BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

IN THE MATTER OF:	)	
	)	
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 and Part 407; and PROPOSED NEW 35 ILL. ADM. CODE 302.208(h)	)	R07-9 (Rulemaking - Water)

Proceedings held on March 7, 2007, at 10:34 a.m., at the Illinois Pollution Control Board, 1021 North Grand Avenue East, Springfield, Illinois, before Marie E. Tipsord, Hearing Officer.

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APPEARANCES

Board Members present:

Chairman G. Tanner Girard
Board Member Thomas E. Johnson

Board Staff Members present:

Anand Rao, Senior Environmental Scientist

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
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On behalf of the Illinois EPA

Also present: Robert G. Mosher
Brian T. Koch
Toby Frevert

INDEX

EXHIBITS

(No exhibits were marked.)

PROCEEDINGS

(March 7, 2007; 10:34 a.m.)

HEARING OFFICER TIPSORD: Good morning. My name is Marie Tipsord, and I've been appointed hearing officer in this rulemaking, R07-9, entitled "Proposed Amendments to 35 Ill. Admin 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302.102(b)(8), 302.102(b)(10), 302.208(g), 309.103(c)(3), 405.109(b)(2)(A), 405.109(b)(2)(B), 406.100(d); Repealed, 35 Ill. Admin Code 406.203, Part 407, and Proposed New 35 Ill. Admin Code 302.208(h)."

To my right is Dr. Tanner Girard -- he is the presiding board member in this rulemaking -- and to my left is Mr. Thomas Johnson, also a board member here observing today. To Dr. Girard's right is Anand Rao from our technical unit, and I believe that's all of us from the Board today.

We are going to proceed first, and the purpose of today's hearing is to hear the prefiled testimony of the IEPA. I have spoken with the Agency, and I agree that since this testimony is short, they're going to go ahead and read the testimony into the record for ease of all of us here today. After we finish with both testifiers, we will then proceed to questions, and we'll start with the prefiled questions, which Albert Ettinger on behalf of

the Environmental Law & Policy Center, Prairie Rivers and the Sierra Club of Illinois prefiled a motion for leave to prefile questions. Is there any objection to that motion?

MR. SOFAT: No.

HEARING OFFICER TIPSORD: Okay. Seeing none, I will accept those prefiled questions, so after we finish the testimony, we'll go to those prefiled questions. Anyone may ask a follow-up to those questions, and after we're through with those questions, anyone may ask a question of the Agency. If you want to ask a question, please raise your hand, wait for me to recognize you and then state who -- your name, who you represent and then ask your question. Please don't speak over one another, as it makes it difficult for the court reporter to get everything down. Any questions by the Board or staff should not be viewed as any prejudgment or any bias. It's merely our opportunity to make sure the record is complete in this proceeding. And with that, Dr. Girard?

CHAIRMAN GIRARD: Good morning. On behalf of the Board, I welcome everyone to this hearing to consider changes to the Illinois water quality standards for sulfate, total dissolved solids and mixing zones. We

look forward to the testimony and questions today. Thank you.

HEARING OFFICER TIPSORD: Thank you. All right. With that, are there any opening statements?

MR. SOFAT: Yes, I will make a statement. Good morning. I am Sanjay Sofat, an assistant counsel with the Illinois IEPA. With me today are three Agency witnesses. To my right is Toby Frevert, who is the manager of the Division of Water Pollution within the Bureau of Water at IEPA. Mr. Frevert will respond to any policy-related questions. To my immediate left is Robert Mosher, who is the manager of the Water Quality Standards Unit within the Division of Water Pollution at IEPA. Mr. Mosher will testify regarding the Agency's proposal to delete the water quality standard for total dissolved solids and several sections of Subtitle D of the board regulations. He will also testify regarding proposed changes to the Board's mixing zone regulations at 35 Ill. Adm. Code 302.102.

To the left of Mr. Mosher is Brian Koch, who is a toxicologist in the Water Quality Standards Unit of the Division of Water Pollution Control at Illinois EPA. Mr. Koch will testify regarding procedures used in the derivation of the Agency's proposed sulfate standard for

aquatic life use and livestock watering use. He will also testify regarding the Agency's interpretation of the proposed language for the sulfate standard.

The Agency has brought copies of Bob Mosher and Brian Koch's testimony that the Agency has filed before the Board. They are available on the back table. Also there's a sign-up sheet. If we run out of documents, if you give your name and address, we can mail those to you.

We are here to testify in support of the Agency's proposal that amends Parts 302, 309, 405, 406 and 407 of the Board's regulations. Changes to Part 302 of the Board's regulations include an aquatic life based sulfate standard that depends on the hardness and chloride concentrations of the receiving stream, a chronic sulfate standard for livestock watering use, deletion of the general use water quality standard for total dissolved solids and amendment to the mixing regulations. Changes to Parts 309, 405 and 406 of the board regulations would ensure that mine discharges are subject to the Subtitle C water quality standards. The Agency is proposing to delete Part 407 of the board regulations, as it is obsolete and does not serve any purpose in the Agency's permitting decisions.

This agency's proposal is consistent with the

Title VII requirements of the Illinois Environmental Protection Act. We believe this is a scientifically sound proposal and one that deserves to be adopted without any changes. Thank you.

HEARING OFFICER TIPSORD: Thank you, Mr. Sofat. I also would like to mention that there are sign-up sheets to the right for the notice and service lists. If you place yourself on the notice list, you will receive information about all board orders and hearing officer orders. The service list entitles you to service of all documents, including prefiled testimony, and it also requires you to serve all of your documents on others. You can sign up here or you can also sign up on the Board's Web site at www.ipcb.state.il.us, and I also would note that all -- anything filed with the Board in this proceeding will be linked almost immediately or as quickly as we can on our Web site, so if you want to -- ever want documents that maybe haven't been served on you or that you think you might want to look at, they are available on our Web site and you can download them from our Web site at any time.

So with that, Mr. Sofat -- does anyone else want to make an opening statement or identify themselves for the record at this time? Okay. We'll go ahead and swear

in your persons testifying and go ahead with the testimony.

(Witnesses sworn.)

HEARING OFFICER TIPSORD: Excuse me. I note that, Toby, although identified as someone who was going to be testifying, you were not sworn in.

MR. FREVERT: I have to leave about 11:30 for about an hour, so I'll be gone for a while, and if there's some testimony I need to give after that, I'll be happy to, but I didn't want to look like I was going to swear in and rudely just get up and leave your hearing as a witness.

HEARING OFFICER TIPSORD: Okay. Well, let's go ahead and swear you in, because we know we're going to anyway.

(Witness sworn.)

HEARING OFFICER TIPSORD: Okay. Go ahead, Mr. --

MR. SOFAT: The Agency will start with Robert Mosher.

Mr. Mosher, I'm going to hand you this document. Please look over the document and -- for a few moments.

HEARING OFFICER TIPSORD: Excuse me. Let's go off the record for just a second.

(Discussion held off the record.)

MR. SOFAT: Mr. Mosher, can you just read your testimony?

MR. MOSHER: My name is Robert Mosher and I have been employed by the Illinois Environmental Protection Agency for over 21 years. For almost the last 20 years I have been the manager of the Water Quality Standards Unit. My duties in this capacity are primarily to oversee the development of new and updated water quality standards and, together with others in the Division of Water Pollution Control, to apply those standards in NPDES permits and Section 401 water quality certifications. I have a B.S. degree in zoology and environmental biology and an M.S. degree in zoology from Eastern Illinois University.

In my testimony today I will discuss the current regulatory environment that necessitates changes to water quality standards for sulfate, total dissolved solids, or TDS, and mixing zones. First I will relate the general benefits that the Agency's proposed changes will bring to our system of water quality standards and water quality based effluent limitations in NPDES permits. Second, I will discuss the deletion of the water quality standard for total dissolved solids. Third, I will explain the

changes proposed for mixing zone standards and the basis for these in terms of the reasoning behind the changes and the discharges that would benefit from these changes. Finally, I will cover the reasons for the deletion of portions of 35 Illinois Administrative Code -- or IAC -- Subtitle D, mine-related water pollution regulations.

General use water quality standards for sulfate, currently at 500 milligrams per liter, and TDS, at 1,000 milligrams per liter, have existed in Illinois regulations since 1972. These standards were adopted to protect aquatic life and agricultural uses; however, few modern studies were available to determine appropriate values. Adopted standards stemmed more from the opinion of a few experts than from documented scientific experiments. Because coal mine effluents in particular are often high in sulfate, a special standard was developed that is unique to mine discharges and is found in Title 35, IAC, Subtitle D, mine-related water pollution. Adopted in 1984, this sulfate standard of 3500 milligrams per liter also was not documented by the kind of aquatic life toxicity or livestock tolerance studies that are now expected in standards development. Under existing general use water quality standards, permitting many mine discharges without the special rules

provided in Subtitle D would be problematic because many mines cannot meet general use sulfate and TDS standards in effluents at the point of discharge and do not qualify for conventional mixing zones. Other industries also have difficulty meeting the general standards and many have received adjusted standards or site-specific water quality standards relief from the Illinois Pollution Control Board given that regardless of the source, sulfate and many of the other constituents of TDS are not treatable by any practical means.

A solution to this dilemma was to reevaluate the sulfate and TDS standards that account for most of the permitting problems. Studies of aquatic life communities downstream from high sulfate and TDS discharges appeared to show that organisms incur no detrimental effect from concentrations of these pollutants higher than the existing water quality standards. Since no national criteria exist for these pollutants and few other states even have sulfate and TDS standards, a long process was begun to gather existing information on sulfate aquatic life toxicity. When available data proved inadequate to derive a standard, new studies were commissioned with sponsorship from USEPA, the Illinois Coal Association and Illinois EPA. At the same time, investigations on the

tolerance of livestock to sulfate in drinking water were begun.

