incoming levels of 0.1 mg/l (100 ppb) down to 0.003 mg/l (3 ppb), presumably as a step to qualify for the pretreatment exception in 35 Ill. Adm. Code 307.103(c), which allows a 0.003 mg/l, instead of 0.0005 mg/l, discharge if all other requirements of that subsection are met. Reilly believes that it can now comply with a 0.025 mg/l monthly average (as well as a .035 daily average) if variance were granted. However, Reilly has concluded that its only relief now is site specific relief, for which it has applied. (R88-9) Reilly asserts that its treatment system was one of only two systems out of eleven studied for regulating a large number of priority pollutants that was considered "by USEPA to be classified under the category of Best Available Technology Economically Achievable (BAT) for the Organic Chemicals, Plastics and Synthetic Fibers (OCPSF) industrial category" (Pet. p. 3). The Agency stated that the fact that USEPA has considered Reilly's treatment facility to be BAT does not apply to mercury, since there is no federal law regulating mercury discharges by petitioners as a priority pollutant. In the USEPA's notice of final rule 52 F.R. 42522 (November 5, 1987), certain priority pollutants, including mercury, were listed as not regulated, and the reasons why not; in the case of mercury, the reason given was that mercury was "Detected in Treated Effluents From a Small Number of Discharge Sources and Uniquely Related to Those Sources" (see Appendix D-Toxic Pollutants of the Notice, Id. 42568). The Agency correctly asserts that mercury was not excluded because of other potential reasons, i.e., trace amounts and insignificant toxic effects, or sufficient controls by existing technologies. The USEPA's authority to make such a determination is contained in paragraph 8(a)iii, 1842 of a modified settlement agreement in NRDC v. Train, 12 ERC 1833, March 9, 1979.

The Agency asserts that the necessary degree of treatment is contained in the above mentioned exception provisions in the Board's rules for mercury where, in Section 307.103(c)(3) the requirement is the "best degree of treatment consistent with technological feasibility, economic reasonableness and sound engineering judgment". The Agency does not at this time agree that Reilly is providing the best degree of treatment.

The record addresses a number of alternatives. The Board will address the compliance efforts in summary, recognizing that many treatment strategies under these general headings were discussed in the Petition, and others were summarized in the PCB 84-82 Opinion:

- 1) Use of filters to replace the wet scrubbers. Reilly rejected this option because of minimal reductions, and short life due to continual plugging. The Agency feels filter design has recently improved but agrees that greater potential reductions exist in other waste streams, particularly diversion of stormwater and separate treatment of the wet distillate cut.
- 2) Diversion of Stormwater. The stormwater averages 0.003 mg/l and might be directly discharged pursuant to the Section 307.103(c) and subject to City approval of treatability for phenols, thus reducing hydraulic overload. However, the Agency feels this option is not essential since the limit is exceeded without the stormwater flow. The Board notes that the City now has an Agency approved Pretreatment Program, so the City will approve or disapprove Reilly's discharges and thus the Agency need not renew Reilly's permit, due to expire on August 31, 1988.
- 3) Increase mercury precipitation. Reilly has undertaken a number of efforts in this area. The Agency had no comment except to note that Reilly now is able to convert 75% of the mercury to precipitate as compared to 52% in 1985-86 (Pet. B-9, Agency Rec. p. 7), allowing removal by the clarifier.
- 4) Increased clarifier efficiency. Changes in design, operation, settling aids and flow have been attempted. The Agency believes a larger and newer clarifier could reduce the present solids concentration in the discharge by 90%, although 0.003 mg/l mercury would not be achieved.
- 5) Source separation. The Agency notes that the Petition does not discuss the possibility of treating the wet cut separately and before treatment for organics in the bio-reactors.

