

ILLINOIS POLLUTION CONTROL BOARD
May 18, 2023

SIERRA CLUB and PRAIRIE RIVERS)	
NETWORK,)	
)	
Petitioners,)	
)	
v.)	PCB 22-69
)	(Third-Party NPDES Permit Appeal)
ILLINOIS ENVIRONMENTAL)	
PROTECTION AGENCY and WILLIAMSON))	
ENERGY, LLC,)	
)	
Respondents.)	

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

Sierra Club and Prairie Rivers Network timely filed a petition asking the Board to review an April 15, 2022 permit determination of the Illinois Environmental Protection Agency (IEPA). IEPA reissued a National Pollutant Discharge Elimination System permit to Williamson Energy, LLC for its Pond Creek coal mine, located four miles east of Johnson City in Williamson and Franklin Counties. The petition alleges that the permit does not ensure compliance with Illinois water standards and does not meet permitting requirements. The petition requests that the Board remand the permit to the IEPA to establish conditions and limits that protect water and to comply with permitting requirements.

The parties each filed a motion for summary judgment. Each filed a response and a reply in support of its motion. The parties assert that the record presents no genuine issue of material fact. After carefully reviewing the record of the determination and the parties' arguments in their filings, the Board concludes to grant IEPA's and Williamson Energy's motions for summary judgment and deny petitioners' motion on the issues of the chloride limit and the protection of mussels. The Board also concludes to grant petitioners' motion for summary judgment and deny IEPA's and Williamson Energy's motions on the issue of chloride monitoring. Finally, the Board concludes to deny the parties' motions for summary judgment on the issues of protection of existing uses; compliance with limits for sulfate, nickel, iron, and copper; the Antidegradation Assessment; the reasonable potential analysis; discharges to Pond Creek; cumulative effects of chloride discharges; and the history of violations.

GUIDE TO THE BOARD'S OPINION

The Board first at page 2 lists abbreviations and acronyms used in this opinion. Next, at pages 2-3 the Board reviews the procedural history. At pages 4-75, the Board summarizes the factual background, including public comments and IEPA's Responsiveness Summary. At pages 75-77, the Board addresses the legal background, including statutory and regulatory authorities, the standard of review, and the burden of proof. Next, the Board separately discusses the issues

contested in the motions for summary judgment and decides the motions for summary judgment on them. The Board addresses protection of existing uses at pages 78-80; the chloride limit at pages 80-82; chloride monitoring at pages 83-86; compliance with sulfate, nickel, iron, and copper limits at pages 86-88; the Antidegradation Assessment at pages 88-96; the reasonable potential analysis at pages 96-99; Pond Creek discharges at pages 99-100; cumulative effects at pages 100-101; mussels at pages 101-102; altered stream flow at pages 102-104; and permitting history and violations at 104-107. After reaching its conclusions, the Board issues its order at page 107.

ABBREVIATIONS AND ACRONYMS USED IN THIS OPINION

BMPs	Best Management Practices
CFR	Code of Federal Regulations
cfs	cubic feet per second
CWA	Clean Water Act
DMR	Discharge Monitoring Report
DO	dissolved oxygen
ECHO	Enforcement and Compliance History Online
Eco-CAT	Ecological Compliance Assessment Tool
gpd	gallons per day
IDNR	Illinois Department of Natural Resources
IEPA	Illinois Environmental Protection Agency
INHS	Illinois Natural History Survey
MDL	Minimum Detection Limit
mgd	million gallons per day
NPDES	National Pollutant Discharge Elimination System
OMM	IDNR Office of Mines and Minerals
PCBs	polychlorinated biphenyls
RDA	Refuse Disposal Area
RO	Reverse Osmosis
TMDL	Total Maximum Daily Load
TSS	Total Suspended Solids
USACE	United States Army Corps of Engineers
USEPA	United States Environmental Protection Agency
USGS	United States Geological Survey
WQBEL	Water Quality-Based Effluent Limit
WQS	water quality standards
ZID	Zone of Initial Dilution

PROCEDURAL HISTORY

On May 10, 2022, Sierra Club and Prairie Rivers Network (collectively, Petitioners) timely filed a petition for review (Pet.) of IEPA’s April 15, 2022 determination to reissue an

NPDES permit to Williamson Energy, LLC (Williamson Energy or Williamson). *See* 415 ILCS 5/40(e)(1) (2020); 35 Ill. Adm. Code 105.204(b). Attached to the petition were seven¹ exhibits:

- Pet. Exh. A: NPDES Permit No. IL007766 (issued Apr. 15, 2022),
- Pet. Exh. B: Transcript of IEPA Public Hearing (Dec. 18, 2019),
- Pet. Exh. C: IEPA Responsiveness Summary (Apr. 15, 2022),
- Pet. Exh. D: Sierra Club and Prairie Rivers Network comments (Aug. 12, 2019),
- Pet. Exh. E: Sierra Club and Prairie Rivers Network comment (Jan. 17, 2020),
- Pet. Exh. F: Baker Comments (Jan. 15, 2020), and
- Pet. Exh. G: Burkholder Comments (Jan. 15, 2020).

On May 26, 2022, the Board accepted the petition for hearing and directed IEPA to file the administrative record by June 9, 2022. On June 2, 2022, Williamson Energy waived its decision deadline to December 8, 2022. *See* 415 ILCS 5/40(a) (2020); 35 Ill. Adm. Code 101.308.

On June 6, 2022, IEPA filed a motion requesting that the Board extend to July 25, 2022, the deadline to file the administrative record. On June 10, 2022, Williamson Energy responded that it did not object to IEPA's motion. On July 8, 2022, the hearing officer granted IEPA's motion and extended the deadline to July 25, 2022. Also on July 8, 2022, Williamson Energy waived its decision deadline to September 1, 2023. *See* 415 ILCS 5/40(a) (2020); 35 Ill. Adm. Code 101.308.

On July 22, 2022, IEPA filed a motion to extend the deadline to file the administrative record to August 17, 2022. On July 25, 2022, the hearing officer granted the motion and extended the deadline. On August 17, 2022, IEPA filed the administrative record of its determination (R. 1-21268).

On September 19, 2022, Petitioners filed a motion for summary judgment (Pet. Mot.) accompanied by a memorandum in support (Pet. Memo.). On the same date, Williamson Energy filed a motion for summary judgment (Williamson Mot.) accompanied by a memorandum in support (Williamson Memo.), and IEPA filed a motion for summary judgment (IEPA Mot.).

On November 4, 2022, Petitioners responded to the Respondents' motions for summary judgment (Pet. Resp.). On the same date, Williamson Energy (Williamson Resp.) and IEPA (IEPA Resp.) responded to Petitioners' motion for summary judgment.

On November 23, 2022, the Board received replies in support of motions for summary judgment from Petitioners (Pet. Reply), Williamson Energy (Williamson Reply), and IEPA (IEPA Reply).

¹ The petition designated five exhibits, with the fifth exhibit itself having two exhibits. The Board re-designates those two as the sixth and seventh exhibits to simplify citations to them.

FACTUAL BACKGROUND

Pond Creek Mine

Williamson Energy operates the Pond Creek No. 1 Mine, which is located four miles east of Johnson City in Franklin and Williamson Counties. R. at 4. Williamson Energy began construction of the mine in 2005 and first produced coal in 2006. *Id.* at 8311, 8323, 8339. The mine has estimated coal reserves of 383.3 million tons and “a life expectancy of more than 20 years.” *Id.* at 8311. The mine has one operating longwall system and two continuous miner units. *Id.* at 8311, 8323, 8339. “The productive capacity of the mine is 7.5 million tons per year,” and Williamson Energy’s “Preparation Plant facilities are capable of processing 2,000 tons of coal per hour.” *Id.*

Big Muddy River

“The Big Muddy River is a natural channel river approximately 166 miles long.” R. at 8318. Approximately 103.7 miles from the Mississippi River, a dam on the Big Muddy River creates Rend Lake. *Id.* Above Rend Lake, the Big Muddy River has a drainage area of approximately 110.27 square miles. *Id.* Land in the basin is used mainly for agricultural purposes, and land not used for agriculture is generally wooded or residential. *Id.* The surrounding area also includes sub-surface coal mines including abandoned mines. *Id.*

The Big Muddy River is classified as a General Use water. R. at 6204. “[T]his segment of the Big Muddy River is not subject to enhanced dissolved oxygen standards.” *Id.* IDNR has not listed the river as a biologically significant stream. *Id.* at 48.

Pond Creek

“Pond Creek is a natural stream that is approximately 62 miles long.” R. at 8338. Williamson Energy’s Preparation Plant facilities are located approximately 20 miles upstream from Pond Creek’s confluence with the Big Muddy River. *Id.* Pond Creek has a drainage area of approximately 104 square miles within the Big Muddy River Basin. *Id.* Land in the basin is used mainly for agricultural purposes, and land not used for agriculture is generally wooded or residential. *Id.* The surrounding area also includes sub-surface coal mines including abandoned mines. *Id.*

Pond Creek is classified as a General Use Water. R. at 6201. “Primary contact recreation and secondary contact uses are fully supported,” and “Pond Creek is not subject to enhanced dissolved oxygen standards.” *Id.*; *see id.* at 8338. Pond Creek is not rated under IDNR’s Biological Stream Characterization program and has not been rated for integrity or diversity. *Id.* at 6201, 8311. IDNR did not list it as a biologically significant stream. *Id.* at 48.

Unnamed Tributary of Pond Creek

Williamson Energy is currently permitted to discharge to an unnamed tributary of Pond Creek through eight permitted outfalls. R. at 8338. “The mine currently discharges to an

unnamed tributary of Pond Creek at a point where 0 cubic feet per second (cfs) of flow exists upstream of the outfall during critical 7Q10 low-flow conditions.” *Id.* at 8311. “The outfalls are located between two miles and seven miles from the confluence of the unnamed tributary and Pond Creek.” *Id.* at 8311.

The unnamed tributary is classified as a General Use Water. R. at 6207, 8311. The unnamed tributary is not rated under IDNR’s Biological Stream Characterization program. *Id.* IDNR has not listed it as a biologically significant stream. *Id.* at 48. The unnamed tributary is not listed on the 2016 Section 303(d) list for impaired waters and is not subject to enhanced dissolved oxygen standards. *Id.* at 6207, 8311.

Summary of Mine Operations

Water Flow and Water Management Facilities at the Mine

The 2016 Antidegradation Assessment describes water flow and water management facilities at the mine. R. at 8313-17. This assessment is described in detail below.

Inactive Slurry Impoundments/RDA No. 1 and RDA No. 2. RDA No. 1 and RDA No. 2 are inactive impoundments that no longer receive slurry from the Preparation Plant. R. at 8314, 8316. “However, coarse refuse is placed on the east side of RDA No. 1 and RDA No. 2 to create the west embankment for RDA No. 3.” *Id.* at 8316; *see id.* at 8358 (Figure 1-1). These two inactive impoundments continue to collect stormwater, which is pumped to the Fresh Water Lake. *Id.* at 8314, 8316. “Stormwater runoff from the slopes of these impoundments flows to Ponds 007/008 and the underdrain from these impoundments is also connected to these ponds.” *Id.*; *see id.* at 8359 (Figure 1-2).

Slurry Impoundment /RDA No. 3. RDA No. 3 receives coarse and fine coal refuse from the Preparation Plant and may also receive water directly from the Plant. R. at 8316; *see id.* at 8358, 8359 (Figures 1-1, 1-2). Solids in the process water settle in the impoundment. *Id.* Water may also be pumped from Pond 009 to RDA No. 3 for temporary storage of stormwater. *Id.* Decant water from this impoundment is pumped to the Water Holding Cell before it is pumped to the Fresh Water Lake. *Id.* “During precipitation events, decant water can be pumped to Pond 006 to maintain appropriate water levels in the impoundment.” *Id.*

In its Responsiveness Summary, IEPA states that “[w]ater pumped from underground is conveyed via pipelines to Refuse Disposal Area No. 3 (IDNR Permit No. 417).” R. at 55. The facility has created additional water holding capacity by raising the elevation of the RDA. *Id.*

Fresh Water Lake. The Fresh Water Lake collects water for use in the Preparation Plant, and Plant operations require maintaining certain water levels. R. at 8316; *see id.* at 8358, 8359 (Figures 1-1 and 1-2). The Fresh Water Lake receives water from the Water Holding Cell, Ponds 001-004 and 006-009, and from stormwater ponds. *Id.* If needed to maintain water levels in RDA No. 3 and the Water Holding Cell, “mine infiltration water can be pumped to the Fresh Water Lake.” *Id.*

Water Holding Cell. The Water Holding Cell receives mine infiltration water, and it may also receive decant water from RDA No.3 if necessary to maintain appropriate water levels there. R. at 8317; *see id.* at 8358, 8359 (Figures 1-1, 1-2).

From the Water Holding Cell, water goes to the Fresh Water Lake for use in the Preparation Plant. It may also go to Pond 006, “but only during precipitation events.” R. at 8317. “Water in the Water Holding Cell is not allowed to directly discharge from the facility to any waterway.” *Id.*

Ponds 001, 002, 003, 004. These four ponds “collect stormwater runoff from undeveloped areas, the mine yard, the raw coal pile, and access roads.” The ponds allow solids to settle before discharge. R. at 8315; *see id.* at 8358, 8359 (Figures 1-1, 1-2). “Because of the quality of the stormwater, water collected in these ponds is the preferred source of water for the Preparation Plant.” *Id.* at 8315. If the Preparation Plant needs additional water, “water from the ponds can be pumped to the Fresh Water Lake.” *Id.* If necessary to control water levels, “water can be discharged from the ponds to an unnamed tributary of Pond Creek via Outfalls 001, 002, 003, and 004, respectively.” *Id.*

Pond 005. Pond 005 “collects stormwater runoff from undeveloped areas, the clean coal pile, and access roads.” The pond allows solids to settle before discharge. R. at 8315; *see id.* at 8358, 8359 (Figures 1-1, 1-2). To supply water for mining operations, Pond 005 also receives water from Johnson City Lake at a rate of 0.72 mgd. *Id.* at 8315. If necessary to control water levels, “water can be released to an unnamed tributary of Pond Creek via Outfall 005.” *Id.*

Pond 006. Pond 006 “receives stormwater runoff from the raw coal pile and the Water Holding Cell during precipitation events.” The pond allows solids to settle before discharge. R. at 8315; *see id.* at 8358, 8359 (Figures 1-1, 1-2). If needed to supply water to the Preparation Plant, “[w]ater can be pumped from Pond 006 to the Fresh Water Lake.” *Id.* at 8315. If necessary to control water levels, “[w]ater can be discharged from Pond 006 to an unnamed tributary of Pond Creek via Outfall 006. Outfall 006 is currently maintained such that discharges only occur during precipitation events.” *Id.*

Pond 007/008. Pond 007/008 collects stormwater runoff from the slopes of the inactive impoundments RDA No. 1 and RDA No. 2. The ponds allow solids to settle before discharge. R. at 8315; *see id.* at 8358, 8359 (Figures 1-1, 1-2). These ponds also receive “a small quantity of water” from the underdrain of these two inactive impoundments. *Id.* “Water from this pond can be pumped to the Fresh Water Lake.” *Id.* If necessary to control water levels, “excess water in Pond 007/008 can be discharged through Outfalls 007 and 008 to an unnamed tributary of Pond Creek.” *Id.*

Pond 009. Pond 009 collects stormwater runoff from the slopes of RDA No. 3 and allows solids to settle before discharge. While construction of this pond was approved by Permit No. 2015-MA-3432, it does not have an NPDES permit to discharge through Outfall 009. R. at 8316; *see id.* at 8358, 8359 (Figures 1-1, 1-2).