This new research into sulfate toxicity found that, as suspected, high sulfate concentrations pose a problem of osmotic -- or salt -- balance for some organisms. Many organisms, including all species of fish tested and many invertebrate species, are very tolerant of sulfate, so much so that no known existing concentration in Illinois would cause harm. Other species, including the invertebrate water fleas, Daphnia and Ceriodaphnia, and scud, Hyalella, have a harder time maintaining salt balance under high sulfate conditions, which leads to toxicity. Unlike other toxicants that have ongoing effects that lead to mortality over extended time periods, sulfate-induced mortality occurs relatively quickly but with no apparent residual effect. The new research also found that two common constituents of natural waters, chloride and hardness, are key to an understanding of the toxicity of sulfate. Brian Koch will further explain in his testimony how sulfate standards were developed to protect both aquatic life and livestock water uses.

While sulfate was being evaluated, it became increasingly obvious that TDS is a very inappropriate

parameter for use in water quality standards. 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 in various proportions. Our investigations into sulfate toxicity reinforced the notion that 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. For example, a water sample with a high chloride and TDS concentration of 2,000 milligrams per liter is acutely toxic to some species of aquatic life, but a sample with high sulfate at the same TDS concentration is nontoxic. In my experience with toxicity testing with ambient waters and effluents, I am not aware of an instance where common ions other than sulfate or chloride cause toxicity. With protective sulfate and chloride standards in force, salt toxicity is effectively regulated and there is no need for a TDS standard. Illinois EPA is therefore proposing that the TDS water quality standard be deleted along with the adoption of the new sulfate standard. The existing chloride standard is considered to be protective of uses without being overprotective and therefore is not proposed to be changed by our proposal.

Mixing zone standards at 35 IAC 302.102 dictate

the conditions under which the Agency may allow dilution of an effluent by its receiving water. As regulations change, the realities of mixing needs must be reassessed. Sulfate is part of a small group of substances for which treatment is usually infeasible and for which mixing becomes an important option in regulation. The other common substances for which treatment does not exist are chloride, boron and fluoride. It is not uncommon for discharges from coal mining operations as well as other activities to exceed these water quality standards and require some mixing zone allowance to achieve attainment of standards in the receiving stream.

Most high sulfate discharges from coal mines occur during wet weather events that bring sediment-laden water into treatment ponds, and from there the water is discharged to water bodies where water quality standards apply. The ponds function to remove sediment and, if necessary, control pH, but sulfate and chloride are not reduced. Water from the unmined or reclaimed watershed also enters streams during sedimentation pond discharge events and provides dilution for these effluents. At many mines this is a simultaneous process; in other words, rain makes both the effluent and the receiving stream flow and lack of rain means both sources do not

flow. For the past few years, Illinois EPA has granted wet weather discharges allowed mixing zones for sulfate and sometimes chloride with consideration of these upstream flows. We now propose to augment the mixing regulations to make them clear in this regard. The changes to the mixing standards will allow mixing if it is verifiable that upstream dilution will always exist when an effluent is discharged.

Two aspects of the mixing regulations found at 35 Illinois Administrative Code 302.102 are proposed for change. The first of these is the prohibition at 302.102(b), paragraph 6 and 10, preventing any receiving stream being entirely used for mixing. The existing standard dictates that a zone of passage, an area not impacted by the mixture of effluent with the receiving water, must be preserved for use by aquatic life whenever mixing is allowed. This is a concept recognized in regulations nationwide as a precept of mixing zones. However, there is one circumstance of mixing of effluent with receiving water that practically and physically cannot include a zone of passage. Many discharges of stormwater, particularly those from mines, are located high in the watershed where only a few square miles or less of drainage area supplies the receiving stream.

These receiving streams are so small and narrow that stormwater-driven effluent will mix completely across the stream channel and leave no zone of passage as would have been physically realized in a wider stream. Under a strict interpretation of the existing mixing standards, these discharges would not be allowed mixing and a large segment of discharges would not be able to exist.

If the Agency's proposal to do away with the zoning of passage requirement in very small streams high in watersheds is to be functional, a method of defining, quote, very small streams, unquote, is needed. With the help of the Illinois State Water Survey, the Illinois EPA proposes that a concept similar to the commonly used and well understood 7Q10 flow be adopted to identify these streams. Quote, small, unquote, may be equated with a stream's ability to maintain flow. Streams very high up in watersheds will typically dry up during periods of little rainfall and then fill with water again when rainfall returns. The more often a stream is dry, the more hostile that habitat will be to aquatic life. Streams losing all flow for at least one week -- a one-week period of nine out of ten years on average will present only a very limited habitat for aquatic life. This will consist of organisms that can live out their

life cycles in a relatively short time and then survive dry conditions as eggs or dormant stages. Fish will use these headwater streams on a migratory basis, with a few pioneering species possibly using them only seasonally as spawning or feeding areas. Streams identified as 7Q1.1 zero flow are defined as having no flow for at least seven consecutive days in nine out of every ten years.

Under our proposal, wet weather discharges to streams determined to be 7Q1.1 zero flow will be allowed the entire stream volume for mixing. Aquatic life that may inhabit the stream at the time of discharge will be protected because an analysis of the effluent and the amount of flow expected in the stream during discharge events will be required in order to determine that the available mixing will reduce effluent concentrations to below water quality standards. For streams that have been determined to have adequate dilution potential for a given discharge, the force present in these stormwater-driven effluents will be sufficient to cause near instant mixing to occur. Therefore, aquatic life will not be exposed to concentrations over the water quality standards. Fish will be able to migrate through the area of mixing with no ill effects.

The other change to mixing zone regulations is to

delete the statement in 35 IAC 302.102(b), paragraph 8, that prohibits mixing in streams that have a 7Q10 flow of zero. The stormwater mixing I just described depends on this change as well as non-stormwater discharges that have unique characteristics. The existing definition of dilution ratio at 35 Illinois Administrative Code 301.270 states that dilution ratio is to be determined from the 7Q10 stream flow or the lowest flow that is present when discharge occurs, whichever is greater. This implies that for noncontinuous dischargers, the allowed stream flow to be used in the mixing-based permit limit calculation is the flow expected when the discharge occurs.

Under our proposal, these flows must allow for a zone of passage, which is 75 percent of the stream flow if the dilution ratio is 3 to 1 or greater and the stream 7Q1.1 is greater than zero. Many effluents are continuously discharged and consequently the default stream flow for calculating dilution is 7Q10. These would include sewage treatment plants, power plants and most industrial discharges. However, some facilities outside these general categories produce effluent only periodically, and where it can be demonstrated that effluent will only be discharged at times and in

quantities that will be sufficiently diluted by the stream flow present at the time of discharge, that stream flow may be used for the mixing granted. Deleting the sentence, quote, "Mixing is not allowed in receiving waters which have a zero minimum seven-day low flow which occurs once in ten years," unquote, enables the definition of dilution ratio to guide the Illinois EPA in granting mixing. Discharges that can be withheld until sufficient stream flow exists or naturally are only produced in tandem with higher stream flows will benefit from this clarification.

It is important to note that all other aspects of the mixing zone regulation, and for that matter all other water regulations, are still in force and work together with the changes proposed. Especially important is the reference to the provisions of 35 IAC 304.102, which stipulates that the best degree of treatment must be provided to effluents before mixing may be allowed.

With the changes proposed for sulfate and TDS and the deletion of Subtitle D mine exemptions to water quality standards, Illinois EPA is proposing to regulate all types of discharges in an equitable manner. Water quality based permit limit decisions will now be required in lieu of the special exemptions formerly allowed for

mines. Additionally, as a housekeeping measure, an outdated portion of Subtitle D unrelated to water quality standards will also be deleted.

The changes to standards proposed in the Illinois EPA's petition are based on sound science and assure the protection of designated uses of waters of the state. These modernized standards will benefit mines and other dischargers of sulfate and other dissolved salts that are not amenable to treatment. Permit limits issued using the new sulfate and mixing regulations will be protective, yet not overly so, and will cause no unnecessary burden on economic activity. The Agency requests that the Board adopt this proposal.

HEARING OFFICER TIPSORD: Thank you, Mr. Mosher.

MR. SOFAT: Mr. Koch, would you read your testimony into the record?

MR. KOCH: My name is Brian Koch and I have been employed by the Illinois Environmental Protection Agency for over one year. I work as a toxicologist in the Water Quality Standards Section of the Division of Water Pollution Control. I have a B.A. and M.S. in zoology from Southern Illinois University Carbondale with specialization in fisheries ecology and aquatic

toxicology respectively. My primary responsibility at the Agency is to derive water quality standards and criteria through the implementation of USEPA and Illinois EPA methodologies. My testimony will discuss procedures utilized in the derivation of new sulfate water quality standards for two designated uses, aquatic life use and livestock watering.

My employment with Illinois EPA began in January of 2006, whereupon I was immediately assigned to become familiar with the procedures utilized in the derivation of updated sulfate standards. Prior to my employment, personnel from Illinois EPA, USEPA and Illinois Natural History Survey spent several years reviewing literature and conducting research in support of standards derivation. Critical issues such as data selection and statistical analyses had already been completed, thereby providing a foundation for the new standards. It has been my responsibility to obtain a complete understanding of the formal guidelines Illinois EPA used to derive the proposed aquatic life standards, as described by the USEPA document entitled "Guidelines for Deriving Numerical National Water Quality Criteria for the Protection of Aquatic Organisms and Their Uses," Exhibit L of the Agency's proposal. The guidelines are followed

in standards development by USEPA and other states and are also used as a basis for procedures in 35 Illinois Administrative Code Part 302, Subpart E and Subpart F, used in deriving water quality criteria.

