Original Do Not Remove

BEFORE THE

POLLUTION CONTROL BOARD OF THE

STATE OF ILLINOIS

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

FIRST AMENDED

PETITION FOR VARIANCE FROM

SECTION 304.122

PETITION FOR VARIANCE

Pursuant to Title 35: Environmental Protection of the Illinois Administrative Code, Section 104.120, Union Oil Company of California ("Union") by it Attorneys, GEORGE C. BOND, SAM A. SNYDER, TIMOTHY R. THOMAS, RAYMOND N. FLECK and WALTER W. CRIM petitions the Illinois Pollution Control Board ("Board") for variance from compliance with Rule 304.122, of Subtitle "C" of the Board's Rules and Regulations pending final resolution of a site-specific ammonia nitrogen rule change petition filed on April 25, 1984. In support of this request, Union submits the following:

Description of Business, Area and Waterway

1. Union is a corporation under the laws of the State of California, authorized to do business in the State of Illinois. Directly or through its subsidiaries, Union is engaged in all phases of the petroleum industry, including the operation of a petroleum refinery known as its Chicago Refinery, located on a 860 acre tract of land in Will County, near Lemont, Illinois, which Refinery is the subject of this petition.

2. The Chicago Refinery was constructed during the period 1967 through 1970. It became operational in the spring of 1970 as the first major refinery built in the United States during the 1970's.

3. On July 23, 1984, an explosion and fire destroyed two process units and caused damage to various other units including the Wastewater Treatment Unit. Since that time, repairs have been made to the Wastewater Treatment Unit and it has returned to operation. The two destroyed process units are being rebuilt. One of the process units is a gas processing unit and will be replaced like-in-kind. The other process made a high octane gasoline blending component. This process will be replaced with a similar process which uses hydrofluoric acid rather than sulfuric acid as a catalyst. This new process will not increase the ammonia loading to the Wastewater Treatment Unit. All other areas of the Refinery are undergoing a complete fire-safety inspection to determine the extent of the damage. These units will

be repaired over the next few months.

4. With the exception of the Alkylation Unit, all other processing units will be returned to service by March 1, 1985. The projected startup date for the Alkylation Unit is December 1, 1985.

5. The Chicago Refinery takes its influent from and discharges its effluent into the Chicago Sanitary and Ship Canal, which constitutes part of the Chicago River System. The Refinery takes approximately 3.6 million gallons of water daily from the Canal, and discharges approximately 3.3 million gallons thereto, the difference being cooling tower evaporation and steam losses.

6. Approximately twenty-five different products are produced at the Chicago Refinery, including conventional gasolines, turbine fuels for jet airliners, diesel fuels, furnace oils for home heat, petroleum coke and various specialty naphthas which can be manufactured into 200 intermediate products, including antifreeze, dacron, detergent, industrial alcohols, plastics and synthetic rubber. However, ninety percent of the Refinery's output goes into making automobile gasolines, diesel fuels, home heating oils and turbine fuels for use in Illinois and the Midwest.

7. The Chicago Refinery has a rated capacity of 154,000 barrels of crude oil per day and employs approximately 705 people. This refinery represents a three-fold increase in capacity with one-twentieth the water use of the old Lemont Refinery, now closed, which processed some 50,000 barrels a day of crude oil and required 70 million gallons

of water daily. The increased efficiency of the Chicago Refinery is directly attributable to advance design techniques, including the use of closed cooling water systems, air cooling and close-coupled process units.

8. Due to vicissitudes of world crude supply and the depletion of "sweet" crude fields, "sour" crude is becoming an ever larger share of the petroleum reserves available for refining. Today, the majority of the Chicago Refinery's crude slate is "sour" crudes. These "sour" crudes, which have higher amounts of nitrogen and sulphur, have caused a doubling of the nitrogen input since 1977, which directly contributes to the amount of ammonia nitrogen produced at the Refinery.

