

ILLINOIS POLLUTION CONTROL BOARD
November 12, 1982

MOBIL CHEMICAL CO.,)
)
) Petitioner,)
)
) v.) PCB 82-18
)
 ILLINOIS ENVIRONMENTAL PROTECTION AGENCY,)
)
) Respondent.)

EUGENE W. BEELER, JR. (MANGUM, BEELER, SCHAD & DIAMOND) AND
WINFRED T. COLBERT APPEARED ON BEHALF OF PETITIONER,

E. WILLIAM HUTTON APPEARED ON BEHALF OF RESPONDENT, AND

LOUIS J. PERONA, ASSISTANT STATE'S ATTORNEY, APPEARED ON BEHALF
OF THE COUNTY OF BUREAU.

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

This matter comes before the Board on the petition for variance of Mobil Chemical Co. (Mobil), filed February 23, 1982 as amended July 14, 1982. Mobil seeks variance for two effluent discharges from its De Pue, Bureau County, fertilizer manufacturing plant. As to its Outfall 001, Mobil seeks a three-year variance from Section 12(a) of the Environmental Protection Act (Act) and from the 15.0 total suspended solids (TSS) effluent standard of 35 Ill. Adm. Code 304.124(a) [formerly Rule 408(a) of Chapter 3: Water Pollution]. As to Outfall 002, a two year variance is sought from Section 12(a) of the Act from the water quality standards for ammonia nitrogen (1.5 mg/l), fluoride (1.4 mg/l), and total dissolved solids (TDS) (1000.0 mg/l) contained in 35 Ill. Adm. Code 302.208 [formerly Rule 203(f) of Chapter 3].

On April 15, 1982 the Illinois Environmental Protection Agency (Agency) filed its initial Recommendation that variance be denied as to Outfall 001, but granted in part, with conditions as to Outfall 002. Based on information obtained as a result of May 26 and July 22, 1982 meetings with Mobil, the Agency amended its Recommendation August 30, 1982 to suggest that variance with conditions be granted as to each outfall, but that variance for Outfall 002 be limited to one year.

Pursuant to Bureau County's March 15, 1982 objection to the petition, hearing was held on August 31, 1982 at which the parties, the County and members of the public were in attendance. On September 16, 1982, the County petitioned the Board for leave to intervene in this matter. In the "Argument" attached thereto, the County states its support of grant of variance for the terms and with the conditions outlined in the Agency's amended Recommendation. The petition for leave to intervene is granted. As the Hearing Officer allowed the County to present testimony of two witnesses at hearing, "de facto" leave had already been granted, in a situation where a formal leave to intervene would have been within the Hearing Officer's power to grant.

Finally, on September 30, 1982 Mobil moved for leave to file instanter a "Response to Agency's Recommendation". The motion and Response recite that the Agency has no objection to this late filing, and the response outlines post-hearing discussions between Mobil and the Agency concerning both agreed to and still contested modifications to variance conditions suggested in the Agency's amended Recommendation. The motion is granted.

At hearing, technical testimony in Mobil's behalf was presented by its employee Robert D. Stevens. The Agency presented no witnesses. Bureau County presented two witnesses whose testimony was primarily directed to the Outfall 002 problem: Kenneth Abrahams whose mother-in-law was the former owner of the property on which that outfall is located, and Kathryn Zawacki whose home is located on the unnamed tributary of the Illinois River into which the outfall discharges, one mile downstream of that discharge.

Mobil's phosphate fertilizer manufacturing operation employs 117 employees to produce 250,000 tons of fertilizer per year from the raw materials phosphate rock, sulfur, and ammonia. The facility consists of a sulfuric acid manufacturing plant, a phosphoric acid manufacturing plant, and a diammonium phosphate (DAP) plant.

Outfall 001 discharges non-contact cooling water and boiler feedwater treatment effluent. Mobil currently draws 15 million gallons per day (mgd) of water from the Illinois River for use in its operation, but has the capacity to draw 20.3 mgd. 98% of this water, 14.6 mgd, is used "as is" for non-contact cooling of sulfuric and phosphoric acids. An additional 94,500 gallons are used "as is" for dilution water in the sulfuric acid plant.

The remaining 290,000 gallons are used as boiler feed water, after the water is filtered and conditioned in a cold lime-zeolite softening system to remove background solids from the raw water. Several steps in the process between intake and use of the water produce effluent with high solids contents:

1. The water enters a precipitator/clarifier where lime, soda ash and settling agents are added to clarify and precipitate calcium and magnesium. This process generates an average daily effluent of 1,000 gpd containing 1,208 pounds of solids.