A key component in standards derivation is the gathering and assessing available toxicity data for the substance of interest. Given that sodium is the predominant cation in Illinois waters, the Agency searched for sodium sulfate aquatic life toxicity data that was reputable and representative of Illinois fauna. The Agency searched the USEPA ACQUIRE database as well as other sources and compiled a database of toxicity values. Upon consultation with USEPA and ADVENT-ENVIRON, a consultant employed by the Illinois Coal Association, several of the studies were deemed unacceptable for use in standards derivation. An explanation for the approval or rejection of each study is provided in the justification document, Exhibit K of the Agency's proposal. Dr. Charles Stephan, the primary author of the Guidelines document, took precedence in this evaluation of toxicity data and compiled a final list of final values -- sorry -- compiled a list of final values considered valid for sulfate standards derivation, Exhibit M of the Agency's proposal. Upon review of

acceptable data, it was apparent that fish are quite tolerant of sulfate, while invertebrates are much more sensitive due to problems in maintaining osmotic balance. Of all tested species, the amphipod Hyalella azteca was most sensitive to sulfate. However, data on this species was limited and warranted further research to determine the extent of sulfate toxicity. At this time it was also noted that sulfate toxicity to invertebrates may be dependent on water chemistry. In order to supplement knowledge of sulfate toxicity, Dr. David Soucek of the Illinois Natural History Survey was contracted to conduct laboratory toxicity testing on multiple invertebrate species exposed to sodium sulfate at various concentrations of hardness and chloride. Detailed reports of Dr. Soucek's research as well as additional toxicity values generated from this research have been provided in the justification document, Exhibits P through U of the Agency's proposal.

Dr. Soucek's research was instrumental in the derivation of new sulfate aquatic life standards, as it verified that sulfate toxicity to aquatic invertebrates is dependent on hardness and chloride concentrations of water. Additionally, the research characterized sulfate toxicity to previously untested invertebrates, thereby

increasing the data set and providing a more accurate estimation of sulfate toxicity to sensitive species. A fortunate by-product of Dr. Soucek's research was the finding that chronic exposures of sulfate to the water flea, Ceriodaphnia dubia, did not result in reduced survival compared to acute exposures. Because sulfate toxicity is exerted through the inability of an invertebrate to maintain osmotic balance with surrounding water, it is believed that sulfate does not exhibit traditional chronic toxicity similar to substances such as heavy metals or pesticides. Whereas chronic effects of other substances typically occur at concentrations a factor lower than acute thresholds, Dr. Soucek has self-sustaining Ceriodaphnia dubia cultures inhabiting water with sulfate concentrations that are one-half to one-third of acute thresholds. The unique toxicodynamics of sulfate therefore required a sulfate-specific adjustment factor when converting from the LC50 level of effect, which is the concentration lethal to 50 percent of tested organisms, to the protective level of effect, a procedure to be further described in my testimony.

All aspects of Dr. Soucek's research, as well as acceptable data from other sources, were used to derive the new acute sulfate standards. As previously stated,

the procedures used in deriving numerical standards are described in the Guidelines document. A detailed account of the data and equations used in the derivation of sulfate standards can be found in Attachment I of the Agency's proposal, pages 9 through 15.

When data is available to show that acute toxicity to two or more species is related to a water quality characteristic, a final acute equation must be calculated in order to describe the relationship. Such was the case with sulfate, where sulfate toxicity to Hyalella azteca and Ceriodaphnia dubia was quantified in respect to hardness and chloride concentrations of test water. Sulfate LC50 values for the two species were measured or estimated at various concentrations of hardness and chloride and were then transformed into equations with hardness and chloride-specific slopes accounting for these relationships. Two separate equations were required due to the finding that sulfate was increasingly toxic at low chloride concentrations but decreasingly toxic at concentrations intermediate and higher, therefore requiring different slopes. With the two equations in place, LC50 values for all valid tests within the database were then normalized at specific concentrations of hardness and chloride, whereupon GMAVs,

genus mean acute values, and FAVs, final acute values, were then calculated. The FAVs are the values that each equation solves to when the normalized hardness and chloride concentrations are entered into the final equations. Two critical components of the sulfate standards derivation warrant further discussion, the FAV equations that account for hardness and chloride concentrations and the adjustment factor that the FAV equation is multiplied by in order to reach a protective effect level.

By definition, the FAV is the value protective of at least 95 percent of the species at the LC50 level of effect. Because sulfate toxicity is dependent on water chemistry, the FAVs are expressed in the form of two equations accounting for different ranges of hardness and chloride. An important concept to grasp is that a standard cannot be set at the FAV effect level, as this concentration would result in at least 50 percent mortality in highly sensitive species, as well as lesser mortality in more tolerant species. 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, NOEC, which is the

test concentration that did not result in mortality greater than that observed in the control. The default adjustment factor value of 0.5 is used when insufficient data is available for a substance. This default factor was derived by taking the geometric mean of the NOEC to LC50 ratios of over 200 tests on various toxicants. In the instance of a substance with atypical toxicity, such as sulfate, a pollutant-specific adjustment factor may be calculated if the data set is of sufficient quantity and quality and includes results from sensitive test species. The pollutant-specific adjustment factor for sulfate was derived by taking the geometric mean of NOEC to LC50 ratios from the two most sensitive species, Hyalella azteca and Ceriodaphnia dubia. The analyses resulted in an adjustment factor of 0.65, which is of greater specificity and accuracy for sulfate toxicity than the general multiplier of 0.5. The sulfate-specific adjustment factor was incorporated into both standards and serves to assure that an appropriate amount of protection is provided to aquatic life.

The outcome of the Agency's efforts with sulfate was the development of two acute aquatic toxicity criterion equations for sulfate at specified ranges of hardness and chloride. The adoption of these equations

will allow for the calculation of site-specific sulfate standards that are dependent on water quality characteristics. By entering hardness and chloride measurements from a specific site into the appropriate equation, the resulting value will be the protective concentration of sulfate at that specific site under those water quality characteristics. The calculated aquatic life standards are not to be exceeded at any time but may be superseded by the livestock watering standard if applicable.

The existing general use and Lake Michigan basin aquatic life standard for sulfate was adopted in 1972. There is no existing livestock standard, but it is implied that the 500 milligrams per liter aquatic life standard was thought to be protective of livestock, as the McKee and Wolf (1972) water quality criteria document used in support of standards adoption listed 500 milligrams per liter as a concentration protective of livestock. Upon early stages of developing the newly proposed aquatic life standards, it was apparent that the higher aquatic life standards may conflict with the attainment of other designated uses such as livestock watering. At the onset of my employment, it was my responsibility to research the effects of sulfate on

livestock watering to determine if the newly proposed aquatic life standards would threaten attainment of this use. ADVENT-ENVIRON also participated in literature review and supplemented the database. A listing of the toxicity endpoints and respective studies that were considered are listed in Exhibit E of the Agency's proposal. Additionally, full-text versions of studies integral to selection of the proposed livestock standard are attached in the justification document, Exhibits F through J of the Agency's proposal.

A review of the literature found that livestock are acutely tolerant of sulfate within the range of calculable aquatic life sulfate standards. Acute exposure to concentrations within this range may result in cathartic effects for several days, but these effects will diminish as animals acclimate to elevated sulfates. Prolonged exposure to these same concentrations, however, would likely lead to adverse effects on livestock, as well as the economy of impacted livestock operations. Based from literature review, the Agency concluded that a chronic standard of 2,000 milligrams per liter sulfate would be protective of livestock watering, as surface waters supporting this concentration would not lead to adverse effects on livestock or economic impacts to

livestock operations. It must be emphasized that this standard is applicable only in areas where water is withdrawn or accessed for purposes of livestock watering. In many of these waters, aquatic life standards will require that sulfate concentrations are maintained below the 2,000 milligrams per liter livestock standard. However, for livestock waters where the instantaneously applied aquatic life standard is calculated to be above 2,000 milligrams per liter, a 30-day average sulfate standard of 2,000 milligrams per liter will apply for protection of livestock.

The 2,000 milligram per liter chronic standard was determined upon review of recent studies where cattle chronically exposed to drinking water showed increasingly deleterious effects at concentrations from 2,360 milligrams per liter to 3,000 milligrams per liter sulfate. At 2,360 milligrams per liter sulfate, cattle have been shown to have decreased dress-out parameters, signifying that exposure to drinking water at this concentration may result in economic losses to livestock operations. As concentrations reach 2,500 milligrams per liter cattle have poor conception, and at 2 ,600 milligrams per liter cattle have been found to have decreased weight and body condition. As sulfate

concentrations approach 3,000 milligrams per liter, cattle drink less water and become more prone to polioencephalomalacia, a neurological disorder which leads to anorexia, blindness, seizures, and eventually death.

To verify the suitability of this proposed standard, Dr. Gavin Meerdink from the Department of Veterinary Medicine at University of Illinois Champaign-Urbana was contacted. Dr. Meerdink has performed consultations for livestock operations throughout the state and has often dealt with the issue of sulfate in livestock water and feed. Dr. Meerdink was supplied with all values collected from literature review and was informed of our plans of implementing 2,000 milligrams per liter sulfate as a chronic 30-day average standard. Dr. Meerdink questioned the validity of the older studies. He stated that much more has been learned regarding the complexity of sulfur compounds and ruminants over the last 30 years and that the recent studies likely had better detail in experimental design. He stated that sulfur compounds within the ruminant are a complicated issue, as much variability can be attributed to the sulfur content of feed as well as the ability of rumen microbes to convert sulfur compounds into sulfides.

