

ILLINOIS POLLUTION CONTROL BOARD
February 20, 1985

UNION OIL COMPANY)
OF CALIFORNIA,)
)
Petitioner,) PCB 84-66
)
v.)
)
ILLINOIS ENVIRONMENTAL)
PROTECTION AGENCY,)
)
Respondent.)

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

This matter comes before the Board upon a May 31, 1984 petition for variance filed by Union Oil Company of California (Union) requesting a two year extension of relief from 35 Ill. Adm. Code 304.122(b) or until final resolution of its site-specific regulatory proceeding R84-13; whichever is sooner. Section 304.122(b) provides a 3.0 mg/l ammonia nitrogen effluent standard applicable to Union's Chicago Refinery discharge into the Chicago Sanitary and Ship Canal. In its petition Union requested that pending resolution of its site-specific request it be allowed to discharge ammonia nitrogen at levels of 775 lbs/day monthly average and 1,705 pounds daily maximum which correspond to U.S.E.P.A. BAT allowables. The most recent variance, PCB 82-87, set the levels at 550 and 1,010 pounds respectively. In its Response to the Agency Recommendation Union "requests that the condition relating to effluent ammonia quantity be revised to consider the increased ammonia from the coker complex".

On July 19, 1984, the Board granted the Illinois Environmental Protection Agency's (Agency) motion to file its recommendation instanter. Union's response was filed on July 23, 1984. Meanwhile, Union experienced an explosion and fire later that day. The Board granted Union's motion to defer decision in this matter (August 22, 1984). An amended petition subsequently was filed on November 19, 1984. The Agency moved to file its recommendation instanter which was granted by the Board on January 10, 1985. On February 7, 1985, the Agency filed a motion to allow the filing of a supplemental recommendation. Union objected in its filing of February 14, 1985. The motion is granted. Hearing was waived and none was held. One citizen comment was received by the Agency on December 20, 1984 and was attached to its recommendation. The Board does not interpret the comment as an objection so as to trigger a hearing in this matter.

Union has been granted four previous variances from the ammonia nitrogen effluent limitation found at section 304.122(b):

PCB 77-163, September 29, 1977; 27 PCB 511
 PCB 78-168, September 21, 1978; 31 PCB 499
 PCB 80-124, September 4, 1980; 39 PCB 438
 PCB 82-87, October 5, 1982; 49 PCB 43
 and December 2, 1982; 50 PCB 57

The variance in PCB 82-87 imposed a monthly average ammonia nitrogen effluent limitation of 550 lbs/day and a daily maximum of 1,010 pounds.

Union owns and operates a petroleum refinery located in Lemont in Will County which has a rated capacity of 154,000 barrels of crude oil per day. Most of the oil used is sour crude which is high in nitrogen content and which contributes to the high ammonia nitrogen levels in its wastewater discharge. The refinery draws from and discharges to the Chicago Sanitary and Ship Canal. After treatment in Union's wastewater treatment plant (WWTP), approximately 3.3 million gallons per day (MGD) of process wastewater and contaminated surface runoff are discharged. The WWTP consists of a combined flow equalization and storm basin, two API separators, a primary clarifier, activated sludge basin and a polishing pond. In-plant technology includes three sour water strippers, two stripper storage tanks, and the recycling and treating of all cooling water. Union's volume of treated effluent is about 28 gallons per barrel of crude oil refined (USEPA BAT guidelines are 42 gallons per barrel).

In lieu of direct compliance with 35 Ill. Adm. Code 304.122(b), Union has filed for site-specific regulatory relief (R84-13).

The data in the chart below show that since January 1983, Union has complied with the interim ammonia nitrogen variance limitations of 550 lbs/day monthly average and 1,010 lbs. daily maximum. Union expects that its expanded Delayed Coker Unit and its new Needle Coker Complex will increase the ammonia nitrogen concentration of its effluent by 73 lbs/day under "specified process conditions" (Response at 3). Union believes that the strippers will not remove all the extra ammonia nitrogen anticipated (Am. Pet. at 5).

Assuming the monthly average ammonia nitrogen limitation of 550 lbs/day was retained and further assuming an additional 73 lbs/day ammonia nitrogen, based on the chart data, there would be excursions above the limitation. Union has failed to make a convincing case for the requested 775 lbs/day monthly average level in this proceeding. The Board will, however, increase the current monthly average level to 625 lbs/day to allow for the increase expected from the coker facilities. The Board notes that the Agency has supplied data in terms of a thirty day average rather than a monthly average.

