ILLINOIS POLLUTION CONTROL BOARD
May 18, 1984

IN THE MATTER OF:	)	
	)	
PROPOSED AMENDMENTS TO TITLE 35, SUBTITLE D: MINE RELATED WATER POLLUTION, CHAPTER I, PARTS 405 and 406	)	R83-6 (Docket A)

PROPOSED RULE. SECOND NOTICE

SECOND PROPOSED OPINION OF THE BOARD (by J. Marlin):

On February 7, 1983 the Illinois Environmental Protection Agency (Agency) and the Illinois Coal Association (ICA) proposed that the Board amend 35 Ill. Adm. Code 405 and 406 to add an effluent standard for manganese and to set a permanent rule specifying the application of water quality standards to coal mine discharges. Amended proposals were filed on May 27 and August 26, 1983. The proposal was the result of a joint industry/government group called the Mine-Related Pollution Task Force (MRP).

On May 5, 1983 the Board designated this proposal as Docket A of R83-6. Docket B was utilized to extend the expiration date of Section 406.201 beyond July 1, 1983 (Final Order, Adopted Rule, October 6, 1983; 7 Ill. Reg. 14515, October 28, 1983).

Public hearings were held on May 12, 1983 at Springfield, and on May 27, 1983 at Ina. Since the pages are not numbered sequentially, Roman numerals will be used to indicate the volume. Thus, (II-17) will refer to page 17 of the second day of hearings.

On July 5, 1983 the Department of Energy and Natural Resources notified the Board that a negative declaration had been made. On August 26, 1983 the Hearing Officer closed the record except for final comments (Section 102.163). No comments were received during this period.

On December 15, 1983 the Board proposed for first notice amendments to Part 405 and 406. The Board adopted a Proposed Opinion on the same date. The proposal appeared at 8 Ill. Reg. 78 and 93, January 6, 1984.

On February 15, 1984 the ICA, acting on behalf of the MRP, requested that the comment period be extended. On February 17 they requested an additional hearing. On March 6 the Hearing Officer extended the comment period and scheduled an additional hearing.

On March 20 and 26, 1984 the Agency, acting on behalf of the MRP, filed a written comment addressing several aspects of the First Notice Proposal. The MRP presented testimony and exhibits on this matter at the third public hearing, held in Springfield on April 13.

On April 17, 1984 the Hearing Officer entered an Order allowing additional written comments through April 27. The Board received comments from Peabody Coal Co. and the Agency, both acting on behalf of the MRP.

The Board notes that throughout this proceeding it has received comments and testimony only from the MRP.

Summary of the Proposal

The proposal will be discussed in detail in the order of sections affected. The following is a summary in a more informative order.

The proposal adds an effluent standard of 2.0 mg/l manganese, with a modified pH standard where necessary for manganese treatment (Section 406.106).

The proposal repeals the temporary exemption from the water quality standards contained in Section 406.201. This is replaced with a permanent procedure. Mine discharges will have permit conditions based on the permanent procedure for total dissolved solids (TDS), chloride, sulfate, iron and manganese if:

1. There is no impact on public water supplies;

2. The applicant utilizes "good mining practices" to reduce production of TDS related contaminants; and,

3. The discharge is less than 1,000 mg/l chloride and 3,500 mg/l sulfate.

If the discharge exceeds the numerical levels, the permittee will need to prove no adverse effect to the receiving stream (Section 406.203).

Finally, the proposal extends the TDS water quality provisions to abandoned mine impoundments and discharges (Sections 405.109 and 405.110).

Discussion of Proposed Amendments

Section 405.109 Abandonment Plan

Paragraphs (b)(3) and (b)(4) have been added, and the old paragraphs with these numbers moved down. These para-

graphs specifically address the impact of the special TDS provision of Section 406.203 on discharges from abandoned mines and on waters remaining in impoundments at such mines. This point first arose in a case decided during the process of adoption of new Chapter 4 (IEPA v. Material Service Corp. and Freeman United Coal Mining Co., PCB 75-488, 37 PCB 275, February 7, 1980) (I-42).

Strip mines frequently leave a final cut which fills with water after abandonment; slurry ponds and other impoundments may also be left (I-40). Some of these may have a surface water discharge. Paragraph (b)(3) addresses the discharge, while paragraph (b)(4) addresses the waters in the lake or impoundment.