From Pond 009, water must be pumped to the Fresh Water Lake, where it can be used in the Preparation Plant. R. at 8316. From Pond 009, water can also be pumped to RDA No. 3. *Id.*

Water Use Generally

In its coal extraction process, Williamson Energy uses water to suppress dust. R. at 6204, 8313. The mine purchases fresh, untreated water from the City of Johnson City. Purchased water is pumped to Pond 005. *Id.* at 8313; *see id.* at 8359 (Figure 1-2: Water Flow Diagram Current System). “During mining operations, the water from Pond 005 is pumped to the mine to extract coal. After use during the coal extraction process, this water is not recoverable.” *Id.* at 8313; *see id.* at 6204.

The Fresh Water Lake supplies water to wash coal in the Preparation Plant. R. at 6204, 8313; *see id.* at 8358-59 (Figures 1-1, 1-2). “The fine material ultimately ends up at the thickener units” attached to the Preparation Plant. *Id.* at 8313. Underflow from the thickeners is pumped to the Slurry Impoundment/RDA No. 3. *Id.* at 6204, 8313. Over time, the fine solid particles present in the thickener underflow “settle to the bottom of the impoundment leaving clarified water on the surface.” *Id.* Williamson Energy can recycle the clarified water “by pumping it from the impoundment back to the Fresh Water Lake where it can be pumped into the Preparation Plant and reused in the process.” *Id.* at 8313. Williamson Energy reports that “the majority of the wash water is recovered.” *Id.* However, “[t]here is some loss of water during the washing process.” *Id.* Also, the fine material does not immediately settle to the bottom of the impoundment. Maintaining the quality of the clarified water may require additional water for the Preparation Plant. *Id.* at 6204, 8313. The Plant’s water may be supplemented with stormwater or mine infiltration water. *Id.* at 8313.

Groundwater Infiltration

An aquifer above the coal seam causes water to infiltrate the mine. R. at 6204, 8313. The infiltrating groundwater typically has contaminant concentrations exceeding water quality standards. R. at 8314. Chloride concentrations “range from 1,099 mg/L to 2,799 mg/L, depending on the location of the water underground,” with an average of 2,237 mg/L. *Id.*; *see id.* at 6204. Sulfate concentrations also depend on location and range from 1,720 mg/L to 2,120 mg/L with an average of 1,940 mg/L. *Id.*

Williamson Energy removes water from the mine to protect the health and safety of the workforce and the overall mining operation. R. at 6204, 8313. Mine infiltration water is pumped to the Fresh Water Lake and then to use in the Preparation Plant. *Id.* at 8314.

“The current total daily quantity of mine infiltration water required to be pumped out of the mine is approximately 2,700,000 gallons per day.” R. at 8314. “During normal coal processing operations, the Preparation Plant requires approximately 2,300,000 gpd.” *Id.* at 8314-15. Without considering additional stormwater or clarified water, “this leaves an average daily surplus of approximately 400,000 gpd of mine water.” *Id.* at 8315. Surplus mine water that cannot be used in the Preparation Plant may be stored in sealed areas of the mine when possible, in RDA No. 3, or in the Water Holding Cell, although these have limited capacities. *Id.*; *see id.*

at 8358, 8359 (Figures 1-1, 1-2). Williamson Energy states that it discharges “a limited amount of excess water through Outfall 006 in compliance with effluent limits,” although it describes this as a temporary arrangement allowing limited discharges. *Id.* at 8313-14.

Permits

Williamson Energy operates the mine under Permits 374 and 417 from the IDNR Office of Mines and Minerals. R. at 8311. Submissions for these permits included details of the pond design, collection ditches, and outfall points. *Id.* Williamson also has an approved individual Section 404 Permit from the USACE and an IDNR Section 401 water quality certification for impacts of the refuse disposal area. *Id.*

The mine discharges under NPDES Permit No. IL0077666. R. at 8311. On December 29, 2009, Alliance Consulting, Inc., on behalf of Williamson Energy, submitted to IEPA renewal information for NPDES Permit No. IL0077666. R. at 17545-46, 17650-51.

Application for Reissued Permit

By letter dated February 13, 2015, Alliance Consulting, Inc. submitted, on behalf of Williamson Energy, an application to renew NPDES Permit No. IL 0077666 for the Pond Creek Mine. R. at 8675; *see id.* at 10527. It included a summary of modifications to the existing permit. R. at 8779-80.

Outfall 009. Williamson Energy proposed a new Outfall 009 to an unnamed tributary to Pond Creek. It noted that it had pending with IDNR an application for the proposed RDA No. 3. R. at 8779, 10639. That proposed area would “tie into the existing Refuse Disposal Area Nos. 1 & 2 and will eliminate a portion of the sediment control structure currently in place.” *Id.* at 8779, 10629. On November 5, 2015, IEPA issued Permit No. 2015-MA-3432 to construct and develop RDA No. 3. R. at 8629-51 (revised permit application).

Williamson Energy prepared a February 13, 2015 Antidegradation Assessment for this proposed discharge to an unnamed tributary to Pond Creek. R. at 8786-98, 10636-48. The assessment concluded that the treatment proposed in the permit application is “the most practical and cost-effective treatment of surface water runoff from the proposed mine operation.” R. at 10643; *see id.* at 8263-66.

Outfall 005. Williamson Energy requested a drainage modification to Outfall 005. Permit revision allowed Williamson Energy to develop and operate an area that pumped fine coal refuse into geotextile tubes. R. at 6156-62, 10779-81, 10765-77 (IEPA comments), 10758-63, 10687-10756 (supplemental information); *see id.* at 8779, 10629. “[S]urface runoff and dewatering of the geotextile tubes is collected in a ‘no discharge’ perimeter containment basin.” *Id.* at 8779, 10629. From that basin, water is pumped to the existing refuse disposal area or the coal Preparation Plant. *Id.*

With construction of the new refuse facility under the requested permit, “the geotextile tube area is no longer necessary.” R. at 8779, 10629. Williamson Energy seeks to modify the

drainage control plan by allowing stormwater runoff from that area to discharge through Pond 005. *Id.* It requested this change to eliminate pumping stormwater into the impoundment and limiting its operating life. *Id.*

Mixing Zone. Williamson Energy proposed to use a stormwater mixing zone to discharge from Pond 007/008 to Pond Creek instead of its unnamed tributary during specified precipitation events. R. at 8779, 10629, citing 35 Ill. Adm. Code 302.102; *see* R. at 10634 (Water Flow Diagram), 10639 (Antidegradation Assessment). It argues that Pond Creek has a larger drainage basin that can accept a discharge from the site and still meet water quality standards. R. at 8800, 10650. Its Mine Stormwater Analysis determined maximum discharges based on the water quality standards by considering calculated dispersion values and peak flows during storm events. *Id.* at 8801, 10651 (Table 1).

2016 Antidegradation Assessment

Under 35 Ill. Adm. Code 302.105, IEPA must make a case-by-case assessment of any proposed increase in pollutant loading that necessitates a renewed NPDES permit. Among the requirements for this Antidegradation Assessment, subsection (f)(1) requires that:

[i]n conducting an antidegradation assessment pursuant to this Section, the Agency must comply with the following procedures.

- 1) A permit application for any proposed increase in pollutant loading that necessitates the issuance of a new, renewed, or modified NPDES permit or a CWA Section 401 certification must include, to the extent necessary for the Agency to determine that the permit application meets the requirements of this Section, the following information:
 - A) Identification and characterization of the water body affected by the proposed load increase or proposed activity and the existing water body's uses. Characterization must address physical, biological and chemical conditions of the water body.
 - B) Identification and quantification of the proposed load increases for the applicable parameters and of the potential impacts of the proposed activity on the affected waters.
 - C) The purpose and anticipated benefits of the proposed activity. Such benefits may include:
 - i) Providing a centralized wastewater collection and treatment system for a previously unsewered community;

- ii) Expansion to provide service for anticipated residential or industrial growth consistent with a community's long range urban planning;
 - iii) Addition of a new product line or production increase or modification at an industrial facility; or
 - iv) An increase or the retention of current employment levels at a facility.
- D) Assessments of alternatives to proposed increases in pollutant loading or activities subject to Agency certification pursuant to Section 401 of the CWA that result in less of a load increase, no load increase or minimal environmental degradation. Such alternatives may include:
- i) Additional treatment levels, including no discharge alternatives;
 - ii) Discharge of waste to alternate locations, including publicly-owned treatment works and streams with greater assimilative capacity; or
 - iii) Manufacturing practices that incorporate pollution prevention techniques.
- E) Any additional information the Agency may request.
- F) Proof that a copy of the application has been provided to the Illinois Department of Natural Resources. 35 Ill. Adm. Code 302.105(f)(1).

Subsection (f)2) establishes requirements for IEPA's consideration of an Antidegradation Assessment. 35 Ill. Adm. Code 302.105(f)(2).

By letter dated November 18, 2016 (R. at 8309), Williamson Energy submitted to IEPA an Antidegradation Assessment (R. at 8310-69). The assessment addressed "a new outfall to the Big Muddy River to facilitate water management at the facility" and "a new outfall in Pond Creek and associated stormwater mixing zone." *Id.* at 8309.

The assessment included two attachments. The first is a Draft Conceptual Diffuser Design by AquAeTer for the proposed discharge to the Big Muddy River. *Id.* at 8372-8431. AquAeTer considered the possibility of using a diffuser to meet the chloride WQS within a mixing zone. *Id.* at 8377. The purpose of its study was "to determine if a mixing zone is possible and the total potential discharge rate that could be achieved." *Id.* at 8380. The conceptual diffuser included five individual, single-port diffusers allowing for "a staged

discharge based on flow in the River and the constituent concentration in the effluent.” *Id.* AquAeTer performed “diffuser simulations of the mixing zone dispersion that can be achieved.” *Id.* at 8380.

The second attachment also by AquAeTer was an analysis of the proposed Pond Creek discharge mixing zone. R. at 8433-53. The analysis calculated possible maximum allowable discharges from Pond 009 into Pond Creek based on meeting WQSs. *Id.* at 8433.

In a memorandum dated December 13, 2016, IEPA reviewed information prepared for Williamson Energy’s permit renewal and the Antidegradation Assessment provided on November 18, 2016. R. at 8263. IEPA tentatively concluded that:

The proposed activity will result in the attainment of water quality standards; that all existing uses of the receiving stream will be maintained; that all technically and economically reasonable measures to avoid or minimize the extent of the proposed increase in pollutant loading have been incorporated into the proposed activity; and that this activity will benefit the community at large by allowing the continuation of coal mining with all of its economic benefits to the local economy. *Id.* at 8266, citing 35 Ill. Adm. Code 302.105.

IEPA stressed that comments received during the public notice period “will be evaluated before a final decision is made by the Agency.” R. at 8266.

In the following subsections, the Board addresses the 2016 Antidegradation Assessment.

Proposed Discharge to Big Muddy River

Williamson Energy performed its Antidegradation Assessment “for the proposed addition of a new outfall to the Big Muddy River.” R. at 8309; *id.* at 8324-27. The proposed new Outfall 011 would discharge process water and mine infiltration water, which would then no longer discharge to an unnamed tributary of Pond Creek. *Id.* at 8312. “The outfall structure will be a multi-port diffuser and a mixing zone is being requested for the discharge.” *Id.*

Williamson Energy proposed to discharge to the Big Muddy River “approximately 14 miles downstream from the Rend Lake Dam and 12.5 miles downstream from Outfall 017 approved in NPDES Permit IL0078565 for Sugar Camp Energy, LLC.” R. at 8318; *see* 35 Ill. Adm. Code 302.105(f)(1)(A); R. at 6200, 8360 (Figure 2-1). Upstream from Williamson Energy’s proposed outfall, there is 37.0 cfs of flow during 7Q10 low-flow conditions. *Id.* at 6204.

The proposal included constructing a pipeline approximately 12.5 miles in length to convey process water and groundwater infiltration to the proposed outfall. *See* R. at 6904-7905 (application for pipeline); 8325, 8332, 8361 (Figure 2-2: Water Flow Diagram Proposed System).

Receiving Water for Proposed Outfall 011

Flow in the Big Muddy River is controlled by the USACE dam at Rend Lake. R. at 8320. “The minimum flow maintained by USACE appears to be 30 cfs, although there have been four instances with recorded flows less than 30 cfs since the installation of the dam in 1973.” *Id.* The assessment also evaluated data from a USGS gauge maintained at Plumfield, Illinois. *Id.*, citing *id.* at 8384 (Table 1: Frequency of Flows on the Big Muddy River).

Williamson Energy’s proposed Outfall 011 would discharge to segment N-11 of the Big Muddy River. R. at 8318, citing *id.* at 8360 (Figure 2-1). Segment N-11 is listed in the 2016 Section 303(d) impaired waters due to iron (dissolved), dissolved oxygen, sedimentation/siltation, TSS, mercury, PCBs, pH, and fecal coliform. *Id.* at 8318-19; *see id.* at 6204. The Big Muddy River was listed on the 2014 Section 303(d) list for sedimentation/siltation, sulfates, TSS, mercury, and PCBs. R. at 8318; *see id.* at 6250-53 (nickel), 8277 (dissolved iron). In its Responsiveness Summary, IEPA reported that Segment N-11 is on the 2018 list “as impaired for aquatic life use with potential causes given as dissolved oxygen, iron, sedimentation/siltation, and total suspended solids, primary contact use with potential cause given as fecal coliform, and fish consumption use with potential cause given as mercury and polychlorinated biphenyls (PCBs).” R. at 50. It also reported that the segment fully supports aesthetic quality use. *Id.*

Discharge volume will depend on flow in the Big Muddy River. It will also depend on the chloride concentration of water in the Water Holding Cell. *Id.* at 8325, 8332. Discharge calculations also account for chloride concentrations coming downstream from a similar discharge. *Id.*

Williamson Energy proposed Outfall 011 would discharge through a diffuser structure. R. at 8324-25, 8331-32, citing *id.* at 8372-8453 (Draft Conceptual Diffuser Design). As designed by AquAeTer, Inc., “[t]he conceptual diffuser consists of five individual, staged, single-port diffusers,” which allows discharge to vary with river flow and constituent concentrations in the effluent. R. at 8377; *see id.* at 8391 (Figure 3). The diffuser design report included modeling based on maximum effluent total flow rate of 13.2 cfs. “At the maximum chloride concentration of 12,000 mg/L, this maximum discharge requires a River flow of 1,734 cfs to meet a dispersion of 34:1 in less than 25% of the River volume.” *Id.* at 8431. It concluded that all discharge scenarios met water quality standards within mixing zone requirements and reported that “[t]he maximum distance to meet the water quality standard for all scenarios is 252 feet.” *Id.*

The diffuser design report added that the mine now discharges into streams “substantially smaller than the Big Muddy River at the point of the proposed mixing zone.” R. at 8393. The report asserted that, “[w]hile the mine’s discharges are intermittent at best and any discharges are within its permitted limits, relocating the primary mine-water discharge point to the Big Muddy River will have an immediate positive impact to the mine-adjacent watershed by reducing pollutant loading into the smaller streams higher in the watershed.” *Id.*

Water Quality

Constituents of concern are those “for which the Big Muddy River reach is listed on the 2014 or 2016 303(d) list, there is a water quality standard and the compound is potentially found in the discharge, or the compound is on the current NPDES permit for monitoring or has a permit limit.” R. at 8318. The Antidegradation Assessment listed constituents of concern as: sedimentation/siltation, sulfates, TSS, mercury, PCBs, iron, dissolved oxygen, pH, fecal coliform, settleable solids, chloride, phenols, manganese, cadmium, copper, nickel, zinc, arsenic, chromium, selenium, silver, and cyanide. *Id.* at 8318-19.