9. Because of the advanced water conservation practices incorporated in its original design, the Refinery has an average treated effluent discharge volume of about 28 gallons per barrel of crude refined. This flow is considerable lower than that specified by USEPA as achievable using BAT (Best Available Technology) of 42 gallons per barrel. Ironically, Union's achievement in incorporating extensive air cooling and water recycling into this Refinery penalizes it, because the limitations contained in the Ammonia Nitrogen Rule are based on concentration instead of actual pounds discharged. The Refinery discharge is, however, in compliance with the USEPA BAT ammonia nitrogen limits which are mass emission limits based on refinery throughput and processing complexity. Moreover, Union has taken further steps which

exceed BAT ammonia nitrogen limits in improving waste water treatment at the Chicago Refinery. These include: firstly, the removal and sale of waste acids and caustics; secondly, an ammonia nitrogen thermal oxidation process that consists of pumping water, bearing such substances from the sour water stripper bottoms, at a maximum rate of approximately 40 gallons per minute, and routing it for thermal oxidation to the Union Chemicals Division coke calciner located adjacent to the Refinery, thereby eliminating a major source of both substances (to Union's knowledge, no other refinery has instituted such a program); and thirdly, designed into the Chicago Refinery, as an intergral part of its water treatment process, is a large basin have a total capacity of 50,000,000 gallons and a treated water holding pond having a total capacity of 12,000,000 gallons.

10. Union is requesting increased limits for ammonia nitrogen in this variance because of process expansions at the Refinery. In July 1984, a project was completed which increases the capacity of the Delayed Coker Unit by 50 percent. By March 1, 1985, a new Needle Coker complex will have begun operations. This complex contains a vacuum distillation unit, a hydrodesulfurization unit and a needle coker; all of which generate ammonia-bearing wastewater. This wastewater will be processed by a stripper unit for ammonia removal. However, because this process will not remove all the ammonia, an increase in effluent ammonia nitrogen will result.

Wastewater Treatment

11. An average of about 2,400 gallons per minute of process wastewater and contaminated surface runoff is currently processed through the refinery wastewater treatment system. The system includes a combined flow equalization and storm water basin, two oil-water separators, a primary clarifier, activated sludge system, and a polishing pond prior to final discharge into the Chicago Sanitary and Ship Canal. Union estimates that the total capital cost in 1968 dollars of all wastewater treatment equipment at its Chicago Refinery is $11,000,000 and the current replacement value is over $38,000,000. Union further estimates that the annual operating cost of all such equipment is currently over $1,800,000. In-plant technology at Union's Chicago Refinery includes: (a) sour water strippers, (b) segregation of sewers, and (c) minimizing of all once-through cooling water. In designing the refinery, Union installed three separate sour water strippers and two stripper storage tanks, thereby exceeding the standard control practices commonly used in the industry for ammonia nitrogen removal, in terms of the number of pieces of such equipment. (The three strippers alone constitute an investment of $1,500,000 in 1968 dollars, which in terms of present replacement costs is approximately $5,200,000). Additionally, in designing the refinery, Union foresaw and avoided the control problems inherent in the use of barometric condenser water and once-through cooling water,

both potential sources of ammonia nitrogen, by eliminating barometric condensers and by recycling and treating all cooling-water.

12. Union has achieved a reduction in the ammonia nitrogen concentration of its treated effluent water since 1973 as shown in Table 1. Notwithstanding significant capital improvement and operating expenditures, compliance with the 3 mg/l standard had not been possible, and the Refinery has operated under 3 separate variances from old Rule 406 which was recodified as Section 304.122. Pursuant to Procedural Rule 304.122, Union incorporates in this pleading the Petition for Variance, the record, and the Opinion and Order, in Union Oil Company v. Illinois Environmental Protection Agency, PCB 82-87 which provides a detailed description of past efforts to comply.

Ammonia Nitrogen Reduction Program

13. The chief means by which ammonia nitrogen is removed from the effluent discharge by Union's Chicago Refinery is by (a) ammonia stripping through the use of sour water strippers and holding tanks, (b) the minimizing of all once-through cooling water, (c) the thermal oxidation of ammonia-bearing wastewater from the sour water stripper bottoms, and (d) incorporation of ammonia nitrogen into biological sludge.

