ILLINOIS POLLUTION CONTROL BOARD
September 20, 2007

IN THE MATTER OF:	)	
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TRIENNIAL REVIEW OF SULFATE AND TOTAL DISSOLVED SOLIDS WATER QUALITY STANDARDS: PROPOSED AMENDMENTS TO 35 ILL. ADM. CODE 302.102(b)(6), 302.102(b)(8), 302.102(b)(10), 302.208(g), 309.103(c)(3), 405.109(b)(2)(A), 409.109(b)(2)(B), 406.100(d); REPEALER OF 35 ILL. ADM. CODE 406.203, 406.209, and PART 407; and PROPOSED NEW 35 ILL. ADM. CODE 302.208(h)	)	R07-9 (Rulemaking - Water)

Proposed Rule. First Notice.

OPINION AND ORDER OF THE BOARD (by G.T. Girard):

The Illinois Environmental Protection Agency (Agency) proposed rules to update existing general use water quality standards for sulfate and total dissolved solids (TDS) by amending 35 Ill. Adm. Code Parts 302, 309, 405, 406, and 407 of the Board's water and mine-related pollution rules. The Board has held two hearings and accepted comments on the proposal. Today the Board adopts a first-notice proposal. The Board is proposing the rule as proposed by the Agency with certain specific changes delineated in the opinion below. Those changes include in the rules on mixing zones language reflecting current Agency practice that allows mixing in up to 50% of the stream flow when dilution is less than 3:1.

The Board's opinion opens with a procedural background and follows with a summary of the Agency's proposal. Next the Board summarizes the testimony and comments in the record. Finally, the Board will discuss the issues raised and the rule adopted for first notice.

PROCEDURAL BACKGROUND

On October 23, 2006, the Agency filed a proposal under the general rulemaking provisions of Section 27 of the Environmental Protection Act (Act) (415 ILCS 5/27 (2006)). The proposal included a 15-page statement of reasons (Reasons) and a bound 3-inch thick collection of supporting facts and exhibits. On November 16, 2006, the Board accepted the rulemaking for hearing.

On November 27, 2006, in accordance with Section 27(b) of the Act (415 ILCS 5/27 (2006)), the Board requested that the Department of Commerce and Economic Opportunity (DCEO) conduct an economic impact study for this rulemaking. To date the Board has not received a response from DCEO.

The Board held two hearings in this proceeding before Hearing Officer Marie Tipsord. The first hearing was held on March 7, 2007, in Springfield (Tr.1) and the second on April 23, 2007, in Chicago (Tr.2). At those hearings the Board heard testimony from:

Robert Mosher, Brian Koch and Toby Frevert on behalf of the Agency;
James Huff and Brigitte Postel on behalf of CITGO Petroleum Corporation (CITGO);
Glynnis Collins on behalf of Prairie Rivers Network, Sierra Club and the Environmental Law and Policy Center (collectively Environmental Groups);
Phil Gonet on behalf of the Illinois Coal Association (ICA);
Jim Boswell on behalf of the ICA.

At the close of hearings a June 7, 2007 deadline for public comments to be filed was set. The Board received a total of eight public comments from the following:

Illinois Environmental Protection Agency (PC2, PC4);
Illinois Coal Association (PC1, PC3);
Illinois Association of Wastewater Agencies Water Quality Subcommittee (IAWA) (PC5);
CITGO Petroleum Corporation (PC6)
Illinois Environmental Regulatory Group (IERG) (PC7);
Prairie Rivers Network, Sierra Club and the Environmental Law and Policy Center (PC8).

PROPOSAL

The following discussion will summarize the Agency's proposal and statement of reasons. First, the Board will summarize the background of the proposal and then discuss each of the Agency's proposed changes in more detail. Next, the Board will summarize the Agency's position in the statement of reasons on the economic reasonableness and technical feasibility of the rule.

Background

The Agency states that the proposal fulfills the requirements of the Federal Water Pollution Control Act, 33 U.S.C. § § 1251-1387, also known as the Clean Water Act (CWA). Reasons at 7. States are required to revise and update water quality standards to ensure that standards are protective of public health and welfare, enhance the quality of water and promote the purposes of the CWA. *Id*., citing 33 U.S.C. §1313(c)(2)(A). This update is known as a triennial water quality standards review. *Id*., citing 33 U.S.C. §1313(c)(1).

The Agency's proposal is designed to refine the numeric water quality standard for sulfate based on the best available scientific knowledge. Reasons at 7-8. In 1972, the Board adopted water quality standards for sulfate and TDS to protect aquatic life and agricultural uses without scientific studies to determine appropriate values. Reasons at 8, and *see* In the Matter of: Water Quality Standards Revisions, R71-14 (Mar. 7, 1972). The adopted sulfate water quality standard presented issues for coal mines because the effluents from coal mines are often high in

sulfate. Reasons at 8. To address these issues, the Board adopted standards for sulfate and chloride for mine discharges. *Id*. and *see* 35 Ill. Adm. Code Subtitle D.

The Agency, in order to remedy the deficiency in the 1972 rulemaking and provide a scientific justification for sulfate water quality standards, engaged in a multi-year project researching the toxicity of sulfate to aquatic life and livestock. Reasons at 8. Based on the conclusion of these studies, the Agency's proposal seeks to:

1. update the sulfate general use water quality standard to be protective of aquatic life and livestock watering uses;

2. repeal the TDS general use water quality standard;

3. amend the mixing regulations at 35 Ill. Adm. Code 302.102 to allow mixing in 7Q1.1 zero flow streams[1] to dischargers that can demonstrate attainment of water quality standards when the discharge occurs; and

4. delete portions of the existing mine waste rules at 35 Ill. Adm. Code Subtitle D to ensure that sulfate limits in mine National Pollutant Discharge Elimination System (NPDES) permits are based on the general use water quality standards of Subpart C. Reasons at 8-9.

Sulfate Water Quality Standard

The proposed change to the sulfate water quality standard is based on extensive research and review of existing data on sulfate aquatic toxicity. Reasons at 9. In addition, the Agency commissioned new studies with "augmented sponsorship from the USEPA [Unites States Environmental Protection Agency (USEPA)] and the Illinois Coal Association." *Id*. The new research into sulfate toxicity found that high sulfate concentrations pose the problem of osmotic (salt) imbalance for aquatic organisms. *Id*. The Agency states that many organisms, such as all the fish tested and some invertebrates, are very tolerant of sulfate while other species, including water fleas (*Daphnis* and *Ceriodaphnia*) and scud (*Hyalella*), are less tolerant of high sulfate conditions. *Id*. Further, sulfate has been demonstrated to affect only the short-term survival of organisms unlike many toxicants that exert toxic effects over both the short and long term. *Id*. The new research also found that chloride and hardness can impact the osmotic imbalance leading to sulfate toxicity. *Id*.

Dr. David Soucek of the Illinois Natural History Survey (Survey) performed the research and as a result developed equations to determine non-toxic amounts of sulfate. Reasons at 10. Dr. Soucek considered various concentrations of hardness and chloride in a water body to calculate levels of sulfate that would be non-toxic. *Id*. The Agency proposal will allow for

[1] Streams that have zero flow for at least seven consecutive days recurring on average in nine years out of ten.

various sulfate concentrations ranging from 500 milligrams per liter (mg/L) in soft waters with low chloride levels to over 2,500 mg/L in hard waters of average chloride concentrations. *Id.*

The Agency determined that an update of the water quality standard for waters used for watering livestock was necessary for protection of livestock. Reasons at 10. The Agency performed an extensive literature review and found that livestock are capable of withstanding sulfate concentrations that are on average higher than the proposed aquatic life standards. *Id.* The Agency further found that hardness and chloride concentrations are irrelevant to sulfate impacts on livestock and that extended exposure to drinking waters high in sulfates may lead to weight loss, disease, and death of livestock. *Id.* Based on this, the Agency determined that a chronic standard for sulfate in livestock drinking water was necessary. *Id.* The Agency is proposing a chronic sulfate standard of 2,000 mg/L where livestock watering is present. *Id.* The Agency believes that this chronic standard will be protective of livestock. *Id.*

Total Dissolved Solids Standard

TDS is the sum of dissolved substances in water and TDS is dominated by the common ions of sulfate, chloride, sodium, calcium, carbonate, and magnesium in various proportions. Reasons at 11. The Agency is proposing the deletion of the general water quality standard for TDS in this rulemaking. Reasons at 10-11. The Agency states that investigations into sulfate toxicity indicate that the existing TDS standard is unnecessary. Reasons at 11. The standard is unnecessary because the toxicity of each constituent in TDS is the significant factor in protecting aquatic life rather than the total. *Id.* The Agency believes that with toxicity based standards adopted for sulfate and chloride, the TDS standard is not needed, as TDS cannot predict the threshold of adverse effects to aquatic life. *Id.*

Mixing Regulations

The Agency proposes an amendment to allow for mixing in 7Q1.1 zero flow streams when adequate upstream dilution exists. Reasons at 11. The Agency claims this concept is consistent with the Agency's current practice in that the Agency has been allowing for wet weather discharge to 7Q1.1 zero flow streams. *Id.* The Agency states that experience shows that most mine discharges of high sulfate occur during wet weather events. *Id.* The Agency explains that the best degree of treatment at mines is provided by collecting site drainage, which is high in total suspended solids, into on-site ponds where settling occurs. *Id.* The treated water is then discharged into water bodies when a significant amount of water from the un-mined watershed enters the water bodies during the discharge, allowing for sufficient dilution to occur. *Id.*

Subtitle D Changes

The Agency is proposing to delete separate sulfate and chloride standards for mining operations that are included in Subtitle D. Reasons at 11. The Agency proposes to require that limits in mine permits be set using the Subtitle C water quality standards. Reasons at 12. The Agency is also proposing to remove outdated portions of the Subtitle D rules.

Economic Reasonableness and Technical Feasibility

The Agency states that the proposal contains science-based standards that for most dischargers "will allow attainment of water quality standards without the implementation of additional management practices or process alternatives." Reasons at 13. The Agency believes that a "significant majority of discharges" will meet the applicable permit limits with the help of ongoing and routine control measures. *Id*.

The Agency judges that a small number of existing mines may need to employ additional controls to meet water quality standard-based permit limits. Reasons at 13. However, the Agency has been "proactive in getting information to these dischargers that will help achieve compliance." *Id.* The Agency believes that new mines will be able to design for sulfate control. Reasons at 13-14.

The Agency anticipates that the new standards will eliminate virtually all petitions from industrial and municipal dischargers for site-specific water quality standard relief concerning sulfate and TDS. Reasons at 13. The Agency feels that this will result in extensive cost savings not only for industry but also for the Agency and the Board, as they will no longer need to expend resources on regulatory relief. *Id*.

SUMMARY OF TESTIMONY

The Board will first summarize the testimony of the Agency. Next the Board will summarize the testimony of CITGO. The Board will then summarize ICA testimony. A summary of the Environmental Groups testimony will follow.

Agency Testimony

As stated above, Mr. Bob Mosher, Manager of the Water Quality Standards Unit, and Mr. Brian Koch, Toxicologist in the Water Quality Standards Unit, testified for the Agency. Mr. Mosher's testimony generally describes the Agency's reasons for changing the standards, while Mr. Koch's testimony describes the procedures used to develop the proposed standards. Also, Mr. Toby Frevert, Manager, Division of Water Pollution Control, responded to questions during the first hearing. The following paragraphs will summarize their testimony in turn.

Bob Mosher

Mr. Mosher's direct testimony addressed three specific areas. First, Mr. Mosher discussed the general benefits the proposed changes in the standards will bring to water quality. Tr.1 at 11. Second, Mr. Mosher discussed the deletion of the water quality standard for TDS. *Id*. Third, Mr. Mosher explained the changes to the mixing zone standards. Tr.1 at 11-12. Mr. Mosher also responded to questions during his testimony. The paragraphs below will summarize his testimony in each of these areas.

Water Quality Standards. According to Mr. Mosher, the general use water quality standards for sulfate (500 mg/L) and TDS (1,000 mg/L) have existed in Illinois since 1972. Tr.1 at 12. The standards were adopted to protect aquatic life and agricultural uses though few

modern studies were available to determine appropriate standards. *Id*. Mr. Mosher stated that the adopted standards stemmed from the opinion of a few experts rather than documented scientific experiments. *Id*. Mr. Mosher explained that a special standard was developed for mine discharge because the effluent from mines was often high in sulfate. *Id*. The sulfate standard for mines was set at 3,500 mg/L in 1984 (*see* 35 Ill. Adm. Code Subtitle D) and was not documented by the same type of aquatic life toxicity and livestock tolerance studies used in standards development today. *Id*.

Mr. Mosher testified that under existing general use water quality standards, most mine discharges could not be permitted absent the special rules in Subtitle D. Tr.1 at 12-13. Mr. Mosher explained that many mines cannot meet the general use water quality standards for sulfate and TDS at the point of discharge and many mines do not qualify for conventional mixing. Tr.1 at 13. Mr. Mosher noted that other industries also have difficulty meeting the general use water quality standards for sulfate and TDS and have received adjusted standards or site-specific rules for discharges because sulfate and other constituents of TDS are not treatable by any practical means. *Id*.

Mr. Mosher stated that a solution to the dilemma was to reevaluate the water quality standards for sulfate and TDS that account for most of the permitting problems. Tr.1 at 13. Mr. Mosher indicated that studies of aquatic life communities downstream of high sulfate, high TDS discharges demonstrate that organisms incur no detrimental effect from concentrations of these pollutants higher than the current water quality standards. *Id*. Mr. Mosher noted that no national criteria exist for sulfate and TDS and few states even have water quality standards for these pollutants. Mr. Mosher testified that a process was begun to gather existing information on sulfate aquatic life toxicity; however, the data was inadequate to derive a standard. *Id*. The Agency, along with USEPA and ICA, commissioned new studies. *Id*. At the same time investigations into livestock tolerance for sulfate in drinking water were begun. Tr.1 at 13-14.

Mr. Mosher stated that the new research confirmed that high sulfate concentrations pose a problem of osmotic or salt balance for some organisms. Tr.1 at 14. Mr. Mosher indicated that many organisms including all species of fish tested and many invertebrate species are very tolerant of sulfate. *Id*. Mr. Mosher opined that many are so tolerant that no concentration currently found in Illinois could harm the species. *Id*. Mr. Mosher further indicated that some species such as invertebrate water fleas (*Daphnia* and *Ceriodaphania*) and scud (*Hyalella*) have a harder time maintaining a salt balance under high sulfate conditions that leads to toxicity. *Id*.

Mr. Mosher testified that sulfate toxicity leads to mortality relatively quickly but with no apparent residual effect. Tr.1 at 14. The new research also found that two constituents, chloride and hardness, are keys to understanding sulfate toxicity. *Id*. Mr. Mosher noted that Mr. Koch would discuss this correlation in more detail. *Id*.