Discharges from abandoned impoundments will have to meet the effluent standards of Section 406.106. If there was no TDS water quality condition imposed under special procedures during active mining, the discharge will have to avoid water quality violations. If there was such a TDS water quality condition, the waters of the impoundment will have to meet the effluent standards and make a part of the showing required under the TDS water quality Section 406.203(c)(1) and (c)(2) (I-38, II-10, 14, 18).

Paragraph (b)(4) applies to the waters in the impoundments, which may not be required to meet water quality standards during active mining, as for example, treatment lagoons and settling basins. Impoundments which will not meet such standards on abandonment will be required to meet the effluent standards after abandonment, and to make part of the showing under the TDS water quality Section 406.203 (c)(1) and (c)(2) (II-21).

Section 406.109(b)(4) applies the effluent standards as though they were water quality standards (I-38, II-11, 14, 18). This will be sufficient to ensure that any discharge will at least meet the effluent standards.

The second and third proposals limited the TDS procedure to impoundments which did not meet the water quality standards during active mining. The Board has deleted this requirement, since the water quality problems in a final cut lake may not appear until after abandonment (I-40).

The Board has added paragraph (e) to the proposal: this requires conditions in abandonment plans to assure continued application of the TDS water quality procedure (I-37).

In the First Notice Order the Board proposed to strike the language in Section 405.109(b)(1) requiring the Agency to approve abandonment plans showing that the plan can be executed within one year "unless otherwise approved by the Agency". The Board proposed to insert a reference to paragraph (b)(1) into paragraph (d), which specifies the circumstances under which the Agency may approve longer times for abandonment. In its comments and at the third hearing, the Agency indicated that it interpreted existing paragraph (b)(1) as allowing approval of longer abandonment plans in circumstances other than those allowed under paragraph (d), reclamation plans approved under the Surface Coal Mining Land Conservation and Reclamation Act.

The problem with the existing language as construed by the Agency is: it allows a discretionary Agency action with no standard for review; and, it seems to allow the Agency to grant a "variance" from the Board requirement of abandonment within one year. The Board has addressed this by requiring a "reasonable time", by specifying environmental damage and the time required to complete the steps in the plan as factors which determine reasonableness, and by creating a presumption that one year is a reasonable time.

Section 405.110 Cessation, Suspension or Abandonment

Paragraph (e)(2) has been added to specifically require a showing that Sections 405.109(b)(3) and (b)(4) have been met before a certificate of abandonment is issued. The permittee will have to show that those sections will be met to get approval of the abandonment plan, and also show that they were in fact met before the certificate of abandonment is issued (I-37, II-10, 15).

Section 406.104 Dilution

This section was taken from Section 304.102, which it tracks almost verbatim. Paragraph (a) has been amended to make it clearer that the dilution rule refers only to the effluent standards. This may have been lost when the language was moved from Part 304 to Part 406, which deals with both effluent and water quality standards.

The Board does not construe Section 406.104 as in any way limiting dilution after treatment in order to avoid violation of water quality standards. This dilution may take place prior to discharge to waters of the State, so long as it does not interfere with contaminant removal efficiency (I-62, 67). If effluent concentrations are measured beyond the dilution point, concentrations would have to be corrected.

Section 406.105 has been renumbered to 406.202: the water quality rule and special TDS procedure will be placed together in a separate Subpart.

Section 406.106 Effluent Standards

An effluent standard of 2.0 mg/l manganese has been added to the table. Manganese is frequently regulated as an effluent parameter, and its omission from the revised mine waste rules may have been an oversight caused by the ambiguity as to whether the effluent standards table of old Chapter 4 supplemented or superseded the effluent standards of old Chapter 3 (I-55). The Board regulates manganese in effluents other than mine waste at 1.0 mg/l (Section 304.124). Federal regulations impose a limitation of 2.0 mg/l on mining activities, including, for example, the acid mine drainage category (40 CFR 434.32(a)).

Treatment for manganese is similar to iron, involving addition of alkali to cause precipitation, followed by sufficient detention to allow settling. Unlike iron, manganese may be too soluble at pH 9 to precipitate sufficiently to meet the 2.0 mg/l standard. Effluents will be allowed to go to pH 10 if necessary to meet the manganese standard (I-36). (For related discussion, see Section 304.125; R76-21, Opinion of September 24, 1981, 43 PCB 367, 6 Ill. Reg. 563).

