ILLINOIS POLLUTION CONTROL BOARD
July 11, 1974

MODINE MANUFACTURING CO. PETITIONER	)	
v.	)	PCB 74-14
ENVIRONMENTAL PROTECTION AGENCY RESPONDENT	)	

MR. RICHARD J. KISSEL, ATTORNEY, in behalf of MODINE MANUFACTURING CO.
MR. JOHN T. BERNBOM & MR. JAMES SCHLIFKE, ATTORNEYS, in behalf of the ENVIRONMENTAL PROTECTION AGENCY

OPINION AND ORDER OF THE BOARD (by Mr. Marder)

This action involves a request for variance filed January 9, 1974, by Modine Manufacturing Co. (Petitioner). Relief is sought from Rule 408 (a) as it applies to zinc until December 1974, 404 (f) unless the Board considers Petitioner's lagoon to be a 404 (c) (iii) exemption, and such other rules applicable so as to allow the Agency to grant construction and operating permits.

The Agency filed its recommendation on February 21, 1974, stating that the variance should be denied. The Agency also states that Petitioner's receiving stream is not entitled to be classified as secondary contact and therefore certain other parameters of Petitioner's discharges will not comply with applicable discharge standards.

Hearing was held on April 26, 1974, at which time detailed testimony was elicited on the above points.

Modine Manufacturing Co. owns and operates a facility which produces air conditioning condenser and evaporator coils at Ringwood, Illinois (McHenry County). These are aluminum heat exchanges for the automobile, commercial, and residential market (R. 8). Said facility employs approximately 180 employees at an annual payroll of approximately $1,300,000.

The instant variance request centers around discharges from Petitioner's present, and anticipated future, treatment system. Petitioner's Exhibits 1 and 2 are flow diagrams depicting present and future waste flow respectively. Mr. Steven Schwartz (environmental officer for Modine) testified as to both of these exhibits.

Petitioner's Exhibit #1 shows that waste flows are generated from a number of sources. One source is blowdown from a scrubber used as an

air pollution device on Petitioner's Red-Ray Oven. Approximately 200 gpm of water is used as the scrubbant. This water is recirculated after neutralization with the exception of a 50 gpm blowdown which enters the first stage of a three-stage lagoon (R. 19). A second source of waste is in the form of quench water from Petitioner's Water Quench Chamber. This system consists of once through water used for cleaning and cooling of parts and is approximately on the order of 200 gpm. This quench water also goes to the head of the three-stage lagoon. The only other flow to the three-stage lagoon is domestic waste, which has been treated by extended aeration (R. 19). The three-stage lagoon presently handles about 390,000 gpd with the influent and effluent rate the same (R. 21). The discharge is then to an unnamed tributary to Dutch Creek. The present discharge is of the following nature (R. 23):

Flow	390,000 pgd
BOD_5	5-10 ppm
D.O.	Neon Saturation 7-8 ppm
Zinc	1-30 ppm
Fluoride	2-2.5 ppm (calcium fluoride)
Suspended Solids	4 ppm
Total Solids	800 ppm
pH	7-8

Petitioner's Exhibit #2 details the proposed waste flow. The essential difference is that 90-95% of the influent to the first lagoon will be recycled for reuse, leaving a net flow to the receiving stream of 40,000 gpd (R. 27).

Mr. Schwartz testified as to his experience with Modine's Clinton, Tennessee, plant, which is presently using similar technology (R. 28). He related that the Clinton operation is essentially the same as the Ringwood, Illinois, plant, with the exception of size. The Clinton plant was designed in 1972 and initially started up in October, 1973. Mr. Schwartz related that this waste operation is a novel approach (R. 33), and that is a main reason why the Illinois plant did not construct in parallel with the Clinton, Tennessee, plant. Based on Clinton experience, Mr. Schwartz anticipates the following effluent criteria (R. 35).