Although limited animal taxa are represented in the literature, Dr. Meerdink acknowledged that cattle are a suitable study organism, as sulfur compounds in monogastric animals, such as pigs and rats, are much less of an issue. In summary, Dr. Meerdink stated that a 2,000 milligrams per liter sulfate standard would adequately protect livestock. He related that unacclimated animals may exhibit diarrhea for several days immediately after initial exposure but will suffer no economically significant weight loss or other adverse condition. In his experience, livestock will soon adapt to the higher sulfate water and the temporary symptoms will disappear. Dr. Meerdink also stated that he would feel uncomfortable setting a standard at concentrations significantly higher than 2,000 milligrams per liter of sulfate.

The development of updated sulfate standards required modifications to the regulatory language in 302.208. The following is a summary of regulatory changes that reflect the updated sulfate standards for aquatic life and livestock watering. The previous numerical standards for sulfate and TDS have been stricken from 302.208(g). Sulfate regulations now exist in 302.208(h)(1) to (3), beginning with the livestock

standard listed in 302.208(h)(1). The 2,000 milligram per liter livestock standard will be implemented as the average concentration not to be exceeded over a 30-day period in waters that are withdrawn or accessed for purposes of livestock watering. Sulfate concentrations are allowed to instantaneously exceed 2,000 milligrams per liter in these waters providing aquatic life standards are not exceeded and the 30-day average does not exceed 2,000 milligrams per liter sulfate.

Water bodies not utilized for livestock watering are exempt from this standard but are regulated by sulfate aquatic life standards calculated in 302.208(h)(2)(A) or 302.208(h)(2)(B). The calculation of the standard is subject to use of a specific equation dependent on hardness and chloride concentrations within the water body. The equation in 302.208(h)(2)(A) calculates sulfate aquatic life standards for waters where hardness is between 100 and 500 milligrams per liter and chloride between 25 and 500 milligrams per liter. Upon entering hardness and chloride concentrations from the receiving water into the provided equation, the resulting value will be the sulfate concentration not to be exceeded at any time. Section 302.208(h)(2)(B) contains the equation that calculates

sulfate standards when hardness is between 100 and 500 milligrams per liter and chloride is greater than or equal to 5 milligrams per liter but less than 25 milligrams per liter. Additionally, in the occasion that hardness and chloride concentrations are outside of the previously described ranges, the sulfate -- the following sulfate standards must be met. Pursuant to Section 302.208(h)(3)(A), if the hardness concentration of waters is less than 100 milligrams per liter or chloride concentration of waters is less than 5 milligrams per liter, the sulfate standard is 500 milligrams per liter. Pursuant to Section 302.208(h)(3)(B), if the hardness concentration of waters is greater than 500 milligrams per liter and the chloride concentration of waters is 5 milligrams per liter or greater, the sulfate standard is 2,000 milligrams per liter. The Agency believes the proposed aquatic life and livestock standards are scientifically sound and will serve to efficiently -- effectively protect the environment from adverse amounts of sulfate.

This concludes my prefiled testimony. I will be supplementing the testimony as needed during the hearing and would be happy to address any questions.

MR. SOFAT: Thank you, Mr. Koch.

HEARING OFFICER TIPSORD: Thank you.

MR. SOFAT: That ends the Agency's testimony.

HEARING OFFICER TIPSORD: Okay. With that, let's go ahead and move to the prefiled questions from the Environmental Law & Policy Center, Prairie Rivers Network and Sierra Club. Would you prefer to read the question and then have them answer it?

MS. COLLINS: Sure, that would be fine.

HEARING OFFICER TIPSORD: Okay. And you need to identify yourself for the court reporter.

MS. COLLINS: My name is Glynnis Collins, G-L-Y-N-N-I-S, Collins. I'm representing Prairie Rivers Network.

The first question we had for the Agency, at page 7 of the --

HEARING OFFICER TIPSORD: Excuse me. You're going to have to speak up.

MS. COLLINS: Sorry. At page 7 of the statement of reasons it is stated that this is the triennial review. What is the reason for this proposal being designated as a triennial review unlike other water quality standard proposals that the Agency from time to time has proposed to the Board?

MR. SOFAT: I will answer that question.

HEARING OFFICER TIPSORD: In which case we need to have you sworn in.

MR. SOFAT: Okay.

(Witness sworn.)

MR. SOFAT: On page 11, what we have is we identify the sections of Clean Water Act that require the Agency to periodically review those standards, water quality standards, and all we are indicating here is that this particular proposal is pursuant to Section 3 -- well, I think it's 303(c)(2)(A) of the Clean Water Act, so I'm not sure what other regulations you are alluding to.

MS. COLLINS: I don't think we had any questions about other regulations; just that this seemed to be a pretty specific modification, so why would this count as a review of -- the triennial review of all the water quality standards?

MR. SOFAT: In the past we have proposed regulations; for example, phosphate effluent standard, BTEX rulemaking that we did. We did all of those rulemakings under the triennial review section of the Clean Water Act. It is simply that you -- states you need to go back and review your existing standards and

see which standards are up for renewal because the science has changed or there's some other reason to do that. So in this case we found that we need to -- the science that -- you know, the science behind the adopted sulfate standard was not reflective of what the standard stands for. In other words, the standard is for the aquatic life use, and we found out that it's for livestock and we intended to update that standard. Thank you.

HEARING OFFICER TIPSORD: Anything further? Okay. Identify yourself for --

MR. GONET: I'm Phil Gonet of the Illinois Coal Association. Are these questions available to us here?

HEARING OFFICER TIPSORD: They were available on-line. Did you bring any additional copies?

MS. COLLINS: I didn't. I apologize.

MR. SOFAT: We can make copies.

HEARING OFFICER TIPSORD: We can get copies if you give us just a second. We'll go off the record for just a second and we'll see if we can't get some copies before we go on, okay?

(Brief recess taken.)

HEARING OFFICER TIPSORD: All right. We'll

go to question number 2.

MS. COLLINS: Are other water quality standard proposals planned by the Agency that it is anticipated will be filed within three years?

MR. FREVERT: I'll answer that one. Yes, there are. Several things are underway. Certainly we're wrapping up a file review of secondary contact use classification for streams in northeastern Illinois. I'm very confident that will go to rulemaking before the Board within three years. In addition to that, we're working with a number of outside people to investigate redesign of the entire aquatic life use classification system. I don't know the exact timing of that, but that's an important standard upgrade that we're pursuing as rapidly as we can. Of course there's a dissolved oxygen standard currently before the Board. USEPA is in the process of revisiting and reissuing bacterial criteria sometime upon receipt of that new federal guidance on how to deal with such bacteria. I suspect that will trigger a ruling. And then from time to time critical issues pop up that need immediate attention, so there's almost always a stream of some kind on the standard modification.

HEARING OFFICER TIPSORD: Anything else?

Question number 3?

MS. COLLINS: It is stated on -- at page 8 of the statement of reasons that the current total dissolved solids standard is unnecessary for the protection of aquatic life. What forms of TDS have been found to be present in Illinois waters?

MR. MOSHER: Total dissolved solids is the sum of the concentration of all dissolved substances found in water. For most Illinois waters, TDS is dominated by substances comprising water hardness. The main constituents of hardness are calcium, magnesium, carbonate and bicarbonate. For other waters receiving significant human-induced inputs, sodium, sulfate and chloride can become major components of TDS. Less significant components of TDS include potassium, nitrate and barium.

MS. COLLINS: Thank you.

HEARING OFFICER TIPSORD: Go ahead. Question number 4.

MS. COLLINS: Are all forms of TDS that have been found to be present in Illinois waters covered by a specific numeric standard for the constituent chemicals?

MR. MOSHER: No. Of the most common substances that make up TDS, only sulfate, chloride,

barium and for some waters nitrate are covered by water quality standards. These constituents have potential to be present in harmful concentrations. Based on Illinois EPA's experience reviewing ambient and effluent water quality data, the remaining major constituents have not been found in harmful concentrations.

MS. COLLINS: If it's all right, I have two follow-up pieces to this.

HEARING OFFICER TIPSORD: Absolutely. Go ahead.

MS. COLLINS: One is some of the constituents without numeric standards that we're concerned about are aluminum, magnesium, sodium, calcium, potassium; calcium particularly because it significantly increases the toxicity of sulfate, we're told by Dr. Soucek. Can the Agency respond to the concern that calcium might be -- removing the TDS standard could result in problems with calcium?

MR. MOSHER: Yeah. I mean, what you said about calcium significantly increasing the toxicity of sulfate is a debatable statement, I think, because really, sodium, calcium, magnesium paired with sulfate are really not toxic. I mean, they're all of a very low level, and then that toxicity increases as you go to

potassium and other metals. Copper sulfate, you know, would be much, much more toxic, not because of the sulfate but because of that metal. So I don't know that Dr. Soucek -- you know, I'd be interested to see where that's quoted, number one. Number two, all of the investigations Dr. Soucek did were coupled with hardness of the water. Calcium is the main constituent along with magnesium, and so he did all his experiments with various concentrations -- increasing concentrations of calcium and magnesium and found that for the range of hardness in Illinois that we normally would see, the calcium and magnesium only makes sulfate less toxic.

So, yeah, true, we don't have standards for calcium, magnesium, the other things that you mentioned, but the question, I think, is do we ever need them, and you could concoct some solution of some of these things at some extremely high concentration, and, yes, everything in the world is toxic at some high concentration, but the things that we don't have water quality standards for, these very common things, what we're saying is we never expect to see those concentrations. If for some odd reason some discharger would approach us -- there's no existing discharger I know like that, but if some discharger were to come and

say, we want to build a new plant and discharge a high concentration of potassium or extremely high concentrations of calcium, we would then evaluate that based on the other things at our disposal, such as the antidegradation regulation, such as whole effluent toxicity regulations, such as the regulations that require the best degree of treatment to be provided. We would question why there had to be such high concentrations to begin with in an effluent. So that all -- the bottom line answer there is there are these substances that we just don't believe it's worthwhile to have water quality standards for because we just don't ever think we'll see them.