The Board regulates manganese as a water quality standard at 1.0 mg/l (Section 302.208). The standard was based on fish toxicity (R71-14, 3 PCB 755, 4 PCB 3, March 7, 1972). In her study of several streams impacted by mine discharges, which is discussed below, Dr. Allison Brigham found that manganese was found to account for the greatest amount of variance of species diversity and richness of several variables studied (II-31).

The manganese effluent standard will not apply to mine discharges which are associated with areas where no mining activities have taken place since May 13, 1976. This date is taken from Federal regulations regulating manganese discharges from coal mining (I-36, 54; II-10, 12).

Section 406.202 Violation of Water Quality Standards

This Section has been moved from Section 406.105. Subpart A of Part 406 will deal only with effluent rules, while Subpart B will deal with water quality rules. The TDS procedure of the next Section will thus appear next to the Section which it modifies.

Section 406.203 Water Quality-based TDS Permit Conditions

TDS includes all material dissolved in water, as opposed to total suspended solids. In Illinois coal mine discharges TDS consists mostly of chloride and sulfate (I-49). Underground mines often have high chloride levels from saline water encountered in mining. Surface mines often produce sulfuric acid from the action of air and water on sulfur minerals exposed in mining. Neutralization of the acid produces sulfate salts, and further increases the TDS because of the dissolved solids in the alkali which must be added.

The problems with treating for TDS have been adequately addressed in prior Board Opinions. The Board repealed the TDS effluent standard in R76-21, supra, finding that the only treatment technologies involved large amounts of energy consumption, and produced concentrated brines which still required ultimate disposal. Regulation of TDS discharges was left to enforcement of water quality standards of Section 302.208:

Chloride	500 mg/l
Sulfate	500 mg/l
TDS	1000 mg/l

In R76-20, 77-10, the Board recognized that coal mines faced a special problem with TDS in that they produced high TDS discharges, but were often forced to locate upland, away from major rivers with dilution adequate to avoid violation of water quality standards. In response, the Board adopted the temporary exemption procedure now found at Section 406.201 (Opinion and Order of July 24, 1980, 39 PCB 196, 260).

The permanent TDS rule follows the temporary exemption in some respects: the applicant is required to demonstrate that he is utilizing "good mining practices", and that there will be no impact on public water supplies (I-30). However, under the permanent rule, the permittee, rather than the Agency, will be required to demonstrate no impact on the receiving stream.

The TDS procedure creates a presumption of no adverse impact on the stream if discharge levels are less than 3500 mg/l sulfate and 1000 mg/l chloride (I-30). If levels are higher, the permittee will have to prove no adverse impact. This will involve actual stream studies to be done by the permittee, involving a demonstration of the effect of the existing or proposed discharge levels on the stream, not a showing of compliance with water quality standards (I-31, 46, 61).

If the 1000 and 3500 mg/l numbers are met, it is assumed that there is no adverse impact on the receiving stream. This is a presumption which could be rebutted by other evidence introduced into the record in the permit proceeding before the Agency.

If the water quality-based TDS condition is granted, the discharge will not be subject to the water quality standards for sulfate, chloride, iron, manganese and total dissolved solids. The permit will contain conditions requiring monitoring for these parameters and limiting discharge concentrations (I-47, II-17).

The Board's proposed Section 406.203 differs from the amended proposal of August 26, 1983 in several respects. The most fundamental difference is that, whereas the MRP proposed a rule which would "exempt" the mine discharge from the water quality standards, the Board has proposed a special procedure by which effluent limitations may be written into the permit based on mining practices, impact on public water supplies and impact on the receiving stream, without regard to numerical water quality standards. The MRP proposal allowed no consideration of impact on the receiving stream unless effluent levels exceeded 3500/1000. Then the Agency had the discretion to require the permittee to demonstrate no adverse effect. The Board rule on the other hand requires a showing of no adverse effect in all cases. The permittee may rely on a presumption of no adverse effect if effluent levels are under 3500/1000. This could be rebutted by actual evidence of adverse effect presented by the Agency or the public. Where effluent levels exceed 3500/1000, the permittee must show no adverse effect through stream studies.

At the third hearing the MRP accepted this without complaint except as to the last aspect: MRP wants the Agency to be able to waive the stream study in the situation where the discharge is to a small tributary which runs a short distance before joining a stream with adequate dilution to meet the water quality standards.

The Board declines to allow the Agency to waive the stream study. In the situation outlined above, the stream study may consist of a detailing of the size, length and flow characteristics of the tributary, and the mixing zone in the larger stream. The Agency may accept this as a showing of no adverse effect on a case-by-case basis.