2. Clarifier water from the precipitator is processed through 2 large sand filters for further solids removal. Periodic backwashing of the filters, which frequency is dependent on solids content of the river water, generates a flow of 8,250 gpd containing 64 pounds of solids.

3. The filtered water is then softened. Softener regeneration results in a discharge of 1,960 gpd containing 0.5 pounds of solids.

4. The finished water is then used for boiler feed water. Boiler blowdown results in a discharge of 30,000 gpd containing 0.5-0.6 pounds of solids.

Precipitator underflow is reunited with the non-contact cooling water stream, which then flows to two 50' X 500' settling lagoons. Filter backwash, softener regenerate, and boiler blowdown are also routed to the lagoons, prior to the lagoons' discharge into De Pue Lake, a backwater lake of the Illinois River.

Mobil asserts that the nature and extent of its failure to meet the 15 mg/l TSS limit of the Board's rules and its NPDES permit (a condition appealed in still-pending PCB 79-209) "are a direct function of the TSS levels present in the influent (intake water) from the Illinois River, i.e., the influent TSS levels are greater than 15 mg/l". Mobil further notes that the TSS levels in its non-contact cooling water discharge have been 25% - 40% lower than the TSS levels in the intake water (Ex. 5).

Mobil proposes to re-route the precipitator underflow by pumping it to an existing gypsum pond water system (Outfall 002, which is discussed in more detail, infra), rather than reuniting it with the non-contact cooling water. This system would cost \$35,000-\$40,000 and could be complete and operational by December, 1982.

Mobil has also investigated the possibility of removing the remaining 5% TSS loading added by the filter backwash, softener regenerate and boiler blowdown. Comparative costs of re-routing these streams are as follows:

<u>Waste Stream</u>	<u>Pounds/Day</u>	<u>Percent Total</u>	<u>Estimated Cost to Remove</u>	<u>Estimated Removal Cost Per Pound</u>
Precipitator/ Clarifier	1208	95	\$ 40,000	\$ 33/lb.
Sandfilter Backwash	64	5	\$200,000	\$ 3,125/lb.
Combined Boiler Blowdown and Softener Regenerate Wastewater	1	.0785	\$ 20,000	\$20,000/lb.

Mobil states that removal of the sandfilter backwash, boiler blowdown and softener regenerate wastewater would require the discharge of the backwash water into the existing closed-loop gypsum pond water system. At the current time, the water balance in this system is slightly negative (requiring small water additions). If the backwash water option was added to the gypsum pond system, the balance would become very positive, so that there would be water in excess of that required to run the plant. This would require additional capital expenditure not identified in the mentioned construction cost to either increase the system's water evaporation rate or treat contaminated pond water and discharge. As a result, Mobil considers this option infeasible.

Mobil asserts that if variance is granted to allow for re-routing only of the precipitator underflow, that environmental harm would be minimal, as the TSS in its effluent would continue to be lower than that in the influent river water.

In its amended Recommendation, the Agency recommends variance with conditions from 35 Ill. Adm. Code 304.124, but not from the Act itself. The Agency does not dispute Mobil's economic claims, and is particularly concerned about the water balance problems alleged concerning re-routing of the filter backwash, which could exacerbate the water quality problems downstream from Outfall 002. It suggested grant of variance for a three-year period, subject to conditions requiring investigation and reporting of emerging technology to cost effectively remove TSS from the process streams still tributary to Outfall 002, and to maintenance of an 8 foot depth in all portions of its settling lagoons. However, as Mobil recites in its Response, the parties have agreed that the intent of the latter conditions would be satisfied and more appropriately implemented by annual lagoon dredging and use of normal good operating practices.

The Board finds that denial of variance would impose an arbitrary or unreasonable hardship, balancing the minimal environmental impact of less-than-full compliance against the

major costs to achieve full compliance. A three-year variance from 35 Ill. Adm. Code 304.124 is granted, subject to the recommended and agreed conditions. Variance from the Act is denied as unnecessary.