MS. COLLINS: Okay. That leads into the second follow-up I had to this question, which is we're particularly concerned with discharges from cooling towers and scrubbers and wonder if the Agency can tell us a little more about what components of TDS are in those discharges and at what levels and whether the Agency might need to require whole effluent toxicity testing or special measures to assure that those discharges are okay given the removal of the TDS standard.

MR. MOSHER: Well, we deal with two major kinds of scrubbers. One type of system is used by oil

refineries and other industrial air scrubbers that remove sulfur from emissions through the use of soda ash. The by-product of that, the waste product, so to speak, is sodium sulfate, and of course that's exactly the chemical that was used in the testing, so we're very confident that the oil refineries in the state that are now either already switched over to that system of reduced sulfur emissions in the air or are getting there or will be doing that in the next few years, that the effluent that is very high in TDS is almost entirely composed of sodium sulfate, and we have a good handle on that through our research for this proceeding.

The more -- The older type of air scrubbing for sulfur, coal-fired power plant type system, uses limestone to capture the sulfate -- or the sulfur out of the air, and you end up with gypsum, calcium sulfate and of course some magnesium sulfate. Those substances aren't very soluble and you end up with a precipitate. The gypsum is at the bottom of the settling pond or in a dry system. As it comes out, it can be reused for gypsum wallboard or other products. You know, there's a use for that substance. So we don't see that as being a dissolved solids type issue.

There's a -- You mentioned not only air scrubbers

but cooling towers, and there are an awful lot of cooling towers out there for all kinds of different industries, and what's going on in cooling towers is evaporation, and they start out with a source water, whether that's city water or well water or surface water, and they evaporate that sometimes up to six cycles of concentration and then they want to discharge that to a surface water, and we're mindful in those cases when we permit those facilities that we have to look at that source water. If the source water is of a quality that can be concentrated up to six times and discharged into the waters of the state and still meet water quality standards, then that's an acceptable thing and we permit that. Where that is not the case -- and we do have issues arise like that -- when those facilities are permitted or before they're permitted, we have to look for alternatives. We have to ensure that whatever comes out of that cooling tower is going to be acceptable, and that's a major part of what we do on a day-to-day basis through the antidegradation program on facilities that aren't built yet and then looking through our whole effluent toxicity program on facilities that already exist. So we're mindful of the things that you ask in your question and it's a significant part of what we do on a daily basis.

MS. COLLINS: Thank you.

HEARING OFFICER TIPSORD: Go ahead. Question number 5.

MS. COLLINS: And now I'll be sticking to the list.

HEARING OFFICER TIPSORD: That's quite all right.

MS. COLLINS: At page 10 of the statement of reasons, it is stated that the proposed aquatic-based sulfate standards are concentrations not to be exceeded at any time. What does it mean that a standard is not to be exceeded at any time?

MR. MOSHER: Many water quality standards, including those listed in 35 IAC 302.208(g), are not to be exceeded in waters at any time. This means that any sample of water tested must meet the standard with no averaging allowed.

MS. COLLINS: And then on to question 6, what as a practical matter occurs if a sample is taken showing that the standard has been exceeded?

MR. MOSHER: A sample that exceeds the concentration of a given substance specified in the water quality standard would be considered in violation of the water quality standard. For example, the acute standards

of 35 IAC 302.208(e) and the standards of 302.208(g) are violated in any sample concentration -- or I'm sorry -- if any sample concentration exceeds the standard value.

MS. COLLINS: At page -- Question 7, at page 10 of the statement of reasons it is stated that studies suggest that extended exposures to drinking waters high in sulfate may lead to weight loss, disease and death of livestock. To address this potential problem, the Agency proposes a 2,000 milligrams per liter standard for water to be used for livestock watering. Why is a standard of 2,000 milligrams per liter thought by the Agency to be protective of livestock?

MR. KOCH: The chronic sulfate standard of 2,000 milligrams per liter was chosen upon review of the literature as well as consultation with an expert in this field. In regards to sulfate, cattle are believed to be the most sensitive of Illinois livestock due to their complex digestive systems. Recent studies have suggested that chronic exposure to drinking water with sulfate concentrations between 2,360 and 3,000 milligrams per liter may adversely affect cattle. A chronic standard of 2,000 milligrams per liter was chosen to allow for a margin of safety from the lowest observable adverse effect concentration. A water margin of safety is not

needed for protection of untested animals since cattle are believed to be most sensitive. The Agency contacted an expert in Illinois livestock operations for an opinion on the proposed standard. Dr. Gavin Meerdink, a now-retired professor for University of Illinois at Champaign-Urbana, has personally dealt with sulfate issues at livestock operations throughout the state for several years and supports implementation of a 2,000 milligram per liter chronic sulfate standard.

MS. COLLINS: And question 8 you've really answered already, unless you want to elaborate.

MR. RAO: May I ask a follow-up question to the previous one? Mr. Koch, in your testimony you refer to Dr. Meerdink's endorsement of the standard proposed for livestock. Did Dr. Meerdink submit any written recommendations regarding the sulfate standards or is that --

MR. KOCH: No, he never submitted a written recommendation as far as what concentration it should be. We contacted him -- Bob Mosher and I contacted him and we spoke to him about the issue we're having and explained to him what the standards are and what they served to protect, and we told him that we were looking at the literature and it seemed that 2,000 would be an

appropriate standard, and he agreed with that. He says that in his experience, cattle that are subjected to 2,000 milligrams per liter, they typically will -- they'll have diarrhea initially but after a few weeks they'll get over it. He said typically that occurs only in unacclimated cattle. For example, when you move new cattle to a different source of water, you know, from basically low sulfate to high sulfate, they'll have those bouts of diarrhea but they'll get over that. He says they won't have any adverse effects.

MR. RAO: Thank you.

HEARING OFFICER TIPSORD: I actually have a follow-up. Dr. Meerdink was at U of I for a number of years?

MR. KOCH: Uh-huh.

HEARING OFFICER TIPSORD: How did and why did you choose to contact him? Was there some literature he had provided that led you to him?

MR. MOSHER: No. This must be four years ago when we were at the early stages of putting this together. We recognized that -- well, we could read in the Board opinion in 1972 that sulfate was thought to be an agricultural issue because of the livestock drinking water, and so I called up U of I Department of Veterinary

Science and I said to the receptionist, "Do you have someone who is involved in these types of issues?" I explained it to her and she said, "Oh, yeah, Dr. Meerdink," and at that time he was still a professor. He's since retired. But that's how I got a hold of him, and we've had many conversations with him since.

HEARING OFFICER TIPSORD: Thank you. Miss Collins, question 8 is answered, did you say?

MS. COLLINS: I think, unless you have any more specifics you want to provide.

MR. KOCH: No, I'll just state our answer. The Agency is only aware of the studies that have been referenced within the filed rulemaking.

HEARING OFFICER TIPSORD: Question number 9.

MS. COLLINS: Is a standard necessary to protect wildlife from exposure to drinking water that is high in sulfate?

MR. KOCH: The Agency did not find any published studies on the effects of sulfate on wild animals. Nonetheless, it is known that sulfate is an issue to ruminant animals more so than non-ruminants. This is due to the presence of microbes within the ruminants and their ability to convert sulfur into sulfides. Deer are the only wild ruminant in the state

that may exhibit sensitivity to sulfate similar to that of cattle. However, wild deer have the ability to relocate and drink from different watering sources, whereas cattle are subject to the same watering source. It is therefore believed that cattle in livestock operations are the organisms most susceptible to sulfate in Illinois.

HEARING OFFICER TIPSORD: Go ahead.

MS. COLLINS: Question 10, at page 11 of the statement of reasons mine discharges are discussed, and it is indicated that the Agency intends to limit discharges -- I think he means from mines to times and places where a significant amount of water from the unmined portion of the watershed also enters the stream during the discharge, thus providing the necessary dilution to ensure compliance with applicable standards. How does the Agency limit discharges from the mines so as to do this?

MR. MOSHER: Permit limits for substances discharged at mines may be adjusted for allowed mixing that is based on the amount of dilution water present when the mine discharge occurs. Mine or other types of discharges that are caused by storm events lend themselves to this type of mixing allowance, although

discharges demonstrated to be controllable such that the effluent will only be released when dilution exists may also be considered for mixing. Limits may be calculated based on the flow of water predicted to be present in the receiving stream from the contribution of the watershed outside of the permitted mine area. This compared with the discharge from the mine through the NPDES permitted outfall will yield a dilution factor. The background receiving stream concentration of the parameter for which mixing is granted must also be known in order for the permit limit to be calculated. In these instances, a prohibition on dry weather discharge is included in the permit. Alternatively, the receiving stream can be gauged and the permit would contain a condition that allows a discharge only when a given amount of flow is present in the receiving stream. Permit limits are set based on the upstream flow measured with prohibitions placed on effluent flow when a certain dilution ratio is not achieved. The guiding principle is that discharge from the mine or other regulated facility must not cause water quality standards in the receiving stream to exceed -- to be exceeded.

HEARING OFFICER TIPSORD: Go ahead.

MS. COLLINS: Thank you. Question 11, are

mines limited to discharges during precipitation events? If so, how are such events defined and how does the Agency measure the amount of dilution that will be available following such events?

MR. MOSHER: Some mines discharge during dry weather conditions. At these mines, permit limits will either be set at water quality standards with no mixing allowed or will recognize dilution that is present at the time of discharge pursuant to the mixing zone regulations at 35 IAC 302.102. Mines that are granted mixing for wet weather discharges only will have permit limits based on the dilation ratio present during those events. Often a proportional flow relationship between the mine outfall and the receiving stream can be calculated based on the watershed area of the mine basin and the unaffected watershed of the receiving stream; in other words, a wet weather dilution model. Alternatively, the receiving stream and effluent outfall can be gauged and the permit written to allow a given amount of mine discharge only when a given amount of receiving stream flow is present. Permit limits are based on the dilution ratio and whatever amount of zone of passage that is dictated by the mixing zone regulations applicable to the site. If mixing is granted through use of a wet weather dilution

model, the permit will specify that no discharge may occur during dry weather unless all water quality standards are met in the effluent.