TDS. Mr. Mosher stated that the new research made obvious the fact that TDS was inappropriate to use as a parameter for water quality. Tr.1 at 14-15. Mr. Mosher explained that TDS is the sum of all dissolved substances in water and is dominated by the common ions of sulfate, chloride, sodium, calcium, carbonate, and magnesium. Tr.1 at 15. Mr. Mosher opined that based on the Agency's investigation regarding sulfate toxicity, "it makes little sense to have

a standard that covers all these substances together when the toxicity of each constituent is really what is important." *Id*. Mr. Mosher offered as an example that a sample with a high chloride and TDS concentration of 2,000 mg/L is highly toxic to some species of aquatic life but a sample with high sulfate at the same TDS concentration is nontoxic. *Id*. Mr. Mosher states that he is not aware of an instance where common ions other than chloride and sulfate cause toxicity. *Id*. Mr. Mosher opined that sulfate and chloride standards effectively regulate salt toxicity and a TDS standard is no longer necessary. *Id*. Therefore, Mr. Mosher testified, the Agency is recommending that the TDS standard be deleted. *Id*.

Mixing Zones. Section 302.102 sets forth the conditions under which the Agency may allow dilution of an effluent by the receiving waters. Tr.1 at 15-16. Mr. Mosher pointed out that sulfate is one of a small group of substances for which treatment is usually infeasible and for which mixing becomes an important option in regulations. *Id*. Mr. Mosher noted that the other common substances for which treatment does not exist are chloride, boron and fluoride. *Id*. Mr. Mosher testified that coalmines and other industries can commonly discharge effluent that exceeds the current water quality standards for these pollutants and, therefore, mixing is required to comply with the standards in the receiving streams. *Id*.

Mr. Mosher stated most high sulfate discharges from coal mines occur during wet weather events that bring sediment-laden water into treatment ponds, and then the water is discharged into water bodies where the water quality standards apply. Tr.1 at 16. According to Mr. Mosher, the ponds function to remove sediment and control pH, but sulfate and chloride are not reduced. *Id*. Also during wet weather events, water from unmined or reclaimed watershed enters the water bodies and provides dilution. *Id*. Mr. Mosher stated that at many mines this is a simultaneous process. *Id*.

Mr. Mosher indicated that for the "past few years" the Agency "has granted wet weather discharges allowed mixing zones for sulfate and sometimes chloride with consideration of the upstream flows." Tr.1 at 17. Mr. Mosher stated that the Agency now proposes to amend the mixing zone rules to clarify that mixing is allowed. *Id*.

The first change proposed by the Agency is to provide that a zone of passage need not always be present in a receiving stream. Tr.1 at 17. A zone of passage is an area in the stream not impacted by the mixture of effluent with receiving water that is preserved for use by aquatic life whenever mixing is allowed. *Id*. Specifically, Mr. Mosher testified that there is one circumstance where a zone of passage cannot be included in a receiving stream due to physical and practical limitations. *Id*. That instance is often high in a watershed where only a few square miles or less of drainage supplies the receiving stream. *Id*. The receiving streams are small and narrow and stormwater-driven effluent will mix completely across the stream channel and leave no room for a zone of passage. *Id*. Mr. Mosher stated that under a strict interpretation of the existing rules, these dischargers would not be allowed mixing and would not be able to continue operation. *Id*.

Mr. Mosher stated that the Agency must define "small streams" to ensure that eliminating the zone of passage requirement is functional. Tr.1 at 18. Mr. Mosher testified that the Agency developed a definition of "small streams" with the help of the Illinois State Water Survey using a

concept similar to the commonly used 7Q10 flow. *Id*. The Agency is proposing defining "small streams" to equate with the streams ability to maintain flow. *Id*. Streams very high in the watershed will tend to lose flow and dry up when there is no rainfall. *Id*. Mr. Mosher opined that streams losing all flow for at least one week nine out of ten years will have very limited habitat for aquatic life. *Id*. Under the Agency's proposal, Mr. Mosher stated that wet weather discharges to these streams called 7Q1.1 zero flow will be allowed mixing for the entire stream volume during wet weather events. Tr.1 at 19. The Agency's proposal defines streams identified as 7Q1.1 zero flow as streams having no flow for a t least seven consecutive days in nine out of every ten years. *Id*. Mr. Mosher testified that aquatic life will be protected because an analysis of the effluent and the amount of flow expected in the stream during discharge events will be required to determine that the available mixing will reduce effluent concentrations below the water quality standards. *Id*.

A second change to the mixing zone rules proposed by the Agency, is to delete the prohibition of mixing in streams that have a 7Q10 flow of zero. Tr.1 at 20. Mr. Mosher explained that this change is necessary to allow for the wet weather discharges described above as well as non-stormwater discharges that have "unique characteristics". *Id*. Mr. Mosher further explained that the existing definition of dilution ratio implies that noncontinuous dischargers would use the flow expected when the discharge occurs to determine the allowed stream flow. *Id*. Mr. Mosher stated that under the Agency's proposal these flows must allow for a zone of passage that is 75% of the stream flow if the dilution ratio is 3 to 1 or greater and the stream 7Q1.1 is greater than zero. *Id*.

Mr. Mosher testified that many effluents are continuously discharged and therefore the default stream flow for calculating dilution is 7Q10. Tr.1 at 20. Such dischargers include sewage treatment plants, power plants, and industrial dischargers. *Id*. Mr. Mosher stated that some facilities outside these general categories may produce effluent only periodically. *Id*. Mr. Mosher testified that stream flow may be used for granting mixing where the discharger can demonstrate that discharges will occur at times and in quantities that will be sufficiently diluted by the stream flow present at the time of the discharge. Tr.1 at 20-21. Mr. Mosher opined that the proposed deletion enables the definition of dilution ratio to guide the Agency in granting mixing. Tr.1 at 21.

Mr. Mosher emphasized that all other aspects of the mixing zone and water regulations remain unchanged by this proposal. Tr.1 at 21. Mr. Mosher stated that the proposed changes will work with the other regulations. *Id*. Mr. Mosher noted that dischargers will still be required to provide the best degree of treatment (*see* 35 Ill. Adm. Code 304.102) before mixing is allowed. *Id*. Mr. Mosher further noted that with the changes proposed for sulfate and TDS and the deletion of the mine exemptions in Subtitle D will allow the Agency to regulate all types of dischargers in an equitable manner. *Id*.

Response to Questions and Testimony. When asked about whether deletion of the TDS could create an issue with calcium, Mr. Mosher indicated that calcium, sodium, and magnesium paired with sulfate are not toxic. Tr.1 at 42. Further, the studies performed to determine aquatic life standards included hardness, and calcium is a constituent of hardness. Tr.1 at 43. Mr. Mosher also replied that if some unique situation occurred where calcium discharges were

problematic, the Agency would evaluate the discharge using the antidegradation provisions of the rules. Tr.1 at 43-44. Mr. Mosher continued to address the issue of calcium at the second hearing and indicated that the Agency can, through the permit process, require mines to provide data on toxicity and what alternatives might exists. Tr.2 at 54. Mr. Mosher stated that the Agency believes the issue is under control. *Id*.

In response to questions regarding the economic impact of the proposed changes, Mr. Mosher conceded that no formal economic impact analysis had been performed. Mr. Mosher noted that several adjusted standards and site-specific rulemakings have been granted dealing with sulfate and TDS. Tr.1 at 69. Mr. Mosher believes that all the existing adjusted standards and site-specific rulemakings will be unnecessary and this will preclude a future need. Tr.1 at 69-70. As to the change for coal mines, Mr. Mosher stated that the Agency believes those mines "will suffer no economic hardship" and the proposed rules may provide a "way for mines to continue to exist." Tr.1 at 70.

A question was asked concerning whether the Agency considered changing the standards for secondary contact waters for sulfate and TDS in this rulemaking. Tr.1 at 74. Mr. Mosher replied that the Agency wished to keep the secondary contact waters separate and distinct. *Id*. Mr. Mosher testified at the second hearing that the Agency intended to file the secondary contact waters standards rulemaking later this year. Tr.2 at 40. Mr. Mosher stated that the Agency wishes to make all changes to secondary contact waters at the same time and the Agency believes that stakeholders should be given an opportunity to comment on sulfate and TDS standards. Tr.1 at 74; Tr.2 at 40. Mr. Mosher indicated that there is an additional problem for review with secondary contact waters and that is the issue of standards when chloride exceeds 500 mg/L. Tr.2 at 41. Thus, Mr. Mosher stated the Agency still prefers to address all secondary contact water standards together. *Id*.

Mr. Mosher answered a question from the Environmental Groups that indicated the Agency practice is to allow mixing in 50% of the flow, if the dilution ratio is less than 3 to 1. Mr. Mosher added, "[t]here can be cases where our Agency would chose not to use 50%" of the flow. Tr.1 at 65. Mr. Mosher clarified that when the dilution ratio is less than 3 to 1, the Agency looks at the factors present and what makes the most sense on a case-by-case basis. *Id.* Mr. Mosher responded to suggestions by the Environmental Groups that the Agency's general practice for mixing zones be codified and indicated the Agency would rather maintain the flexibility the Agency has used over the past several years. Tr.2 at 55. Mr. Mosher referred to situations where the Agency would allow more or less than 50%, including dischargers who provide a vital service to society but have an untreatable effluent that might necessitate 51% as long as aquatic life was protected. Tr.2 at 55-56. In turn, Mr. Mosher questioned the Environmental Groups on the scientific basis for proposing 50% as the maximum value. Tr.2 at 56. Mr. Mosher indicated that the Agency does not agree with the Environmental Groups' proposed language changes. *Id*.

Brian Koch

Mr. Koch testified concerning the procedures used to develop the water quality standards for aquatic life and livestock. Mr. Koch also summarized the proposed rule changes for sulfate standards. The following paragraphs will summarize his testimony on those two issues.

Aquatic Life. Mr. Koch has been employed with the Agency since January 2006 and he has been charged with obtaining a complete understanding of the formal guidelines the Agency used to derive the proposed aquatic life standards. Tr.1 at 23. Mr. Koch testified that prior to his employment, the Agency, USEPA and the Survey spent several years reviewing literature and conducting research in support of standards derivation. *Id*. Mr. Koch stated that the guidelines are followed in standards development by USEPA and other states and were used as a basis for deriving water quality standards in Subparts E and F of the Board's rules (35 Ill. Adm. Code.Subparts E and F). Tr.1 at 23-24.

Mr. Koch opined that a key component in standards derivation is gathering and assessing available toxicity data for the substance. Tr.1 at 24. Mr. Koch stated that sodium is the predominant cation in Illinois waters, so the Agency searched the data for sodium sulfate aquatic life toxicity data that was both reputable and reflective of Illinois fauna. *Id*. Dr. Charles Stephan, a primary author of the guidelines document, took the lead in the evaluation of toxicity data and compiled the list of final values considered for sulfate standards derivation. *Id*. Mr. Koch testified that based on a review of the data, fish are quite tolerant of sulfate while invertebrates are much more sensitive due to problems in maintaining osmotic balance. Tr.1 at 25. At this time, Mr. Koch noted that sulfate toxicity to invertebrates was impacted by water chemistry. *Id*.

Dr. Soucek of the Survey was contracted to conduct laboratory toxicity testing on multiple invertebrate species exposed to sodium sulfate at various concentrations of hardness and chlorides. Tr.1 at 25. Dr. Soucek's research was instrumental in the derivation of new sulfate aquatic life standards because the research verified that sulfate toxicity to aquatic invertebrates was dependent on hardness and chloride concentrations of water. *Id*. Mr. Koch stated that Dr. Soucek's research also characterized sulfate toxicity to previously untested invertebrates and thus increased the data set. Tr.1 at 25-26.

Mr. Koch stated that a by-product of Dr. Soucek's research was the finding that chronic exposures of the water flea to sulfate did not result in reduced survival compared to acute exposure routes. Tr.1 at 26. Mr. Koch testified that the research indicated that sulfate does not exhibit traditional chronic toxicity similar to substances such as heavy metals or pesticides. *Id*. Mr. Koch indicated that the unique toxicodynamics of sulfate required a sulfate adjustment factor when converting the concentration lethal to 50% of tested organisms (LC50) to the protective level of effect. *Id*.

Mr. Koch testified that when data is available to show that acute toxicity to two or more species is related to a water quality characteristic, an acute equation must be calculated to describe the relationship. Tr.1 at 27. With sulfate, toxicity to *Hyalella azteca* and *Ceriodaphnia*

dubia was quantified in respect to hardness and chloride and the sulfate LC50 values were measured or estimated at various concentrations and transformed into equations. *Id*. Mr. Koch indicated that two separate equations were necessary due to the finding that sulfate was increasingly toxic at low chloride concentrations but decreasingly toxic at concentrations intermediate and higher. *Id*.

With the equations in place, LC50 values for all valid tests within the database were normalized at specific concentrations of hardness and chloride whereupon genus mean acute values and final acute values (FAV) were calculated. Tr.1 at 28. Mr. Koch stated that by definition the FAV value is protective of at least 95% of the species at the LC50 level of effect. *Id*. However, the standard cannot be set at the FAV effect level, as this concentration would result in 50% mortality in highly sensitive species. *Id*. Mr. Koch indicated that to achieve a sufficient level of protection, an FAV or FAV equation is multiplied by an adjustment factor that translates the LC50-based FAV into a value that is representative of a no observable effect concentration. *Id*.

Mr. Koch stated that based on the research, the Agency developed two acute aquatic toxicity criterion equations for sulfate at specified ranges of hardness and chloride. Tr.1 at 29. Mr. Koch opined that the adoption of these equations will allow for the site-specific calculation of sulfate standards. Tr.1 at 30. Mr. Koch testified that the resulting value will be a protective concentration for sulfate at that site under those water quality characteristics. *Id*.

Livestock. Mr. Koch testified that there is no existing livestock water quality standard; however, the 500 mg/L aquatic life standard was considered protective when that standard was adopted in 1972. Tr.1 at 30. After Mr. Koch was employed by the Agency, he was charged with researching the effects of sulfate on livestock watering to ascertain if the proposed aquatic life standard would threaten livestock. Tr.1 at 30-31. Mr. Koch stated that a review of the literature established that livestock are acutely tolerant of sulfate within the range of calculable aquatic life sulfate standards. Tr.1 at 31. Mr. Koch opined that acute exposure to concentrations within this range may result in cathartic effects for several days, but the effects will lessen as the livestock acclimate to elevated sulfate. *Id*.

Mr. Koch noted that prolonged exposure to elevated sulfate levels would likely lead to adverse effects for the animals and the economy of livestock operations effected by the exposure. Tr.1 at 31. Mr. Koch stated that based on the literature review the Agency concluded that a chronic standard of 2,000 mg/L of sulfate would be protective of livestock watering and would not lead to adverse effects on livestock or the economy of livestock operations. *Id*. The Agency's proposed standard is only applicable where water is used for livestock watering, and in many of those waters, aquatic life standards will require a lower sulfate level. Tr.1 at 32. The Agency's proposal requires a 30-day average sulfate standard of 2,000 mg/L if the aquatic life standard, applied instantly, is higher. *Id*.

Mr. Koch stated that the Agency contacted Dr. Gavin Meerdink, from the Department of Veterinary Medicine at University of Illinois - Urbana, to verify the suitability of the proposed standard. Tr.1 at 33. According to Mr. Koch, Dr. Meerdink has performed consultations for livestock operations throughout Illinois and has often dealt with the issue of sulfate in livestock

water and feed. *Id*. Dr. Meerdink agreed that a 2,000 mg/L sulfate standard would adequately protect livestock. Tr.1 at 34.