A summary of the effluent ammonia data submitted by Union in its discharge monitoring reports (DMR's) follows:

Month	Flow MGD 30 day Avg.	Quantity (lbs/day)		Concentration mg/l Avg.
		30 day Avg.	Max.	
*July 84	0.67	235.4	297.0	20.7
June 84	3.74	327.8	684.2	4.8
May 84	2.85	534.6	990.0	10.2
April 84	4.25	418.0	759.0	11.8
March 84	3.54	545.6	970.2	18.5
Feb. 84	2.76	519.2	827.2	23.1
Jan 84	0.80	244.2	400.4	36.7
Dec. 83	2.39	391.6	693.0	19.7
Nov. 83	2.76	514.8	673.2	22.4
Oct. 83	3.40	503.8	765.6	17.8
Sept. 83	3.62	506.0	662.2	16.8
Aug. 83	3.28	451.0	807.4	16.5
July 83	3.82	519.2	699.6	16.3
June 83	2.42	536.8	695.2	26.7
May 83	3.18	499.4	717.2	18.9
April 83	4.61	539.0	690.8	14.1
March 83	4.06	473.0	803.0	14.0
Feb. 83	.81	543.4	930.6	23.3
Jan. 83	.04	506.0	673.2	20.0

* Explosion and fire of July 23, 1984 terminated refinery activities. This data is from the January 7, 1985 Agency Recommendation. The original kilogram/day values have been converted into lbs/day by use of the multiplier value 2.2.

The daily maximum interim limitation of 1,010 lbs/day ammonia nitrogen, as the above data point out, was not violated. Assuming an additional 73 lbs/day, there would have been two excursions during the listed 19 months. Therefore, the Board will increase the daily maximum to provide for the increase in ammonia nitrogen expected as a result of the coker facilities. The Board will increase the daily maximum ammonia nitrogen interim limitation to 1,160 lbs/day.

The Board believes that Union will be able to meet these limitations over the period of this variance. The Board will address the need for long term relief in light of expected increases in nitrogen in crude oil in the regulatory proceeding. In granting this variance, the Board specifically notes that Union's water conservation practices increase the concentration of ammonia nitrogen in its effluent, but not the total amount discharged. The Board has no intention of penalizing Union for conserving water.

For a history of Union's efforts at compliance see Table 1 in its response to the Agency recommendation. Of note during the last variance period is the use of a sulfide removing chemical and additional steam to enhance nitrification, full scale trial addition of Sybron/biochemical mutant bacteria to establish a nitrifier population, and the installation of permanent dissolved oxygen analyzers in the aeration basin (Response, Table 1). The additional steam and bacteria did not increase nitrification (Am. Pet. at 11). Present annual operating and maintenance costs are over \$1,800,000 (Am. Pet. at 6). Present design projects include hydrogen peroxide addition to the WWTP and final clarifier modifications.

Alternative systems to meet the 3 mg/l ammonia nitrogen effluent standard were studied by Union's consultants in the Aware Report which is incorporated into this variance proceeding. Considered not technically feasible were single-stage activated sludge, single stage activated sludge with mutant bacteria, land application, ozonation, air stripping and steam stripping (R84-13 Aware Report at 3-22). Other systems which can meet the 3 mg/l ammonia nitrogen standards but not consistently include: single stage activated sludge with powdered activated carbon, two stage activated sludge, two stage biological treatment with activated sludge in the first phase and fixed media in the second stage, and ion exchange (Id. at 3-23). Breakpoint chlorination can consistently meet the 3 mg/l standard but its use would result in the formation of potentially toxic chlorinated hydrocarbons (Id. at 4-21 through 4-24). Its capital cost is \$1,950,000 and its operating and maintenance cost is \$932,000 per year (Id. at 4-24).