MR. RAO: Can I ask a follow-up question? Mr. Mosher, on page 5 of your prefiled testimony -- I know it's not numbered, but I think it occurs on page 5 -- you state that Illinois EPA has granted wet weather discharges allowed mixing zones for sulfate and sometimes chloride with consideration to upstream flows in the past few years. Can you be a little bit more specific and tell us, you know, what was the receiving stream and what particular source received this permit?

MR. MOSHER: Well, I can't name the names right now. We could --

MR. RAO: If you can --

MR. MOSHER: -- go and look into that.

MR. SOFAT: Can we just give an example?

MR. RAO: Yeah, that would be helpful. That way, if we want to see how the Agency permitted these discharges, you know, it would be an example to see how it's done.

MR. SOFAT: Okay. We can do that.

MR. MOSHER: Yeah. There's been an interim period that we've undergone in permitting coal mine

discharges for the last couple years. USEPA has said that they consider parts of Subtitle D to be illegal and that they refuse to okay permits that are put together with that, so we have looked at mixing in the receiving stream as an alternative to the sulfate and chloride provisions of Subtitle D, so our permitting process the past couple years has been a blend of those regulations, which we hope to rectify and consolidate here with this proposal.

MR. RAO: Okay. Thank you.

HEARING OFFICER TIPSORD: Question number 12.

MS. COLLINS: How is the flow in the receiving water monitored so as to assure that necessary dilution is present?

MR. MOSHER: Well, we consulted our manager of mine permits on that one. He has put conditions in NPDES permits for coal mines that require the discharge and/or the receiving stream to be capable of measuring the flows. There isn't any specific way that he requires that. There's -- would be a number of ways you could engineer the discharge to be adjustable or hold back water. The stream gauging of course is pretty standardized on a receiving stream.

MS. COLLINS: Just to follow up for clarification, is it now or is it envisioned in the future that receiving water gauging would always be required for these kind of permits?

MR. MOSHER: Not always. That type of thing I think would be -- it is complicated to not only build that at the mine but also to permit it and to monitor compliance from the Agency's aspect, and we would reserve that level of effort for situations that don't lend themselves to this concept I referred to as a wet weather model; the wet weather model being if the only inputs to a discharge, a mine discharge or whatever kind of discharge, are from wet weather runoff -- in other words, there aren't any other effluents going into these ponds or whatever that could occur during dry weather, it's simply rainwater -- then this model comparing the acreage of the unaffected watershed versus the acreage of the mine basin is a valid way of determining what the dilution ratio is, we believe.

HEARING OFFICER TIPSORD: Go ahead.

MS. COLLINS: 13, how is the amount of the discharge measured and controlled?

MR. MOSHER: Again, as our mine permit manager interpreted that question, it was just -- the how

is left up to the permittee, how they want to build structures or gauges or however to measure effluents in receiving streams.

MS. COLLINS: But again, it's not necessarily the case that every -- each of these discharges is required to have the quantity of discharge monitored?

MR. MOSHER: I believe in the mine program that those quantities are often estimated from, again, the area of acreage of basin. There's other reasons than this to want to know how much effluent is being discharged besides just this dilution ratio concept, so that -- those requirements have been there for quite a while. Again, when we encounter situations -- and every permit is unique -- we look and see what's going into the mine discharge, what is the composition of that mine effluent. If it's towards the more simple case of it's just runoff, then taking that dilution ratio based on acreage to acreage, upstream watershed to mine basin acreage, is what we will use and we have been using, and it's only when it -- when things get complicated that we have to look further than that.

MR. RAO: I had a related question. Mr. Mosher, on page 7 of your testimony you state that

the force present in stormwater-driven effluents will be sufficient to cause near instant mixing. Are stormwater-driven effluents like discharge from mines? Are they discharged at a much higher rate than an effluent from POTW or are these discharges controlled in some way?

MR. MOSHER: Well, stormwater at mines or anywhere else involves a treatment pond, and those treatment ponds are perched and the water exiting the pond has got some head behind it, goes through the pipe and enters the receiving stream. Those are forceful discharges, more so than other types. It -- well, a sewage treatment plant could be situated the same way, where there would be head and there would be force behind the discharge, or not, but these sedimentation pond effluents are always like that. They are always located above that receiving stream up in the mined area. There's a little distance involved. There's a drop in elevation. And what we intend with our -- my statement there is that that type of forceful effluent coming out of a discharge pipe meets up with stormwater runoff in the stream itself, in the bed of the stream, and the two are mixing in a very confined area, so unlike our conventional mixing where you have a larger stream -- the

larger the stream, the more true this is going to be -- larger streams, that mixing tends to be less forceful, tends to not diffuse as quickly, tends to remain segregated, and the mixing is a much lower energy type situation than the stormwater.

MR. RAO: Thank you.

HEARING OFFICER TIPSORD: Go ahead. Question 14.

MS. COLLINS: Regarding the proposed change to 35 Illinois Administrative Code 302.102(6), what is the justification for not requiring a zone of passage for those streams that have a zero flow an average of nine out of ten years?

MR. MOSHER: The concept of a zone of passage existing in very small streams is not supported by the realities of physical mixing. The momentum of effluents entering streams that are only up to five or six feet in width is such that the effluent will mix almost instantly with the entire stream flow. No zone of passage unimpacted by the effluent exists. When allocating mixing to effluents that discharge to very small streams, it is not realistic to calculate limits based on a zone of passage that doesn't exist. Streams that do not have flow for a minimum of seven consecutive

days each year for an average of nine out of ten years are termed 7Q1.1 zero flow streams. These are headwater streams that fit any definition of small. Aquatic life habitat in these streams is limited due to the intermittent flow. The lack of a zone of passage will not adversely impact aquatic life because aquatic life is limited to begin with, and the near instant mixing attained between an effluent and a very small stream means that water quality standards will be met within a few feet of the end of pipe.

MR. RAO: Mr. Mosher, if that's the case that -- if there's near instant mixing and meet the standards within a couple of feet from the pipe, is there a need for a mixing zone?

MR. MOSHER: Yes, there still is the need. The effluent itself will be given permit limits for sulfate or chloride in the case of coal mines or a few other things for other discharges. Those limits will be higher than the water quality standard. Whenever we grant an NPDES permit with effluent limits higher than the water quality standard, there has to be the concept of mixing recognized and there -- you know, the rules have to, you know, account for that.

HEARING OFFICER TIPSORD: Question number

15.

MS. COLLINS: Regarding the proposed change to 35 Illinois Administrative Code 302.102(8), currently discharges to waters with a 7Q10 flow of zero must meet water quality standards at the point of discharge or end of pipe. What is the justification for eliminating this limitation on dilution?

MR. MOSHER: Many existing coal mines as well as other types of discharges discharge to zero 7Q10 flow streams only during periods when a substantial dilution ratio exists between the receiving water and the effluent. Many discharges are the result of stormwater runoff and only flow during wet weather events when the stream is also experiencing flow. Some facilities may produce effluent only seasonally or only in small quantities that can be stored on site. These effluents can be controlled to discharge only when dilution exists in the stream to allow water quality standards to be met given the provisions of the mixing zone regulations. The proposed change to 35 IAC 302.102(b), paragraph 8, aligns the regulations with the existing definition of dilution ratio in Part 301. Section 301.207 says, quote, "Dilution ratio means the ratio of the seven-day once in ten year low flow of the receiving stream or the lowest

flow of the receiving stream when effluent discharge is expected to occur, whichever is greater, to the average flow of the treatment works for the design year," unquote. Modification of paragraph 8 allows effluents to receive mixing using the lowest stream flow present when effluent discharge exists.

HEARING OFFICER TIPSORD: Question number 16?

MS. COLLINS: If this proposal is adopted, how does the Agency intend to write permits for dischargers that may discharge during dry weather conditions?

MR. MOSHER: If dry weather in this question means a discharge that would be expected to occur any day of the year, permits for these facilities will be written such that no mixing is granted unless flow exists in the receiving stream at 7Q10 conditions, whereupon a mixing zone may be available.

HEARING OFFICER TIPSORD: Question --

MS. COLLINS: And 17, is it intended by the Agency if this proposal is adopted to require permit limits that require meeting water quality standards at the end of pipe for dischargers that may have dry weather discharges to waters with a 7Q10 flow of zero? If so,

what would be the Agency's regulatory basis for such limits?

MR. MOSHER: If a discharger has no ability to control when the discharge may occur and that discharge is to a 7Q10 zero flow stream, then no mixing zone may be allowed and the permit limits will require the effluent to meet water quality standards at end of pipe.

MS. COLLINS: 18, will the proposed changes to the mixing zone rules of 35 Illinois Administrative Code 302.102 have any effect as to dischargers that may discharge during low stream flow conditions?

MR. MOSHER: Discharges that will occur during low stream flows will be allowed mixing only when dilution to meet water quality standards is available. Otherwise permit limits will be set at the water quality standard at the end of pipe.

HEARING OFFICER TIPSORD: Question 19.

MS. COLLINS: 19, currently, in writing permits under 302.102(8), what is the Agency's practice in writing permits where the dilution is less than 3.1 -- sorry -- 3 to 1 during low flow conditions but greater than zero?