Rule Changes. Mr. Koch explained that the development of updated standards required the modification of Section 302.208. Tr.1 at 34. The first change is to strike the current sulfate and TDS standards from Section 302.208(g) and move the proposed sulfate standards to a new Section 302.208(h). *Id*. Section 302.208(h)(1) is the livestock standard, which will be implemented as the average concentration not to be exceeded over a 30-day period. Tr.1 at 35. Mr. Koch clarified that sulfate standards may exceed 2,000 mg/L instantaneously as long as the 30-day average of 2,000 mg/L is not exceeded. *Id*.

Section 302.208(h)(2) includes equations that provide sulfate water quality standards in mg/L for the specified ranges of hardness and chloride. Tr.1 at 35. Section 302.208(h)(3) sets a sulfate limit of 500 mg/L when hardness is less than 100 mg/L or chloride is less than 5 mg/L. If hardness is greater than 500 mg/L and chloride is more than 5 mg/L, the sulfate standard is 2,000 mg/L. Tr.1 at 36.

Toby Frevert

Mr. Frevert did not offer prepared testimony but was available to respond to questions during the first hearing. Specifically, Mr. Frevert testified about rulemakings that are currently being considered by the Agency. Tr.1 at 40. One of those rulemakings involves water quality standards for secondary contact waters for streams in northeastern Illinois. *Id*. Mr. Frevert also responded to questions concerning the identification of 7Q1.1 zero flow streams. Although these streams have not yet been identified (*see* Tr.1 at 79-80), Mr. Frevert stated that in his experience a stream with less than 20 square miles of drainage would generally go dry annually. Tr.1 at 80. Mr. Frevert further stated that in his experience there are "thousands and thousands of miles of drainage ways that have just a few square miles of drainage way." Tr.1 at 81.

CITGO Testimony

At the second hearing, CITGO presented testimony from Bridget Postel, Environmental Engineer, Water Coordinator for CITGO, and James Huff, Vice-President of the environmental consulting firm Huff & Huff. In addition, CITGO filed a post-hearing public comment.

Bridget Postel

Ms. Postel has been employed by CITGO for the past three years and has been at the Lemont Refinery since October 2003. Tr.2 at 8-9. Ms. Postel holds the position of environmental engineer and has had various experiences in the field. Tr.2 at 9. The Lemont Refinery is operated by CITGO and was constructed during the period of 1967 through 1970 and became operational in late fall 1969. *Id*. The average daily production of the Lemont Refinery is 168,626 barrels per day and the Refinery employs approximately 530 people. Tr.2 at 9-10. The Lemont Refinery draws from and discharges to the Chicago Sanitary and Ship Canal, drawing approximately four million gallons of water and discharging approximately 3.8 million gallons of water. Tr.2 at 10. Ms. Postel explained that the wastewater effluent contains

dissolved solids derived from compounds present in crude oil that are removed from the crude by various refinery operations. Tr.2 at 10-11. The effluent also concentrates TDS present in the intake water from the canal by evaporative cooling, according to Ms. Postel. Tr.2 at 11.

Ms. Postel testified that the purpose of her testimony was to support the Agency's proposal and to request that the changes pertaining to TDS and sulfate be extended to the Lemont Refinery. Tr.2 at 11. Ms. Postel stated that TDS has recently become an issue for CITGO because of an agreement that CITGO reached with USEPA and four states including Illinois to substantially reduce sulfur dioxide and nitrogen oxide emissions from several facilities. Tr.2 at 12. Ms. Postel testified that the equipment used to reduce these air emissions result in increased TDS in the effluent. *Id.* Ms. Postel noted that because of the TDS levels in the lower Des Plaines River near I-55, the Agency could not issue a construction permit for the project. *Id.* Ms. Postel stated that treatment for TDS in the wastewater stream is neither technically feasible nor economically feasible and technologies for removing sodium sulfate are limited. Tr.2 at 12-13. While investigating options, Ms. Postel stated that CITGO became aware of the Agency's efforts to eliminate TDS water quality standards for both general use waters and secondary contact waters. Tr.2 at 14.

Ms. Postel noted that even two years ago the progress of the rulemaking was clearly not going to help the Lemont Refinery meet the TDS requirements and therefore CITGO sought and received a variance to allow CITGO to proceed with construction. Tr.2 at 15. The Board granted CITGO the variance in April 2005 (*see* CITGO Petroleum Corporation v. IEPA, PCB 05-85 (Apr. 21, 2005)). Ms. Postel stated that CITGO has proceeded under the variance and consent decree and the project is on schedule. Tr.2 at 16. Ms. Postel indicated that on May 2, 2006, CITGO attended a stakeholders meeting with the Agency and discovered that elimination of the TDS water quality standards would be proposed only for general use waters and secondary contact TDS standards would be eliminated in a future Agency' rulemaking proposal. Tr.2 at 16-17.

Development of the future proposal to amend secondary contact water quality standards is experiencing delays, according to Ms. Postel. Tr.2 at 17. Ms. Postel claims that the issue of eliminating a TDS water quality standard for secondary contact waters has not received any comment during the stakeholders meeting and has not even been raised. *Id.* Ms. Postel further claims that the only two facilities affected by the TDS standard for secondary contact waters are Lemont Refinery and ExxonMobil Joliet Refinery. *Id.* Ms. Postel noted that the Exxon-Mobil Joliet Refinery was recently granted site-specific relief. Tr.2 at 18, citing Revisions to Water Quality Standards for Total Dissolved Solids in the Lower Des Plaines River ExxonMobil Oil Corporation: 35 Ill. Adm. Code 303.445, R06-24 (Feb. 15, 2007)).

Ms. Postel stated that CITGO sees "no reason why the Board cannot amend the Secondary Contact TDS standard at the same time as General Use water ways, at least as it pertains to CITGO." Tr.2 at 18. Ms. Postel stated that if the secondary contact TDS standard is not amended in this proceeding, CITGO may be required to propose a site-specific rule. *Id.* Ms. Postel noted such a proceeding would repeat the same testimony and evidence as presented in this proceeding. *Id.* Ms. Postel testified that the information that justifies deletion of the TDS standard for general use waters applies equally to secondary contact waters. Tr.2 at 19. Ms.

Postel urged the Board to recognize that removal of the TDS water quality standard for secondary contact waters is consistent with the Agency's proposal and to eliminate the TDS standard for secondary contact waters to the extent applicable to Lemont Refinery. Tr.2 at 18-19

James Huff

Mr. Huff testified that he has followed the Agency's efforts to amend TDS and sulfate closely since 2004. Tr.2 at 21. Mr. Huff commended the efforts of the Agency and noted that Illinois has an opportunity to develop water quality standards based on better science than what was historically available. Tr.2 at 22. Mr. Huff stated that he reviewed the Agency's testimony and exhibits and he fully supports the Agency's proposed changes as they apply to general use water quality standards. *Id*. Mr. Huff recommended that the proposed changes for TDS and sulfate be included for secondary contact waters. Tr.2 at 23. Mr. Huff claims that there "is no technical reason not to eliminate the TDS water quality standards proposed for General Use streams to the Secondary Contact waterways." *Id*. Mr. Huff stated that the evidence presented by the Agency concerning general use standards applies to secondary contact waters as well. *Id*.

Mr. Huff acknowledged the testimony of Mr. Frevert and Mr. Mosher that the Agency wished to propose all secondary contact waters changes in one rulemaking and that the hardness and chloride levels in the Sanitary and Ship Canal are similar to level found in the lower Des Plaines River. Tr.2 at 23. Mr. Huff noted that CITGO chose to seek a variance because of time constraints and the understanding that the Agency would propose rules to eliminate the TDS water quality standard and thus eliminate the need for the variance. Tr.2 at 24. Mr. Huff further noted that in a comment filed in the ExxonMobil site-specific rulemaking, the Agency indicated that certain conditions of the CITGO variance would no longer be pertinent. *Id*.

Mr. Huff testified that the delay in getting the sulfate and TDS proposal to the Board and excluding secondary contact waters has placed CITGO in a difficult position. Tr.2 at 25. Mr. Huff opined that the sulfate and TDS levels in the Des Plaines will not exceed the standards proposed for general use waters. Tr.2 at 26. Mr. Huff maintained that relying on secondary contact water quality changes in a future rulemaking "is fraught with uncertainty from a timing perspective." Tr.2 at 27. Mr. Huff noted that the Agency's desire to amend secondary contact water quality standards only once seems to be an inadequate justification for not adopting TDS changes now. *Id*.

Mr. Huff noted that there are currently no sulfate or chloride water quality standards on the secondary contact waterways. Tr.2 at 27. Mr. Huff further noted that the general use sulfate standards are limited to waterways having chloride less than 500 mg/L, which is the general use water quality standard for chloride. Tr.2 at 27-28. Mr. Huff pointed to data collected by CITGO that indicate elevated chloride levels from February 19, 2007, to at least March 5, 2007, in the lower Des Plaines River. Tr.2 at 28. Mr. Huff stated that the proposed regulations are not clear as to what the sulfate standards would be during such a period when the general use water quality standard for chloride would be exceeded. *Id*. Mr. Huff indicated that the Agency's draft proposal for secondary contact water quality standards includes the same equation as the general use waterways without the chloride limitations. Tr.2 at 29.

Mr. Huff concluded that the Agency's proposal is appropriate for primary contact waterways with some adjustment for chlorides exceeding 500 mg/L. Tr.2 at 29. Mr. Huff further concluded that adopting the equation for secondary contact waterways is also appropriate and consistent with the Agency's intention. *Id.*

Prairie Rivers Network, Sierra Club and the Environmental Law and Policy Center Testimony (Environmental Groups)

Glynnis Collins, Watershed Scientist for Prairie Rivers Network, testified on behalf of the Environmental Groups and noted that the Environmental Groups are generally supportive of the Agency's proposal regarding TDS, sulfate, and mixing zones. Tr.2 at 46. Further, Ms. Collins indicated the strong support for elimination of the provisions of Subtitle D. *Id.* Ms Collins stated that the scientific work regarding the effects of dissolved solids and aquatic life should continue after adoption of the standards, as the Environmental Groups are not convinced that Illinois' standards are fully protective of aquatic life. *Id.* Specifically, the Environmental Groups have concerns about water with high calcium levels and chloride levels higher than 500 mg/L. Tr.2 at 47. Also, the Environmental Groups have concerns regarding the change to the mixing zone regulations. The Board will summarize Ms. Collins testimony in each of these areas below.

Calcium

Ms. Collins expressed concern that some data suggests that when calcium is the primary cation in a solution, calcium may serve to increase toxicity of sulfate. Tr.2 at 47. Ms. Collins stated that the Environmental Groups understand that some mining operations use calcium hydroxide in processing and this results in large amounts of calcium in the effluent. *Id.* The Environmental Groups recommended that the Agency investigate the potential for calcium hydroxide use to influence sulfate toxicity and if necessary restrict or regulate the use through the permit process. *Id.*

Chloride

Ms. Collins stated that the data reviewed by the Environmental Groups indicates that chloride concentrations higher than 25 mg/L increases toxicity of sulfate as chloride bubbles increase and this relationship holds true for concentrations up to 500 mg/L. Tr.2 at 47. Ms. Collins agrees that the general use water quality standard for chloride is 500 mg/L; however, many Illinois waters do not meet that standard. Tr.2 at 48. Ms. Collins noted that the proposed rule does not define a sulfate standard for those water unless hardness is greater than 500 mg/L. *Id.* Ms. Collins insisted that the rule must provide an equation, numeric standard or procedures for site-specific standards development covering the entire range of possible chloride and hardness levels. *Id.*

Mixing Zones

Ms. Collins testified that the Environmental Groups believe that the proposed changes to the mixing zone requirements must be clarified and the Agency's current practice regarding the

area and volume of mixing must be included in the Board's rules. Tr.2 at 49. The Environmental Groups proposed that Section 302.102(b)(8) be amended to specify what dilution rate is required when 3 to 1 dilution is not available. Tr.2 at 50. Ms. Collins stated that this change is critical, as the current standard does not say what happens where there is less than 3 to 1 dilution available; however, the rule does require that the water quality standard be met at he pipe if the discharge is to a 7Q10 stream. *Id*. Ms. Collins noted that the Agency had testified that as a general practice, mixing can occur in no more than 50% of the flow in such cases and the Environmental Groups will accept this practice. *Id*. However, Ms. Collins emphasized that the standard must be placed in the rule given the change proposed which will more frequently allow mixing in waters with less than 3 to 1 dilution. Tr.2 at 50-51.

Illinois Coal Association (ICA)

Phillip Gonet, President of ICA, and Jim Boswell, Manager of Hydrology at Peabody Energy, testified on behalf of ICA at the second hearing. Mr. Gonet offered testimony while Mr. Boswell was available to answer questions. Mr. Gonet testified that the proposed changes provide a more reasonable and scientific approach than the current rule; however, there are still issues to be addressed. Tr.2 at 63. Specifically, Mr. Gonet claimed that the Agency stated publicly that "no harmful effects" are occurring as a result of modern mining in Illinois. *Id*. Mr. Gonet stated that studies targeting effects of coal mines on aquatic life have shown healthy macroinvertebrate communities existing downstream from mine discharges. *Id*. Mr. Gonet opined that sulfate is not a conventional toxic chemical as compared to heavy metals and, conversely, sulfate is a necessary nutrient for normal functioning cells. *Id*. Mr. Gonet noted that sulfate salts are essential to cation delivery and sulfur increases the protein content of plants. *Id*. Mr. Gonet testified that given the beneficial uses of sulfate and the fact that USEPA has no standard for sulfate, "the reasoning for imposing a sulfate standard altogether" is questionable. Tr.2 at 64.

Mr. Gonet stated that based on the equations proposed, the sulfate standard for daily maximums is between 500 mg/L and 2,600 mg/L. Tr.2 at 64. Mr. Gonet stated that there "are many coal mine effluent concentrations that regularly exceed these concentrations of sulfate." *Id*. Based on a report entitled, "Determination of Economic Impact of Changing Water Quality Standards for Sulfate on Coal Mines, Final Technical Report: May 1, 2004, through April 30, 2005," Mr. Gonet testified that a treatment option necessary to achieve the 2,000 mg/L standard would result in a total cost of $10,953,000 for every 100 acres of drainage over a ten-year period. Tr.2 at 65; Exh. 2. The treatment option contemplated in the report relied on using excess lime and hydrochloric acid for precipitating the sulfate. *Id*. The total annualized cost (capital and operating) for all mines in Illinois would by $730,000,000 over a period of 10 years. Exh. 2 at 3. Mr. Gonet opined that based on the cost of compliance, potential and existing mine operators will be discouraged from moving to Illinois or remaining in Illinois. *Id*. Mr. Gonet also acknowledged that the economic report addressed only the situation where mixing is not granted and active treatment would be the option. Tr.2 at 90-91. When asked about the effect of the proposed amendments to the mixing regulations, Mr. Gonet stated, "we believe that the proposal allows us the proper mixing and provides adequate protection to the streams." *Id*.

Mr. Gonet testified that the consequences of implementing the proposed sulfate standard will directly impact the coalmining industry and the development of the standard was contrary to USEPA guidelines. Tr.2 at 65. Mr. Gonet claimed that the Agency did not account for social and economic impacts that would result from the loss of jobs and the state income that coal mines provide to Illinois. Tr.2 at 66.