Flow	40,000 gpd
BOD_5	5-10 ppm
D.O.	8.0 (Petition Pg. 8)
Zinc	1 ppm
Fluoride	2.5 ppm
Suspended Solids	4 ppm
Total Solids	2000-2500 ppm
pH	8.5 (Petition Pg. 8)

The cost of these improvements was stated as about $190,000 (R. 36), and would have a startup date of December of 1974.

Mr. Schwartz then went on to discuss what he felt were alternate technologies which could conceivably be used. The two alternates mentioned were reverse osmosis and total evaporation, both of which Mr. Schwartz felt were not feasible (R. 42). Mr. Donald Schwegel (Baxter

& Woodman Engineering) also testified that he felt the alternatives were not feasible (R. 80).

Petitioner's waste discharges into an unnamed tributary of Dutch Creek. Petitioner's Exhibit #3 is a map of the northeast region of Illinois (from Illinois Water Survey Bulletin 57). The tributary in question is not noted on the map. It was generally accepted that this would indicate a seven day-once-in-ten-year-low flow of zero (R. 83, R. 93 Taylor). Mr. Robert Taylor (Environmental Protection Agency biologist) testified that in his normal round of duties he visits Modine approximately six to ten times per year, and that the tributary upstream of Modine's discharge has been without flow 35-40% of the time.

One of the major points of contention in the instant case is which classification shall be given to the tributary into which Modine discharges. From the abovementioned expected effluent parameters, one can see that the applicable water standards will be met if the stream is considered secondary contact, but will not meet general water quality standards, e.g.:

	Petitioner's Expected Discharge	Rule 203	Rule 408
BOD_5	5-10 ppm	4 ppm*	4 ppm*
Suspended Solids	4 ppm	5 ppm*	5 ppm*
Zinc	1 ppm	1 ppm	1 ppm
Fluoride	2.5 ppm	1.4 ppm	2.5 ppm
Total Solids	2200 ppm	1000 ppm	3500 ppm max.
pH	8.5	6.5-9.0	5-10

* If 404 (f) applies, however, Pfeffer exception is 10 mg/l BOD_5, 12 mg/l SS - and Petitioner is seeking a 404 (f) (i) exception.

Part III of Chapter 3 defines secondary contact waters. Rule 302 (k) [as amended February 14, 1974] states:

> "Secondary Contact and Indigenous Aquatic Life Waters:
> Secondary contact and indigenous aquatic life waters are those waters which will be appropriate for all secondary contact uses and which will be capable of supporting an indigenous aquatic life limited only by the physical configuration of the body of water, characteristics and origin of the water, and the presence of contaminants in amounts that do not exceed the applicable standards.
>
> The following are designated as secondary contact and indigenous aquatic life waters:
>
> (k) All waters in which, by reason of low flow or other conditions, a diversified aquatic biota cannot be satisfactorily maintained even in the absence of contaminants."

Rule 205 then states the criteria which a secondary contact and indigenous aquatic life water must conform with.

Petitioner contends that Rule 302 (k) applies to its receiving stream. The burden of proof rests squarely with Petitioner. The Board in its Opinion on this matter said:

> "Part III contains water use designations. All waters are designated for general use except those in the restricted category, which has here been broadened in response to testimony to include waters whose flow is too low to support aquatic life. This should relieve the burden of treatment beyond the effluent standards for discharges to intermittent streams. Such extra effort is difficult to justify when it will not result in a satisfactory aquatic life because of insufficient flow." (Vol. 3, P. 765)

Petitioner is then faced with the task of proving a very important element before obtaining such a reclassification:

That a diversified aquatic life could not be present, absent Petitioner's presence of contaminants.

This Board does not treat reclassification of streams lightly; each case must stand on its own firm foundation. Each case must be proved up on an individual basis. The concept of hitchhiking on past Board determinations will not suffice as adequately fulfilling a burden of proof.

Petitioner's allegations of proof centered about the testimony of Dr. Wahtola (Limnetics, Inc.), who was engaged by Petitioner to study the aquatic biota as well as chemical constituency of the subject stream. Petitioner's Exhibit #5 is a summary report of this work. Dr. Wahtola testified that the study conducted was oriented to observe members of the phytoplankton, zooplankton, benthos, and fish which were present. In his opinion a diversified aquatic biota is that not only should there be the presence of the various trophic levels but that there should be also some sort of balance between the organisms (R. 115).