MR. MOSHER: Illinois EPA acknowledges that

the existing mixing zone regulations are silent on the percent of stream water to be used for mixing when dilution ratio is less than 3 to 1. We evaluate mixing on a case-by-case basis in these circumstances. We've had conversations recently, Glynnis, of exactly how that has gone through our permits issuance process. In my 21 years of doing this, that was one of the first things I looked at in regulations and said, well, what do I do now, and in practice at the Agency, we looked back through the files to a time before I or other people worked there and said, well, what did our predecessors do? Our predecessors gave more often than not 50 percent as the level. We try to be consistent in doing that, but we recognize that, again, those regulations don't specify. There can be cases where our agency would choose to not use 50 percent. We would look at, again, case by case, what are the factors present and what makes the most sense as to what to allow.

MS. COLLINS: 20, please provide an example of the calculation of a sulfate water quality standard under proposed Illinois -- 35 Illinois Administrative Code 302.208(h) using values for hardness and chloride that are typical of Illinois streams.

MR. KOCH: Typical concentrations of

hardness and chloride throughout Illinois streams are 250 and 25 milligrams per liter respectively. By incorporating these values into the aquatic life equation in 302.208(h)(2)(A), the sulfate concentration not to be exceeded will be 1,701 milligrams per liter. At this calculated acute concentration, the chronic livestock standard of 2,000 milligrams per liter is not pertinent. It should be noted that the 1,701 milligrams per liter is an estimate based on hardness and chloride concentrations throughout the state. Due to higher water hardness in northern areas, streams in northern Illinois will likely have sulfate standards close to 2,000 milligrams per liter while southern streams would have sulfate standards closer to 1,500 milligrams per liter. Please refer to Exhibit V of the Agency-filed rulemaking for calculations of acute sulfate standards at various concentrations of hardness and chloride.

MS. COLLINS: Thank you.

HEARING OFFICER TIPSORD: Question 21.

MS. COLLINS: 21, it appears that under proposed 35 Illinois Administrative Code 302.208(h)(3)(B) that the sulfate standard will be 2,000 milligrams per liter in all cases when the chloride concentration is greater than 500 milligrams per liter. Is this correct?

MR. KOCH: No, this is not correct. I think it was just a misprint. What you meant to say is hardness -- when the hardness is greater than 500 milligrams per liter.

MS. COLLINS: Okay. Thank you.

MR. KOCH: But to answer it correctly, if the chloride concentration is greater than 500 milligrams per liter, then the chloride standard of 500 milligrams per liter will be violated. Pursuant to 302.208(h)(3)(B), if the hardness concentration is greater than 500 milligrams per liter and the chloride concentration is 5 milligrams per liter or greater, the sulfate standard is 2,000 milligrams per liter. That hardness concentration of above 500 milligrams per liter, a standard of 2,000 milligrams per liter was selected because limited test data suggests that toxicity begins to increase at these higher concentrations. Currently there is no data that suggests a standard of lower than 2,000 milligrams per liter is necessary at hardness concentrations greater than 500 milligrams per liter. More testing would be needed to calculate an equation for the rare occasions that hardness is significantly higher than 500 milligrams per liter.

MS. COLLINS: Thank you.

HEARING OFFICER TIPSORD: Question 22.

MS. COLLINS: Finally, what is or was the purpose of Part 407, which the Agency proposes to repeal?

MR. MOSHER: Well, we have it from our mine permits manager that that section is no longer pertinent to the current realities of permitting mines. Quite a while ago there was a different permitting system in place, and the section that is proposed to be deleted out of Part 407 -- or I think it's the entire section we intend to delete -- was there only to convert those old-style permits into NPDES permits, and once that was completed, once all the five-year cycle of renewing mine permits ran its course, then that Part 407 was -- is no longer necessary. They're all currently permitted under the NPDES permit system. We don't need that anymore, so it's kind of a housekeeping thing.

MS. COLLINS: Well, thank you very much.

MR. SOFAT: Thank you.

HEARING OFFICER TIPSORD: Are there any other questions for the Agency? Let's go off the record for just a second.

(Discussion held off the record.)

MS. HIRNER: My name's Deirdre Hirner, and I'm the executive director of the Illinois Environmental

Regulatory Group, and I have just a couple of quick questions. On page 13 of the statement of reasons, Section 4 entitled "Technical Feasibility and Economic Justification," last paragraph says, "This is a significant cost savings for those entities as well as to the Board and Agency, which together as representatives of state government must hear and respond to these petitions." Then on the last page of Bob Mosher's testimony, second -- there's no page number, I'm sorry, but it's the second to the last sentence -- it says, "And will cause no unnecessary burden on economic activity." My question is, what serves as the basis for these statements? Has the Agency prepared a detailed economic analysis of the impact on the mining industry similar in nature to the science-based testimony provided or similar to that stated regarding impact on the livestock industry?

MR. MOSHER: Well -- excuse me one minute. Well, there's no formal economic impact, to answer part of your question. We do note that over the years there's been many adjusted standards, site-specific rulemakings before the Board dealing with sulfate and total dissolved solids that all of the existing ones that now exist would be unnecessary under the proposal, and we interpret that

to mean that that would preclude the need for future adjusted standards or site-specific regulations from these types of industries, not only coal mines but several other types of industries. We've heard -- As our permitting issues have unfolded with USEPA and coal mine permits, we've heard from the coal mines that of course the Subpart D exemptions to sulfate and chloride standards were necessary for the functioning of coal mines. We hear that. We believe that in most cases -- of course we haven't looked at all cases of coal mines yet, the existing ones, and of course we don't know what the future will hold for different mines in different locations, but we believe that many and probably most of those mines will suffer no economic hardship because of our rules, and in fact, our rules taking the place of the Subtitle D, sulfate and chloride, provide a way for mines to continue to exist. So, no, we don't have the dollars and cents added up, but we are very aware of the -- you know, the conditions across the state and how the existing standards certainly cause economic impact. Our proposal certainly reduces that by a lot.

MS. HIRNER: So in similar fashion, as a follow-up, on page 13 where it says, "The Agency anticipates that the proposal would require a small

number of existing mines to employ additional controls to meet water quality based permit limits," so the -- so we -- would I carry your answer over to answer my question of has the Agency prepared an economic analysis relative to the cost of these additional controls?

MR. MOSHER: No, we don't have -- again, we don't have the dollars and cents. What we do have is an ongoing program with a professor from Southern Illinois University Carbondale in the mine program there to identify ways in which noncompliant mines or new mines can be designed such that they will be compliant. Those are management rather than treatment things that mines can do, and we're hopeful that that will be very useful and will minimize the cost to mines that are not currently compliant with these proposed standards.

MS. HIRNER: So these standards will apply only to currently operating or future -- or mines opened in the future?

MR. MOSHER: Well, yes. Since they're general use standards, they apply to all waters of the state except for a very select few waters in the north part of the state, but, yeah, I mean, everyone must comply with these water quality standards.

MS. HIRNER: Thank you. That's all.

BOARD MEMBER JOHNSON: Just a follow-up. You and I have recently been involved in a site-specific rule with respect to ExxonMobil's plant in Joliet, and I guess whether there's a detailed economic analysis on paper, that site-specific rule that we promulgated in that instance was -- expended Board resources and expended Agency resources and certainly expended the proponent's resources as well. That rulemaking would not have been necessary if this proposed rule is adopted; is that correct?

MR. MOSHER: For the most part. Now, there is a -- the unique thing about ExxonMobil was that it initially discharged into secondary contact and indigenous aquatic life water with a set of standards and then the water flows under a bridge and it becomes a general use water. We're changing general use, not secondary contact, so ExxonMobil would still have a bit of an issue and would have still had to come in for relief. However, as Toby Frevert mentioned, our future plans are to change the water quality standards for the secondary contact waters, do away with that category altogether. We anticipate that the same standards we're proposing today for TD -- well, no standard for TDS and the new sulfate standard will be proposed also for the

new designation of the lower Des Plaines River and the Chicago waterways, so eventually there would be no need at all for ExxonMobil to come in for relief.

BOARD MEMBER JOHNSON: Thanks.

MR. RAO: I had a follow-up question too. On page 6 of your testimony you had mentioned that under a strict interpretation of the existing mixing standards, a large segment of the current discharges mainly from mines would be affected by the current rules. Can you tell us how many, you know, mine discharge permits are -- currently exist in the state that are affected by these rules?

MR. MOSHER: Well, the number we can come up with later for you. Just about every coal mine will have some sulfate or chloride above the existing water quality standards, so they will either need a mixing zone or they won't be able to meet those existing standards. Just about every one. Sulfate is just, you know, part of the geology around coal and there's no getting away from it.

MR. RAO: Yeah. I just wanted to know the number of mines.

MR. MOSHER: Right. But we'll get you the number of mines. All -- Just about all mines -- and I'll ask our mine permit manager if he knows of any coal mines

that are not -- you know, would meet 500 sulfate or 500 chloride with no mixing. I'll ask him that question also.

MR. RAO: Thank you.

MR. HUFF: I'm James Huff, H-U-F-F, and I'm here today on behalf of ExxonMobil, Joliet refinery, as well as Citgo, Lemont refinery. I did have two follow-up questions. One is, Mr. Mosher, you just indicated that you anticipate that the changes in the secondary contact will be similar or the same numbers as on the primary contact for sulfate and TDS. What -- Has the Agency considered changing the secondary contact now simultaneously for TDS and sulfate, and what was the thought process for not doing that?

MR. MOSHER: I don't know if Toby heard that whole question, but that -- he's of course the manager and has been very active in the works rulemaking, not a proposed rulemaking, for Chicago waterways and the lower Des Plaines River, and he can correct me if he wants to, but it was his desire that the upcoming rulemaking for the secondary contact waters was to be distinct and that we would not try to change any standards in those waters now; we would just wait and do it all at one time. So did that answer your question?

MR. HUFF: Yes. And the second question, would you expect that the hardness and chlorides in the Chicago Sanitary Ship Canal are similar to those that are found in the lower Des Plaines River?