As to the livestock standard proposed by the Agency, Mr. Gonet testified that there are studies suggesting a tolerance limit up to 2,500 mg/L of sulfate will have no long-term effects. Tr.2 at 66. Further, according to Mr. Gonet, there are additional studies that are inconclusive as to the appropriate sulfate concentrations that cause long-term effects, and none of the studies cited lasting impacts at sulfate concentrations below 3,000 mg/L. Tr.2 at 66-67. Mr. Gonet opined that the data supports a level of 2,500 mg/L with no long-term effects or loss of performance and therefore the proposed standard should be changed from 2,000 mg/L to 2,500 mg/L. Tr.2 at 67.

Mr. Gonet stated that the monthly maximum sulfate standard is being applied to all discharges into the waters of the State. Tr.2 at 67-68. Mr. Gonet claimed that there are numerous discharges that will be episodic and a result of precipitation events. Tr.2 at 68. Mr. Gonet stated that the Agency relied upon a 96-hour toxicity test and such a test will not be applicable to flows that result in shorter exposure periods to the aquatic organisms. *Id*. Also, Mr. Gonet noted that many streams flow only as a result of stormwater run-off and aquatic life is probably not present in the receiving stream. *Id*. Therefore, Mr. Gonet opined that imposing a standard for a designated use that does not exist is erroneous. *Id*. Mr. Gonet asserted that the sulfate standard and mixing standards should only be imposed on receiving streams that warrant aquatic life designated use. *Id*.

Mr. Gonet noted that the Agency's proposed standard is based on two test species that are commonly used for laboratory toxicity testing and were selected because these organisms were known to be less tolerant and more sensitive to sulfate exposure. Tr.2 at 69. Mr. Gonet opined that these two species do not necessarily inhabit every surface water in Illinois, but are historically used by USEPA to derive water quality standards. *Id*. Mr. Gonet offered that USEPA protocols, however, recommend using toxicity data from eight different taxonomic families to derive water quality criteria. *Id*. Mr. Gonet conceded that while the addition of species "will not likely alter the slope of the equation," a less stringent numerical standard might result. Tr.2 at 70.

Mr. Gonet also took issue with the range of values over which the standard is valid. Tr.2 at 71. Mr. Gonet noted that the equations use hardness of between 100 and 500 mg/L and chloride at 5 and 500 mg/L and if those ranges are exceeded the standard for sulfate is 2,000 mg/L. *Id*. Mr. Gonet observed that if hardness is set at 500 mg/L and chloride is between 5 and 500 mg/L, the resulting range for sulfate standards is between 2,020 and 2,720 mg/L. *Id*. Mr. Gonet testified that once the range is exceeded the standard becomes 2,000 mg/L and results in an arbitrary reduction in the sulfate limit. Tr.2 at 71-72.

Mr. Gonet claimed that if adopted, the rule will be applied retroactively. Tr.2 at 72. Mr. Gonet clarified that the standards will be applied to all NPDES permit holders no matter when

the permit was first issued. Tr.2 at 72-73. Mr. Gonet claims that this "policy presents a barrier to all active and future NPDES permits" in Illinois. Tr.2 at 73. Mr. Gonet believes that there is no way an operation can reasonably account for future regulations when planning a facility and expecting a business to achieve compliance retroactively is unjustified. *Id*.

SUMMARY OF COMMENTS

The Board has received a total of eight public comments in this proceeding. The following paragraphs will summarize the comments beginning with public comment number one and proceeding in order.

Illinois Coal Association (ICA)

ICA filed two public comments in this proceeding (*see* PC 1 and PC3). The first (PC 1) was filed prior to the second hearing and Mr. Gonet's testimony at the second hearing was nearly identical to that comment. Therefore, the Board will not summarize PC 1. The second comment (PC 3) consists solely of supporting documents cited by ICA in the testimony. The Board will review these supporting documents in reaching a decision on the merits of the rule; however, the Board will not summarize the content of those documents.

Illinois Environmental Protection Agency (Agency)

The Agency filed two public comments (PC 2 and PC 4), both of which provide responses to questions asked at the two hearings in this proceeding. The first response was to a question seeking specifics about the Agency's present policy to allow wet weather dischargers mixing zones for sulfate and chloride. PC 2 at 1. The Agency gave an example where the receiving stream for the mine effluent was a small-channelized ditch and the hardness value in the effluent was lower than values measured upstream. PC 2 at 1-2. The Agency used the effluent's average hardness value to calculate the sulfate standard. PC 2 at 2. The Agency used upstream values and effluent values to establish the chloride value. After performing the calculations, the Agency found that no mixing was necessary to meet the sulfate standard; however mixing was necessary for chloride. *Id*. The permit therefore included a condition that prohibits discharge during dry weather. *Id*.

When asked how many mine discharge permits exist in Illinois, the Agency commented that there are 19 active coal mines in Illinois at the present time and all have discharges that have the potential to exceed the Board's existing sulfate or chloride water quality standards. PC 2 at 2. The Agency noted that there are other mine-related discharges at mine reclamation sites, coal ash disposal sites, and related facilities not associated with active coal mines. *Id*. These sources hold approximately 90 NPDES permits and most of these also have the potential to exceed the Board's existing sulfate or chloride water quality standards. PC 2 at 2-3.

The Agency also responded to a question regarding the identification of 7Q1.1 streams. The Illinois State Water Survey has not developed a map depicting the 7Q1.1 streams; however, the Agency believes sufficient data and information exists to identify the 7Q1.1 streams. PC 2 at 3. The Agency expects that as a part of the permit process the applicant will provide the

information necessary and the Agency will use the expertise of the Illinois State Water Survey where necessary. *Id.*

In PC 4, the Agency responded to a question about when the Agency will file a rulemaking addressing new water quality standards for secondary contact waters. PC 4 at 1. The Agency indicated that the rulemaking will be filed by the end of the summer this year. *Id.*

Illinois Association of Wastewater Agencies Water Quality Subcommittee (IAWA)

IAWA complimented the Agency on providing a strong scientific basis for the sulfate limit that had been considered overly simplistic. PC 5 at 1. IAWA supports the proposed change to the sulfate standard and encourages the Agency to assess and correct other limits that have not been rigorously reviewed in decades. *Id.* IAWA stated that excessively lenient standards hurt the environment if the discharger exceeds limits while excessively strict limits harm the economy by wasting money in efforts toward monitoring and control. *Id.*

IAWA also supports elimination of the TDS standard agreeing, that any pollutant that is harmful should be regulated separately. PC 5 at 1. IAWA feels that the Agency retaining discretion for staff in deciding the proper dilution value is appropriate. *Id.* IAWA believes that accounting for all possible scenarios is impossible and the Agency's staff should be allowed the discretion to make these determinations. *Id.*

IAWA suggested the use of actual flow value for discharges that occur only during precipitation events. RC 5 at 1. IAWA agrees with the Agency's decision not to propose standards for extremely high levels of sulfate and hardness. *Id.*

CITGO Petroleum Corporation (CITGO)

CITGO supports the Agency's proposal to delete the TDS water quality standards for general use waters and believes that the proposal should extend to secondary contact waters. PC 6 at 1. According to CITGO, the Agency stated two reasons for delaying a change to the TDS standard for secondary contact waters: 1) stakeholders should be allowed to comment; and 2) the Agency must consider sulfate standards when chloride is more than 500 mg/L. PC 6 at 2. CITGO argues that neither of these reasons is sufficient grounds for delay. *Id.* CITGO maintains that delaying the deletion of the TDS standard will require CITGO to seek a site-specific rule, another variance, or to act on conditions in the variance CITGO currently has. *Id.* CITGO commented that none of these would be necessary if the proposal was extended to CITGO. *Id.*

CITGO maintains that chloride and sulfate standards are not among the issues being discussed by stakeholders during meetings concerning the secondary contact waters standards. PC 6 at 3. Further, CITGO is the only discharger in the Chicago area adversely affected by the current TDS standard and TDS has not even been mentioned in the meetings. *Id.* CITGO acknowledges that the Agency seems to want to propose a sulfate standard for waters with more than 500 mg/L of chloride; however, CITGO claims that there is no scientific evidence supporting the 500 mg/L standard. *Id.* CITGO notes that the Agency's intent is not to use the

general water quality standard to address waters with chloride levels over 500 mg/L, but rather to address those on a case-by-case basis. PC 6 at 4.

CITGO opines that there is no need to address sulfate and chloride standards when deleting TDS. PC 6 at 4. CITGO suggests that given the lack of scientific data and the fact that no chloride standard currently exists for secondary contact waters, the Agency can address sulfate and chloride standards on a case-by-case basis where chloride is over 500 mg/L in secondary contact waters. *Id*. However, if the Board believes that a sulfate and/or chloride level should be added when eliminating TDS, CITGO posits that adopting the equation proposed for general use waters without the 500 mg/L chloride cap would be sufficient. *Id*.

CITGO argues that postponing the elimination of the TDS standard for secondary contact waters will harm CITGO. PC 6 at 4. CITGO is reaching a critical decision-making time under the variance. *Id*. Under the variance, CITGO must take certain steps to meet the conditions in the variance including design and construction on the system. PC 6 at 5. Given the uncertainty of adopting secondary contact water standards, without the deletion of TDS standards in this rulemaking, CITGO may be forced to expend significant funds to begin a treatment system under the terms of the variance. *Id*.

Illinois Environmental Regulatory Group (IERG)

IERG generally supports the Agency's proposal and offers comments on three areas. First, IERG believes the record lacks sufficient details concerning the economic impact of the proposed rule. PC 7 at 1-4. Second, IERG supports CITGO's request, and third, IERG seeks a limitation on the applicability of the rule. PC 7 at 4-6. The Board will summarize each of these issues below.

Economics

IERG notes that pursuant to Section 27(b) of the Act (415 ILCS 5/27(b) (2006)), DCEO has not prepared an economic study, nor is DCEO required to prepare one. PC 7 at 2. IERG feels that the Board's obligation to determine the economic impact of the rule is not alleviated by the Board's request to DCEO and that the Board must fully consider the economic impact by an economic analysis. *Id*. IERG commented that the Board must have a full and adequate record including documentation and support that the proposed amendments are economically reasonable and technically feasible. *Id*.

IERG places the burden on the Agency, as the proponent, to provide the Board with the record necessary to determine economic reasonableness and technical feasibility. PC 7 at 3. IERG does not believe the Agency has adequately provided the information to the Board. *Id*. IERG noted that the Agency provided no basis for the statements made in the record about the economic impact of the rule. PC 7 at 4.

CITGO

IERG supports elimination of the TDS standard for general use waters and asks the Board to consider the suitability of CITGO's request. PC 7 at 4-5. IERG agrees with CITGO, that the Agency's justification for not including secondary contact waters in this proposal is inadequate and TDS is not an issue in the stakeholders meetings on secondary contact waters. PC 7 at 5.

Limitation on Applicability

IERG noted that the standard being proposed is determined using equations in the rule, which allows for a site-specific standard to be developed. PC 7 at 6. IERG further noted that ICA believes the standard is too restrictive and will be costly to obtain. *Id*. IERG understands that of particular concern to ICA is the ability of old closed mines to comply with the standard being proposed. *Id*. IERG asks the Board to consider limiting prospective applicability of the rule to those mines currently active and operational and to those inactive, closed mines if they re-open for active mining. *Id*.

Prairie Rivers Network, Sierra Club and the Environmental Law and Policy Center (Environmental Groups)

The Environmental Groups continue to support the proposed changes to the water quality standards for sulfate and TDS. PC 8 at 1. However, there are concerns for the Environmental Groups. *Id*. Those three areas are mixing, interactions between sulfate and other dissolved solids, and chloride levels above 500 mg/L. The Board will summarize each of these issues below.

Mixing

The Environmental Groups noted that at hearing, they proposed language that codified the Agency's practice to allow mixing in streams where a 3 to 1 dilution rate was not present, but the flow is higher than zero 7Q1.1. PC 8 at 1. The Environmental Groups are "surprised" that the Agency has not accepted this change, because in future permits the Agency may want to deviate from the current practice of assuring a zone of passage for aquatic life by insisting on at least 50% volume flow. *Id*. The Environmental Groups acknowledge that the Agency claims the proposed language from the Environmental Groups is arbitrary with no scientific basis. *Id*. However, the Environmental Groups commented that the current Board rule covering the situation where the dilution rate is 3 to 1 was based on the same type of consistent Agency practice. *Id*. The Environmental Groups argue that Agency practice is sufficient justification for including language in the rule and the Board should include the language proposed by the Environmental Groups. PC 8 at 1-2.

Interaction Between Sulfate and TDS

The Environmental Groups reiterate the concern that calcium may increase the toxicity of sulfate. PC 8 at 2-3. However, the Environmental Groups agree with the Agency's approach to

address this issue on a permit-by-permit basis by discouraging the use of $Ca(OH)_2$ and requiring monitoring. PC 8 at 3.

Chloride

The Environmental Groups commented that the proposal does not address the situation where chloride concentrations in the receiving waters are greater than 500 mg/L. PC 8 at 3. The Environmental Groups noted that the Agency indicated an intent to address this on a case-by-case basis. *Id*. The Environmental Groups ask that the Board make clear in the rule that if the chloride concentration is greater than 500 mg/L, the Agency must develop sulfate limits on a case-by-case basis that will not increase the potential adverse effects on aquatic life. *Id.*

DISCUSSION

In general the participants and the record support the Agency's proposal. However, there are several issues raised in the testimony and comments that the Board will discuss. In addition, the Board will delineate the reasons for proceeding with the proposal to first notice. First, the Board will discuss the proposed general use water quality standard for sulfate, including sulfate standards when chloride and hardness are above 500 mg/L. Second, the Board will discuss the changes to the mixing rules and the inclusion of language for mixing if the dilution rate is less than 3:1. Third, the Board will then explain the deletion of the general use water quality standard for TDS and fourth, follow with a discussion of the changes to Subtitle D. Fifth, the Board will articulate the reasons for not extending the changes for TDS and sulfate to secondary contact waters. Sixth, the Board discusses the economic reasonableness of the proposal. Finally, the Board explains why the rule will not apply retroactively.

Water Quality Standard for Sulfate

The Agency has proposed two acute aquatic toxicity criterion equations for sulfate at specified ranges of hardness and chlorides under Section 302.208(h). These equations allow for the calculation of site-specific sulfate standards based on water quality characteristics. In addition, the proposal includes a numeric chronic sulfate standard of 2000 mg/L applicable to areas where water is withdrawn or accessed for livestock watering. The Agency's proposal for the sulfate standards is supported by scientific data and literature on the effects of sulfate on aquatic life and livestock.

Sulfate is an inorganic anionic substance that forms salts with sodium, potassium, magnesium and other cations. Sulfate is widely distributed in nature and may be present in natural waters at concentrations ranging from a few to several thousands milligrams per liter. Standard Methods for Examination of Water and Wastewater, 19th Edition, 1995. Mine drainage wastes may contribute large amounts of sulfate through pyrite oxidation. *Id.* According to the Agency, sulfate levels range from 30 to 150 mg/L in northern and central Illinois streams. In Southern Illinois many streams have sulfate concentrations up to 2000 mg/L with occasional high readings exceeding 5000 mg/L. The high sulfate streams receive discharges from coal mines. Prop. Attachment I at 1.