The proposal allows special conditions for iron and manganese. Note that the 3500/1000 presumptive levels for sulfate and chloride could allow the Agency to write a

permit condition with a numerical limitation between the water quality standards and effluent standards for iron and manganese without consideration of actual effect on the stream. The permit could not allow iron or manganese to exceed the effluent standards of Section 406.106:

	Effluent Std.	General Use Water Quality Stds.
Iron	3.5 mg/l	1.0 mg/l
Manganese	2.0 mg/l	1.0 mg/l

The Board's first notice proposal did not allow inclusion of iron and manganese in special permit conditions. In its comments MRP acknowledged the lack of information on these parameters in the earlier record. At the third hearing MRP supplemented the record as to the basis for including these parameters.

USEPA has concluded that effluent levels equal to the Section 406.106 standards for iron and manganese represent the best available technology economically achievable (BAT) (Exhibit S). As noted, coal mines cannot freely relocate to a point where there would be adequate dilution to meet the stricter water quality standards. Treatment of discharges beyond the BAT levels to meet water quality standards would be prohibitively expensive. Accordingly the Board has included iron and manganese in the proposal, allowing the Agency to set permit conditions between the water quality and effluent standards based on case-by-case evalutations ations of
stream impact, stream uses and mining practices.

The presumptive levels refer to concentration of sulfate and chloride, with no TDS level specified. As a matter of experience, TDS is mostly these two ions (I-49). Sulfate and chloride concentrations generally correlate better with environmental impacts than TDS (I-33; Ex. E, p. 29, II-32). Monitoring of TDS will continue to provide a check for the possible presence of large concentrations of some other material (I-47, II-17).

Exhibit E is a study entitled "Acute Toxicity of Chlorides, Sulfates, and Total Dissolved Solids to Some Fishes in Illinois" by Paula Reed and Ralph Evans of the State Water Survey. They studied effects of TDS and constituents on channel catfish fingerlings, large mouth bass fingerlings and blue gill fingerlings. They found the following 96-hour median tolerance limits (I-33, Ex. E, p. 29):

Sulfate	11,000 to 13,000 mg/l
Chloride	8,000 to 8,500 mg/l
TDS (sulfate)	14,000 to 17,500 mg/l
TDS (chloride)	13,000 to 15,000 mg/l

The presumptive values for sulfate are set at about one-third of the 96-hour median tolerance limit; those for chloride at about one-eighth (I-33). This is less stringent than the general practice of setting water quality standards at one-tenth the median tolerance limit (Section 302.210); however, this departure is justified for these contaminants, which are highly soluble, not toxic in the usual sense and not expected to accumulate or have any chronic effect.

The presumptive levels are also well below the levels considered safe for livestock watering (I-34).

If the discharge is above the presumptive levels, the operator could elect to treat the effluent, or to obtain a source of fresh water to dilute it to below the presumptive levels (I-61, 67). However, the thrust of the proposal is to allow permittees to adopt operating practices designed to reduce TDS production, rather than to require end-of-pipe treatment.

The Agency is to approve the water quality-based TDS condition only if the permittee proves that it is utilizing "good mining practices" designed to minimize TDS production. The Agency may promulgate a code of good operating practices, in which case compliance with the code would be prima facie proof of use of good mining practices. A "final" draft of the code has been filed as Exhibit H. The Board has proposed Sections 406.204 through 406.208 as a definition of "good mining practices". These are taken from Exhibit H.

Section 406.204 defines "good mining practices." The Agency is to consider whether the operator is utilizing the following practices:

1. Practices which may stop or minimize water from coming into contact with disturbed areas.

2. Retention and control within the site of waters exposed to disturbed materials.

3. Control and treatment of waters discharged from the site.

4. Unconventional practices.

These practices are each further defined in Sections 406.205 through 406.208.

These Sections are not intended to require that each of these practices be carried out at each site; indeed, some of the practices would exclude the use of others. What the Board intends is that the Agency review each of these practices to determine if the operator is doing all that is reasonable at the site to prevent the production of TDS discharges or to minimize their impact.

The proposal is in practice a modification to the Illinois NPDES program, since all mines with point source surface discharges are presently required to have NPDES permits. The procedures of Section 406.203 will arise in the context of NPDES permit modification. Hearings will be provided pursuant to Section 309.115. The hearing is to be allowed if the Agency finds, on the basis of requests, a "significant degree of public interest in the draft permit(s)".