MR. MOSHER: Well, given that there's a boundary line at the I-55 bridge where that water body goes from one use category to the other, you know, there's no difference in the water quality really as it goes from the north side of the bridge to the south side.

MR. HUFF: Well, that's all the lower Des Plaines there.

MR. MOSHER: Okay.

MR. HUFF: And the Chicago Sanitary Ship Canal, if you go upstream by Lemont, in that area.

MR. FREVERT: The majority of the flow in the lower Des Plaines River is from the ship canal and it's not from the Des Plaines River, so I would assume that basically water chemistry like chloride is going to be dominated in the lower Des Plaines more so by what's coming out of the Chicago waterway than what's coming down the Des Plaines River. Nevertheless, they both are subject to fairly significant de-icing operations and chloride is elevated in the winter.

MR. HUFF: So the answer is yes, you'd

expect the chloride and the hardness to be similar between those two water bodies.

MR. FREVERT: I suspect they were. One of our guys has looked at that, but I don't remember off the top of my head. Probably similar.

MR. HUFF: Thank you.

HEARING OFFICER TIPSORD: Are there any other questions?

MS. SKRUKRUD: I just had a couple of questions for Bob Mosher, just some clarification questions. My name is Cindy Skrukrud, S-K-R-U-K-R-U-D. I'm with the Sierra Club. Bob, on page 5, at the top of page 5 there's a -- you have a statement that it's not uncommon for discharges from coal mining operations as well as other activities to exceed these water quality standards. I wondered if you could elaborate on what other activities.

MR. MOSHER: Okay. Oil refineries certainly, that's exasperated in recent years because of the air pollution requirements. There are specific industries that have as by-products or waste products sulfates. We mentioned the fact that simple cooling water gets concentrated. There's groundwater in the state that people use for different reasons, drink, water

livestock. Coming up out of the ground doesn't mean 1,000 TDS. You know, that's just a fact of life. But really, on the -- in the industrial sector, there are just lots of different processes that result in sulfates or high TDS, and I would say in most of those cases that high TDS is because of sulfate much more so than anything else.

MS. SKRUKRUD: Thanks. Then at the bottom of page 7, here you're talking about continuously discharging effluents and then you gave the examples of sewage treatment plants, power plants and most industrial discharges. Then the next sentence says, "However, some facilities outside these general categories produce effluent only periodically," and I just wondered if you could give some examples there.

MR. MOSHER: Well, the sentence probably should have been, looking at it again, that both outside and within those categories. Let me give you a couple examples within the categories. Sewage treatment plants, there are some facilities like camps or state parks, shower units, that are only used seasonally and are very small and use lagoons as treatment, and those lagoons can be manipulated to store effluent for the entire year and only discharge whenever the operator sees fit or whenever

his permit would say that he has -- that he should discharge, so that qualifies my statement. There are some industrial discharges that could behave the same way. If we consider, like, a cannery, a vegetable cannery, to be an industrial discharge, which I guess it is, then they may only run that cannery for two weeks when the crop comes in.

Facilities outside that are things that you really don't think of as being an industry, and I have an example. Natural gas is stored underground during the warm months so that it can be withdrawn and used during the cold months. Geologic formations are -- in some places are such that they can do that, and when they bring that -- the gas back up out of the ground, it might have water that has to be removed before it can be -- the gas can be used, and that water can have some chlorides or sulfates or other TDS that they picked up underground, very small quantities of water, water that could be stored by the facility for an entire year waiting for that receiving stream to have some, you know, high flows from storm events, and then that water could be discharged in maybe a matter of days and easily be diluted. The water quality standard easily could be met even though it's a 7Q10 zero flow stream. So that's an

example of that kind of controlled discharge.

MS. SKRUKRUD: Okay. Thank you.

HEARING OFFICER TIPSORD: Mr. Rao?

MR. RAO: Yeah, I have a few. Mr. Mosher, on page 6 of your testimony you state that you developed this concept of 7Q1.1 flow streams with the help of Illinois State Water Survey, and are you aware if Illinois State Water Survey has identified a map of these 7Q1.1 streams?

MR. MOSHER: Well, they're willing and waiting to do that. We are in touch with Mr. Vernon Knapp at the Water Survey. He has done the 7Q10 maps that we've been using, the harmonic flow -- harmonic mean flow maps that we've been doing and are part of the regulation, and we are waiting to give him the go-ahead to develop either maps or equations that would identify what streams are 7Q1.1 zero flow streams. That's going to be a grant that he will need. He'll need some money to do that work, and it probably wasn't prudent to have him do that before we even had this hearing, because when we are waiting for someone to say that concept isn't good, we don't like that, it shouldn't be part of board regulations. We're at the stage now where Mr. Knapp can -- we can make a phone call and he can begin that

process, if we find the money, right? But -- So it's just a matter of what comes first. You know, we want to hear if there's any comments about this concept before we go through that exercise and spend that money.

MR. RAO: Okay. I just want to get an idea as to how many stream segments or streams that are in the --

MR. MOSHER: Well, yeah. I've talked to Mr. Knapp and he's aware that we're going to have another hearing in April, and he's agreed that if we enter into this contract with him that he would be able to come and provide some expert testimony as to what his vision or what his initial results at least would say to that watershed size.

MR. RAO: Yeah, that will be helpful if you can swing it.

MR. FREVERT: I'll just supplement that. As a general rule of thumb from my experience here in central Illinois anyway, any stream that has less than maybe 20 square miles of drainage area probably does go dry annually. Not every year, but in a normal year, so -- and obviously there's going to be some variation, but I wouldn't expect a great deal of variation from one location to another. And there -- you know, there's

literally thousands and thousands of miles of drainage ways that have just a few square miles of drainage ways.

MR. RAO: Thank you. I had a question for Mr. Koch. Mr. Koch, Attachment 1 to the statement of reasons discusses the derivation of equations, and the statement of reasons at page 10 explains that Dr. Soucek developed the equations for sulfate standards, and when we are looking at Exhibits P, Q, R, S, T and U, which are authored by Dr. Soucek, we didn't find any of those final equations in his documents. Just curious as to whether Attachment 1 was also prepared by Dr. Soucek, or was it prepared by you?

MR. KOCH: I've got -- You mean Attachment I?

MR. RAO: Yeah. I don't know. It looks like -- It's the first attachment.

MR. MOSHER: 1. Okay.

MR. SOFAT: This one. "Facts and Support"?

MR. RAO: Uh-huh. Yes.

HEARING OFFICER TIPSORD: Which is 1A, sort of, marking.

MR. KOCH: Okay. And your question is that you --

MR. RAO: Who prepared that document,

whether it was prepared by the Agency or Dr. Soucek?

MR. KOCH: We prepared this document, "Facts and Support."

MR. RAO: And so the equations were derived by you using the information generated by Dr. Soucek? Is that --

MR. KOCH: Technically, since I started here in January of last year, by early spring the equations were already formulated by Dr. Soucek and Dr. Chuck Stephan from USEPA, so what they did is they took Dr. Soucek's data and they basically came up with a formula, which gave us the FAV equation. What I did is I just came -- when I came in here, I kind of kept up to speed on what they were doing, I learned what they did, but I never actually made the actual equations, but I followed everything they did. I know what they did.

MR. RAO: Okay. And also, this final report submitted by Dr. Soucek -- I think it was dated January 9, 2004 -- to the Agency, I think -- I don't know what the exhibit number is. Has this report been -- you know, has it undergone any kind of peer review other than by IEPA and USEPA personnel?

MR. MOSHER: I could probably answer that. That final report was the first contract entered into

with Dr. Soucek. After he completed that work, USEPA entered into another contract with him so that the first report is a final report and then the next four reports are from the USEPA contract. There's a first, second and third quarter draft and then another final report for that part of the work. I forgot the rest of the question.

MR. RAO: Has it been peer reviewed?

MR. MOSHER: Oh, peer reviewed. Dr. Soucek has a paper in a peer review journal based on a lot of his work, and I think he's even going for more papers as -- you know, he's writing more papers now, so we can get you that paper and contact Dr. Soucek and find out if other papers are published or in review, in peer review journals, but I know of one for sure and we'll get a copy of that.

MR. RAO: Thank you.

HEARING OFFICER TIPSORD: Anything else?

MR. RAO: I'm done.

HEARING OFFICER TIPSORD: Anything else? All right. Let's go off the record for just a second.

(Discussion held off the record.)

HEARING OFFICER TIPSORD: Let's go back on the record. I want to thank everyone today. I think we

got some good information in the record, and I appreciate the Agency's testimony and their answers to questions and good questions that were asked. Our next hearing is scheduled for April 23, 2007. It's at 10 a.m. in room 9031 at the Thompson Center in Chicago, Illinois. The prefiling -- The testimony for that hearing should be prefiled by April 9, 2007, and I'll put out a hearing officer order to that effect. Again, I remind you that prefiled testimony will be linked and available on the Web site shortly after we receive it, and so if you aren't on the service list and want the testimony, or at least to look at it, it will be there. With that, I think we're adjourned for today. Thank you very much, everyone.

(Hearing adjourned.)

STATE OF ILLINOIS)
) SS
COUNTY OF BOND)

I, KAREN WAUGH, a Notary Public and Certified Shorthand Reporter in and for the County of Bond, State of Illinois, DO HEREBY CERTIFY that I was present at the Illinois Pollution Control Board, Springfield, Illinois, on March 7, 2007, and did record the aforesaid Hearing; that same was taken down in shorthand by me and afterwards transcribed, and that the above and foregoing is a true and correct transcript of said Hearing.

IN WITNESS WHEREOF I have hereunto set my hand and affixed my Notarial Seal this 15th day of March, 2007.

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Notary Public--CSR

#084-003688