ENVIRONMENTAL ASSESSMENT

Reilly asserts that since grant of variance in 1984, Mississippi water quality has not degraded, referencing the U.S. Geological Survey's (USGS) monitoring data collected 20 miles upstream from St. Louis (Alton) and 137 miles downstream from St. Louis (Thebes). (Pet. B-3,4) The Agency notes that no statistical variation would be expected, given the large flow in the Mississippi River. The Agency also presents other environmental and health effects data concerning mercury: The Food and Drug Administration guideline limit for fish flesh is 1.0 ppm (1 mg/l), which was not exceeded during the present

variance*; the USEPA published a document in 1980 ["Ambient Water Quality Criteria for Mercury" (EPA 440/5-80-058, October 1980), which established criteria of a) 0.00057 g/l (0.57 mg/l) for total recoverable mercury as a 24 hour average, with no exceedences of 0.0017 g/l (1.7 mg/l) at any time to protect freshwater aquatic life and b) an ambient water criteria of 144 ng/l (0.000144 mg/l) to protect human health.

Regarding the latter study, the authors used incidences of mercury poisoning to determine a lowest observable effect level (LOEL) of 200 g/day/70 kg for ingested mercury. The mercury concentration in the average diet for food from various species was calculated using a "Practical Bioconcentration Factor" (PBCF) to quantify a species-specific ability to concentrate mercury. The median PBCF was then used to back calculate a water mercury concentration that would produce the fish mercury concentration, and that figure was given a safety factor of 10.

The Agency, referenced the following assumptions in the criteria document and made the following observations (citations to record omitted, Agency Rec. 9,10.):

Species	Amount of Fish Eaten g/day	Mercury Concentration in Edible Fish Tissue ppm (mg/l)	PBCF
Trout	0.561	0.240	6000
Bass	0.467	0.200	5000
Catfish	0.467	0.070	1750
Pike	<u>0.224</u>	0.390	9750
Total	1.719		5500
Median			

- a. The total amount of freshwater fish is 1.719 g/day which is less than 10% of the 18.7 g/day/70 kg of the average total fish and shellfish intake.
- b. The mercury concentration of fish tested in the Mississippi River upstream and downstream of the facility is generally less than that assumed in the guidance document.
- c. The PBCF calculated in the guidance document uses a freshwater total mercury concentration of 40 ng/l (0.000040 mg/l or 0.00000040 g/l). From the very limited data, it

* The Agency is presumably referring to the FDA action level for mercury in fish and shellfish of 1.0 mg/kg referenced in 49 FR 45663, November 1984.

appears that the actual Mississippi water concentration is higher but the fish concentration is lower i.e. that the assumed PBCF is too high to describe the Illinois data.*

The Agency also repeats, as part of its recommendation, specific findings contained in the Board's R70-5 Opinion by Mr. Currie adopted March 31, 1971:

1. Although various mercury compounds are of varying toxicity, all are subject to bacterial conversion into the highly toxic methyl compounds. This conversion is likely to occur under conditions common to Illinois stream beds and to soils. Accordingly it makes sense to deal with all discharges of mercury and its compounds on the assumption that they may end up in methyl form.
2. Once mercury gets into the environment it neither degrades to harmless substances nor ceases to exist. Mercury deposits presently existing on stream beds will be a continuing source of methyl mercury to the water for many years. Dredging of deposits has so far proved of doubtful value, since it stirs up the mercury and increases water concentrations for the short term. Moreover, mercury in bottom sediments is often converted to the volatile dimethyl mercury, which escapes to the atmosphere and comes down in the rain many miles away. In short, mercury once put into the environment remains where it can do harm for a very long time.
3. Mercury is biologically concentrated by fish on the order of 3000 times. This means that very low concentrations in water will result in substantially higher concentrations in fish, which people eat.