The Antidegradation Assessment determined that several of the constituents of concern do not need to be addressed. Noting analysis of the mine’s discharge under permitting requirements, the assessment stated that “[c]yanide, phenols, arsenic, chromium, mercury, selenium, cadmium, zinc, and silver results have been non-detect.” *Id.* at 8319. Because the mine was constructed more than 30 years after the ban on PCBs and the mine does not anticipate activities that would use them, “PCBs are not expected in the mine’s discharge.” *Id.* The discharge from mining operations is not expected to have an effect on dissolved oxygen levels in the river, and “[f]ecal coliform is another constituent that is not expected to be present in the discharge.” *Id.* Because discharges of these constituents would not further impair the Big Muddy River, the assessment did not address them. *Id.*

Williamson Energy’s Antidegradation Assessment stated that background concentrations upstream of its proposed discharge “will be influenced by the recently permitted, but not yet operational, discharge from the upstream Sugar Camp mine.” R. at 8319. The assessment and mixing zone evaluation estimated background concentrations “using the background concentrations for the Big Muddy River upstream of the Sugar Camp Mine, as provided by IEPA, and the estimated discharge from the Sugar Camp Mine through the recently permitted outfall location.” *Id.*, citing *id.* at 8389 (diffuser design).

Endangered/Threatened Species Consultation

On November 2, 2016, Williamson Energy initiated an endangered species consultation using the IDNR Eco-CAT website. R. at 6203, 6206, 8355; *see* 35 Ill. Adm. Code 302.105(f)(1)(F). While this consultation showed the presence of the bird Chuck-Will’s-Willow (*Caprimulgus carolinensis*) in the vicinity of the proposed discharge, it did not indicate that there were aquatic endangered or threatened species near it. *Id.* Although the Antidegradation Assessment reported that Williamson Energy had not received a formal response from IDNR (*id.* at 8355), IEPA considered it likely that IDNR would terminate the consultation (*id.* at 6203, 6206).

Proposed Increases in Loading

To calculate predicted pollutant loadings to the Big Muddy River, the Antidegradation Assessment selected samples collected from the Water Holding Cell to represent concentrations in its proposed discharge. R. at 8321. The assessment used these data to calculate potential

loadings for chloride, sulfate, TSS, iron, manganese, nickel, and copper. *Id.*, citing *id.* at 8363 (Table 2-1: Water Holding Cell Data); see 35 Ill. Adm. Code 302.105(f)(1)(B).

Estimated Chloride Loading. The Antidegradation Assessment calculated a range of potential loadings for chloride at the edge of the proposed mixing zone. R. at 8364 (Table 2-2: Discharge Flow and Loading – Chloride). The calculations were based on two background chlorine concentrations. The first was the 90th percentile upstream background value of 31.2 mg/L. The second, based on projected concentrations from the permitted upstream discharge, was 151 mg/L. *Id.* at 8321, 8364, 8389. The assessment calculated loadings based on four discharge concentrations: the minimum, average, and maximum sample results from the Water Holding Cell of 1,699 mg/L, 2,251 mg/L, and 2,799 mg/L; and a concentration of 12,000 mg/L based on expected future mining operations to the north. R. at 6204, 8364.

With a background concentration of 31.2 mg/L, modeling shows that dispersion ranging from 3.6:1 to 25.5:1 would be needed to meet the chloride water quality standard of 500 mg/L at the edge of the mixing zone. R. at 8321, 8364. With a background concentration of 151 mg/L, dispersion ranges from 25.2:1 to 34.0:1. *Id.* With the background concentration of 31.2 mg/L, projected downstream loadings for these dispersion scenarios range from 19,141 lbs/day to 183,585 lbs/day. *Id.* With the background concentration of 151 mg/L, projected loadings range from 24,456 lbs/day to 1,197,698 lbs/day. *Id.* at 6204, 8321, 8364.

Estimated Sulfate Loading. The assessment calculated a range of potential loadings for sulfate using the same background flow and allowable discharge flow determined by modeling for chloride. R. at 8321, 8365 (Table 2-3: Discharge Flow and Loading – Sulfate). The calculations were based on two background sulfate concentrations. The first was the 90th percentile upstream background value of 40.5 mg/L. The second, based on projected concentrations from the permitted upstream discharge, was 60.1 mg/L. *Id.* at 8321, 8365. The assessment calculated loadings based on the minimum, average, and maximum sample results of 820 mg/L, 1,741 mg/L, and 2,120 mg/L to represent current operation of the Water Holding Cell. R. at 6204, 8321, 8364.

The range of sulfate loadings that are projected to meet the water quality standard at the edge of the mixing zone are 19,515 to 238,643 lbs/day with a background concentration of 40.5 mg/L, and 9,720 to 476,031 lbs/day with a background concentration of 60.1 mg/L. R. at 8321, 8365.

Estimated TSS Loading. This reach of the Big Muddy River is impaired for sedimentation/siltation, which is monitored by the parameter TSS. The assessment notes that “there are no water quality standards for total suspended solids.” R. at 8321.

The assessment calculated a range of potential loadings for TSS using the same background flow and allowable discharge flow determined by modeling for chloride. R. at 8321-22, 8366 (Table 2-4: Discharge Flow and Loading - TSS). A background concentration of 14.4 mg/L was based on the maximum found in samples collected from the Big Muddy River. *Id.* at 8366. The assessment calculated loadings based on the minimum, average, and maximum sample results of 7 mg/L, 37 mg/L, and 72 mg/L to represent current operation of the Water

Holding Cell. *Id.* at 6204, 8322, 8366. The assessment stated that these samples were collected before settling and that other sites have shown non-detect levels. *Id.* at 8322.

The range of TSS loadings that are projected for these discharge concentrations is 2,337 lbs/day to 118,332 lbs/day. R. at 8322.

Estimated Iron Loading. The assessment calculated a range of potential loadings for iron using the same background flow and allowable discharge flow determined by modeling for chloride. R. at 8322, 8367 (Table 2-5: Discharge Flow and Loading – Iron). Background concentrations of 0.192 mg/L and 0.220 mg/L were based on data collected from the Big Muddy River upstream from the Plumfield gauge. *Id.* at 8367. The assessment calculated loadings based on minimum, average, and maximum sample results of 0.216 mg/L, 0.685 mg/L, and 1.835 mg/L to represent current operation of the Water Holding Cell. *Id.* at 6204, 8322, 8367.

The iron loadings that are projected to meet the water quality standards at the edge of the mixing zone range from 34 to 226 lbs/day at the 0.192 mg/L background concentration, and 34 to 336 lbs/day at the 0.212 mg/L background concentration. R. at 6204, 8322, 8367.

Estimated Manganese Loading. The assessment calculated a range of potential loadings for manganese using the same background flow and allowable discharge flow determined by modeling for chloride. R. at 8322, 8368 (Table 2-6: Discharge Flow and Loading - Manganese). Background concentrations of 0.194 mg/L and 0.212 mg/L were based on data collected from the Big Muddy River upstream from the Plumfield gauge. *Id.* at 8368. The assessment calculated loadings based on minimum, average, and maximum sample results of 0.125 mg/L, 0.204 mg/L, and 0.419 mg/L to represent current operation of the Water Holding Cell. *Id.* at 6204, 8322, 8368.

The manganese loadings that are projected to meet the water quality standard at the edge of the mixing zone range from 33 to 229 lbs/day at the 0.194 background concentration, and 34 to 336 lbs/day at the 0.212 mg/L background concentration. R. at 6204, 8322, 8368.

Estimated Nickel Loading. The assessment calculated a range of potential loadings for nickel using the same background flow and allowable discharge flow determined by modeling for chloride. R. at 8322-23, 8369 (Table 2-7: Discharge Flow and Loading – Nickel). Because data collected from the Big Muddy River upstream from the Plumfield gauge were all non-detect for nickel, the calculations used a background concentration of 0.005 mg/L. *Id.* at 8369. The assessment calculated loadings based on minimum, average, and maximum sample results of 0.004 mg/L, 0.008 mg/L, and 0.014 mg/L to represent current operations of the Water Holding Cell. *Id.* at 6204, 8323, 8369.

The range of nickel loadings projected to meet the water quality standard at the edge of the mixing zone range from 1 to 8 lbs/day. R. at 6204, 8323, 8369

Estimated Copper Loading. The assessment calculated a range of potential loadings for copper using the same background flow and allowable discharge flow determined by modeling for chloride. R. at 8323, 8370 (Table 2-8: Discharge Flow and Loading – Copper). Because

data collected from the Big Muddy River upstream from the Plumfield gauge were all non-detect for copper, the calculations used a background concentration of 0.005 mg/L. *Id.* at 8370. The assessment calculated loadings based on minimum, average, and maximum sample results of 0.011 mg/L, 0.023 mg/L, and 0.032 mg/L to represent current operations of the Water Holding Cell. *Id.* at 6204, 8323, 8370.

The range of copper loadings projected to meet the water quality standard at the edge of the mixing zone range from 1 to 8 lbs/day. R. at 6204, 8323, 8370.

Purpose and Benefits

In its 2016 Antidegradation Assessment, Williamson Energy reported that the mine directly employed 203 persons full-time with an annual payroll of approximately \$18 million. R. at 6201, 6205, 8324, 8327-28, 8340, 8344, 8351. In 2019, Williamson Energy submitted supplemental information reporting that the mine provides “approximately 235 direct jobs with a payroll of approximately \$20.3 million annually.” *Id.* at 5888; *see id.* at 90. In addition, Williamson Energy estimated that the mine generates work for another 100 persons as “truck drivers, supply and support personnel, train crews, and technical personnel.” *Id.* Williamson Energy also estimated that the mine generates approximately \$25 million in sales of supplies and services from local and regional vendors. *Id.* In addition, mine operations “provide tax revenues through payroll, coal severance, and mineral resource taxes for the surrounding counties and the State of Illinois.” *Id.* at 6201, 6205. “The total local, state, and federal revenues generated by the continuation of this Mine are approximately \$78 million annually,” including estimated real estate taxes of \$1.3 million per year. *Id.* at 6201, 6205, 8324, 8340; 35 Ill. Adm Code 302.105(f)(1)(C).

Water Management Process

Williamson Energy’s Antidegradation Assessment described the “typical water management process” it would follow under this proposed discharge. R. at 8325, 8332, citing *id.* at 8361 (Figure 2-2).

Groundwater Infiltration. Williamson Energy anticipates a maximum flow rate of 3.5 mgd for mine infiltration water. R. at 8325, 8332. It intends to pump this water to the Water Holding Cell and discharge it through the diffuser at Outfall 011. *Id.* The mine infiltration water may also be pumped to the Freshwater Lake and used in the Preparation Plant. *Id.*; *see id.* at 8361 (Figure 2-2).

Ponds 001, 002, 003, and 004. In this proposed alternative, “Ponds 001, 002, 003, and 004 will continue to collect stormwater runoff from undeveloped areas, the mine yard, the raw coal pile, and access roads.” R. at 8325, 8332. These ponds will continue to be “the preferred source of make-up water to the Preparation Plant.” *Id.* To control water levels in these ponds, water can be discharged through Outfalls 001, 002, 003, and 004, respectively, to an unnamed tributary of Pond Creek. *Id.*; *see id.* at 8361 (Figure 2-2).

Pond 005. In this proposed alternative, “Pond 005 will continue to collect stormwater runoff from undeveloped areas, the clean coal pile, and access roads.” R. at 8325, 8332. This pond will also continue to receive water from Johnson City Lake at a rate of 0.72 mgd. *Id.* To control water levels, water can be discharged through Outfall 005 to an unnamed tributary of Pond Creek. *Id.* at 8325-26, 8332; *see id.* at 8361 (Figure 2-2).

Pond 006. In this proposed alternative, “Pond 006 will continue to receive stormwater runoff from the raw coal pile, but will no longer receive water from the Water Holding Cell during precipitation events.” R. at 8326, 8333. From Pond 006, water can go to the Fresh Water Lake for supplying the Preparation Plant. *Id.* To control water levels, water can be discharged through Outfall 006 to an unnamed tributary of Pond Creek. *Id.*; *see id.* at 8361 (Figure 2-2).

Ponds 007/008. In this proposed alternative, stormwater runoff from the slopes of inactive slurry impoundments RDA No. 1 and RDA No. 2 “will continue to be collected in Ponds 007/008.” R. at 8326, 8333. These ponds will also continue to receive underdrain from these two inactive slurry impoundments. *Id.* Water from these ponds will be pumped to Pond 009 and may also be pumped to the Fresh Water Lake. *Id.* To control water levels in these ponds, water can be discharged through Outfalls 007 and 008 to an unnamed tributary of Pond Creek. *Id.*; *see id.* at 8361 (Figure 2-2).

Pond 009. Williamson Energy stated that Permit No, 2015-MA-3432 authorized construction of Pond 009, which collects stormwater runoff from the slopes of active slurry impoundment RDA No. 3. R. at 8326, 8333. Excess water in Pond 009 must be pumped to the Fresh Water Lake, from which it can be used in the Preparation Plant, and it can also be pumped to RDA No. 3. *Id.*; *see id.* at 8361 (Figure 2-2).

The Antidegradation Assessment states that it “is not feasible” to send all of the stormwater from RDA No. 3 to the Fresh Water Lake. R. at 8326, 8334. Williamson Energy concluded that “[e]xcess stormwater must be discharged for the mine to continue operation.” *Id.* Because Pond 009 does not have an NPDES permit, Williamson Energy would seek a permit modification to allow Pond 009 to discharge to a Pond Creek mixing zone. *Id.* The mixing zone analysis calculated potential maximum allowable discharges from Pond 009 into Pond Creek based on meeting water quality standards. R. at 8433.

Fresh Water Lake. For use in the Preparation Plant, the Fresh Water Lake receives water from the stormwater ponds, Ponds 001-004 and 006-009, the slurry impoundment RDA No. 3, and the Water Holding Cell. R. at 8326, 8333. “[T]o maintain water level in the active Slurry Impoundment and Water Holding Cell, mine infiltration water can be pumped to the Fresh Water Lake.” *Id.*; *see id.* at 8361 (Figure 2-2).