What has been called Outfall 002 consists of groundwater seepage from a gypsum storage area and clearwater pond used in Mobil's phosphoric acid manufacturing process. The gypsum/clearwater pond treatment system operates on a closed-loop basis. In this recycling system, water serves as the transport medium for gypsum produced during acid manufacture and filtered out of the acid. Gypsum is slurried with pond water and pumped to the gypsum disposal area. The gypsum is settled in the gypsum pond, and most of the clear water is recycled to the acid plant. However, seepage from the gypsum pond flows into an unnamed ditch running along the perimeter of the gypsum/clearwater pond system. This ditch is tributary to Negro Creek, which is tributary to the Illinois River. Seepage to the unnamed ditch ranges from 10,000 to 28,000 gpd. The ditch fails to comply with the state's water quality standards for fluoride, ammonia nitrogen, TDS and pH, and with the federal phosphorus standard. Stream samples taken 1,200 feet downstream of the process wastewater treatment system in the period November, 1981 through January, 1982 showed levels for these parameters in the following ranges:

Fluoride	5.64 - 36.0 mg/l	Phosphorus	131. - 402.0 mg/l
Ammonia	63.4 - 230.0 mg/l	pH	6.54 - 7.27
TDS	1,224.0 - 4,556.0 mg/l		

Mobil has had a long history of problems with the pond system, which received its first operating permit in 1972. Mobil states that when the ponds were first constructed, state-of-the-art industry design recommendations were for installation of separate leak and seepage containment systems along the ponds' base. Mobil felt that an improved design eliminated the need for such containment systems, particularly since a natural clay layer between 5 and 25 feet thick underlays the ponds. The same design system was employed in a 1976 expansion of the gypsum pond, at which time a 12 inch clay liner was put inside the expanded earthen dam.

Leaks formed in the pond walls. In 1977 the Agency issued supplemental permit allowing for construction of a collection pond (swale) to contain seepage from the gypsum pond prior to its being pumped back into a clearwater pond. An experimental permit was also issued to allow construction and installation of two pilot test collection trenches, one 45 and the other 125 feet along, and appurtenant pipes, pumps, and to allow re-routing of the unnamed ditch. The system was permitted to test the feasibility of intercepting seepage from the gypsum pond before its entry into the ditch. The Agency reports that only the 45 foot trench was built, and that its use was discontinued by Mobil in 1981 since

the company felt it had no significant effect. Finally, in October 1981 the Agency issued Mobil a permit to operate a collection sump and pump back system. This involved the above described re-routing of a portion of the ditch and use of another portion to collect the seepage. The sump is used to dewater the general area upstream of the location where the existing ditch joins the by-pass. Water is pumped back to the swale.

Mobil states that it expended \$90,000 in 1978 to install the swale and pump system along the base of the affected pond. As this took care of only 90% of the seepage, Mobil began further investigation as to the problem's source. Some 4 years and \$95,000 later, Mobil states that it believes that an opening has developed along the base of the pond's earthen dam allowing small quantities of water to seep out and flow below ground level along the top of the area's underlying clay layer, to emerge in the unnamed ditch.

Mobil seeks variance to allow it to further identify and define the area subject to seepage, and to contain and return seepage to the pond system while so doing. It proposes to deepen the existing collection trench by 4' - 6', and to excavate the collection sump to contain a surge volume of 85,000 gallons to intercept rainfall runoff. It also proposes to install a new pump to operate in parallel to the existing pump. Both pumps would be piped directly to the clearwater pond.

Mobil believes that this project, as outlined, would increase pumpback system reliability to 90-95%. Construction costs are estimated to be \$90,000 - \$110,000 and the increase in annual operation and maintenance costs to be \$3 - \$5 million. Project completion time is estimated to be 10 months. Mobil considered and rejected two minimally quicker alternatives, each on the basis of lack of surge volume containment, higher costs, and greater operational difficulties.

Mobil requests that variance be extended for 14 months after construction is completed, for a variance period totalling 24 months. Two months of those months would provide a start-up cushion, while the other twelve are requested for collection of monitoring data and system evaluation. Mobil believes that this would allow it to define the limits of this latest system improvement and provide data necessary to plan any other necessary improvement. During the variance period, Mobil requests that the unnamed ditch be subject to interim water quality limits of 150 mg/l for ammonia nitrogen, 20 mg/l for fluoride, and 4,600 mg/l for TSS.

Mobil states that denial of variance would impose an arbitrary or unreasonable hardship because 1) it is unaware of any way to achieve immediate compliance with water quality standards, including plant shutdown, 2) it is currently unaware of any way to eliminate the seepage source, and 3) it believes that seepage would be unaffected by a production curtailment.