The environmental impact of the granting of variance is minimal. Union calculated its discharge of ammonia to the Chicago Sanitary and Ship Canal as increasing the concentration in the Canal by 0.050 mg/l (Am. Pet. at 14). The ammonia nitrogen loadings from the three Metropolitan Sanitary District of Greater Chicago's (MSD) WWTPs total 93.6 percent of all such loadings to the Illinois River system which includes the Canal. Union discharges 1.3 percent (Am. Pet. 22). At the Lockport sampling station, the secondary use ammonia nitrogen standards of 35 Ill. Adm. Code 302.407 are being consistently violated (Am. Pet. 16, 24). Neither Union nor the Agency address whether the Illinois River downstream meets the general use ammonia nitrogen water quality standards of section 302.212.

As for stream dissolved oxygen concentrations, the secondary use water quality minimum standard of 4 mg/l for the Canal is being violated (Am. Pet 16, 24; see 35 Ill. Adm. Code 302.405, 303.441). Union alleges that these dissolved oxygen violations are due to the discharges upstream of the Union facilities (Am. Pet. 16), most likely referring to the MSD's Northside, Calumet and West-Southwest wastewater treatment plants. The general use dissolved oxygen standards downstream for the Illinois River were violated five times in two years (Am. Pet. 15).

The Board finds that the granting of the variance will cause minimal environmental impact. Union should, however, continue its efforts to reduce the concentration of its ammonia nitrogen discharge.

Given that a technically feasible and economically reasonable means of meeting the 3 mg/l ammonia nitrogen standard has not been identified despite Union's efforts, the Board finds that denial of variance would impose an arbitrary or unreasonable hardship. Because Union did timely file its petition and that any delay (explosion) was beyond its control, the term of variance will be granted from September 29, 1984 until April 25, 1987 or until the Board renders a final decision on its site-specific regulatory proposal, R84-13, whichever is sooner. The variance will be subject to conditions. The interim ammonia nitrogen effluent limitations shall be a monthly average of 625 lbs/day and a daily maximum of 1,160 lbs/day. Union shall continue to monitor and report discharge data. The Board believes that the condition requiring monitoring of the coking complex discharge is necessary. However, the Board agrees with Union that condition number 5 of the Agency recommendation, which recommends the study of additional ammonia nitrogen removal systems, is unnecessary in light of the Aware Report. Petitioner shall continue its research to identify means of further reducing its discharge of ammonia nitrogen.

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

ORDER

Union Oil Company of California, Chicago Refinery, located in Lemont, Illinois is hereby granted a variance from 35 Ill. Adm. Code 304.122(b) subject to the conditions below:

1. This variance begins on September 29, 1984 and expires on April 25, 1987 or when a final decision is rendered by the Board in R84-13, whichever is sooner.
2. The interim effluent ammonia nitrogen limitations shall be a monthly average of 625 lbs/day and a daily maximum of 1,160 lbs/day.
3. The discharge shall be monitored and reported as stated in petitioner's NPDES permit.
4. Petitioner shall sample and monitor flows from the Delayed Cokers and the new Needle Coker complex to determine the effect of the increased Delayed Coker capacity and the new Needle Coker complex on ammonia loadings to the treatment plant and on effluent quality and quantity from the treatment plant.

- 5. By December 31, 1985, Petitioner shall prepare a report on its findings from the study in Paragraph 3 above and submit it to the Agency.
- 6. Petitioner shall send four copies of all reports to the Agency at the following address:

Illinois Environmental Protection Agency
 Divison of Water Pollution Control
 2200 Churchill Road
 Springfield, Illinois 62706
 Attn: James Frost

- 7. Petitioner shall submit all data from studies referred to in Condition 4 above, when requested by the Agency. In the event that this variance is terminated by a site-specific rule, Petitioner shall submit all data to the Agency within 60 days after the effective date of the rule change.
- 8. Within 45 days of the date of this Order, petitioner shall execute and complete a Certificate of Acceptance and submit it to the Agency at the same address in Paragraph 6 above. This 45 day period shall be in abeyance during any period that this matter is being appealed.

CERTIFICATE

UNION OIL COMPANY OF CALIFORNIA, Petitioner, hereby accepts and agrees to be bound by all terms and conditions of the Order of the Pollution Control Board in PCB 84-66, dated _____.

 Petitioner

By _____, authorized agent

 Title

 Date

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 20th day of February, 1985 by a vote of 5-0.

Dorothy M. Gunn

 Dorothy M. Gunn, Clerk
 Illinois Pollution
 Control Board