14. As noted in our petition in PCB 82-87, Union has implemented a three-phase program to reduce ammonia nitrogen in the Chicago Refinery effluent. This program consists of the following: (1) source control; (2)

upgrading and optimizing existing facilities, and (3) applied research on treatment techniques.

15. The following progress has been made in the three-phases of the control program since issuance of the December 2, 1982 variance renewal.

A. Source Control

16. Chicago Refinery has continued the sewer sampling program by which grab samples are taken from process and storm sewers once per shift. These samples are analyzed for ammonia nitrogen in order to locate sources of intermittent discharges. Two portable composite samplers were placed in service to identify suspected stormwater and process sewer fugitive ammonia nitrogen discharges. No sources have been identified; however, sampling is continuing.

B. Upgrading and Optimizing Existing Facilities

17. Since the filing of Union's previous variance petition (June 28, 1982), various projects to upgrade and optimize existing facilities for the removal of ammonia nitrogen at the Chicago Refinery have been completed. Many of these projects deal with improvements to the performance and reliability of the Refinery's three sour water strippers. As stated previously, the Refinery's stripper system constitutes one of its primary means of ammonia nitrogen removal. Union not only has fully implemented this technology, but continues to investigate ways of increasing its efficiency.

18. However, while the sour water stripper system is critical

in ammonia nitrogen removal, it also constitutes a potentially major source of fugitive discharges of such substance to the Refinery's waste water treatment system. Malfunctions and breakdowns in the stripper system on occasion have resulted in the discharge of ammonia nitrogen in high concentrations to the Refinery's waste water treatment system. As a result, projects designed to improve stripper efficiency are considered to be of prime importance to the Refinery.

19. During the period of the variance, a number of projects were installed in the stripper system to improve the efficiency of this system. Equipment was installed to route stripped sour water with the lowest ammonia nitrogen content to the Crude Unit desalter and then to the wastewater treating facilities. The higher ammonia water can then be diverted to Union Chemicals Division for thermal oxidation. The metallurgy of D-[illegible] ripper overhead piping was upgraded from carbon steel to aluminum in order to increase on-stream efficiency. A sour water stripper overhead condenser will have the interior metalized with aluminum during 1984 in order to increase on-stream efficiency. Two sour water stripper overhead tube bundles will be replaced with bundles of a modified design. This new design increases the tube pitch which should reduce downtime due to bundle freeze-ups. This design also has a change in bundle head which should reduce maintenance turnaround time. The addition of vent and drain connections should improve freeze protection.

when they are taken temporarily out of service. Capital and increased operating costs associated with the stripper system will total about $650,000 for the period of the past variance.

C. Applied Research on Treatment Techniques

20. In addition to the Source Control Program and process improvements described above, Union continues to be committed on an on-going effort to attempt, by the application of research data to its waste water treatment plant, to reduce ammonia nitrogen levels in the effluent at its Chicago Refinery to achieve its ultimate goal of compliance with Rule 304.122.

21. Since 1976, Union has been engaged in an effort to achieve and maintain biological nitrification in the Chicago Refinery's treatment plan through the application of data acquired by Union and its consultants. The Refinery's waste water treatment consists of single-stage activated sludge process composed of an aeration basin and a clarifier. On several occasions during the period 1976 to date, the Refinery has succeeded in achieving nitrification but has been unable to sustain it. The most successful of these efforts occurred in 1976 when, during the summer and fall of that year, nitrification was achieved and maintained for approximately seven and one-half months, then lost during the winter of 1976-1977. Subsequently, the Refinery has experienced sporadic partial nitrification from June 1983. Neither Union nor its consultants has been able to identify with

certainty the factors upon which nitrification can be sustained at the Chicago Refinery.