Active Slurry Impoundment RDA No. 3. In this proposed alternative, RDA No. 3 “will continue to receive coarse and fine coal refuse from the Preparation Plant.” R. at 8327, 8334. To manage water volume, the impoundment may also receive water from mine infiltration or Pond 009. *Id.* After solids settle in the impoundment, clarified water is pumped to the Fresh Water Lake for reuse in the Preparation Plant. *Id.* Clarified water may also be pumped to the

Water Holding Cell before discharge to the Big Muddy River through a diffuser. *Id.*; *see id.* at 8361 (Figure 2-2); *id.* at 8372-8431 (diffuser design).

Inactive Slurry Impoundments RDA No. 1 and RDA No. 2. In this proposed alternative, “[c]oarse refuse will continue to be placed on the east side of RDA No. 1 and RDA No. 2 to create the west embankment for RDA No. 3.” R. at 8327, 8334; *see id.* at 8361 (Figure 2-2). From the slopes of these inactive impoundments, stormwater runoff will continue to flow to Ponds 007/008. *Id.* at 8327, 8334. “[T]he underdrain from these impoundments is also connected to these ponds.” *Id.*

The Antidegradation Assessment reports that “21 acres of slope have been reclaimed, decreasing constituent loadings to Ponds 007/008.” R. at 8327, 8334; citing *id.* at 8358 (Figure 1-1: Refuse Reclamation and Loading Decrease). Williamson Energy planned to reclaim an additional 24 acres, and the assessment asserted that loadings to Ponds 007/008 would continue to decrease. *Id.* at 8327, 8334.

Water Holding Cell. The Water Holding Cell will continue to receive mine infiltration water, and it can also receive decant water from the active slurry impoundment to maintain appropriate water levels. R. at 8327, 8334. From the Water Holding Cell, water will continue to go to the Fresh Water Lake for use in the Preparation Plant. *Id.*; *see id.* at 8361 (Figure 2-2).

Williamson Energy proposed to discharge from the Water Holding Cell to the Big Muddy River through a new outfall and diffuser. R. at 8327, 8334; *see id.* at 8361 (Figure 2-2). With this discharge, “process water and mine infiltration water will no longer be stored in stormwater ponds on-site.” *Id.* at 8327, 8334.

Assessment of Alternatives to Discharges of Chlorides, Sulfates, Manganese, Copper, and Iron

The Antidegradation Assessment weighed alternatives to Williamson Energy’s proposed discharge for the constituents of concern: chlorides, sulfates, manganese, copper, and iron to the Big Muddy River. R. at 6205-06, 8324-31; *see* 35 Ill. Adm. Code 302.105(f)(1)(D); R. at 5888-5894 (supplemental information).

Do Not Mine. In its 2016 assessment, Williamson Energy projected that ending mining at its site would result directly in the loss of approximately 203 jobs with an annual payroll of approximately \$18 million and indirectly in the loss of approximately 100 additional jobs related to mine operations. R. at 8327-28. In 2019, Williamson Energy submitted supplemental information reporting that the mine provides “approximately 235 direct jobs with a payroll of approximately \$20.3 million annually.” *Id.* at 5888; *see id.* at 90.

Williamson Energy also projected that, without output from the mine, the economy would have to replace or forego the energy approximately equal to the demand of 4.7 million American households. *Id.* at 5888. Williamson Energy added that it “contributes approximately \$1.5 million in federal taxes and approximately \$0.7 million in local and state taxes.” *Id.* at 5888; *see id.* at 8328. Williamson Energy also cited its investment in the mine. R. at 5888,

8328. If mining ceased there, it argued that it would experience a substantial economic loss because of its “significant investment in land, coal reserves, permitting expenses, and mining equipment.” *Id.* Based on these factors, Williamson Energy did not consider “Do Not Mine” as a feasible or reasonable alternative to its proposed discharge. R. at 5889, 8328.

RO. RO treats water by using “partially permeable membranes to remove dissolved salt and other unwanted particles in suspension from the water stream.” R. at 88, 5890. “The contaminants are periodically released from the membrane by backwashing at high pressure.” *Id.* at 8328. Williamson Energy stated that “[t]his creates a waste stream of water with a high concentration of contaminants that is typically 25% of the flow being sent to the RO treatment system.” *Id.* at 6202, 6205, 8328.

Based on a design capacity of 3.5 mgd, Williamson Energy projected that RO at its site would generate 2.625 mgd of de-salinized water and 0.875 mgd of highly brackish water. R. at 5890. Although the de-salinized water could be reused in the mining process or discharged under an NPDES permit, the concentrated brackish water requires management through deep well injection or crystallization and a solid waste landfill. *Id.* 88, 5890.

Williamson Energy acknowledged that an RO plant could be designed for treating its proposed discharge. “A plant of this size would cost approximately \$15 million of up-front capital investment. The operational and maintenance expenditures would cost approximately \$200,000 per month.” R. at 5890. Williamson Energy cited the experience of an affiliated company at which an RO system “has experienced low plant utilization and lower than design throughput due to the plugging of filters and membranes.” *Id.*

To dispose of the concentrated waste from the RO system, Williamson Energy projected that deep well injection would have capital costs of approximately \$39 million, with an annual operating budget of \$0.90 million. *Id.* Combining the RO System with deep well injection resulted in total estimated capital costs of \$54 million and annual operating expenses of \$3.30 million. *Id.* Williamson Energy cited the experience of its affiliate, which uses two deep wells to dispose of concentrated brackish water. Because its two wells accept only about 25% of its discharge, it must store the remainder in a large holding facility and is weighing alternatives for additional disposal capacity. *Id.*

For the alternative of waste disposal through crystallization and a solid waste landfill, Williamson Energy projected a capital cost of \$65 million and annual operating expenses of \$6.70 million. *Id.* at 5890-91. Combining the RO system with this treatment resulted in total estimated capital costs of \$79 million and annual operating expenses of \$9.10 million. *Id.* at 5891.

Williamson Energy concluded that RO technology “is not cost effective” and would create an additional waste stream generating its own disposal problems. R. at 5891. It concluded that “RO is not considered applicable or feasible as a long-term solution for this type of application.” *Id.* at 5891, 8329.

Deep Well Injection of Mine Infiltration Water. Although Williamson Energy acknowledged that “[t]he mine infiltration water could be discharged directly to a deep well,” it cited “cost and operational difficulties” with this option. R. at 5892, 8329. Williamson Energy stated that wells must be installed at great depth to avoid affecting aquifers and into a geologic formation capable of receiving the water. *Id.* at 88, 5892. It added that wells cannot be close to one another, or they will limit the flow and volume they can receive. *Id.* at 88, 5892.

Williamson Energy estimated that its operation would require nine injection wells. R. at 88, 5892. Because the wells must be separated from one another, it also estimated that this option would require miles of pipeline reaching each of the nine wells. *Id.* This option would also require an ultra-filtration system “to remove any suspended solids from the water prior to injection.” *Id.* Based on the experience of an affiliated company, Williamson Energy projected that this option required capital expenditures of approximately \$39 million and annual operating costs of \$0.9 million. *Id.* at 5892. At its affiliate, well injection “has been hampered by excess pressures, scaling of injection tubing, and plugging off the receiving geologic formation,” and “the wells have been inactive for several years.” *Id.* Williamson Energy concluded that deep well injection was not feasible for its operation. *Id.* at 5892, 6202, 6205, 8329.

Evaporation. Williamson Energy stated that “[e]vaporation works by constructing ponds with large surface areas, filling the ponds with water, and exposing water to the forces of nature.” R. at 88, 5893, 8329. The exposed water then evaporates, “leaving a TDS residue in a constructed evaporation pond.” *Id.* Criteria for designing this option included location “in a moisture deficient area, sufficient surface area to evaporate the total annual waste water volume plus precipitation that would fall on the pond, using the maximum wet year, and using the minimum evaporation year of record.” *Id.* Because of salt accumulation, the land area used for this system “would not be expected to be productive once it is used for this purpose.” *Id.*

Williamson Energy developed a preliminary design for an evaporation system for its anticipated flow rate of 3.5 mgd. Based on weather data, it determined that there would be a seven-month evaporation season from April to October at the site. R. at 5893. Based on the anticipated flow and the evaporative season, the design projected that this option would require 1,621 evaporators placed on floating platforms. *Id.* During the non-evaporative season, this option would require a pond with a surface area of 160 acres and a depth of 10 feet to store excess water. *Id.* Williamson Energy projected that this option would require capital costs of \$30 million, not including the storage pond, and annual operating expenses of \$4.2 million. *Id.*

Williamson Energy determined that the climate at its site is not conducive to this option. R. at 6202. Also, the option does not address the salt concentrates generated by the evaporation pond. *Id.* at 5893. Citing its inefficiencies, high costs, and operational difficulties, it concluded that “[t]his option is not considered applicable or economically feasible” for its site. *Id.* Williamson Energy added that IEPA does not favor this option, and it questions whether IEPA would issue a permit for it. *Id.* at 8330.

Mechanical Evaporation. Mechanical evaporation uses high temperature and pressure to reduce groundwater volume. R. at 8330. While the recovered water “would be of high quality and could be used onsite,” the concentrated brine stream requires additional treatment. *Id.*

Williamson Energy determined that equipment for this option is costly to construct, operate, and maintain, and it cited both its energy use and the waste it generates. *Id.* It concluded that this option was neither applicable nor feasible for its operations. *Id.* at 6202, 6205, 8330.

Crystallization. “Crystallization is the process that converts the concentrated TDS brine generated in a mechanical evaporator or reverse osmosis process to a disposable salt cake.” R. at 88, 5894, 8330. The process provides an alternative to underground injection for this brine. *Id.*

Williamson Energy argued that the salt cake resulting from this process was not likely to be sold because of “the various salt compositions that are captured in a mine related RO process.” R. at 5894. It added that this process generally requires a large, lined landfill for disposal of its wastes. *Id.*

Williamson Energy argued that the equipment for this process is energy-intensive and costly to construct, operate, and maintain. R. at 5894. It projected that this option would result in capital costs of \$65 million with annual operating costs of \$6.70 million. *Id.* While mobile evaporator units are available, they cost an estimated \$0.25 per gallon. *Id.* at 8330. Based on these factors, Williamson Energy concluded that “crystallization is not a stand alone treatment option, and it is not considered either applicable or feasible as a treatment system” for the long-term operation of its mine. *Id.* at 5894, 6202, 6205, 8330.

Cost Effective Sulfate Removal (CESR). CESR is a proprietary technology for sulfate removal. R. at 8330. It involves four steps, the first of which is adding hydrated lime to the feed water to precipitate gypsum. *Id.* The second step uses dewatering and filtration to remove the non-hazardous gypsum sludge. It also involves additional liming to raise the pH level and precipitate dissolved metals. *Id.* The third step involves additional liming and adding a proprietary reagent to precipitate ettringite. *Id.* Finally, the fourth step reduces the pH to meet local discharge requirements and also involves clarification and sludge removal. *Id.*

Williamson Energy stressed that this option is not proven for removing chlorides and “would exacerbate the TDS concentration.” R. at 8331. It described this technology as “unproven” and cited its “extreme complexity.” R. at 8330. It listed reasons that it considered it impractical for use at its mine:

- 1) each precipitation step is time consuming and would require the use of large amounts of land, 2) infrastructure costs, including the installation of tanks and storage handling equipment is high, 3) this proprietary technology is still being developed and is cost-prohibitive at this time, 4) this technology is plagued by severe scaling and precipitation of minerals, 5) the very large amounts of resultant sludge would need to be disposed of as solid or hazardous waste, 6) the water treated in this system has a high specific conductivity and a high concentration of total dissolved solids, and 7) there is a high supervision and maintenance requirement to use this technology. *Id.* at 8330-31.

Based on these factors, Williamson Energy considered this option “inappropriate for use at its mine. *Id.* at 6202, 6205, 8331.

Coagulation Precipitation. This process adds alkaline chemicals such as hydrated lime, limestone, soda ash, caustic soda, and ammonia to acid mine effluent to precipitate metals and reduce acidity. R. at 8331. Designing this system requires considering the level of acidity, concentrations of suspended solids, iron, and manganese, and flow rates. *Id.* Williamson Energy argued that this option “would exacerbate the TDS concentration without materially reducing chloride concentrations.” *Id.*

Williamson Energy listed a number of objections to this option:

1) worker safety regarding the chemicals to be used, 2) treatment cost, 3) process operation and maintenance, 4) disposal of precipitate sludge in a landfill possibly considered a hazardous substance, 5) necessity of such treatment considering that acid water is not considered a factor for the proposed operation, 6) susceptibility to system malfunction due to high volume flows from storm events, [and] 7) improbability of actual improvement in overall water quality when compared to the use of sedimentation ponds. R. at 8331.

Considering these factors, Williamson Energy concluded that “the use of this technology is considered inappropriate at the Mine.” *Id.* at 6202, 6206, 8331.

Supervac. Williamson Energy stated that “Supervac is a technology to handle solid wastes and sludge that result from other waste treatment technologies.” R. at 8331. Williamson Energy concluded that it “would not be feasible for use at the Mine because it is not a stand-alone water treatment technology.” *Id.*

Assessment of Alternatives for Total Suspended Solids, Total Settleable Solids, and Sedimentation/Siltation

The Antidegradation Assessment also weighed alternatives to discharging TSS, total settleable solids, and sedimentation/siltation to the Big Muddy River. R. at 6206, 8331-37; *see* 35 Ill. Adm. Code 302.105(f)(1)(D).

Do Not Mine. Based on substantially the same factors it weighed in considering this as an alternative to discharging chlorides, sulfates, manganese, copper, and iron, Williamson Energy did not consider “Do Not Mine” a feasible or reasonable alternative to its proposed discharge of solids and sediment. R. at 5889, 8335; *see id.* at 5888, 8328; *supra* at 18-19.

No Discharge of Stormwater. Williamson Energy stated that total containment with no discharge of stormwater is not feasible when “the area of the Mine receives in excess of 41 inches of precipitation as an annual average,” often with great intensity in short periods. R. at 8335. It argued that storing this stormwater would require a “massive” surface area that would displace more productive uses of land. *Id.* It added that Illinois regulations allow discharges from sedimentation ponds when the water meets applicable standards. *Id.* Williamson Energy concluded that eliminating stormwater discharges “is not an available option.” R. at 6202, 6206, 8335.

Reduce Number of Outfalls. Although Williamson Energy acknowledged that it would be possible to combine outfalls within the permit area, it argued that it would simply result in the same total water discharge with the same overall water quality to the receiving streams. R. at 8335-36. It argued that, because this option would not improve the quantity or quality of the discharged water, it ruled this option out from further consideration. *Id.* at 8336.

Alternative Control and Treatment Devices. Williamson Energy listed alternatives to sediment ponds for controlling discharges of settleable solids: “chemical soil stabilizers, erosion control blankets, geotextile filter bags, fiber rolls, silt fencing, straw mulch, straw bale dikes, and temporary seeding.” R. at 6202, 8336. It stated that it had used these in construction and operations under the current permit both as supplemental treatment and to prevent generating settleable solids. *Id.*

Williamson Energy argued that, although these alternatives are practical and effective for controlling surface runoff, they would not feasibly replace sediment control ponds. R. at 6202, 8336. It proposed to require these practices as BMPs as needed. *Id.*

Alternate Treatment Technologies. The assessment considered three technological alternatives to the discharge of solids and sediments.