Dr. Wahtola conducted his test on December 27, 1973, and found that at that time a diversified aquatic biota was present. However, Dr. Wahtola testified that due to the nature of the stream, he did not feel it could support a diversified aquatic biota at times and thus should fall under Rule 301 (k). He based his opinion on the following statements:

> "1. If you were to have all members of trophic levels present which includes the phytoplankton, zooplankton, the benthos, the fishes, and if you go further and say that you must have in your definition of diversified aquatic biota the stipulation that there be stability, then you are talking probably of a system

which is well addressed in a paper by Howard Sanders. And he discusses diversity. The title of the paper is 'Marine Benthic Diversity (Note Pet. Ex. 6): A Comparative Study.' " (R. 119)

2. "THE WITNESS: When considering diversity, diversity also has to have in it a function of stability, or a time clause.

And Odum, who is a well-known ecologist, Wilham and Dorris, who have done a great deal of work with diversity, and Shannon-Weaver, who have developed an index which is probably one of the better known indices, have all expressed opinions on what diversity really means. And diversity is a dimensionless number. So, whether one is talking about plants, animals, marine organisms, fresh water organisms, the number that you derive eventually will give you an answer that relates to diversity.

And diversity as described by Sanders and described by others is one that if you have a community, the community itself is dictated or can have its function, ecological function dictated. And what I mean by that is that you have communities which are physically controlled, and you have those which are biologically accommodated. And to elaborate on that, a community that is physically controlled is one that undergoes severe physical stress, that the biological community can do nothing about the physical system. And an example of that would be the inter-tidal shore as far as an ocean is concerned and where it goes from wetness to dryness in a matter of hours on a daily basis.

Another example could be the creek that Modine is discharging into, that when it goes dry that there is a severe biological stress placed on it, or a physical stress placed on the biological community.

Temperature will do the same thing, extreme fluctuations in temperature. So that a community that is physically controlled usually has a very low diversity in comparison with one that is biologically accommodated. An example of a biologically accommodated community would be one, the deep oceans where you have very, very narrow limits on the physical community so the biological community is allowed to progress and become more diverse.

> One of the theories proposed about diversity is that with time, you will have a greater diversity provided the biological community is allowed to progress without the physical interference.
>
> And now those are the two extremes. And if you are talking of all - the entire spectrum, streams, lakes, rivers, all fall into different categories. To bring it to fresh water, Lake Baikal is several million years old. The species diversity within that lake is tremendous simply due to the fact that the genetic pool is allowed to remain and stay throughout millions of years so that there is adaptation. There is evolution going on within that system.
>
> So that if you now look at a fresh water system such as Lake Baikal, coming here to the United States and say we have a lake that is only ten thousand years old, in comparison it is not a very diverse system.
>
> If you go even further, then, and go to a rivering system, the organisms in a river as compared to a lake would not be considered as diverse. And if you go even further down the scale, and that being to Modine Creek or the creek, the unnamed tributary into which Modine is discharging, the genetic pool in that instance would not have the opportunity in all instances to replenish and become diverse.
>
> So that through sampling on any one day, you could find if or if not a community is diverse in terms of the formula. But will it, through eons of time maintain that diversity, and the answer is in this particular instance probably not. So that is the basis for my decision."
>
> (R. 123-126)

Dr. Wahtola concludes that because of the stress placed on the stream, stability is impossible, and therefore a consistent diverse aquatic biota is also non-existent.

Under cross-examination counsel brought up the concept of aestivation (hibernation) of aquatic organisms and suggested that even if the stream had no flow a gene pool could exist due to small pools of entrapped water and the concept of aestivation. Dr. Wahtola replied that "not all organisms aestivate" (R. 136), and that even if small pools were present, this would not change his opinion on diversity (R. 140).