The Board agrees with the Agency that the existing sulfate water quality standard of 500 mg/L, which was adopted in 1972 needs to be updated to reflect the current science on sulfate toxicity. In this regard, the Board applauds the Agency's effort to review the available literature and commission new studies on sulfate aquatic life toxicity to support the development of new standards. Based on the literature survey, the Agency concluded that fish are so tolerant of sulfate that no further discussion or testing is necessary. However, the Agency found that additional toxicity data on invertebrate species was necessary for standard development. The Board notes that the Agency contracted Dr. David Soucek of the Illinois Natural History Survey to conduct the laboratory toxicity testing on invertebrate species.

The results of Dr. Soucek's research indicate that hardness and chloride concentrations affect sulfate toxicity to aquatic invertebrates. The effect of chloride and hardness on sulfate toxicity to aquatic invertebrates is believed to be due to alteration of regulation of osmotic conditions that help invertebrates achieve and maintain ionic balance. *Id.* at 12-13. Since research demonstrates that sulfate toxicity is dependent on chloride and hardness concentrations, the Board agrees with the Agency that these water quality parameters must be taken into consideration in setting State-wide water quality standards for sulfate. Further, since these parameters vary in water bodies across the state, the sulfate standards should be set on a site-by-site basis.

The Agency has proposed equations for determining the maximum allowable sulfate levels based on chloride and hardness concentrations on a site-specific basis. Due to higher water hardness in northern parts of the State, the Agency estimates streams in northern Illinois will likely have sulfate standards around 2000 mg/L while southern streams might be closer to 1500 mg/L. Tr.1 at 66. The proposed equations were developed using USEPA guidelines with some modifications. The Board notes that the Agency consulted with the USEPA regarding the methodology used for developing the equations. Prop. Attachment I at 11. A significant deviation from USEPA guidelines is the use of a multiplier in calculation of FAV, which is protective of at least 95% of the species at LC50 level of effect. *Id.* at 14. The Agency used a pollutant specific multiplier value of 0.65, which was developed from the testing data for the most sensitive species, instead of the general value of 0.50 recommended by USEPA. The Board agrees with the Agency that the multiplier value of 0.65 represents greater specificity and precision for sulfate than the general value recommended by USEPA.

Regarding protection of livestock watering, the Agency notes that acute, short-term exposures to waters with high sulfate levels produces temporary cathartic effects in livestock that diminish as livestock are acclimated to such waters. *Id.* at 6. However, chronic exposure to high-sulfate waters may lead to weight loss, disease, and death of livestock. *Id.* An intended purpose of the Board's existing sulfate standard is to protect livestock watering. The Agency states that the existing sulfate limit of 500 mg/L was chosen to protect livestock at the same level suggested for human consumption of drinking water. *Id.* at 6.

The Board agrees with the Agency that the existing sulfate standard must be re-evaluated to determine the suitability of the standard for protection of livestock watering. In this regard, the Board notes that Agency's literature review provides updated information for developing a sulfate standard for livestock watering. While the number of studies is limited, some of these

studies indicate threshold concentrations at which high-sulfate waters will adversely affect livestock range from 2300 to 3000 mg/L. *Id.* at 7. The Board agrees with the Agency that while the limited number and assorted endpoints do not allow for mathematical derivation of sulfate toxicity to livestock, the proposed standard of 2000 mg/L sulfate affords adequate protection to livestock. Further, the Board finds that implementing the standard based on a 30-day average addresses the chronic nature of sulfate toxicity with respect to livestock watering.

While the participants generally support the Agency's proposal to develop a sulfate standard, the participants expressed concerns regarding the determination of sulfate standard when chloride is above 500 mg/L and hardness is less than 100 mg/L; and the proposed cap on sulfate standard at 2000 mg/L when hardness is above 500 mg/L. The Board will address these issues below.

Sulfate Standard when Chloride is Over 500 mg/L

The existing general use water quality standard for chloride is 500 mg/L, while no chloride standard currently exists for secondary contact waters. 35 Ill. Adm. Code 302.208(g), 302.407. The Agency's proposal provides specific provisions for determining sulfate standards for waters within any range of chlorides, but the determination of a sulfate standard is limited by the range of hardness. As pointed out by the Environmental Groups, the proposal does not include a provision for determining a sulfate standard when chlorides are above 500 mg/L and hardness is less than or equal to 500 mg/L. Tr.2 at 48. CITGO also states that what sulfate standards would apply during periods of elevated chlorides on general use waterways is not clear. Tr.2 at 28-29. The Environmental Groups state that many Illinois waters have chloride levels in excess of 500 mg/L, but do not identify specific reaches. Tr.2 at 48. CITGO identifies chloride levels in excess of 500 mg/L at its intake along the secondary contact waters of the Chicago Sanitary and Ship Canal, and indicates general use waters may also experience periods of elevated chlorides. Tr.2 at 28. The Environmental Groups urge that the rule include an equation, numeric standard or procedure to establish sulfate standards for the entire range of chloride and hardness.

The Agency indicated that for general use waters, if chloride is over 500 mg/L, the general use water quality standard is violated, and the rule should not imply that chloride concentrations greater than 500 mg/L are acceptable. When chloride concentrations are greater than 500 mg/L, the Agency has indicated that the Agency intends to address these waterways on a case-by-case basis, perhaps through permitting. PC 6 at 4, Tr.2 at 60. With secondary contact waters, the Agency believes the issue should be further examined. CITGO points out that there is no chloride standard currently for secondary contact waters and suggests using the same equation as general use waters for sulfate but not capping the chloride limit at 500 mg/L. The Environmental Groups agree that the general use water quality standard for chloride should never be violated, but in reality chloride values of over 500 mg/L do exist. The Environmental Groups urge that the rule include an equation, numeric standard or procedure to establish sulfate standards for the entire range of chloride and hardness.

Most of the concerns about determining sulfate standards in waters with chloride concentrations exceeding 500 mg/L appear to be associated with secondary contact waters or

waters impacted by secondary contact waters. Since the Board is not proposing standards for secondary contact waters today, the Board will discuss the issue of chloride levels only as the issue pertains to general use waters.

Regarding general use water quality standards, the Board agrees with the Environmental Groups that the rule must address the scenario when chloride concentrations exceed 500 mg/L and hardness is less than 500 mg/L. Proposed section 302.208(h)(3)(B) does set a sulfate standard of 2000 mg/L when chlorides are 5 mg/L or greater. This would include chloride values greater than 500 mg/L that violate the chloride water quality standard, as long as hardness is greater than 500 mg/L. The Agency explains that hardness mitigates the toxicity of sulfate to aquatic life. Prop. Attachment I at 2. Although the proposal provides a sulfate standard in high chloride waters with hardness greater than 500 mg/L, no provision is provided for such waters with hardness less than 500 mg/L. By not addressing the full range of combinations for chlorides and hardness, the proposed rule appears to lack a standard for sulfates when chlorides are greater than 500 mg/L and hardness is less than 500 mg/L. Although the Agency has indicated that the intent is to address these situations on a case-by-case basis through permitting, the proposed rule does not reflect this intent.

When issuing an NPDES permit, along with water quality standards, the Agency is bound by rules prohibiting degradation of the waters. In the case of sulfate standards, where chloride is above the general use water quality standard, the Board finds that the Agency can utilize the equations and/or other rule provisions to insure the quality of the water through the permit process. Further, a sulfate standard, which is protective of aquatic life, should be applied, even if the chloride standard exceeds the general use water quality standards. To codify the Agency's intent, the Board is proposing to add the following additional language to the rule at 302.208(h)(3):

> C) If the combination of hardness and chloride concentrations of existing waters are not reflected above, the sulfate standard will be determined on a case-by-case basis in conjunction with an applicable NPDES permitting process.

The Board invites additional comments on the proposed rule language.

Sulfate Standard when Hardness is above 500 mg/L

During the April 23, 2007 hearing, Mr. Gonet indicated that the sulfate standard appears to be arbitrarily capped at 2000 mg/L under Section 302.208(h)(3)(B) when the ranges for hardness and chlorides are exceeded. Tr.1 at 71-72; PC 1 at 2-3. Mr. Gonet suggested that the sulfate standard for waters with hardness greater than 500 mg/L be set using the equations with limits obtained directly prior to exceeding the range. *Id*. The Agency explains that the equations would be acceptable for nearly all streams, except in rare instances of extremely high or low hardness and chloride concentrations. According to the Agency, very little sulfate toxicity data is available at these extremes so the typical standard derivation is not practical and numerical standards must be implemented. Prop. Attachment 1 at 15. The Board agrees with the

Agency and declines to make any changes to the sulfate standard proposed at Section 302.208(h)(3).

The Board has reviewed the record and finds that the record supports Agency proposed new standards for sulfate. The Board finds that the technical support for this standard demonstrates that the standard will be protective of aquatic life and livestock. Therefore, the Board will proceed to first notice with the Agency's proposed sulfate water quality standards for general use waters as amended in response to the Environmental Groups' concerns.

Total Dissolved Solids

The Agency proposes the deletion of the Board's existing TDS water quality standard in lieu of and the proposed sulfate water quality standard and the existing chloride water quality standard. As with sulfate standards, the participants support the Agency's proposal to delete the TDS standard for general use waters. The Agency asserts that in Illinois waters the toxicity associated with substances comprising major portion of TDS is predominantly due to either chloride or sulfate. Tr.1 at 15. The toxicity of other ions that make up TDS, such as sodium, calcium, magnesium and carbonates is insignificant when compared to chloride and sulfate toxicity. The Board agrees with the Agency that with the adoption of sulfate standard and the existing chloride standard, the water quality standards adequately address toxicity of dissolved salts. In light of this, the Board finds that a TDS standard is not necessary.

The Board finds that the record support elimination of the TDS standard for general use waters. The Board will proceed to first notice with the Agency's proposal for general use waters. The Board will discuss TDS for secondary contact waters below.

Mixing Zones

As noted earlier, the Agency proposes two changes to the Board's mixing zone regulations under 35 Ill. Adm. Code 302.102. First, the Agency proposes to delete the prohibition against mixing in 7Q10 zero flow streams at Section 302.102(b)(8). The Agency argues that by deleting the prohibition against mixing in subsection (b)(8), the rules would allow mixing when adequate dilution is available in the receiving stream as a result of rainfall or snow-melt events. The Agency points to the Board's definition of "dilution ratio" under 35 Ill. Adm. Code 301.270 that contemplates stream flow values other than 7Q10 for mixing and dilution allowances. Prop. Attach I at 17. The Board agrees with the Agency that allowing mixing when streams are not at drought flow will not result in adverse impact to aquatic life, as long as attainment with water quality standards is demonstrated on a consistent basis. Further, the proposed amendment would allow mixing as a means to achieve attainment of water quality standards for discharges of substances such as sulfate, boron, chloride and fluoride, for which technically feasible and economically reasonable treatment is not available.

The second change proposed to the mixing rules pertains to Section 301.102(b)(6), which requires a zone of passage when mixing is allowed in receiving streams. As noted previously, a "zone of passage" is an area in the stream not impacted by the mixture of effluent with receiving water that is preserved for use by aquatic life whenever mixing is allowed. The Agency

proposes to allow mixing without requiring a zone of passage in very small streams, which the Agency defines as streams that have zero flow for at least seven consecutive days recurring on average in nine years out of ten. The Agency classifies these streams as 7Q1.1 zero flow streams. Generally, these streams have zero flow during dry weather and contain high velocity flow during rainfall or snowmelt events. Usually effluent discharge into these streams coincides with wet weather flows in the streams. The Agency asserts that this change is necessary given the elimination of the TDS standard to allow mines to mix effluent under wet weather conditions.

The Agency states that 7Q1.1 zero flow streams allow for limited habitat for aquatic life. Further, the high velocity flows in the stormwater driven 7Q1.1 streams result in near instantaneous mixing causing pollutant concentrations to meet water quality standards. Therefore, aquatic life that may inhabit a stream at the time of discharge will be afforded protection. Additionally, the Board notes that aquatic life will be protected since an analysis of the effluent and the amount of flow expected in the receiving stream during discharge events will be required to ensure that available mixing will reduce effluent concentrations to below water quality standards. In light of this, the Board agrees with the Agency that requiring a zone of passage in 7Q1.1 zero flow streams is not appropriate.

An issue was raised concerning the Agency's policy for allowing mixing when the available dilution ratio is less than 3 to 1 and the Board will discuss that below. However, the allowance of mixing in 7Q1.1 zero flow streams under wet weather conditions was not substantively opposed.

Dilution Ratio Less than 3:1

The Environmental Groups suggest amending the proposal under 302.102(b)(8) to codify a general practice by the Agency to allow mixing in no more than 50% of the flow for streams where the dilution ratio is less than 3 to 1. The Agency testified that in streams where the dilution ratio is less than of 3 to 1, the Agency generally uses 50% or less, but on a case-by-case basis determines if mixing can occur in more than 50% of the flow of the stream. The Environmental Groups suggest amending the proposal to codify the practice. The Agency and IAWA oppose the suggestion by the Environmental Groups to codify the Agency's general practice of using 50% or less in order to maintain flexibility for the Agency to address other relevant factors on a case by case basis.

The Board finds that the Agency's practice must be codified. The Agency testimony indicated that using the 50% or less value in streams where the dilution ratio is less than 3 to 1 is the general practice the Agency has been following for years. *See* Tr.1 at 64-65. The Environmental Groups merely suggest language to codify a practice the Agency has been following. The proposed language still allows the Agency flexibility to use less than 50%, but no more. Furthermore, the Section 1-70 of the Illinois Administrative Procedure Act defines a rule to mean "each agency statement of general applicability that implements, applies interprets, or prescribes, law or policy." 5 ILCS 100/1-70 (2006). Thus, the Board finds that the Agency's policy that is of general applicability must codified. The Board will amend proposed Section 302.102(b)(8) to read:

> The area and volume in which mixing occurs, alone o in combination with other areas and volumes of mixing must not contain more than 25% of the cross-sectional are or volume of flow of a stream except for those streams where the dilution ratio is less than 3:1. ~~Mixing is not allowed in receiving waters which have a zero minimum seven day low flow which occurs once in ten years.~~ In streams where the dilution ratio is less than 3:1, other than streams that have a zero flow for at least seven consecutive days recurring on average in nine years out of ten, the volume in which mixing occurs, alone or in combination with other volumes of mixing must not contain more than 50% of the volume of flow.

In summary, the Board finds that the record supports the change to the mixing zone provisions. The Agency has established a need for the amendment; therefore the Board will proceed to first notice with the Agency's proposed rule as amended by the Board in response to the Environmental Group's recommendation. The Board invites the participants to comment on this issue.