Mobil states that this improvement was designed to produce 100% containment of its wastewater, and possibly contaminated runoff from rainwater, and that it hopes the system will enable it to achieve full compliance with water quality standards. In its amended petition, it states its belief that variance would result in

"no significant detrimental impact to the nearby environment. The unnamed ditch flows 1.2 miles from the treatment pond area southeasterly to Negro Creek which, in turn, flows 1 mile south to the Illinois River. The ditch is thickly weeded and heavily wooded with scrub trees along most of its length, is not a source for public and food processing water supply, and we believe would have little, if any, use for swimming, fishing, or other recreational purposes. Slightly increased algae growth can be observed only in a few open areas approximately 1,000 feet downstream of the treatment pond area" (Am. Pet. at 13).

In its Recommendations, the Agency strongly disagrees with this assessment, believing that Mobil's discharge has had a substantial adverse impact. Ammonia nitrogen levels are "excessive, being well above acute toxicity levels for many species of fish" and "would cause algae blooms in the stream" (Rec. p. 15).

Testimony given by Donald Bosnick and Kathleen Zawacki in PCB 79-209 is cited to refute Mobil's claims. These individuals testified to the degradation of the stream from a clear, recreationally usable waterway containing aquatic life to an ugly ditch devoid of life. Each had played by the stream as children; Mrs. Zawacki had recently observed children swimming in it, but refuses to allow her own child to do so. She also testified to the strong odor occasionally given off by the stream, and to the occasional white and yellow colored bottom deposits. As Mobil has made no objection to the Board's consideration of this testimony, and as Mrs. Zawacki herself again testified in this variance proceeding, the Board will consider this information.

At hearing in this matter, Mrs. Zawacki testified to an occurrence in July, 1982. As aforementioned, the Zawacki home is located about one mile downstream of the Mobil gypsum pond; the unnamed ditch runs behind the home and is approximately 120'-140' from the Zawacki's well. Following a heavy rainfall, the ditch overflowed its banks. When the water receded, the ground had a "white-type, definite look". The water had an "awful strong gagging smell", which smell was said to be "also in our creek most of the time" (R. 85-87).

Due in part to the odor, Mrs. Zawacki has had the Agency sample the water in the creek on at least 2 occasions (Bureau County, Ex. 1,2), analysis of which samples show water quality violations. In September-October, 1980 after her well water

also began to smell, the well water was sampled by some state agency, probably the Department of Public Health. Sample results were not entered into evidence (R. 99).

On cross-examination, Mr. Stevens, Mobil's witness, testified that gypsum itself does not have an odor. He did however testify that he has smelled an odor near Mobil's clearwater ponds. Mr. Stevens could not specify the odor's source, but did not refute the Agency's speculation that the source of the odor might be from sulfate concentrations, while agreeing that gypsum, a crystalline calcium sulfate, is considered an inert substance (R. 109-110).

Concerning Mobil's hardship allegations, in its Recommendation, the Agency states its belief that "Mobil has made something less than an all-out effort to achieve compliance. Breakdowns and overflows of the bypass/sump/collection system began to occur in April 1981, and the Agency notes that Mobil has given "no explanation for its continued failure to resolve [them]". No explanation was given for the failure to dig the second pilot test trench for which an experimental permit was issued. Delay in follow-up on preliminary consultant's reports was also noted (Rec. p. 12).

However, admitting the technical difficulty of obtaining immediate compliance, the Agency recommends grant of variance in the interests of ameliorating a severe environmental problem. In its Amended Recommendation, the Agency recommends grant of variance for one year, subject to imposition of Mobil's suggested interim limits, a thrice weekly monitoring requirements and other conditions.

In its Response, Mobil indicates that the Agency has agreed to the reasonableness of a modified monitoring plan calling for monitoring twice weekly, and also whenever there is a rainfall of greater than one inch. Disagreement continues to exist as to the duration of variance.

It is the Agency's position that variance should terminate upon the completion and start-up of Mobil's contaminant mechanism in August, 1984. The Agency feels that this short term is consistent with the objective of returning the unnamed ditch to its full use potential as quickly as possible, and would provide Mobil with an incentive to design, construct and operate its existing and planned facilities to as to provide complete containment of run-off. While noting that stricter limitations conceivably could be set during the second year of a two year variance, the Agency feels this to be infeasible. As no construction permit application had been filed, the Agency is unaware of the basis of design or specific manner in which the project would be carried out, so that there is insufficient information on which to propose water quality limits reasonably based upon expected performance levels. If additional variance relief proves necessary after equipment installation, the Agency

says, Mobil can then petition for the Board for an additional variance "with appropriate interim water quality levels". (As aforementioned, Bureau County has adopted the Agency's position.)