In the First Notice Order the Board included an absolute hearing requirement based on the proposition that Section 302 of the Clean Water Act required such a hearing. The Agency, ICA and MRP objected to this interpretation at the final hearing and in their written comments. They suggested that Section 302 applies only in situations in which the Administrator of USEPA determines that technology-based effluent standards are not sufficient to assure attainment of water quality standards.

In June, 1983 there were 45 active coal mines in Illinois, 19 surface and 26 underground. Of these, 31 are operating under the current exemption of Section 406.201, 14 surface and 17 underground (Agency comment of August 3, 1983 in R83-6B). The remaining 14 are assumed to be able to meet the current water quality standards and are not impacted at all by the permanent TDS procedure.

The 31 mines operating under the temporary exemption should be able to easily demonstrate that they are using good mining practices and that they are not adversely impacting public water supplies, since these requirements are not altered. The mines with less than 1000 mg/l chloride and 3500 mg/l sulfate will qualify under the permanent procedure automatically. The main difference will be the mines which are above the presumptive levels. They will be required to demonstrate no adverse impact on the receiving stream. If they are unable to make the showing, expensive treatment may be required for continued operation.

As noted, the 31 potentially affected mines include 14 surface and 17 underground mines. Sulfate should be the limiting factor for surface, chloride for underground mines. It appears that at the time Exhibit C was prepared, no surface mines exceeded the 3500 mg/l sulfate level, but that four underground mines exceeded the 1000 mg/l chloride level (II-52). Thus a maximum of four underground mines are expected to have to make stream studies. These are likely to cost in excess of $10,000 each.

The cost of complying with the Part 302 water quality standards through application of end-of-pipe treatment technology was discussed at 39 PCB 251. Updating these costs to the fourth quarter of 1982 infers construction costs of $195 million and annual operating costs of $52.8 million (II-56). However, the number of mines in the State has decreased, possibly reducing the aggregate estimates. Any costs associated with compliance with the exemption procedure must be judged as savings with respect to the cost of current regulations.

Costs of various good mining practices are estimated in Exhibit C, although it is difficult to summarize these concisely. These costs are less than the cost of treatment by orders of magnitude. The initial costs have already been met under the temporary rule, although there may be continuing costs associated with some practices.

The proposal creates a special TDS water quality rule for a category of dischargers. The Board has proposed to treat these dischargers differently for several reasons unique to this industry group. Section 28 of the Act allows the Board to make "different provisions as required by circumstances for different contaminant sources and for different geographical areas".

At the outset, the Board notes that coal mines represent an easily defined category of dischargers. It is the only industry group with high TDS discharges which has made itself known to the Board by filing a general proposal. The Board would consider granting special rules by industry category to any group should that group propose rules to it (Section 28 of the Act and 35 Ill. Adm. Code 102.120).

Having defined a category of TDS dischargers, it is possible to be more specific as to the identity of the TDS constituents: it is either primarily chloride or sulfate, and not often both. This allows the use of chloride and sulfate toxicity data, which is better defined than for TDS in general.

Since there is no economically reasonable treatment available for TDS discharges, compliance with the water quality standards depends on process changes and location close to large rivers with adequate dilution. Existing facilities have the variance and site-specific rulemaking procedures to ease any difficulties. However, it has proven possible to propose a general regulation for mines, both new and existing.

The most unique feature of coal mines is their relative inability to locate close to major rivers; instead, they must locate where coal deposits are located. Thus choice of location is largely eliminated for this category of dischargers.

Restricting consideration to a single industry group allows the Board to adopt meaningful regulations taking account of the processes which produce the TDS. It would not be feasible to address such a problem for industry in general.

Conclusion

In a separate Order the Board has modified the First Notice proposal of December 15, 1983, and directed that a second notice be prepared reflecting the modified proposal. The Proposed Opinion of December 15, 1983 is withdrawn and this Second Proposed Opinion is substituted. This Second Proposed Opinion supports the Board's Proposed Rule, Second Notice Order of this same date. Because of its length, this Opinion will not be published, but will be distributed to participants. The Final Opinion will be published in the Opinion volumes.

Board Member B. Forcade concurred.

I, Christan L. Moffett, Clerk of the Illinois Pollution Control Board, hereby certify that the above Opinion was adopted on the 15th day of May, 1983 by a vote of 6-0.

Christan L. Moffett, Clerk
Illinois Pollution Control Board