Filtration. In a filtration process, water passes through a physical barrier that removes particulate matter from the water stream. R. at 8336. Williamson Energy argued that filtering mine water and stormwater would require a large and elaborate filtration system that would produce a sludge similar to that generated by the proposed settling ponds. *Id.*

Williamson Energy concluded that filtration is not feasible for its proposed operation because:

- 1) filtration is much more expensive than sediment ponds both in initial cost and long-term maintenance and operation, 2) filtration processes require a steady stream of water for treatment which is not the case in treating stormwater runoff, 3) a large area of land would be required for such a facility, and 4) maintenance and supervision of the filtration and sludge disposal operation would be burdensome and would increase production costs. R. at 6202, 6206, 8336.

Constructed Wetland. Constructed wetlands create anaerobic and aerobic environments to remove sulfates, some metals, and other contaminants. R. at 8337. A facility pumps water into the wetland at a controlled flow rate and allows the water to travel slowly through the system to achieve treatment. *Id.*

Williamson Energy cited two other facilities using wetlands as pilot projects. It stressed that both treat less than 100 gpm, “a small fraction of the total mine water and stormwater managed at the operations.” R. at 8337. It argued that, “[e]ven at the small flow rate, the surface area used by the wetlands is significant.” *Id.* It added that an “enormous amount of land” would be required to construct a wetland large enough for flow rates expected from mine stormwater runoff. *Id.* at 6203, 6206, 8337.

Williamson Energy asserted that this option had proven to be effective with significant limitations: “1) low and consistent rates of inflow, 2) eventual sludge accumulation requiring dredging and wetland reconstruction, and 3) release of hydrogen sulfide and other digestive gases into the atmosphere from sulfate digestion processes.” R. at 6203, 6206, 8337. Williamson Energy concluded that, even if this option is beneficial on a small scale, “it is not expected that [a] constructed wetland can treat the volume of stormwater expected at this facility.” *Id.* at 8337.

Coagulation (Chemical) Precipitation. Williamson Energy argued that this process “is not generally used to remove total suspended solids.” R. at 6203, 8337. Based on substantially the same factors it weighed in considering this as an option to discharging chlorides, sulfates, manganese, copper, and iron, Williamson Energy concluded that “the use of this technology is considered inappropriate at the Mine.” *Id.*

Proposed Discharge to Pond Creek

The assessment also considered a proposed new outfall directly to Pond Creek for discharging stormwater from existing sediment ponds. R. at 8312. It also sought a mixing zone for this proposed discharge. *Id.*

Outfall 009. Williamson Energy proposed a new RDA No. 3 tying into the exiting inactive impoundments RDA No. 1 and RDA No. 2. R. at 6201. With the new RDA No. 3, Williamson Energy proposed a new sediment basin to control rain that falls on the out slopes for discharge through the new Outfall 009 to Pond Creek.

Outfall 009ES. Williamson Energy also proposed an emergency discharge to the unnamed tributary through Outfall 009ES. R. at 6207; *see id.* at 6199, 6238-41. Pond 009 would discharge directly to Pond Creek through Outfall 009, and Williamson Energy expected Outfall 009ES to have a discharge only during an emergency. *Id.* IEPA proposed WQBELs for Outfall 009ES. *Id.* at 6242.

Receiving Water

Outfall 009. Through Outfall 009, Williamson Energy had proposed to discharge to segment NG-02 of Pond Creek, where there is 0 cfs of flow upstream of the outfall during 7Q10 low-flow conditions. R. at 6201; *see id.* at 6199 (map), 8338, 8358 (Figure 2-1). Segment NG-02 is listed on the 2016 Section 303(d) list for impaired waters due to “alteration in stream-side or littoral vegetative covers, chloride, dissolved oxygen sedimentation/siltation, changes in stream depth and velocity patterns, and loss of instream cover.” *Id.* at 8311-12; *see id.* at 6201, 8338. Listed causes and potential sources of the impairment include channelization, impacts from abandoned mine lands, loss of riparian habitat, streambank modifications/destabilization, crop production, agriculture, urban runoff/storm sewers, and dams or impoundments. *Id.* at 8312. Segment NG-02 “is classified as a Category 5 stream, not supporting aquatic life” but has not been assessed for fish consumption or aesthetic quality. *Id.* at 8338; *see* 35 Ill. Adm. Code 302.105(f)(1)(A).

Outfall 009ES. Through Outfall 009ES, Williamson Energy proposed to discharge to an unnamed tributary of Pond Creek, where there is 0 cfs of flow upstream of the outfall during 7Q10 conditions. R. at 6207; *see id.* at 6199 (map). The unnamed tributary is classified as a General Use water. It is not listed as a biologically significant stream and is not listed on the draft 2016 Section 303(d) list because it has not been assessed. *Id.* at 6207. The unnamed tributary is not subject to enhanced dissolved oxygen standards. *Id.* IEPA found that, because Williamson Energy’s “proposed activity will result in only short-term, temporary increases in pollutant loading and will not result in long term or permanent impacts to existing uses,” it is not subject to further Antidegradation Assessment. *Id.*, 6207, 6244, citing 35 Ill. Adm. Code 302.105.

Water Quality

Potential constituents of concern are those “for which the Pond Creek reach is listed on the 2014 or 2016 303(d) list, there is a water quality standard and the compound is potentially found in the discharge, or the compound is on the current NPDES permit for monitoring or has a permit limit.” R. at 8433. The Antidegradation Assessment listed constituents of concern as: sedimentation/siltation, sulfates, TSS, iron, dissolved oxygen, settleable solids, chloride, phenols, manganese, cadmium, copper, nickel, zinc, chromium, selenium, silver, and cyanide. *Id.* at 8433-34.

The Antidegradation Assessment determined that cadmium, silver, zinc, and cyanide are not of concern “either because of the nature of the discharge” or because they were not detected in samples from Pond 009. R. at 8434; *see id.* at 8338. “Dissolved oxygen is not expected to be an issue for this stormwater pond.” *Id.* at 8434. In addition, results for phenols, chromium, arsenic, copper, nickel, and selenium “show that the effluent will meet the water quality standards at the end of the pipe.” *Id.* at 8338, 8434. The assessment concluded that “the proposed discharge will not further impair Pond Creek for any of these constituents.” *Id.* It determined that TSS, chlorides, sulfate, and manganese are constituents of concern for this proposed discharge to Pond Creek. *Id.*

The assessment collected background samples from Pond Creek “upstream of the influences of the current discharges to the Unnamed Tributary of Pond Creek.” R. at 8338; *see id.* at 8441 (Figure 2). Of the 15 samples, the average background concentration of TSS was 55 mg/L. *Id.* at 8443 (Table 1: Representative Background Location). For chlorides, the average was 36 mg/L. *Id.* For sulfates, the average was 213 mg/L. *Id.* For manganese, the average was 0.217 mg/L. *Id.*

The assessment stated that “water stored in Pond 009 is representative of the effluent that will be discharged to Pond Creek.” R. at 8435. It also collected samples from Pond 009. *Id.* Of the nine samples, the minimum, average, and maximum concentrations of TSS were 5 mg/l, 26 mg/l, and 140 mg/L, respectively. *Id.* at 8444 (Table 2: Representative Sample for Discharge to Pond Creek). For chlorides, the minimum, average, and maximum concentrations were 540 m/L, 794 mg/L, and 1,550 mg/L, respectively. *Id.* For sulfates, the minimum, average, and maximum concentrations were 560 mg/L, 827 mg/L, and 1,040 mg/L, respectively. *Id.* For manganese, the minimum, average, and maximum concentrations were 0.026 mg/L, 0.090 mg/L, and 0.210

mg/L, respectively. *Id.* AquaAeTer also submitted 2019 sampling results for Pond 009. *Id.* at 6246-48.

Comparing water quality standards and expected effluent concentrations, chloride and iron concentrations are expected to be greater than the standard at the end of the pipe. R. at 8436. Manganese and sulfate concentrations are expected to be less than the standard at the end of the pipe. *Id.* Williamson Energy expects to control Pond 009 to ensure that chloride and iron meet WQS. *Id.*

The mixing zone analysis calculated potential maximum allowable discharges from Pond 009 into Pond Creek based on meeting WQS. R. at 8433-53, 8455-75, 5971-6154 (calculations).

Endangered/Threatened Species Consultation

The opinion above addressed Williamson Energy's endangered species consultation, which IEPA considered IDNR likely to terminate. *See supra* at 13, citing R. at 6203, 6206, 8355.

Proposed Increases in Loading

The assessment used the predicted effluent flows meeting the chloride and iron water quality standards to predict pollutant loadings to Pond Creek. R. at 8339, 8436-38; *see* 35 Ill. Adm. Code 302.105(f)(1)(B),

Chloride Loadings. The mixing zone analysis calculated background, effluent, and total chloride loads. R. at 8436, 8449 (Table 7). With a background flow of 1,000 cfs and the minimum concentration of 540 mg/L, the background load would be 194,079 lbs/day, at the minimum effluent concentration the load would be 8,442,431 lbs/day, and at maximum effluent concentration the load would be 933,990 lbs/day. *Id.* at 8449.

Iron Loadings. The mixing zone analysis calculated background, effluent, and total iron loads. R. at 8437, 8450 (Table 8). With a background flow of 1,000 cfs and the minimum concentration of 0.132 mg/L, the background load would be 2,658 lbs/day, at the minimum effluent concentration the load would be 2,064 lbs/day, and at maximum effluent concentration the load would be 1,286 lbs/day. *Id.* at 8450.

Manganese Loadings. The mixing zone analysis stated that "the manganese concentration in the effluent is less than the water quality standard." R. at 8437. The analysis calculated background, effluent, and total manganese loads. R. at 8437, 8451 (Table 9). With a background flow of 1,000 cfs and the minimum concentration of 0.026 mg/L, the background load would be 1,170 lbs/day, at the minimum effluent concentration the load would be 406 lbs/day, and at maximum effluent concentration the load would be 127 lbs/day. *Id.* at 8451.

Sulfates Loadings. The mixing zone analysis stated that "the sulfate concentration in the effluent is less than the water quality standard." R. at 8438. The analysis calculated background, effluent, and total sulfates loads using effluent flows. R. at 8438, 8452 (Table 10). With a

background flow of 1,000 cfs and the minimum concentration of 560 mg/L, the background load would be 1,148,300 lbs/day, at the minimum effluent concentration the load would be 8,755,113 lbs/day, and at maximum effluent concentration the load would be 626,677 lbs/day. *Id.* at 8452.

TSS Loadings. Because Pond Creek is listed as impaired for sedimentation and siltation, TSS is monitored to measure potential impact on the stream although there is no water quality standard for it. R. at 8438. The mixing zone analysis calculated background, effluent, and total TSS loads. R. at 8438, 8453 (Table 11). With a background flow of 1,000 cfs and the minimum concentration of 5 mg/L, the background load would be 296,509 lbs/day, at the minimum effluent concentration the load would be 78,171 lbs/day, and at maximum effluent concentration the load would be 84,360 lbs/day. *Id.* at 8453. “The resulting downstream concentration would range from 18 to 64 mg/L.” *Id.*

Purpose and Benefits

The analysis listed substantially the same purposes and benefits as for the proposed discharge to the Big Muddy River. *See supra* at 16, citing R. at 6201, 6205, 8324, 8340.

Analysis of Alternatives for Discharging Manganese, Chloride, Sulfate, and Iron in Pond Creek

The assessment examined discharge alternatives “to determine whether the measures are technically feasible and economically reasonable and would result in a lesser load increase, no load increase, or minimal environmental degradation to the receiving stream.” R. at 8341; *see id.* at 6202.

Proposed Alternative: Discharge to Pond Creek. Under its proposed alternative, Williamson Energy “would continue to have the option to discharge stormwater from stormwater collection ponds to an Unnamed Tributary to Pond Creek when water quality standards in the tributary will be met.” R. at 8341. In addition, it proposed to construct a new outfall to discharge from Pond 009 to a mixing zone in Pond Creek. *Id.*; *see id.* at 8361 (Figure 2-2). “The volume of water that will be discharged to Pond Creek will be dependent upon the flow in the Creek and the concentration of chloride and iron in Pond 009.” *Id.* at 8341.

The proposed typical water management process under this alternative (R. at 8341-44, 8349-51) is substantially similar to the process summarized above for the proposed discharge to the Big Muddy River. *See supra* at 16-18, citing R. at 8325-27, 8332-34, 8361 (Figure 2-2).

Do Not Mine. Based on substantially the same factors it weighed when considering this as an alternative to discharging to the Big Muddy River, Williamson Energy did not consider “Do Not Mine” a feasible or reasonable alternative to its proposed discharge. R. at 5889, 8345; *see supra* at 18-19, citing R. at 5888-89, 8327-28.

RO. Based on substantially the same factors it considered when weighing this as an alternative to discharging to the Big Muddy River, Williamson Energy concluded that RO technology “is not cost effective” and creates an additional waste stream generating its own

disposal problems. R. at 5891, 8345-46. It concluded that “RO is not considered applicable or feasible as a long-term solution for this type of application.” *Id.* at 5891, 8329; *see supra* at 19, citing R. at 5890-91, 6202, 6205, 8328-29.

Deep Well Injection with Mine Infiltration Water. Based on substantially the same factors it considered when weighing this as an alternative to discharging to the Big Muddy River, Williamson Energy concluded that deep well injection is not feasible for its operation. R. at 8346; *see supra* at 20, citing R. at 5892, 6202, 6205, 8329.

Evaporation. Based on substantially the same factors it considered when weighing this as an alternative to discharging to the Big Muddy River, Williamson Energy concluded that “[t]his option is not considered applicable or economically feasible” for its site. R. at 8346; *see supra* at 20, citing R. at 5893, 6202, 8329-30. It added that IEPA does not favor this option, and it questioned whether IEPA would issue a permit for it. R. at 8346.

Mechanical Evaporation. Based on substantially the same factors it considered when weighing this an alternative to discharging to the Big Muddy River, Williamson Energy concluded that this option is neither applicable nor feasible for its operations. R. at 8346; *see supra* at 20-21, citing R. at 6202, 6205, 8330.

Crystallization. Based on substantially the same factors it considered when weighing this as an alternative to discharging to the Big Muddy River, Williamson Energy concluded that “crystallization is not a stand-alone treatment option, and it is not considered either applicable or feasible as a treatment system” for the long-term operation of its mine. *Id.* at 5894, 8347; *see supra* at 21, citing R. at 5894, 6202, 6205, 8330.

Cost Effective Sulfate Removal (CESR). Based on substantially the same factors it considered when weighing this as an alternative to discharging to the Big Muddy River, Williamson Energy considered this option impractical for its mine. R. at 8347; *see supra* at 21, citing R. at 6202, 6205, 8330-31.

Coagulation Precipitation. Based on substantially the same factors it considered when weighing this as an alternative to discharging to the Big Muddy River, Williamson Energy concluded that the use of this technology was inappropriate at the Mine. R. at 8348; *see supra* at 22, citing R. at 6202, 6205, 8331.