The Board finds that denial of variance would impose an arbitrary or unreasonable hardship. Mobil has, albeit with a certain measure of "footdragging" (which is not hereby excused), been engaged for some time in a costly attempt to develop technology to cure what has become a serious environmental problem. The Agency's objections to a two-year variance are well taken, although Mobil contended that time will be needed to assess the efficiency of the system. Should it be that, due to limitations in current technology and geologic conditions in the gypsum pond area, complete containment cannot be achieved (as the Agency acknowledges as possible), stricter interim water quality standards could not reasonably be fashioned in any subsequent variance proceeding in the absence of any performance data. The Board is therefore granting variance for an additional two months beyond the time recommended by the Agency. Variance from 35 Ill. Adm. Code 302.206 is therefore granted until November 15, 1983 subject to conditions as recommended. Variance from the Act is denied as unnecessary.

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

ORDER

1. Petitioner, Mobil Chemical Co., is granted variance for discharges from Outfall 001 of its De Pue facility from the 15.0 mg/l total suspended solids (TSS) effluent standard of 35 Ill. Am. Code 304.124(a), subject to the following conditions:

- a) This variance shall terminate November 15, 1985.
- b) Petitioner shall at all times maintain and operate both settling ponds in such a manner as to achieve optimal performance.
- c) Petitioner shall dredge its two settling ponds at least once annually.
- d) Petitioner shall monitor at Outfall 001 for TSS by means of a composite sample taken five times per week, and shall submit its results to the Agency with its monthly Discharge Monitoring Reports.
- e) Petitioner shall make a continuous and thorough effort to ascertain the existence of new cost-effective technology for treatment of TSS discharges from the sand filter backwash and boiler blowdown/softener regenerate wastewater. Petitioner shall report its findings to the Agency by July 1 of 1983, 1984 and 1985.

2. Petitioner is granted a variance for seepage from Outfall 002 of its De Pue facility from 35 Ill. Adm. Code 302.208 as it pertains to total dissolved solids (TDS), ammonia nitrogen and fluoride subject to the following conditions:

a) This variance shall terminate November 15, 1983.

b) Petitioner shall at all times maintain and operate its existing bypass/sump/collection system in such a manner as to achieve optimal performance.

c) Concentrations of the following contaminants in the unnamed ditch at Outfall 002 shall not exceed these levels:

Ammonia Nitrogen -- 150 mg/l
 Fluoride -- 20 mg/l
 Total dissolved solids -- 4,600 mg/l

d) At its Sampling Station #4, Petitioner shall monitor flow, and levels of each of the above contaminants, by means of a composite sample taken two times per week and also whenever there is a rainfall greater than one inch (1"). These results shall be submitted to the Agency with Petitioner's monthly Discharge Monitoring Reports.

e) Petitioner shall design and construct the additional seepage control mechanisms specified in its Amended Petition in accordance with the following timetable:

Installation of Containment	April 1, 1983
Complete Installation	June 1, 1983
Including Additional Excavation	
System Start-up and Evaluation	June 1, 1983
	through August 1, 1983

A report of the progress made regarding this work shall be submitted to the Agency monthly.

f) Petitioner shall submit a complete and detailed engineering plan regarding the above additional containment mechanisms to the Agency within 45 days of the date of this Order.

3. Variance from Section 12(a) of the Act is denied as unnecessary.

4. Within forty-five days of the date of this Order, Petitioner shall execute and forward to the Illinois Environmental Protection Agency, 2200 Churchill Road, Springfield, Illinois 62706, a Certificate of Acceptance and Agreement to be bound to all terms and conditions of this variance. This forty-five day shall be held in abeyance for any period this matter is being appealed. The form of the certificate shall be as follows:

CERFITICATE

I, (We), _____, having read the Order of the Illinois Pollution Control Board in PCB 82-18, dated _____, 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. Bureau County's September 16, 1982 petition for leave to intervene is granted.

IT IS SO ORDERED.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify that the above Opinion and Order was adopted on the 12th day of November, 1982 by a vote of 5-0.

Christan L. Moffett
Christan L. Moffett, Clerk
Illinois Pollution Control Board