Subtitle D Changes

The Agency proposes deleting provisions under Subtitle D for Mine Related Water Pollution. Provisions address separate water quality standards for sulfates and chlorides (35 Ill. Adm. Code 406.203), State and NPDES Permits incorporated into mine abandonment plans (35 Ill. Adm. Code 405.109(b)(2)(A) and (B)), and compliance and effective dates for mines (35 Ill. Adm. Code 407). Under the Agency's proposal, effluent limits in permits for mines would be based on the Subtitle C water quality standards for sulfates and chlorides in lieu of Subtitle D. The Agency explained that a separate standard for sulfate from mines was set in 1984 because such discharges were characteristically high in sulfate, and many mines were not able to rely on conventional mixing provisions to achieve compliance. The standard was set at 3500 mg/L and was not documented by the same type of studies used in standards development today. The Board finds that the new sulfate standards proposed by the Agency reflect the current scientific understanding and that the amendments to the mixing regulations will allow mixing to achieve compliance for many mine discharges that did not previously qualify for conventional mixing. In light of this, the Board proceeds to first notice with deletion of the provisions of Subtitle D that address separate water quality standards for sulfates and chlorides, as proposed by the Agency.

In reviewing the Subtitle D regulations, Section 406.209 would also appear to be obsolete with the repeal of Section 406.203. Therefore, the Board also proposes to repeal Section 406.209 at first notice. The Board adds this section to the caption in today's order. The Board invites comment from the participants on this issue.

TDS and Sulfate Standards For Secondary Contact Waters

As noted previously, CITGO presented testimony and comments urging the Board to extend the Agency's proposal to secondary contact waters. IERG supports CITGO's position concerning deletion of TDS standard for secondary contact waters. CITGO and IERG's testimony and comments detail potential economic hardships CITGO will be forced to incur if

the TDS standard for secondary contact waters is not deleted. Currently CITGO discharges to the Chicago Sanitary and Ship Canal under a TDS variance, which expires on December 15, 2009. CITGO states that various steps must be taken throughout the variance period to attain compliance, including sizing and designing a holding area by May 2008. PC 6 at 5.

The Agency has indicated an intent to ultimately delete the TDS standard from the water quality standards for secondary contact waters. The Agency would prefer to make that change when proposing water quality standards for secondary contact waters. The Agency's preference is based on concerns that the stakeholders be allowed to comment on the change and a need to address secondary contact waters where chloride is over 500 mg/L. The Agency informed the Board that this rulemaking would be filed with the Board by the end of summer this year. PC 4 at 1.

Regarding Agency's position to address TDS, sulfate and chloride standards for secondary contact waters in a separate upcoming rulemaking, CITGO states that stakeholders in the UAA (Use Attainability Analysis) proceedings concerning secondary contact waters do not have any disagreement on TDS, sulfate and chloride standards. PC 6 at 3. In addition, both have stated that TDS and sulfate standards have not arisen during stakeholder meetings on secondary contact water quality standards. Further, CITGO states that there is no need to address sulfate and chloride standards at the same time as eliminating TDS standard for secondary contact waters. If the Board finds that addressing sulfate and/or chloride levels is necessary, CITGO argues that adopting the equation for calculating sulfate standard from the general use proposal without the 500 mg/L chloride cap would be sufficient. PC 6 at 4. Alternatively, CITGO requests that the Board eliminate TDS water quality standard for the Chicago Sanitary and Ship Canal or eliminate TDS standard for the outfall from CITGO's refinery. PC 6 at 6.

While CITGO has made some valid arguments for extending the Agency's proposal to secondary contact waters in this rulemaking, the Board finds that the record does not support deleting the TDS standard for all secondary waters without addressing standards for sulfate and chloride for those waters. The Board notes that 35 Ill. Adm. Code 301.380 defines "secondary contact" as "any recreational or other water use in which contact with the water is either incidental or accidental and in which the probability of ingesting appreciable quantities of water is minimal, such as fishing, commercial and recreational boating and any limited contact incident to shoreline activity." Further, 35 Ill. Adm. Code 303.441 designates the following as secondary contact and indigenous aquatic life waters:

a) The Chicago Sanitary and Ship Canal;
b) The Calumet-Sag Channel;
c) The Little Calumet River from its junction with the Grand Calumet River to the Calumet-Sag Channel;
d) The Grand Calumet River;
e) The Calumet River, except the 6.8 mile segment extending from the O'Brien Locks and Dam to Lake Michigan;
f) Lake Calumet;
g) The South Branch of the Chicago River;

h) The North Branch of the Chicago River from its confluence with the North Shore Channel to its confluence with the South Branch;
i) The Des Plaines River from its confluence with the Chicago Sanitary and Ship Canal to the Interstate 55 bridge; and
j) The North Shore Channel, excluding the segment extending from the North Side Sewage Treatment Works to Lake Michigan.

The Board notes that while the designated secondary waters of the state are generally located in Northeastern Illinois (Chicago area), they extend beyond the Chicago Sanitary and Ship Canal into which CITGO discharges effluent. Other than some limited testimony concerning chloride levels being above 500 mg/L in the secondary contact waters, there is no data or testimony regarding quality of the designated secondary waters in terms of sulfate and chloride. Further, the Agency testified that the Agency needs to evaluate the application of the sulfate standard equation to secondary waters when chloride is greater than 500 mg/L. Moreover, the Agency has indicated that the Agency is working on a rulemaking proposal that will dramatically change the water quality standards for the Chicago waterways. In light of this, the Board believes that moving forward with changes to secondary contact water quality standards in the forthcoming rulemaking, which specifically addresses those waters, is more prudent. The Board believes this course of action will allow for a thorough review of the issues associated with the secondary waters, including elimination of TDS standard and adoption sulfate and/or chloride standards, and participation of public specifically interested in the Chicago area waterways.

While the Board declines to eliminate TDS standard for secondary contact waters, the Board recognizes that CITGO may face some hardship if TDS standard for secondary contact waters is not resolved in a timely manner. Specifically, CITGO may have to expend funds on designing wastewater storage system for wastewater from refinery's wet gas scrubber in order to comply with CITGO's variance conditions. In this regard, the Board believes that CITGO has a number of options CITGO can pursue to avoid undertaking any exercise that may be unnecessary in the future, including seeking an extension of the current variance with amended conditions.

Economic Reasonableness

The Agency stated the rule was economically reasonable. The Agency indicated that changing the sulfate standard from 500 mg/L to 2000 mg/L would not lead to adverse effects on livestock or the economics of livestock operations. The Agency did agree that some coal mines would have difficulties meeting the new sulfate standards given the elimination of the special standards for coal mines. The Agency anticipated a small number of existing mines would require additional controls to meet water quality based permit limits. The ICA submitted a technical report on the economic impact for coal mines that indicated compliance with a new sulfate standard of 2000 mg/L could cost $730 million over a ten-year period for the industry's 85 NPDES Permits if treatment is required to meet the standard. The ICA stated that these compliance costs could discourage new mines, while forcing older ones to close. The ICA also acknowledged that the proposed amendments to the mixing regulations will allow mixing as an alternative to additional treatment, but there may still be situations where mixing is not an option. IERG suggests the applicability of the rule be limited to active mines out of concern for

the ability of old, closed mines to comply. IERG also questions whether the Agency fulfilled the Agency's obligation to provide evidence of the economic reasonableness of the rule.

The Board has reviewed the record carefully. The Board finds that the record does support proceeding to first notice with the proposal as amended by the Board. The elimination of the TDS standard for general use waters will positively impact industry and the State. The new sulfate standards will better reflect the current scientific understanding and interactions with hardness and chloride. Furthermore, the changes in the mixing zone requirement will provide new flexibility by allowing mixing as a treatment option where mixing may not have been previously available. Although the ICA provided a detailed economic analysis of the impact of the new sulfate standards on Illinois coal mines, the analysis is based on the assumption that additional treatment would be required for coal mines to achieve compliance. However, the Board believes that the proposed changes to mixing provisions that allow mixing as means of compliance will significantly lessen the economic impact. The Board finds that the record supports proceeding to first notice and including the Agency's proposal to eliminate the special standards for coal mines. The Board encourages the participants to provide additional comment on the economic reasonableness of the entire proposed rule.

Retroactive Application of the Rule

ICA and IERG raise an issue that the proposed rule will have a retroactive application. Specifically, ICA argues that the rule will apply to all NPDES permit holders no matter when the original NPDES permit was issued. ICA believes that such application of the rules could leave current permit holders in a position to comply with a standard that was not originally planned for in developing the site.

The Board disagrees that the proposed rule will apply retroactively. The rule, once effective, will apply prospectively. The Agency will apply the final rule to dischargers when the Agency issues a renewal of an NPDES permit. This is true whenever an NPDES permit holder renews the permit. The permit cannot be issued unless the application demonstrates that the renewal of the permit will not cause a violation of the Act or Board regulations (*see* 415 ILCS 5/39(a) (2006)). If a permit holder cannot comply with the standard, there are regulatory options available such as variances, site-specific rules, and adjusted standards. *See* 415 ILCS 5/27, 28.1, and 35 (2006).

CONCLUSION

The Board finds that the record supports proceeding to first notice with the Agency's proposal as amended by the Board. The Board amends the proposal in this order by including the Agency's current policy of allowing mixing in 50% of the stream flow when there is less than at 3:1 dilution ratio. The Board will not remove the 500 mg/L chloride limit from the general use water quality equation for a sulfate standard. The Board also seeks additional comment on the economic reasonableness of the proposal particularly considering the first-notice proposal to delete a special sulfate water quality standard for coalmines.

ORDER

The Board directs the Clerk to cause the publication of the following rule for first notice in the *Illinois Register*.

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE C: WATER POLLUTION
CHAPTER I: POLLUTION CONTROL BOARD
PART 302
WATER QUALITY STANDARDS

SUBPART A: GENERAL WATER QUALITY PROVISIONS

Section
302.100 Definitions
302.101 Scope and Applicability
302.102 Allowed Mixing, Mixing Zones and ZIDs
302.103 Stream Flows
302.104 Main River Temperatures
302.105 Antidegradation

SUBPART B: GENERAL USE WATER QUALITY STANDARDS

Section
302.201 Scope and Applicability
302.202 Purpose
302.203 Offensive Conditions
302.204 pH
302.205 Phosphorus
302.206 Dissolved Oxygen
302.207 Radioactivity
302.208 Numeric Standards for Chemical Constituents
302.209 Fecal Coliform
302.210 Other Toxic Substances
302.211 Temperature
302.212 Total Ammonia Nitrogen
302.213 Effluent Modified Waters (Ammonia)(Repealed)

SUBPART C: PUBLIC AND FOOD PROCESSING WATER SUPPLY STANDARDS

Section
302.301 Scope and Applicability
302.302 Algicide Permits
302.303 Finished Water Standards
302.304 Chemical Constituents
302.305 Other Contaminants

SUBPART D: SECONDARY CONTACT AND INDIGENOUS AQUATIC LIFE STANDARDS

SUBPART E: LAKE MICHIGAN BASIN WATER QUALITY STANDARDS

SUBPART F: PROCEDURES FOR DETERMINING WATER QUALITY CRITERIA

AUTHORITY: Implementing Section 13 and authorized by Sections 11(b) and 27 of the Environmental Protection Act [415 ILCS 5/13, 11(b), and 27]

SOURCE: Filed with the Secretary of State January 1, 1978; amended at 2 Ill. Reg. 44, p. 151, effective November 2, 1978; amended at 3 Ill. Reg. 20, p. 95, effective May 17, 1979; amended at 3 Ill. Reg. 25, p. 190, effective June 21, 1979; codified at 6 Ill. Reg. 7818; amended at 6 Ill. Reg. 11161, effective September 7, 1982; amended at 6 Ill. Reg. 13750, effective October 26, 1982; amended at 8 Ill. Reg. 1629, effective January 18, 1984; peremptory amendments at 10 Ill. Reg. 461, effective December 23, 1985; amended at R87-27 at 12 Ill. Reg. 9911, effective May 27, 1988; amended at R85-29 at 12 Ill. Reg. 12082, effective July 11, 1988; amended in R88-1 at 13 Ill. Reg. 5998, effective April 18, 1989; amended in R88-21(A) at 14 Ill. Reg. 2899, effective February 13, 1990; amended in R88-21(B) at 14 Ill. Reg. 11974, effective July 9, 1990; amended in R94-1(A) at 20 Ill. Reg. 7682, effective May 24, 1996; amended in R94-1(B) at 21 Ill. Reg. 370, effective December 23, 1996; expedited correction at 21 Ill. Reg. 6273, effective December 23, 1996; amended in R97-25 at 22 Ill. Reg. 1356, effective December 24, 1997; amended in R99-8 at 23 Ill. Reg. 11249, effective August 26, 1999; amended in R01-13 at 26 Ill. Reg. 3505, effective February 22, 2002; amended in R02-19 at 26 Ill. Reg. 16931, effective November 8, 2002; amended in R02-11 at 27 Ill. Reg. 166, effective December 20, 2002; amended in R07-9 at 31 Ill. Reg. _____, effective _____.

SUBPART A: GENERAL WATER QUALITY PROVISIONS

Section 302.102 Allowed Mixing, Mixing Zones and ZIDs

a) Whenever a water quality standard is more restrictive than its corresponding effluent standard, or where there is no corresponding effluent standard specified at 35 Ill. Adm. Code 304, an opportunity shall be allowed for compliance with 35 Ill. Adm. Code 304.105 by mixture of an effluent with its receiving waters,

provided the discharger has made every effort to comply with the requirements of 35 Ill. Adm. Code 304.102.

b) The portion, volume and area of any receiving waters within which mixing is allowed pursuant to subsection (a) shall be limited by the following:

1) Mixing must be confined in an area or volume of the receiving water no larger than the area or volume which would result after incorporation of outfall design measures to attain optimal mixing efficiency of effluent and receiving waters. Such measures may include, but are not limited to, use of diffusers and engineered location and configuration of discharge points.

2) Mixing is not allowed in waters which include a tributary stream entrance if such mixing occludes the tributary mouth or otherwise restricts the movement of aquatic life into or out of the tributary.

3) Mixing is not allowed in water adjacent to bathing beaches, bank fishing areas, boat ramps or dockages or any other public access area.

4) Mixing is not allowed in waters containing mussel beds, endangered species habitat, fish spawning areas, areas of important aquatic life habitat, or any other natural features vital to the well being of aquatic life in such a manner that the maintenance of aquatic life in the body of water as a whole would be adversely affected.

5) Mixing is not allowed in waters which contain intake structures of public or food processing water supplies, points of withdrawal of water for irrigation, or watering areas accessed by wild or domestic animals.

6) Mixing must allow for a zone of passage for aquatic life in which water quality standards are met. <u>However, a zone of passage is not required in receiving streams that have zero flow for at least seven consecutive days recurring on average in nine years out of ten.</u>

7) The area and volume in which mixing occurs, alone or in combination with other areas and volumes of mixing, must not intersect any area of any body of water in such a manner that the maintenance of aquatic life in the body of water as a whole would be adversely affected.

8) The area and volume in which mixing occurs, alone or in combination with other areas and volumes of mixing must not contain more than 25% of the cross-sectional area or volume of flow of a stream except for those streams where the dilution ratio is less than 3:1. <u>The area and volume in which mixing occurs, alone or in combination with other areas and volumes of mixing must not contain more than 25% of the cross-sectional are or volume of flow of a stream except for those streams where the</u>

dilution ratio is less than 3:1. In streams where the dilution ratio is less than 3:1, other than streams that have a zero flow for at least seven consecutive days recurring on average in nine years out of ten, the volume in which mixing occurs, alone or in combination with other volumes of mixing must not contain more than 50% of the volume flow. ~~Mixing is not allowed in receiving waters which have a zero minimum seven day low flow which occurs once in ten years.~~

9) No mixing is allowed where the water quality standard for the constituent in question is already violated in the receiving water.