Supervac. Based on substantially the same factors if considered when weighing this as an alternative to discharging to the Big Muddy River, Williamson Energy concluded that it would not be feasible at the Mine because it is not a stand-alone water treatment technology.” R. at 8348; *see supra* at 22, citing R. at 8331.

Alternatives Analysis for Discharging Total Suspended Solids, Total Settleable Solids, and Sedimentation/Siltation in Pond Creek

The assessment also weighed alternatives to discharging TSS, total settleable solids, and sedimentation/siltation in Pond Creek. R. at 6202-03, 8351-54; *see* 35 Ill. Adm. Code

302.105(f)(1)(D). The analysis examined options “to determine whether the measures are technically feasible and economically reasonable and would result in a lesser load increase, no load increase, or minimal environmental degradation to the receiving stream.” R. at 8348.

Discharge to Pond Creek. Above in discussing discharging constituents of concern, the opinion addressed proposed discharges to Pond Creek and an unnamed tributary. *See supra* at 27, citing R. at 8341, 8361; *see id.* at 8348-49.

The proposed typical water management process under this alternative (R. at 8341-44, 8349-51) was substantially similar to the process summarized above for the proposed discharge to the Big Muddy River. *See supra* at 16-18, citing R. at 8325-27, 8332-34, 8361 (Figure 2-2).

Do Not Mine. Based substantially the same factors in considered when weighing this as an alternative to discharging specified constituents, Williamson Energy did not consider “Do Not Mine” a feasible or reasonable alternative to its proposed discharge. R. at 5889, 8352; *see supra.* at 27, citing R. at 5888-89, 8344-45.

No Discharge of Stormwater. The analysis states that total containment with no discharge of stormwater was not feasible when “the area of the Mine receives in excess of 41 inches of precipitation as an annual average,” often with great intensity in short periods. R. at 8352. It argued that storing this stormwater would require a “massive” surface area that would displace more productive uses of land. *Id.* It added that Illinois regulations allow discharges from sedimentation ponds when the water meets applicable standards. *Id.* Williamson Energy concluded that eliminating stormwater discharges “is not an available option.” R. at 8352.

Reduce Number of Outfalls. Although the analysis acknowledges that it would be possible to combine outfalls within the permit area, it argued that this would simply result in the same total water discharge with the same overall water quality to the receiving streams. R. at 8352. It argued that, because this option would not improve the quantity or quality of the discharged water, it ruled this option out from further consideration. *Id.*

Use Alternative Sediment Control and Treatment Devices. The analysis lists alternatives to sediment ponds for controlling discharges of settleable solids: “chemical soil stabilizers, erosion control blankets, geotextile filter bags, fiber rolls, silt fencing, straw mulch, straw bale dikes, and temporary seeding.” R. at 8352-53. It stated that it has used these in construction and operations under the current permit both as supplemental treatment and to prevent generating settleable solids. *Id.* at 8353.

Williamson Energy argued that, although these alternatives are practical and effective for controlling surface runoff, they would not feasibly replace sediment control ponds. R. at 8353. It proposed to require these practices as BMPs as needed. *Id.*

Alternative Treatment Technologies

Filtration. Based on substantially the same factors it considered when weighing this as an alternative for the Big Muddy River, the analysis concluded that filtration was not feasible for its proposed operation. R. at 8353; *see supra* at 23, citing R. at 6202, 6206, 8336

Constructed Wetland. Based on substantially the same factors it considered when weighing this as an alternative for the Big Muddy River, the analysis concluded that, even if this option is beneficial on a small scale, “it is not expected that constructed wetland can treat the volume of stormwater expected at this facility.” R. at 8354; *see supra* at 23-24, citing R. at 6203, 6206, 8337.

Coagulation (Chemical) Precipitation. Based on substantially the same factors it considered when weighing this as an alternative for the Big Muddy River, the analysis concluded that “the use of this technology is considered inappropriate at the Mine.” R. at 8354; *see supra* at 24, citing R. 6203, 6206, 8337.

Reasonable Potential Analysis

On April 1, 2020, Williamson Energy submitted to IEPA supplemental information, including additional water samples, for a reasonable potential analysis. R. at 227-82. In a memorandum dated April 15, 2020, IEPA addressed WQBELs for discharges from Outfalls 001 through 008 to the unnamed tributaries of Pond Creek. *Id.* at 211-20; *see id.* at 21204-65. Because the NPDES permit application did not indicate watershed sizes or flow expected for mixing, for these discharges “no mixing is allowed.” *Id.*

IEPA first stated that “[c]hloride should be regulated as a daily maximum at the water quality standard of 500 mg/L for all of the outfalls.” R. at 211.

IEPA also stated that, under 35 Ill. Adm. Code 302.208(h)(2), the sulfate limit of 1250 mg/L is based on the average receiving stream chloride concentration of 21.5 mg/L and critical hardness of 141 mg/L. R. at 211. The permit applies that limit as a daily maximum. *Id.* Because chloride and hardness data were obtained from a monitoring station downstream from the Pond Creek mine, “this limit should be used for all outfalls.” *Id.*

IEPA stated that, “[w]here appropriate, Manganese should be regulated as a daily maximum at the water quality standard of 1.0 mg/L.” R. at 211.

IEPA stated that standard for cadmium, chromium (trivalent), copper, fluoride, lead, manganese, nickel, and zinc are based on hardness of 141 mg/L obtained from a monitoring station near Mount Vernon. R. at 211. IEPA generally converted dissolved metals standard to total metal. *Id.*

Outfall 001

At Outfall 001, IEPA concluded that there was no reasonable potential to exceed the WQS for arsenic, chromium (total), copper, iron (dissolved), lead, manganese, phenols, zinc, and selenium. R. at 212.

IEPA determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Cadmium.” R. at 212. It concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.0144 mg/L. *Id.* at 218.

Applying a multiplier of 1.7, the average of the mercury samples was greater than the human health WQS. R. at 212. IEPA concluded that the permit should include a mercury limit at the human health WQS. *Id.* IEPA recommended a permit limit of 12 ng/L as a 12-month rolling average. *Id.* at 218.

Although the analysis showed a reasonable potential to exceed the silver standard, IEPA stated that Williamson Energy “had no detections reported for Silver.” R. at 212. IEPA concluded that “no regulation of Silver is necessary and that no monitoring beyond the routine requirements is needed.” *Id.*

IEPA stated that the reported nickel value of 0.067 mg/L “has been determined to be an outlier according to the procedure found in the 18th edition of Standard Methods.” R. at 212. Applying the multiplier to the next highest nickel value shows that there is no reasonable potential to exceed the acute WQS. IEPA concluded that “no regulation of Nickel is necessary and that no monitoring beyond the routine requirements is needed.” *Id.*

Outfall 002

At Outfall 002, IEPA concluded that there was no reasonable potential to exceed the WQS for arsenic, chromium (total), iron (dissolved), lead, manganese, mercury, phenols, silver, zinc, and selenium. R. at 212-13.

IEPA determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Cadmium.” R. at 213. It concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.0144 mg/L. *Id.* at 218.

IEPA also determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Copper.” R. at 213. IEPA concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.0245 mg/L. *Id.* at 218.

IEPA also determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Nickel.” R. at 213. IEPA concluded that it should be regulated as a daily

maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.1104 mg/L. *Id.* at 218.

Outfall 003

At Outfall 003, IEPA concluded that there was no reasonable potential to exceed the WQS for arsenic, chromium (total), copper, lead, manganese, nickel, phenols, zinc, and selenium. R. at 213-14.

IEPA determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Cadmium.” R. at 214. It concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.0144 mg/L. *Id.* at 218.

IEPA determined that “[t]here is a reasonable potential to exceed the [Section] 302.208(g) water quality standard for Iron (dissolved).” R. at 214. It concluded that it should be regulated as a daily maximum at the Section 302.208(g) WQS. *Id.* IEPA recommended a permit limit of a daily maximum of 1.0 mg/L. *Id.* at 219.

IEPA determined that applying a multiplier to the average of mercury samples resulted in a level less than the human health WQS. R. at 214. IEPA concluded that “no regulation of Mercury is necessary and that no monitoring beyond the routine requirements is needed. *Id.*”

Although the analysis showed a reasonable potential to exceed the silver standard, IEPA stated that Williamson Energy “had no detections reported for Silver.” R. at 214. IEPA concluded that “no regulation of Silver is necessary and that no monitoring beyond the routine requirements is needed.” *Id.*

Outfall 004

At Outfall 004, IEPA concluded that there was no reasonable potential to exceed the WQS for arsenic, chromium (total), iron (dissolved), lead, manganese, mercury, nickel, phenols, zinc, and selenium. R. at 214.

IEPA determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Cadmium.” R. at 214. It concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.0144 mg/L. *Id.* at 219.

IEPA determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Copper.” R. at 215. It concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.0245 mg/L. *Id.* at 219.

Although the analysis showed a reasonable potential to exceed the silver standard, IEPA stated that Williamson Energy “had no detections reported for Silver.” R. at 214, 215. IEPA

concluded that “no regulation of Silver is necessary and that no monitoring beyond the routine requirements is needed.” *Id.*

Outfall 005

At Outfall 005, IEPA concluded that there was no reasonable potential to exceed the WQS for arsenic, chromium (total), copper, iron (dissolved), lead, manganese, nickel, phenols, zinc, and selenium. R. at 215.

IEPA determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Cadmium.” R. at 215. It concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.0144 mg/L. *Id.* at 219.

Applying a multiplier of 1.7, the average of the mercury samples was less than the human health WQS. R. at 215. IEPA concluded that “no regulation of Mercury is necessary and that no monitoring beyond the basic requirements is needed.” *Id.*

Although the analysis showed a reasonable potential to exceed the silver standard, IEPA stated that Williamson Energy “had no detections reported for Silver.” R. at 215. IEPA concluded that “no regulation of Silver is necessary and that no monitoring beyond the routine requirements is needed.” *Id.*

Outfall 006

At Outfall 006, IEPA concluded that there was no reasonable potential to exceed the WQS for arsenic, chromium (total), copper, iron (dissolved), lead, mercury, phenols, and zinc. R. at 215-16.

IEPA determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Cadmium.” R. at 216. It concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.0144 mg/L. *Id.* at 219.

IEPA determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Nickel.” R. at 216. It concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.1104 mg/L. *Id.* at 219.

Although the analysis showed a reasonable potential to exceed the silver standard, IEPA stated that Williamson Energy “had no detections reported for Silver.” R. at 216. IEPA concluded that “no regulation of Silver is necessary and that no monitoring beyond the routine requirements is needed.” *Id.*

IEPA stated that the zinc value of 0.095 mg/L on December 6, 2019 ‘has been determined to be an outlier according to the procedure found in the 18th edition of Standard

Methods.” R. at 216. Applying a multiplier of 2.1 to the next highest zinc value shows that “there is no reasonable potential to exceed” the acute WQS. *Id.* at 216. IEPA concluded that “no regulation of Zinc is necessary and that no monitoring beyond the routine requirements is needed.” *Id.*

Outfall 007

At Outfall 007, IEPA concluded that there was no reasonable potential to exceed the WQS for arsenic, chromium (total), copper, lead, phenols, and selenium. R. at 216-17.

IEPA determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Cadmium.” R. at 217. It concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.0144 mg/L. *Id.* at 219.

IEPA determined that “[t]here is a reasonable potential to exceed the [Section] 302.208(g) standard for Iron (dissolved).” R. at 217. IEPA concluded that it should be regulated as a daily maximum at the [Section] 302.208 WQS. *Id.* IEPA recommended a permit limit of a daily maximum of 1.0 mg/L. *Id.* at 219.

Although the analysis showed a reasonable potential to exceed the mercury standard, IEPA applied a multiplier of 1.7 to the average of the mercury samples and found that the concentration was less than the human health WQS. R. at 216-17. IEPA concluded that “no regulation of Mercury is necessary and that no monitoring beyond the basic requirements is needed.” *Id.* at 217.

IEPA determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Nickel.” R. at 217. IEPA concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.0144 mg/L. *Id.* at 219.

Although the analysis showed a reasonable potential to exceed the silver standard, IEPA stated that Williamson Energy “had no detections reported for Silver.” R. at 216-17. IEPA concluded that “no regulation of Silver is necessary and that no monitoring beyond the routine requirements is needed.” *Id.*

IEPA determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Zinc.” R. at 217. IEPA concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.1635 mg/L. *Id.* at 219.

Outfall 008

At Outfall 008, IEPA concluded that there was no reasonable potential to exceed the WQS for arsenic, chromium (total), copper, iron (dissolved), lead, phenols, and selenium. R. at 217.

IEPA determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Cadmium.” R. at 218. IEPA concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.0144 mg/L. *Id.* at 219.

IEPA determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Copper.” R. at 218. IEPA concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.0245 mg/L. *Id.* at 220.

Although the analysis showed a reasonable potential to exceed the mercury standard, IEPA applied a multiplier of 1.7 to the average of the mercury samples and found that the concentration was less than the human health WQS. R. at 217, 218. IEPA concluded that “no regulation of Mercury is necessary and that no monitoring beyond the basic requirements is needed. *Id.* at 218.

IEPA determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Nickel.” R. at 218. IEPA concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.1104 mg/L. *Id.* at 220.

Although the analysis showed a reasonable potential to exceed the silver standard, IEPA stated that Williamson Energy “had no detections reported for Silver.” R. at 217, 218. IEPA concluded that “no regulation of Silver is necessary and that no monitoring beyond the routine requirements is needed.” *Id.* at 218.

IEPA determined that “[t]here is a reasonable potential to exceed the acute water quality standard for Zinc.” R. at 218. IEPA concluded that it should be regulated as a daily maximum at the acute WQS using the default metals translator. *Id.* IEPA recommended a permit limit of a daily maximum of 0.1635 mg/L. *Id.* at 220.

Outfall 011

On January 17, 2020, at IEPA’s request, AquAeTer submitted revised modeling of the proposed diffuser design. R. at 1656-1844. On April 1, 2020, Williamson Energy submitted to IEPA supplemental information including additional water samples for a reasonable potential analysis. *Id.* at 226-82, 1241-1301.

At Outfall 011, IEPA concluded that there was no reasonable potential to exceed the WQS for arsenic, chromium (total), cyanide (available), iron (dissolved), lead, manganese, mercury, phenols, silver, zinc, and selenium. R. at 48, 57. IEPA also determined that “there is no reasonable potential to exceed the WQS outside of the mixing zone for cadmium, copper, nickel, sulfate, and chloride.” *Id.* IEPA also determined that there is no reasonable potential to exceed the acute WQS outside of the ZID for cadmium, copper, and nickel.” *Id.* IEPA modified the draft permit to reduce the maximum chloride concentration from Outfall 011 from 12,000 mg/L to 5,000 mg/L. *Id.*

Supplemental Information

Pond 009 Effluent

On April 26, 2019, AquAeTer submitted supplemental information for Pond 009 effluent. R. at 6246. AquAeTer reported results of sampling for numerous constituents performed on February 28, March 4, and March 6, 2019. *Id.* “The results were added to a summary table with the 2016 laboratory results for comparison.” *Id.* at 6248.