When Dr. Wahtola was asked if he felt there were any biologists

who would agree that a diversified aquatic biota could include a stream that did not exhibit different trophic levels, he replied, "I don't believe so" (R. 148).

The Agency called Robert Taylor and Wallace Matsunaga (Environmental Protection Agency biologists) to testify as to the condition of the unnamed stream and its ability to carry a diversified aquatic biota. Mr. Matsunaga testified as to a stream survey conducted around Modine's outfall. He testified that his sampling consisted of macroinvertebrate population, which does not include phytoplankton, zooplankton, or fish. Mr. Matsunaga made no determination of whether the stream was or was not supporting a diverse aquatic biota (R. 173).

Mr. Tucker stressed that sampling of only macroinvertebrates is a good indication that different levels of trophic life exist (and thus a diversified biota) in that the presence of macroinvertebrates indicates that there are things for them to eat, and this indicates a food chain for higher forms of life (R. 182). Mr. Tucker testified as to the potential for the stream to maintain a diversified aquatic biota, e.g.: "In some areas it exists, the potential should be there" (R. 184)

> "Question: Would you say that diversified aquatic biota exists in this stream even when it is not flowing?
>
> Answer: I would say that the potential for the stream to revitalize itself is there as soon as the water runs." (R. 185)

The weight of the evidence is strongly in favor of Petitioner on this point. It would seem that in the instant case, Dr. Wahtola's testimony would lead the board to grant the 302 (k) classification. However, as mentioned above, such a determination cannot be made lightly. In the instant case the flow is said to be non-existent 35-40% of the time. This, coupled with Dr. Wahtola's testimony, along with testimony stating that Modine's flow has (and will have) a minor if any effect on the stream (see below), allows the Board to grant the 302 (k) exception, and we shall so order. It must be remembered that the Board's point of reference in this discussion is just upstream of Petitioner's discharge.

Another major point of contention is the applicability of Rule 404 (f). Petitioner contends that it will be entitled to a 404 (f) (i) exemption in that it operates a three-stage lagoon. If granted, this would allow discharges of 30 mg/l BOD_5 and 37 mg/l S.S. To gain exception for a three-stage lagoon, the following four conditions must be met:

A) The untreated waste load is less than 2500 population equivalent; and
B) The source is sufficiently isolated that combining with other sources to aggregate 2500 population equivalent or more is not practicable; and
C) The lagoons are properly constructed, maintained, and operated; and

D) The effluent does not, alone, or in combination, cause a violation of applicable water quality standards.

Each of these conditions must be studied separately for applicability.

Item (B) is generally accepted to have been met (Agency Brief Pg. 10-11).

Item (C) is contested by the Agency. Under direct examination Mr. Schwartz testified that the lagoons are and will be properly maintained and operated (R. 44). The Agency, however, felt that the lagoon is not properly maintained and operated. The Agency offers no proof of this statement, nor does the Petitioner. The Agency contends that results of the Matsunaga tests show that the condition of the stream changes from unbalanced to semi-polluted across the Modine discharge point (covered in environmental impact portion of this Opinion), and that this could be due to poor lagoon operation (Brief Pg. 11). The Board has no strong indication that the lagoons are improperly maintained. Had the Agency doubted the validity of Schwartz's statement, they had every opportunity to rebut at hearing.

Item (D) is met, considering our above finding that rule 307 (k) applies.

Item (A), however, does not seem applicable to the Board. This rule states that the untreated waste load must be less than 2500 P.E. (one P.E. = 100 gpd). In Petitioner's case the untreated waste load is 390,000 gpd or 3900 PE. This load will be discharged even after the compliance plan is completed. One may argue that this definition is excessively strict in light of the fact that Petitioner intends to recycle 90% of its effluent. Using this theory the calculation point would be at the head of the second stage lagoon. This argument has merit and could be accepted by the Board were other conditions existing.