22. During the period of the variance, the following investigations and projects affecting the Wastewater Treatment Plant were completed. Two full scale trials were completed in which new coagulants were added to the primary treatment system. Lime additions to the primary system was reduced simultaneously. No increase in nitrification was detected through the use of these new coagulants. A trial of Sybron/Biochemical mutant bacteria was conducted. Although activated sludge system conditions were maintained according to Sybron's specifications, no increase in nitrification was observed during the period. A continuous dissolved oxygen analyzer was evaluated for permanent installation in the aeratin tank. Continuous dissolved oxygen monitoring will allow steady-state operations which will provide more favorable conditions for nitrification. A permanent dissolved oxygen analyzer has been installed in the aeration tank. Equipment will be installed in order to add hydrogen peroxide to the Wastewater Treatment Unit in order to reduce sulfide which can hinder nitrification. Modifications will be made to the final clarifier to improve sludge settling and return a higher concentration of suspended bacteria to the aeration basin. The effluent weir of the sedimentation tank has been replaced. The new weir will prevent short-circuiting and sludge carryover into the aeration basin. The refinery has continued its

temperature maintenance program on the Wastewater Treatment Unit. Additional 125 psig steam has been added to the Wastewater Treatment Unit in order to provide an optimum temperature environment for the nitrifying bacteria. Increased costs associated with the above projects totaled $430,000 over the life of the variance.

23. A limited review of inhibition was performed using the final clarifier effluent. Two screening tests were run and in both cases some nitrification was achieved in the samples. No nitrification was occurring in the activated sludge system at the time. Since June 1983, sporadic partial nitrification has been experienced in the activated sludge system. This indicates that the inhibitory substances are being biodegraded under the existing operating conditions. Additional inhibition testing is planned.

24. Monthly average influent levels to the biological treatment system and in the treated effluent since Union's last variance are shown in Table 2. An average reduction of 5 mg/l across the treating system was achieved during that time period. This reduction equates to a 19 percent ammonia removal in the bio-system. As illustrated, the 3 mg/l standard was not met on any monthly average during the variance period.

25. As required by the Opinion and Order of the Pollution Control Board in Union's last variance (PCB 82-87), Quarterly Reports and a Compliance Plan have been submitted to IEPA in a timely manner.

26. The following are being considered as possible areas of investigation in the Ammonia Nitrogen Reduction Program over the course of the next variance:

1. Installation of isolation block valves on stripper overhead air coolers.

2. Upgrade metallurgy of stripper reflux pump casings.

Total estimated costs associated with the above projects is approximately $120,000.

27. Union intends to continue its efforts to sustain biological nitrification in its existing facilities until such time as success is achieved or appears to be impossible. However, based upon Union's experience and all available sources of information on this treatment technique, it appears that biological nitrification has not yet been adapted or applied sufficiently for use in petroleum refineries of the process rate and configuration of the Chicago Refinery, with the same complex waste water, particularly those located in colder climates.

28. Over the life of the present ammonia variance, Union has spent $1,080,000 in the following areas: source control, upgrading and optimizing existing facilities, and applied research on treatment techniques.

Environmental Impact of Variance

29. The environmental impact of the variance herein requested on human, plant, and animal life in the affected area will be minimal. Union has calculated that the discharge from its Chicago Refinery of ammonia nitrogen at its 1983 effluent average flow and 1983 effluent average ammonia

nitrogen (N) concentration would increase the concentration of such substance in the Chicago Ship and Sanitary Canal by an increment of approximately .050 mg/l over that now reported as occurring at a location above Union's present effluent discharge point. This figure is based upon the Chicago Refinery's discharge since the effective date of the present variance (December 2, 1982) and the normal canal flow of 1.8 billion gallons per day. Even at the projected 7-day, 10-year low flow of 1.4 billion gallons per day, the canal ammonia concentration has been calculated to increase only .064 mg/l. Neither increase would be significant compared to the general canal ammonia concentration of approximately 1.7 mg/l. These projected increases in concentration are so small as not to be subject to detection by analytical means. Samples taken upstream and downstream of Union's outfall show no change in ammonia (N), supporting the position that this variance would have no detectable impact on stream quality.