Proposed Outfalls 009 and 009ES

On June 18, 2019, Williamson Energy submitted to IEPA supplemental information for proposed Outfalls 009 and 009ES. R. at 6238. The information included two figures, one entitled Refuse Reclamation and Loading Decrease (*id.* at 6239) and one entitled Water Flow Diagram Proposed System (*id.* at 6240).

Modeling and Mixing Zone

On December 13, 2019, AquAeTer submitted a summary of modeling and mixing zone calculations. R. at 5971-6154. AquAeTer stated that it had in November 2016 provided calculations in its diffuser design report. *Id.* at 5971. It reported that it originally used CORMIX version 3.2 and “performed side-by-side comparison modeling with newer versions of CORMIX.” *Id.* It concluded that “[t]he results were nearly identical.” *Id.*

Discharge Alternatives

On December 17, 2019, Williamson Energy submitted supplemental information to IEPA. R. at 5886-87; *see id.* at 2613 (hearing transcript). The supplemental information first concerned the Antidegradation Assessment and addressed five discharge alternatives including RO. *Id.* at 5887-94.

Chloride Dispersion

On December 17, 2019, Williamson Energy’s supplemental information included modeling of the dispersion of chloride downstream from the proposed mixing zone in the Big Muddy River. R. at 5895-96.

Flood Study

On December 17, 2019, Williamson Energy’s supplemental information included results of a flood study performed by Alliance Consulting “to determine the change in water surface elevations” resulting from the proposed discharge. R. at 5897-5969. The study concluded that “the effects from the expected maximum discharge of Williamson Diffuser on the 2-year through 500-year water surface elevations and the flood extents are minimal.” *Id.* at 5897.

Big Muddy TMDL Report

On January 17, 2020, Williamson Energy submitted to IEPA additional supplemental information. R. at 503, 504. It included a “Big Muddy River TMDL Report” dated October 2004. R. at 854-1238; 1865-2263.

Big Muddy River Fish Data

The supplemental information also included Big Muddy River fish data. R. at 750-853, 2348-2450.

Stage 3 TMDL Report

The supplemental information also included a Stage 3 TMDL Report Upper Big Muddy Watershed prepared for IEPA by LimnoTech dated October 15, 2018. R. at 658-749, 2254-2347.

Updated Mixing Zone Modeling

The supplemental information also included updated CORMIX model results prepared by AquAeTer and dated January 17, 2020. R. at 643-57; *see also id.* at 1376-1566. AquAeTer noted that “[a]n additional consideration for diffuser design was the amount of debris carried by the River.” *Id.* at 643, 1376. A log jam during one trip to the stream had prevented it from reaching a USGS gauge location. *Id.* “[W]e wanted to keep the ports as low as possible to reduce the possibilities of log strikes, both from the standpoint of reducing risk of damage to the ports and to reduce the risk of log jams forming at the diffuser.” *Id.* IEPA asked AquAeTer to “revise the modeling to reduce bottom attachment.” *Id.*

Freshwater Mussels

The supplemental information also included “Freshwater Mussels of the Big Muddy River” prepared by the INHS and issued March 7, 2012. R. at 625-42, 1637-55.

Benthic Macroinvertebrates

The supplemental information included a Benthic Macroinvertebrate Community Survey of the Big Muddy River for Williamson Energy’s diffuser location prepared by Alliance Consulting, Inc. and dated December 2019. R. at 520-623, 1568-1636. It concluded that “the samples collected reflect a stream with poor habitat quality, low biodiversity, and a struggling benthic macroinvertebrate community.” *Id.* at 523, 1574. Contributing factors included “lack of heterogeneity in stream habitat (*i.e.*, very little riffle/run habitat), bank instability and substrate composition.” *Id.* at 1574-75.

Opinion on Ecological Effects

The supplemental information included Opinions on the Ecological Effects of Williamson Energy's Renewal of National Pollutant Discharge Elimination System Permit IL0077666 prepared by Potesta & Associates, Inc. and dated January 17, 2020. R. at 505-519, 1845-64. The report summarizes the opinions of Dr. Mindy Yeager Armstead of Marshall University. *Id.* at 507, 1847; *see id.* at 1855-64.

Dr. Yeager Armstead stated that IEPA had reviewed the Antidegradation Analysis and supporting documents provided by Williamson Energy. R. at 509, 1849, citing 35 Ill. Adm. Code 302.105. She noted that IEPA "concluded that the discharge would attain water quality standards and maintain existing uses of the stream. . . . I concur with their findings and have seen nothing in the public comments reviewed that undermines the agency conclusions." R. at 509, 1849.

Dr. Yeager Armstead cited the 2012 Mussel Survey (R. at 625-42, 1637-55) as providing an "excellent description of the current and historic condition of the Big Muddy River." R. at 510, 1850. She concluded that "[t]he potential for biological effects from discharge mixing in the Big Muddy River is low due to poor habitat conditions, heavy sedimentation, and historic and ongoing anthropogenic impacts in the watershed." *Id.* "The moderately healthy fish and mussel communities are comprised of taxa tolerant of the current conditions" and are likely to continue to persist with the proposed discharge complying with permit conditions." *Id.* at 511, 1851.

Dr. Yeager Armstead also responded to comments. Addressing violations of the facility's permit, she asserted that "[t]he mixing zone and updated real-time discharge limits contained in the draft permit represent a long-term solution to previous permit exceedances." R. at 511, 1851. Addressing monitoring, she stressed that "preliminary evaluations show a substantial relationship between chloride concentration and estimated total dissolved solids. *Id.* She asserted that, when the discharge begins subject to real-time limits, continuous monitoring of the discharge from Outfall 011 will ensure compliance. *Id.*

Addressing the chloride limit, Dr. Yeager Armstead stated that the current single chloride standard is accepted by USEPA and IEPA and that revising it is beyond the scope of this permit appeal. R. at 511-12, 1851-52. She added that mixing zones are calculated with "worst-case" discharge and flow conditions. *Id.* at 512, 1852. She also asserted that "[t]here is no evidence that increased chloride concentrations increase the toxicity of algal blooms." *Id.* at 513, 1853. She added that the comments refer to lakes or flow into the ocean, neither of which is relevant to this proposed discharge. *Id.*

Addressing the risk of flooding, Dr. Yeager Armstead states that the permitting process considered this and concluded that "the maximum pumped volume would raise the water level by less than an inch." R. at 512-13, 1852-53.

Additional Sampling

On April 1, 2020, Williamson Energy submitted to IEPA supplemental information for the Antidegradation Assessment. R. at 226-27. The information included additional water samples for the reasonable potential analysis. *Id.* at 228-82; *see also id.* at 1241-1301, 2451-2511. It also included additional samples for mercury analysis. *Id.* at 392-501; *see also id.* at 1302-12, 2512-22. Williamson Energy also submitted additional water samples for dissolved iron analysis. *Id.* at 283-391; *see also id.* at 1313-75, 2523-84.

Unionid Survey

On July 20, 2020, Williamson Energy submitted to IEPA a “Unionid survey at a proposed diffuser outfall site, Big Muddy River, Franklin County, Illinois” prepared by EcoAnalysts, Inc. for Alliance Consulting, Inc. R. at 151-64, 166-78. The survey reported that abundance was low. It collected “[a] total of 46 live individual of 11 species” in the survey area and observed no state-listed species. The survey stated that the assemblage was consistent with a 2011 survey. *Id.* at 157, 171. The survey concluded that “[c]onstruction of the proposed diffuser outfall is unlikely to harm unionid resources in the Big Muddy River.” *Id.*

Public Notice and Draft Permit

On July 12, 2019, IEPA provided public notice of the draft renewed NPDES permit and placed it on its public notice webpage. R. at 37; *see id.* at 6208-34. IEPA issued a Public Notice/Fact Sheet, which summarized existing and proposed new discharges and addressed Williamson Energy’s Antidegradation Assessment. R. at 6167-83, 6191-6207.

The Public Notice/Fact Sheet stated that IEPA “has made a tentative determination to issue an NPDES permit to discharge into the waters of the state and has prepared a draft permit and associated fact sheet. *Id.* at 6167, 6191. It added that IEPA would accept comments, including a request to hold a hearing, until August 12, 2019. *Id.*, citing 35 Ill. Adm. Code 309.115(a).

IEPA’s fact sheet stated that the renewed permit incorporated modifications including three new outfalls designated as Outfalls 009, 009ES, and 011; 70.7 acres for a pipeline to the Big Muddy River; and additional metals monitoring at specified outfalls R.at 2802.

Public Hearing

On August 12, 2019, Petitioners submitted to IEPA a comment, including a request that IEPA hold a hearing “so our members and other members of the public can share our concerns and ask questions of Agency staff.” R. at 3102; *see id.* at 3106-07.

On October 30, 2019, IEPA posted notice of its public hearing and made the notice available on its public notice webpage. R. at 37. In addition, IEPA mailed notice of the hearing to “Williamson and Franklin County officials; municipal officials in Johnson City; local, state,

and federal elected officials; those on the NPDES public notice list; and those who have requested to be notified of Bureau of Water hearings.” *Id.*

The notice stated that IEPA was holding the hearing “to accept comments from the public on the proposed reissuance of a permit with modifications for this project, prior to making a final decision on the permit application.” R. at 2798. The notice also stated that relevant issues included Williamson Energy’s Antidegradation Assessment and compliance with the CWA and Board regulations. *Id.* It added that “[i]ssues related to the mining operations are not relevant in this proceeding and should be directed to the Illinois Department of Natural Resources, Office of Mines and Minerals.” *Id.*

IEPA conducted the hearing on the permit renewal on December 18, 2019, in Marion. *See* R. at 39, 2596-2796 (transcript), 2798-2801 (notice of hearing). IEPA held the hearing “for the purpose of receiving comments on the draft permit before taking final action on the permit application. *Id.* at 40. “Approximately 185 persons representing the permittee and environmental groups participated in or attended the hearing.” *Id.* at 39. At the hearing, Mr. Clayton Cross commented on behalf of Williamson Energy (*id.* at 2619-26, 3302-06), and thirty-two other persons posed questions or offered oral comments (*id.* at 2626-2758). The record of IEPA’s hearing includes 399 exhibits. *Id.* at 2586-94 (exhibit list), 2843-5884 (exhibits). On January 13, 2020, IEPA posted the transcript of the public hearing on its website. *Id.* at 39.

Public Comments and IEPA Responsiveness Summary

IEPA received a number of comments on the draft permit and after the December 18, 2019 public hearing. *See* R. at 2798-5884. These comments addressed matters including impacts on wildlife (*e.g., id.* at 3265-66, 3366-67), consideration of environmental costs and benefits (*e.g., id.* at 2926-27, 3233), cumulative impacts on water quality (*e.g., id.* at 3057, 3195, 3220), risk of flooding (*e.g., id.* at 2889, 3771), impacts on recreational uses and tourism (*e.g., id.* at 2947-48, 3088, 3398), risks to human health (*e.g., id.* at 2896, 2942, 3031, 3368-69), and alternatives to the discharge and requiring treatment (*e.g., id.* at 2885).

Because of the large number of comments received, the Board in this opinion does not individually list each person who filed a comment or summarize each comment. This does not mean that the Board has not reviewed the comments. The Board recognizes the efforts made to attend the IEPA hearing and prepare and submit these comments.

Following the public hearing, IEPA on April 15, 2022, issued its Responsiveness Summary. R. at 35-113. Williamson Energy also responded to questions. *Id.* at 180-208. IEPA made its NPDES permit determination and the Responsiveness Summary available on its website. *Id.* at 37, 113. IEPA also mailed or emailed them “to all who registered at the hearing and to all who sent in written comments.” *Id.* at 113.

Below, the Board on an issue-by-issue basis summarizes representative comments and also summarizes IEPA’s response in its Responsiveness Summary (R. at 35-113). When Williamson Energy also responded to a comment (*id.* at 180-208), the Board also summarizes its response on that issue.

Protection of Existing Uses

Comment. On August 12, 2019, Petitioners submitted comments to IEPA. R. at 3101-07. Petitioners asserted that the permit's acute limit for chloride is "too weak" and should be set based on conditions in the Big Muddy River at a concentration lower than 500 mg/L. *Id.* at 3103, 3104, citing Amendments to General Use Water Quality Standards for Chloride, R18-32 (dismissed by Board at proponent's request). Petitioners also stressed that the permit did not include a chronic chloride limit. *Id.* at 3104. Based on these factors, Petitioners commented that the permit would fail to protect aquatic life. *Id.* They concluded that "[n]o increased discharge should be allowed to any area where it might harm existing uses under [Section] 302.105(a)." *Id.*

Citing public interest in the permit, Petitioners commented that a hearing should address questions including the effect the proposed discharge of chlorides and sulfates on "existing fish and aquatic life in the Big Muddy River and to other downstream uses." R. at 3106. Petitioners also stated that a hearing should address "[t]he uses of the Big Muddy River and other downstream waters that might be adversely affected by the proposed permit." *Id.* at 3107.

Following the public hearing, Petitioners and Southern Illinoisans Against Fracturing Our Environment (SAFE) on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comment asserted that it will "adversely affect existing uses of the Big Muddy River and Pond Creek and other creeks in the area" to allow increased discharges of pollutants including chloride without proper consideration. *Id.* at 4351, 4353-54.

Considering the direct effects of chloride, the comment argued that at least four factors preclude granting the permit under Section 302.105(a). *Id.* at 4355. First, it asserted that "Illinois' 500 mg/L chloride standard is not protective of existing uses against chronic toxicity especially during warm weather." *Id.* at 4356, citing *id.* at 4465-4792 (amended petition proposing chloride standards in R18-32). Second, it argued that the permit does not include "sound methodology for making a reasonable estimate of chloride levels with the equipment it plans to use." *Id.* at 4355. Third, it asserted that the permit uses a background chloride level lower than the level shown by available data. *Id.*, citing *id.* at 4377 (Baker comment). Fourth, the comment argued that the permit "assumes without evidence that all of the chloride discharged into the Big Muddy will flow downstream without any adverse impact and that no chloride will be stored in groundwater, side channels, sediment or biota to re-emerge into the river at a later time." *Id.* at 4355-56, citing *id.* at 4417 (Burkholder comment).

Response. IEPA asserted that the Big Muddy River and Pond Creek are General Use waters, which must be protected for aquatic life, wildlife, agricultural, secondary contact, and most industrial uses. R. at 49, citing 35 Ill. Adm. Code 302.202. It stated that "WQS are a set of water quality criteria sufficient to support the designated uses of each water body. . . . Numeric WQS are developed for specific parameters to protect aquatic life and human health and, in some cases, wildlife from the deleterious effects of pollutants." R. at 49, 64, 77, 79, 81, 85, 91, 96, 103. IEPA asserted that federal rules allow states to use mixing zones and ZIDs to implement WQS. *Id.* at 49, 77, 79, 103, citing 40 CFR 131.13, 35 Ill. Adm. Code 302.102. In the ZID, both acute and chronic criteria may be exceeded, but the acute criterion must be met at the edge of the

ZID. R. at 49, 77. In the mixing zone, the chronic criterion may be exceeded, but it must be met at the edge. *Id.*

IEPA asserted that the discharge would comply with all applicable WQS before discharge or after mixing in the ZID and mixing zone. R. at 82, 92, 97; *see id.* at 85. IEPA concludes that the revised permit included terms and conditions ensuring that this discharge would protect existing uses of the Big Muddy River and Pond Creek. *Id.* at 48, 49.