The Board in adopting this rule noted that three-stage lagoons are "dependable and economically reasonable." Opinion on R-70-8, 71-14, 71-20, Pg. 17. This language was incorporated to indicate that economics are a concern in allowing such an exemption. In the instant case the economics do not indicate that an exception allowing 30 mg/l BOD_5 and 37 mg/l S.S. should be allowed. Our function is to preserve the environment, and granting such an exemption would not be in keeping with this dictate. Petitioner's discharge will meet a 5-10 mg/l BOD_5 and 4 mg/l S.S. level which is well within the bounds of a Pfeffer exemption of 10 mg/l BOD_5 and 5 mg/l S.S. The Board feel that upon application for permit to the Agency, Petitioner has met the requirements for a 404 (f) (ii) exemption, and that one should be granted. In light of the fact that no economic burden is placed on Petitioner, other than to operate its lagoon as it says it can, the strictest interpretation of Rule 404 (c) (iii) (A) should be drawn. The Board therefore feels that no variance is required from Rule 404 (f) in that under the dictates of 404 (f) (ii) there is no present violation.

The only question left to be decided is whether Petitioner has fulfilled its burden under Section 35 of the Environmental Protection Act to be granted a variance from Rule 408 as it regards zinc. We must then explore the areas of compliance plans, hardship, and environmental impact in reaching this decision.

Compliance Plan: As mentioned above, Petitioner has submitted a compliance plan which will reduce the zinc concentrations to within the applicable regulations. Subject to the above finding that 302 (k) applies, this plan will bring about compliance in all respects.

The delay of starting this compliance plan was explained by Mr. Schwartz by comparing the instant plan with that used in the Clinton, Tennessee, plant. Mr. Schwartz claims that the concept of recycle was novel to the industry (R. 33), and that it would not have been economically feasible to upgrade both (Clinton and Ringwood) plants at the same time (R. 51). This was because due to the novelty of the processes the risk was rather high, and two mistakes could have been made.

Petitioner, after work was completed on Clinton, in November 1973 engaged a consulting firm to detail plans for a similar addition to the Ringwood plant. Mr. Schwartz feels the possibility of a December 1974 startup is very good (R. 55).

Due to the novelty of this process, the Board feels that the technical approach taken to gain compliance - e.g., learning from experience and then applying it to Ringwood - was viable and shows the necessary elements to be termed good faith.

Hardship: In its Petition for variance Petitioner alleges that an arbitrary and unreasonable hardship would ensue should variance be denied, due to the following situations:

1. Without a variance Modine would be subject to an enforcement case which would jeopardize its operation and affect the livelihood of 158 employees.

2. Modine's contribution to the tax base of the community and the gross income of the community could be curtailed.

The Agency does not refute these allegations, but rather states that alternate technology was not explored in sufficient detail to show undue hardship would result if it were used. The Board notes that the thrust of alternate technology is directed toward compliance with Rule 203. Having found that 302 (k) will apply in the instant case, this point is moot.

The Board finds that, although marginal, a hardship case is evident.

Environmental Impact: As mentioned, many findings in this case were difficult to render. Quite a bit of our decision rests on the potential for environmental harm presently or anticipated to be caused by Petitioner's discharges.

The Agency introduced Exhibits #5 and #6 which are summaries of stream analysis made around Modine's discharge. The conclusion drawn from these exhibits was that the area directly above Modine's discharge was termed unbalanced, and those directly below and 1/4 mile downstream semipolluted and polluted respectively. These determinations were based on the existence or lack of existence of tolerant species. The following definitions help in interpreting these findings:

> "Balanced environment: one in which conditions are maintained which are capable of supporting a variety of organisms, mostly intolerant species from diversified taxonomic groups.
>
> Unbalanced environment: one in which the balance of life as described for a balanced environment has been disrupted but not destroyed. The population numbers of some of the intolerant forms are reduced, and an increase becomes apparent in some of the more tolerant forms.
>
> Semipolluted environment: one in which the balance of life found in a balanced environment is destroyed. Intolerant forms are completely absent or reduced to a minimum. The environment is predominantly tolerant forms.
>
> Polluted environment: one in which only the very tolerant forms are able to exist. These are usually present in great numbers unless excluded from the environment by severe conditions."
>
> (R. Pp. 162-163)