(citations to record omitted)

The Agency requests the Board's official notice of the rest of its R70-5 opinion and wishes to emphasize the following quote from Mr. Currie at p. 4:

* The Board notes that the 1980 document cited by the Agency and discussed above has been updated ("Ambient Water Quality Criteria for Mercury - 1984", EPA 44015-84-026, January, 1985), and references procedures described in the "Guidelines for Deriving Numerical Water Quality Criteria for the Protection of Aquatic Organisms and their Uses" by Stephans, C.E. et al. 1985 (available from NTIS, Springfield, VA). The Board requests that these documents (or updates, if any) be addressed in Reilly's site-specific proceeding or other subsequent proceedings, if any.

Furthermore, even apart from the nondegradable aspect of mercury pollution, it would be folly to set effluent standards at such a level as to permit existing pollution sources in every case to degrade the water to the level set by the standard. To do so would transform standard designed to protect the environment into licenses to degrade. It would ignore the fact that a water quality standard prescribes not the ideal condition of the environment, but an outer limit of dirtiness that should be avoided if it reasonably can be. It would commit us to the philosophy of allowing the environment to be as dirty as we can bear it, when our correct philosophy should be to make the environment as clean as we reasonably can. Finally, to allocate to existing users the entire waste-diluting capacity of the environment would leave no room for new industry, encourage inefficient practices, and either discriminate against new entrants or require a re-examination and tightening of effluent limit whenever a new facility was contemplated.

ECONOMIC INFORMATION

Reilly asserts that its pretreatment system's original capital cost exceeded \$900,000. Subsequent improvements have increased the capital investments to over \$1,300,000 with operating costs running \$11.20/1000 gallons of treated water. Since Reilly asserts it is able to treat up to 70,000 gal/day, and the system was designed to treat about 40,000 gal/day, the daily operating costs are presumably about \$784 and \$448 respectively. Reilly also stated that its estimate when it sought its present variance was \$15,000 to reach the 0.003 mg/l level; however, it has spent about \$100,000 to date (Pet. p. 21, B-15) and, although some progress has been made, Reilly has found no technology to date to reach that level. Reilly has concluded:

Reilly, during the course of investigating the various technologies found they would either

1. Not reduce the mercury concentration below 3 ppb.
2. Create additional waste which would have to be disposed of (a problem not currently existing since Reilly can recycle all the sludge presently being generated in the treatment plant)
3. Cause Reilly's product to not meet customer specifications.
4. Increase operating cost at Reilly's Granite City plant to a point that Reilly could not

recover the cost and remain competitive in its area of marketing (i.e. Reilly's Granite City plant would no longer remain a profitable operation). 5. A combination of some or all of the above four. (Pet. p. 21)

Reilly has also committed to continue search for and evaluate any new technology that may become available. Reilly also has informed the Agency that it will continue the compliance plan of the present variance, specifically changes in clarifier operation to increase solids capture as required by Granite City's Pretreatment Program (Agency Rec. 7).

BOARD CONCLUSIONS:

At the outset, the Board emphasizes, as it did in PCB 84-82, that variance is not requested from the City's effluent standard, nor is such variance being considered here.

Petitioners, as the Agency correctly asserts, have provided no new compliance plan but the adoption of a site specific rule in R88-9; however, a compliance plan that consists solely of a site specific rulemaking is not acceptable (Alton Packaging Corporation v. IEPA, PCB 83-49, May 5, 1988). Nevertheless, the Board has occasionally granted short term "more information" or "more research" variances for the purpose of developing a workable compliance plan, and it will so grant a one year variance here, with conditions. The Board is not persuaded that Reilly has fully exhausted its design and operating options that particularly could lead to compliance with 35 Ill. Adm. Code 307.103(c), which allows a concentration of 0.003 mg/l if other provisions of that subsection are met.