30. Moreover, the major source of ammonia nitrogen in the Chicago Ship and Sanitary Canal is the Metropolitan Sanitary District of Greater Chicago ("MSD"), which apparently will not be in compliance with Rule 304.122 until 1985 or later. It is estimated that virtually all of the ammonia nitrogen content of the Chicago Ship and Sanitary Canal, occurring above the effluent discharge point for Union's Chicago Refinery, results directly from the effluent discharged upstream by the MSD (see Table

3). For example, according to the most recent NPDES Permits for the Calumet, Northside and West Southwest plants, the MSD is permitted to discharge up to 148,000 pounds of ammonia nitrogen per day from these three plants alone. By contrast, Union seeks this variance to discharge a maximum of less than 1.2 percent of the above referenced MSD discharge.

31. Low dissolved oxygen levels in downstream areas of the Illinois River was one of the major reasons for regulating effluent ammonia nitrogen discharges. This would be accomplished by the use of Rule 304.122 against effluents discharging into the Illinois River System and the use of Rule 302.212 which sets a water quality limit for ammonia nitrogen. Presented in Table 4 is a summary of 1978-1983 stream quality data collected by the IEPA from its own Illinois River stream quality monitoring stations for dissolved oxygen and ammonia nitrogen. Examination of the data collected form Marseilles to Valley City for the years 1978 to 1983 shows only 5 violations of the minimum dissolved oxygen level (5.0 mg/l) out of 269 pieces of data collected. It seems apparent from IEPA stream data for the Illinois River, there is no serious problem for instream dissolved oxygen. The average dissolved oxygen results were well above the 6.0 mg/l standard for all sampling points for the years 1978-1983.

32. Examination of the data from Table 5, an IEPA Chicago Sanitary and Ship Canal stream sampling station at Lockport, Illinois, show that the water quality at this

station is very poor. Out of 59 pieces of data from 1978-1983 on dissolved oxygen, 31 violations of the water quality limit were observed. Out of 67 pieces of data for ammonia nitrogen, 39 violations of the water quality limit were observed. Union contributes 0.15 percent of total canal flow and 1.3 percent of canal ammonia. The cause of these water quality problems are clearly due to the sources upstream of Union.

Relief Sought

33. Petitioner is seeking a variance from compliance with Rule 304.122 of Subtitle "C" of the Board's Rules and regulations pending final resolution of site-specific ammonia nitrogen rule change petition filed on April 25, 1984. This variance will allow Chicago Refinery to discharge an ammonia nitrogen level which corresponds to a BAT ammonia nitrogen limit calculated specifically for Chicago Refinery. This BAT limit is one which is considered to be representative of the best effluent ammonia nitrogen level that can be attained in the refining industry, based on size and process configuration. The Illinois concentration limit does not take these factors into account and effectively discriminates against a facility such as the Chicago Refinery which incorporates many water conservation features to minimize effluent discharge quantity.

34. Specifically, the BAT equivalent variance limitations requested are a monthly average of 775 pounds of ammonia nitrogen with a daily maximum of 1,705 pounds. These

limits are increased over previous limits because of two major Refinery expansion projects described in paragraph 10. It is requested that these limits become effective March 1, 1985, which corresponds to the startup date for Chicago Refinery.

35. As proven by past ammonia nitrogen reduction results, Petitioner will continue to strive for the lowest possible ammonia nitrogen discharge, regardless of the variance limitations.

Summary

36. Union requests that it be granted a variance from Rule 304.122 pending final resolution of a site-specific ammonia nitrogen rule change petition. This variance would permit discharge of ammonia nitrogen from its Chicago Refinery of 775 pounds monthly average and 1,705 pounds daily maximum, which corresponds to USEPA BAT allowables.