Under cross-examination there was much discussion as to how tolerant and non-tolerant organisms are determined. From the record it was clear that there is some possibility of error which could have led to misclassification of the stream. The following examples of testimony reflect this:

> "Q. Let's take Page C1 of EPA Exhibit No. 6, line 20, which has, 'Midge larvae, 11.'
> Are those all intolerant organisms?
> A. I would not be able to say.
> Q. You mean just identifying a midge larvae doesn't mean it is tolerant, does it?
> A. As a general group, midges are tolerant, but --
> Q. Could there be some midges in this sample that were intolerant?

A. There might have been.
Q. Could it be 11?
A. It is possible.
Q. So that it is possible that that is 11 intolerant organisms rather than tolerant, isn't it?
A. That is possible."

(R. Pp. 174-175)

However, Mr. Tucker stated that midge larvae are almost universally classified as intolerant and that the sample and classification are correct, e.g.:

"Q. In fact, how many of the midge larvae, or approximately how many of the midge larvae species are tolerant, and how many are intolerant?
A. I don't know the exact number. But I only know of one midge larva that is intolerant, and it is a little skinny red one.
Q. And about how many species of midge larvae that you know of?
A. Oh, upward of 30 or 40."

(R. P. 189)

The inference from these discussions is that Modine's discharge as it exists is at least contributing to the stream's degradation. It is very important to note, however, that both Tucker and Matsunaga (both Agency witnesses) tended to hedge on whether Modine's discharge was the direct cause of the apparent degradation [R. 183, R. 167 ("probable cause not definitive")].

Dr. Wahtola testified (R. 127) that in his opinion it is well documented that zinc concentrations presently found in Petitioner's discharge can be lethal; however, at the time of his sampling he found no adverse effects on the aquatic biota, and Modine's discharge had very little effect on the stream. It must be remembered that the compliance plan calls for a 1.0 mg/l zinc concentration by December 1974, which would be acceptable. Dr. Wahtola next addressed himself to the fluoride discharges (R. 128). He cited a study conducted by the Colorado School of Mines (and work by McKee & Wolfe of California) stating that calcium fluoride is much less toxic than other forms of fluoride. It is substantiated in the record that Modine's discharge is high in calcium (R. 23).

From all of the above the Board draws the conclusion that after completion of the compliance plan Petitioner's discharge will have a negligible effect on the receiving stream. It can also be concluded that in the interim period (between now and December 1974) the effect on the stream should be minor. The Board will on the basis of facts elicited grant the requested variance.

In closing the Board will again detail the reasons for its unique decision to grant reclassification pursuant to Rule 302 (k). In the instant case there can be no doubt that the stream in question is intermittent and thus was a potential 302 (k) candidate. But the mere fact that it is intermittent does not suffice alone to grant reclassification. Proof must be elicited that the stream could not support a diverse aquatic biota absent Petitioner's contaminants. Here Petitioner presented expert testimony which was essentially unrebutted by Respondent. It is the very important fact that such testimony was not adequately countered that prompts the Board to take the reclassification action. Future cases of this nature will require a similar burden of proof and adequate rebuttal testimony will naturally weigh heavily in the Board's final decision.

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

ORDER

IT IS THE ORDER of the Pollution Control Board that:

1. The unnamed tributary into which Modine discharges will be classified as secondary contact water as per Rule 302 (k) at the point at which it receives Modine's discharge.

2. Variance from Rule 404 is dismissed as moot in that the Board determines that under the dictates of Rule 404 (f) (ii) no violation exists.

3. Variance is granted to Petitioner from Rule 408 (a) as it applies to zinc until January 15, 1975.

4. Variance is granted from Rule 1002 so as to allow Petitioner to file a project completion schedule.

Mr. Dumelle dissents.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, certify that the above Opinion and Order was adopted by the Board on the 11th day of July, 1974, by a vote of 4 to 1.

Christan L. Moffett