This grant of variance is a close call. While the environmental and human health effects are not substantial during this grant of variance, mercury discharges are inherently a cause of concern. On the other hand, Reilly appears to have in good faith under its present variance actively pursued treatment strategies, so its hardship is not self imposed. Under no circumstances, however, should Reilly construe this one year extension, explicitly or implicitly, as allowing a relaxation of Reilly's efforts to come into full compliance during the pendency of the site-specific proceeding. The Board particularly notes the Agency comments that the use of filters to replace the wet scrubber has not been persuasively shown to be infeasible, and that the feasibility of separately treating the wet cut for mercury before treating for organics in the bio reactors has not been addressed. Efforts to improve clarifier design and operation should be continued. While not essential, the option of direct diversion of stormwater flow would reduce hydraulic load on the treatment facility; the record indicates, however, that this strategy might not enhance compliance. The direct

diversion question aside, the removal and treatment of the contaminated groundwater from the lagoon site must continue as part of Reilly's RCRA closure plan.

Therefore, the Board finds that Reilly would suffer an arbitrary or unreasonable hardship; Reilly's hardship resulting from denial of variance outweighs the injury of the public from grant of the petition. The Board will also set the discharge concentration at the 0.025 mg/l (25 ppb) limit proposed by Reilly rather than the 0.035 mg/l limit in the present variance. The Board will not order Reilly to comply with its proposed daily limit of 0.025 mg/l (25 ppb); rather the Board will apply the averaging rule "as is", since there is insufficient information in the record to evaluate this limit. The Agency's proposed conditions will also be included with little change. As in the prior PCB 88-47 proceeding, Granite City also will be granted variance from Section 307.103 so the City can allow Reilly to discharge into its sewer system.

This Opinion constitutes the Board's findings of fact and conclusions of law in this matter.

ORDER

Reilly Tar and Chemical Corporation and the City of Granite City are hereby granted variance from 35 Ill. Adm. Code 307.103, as it applies to Reilly's discharge, until August 31, 1989, subject to the following conditions:

1. Reilly Tar and Chemical Corp. shall not discharge mercury at a concentration greater than 0.025 mg/l, subject to the averaging rule of 35 Ill. Adm. Code 304.104(a), to the City of Granite City sewer system, nor shall the City of Granite City allow Reilly Tar and Chemical Corp. to discharge mercury at a concentration greater than that level.
2. Reilly Tar and Chemical Corp. shall conduct a compliance program to reduce the mercury concentration in its effluent consistent with the above Opinion and improve the accuracy of its mercury analysis.
3. Reilly Tar and Chemical Corp. shall continue to submit quarterly progress reports during the variance period to:

Mr. Mark Books
Illinois Environmental Protection Agency
Division of Water Pollution Control
Compliance Assurance Section
2200 Churchill Road
Springfield, IL 62706;

- 4. Within 45 days of the date of this Order, Petitioner shall execute and forward to Thomas Davis, Enforcement Programs, Illinois Environmental Protection Agency, 2200 Churchill Road, Springfield, Illinois 62794-9276, a Certification of Acceptance and Agreement to be bound by the terms and conditions contained herein. This variance will be void if the Reilly Tar and Chemical Corp. fails to execute and forward the certificate within the 45 day period. The 45 day period shall be held in abeyance for any period during which the matter is appealed. Failure to execute and forward the Certificate within 45 days renders this variance void and of no force and effect as a shield against enforcement of rules from which variance was granted. The form of the certification shall be as follows:

CERTIFICATION

I, (We), _____, having read the Order of the Illinois Pollution Control Board, in PCB 88-47, dated August 4, 1988, understand and accept the said Order, realizing that such acceptance renders all terms and conditions thereto binding and enforceable.

Petitioner

By: Authorized Agent

Title

Date

- 5. Section 41 of the Environmental Protection Act (Ill. Rev. Stat. 1985, ch. 111¹/₂, par. 1041) provides for appeal of final Orders of the Board within 35 days. The Rules of the Supreme Court of Illinois establish filing requirements.

IT IS SO ORDERED.

I, Dorothy M. Gunn, Clerk of the Illinois Pollution Control Board, hereby certify that the above Opinion and Order was adopted on the 4th day of August, 1988, by a vote of 7-0.

Dorothy M. Gunn

Dorothy M. Gunn, Clerk
Illinois Pollution Control Board