37. To deny Petitioner a variance within the requested guidelines would be an arbitrary and unreasonable hardship because:

- Union's discharge has no significant effect on the water quality of the Chicago Sanitary and Ship Canal.
- The technology to bring the Chicago Refinery's effluent into compliance with Rule 304.122 has not been identified, in spite of significant capital improvement and efforts on the part of the Petitioner.
- Union's research program has been intensive and responsive to the Agency and to the purposes of the

Act.

- There is no demonstrable evidence that there is any available technology to meet the limitations of Rule 304.122.
- Compliance with Rule 304.122 would require curtailment of operations at the Chicago Refinery and result in economic hardship for Union's employees and the surrounding community.

Waiver of Hearing

38. Union waives its right to a hearing, unless a objection is filed pursuant to Section 37 of the Illinois Environmental Protection Act.

Respectfully submitted,
UNION OIL COMPANY OF CALIFORNIA

By: Walter H. Crimm

TABLE 1

Annualized yearly averages for ammonia nitrogen in Chicago Refinery effluent to Chicago Sanitary and Ship Canal.

1974	--	38.0 mg/l
1975	--	30.6 mg/l
1976	--	18.5 mg/l
1977	--	16.0 mg/l
1978	--	13.7 mg.l
1979	--	10.5 mg.l
1980	--	14.8 mg/l
1981	--	13.4 mg/l
1982	--	21.3 mg/l
1983	--	27.2 mg/l
1984	(10 months)	15.6 mg/l

TABLE 2

AMMONIA DISCHARGE SUMMARY

AMMONIA CONCENTRATION (mg/l)

	MONTH	INFLUENT TO BIOLOGICAL UNIT	EFFLUENT TO CANAL
1982	June	31	23
	July	18	16
	August	27	23
	September	20	20
	October	20	20
	November	22	20
	December	13	12
1983	January	26	23
	February	27	26
	March	24	25
	April	22	19
	May	29	25
	June	44	39
	July	41	32
	August	27	24
	September	33	20
	October	35	31
	November	41	38
	December	30	25
1984	January	47	43
	February	34	25
	March	30	25
	April	15	11
	May	41	21
	June	10	12
	July	13	14
	August	--	8
	September	5	3
	October	5	2
29 Month Average		26	21

TABLE 3

AMMONIA LOADINGS OF POINT SOURCE DISCHARGES TO THE ILLINOIS RIVER SYSTEM

Source	Average lbs/day NH_3-N	% of Average Total Loading
MSDGC Northside	7240	19.0
MSDGC Calumet	24110	63.1
MSDGC Westsouthwest	4390	11.5
Union	500	1.3
Major Discharges Downstream of Union	1930	5.1
	38170	100.0

All data shown in this table was gathered from information submitted to environmental on DMR's in 1983.

TABLE 4

IEPA ILLINOIS RIVER STREAM SAMPLING STATIONS
Showing Dissolved Oxygen and Ammonia