10) No body of water may be used totally for mixing of single outfall or combination of outfalls, except as provided in Section 302.102(b)(6).

11) Single sources of effluents which have more than one outfall shall be limited to a total area and volume of mixing no larger than that allowable if a single outfall were used.

12) The area and volume in which mixing occurs must be as small as is practicable under the limitations prescribed in this subsection, and in no circumstances may the mixing encompass a surface area larger than 26 acres.

c) All water quality standards of this Part must be met at every point outside of the area and volume of the receiving water within which mixing is allowed. The acute toxicity standards of Sections 302.208 and 302.210 must be met within the area and volume within which mixing is allowed, except as provided in subsection (e).

d) Pursuant to the procedures of Section 39 of the Act and 35 Ill. Adm. Code 309, a person may apply to the Agency to include as a condition in an NPDES permit formal definition of the area and volume of the waters of the State within which mixing is allowed for the NPDES discharge in question. Such formally defined area and volume of allowed mixing shall constitute a "mixing zone" for the purposes of 35 Ill. Adm. Code: Subtitle C. Upon proof by the applicant that a proposed mixing zone conforms with the requirements of Section 39 of the Act, this Section and any additional limitations as may be imposed by the Clean Water Act (CWA) (33 U.S.C 1251 et seq.), the Act or Board regulations, the Agency shall, pursuant to Section 39(b) of the Act, include within the NPDES permit a condition defining the mixing zone.

e) Pursuant to the procedures of Section 39 of the Act and 35 Ill. Adm. Code 309, a person may apply to the Agency to include as a condition in an NPDES permit a ZID as a component portion of a mixing zone. Such ZID shall, at a minimum, be limited to waters within which effluent dispersion is immediate and rapid. For the purposes of this subsection, "immediate" dispersion means an effluent's merging

with receiving waters without delay in time after its discharge and within close proximity of the end of the discharge pipe, so as to minimize the length of exposure time of aquatic life to undiluted effluent, and "rapid" dispersion means an effluent's merging with receiving waters so as to minimize the length of exposure time of aquatic life to undiluted effluent. Upon proof by the applicant that a proposed ZID conforms with the requirements of Section 39 of the Act and this Section, the Agency shall, pursuant to Section 39(b) of the Act, include within the NPDES permit a condition defining the ZID.

f) Pursuant to Section 39 of the Act and 35 Ill. Adm. Code 309.103, an applicant for an NPDES permit shall submit data to allow the Agency to determine that the nature of any mixing zone or mixing zone in combination with a ZID conforms with the requirements of Section 39 of the Act and of this Section. A permittee may appeal Agency determinations concerning a mixing zone or ZID pursuant to the procedures of Section 40 of the Act and 35 Ill. Adm. Code 309.181.

g) Where a mixing zone is defined in an NPDES permit, the waters within that mixing zone, for the duration of that NPDES permit, shall constitute the sole waters within which mixing is allowed for the permitted discharge. It shall not be a defense in any action brought pursuant to 35 Ill. Adm. Code 304.105 that the area and volume of waters within which mixing may be allowed pursuant to subsection (b) is less restrictive than the area or volume or waters encompassed in the mixing zone.

h) Where a mixing zone is explicitly denied in a NPDES permit, no waters may be used for mixing by the discharge to which the NPDES permit applies, all other provisions of this Section notwithstanding.

i) Where an NPDES permit is silent on the matter of a mixing zone, or where no NPDES permit is in effect, the burden of proof shall be on the discharger to demonstrate compliance with this Section in any action brought pursuant to 35 Ill. Adm. Code 304.105.

(Source: Amended at 31 Ill. Reg. _____, effective _____)

SUBPART B: GENERAL USE WATER QUALITY STANDARDS

Section 302.208 Numeric Standards for Chemical Constituents

a) The acute standard (AS) for the chemical constituents listed in subsection (e) shall not be exceeded at any time except as provided in subsection (d).

b) The chronic standard (CS) for the chemical constituents listed in subsection (e) shall not be exceeded by the arithmetic average of at least four consecutive samples collected over any period of at least four days, except as provided in

subsection (d). The samples used to demonstrate attainment or lack of attainment with a CS must be collected in a manner that assures an average representative of the sampling period. For the metals that have water quality based standards dependent upon hardness, the chronic water quality standard will be calculated according to subsection (e) using the hardness of the water body at the time the metals sample was collected. To calculate attainment status of chronic metals standards, the concentration of the metal in each sample is divided by the calculated water quality standard for the sample to determine a quotient. The water quality standard is attained if the mean of the sample quotients is less than or equal to one for the duration of the averaging period.

c) The human health standard (HHS) for the chemical constituents listed in subsection (f) shall not be exceeded when the stream flow is at or above the harmonic mean flow pursuant to Section 302.658 nor shall an annual average, based on at least eight samples, collected in a manner representative of the sampling period, exceed the HHS except as provided in subsection (d).

d) In waters where mixing is allowed pursuant to Section 302.102, the following apply:

1) The AS shall not be exceeded in any waters except for those waters for which the Agency has approved a zone of initial dilutions (ZID) pursuant to Section 302.102.

2) The CS shall not be exceeded outside of waters in which mixing is allowed pursuant to Section 302.102.

3) The HHS shall not be exceeded outside of waters in which mixing is allowed pursuant to Section 302.102.

e) Numeric Water Quality Standards for the Protection of Aquatic Organisms

Constituent	STORET Number	AS (µg/L)	CS (µg/L)
Arsenic (trivalent, dissolved)	22680	360 X 1.0*=360	190 X 1.0*=190
Cadmium (dissolved)	01025	exp[A+Bln(H)] X {1.138672-[(lnH)(0.041838)]}*, where A=-2.918 and B=1.128	exp[A+Bln(H)] X {1.101672-[(lnH)(0.041838)]}*, where A=-3.490 and B=0.7852
Chromium (hexavalent, total)	01032	16	11

Chromium (trivalent, dissolved)	80357	exp[A+Bln(H)] X 0.316*, where A=3.688 and B=0.8190	exp[A+Bln(H)] X 0.860*, where A=1.561 and B=0.8190
Copper (dissolved)	01040	exp[A+Bln(H)] X 0.960*, where A=-1.464 and B=0.9422	exp[A+Bln(H)] X 0.960*. where A=-1.465 and B=0.8545
Cyanide	00718	22	5.2
Lead (dissolved)	01049	exp[A+Bln(H)] X {1.46203-[(lnH)(0.145712)]}*, where A=-1.301 and B=1.273	exp[A+Bln(H)] X {1.46203-[(lnH)(0.145712)]}*, where A=-2.863 and B=1.273
Mercury (dissolved)	71890	2.6 X 0.85*=2.2	1.3 X 0.85*=1.1
Nickel (dissolved)	01065	exp[A+Bln(H)] X 0.998*, where A=0.5173 and B=0.8460	exp[A+Bln(H)] X 0.997*, where A=-2.286 and B=0.8460
TRC	500600	19	11
Zinc (dissolved)	01090	exp[A+Bln(H)] X 0.978*, where A=0.9035 and B=0.8473	Exp[A+Bln(H)] X 0.986*, where A=-0.8165 and B=0.8473
Benzene	78124	4200	860
Ethylbenzene	78113	150	14
Toluene	78131	2000	600
Xylene(s)	81551	920	360

where: µg/L = microgram per liter,

exp[x] = base natural logarithms raised to the x- power,

ln(H) = natural logarithm of Hardness (STORET 00900), and

* = conversion factor multiplier for dissolved metals

f) Numeric Water Quality Standard for the Protection of Human Health

Constituent	STORET Number	(µg/L)
Mercury	71900	0.012
Benzene	78124	310

where: µg/L = micrograms per liter

g) Concentrations of the following chemical constituents shall not be exceeded except in waters for which mixing is allowed pursuant to Section 302.102.

Constituent	Unit	STORET Number	Standard
Barium (total)	mg/L	01007	5.0
Boron (total)	mg/L	01022	1.0
Chloride (total)	mg/L	00940	500
Fluoride	mg/L	00951	1.4
Iron (dissolved)	mg/L	01046	1.0
Manganese (total)	mg/L	01055	1.0
Phenols	mg/L	32730	0.1
Selenium (total)	mg/L	01147	1.0
Silver (total)	µg/L	01077	5.0
~~Sulfate~~	~~mg/L~~	~~00945~~	~~500~~
~~Total Dissolved Solids~~	~~mg/L~~	~~70300~~	~~1000~~

where: mg/L = milligram per liter and
µg/L = microgram per liter

h) The following concentrations for sulfate must not be exceeded except in receiving waters for which mixing is allowed pursuant to Section 302.102:

1) At any point where water is withdrawn or accessed for purposes of livestock watering, the average of sulfate concentrations must not exceed 2,000 mg/L when measured at a representative frequency over a 30 day period.

2) The results of the following equations provide sulfate water quality standards in mg/L for the specified ranges of hardness (in mg/L as $CaCO_3$) and chloride (in mg/L) and must be met at all times:

A) If the hardness concentration of receiving waters is greater than or equal to 100 mg/L but less than or equal to 500 mg/L, and if the chloride concentration of waters is greater than or equal to 25 mg/L but less than or equal to 500 mg/L, then:

$C = [1276.7 + 5.508 (hardness) – 1.457 (chloride)] * 0.65$

Where, C = sulfate concentration

B) If the hardness concentration of waters is greater than or equal to 100 mg/L but less than or equal to 500 mg/L, and if the chloride concentration of waters is greater than or equal to 5 mg/L but less than 25 mg/L, then:

$C = [-57.478 + 5.79 (hardness) + 54.163 (chloride)] * 0.65$

Where C = sulfate concentration

3) The following sulfate standards must be met at all times when hardness (in mg/L as $CaCO_3$) and chloride (in mg/L) concentrations other than specified in (h)(2) are present:

A) If the hardness concentration of waters is less than 100 mg/L or chloride concentration of waters is less than 5 mg/L, the sulfate standard is 500 mg/L.

B) If the hardness concentration of waters is greater than 500 mg/L and the chloride concentration of waters is 5 mg/L or greater, the sulfate standard is 2,000 mg/L.

C) If the combination of hardness and chloride concentrations of existing waters are not reflected above, the sulfate standard will be determined on a case-by-case basis in conjunction with an applicable NPDES permitting process.

(Source: Amended at 31 Ill. Reg. _____, effective _____)

CHAPTER I: POLLUTION CONTROL BOARD

PART 309
PERMITS

SUBPART A: NPDES PERMITS

SUBPART B: OTHER PERMITS

AUTHORITY: Implementing Sections 13 and 13.3 and authorized by Section 27 of the Environmental Protection Act [415 ILCS 5/13, 13.3 and 27].

SOURCE: Adopted in R71-14, at 4 PCB 3, March 7, 1972; amended in R73-11, 12, at 14 PCB 661, December 5, 1974, at 16 PCB 511, April 24, 1975, and at 28 PCB 509, December 20, 1977; amended in R73-11, 12, at 29 PCB 477, at 2 Ill. Reg. 16, p. 20, effective April 20, 1978; amended in R79-13, at 39 PCB 263, at 4 Ill. Reg. 34, p. 159, effective August 7, 1980; amended in R77-12B, at 41 PCB 369, at 5 Ill. Reg. 6384, effective May 28, 1981; amended in R76-21, at

44 PCB 203, at 6 Ill. Reg. 563, effective December 24, 1981; codified at 6 Ill. Reg. 7818; amended in R82-5, 10, at 54 PCB 411, at 8 Ill. Reg. 1612, effective January 18, 1984; amended in R86-44 at 12 Ill. Reg. 2495 effective January 13, 1988; amended in R88-1 at 13 Ill. Reg. 5993, effective April 18, 1989; amended in R88-21(A) at 14 Ill. Reg. 2892, effective February 13, 1990; amended in R91-5 at 16 Ill. Reg. 7339, effective April 27, 1992; amended in R95-22 at 20 Ill. Reg. 5526, effective April 1, 1996; amended in R99-8 at 23 Ill. Reg. 11287, effective August 26, 1999; amended in R02-11 at 27 Ill. Reg. 202, effective December 20, 2002; amended in R07-9 at 31 Ill. Reg. _____, effective _____.

SUBPART A: NPDES PERMITS

Section 309.103 Application - General

a) Application Forms

1) An applicant for a National Pollution Discharge Elimination System (NPDES) Permit shall file an application, in accordance with Section 309.223 hereof, on forms provided by the Illinois Environmental Protection Agency (Agency). Such forms shall comprise the NPDES application forms promulgated by the U.S. Environmental Protection Agency for the type of discharge for which an NPDES Permit is being sought and such additional information as the Agency may reasonably require in order to determine that the discharge or proposed discharge will be in compliance with applicable state and federal requirements.

2) In addition to the above application forms, the Agency may require the submission of plans and specifications for treatment works and summaries of design criteria.

3) Effluent toxicity monitoring

A) In addition to the above application forms, the Agency may require, pursuant to Section 39 of the Act, the installation, use, maintenance and reporting of results from monitoring equipment and methods, including biological monitoring. The Agency may require, pursuant to Section 39 of the Act, effluent toxicity testing to show compliance with 35 Ill. Adm. Code 302.621 and 302.630. If this toxicity testing shows the effluent to be toxic, the Agency may require pursuant to Section 39 of the Act further testing and identification of the toxicant(s) pursuant to 35 Ill. Adm. Code 302.210(a).

B) The following POTWs shall provide the results of valid whole effluent biological toxicity testing to the Agency:

i) All POTWs with design influent flows equal to or greater than one million gallons per day;

ii) All POTWs with approved pretreatment programs or POTWs required to develop a pretreatment program pursuant to 35 Ill. Adm. Code 310.Subpart E;

C) In addition to the POTWs listed in (a)(3)(B), the Agency may require other POTWs to submit the result of toxicity tests with their permit applications, based on consideration of the following factors.

i) The variability of the pollutants or pollutant parameters in the POTW effluent (based on chemical-specific information, the type of treatment facility, and types of industrial contributors);

ii) The dilution of the effluent in the receiving water (ratio of effluent flow to receiving stream flow);

iii) Existing controls on point or nonpoint sources, including total maximum daily load calculations for the waterbody segment and the relative contribution of the POTW;

iv) Receiving stream characteristics, including possible or known water quality impairment, and whether the POTW discharges to a coastal water, one of the Great Lakes, or a water designated as an outstanding natural resource; or

v) Other considerations (including but not limited to the history of toxic impact and compliance problems at the POTW), which the Agency determines could cause or contribute to adverse water quality impacts.

D) The POTWs required under subsections (a)(3)(B) or (a)(3)(C) to conduct toxicity testing shall use the methods prescribed at 35 Ill. Adm. Code 302.Subpart F. Such testing must have been conducted since the later of the last NPDES permit reissuance or permit modification pursuant to Section 309.182, 309.183 or 309.184 for any of the reasons listed at 40 CFR 122.62(a) (199<u>4</u>), as amended at 60 Fed. Reg. 33926 effective June 29, 1995, herein incorporated by reference (including no later amendments or editions).

4) All POTWs with approved pretreatment programs shall provide the following information to the Agency: a written technical evaluation of the need to revise local limits pursuant to 35 Ill. Adm. Code 310.210.

BOARD NOTE: Subsections (a)(3)(B) through (a)(4) are derived from 40 CFR 122.21(j) (199~~1~~4).

b) Animal Waste Facilities

An applicant for an NPDES Permit in connection with the operation of an animal waste facility shall complete, sign, and submit an NPDES application in accordance with the provisions of 35 Ill. Adm. Code: Subtitle E, Chapter I.

c) Mining Activities

1) If, as defined by 35 Ill. Adm. Code 402.101, mining activities are to be carried out on a facility for which an NPDES Permit is held or required, the applicant must submit a permit application as required by 35 Ill. Adm. Code 403.103, 403.104 and 405.104. If the facility will have a discharge other than a mine discharge or non-point source mine discharge as defined by 35 Ill. Adm. Code 402.101, the applicant shall also submit an NPDES Permit application in accordance with Section 309.223 on forms supplied by the Agency.

2) As provided by 35 Ill. Adm. Code 403.101, except to the extent contradicted in 35 Ill. Adm. Code: Subtitle D, Chapter I, the rules contained in this Subpart apply only to 35 Ill. Adm. Code: Subtitle D, Chapter I NPDES Permits.

3) As provided by 35 Ill. Adm. Code 406.100, except to the extent provided in 35 Ill. Adm. Code: Subtitle D, Chapter I, the effluent ~~and water quality~~ standards of 35 Ill. Adm. Code ~~302, 303 and~~ 304 are inapplicable to mine discharges and non-point source mine discharges.

d) New Discharges

Any person whose discharge will begin after the effective date of this Subpart A or any person having an NPDES Permit issued by the U.S. Environmental Protection Agency for an existing discharge which will substantially change in nature, or increase in volume or frequency, must apply for an NPDES Permit either:

1) No later than 180 days in advance of the date on which such NPDES Permit will be required; or

2) In sufficient time prior to the anticipated commencement of the discharge to insure compliance with the requirements of Section 306 of the Clean Water Act (CWA) (33 U.S.C. 1251 et seq), or with any other applicable water quality standards and applicable effluent standards and limitations.

e) Signatures

An application submitted by a corporation shall be signed by a principal executive officer of at least the level of vice president, or his duly authorized representative, if such representative is responsible for the overall operation of the facility from which the discharge described in the application form originates. In the case of a partnership or a sole proprietorship, the application shall be signed by a general partner or the proprietor, respectively. In the case of a publicly owned facility, the application shall be signed by either the principal executive officer, ranking elected official, or other duly authorized employee.

(Source: Amended at 31 Ill. Reg. _____, effective _____)

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TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE D: MINE RELATED WATER POLLUTION
CHAPTER I: POLLUTION CONTROL BOARD

PART 405
STATE AND NPDES PERMITS

Section
405.100 Preamble
405.101 Special Conditions: Agency Guidance Document
405.102 Standard for Permit Issuance or Certification
405.103 Permit Modification When New Regulations are Adopted
405.104 Permit Applications
405.105 Surface Drainage Control
405.106 Refuse Disposal
405.107 Experimental Permits for Refuse Disposal
405.108 Permit for Use of Acid-producing Mine Refuse
405.109 Abandonment Plan
405.110 Cessation, Suspension or Abandonment
405.111 Emergency Procedures To Control Pollution
405.112 Mine Entrances
405.113 Permit Area
Appendix A References to Previous Rules

AUTHORITY: Implementing Sections 12 and 13 and authorized by Section 27 of the Environmental Protection Act (415 ILCS 5/12, 13, and 27 (2006)).

SOURCE: Adopted in R76-20, R77-10, 39 PCB 196, at 4 Ill. Reg. 34, p. 164, effective August 7, 1980; codified at 5 Ill. Reg. 8527; amended in R83-6A at 8 Ill. Reg. 13267, effective July 16, 1984; amended in R07-9 at 31 Ill. Reg. _____, effective _____.

Section 405.109 Abandonment Plan

a) A state or NPDES permit shall include an abandonment plan as a condition.

b) An abandonment plan shall be incorporated into the permit by reference if it:

1) Includes a time schedule establishing that the abandonment plan will be executed and completed within a reasonable time after abandonment considering any potential adverse impact on the environment pending completion of the plan and the amount of time required to carry out the steps in the plan; one year is assumed to be a reasonable time unless the operator demonstrates that a longer time is reasonable; and

2) Shows that the mine related facilities and mining activities will be abandoned so as not to cause a violation of the Act or this Chapter.~~;~~

~~A) If the plan includes a discharge which will remain after abandonment which will not meet the requirements of 35 Ill. Adm. Code 406.202, and if the permit included water quality-based conditions under 35 Ill. Adm. Code 406.203 during active mining, the discharge shall be deemed to meet 35 Ill. Adm. Code 406.202 with respect to total dissolved solids, chloride, sulfate, iron and manganese if it will meet the requirements of 35 Ill. Adm. Code 406.106 and 406.203(c)(1) and (c)(2); or~~

~~B) If the plan includes impoundments which will remain after abandonment and which will not meet the water quality standards of 35 Ill. Adm. Code 302.204 or 302.208, with respect to total dissolved solids, chloride, sulfate, iron, manganese and pH, such fact shall not prevent approval of the plan if the impoundment will meet the requirements of 35 Ill. Adm. Code 406.106 and 406.203(c)(1) and (c)(2).~~

c) If the abandonment plan does not meet the standard of paragraph (b) the Agency may either deny the permit or issue it with an abandonment plan modified by conditions subject to Section 405.101.

d) The time limit provided by paragraph (b)(1) is inapplicable to abandonment plans for surface coal mines which are approved as reclamation plans under the Surface Coal Mining Land Conservation and Reclamation Act, (Ill. Rev. Stat. 1983, ch. 96 1/2, par. 7902.03).

e) Any abandonment plan constituting a substantial change from the permitted abandonment plan is a revised abandonment plan.

f) A permittee shall apply for a new or revised or supplemental NPDES or state permit prior to implementation of a revised abandonment plan within the time limits provided by 35 Ill. Adm. Code 403.104(c).

~~g) An abandonment plan incorporated into a permit pursuant to showing under 35 Ill. Adm. Code 406.203 shall include conditions pursuant to 35 Ill. Adm. Code 406.203(e)(1) and (e)(2).~~

(Source: Amended at 31 Ill. Reg. _____, effective _____)

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE D: MINE RELATED WATER POLLUTION
CHAPTER I: POLLUTION CONTROL BOARD

PART 406
MINE WASTE EFFLUENT AND WATER QUALITY STANDARDS

SUBPART A: EFFLUENT STANDARDS

Section
406.100 Preamble
406.101 Averaging
406.102 Sampling, Reporting and Monitoring
406.103 Background Concentrations
406.104 Dilution
406.105 Commingling of Waste Streams
406.106 Effluent Standards for Mine Discharges
406.107 Offensive Discharges
406.108 Non-Point Source Mine Discharges
406.109 Effluent Standards for Coal Mine Discharge from Reclamation Areas
406.110 Alternate Effluent Standards for Coal Mine Discharges During Precipitation Events

SUBPART B: WATER QUALITY STANDARDS

Section
406.201 Temporary Exemption from Section 406.105 (Repealed)
406.202 Violation of Water Quality Standards
406.203 TDS Related Permit Conditions <u>(Repealed)</u>
406.204 Good Mining Practices
406.205 Contact with Disturbed Areas

AUTHORITY: Implementing Sections 12 and 13 and authorized by Section 27 of the Environmental Protection Act (415 ILCS 5/12, 13, and 27 (2006)).

SOURCE: Adopted in R76-20, R77-10, 39 PCB 196, at 4 Ill. Reg. 34, p. 164, effective August 7, 1980; codified at 5 Ill. Reg. 8527; emergency amendment in R83-6B at 7 Ill. Reg. 8386, effective July 5, 1983, for a maximum of 150 days; amended in R83-6B at 7 Ill. Reg. 14510, effective October 19, 1983; amended in R83-6A at 8 Ill. Reg. 13239, effective July 16, 1984; amended in R84-29 at 11 12899, effective July 27, 1987; amended in R07-9 at _____ Ill. Reg. _____.

SUBPART A: EFFLUENT STANDARDS

Section 406.100 Preamble

a) Part 406 applies to mine discharges and non-point source mine discharges as defined by Section 402.101.

b) Other discharges, including sanitary sewers, are regulated under Subtitle C, Chapter I: Water Pollution.

c) A facility which has another discharge will be subject to both Subtitle C and Subtitle D. Subtitle D governs mining activities, including mine discharges and non-point source mine discharges. Subtitle C governs other discharges.

d) Except to the extent provided in this Part 406, Part~~s 302, 303 and~~ 304 of subtitle C is ~~are~~ inapplicable to mine discharges and non-point source mine discharges.

(Source: Amended at 31 Ill. Reg. _____, effective _____)

SUBPART B: WATER QUALITY STANDARDS

Section 406.203 TDS Related Permit Conditions (Repealed)

~~a) This Section sets forth procedures by which water quality-based permit conditions for total dissolved solids, chloride, sulfate, iron and manganese may be established by the Agency for coal mine discharges. These procedures apply instead of Section 406.202 whenever a permit applicant elects to proceed under this Section. A permittee must comply with water quality-based permit conditions for total dissolved solids, chloride, sulfate, iron and manganese~~

established pursuant to this Section instead of Section 406.202. Public hearings may be required pursuant to 35 Ill. Adm. Code 309.115.

b) An applicant may elect to proceed under this Section by providing the required information as part of a new or renewed or supplemental state or NPDES permit application.

c) The Agency shall establish permit conditions under this Section if all of the following conditions are met:

1) The applicant proves to the Agency that the discharge will not cause an adverse effect on the environment in and around the receiving stream, by either:

A) Demonstrating that the discharge will contain a concentration less than or equal to 3500 mg/l sulfate and 1000 mg/l chloride; or,

B) Through actual stream studies.

2) The applicant proves to the Agency that the discharge will not adversely affect any public water supply; and

3) The applicant proves to the Agency that it is utilizing good mining practices designed to minimize discharge of total dissolved solids, chloride, sulfate iron and manganese.

d) The Agency may promulgate under 35 Ill. Adm. Code 405.101(c) a code of good mining practices consistent with the definition in Section 406.204. Compliance with the code of good mining practices shall be prima facie evidence that the applicant is utilizing good mining practices within the meaning of paragraph (c)(3).

e) Whenever the Agency issues a permit based on this Section, it shall include such conditions as may be necessary to ensure that:

1) There is no adverse effect on the environment in and around the receiving stream;

2) The discharge does not adversely affect any public water supply; and

3) The permittee utilizes good mining practices designed to minimize discharge of total dissolved solids, chloride, sulfate, iron and manganese.

f) Whenever the Agency issues a permit pursuant to this Section, if may include as a condition a requirement that the permittee submit to the Agency effluent data for total dissolved solids, chloride, sulfate, iron and manganese.

(Source: Repealed at 31 Ill. Reg. _____, effective _____)

Section 406.209 Expiration of Former Exemptions (Repealed)

~~a) Exemptions from the water quality standards granted prior to the effective date of Section 406.203 shall continue until any of the following events occurs:~~

~~1) Any State or NPDES permit for the facility expires, or is revoked, renewed or reissued;~~

~~2) Any State or NPDES permit for the facility is modified, unless the Agency expressly continues the exemption pending review pursuant to paragraph (b);~~

~~3) An application period set pursuant to paragraph (b) expires with no application having been received;~~

~~4) The Agency grants or denies a permit under Section 406.203; or~~

~~5) January 1, 1987, the final date for continuation of former exemptions.~~

~~b) The Agency may require applications for review pursuant to Section 406.203 by notifying individual permittees and setting a date for application not less than 15 months after the date notice is given.~~

~~c) If an appeal to the Board is filed, exemptions continue until the Board enters a final order disposing of the appeal.~~

(Source: Repealed at 31 Ill. Reg. _____, effective _____)

TITLE 35: ENVIRONMENTAL PROTECTION
SUBTITLE D: MINE RELATED WATER POLLUTION
CHAPTER I: POLLUTION CONTROL BOARD

PART 407
COMPLIANCE AND EFFECTIVE DATES (REPEALED)

Section
407.101 Effective Date
407.102 Applications from Holders of Outstanding Permits
407.103 Expiration of Outstanding Permits
407.104 Abandonment Plan for Existing Permits
Appendix A References to Previous Rules

AUTHORITY: Authorized by Section 27 and implementing Sections 12 and 13 and authorized by Section 27 of the Illinois Environmental Protection Act (Ill. Rev. Stat., ch. 111 1/2, pars. 1012, 1013 and 1027) unless otherwise noted.

SOURCE: Adopted at 4 Ill. Reg. 34, p. 164, effective August 7, 1980; codified at 5 Ill. Reg. 34, p. 8527, effective August 10, 1981; Repealed in R07-9 at 31 Ill. Reg. _____, effective _____.

Section 407.101 Effective Date

This Chapter is effective upon filing with the Secretary of State.

Section 407.102 Applications from Holders of Outstanding Permits

a) A holder of an outstanding operating permit under the old Chapter 4 may apply for a state or NPDES permit at any time.

b) The Agency may by notification require a holder of an outstanding operating permit to apply for a state or NPDES permit.

c) Notification shall contain a date, not less than 180 days after notification, by which date an application must be received by the Agency.

Section 407.103 Expiration of Outstanding Permits

Compliance with the provisions of this Chapter is required on the effective date except that immediate compliance with the permit requirement of Section 404.101 is not required of holders of outstanding permits for mines opened prior to the effective date of this Subtitle D, Chapter I. For such facilities, compliance with Section 404.101 is required upon expiration of the outstanding operating permit. Such permits shall expire upon the occurrence of any of the following conditions, whichever occurs first:

a) The lapse of three years after the effective date of this Chapter; or

b) The expiration of any NPDES permit held by the permittee for the facility; or

c) Issuance of a permit for the facility pursuant to Section 403.102 or Section 404.101; or

d) The lapse of an application period fixed pursuant to Section 407.102(c) if an application is not received by the date given in the notification.

Section 407.104 Abandonment Plan for Existing Permits

The requirement of a permit to abandon contained in Rule 502 of old Chapter 4, effective May 23, 1972 shall continue to apply to operators of mines opened prior to the effective date of this

Subtitle D, Chapter I, until such time as such operator shall have been issued under this Subtitle D, Chapter I a valid permit containing an abandonment plan.

Section 407.APPENDIX A REFERENCES TO PREVIOUS RULES

The following table is provided to aid in referencing old Board rule numbers to section numbers pursuant to codification.

Chapter 4, Mine Related Pollution Part VII, Compliance and Effective Dates	35 Ill. Admin. Code Part 407
Rule 701	Section 407.101
Rule 702	Section 407.102
Rule 703	Section 407.103
Rule 704	Section 407.104

I, John T. Therriault, Assistant Clerk of the Illinois Pollution Control Board, certify that the Board adopted the above opinion and order on September 20, 2007, by a vote of 4-0.

John T. Therriault, Assistant Clerk
Illinois Pollution Control Board