STATION	DISSOLVED OXYGEN				AMMONIA			
Marseilles (D23)	Mean	Min	Max	Data	Mean	Min	Max	Data
1978	9.2	5.6	11.9	12	1.6	.01	3.6	9
1979	9.1	5.1	12.9	9	.97	.41	3.0	5
1980	9.2	5.6	12.6	15	1.28	.19	3.2	9
1981	9.8	6.1	16.0	16	.90	.13	1.9	14
1982	9.7	7.0	14.4	9	.98	.88	1.1	3
1983	9.7	5.5	15.1	10	.24	.32	1.7	6
Hennepin (D16)								
1978	12.9	--	--	1	0.9	.10	2.6	13
1979	11.4	--	--	1	.80	.3	3.3	10
1980	10.7	--	--	1	1.04	.62	1.3	3
1981	9.6	5.8	13.1	7	.61	.11	1.8	8
1982	8.7	6.9	11.0	7	.32	.02	1.0	7
1983	9.3	6.8	12.0	4	.43	.12	0.8	4
Lacon (D09)								
1978	NO DATA				0.7	.17	2.2	12
1979	7.2	4.5	9.5	7+	.75	.1	2.9	8
1980	10.7	--	--	1	.90	.31	1.2	3
1981	9.3	4.9	14.3	7+	.59	.04	1.8	8
1982	8.1	6.2	12.5	6	.28	.08	0.7	6
1983	9.6	5.4	12.4	5	.26	.02	0.6	5
Peoria (D30)								
1978	11.4	6.9	13.2	10	0.9	0	2.9	13
1979	9.5	5.3	12.9	11	.75	0	3.0	10
1980	8.8	8.0	9.6	2	.27	0	0.6	7
1981	8.9	5.4	12.6	11	.49	.07	1.4	12
1982	9.8	6.0	12.3	6	.34	.10	1.0	7
1983	8.5	6.7	11.4	5	.19	.10	0.5	5
Pekin (D05)								
1978	11.7	8.9	13.6	7	1.1	0	3.1	10
1979	9.1	5.8	13.7	7	.55	0	2.2	7
1980	7.0	5.5	8.2	3	.23	0	.5	8
1981	9.1	5.5	15.4	14	.44	0	.9	15
1982	8.7	6.4	10.1	3	.27	.12	.5	3
1983	8.2	5.9	11.3	5	.21	.10	.4	4
Valley City (D32)								
1978	9.2	4.1	13.0	12+	.6	0	2.6	12
1979	9.4	5.3	12.8	12	.26	.04	.44	3
1980	9.7	4.0	13.5	12+	.39	0	1.2	6
1981	8.7	6.0	12.6	12	.28	0	.78	11
1982	8.5	6.3	11.3	10	.27	.10	.67	5
1983	8.8	4.5	12.4	9+	.12	.1	.23	6

+ - 1 violation of minimum dissolved oxygen standard.

All units are milligrams per liter.

TABLE 5

IEPA CHICAGO SANITARY AND SHIP CANAL STREAM SAMPLING STATION
Showing Dissolved Oxygen and Ammonia

STATION	DISSOLVED OXYGEN					AMMONIA				
	Mean	Min	Max	Data	Violations	Mean	Min	Max	Data	Violations
Lockport (G102)										
1978	2.7	0	5.4	10	6	5.1	1.6	9.4	14	10
1979	4.7	0.4	4.5	11	9	4.4	2.1	6.8	13	9
1980	3.7	0.5	5.9	13	6	4.3	1.7	9.3	14	9
1981	5.9	1.2	12.2	9	3	3.0	.18	6.2	9	3
1982	4.1	1.0	6.8	9	3	3.0	1.5	5.4	10	5
1983	4.3	2.3	7.7	7	4	2.6	1.4	3.9	7	3

All units are milligrams per liter

STATE OF ILLINOIS)
) ss.
COUNTY OF WILL)

AFFIDAVIT

Darrell W. Bruckert, Supervisor Environmental Services, Chicago Refinery, Union Oil Company of California, being duly sworn, deposes and says that he has read the First Amended Petition for Variance, and avers that the facts contained therein are true and accurate to the best of his knowledge and belief.

Darrell W. Bruckert

Subscribed ans sworn to before me this 19th day of December, 1984.

Notary Public

My commission expires 12/18/86

CERTIFICATE OF SERVICE

I, Darrell W. Bruckert, first being duly sworn on oath, depose and state that I served the foregoing First Amended Petition for Variance on the Illinois Environmental Protection Agency by mailing copies Certified Mail, Return Receipt Requested, to the address listed below postage prepaid.

James Frost (3 copies)
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62706

Steve Ewart, Esq. (1 copy)
Illinois Environmental Protection Agency
2200 Churchill Road
Springfield, Illinois 62706

Steve Grossmark, Esq. (1 copy)
Assistant Attorney General
Environmental Control Division
160 North La Salle Street
Room 900
Chicago, Illinois 60601

Darrell W. Bruckert

Subscribed and sworn to before
me this 19th day of November, 1984.

Maureen Bingham
Notary Public

My commission expires 12/18/86