Williamson Energy responded that WQS are set through a rulemaking process that “determines whether they are protective of uses of the stream.” R. at 184, 198. It asserted that, because the discharge meets the WQS, it will not change the ability of the water body to meet the existing uses. *Id.*

Chloride Standard

Comment. On August 12, 2019, Petitioners submitted comments to IEPA. R. at 3101-07. Petitioners asserted that proposed permit includes an acute chloride limit that is “too weak” and does not include a chronic chloride limit. *Id.* at 3103. Petitioners asserted that the acute chloride limit should be set based on conditions in the Big Muddy River at a concentration lower than 500 mg/L. *Id.* at 3104, citing Amendments to General Use Water Quality Standards for Chloride, R18-32 (dismissed by Board at proponent’s request). Petitioners added that “[t]he lack of a chronic limit is intolerable given that [the] permit allows dry weather discharges.” R. at 3104.

Comment submitted to IEPA before the public hearing also addressed the proposed chloride limit. On December 12, 2019, Lucia Amorelli of Carbondale noted that the chronic limits for chloride at the federal level and in adjoining states are “much lower than the Illinois accepted level of 500 mg/L.” R. at 3288; *see id.* at 2643 (hearing transcript). She also questioned why Illinois does “not have both an acute and a chronic level like other states and the national standard.” *Id.* at 3288.

Petitioners and SAFE also commented that the 500 mg/L chloride standard does not protect against chronic toxicity, especially during warm weather. *Id.* at 4356. They argued that a proper and protective chronic chloride standard could be established based on studies submitted in R 18-32. *Id.*, citing Amendments to General Use Water Quality Standards for Chloride, R18-32 (dismissed by Board at proponent’s request); R. at 4365-4791. In a review of the proposed permit submitted as an exhibit, Dr. Baker stressed intermittent flow in Pond Creek and concluded that the “[e]ffluent limitation must be at least as stringent as the water quality standards they seek to meet.” R. at 4376.

Response. IEPA asserted that the Act requires it to issue a permit “upon proof that the proposed facility or equipment will not cause a violation of the Act or promulgated regulations.” R. at 93, citing 415 ILCS 5/39(a) (2020). IEPA responded that it had not considered chloride standards based on studies regarding effects of salination on aquatic animals. It argued that “the concentrations recommended by these studies have not been adopted by the Board.” R. at 93.

IEPA concluded that the permit includes limits and conditions ensuring that the proposed discharge will meet the promulgated WQS. *Id.*

IEPA also responded that it modified the draft permit in Special Condition 15 by reducing “the maximum chloride concentration for Outfall 011 from 12,000 mg/L to 5,000 mg/L.” R. at 52, 57.

Chloride Monitoring

Comment. On August 12, 2019, Petitioners submitted comments to IEPA. R. at 3101-07. The comment noted that “the permit proposes to use conductivity as a surrogate for chlorides.” *Id.* at 3106. It argued that, as a result of other factors, conductivity and chloride levels may not necessarily correlate with one another. “This could result in a poor calibration curve unless done properly.” *Id.*

Comments at public hearing also addressed the issue of chloride monitoring. On behalf of the Prairie Rivers Network, Amber Pankau first noted the proposal to monitor the downstream chloride concentration in two ways, with both calculations based on a mixing equation and physically with a downstream mixing probe. R. at 2695-96. She questioned whether it would violate the permit “if either of these values are found to be above 500 milligrams per liter of chloride.” *Id.* at 2696.

Ms. Pankau also noted that “the permit proposes continuous monitoring of chloride via the conductivity upstream and downstream of the discharge.” R. at 2697. She questioned how Williamson Energy would develop accurate calibration: “[d]oes the Agency have to approve that calibration curve derived by the mine? Are the calibrated values also reported on the DMR? So do we have all of that information that they’re using to do that calibration?” *Id.*

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments. R. at 4349-71. The comment argued that the proposed permit included a “complex scheme” for chloride monitoring that would estimate chloride levels from conductivity data. *Id.* at 4353, 4370. However, it argued that the permit “offers no guidance on how this correlation is established or whether the Agency needs to approve the correlation.” *Id.* at 4370. The comment asserted that the correlation must be part of the permit so that IEPA and the public can review it. *Id.* It also asserted that the Big Muddy River has variable conductivity and that “the correlation will never be very accurate and will be tricky to establish.” *Id.*, citing *id.* at 5445-49.

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted to IEPA comments on the proposed permit. R. at 4349-71. They argued that the Antidegradation Assessment uses an estimated background level of chloride of 30 mg/L “that is lower than that shown by the available data.” R. at 4355. They argued that an updated 90th percentile background concentration based on the last five years of data would be “greater than 103 mg/L.” *Id.*

Petitioners’ comment also argued that the permit should include a number of additional provisions. First, it argued that the permit should “[r]equire Williamson Energy to create a

Quality Assurance Project Plan for the chloride monitoring scheme and give the public an opportunity to comment on the plan.” R. at 4368. Second, it argued that the permit should “[r]equire a plan for validating the correlation of conductivity to chloride, and stipulate that the correlation has to be sufficiently developed for use, and reviewed by the public, before the permit is granted or the permittee can begin discharging.” *Id.* It also argued that the permit should clarify “how the chloride in the effluent is being monitored. If that monitoring is to be a correlation to conductivity, the effluent and the receiving waters will need correlations developed based on years of data and allowing for variability.” *Id.*

The comment included as an exhibit Dr. Burkholder’s review of the proposed permit. R. at 4413-20. She noted that the permit proposes to monitor chloride by calculating chloride levels from conductivity data. *Id.* at 4418. Although Williamson Energy’s discharge monitoring reports would include only the calculated values, she argued that “the permit provides no information about the equation selected to derive calculated chloride values from conductivity data.” *Id.* She also argued that the permit does not provide scientific support for the equation and does not indicate “whether a robust background dataset was used to customize it for the Big Muddy River prior to supplying the equation.” *Id.*

Response. IEPA responded that the monitoring “will use upstream flow and continuous chloride concentration data and the effluent flow and continuous chloride concentration data to determine the chloride concentration at the edge of the mixing zone.” R. at 47, 66, 70-71, 82, 110. “[U]pstream and effluent chloride concentration will be determined from the use of a continuous conductivity monitor that has been correlated to the chloride concentration.” *Id.* at 47-48, 66, 71, 82, 110. IEPA added that the chloride value “will be reported on the DMR and must not exceed 500 mg/L.” *Id.* at 47, 48, 66, 71, 82. The permit also requires installing a “continuous monitor within 10 feet downstream of the edge of the mixing zone. *Id.* at 48, 66, 82. In addition, the permit requires reporting the effluent discharge rate and the chloride concentration with a maximum of 5,000 mg/L. *Id.* at 65.

IEPA responded that, because chloride varies as a percent of conductivity, Williamson Energy “will develop a site-specific database that correlated the conductivity and chloride concentrations for the Big Muddy River and for the treated effluent.” R. at 68, 75, 82. IEPA asserted that the permit will require “monthly chloride samples and conductivity measurements, in the Big Muddy River (upstream and downstream) and in the effluent, to ensure that the calibration curves remain accurate.” *Id.* IEPA added that the permit requires it to approve the calibration curves “before discharge, after six months of operation, and yearly thereafter.” *Id.*

Williamson Energy responded that data correlating conductivity and chloride concentrations “will be provided to IEPA so that the Agency will be able to ensure compliance with the water quality standards and the permit. R. at 193. It added that information or data submitted to support the calibration will be publicly available.” *Id.*

IEPA responded that both “the mixing zone calculations (correlated to conductivity) and the downstream chloride concentration (correlated to conductivity) must be reported on the DMRs as a daily maximum and must be at or below 500 mg/L.” R. at 65, 82; *see id.* at 2696. IEPA reports that sources submit quarterly DMRs including monitoring results. *Id.* at 83. IEPA

reported that it runs monthly compliance reports using ICIS/ECHO to detect non-compliance. *Id.* at 83, 98. If it detects non-compliance, it determines compliance or enforcement action to address it. *Id.*

IEPA responded to the comment on the 90th percentile chloride concentration by stating that it is based on data from the dam at Rend Lake. R. at 65. IEPA stated that it “originally intended to use that value to calculate the upstream chloride concentration.” *Id.* IEPA added that the permit instead “requires the use of continuous chloride concentration (correlated to the conductivity value).” *Id.* As a result, the 90th percentile figure “will not be used to calculate the amount of mixing available.” *Id.*

Williamson Energy responded that “[t]he design used a background concentration of 151 mg/L for determining the worst-case condition for discharging.” R. at 193. It argued that, “[b]y using a background concentration that is greater than the known background concentration, the Mine is ensuring that the water quality criteria will be met.” *Id.* Williamson Energy asserted that, even if that concentration under-reports background, it still protects compliance with the WQS. “[I]f the background concentration approaches or exceeds the WQS, then Williamson’s ability to use the mixing zone will be limited or prevented by the terms and conditions of the permit.” *Id.*

Antidegradation Assessment

Comment. In comments submitted on August 9, 2019, Joyce Blumenshine stated that “[t]he Antidegradation Statement does not have any information on the social and economic benefits of the Big Muddy River; the wetlands this proposal will impact; the values of the fishing, hunting and other recreation along and in the river; anything regarding potential costs of additional erosion or flooding or the harm to the ecosystem the addition of mine discharges could exacerbate.” R. at 3233. She asked whether IEPA can “require a new Antidegradation Statement that includes the current commercial, recreational, environmental and ecosystem social and economic benefits and has more of a total assessment instead of only what is of benefit to the mine?” *Id.*

Comment at the public hearing also addressed the Antidegradation Assessment. As one example, on behalf of the Southern Illinois Kayak and Canoe Club, Galen Thomas commented that “the antidegradation assessment is deficient because it seems to totally be focused on the water quality issues while not giving any assessment to the impact on the recreational use of the Big Muddy and the potential economic impact on reducing the Big Muddy’s contribution to the region as a tourism destination.” R. at 2674.

Response. In its Responsiveness Summary, IEPA responded that it completed an Antidegradation Assessment as required by 35 Ill. Adm. Code 302.105. R. at 90. IEPA asserted that Williamson Energy provided supplemental information for the alternatives analysis including its projected benefits for employment, payroll, and tax revenues. *Id.*; *see id.* at 8324. IEPA added that Williamson Energy had “summarized the fish data from 1964 to 2018 that has occurred in the Big Muddy River and in the Big Muddy River watershed” (*id.* at 90; *see id.* at 750-853, 2348-2450) and also provided a mussel survey (*id.* at 90; *see id.* at 1637-55). Based on

these factors, IEPA “concludes that the antidegradation assessment satisfied all of the requirements of 35 Ill. Adm. Code 302.105.” *Id.* at 90.

Consideration of Discharge Alternatives

Comment. Comments submitted to IEPA addressed this issue. On August 7, 2019, Beth Martell of Carbondale commented that “[t]he mine has not provided any valid data on alternatives to dumping this mine problem water into the public’s tap via a pipe to the Big Muddy River.” R. at 3019.

On August 12, 2019, Petitioners submitted comments to IEPA. R. at 3101-07. Citing public interest in the proposed permit, Petitioners commented that a hearing should address whether there are “[w]astewater treatments for the polluted water to be discharged under the permit that are alternatives to the simple dilution and primitive lagoon treatment?” R. at 3107. The comment also questioned “[w]hether there are alternatives to discharging the wastewater to rivers and streams?” *Id.*

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comment acknowledged that IEPA received “a new document regarding consideration of alternatives” just before the hearing. *Id.* at 4364, n.31; *see id.* at 5886-94. The comment argued that the public did not have sufficient time to review this information before the hearing. *Id.* at 4363, n.31.

Petitioners’ comment argued that “there has been a completely inadequate consideration of treatment alternatives – costs are not fully quantified.” *Id.* at 4364. It argued that the analysis provides only “rough estimates” of what treatments may cost “but no idea of the profits that might be made from the mine against which to weigh such costs.” *Id.* The comment concluded that IEPA should not accept “summary rejection of better treatment.” It notes that other coal mines use methods that Williamson Energy has claimed cannot be used. *Id.*, citing R. at 5511-17 (Case history on the reduction of chlorides from mine water), 5519-37 (Report on the Current and Proposed Use of Reverse Osmosis Treatment in Surface and Underground Coal Mines), 5539-48 (Treatment and disposal of saline wastewater from coal mines in Poland).

Other comments submitted after the hearing also addressed this analysis. Jan Thomas of Murphysboro discounted the conclusion that deep injection wells were not an economically reasonable option for disposing of the infiltrated groundwater. R. at 3698. She questioned whether Williamson Energy had “provided any hard number to IEPA to justify their assertion.” *Id.* She also questioned “[w]ho determines what is economically reasonable?” *Id.*; *see id.* at 2665-66 (hearing transcript).

Joyce Blumenshine of Peoria commented that the list of discharge alternatives “does not include anything regarding adjustments that could be made in mining operations.” *Id.* at 5870. She added that the analysis does not mention mine profits “or what percentage the costs of an alternative treatment process would be of this mine’s profits.” *Id.* She concluded that “much of the reason discharge to the Big Muddy appears to be preferred is because it is the lowest cost option for the mine.” *Id.*

Response. IEPA responded that an underground injection control (UIC) well could dispose of mine infiltration water under appropriate conditions. R. at 59. IEPA stated that “injection wells must be installed at extreme depths to ensure they do not affect potential aquifers used for public consumption and into a geologic formation that is capable of receiving excess water.” *Id.* It added that the formation at the site of the mine “has a limited amount of volume it can receive instantaneously and long term.” *Id.* IEPA projected that using this alternative at the mine would require nine deep injection wells and miles of pipeline. *Id.* “An ultra-filtration system would also be needed to remove any suspended solids from the water prior to injection.” *Id.* Citing operational difficulties with this alternative at a nearby mine, IEPA concluded that deep well injection “is an unreliable and impractical alternative.” *Id.*; *see id.* at 60.

IEPA added that Williamson Energy provided supplemental information on alternatives. R. at 87; *see id.* at 5887-94. Although it concluded that deep well injection, evaporation, and crystallization were not applicable or feasible, IEPA revised the permit by requiring Williamson Energy to install and operate a 1.0 MGD RO system. R. at 87-90.

Williamson Energy responded that Foresight installed and operated two underground injection wells at its Sugar Camp mine. It stated that “[t]he wells operated until January 2017, at which point the wells ceased operating because they were unable to continue to accept injections.” R. at 191. Williamson Energy added that the two wells accepted “on average 3,750,000 gallons per month, which represents less than 4% of Williamson water disposal needs.” *Id.*

Consideration of Social and Economic Development and Community Benefit

Comment. On August 12, 2019, Petitioners submitted comments to IEPA. R. at 3101-07. The comment argued that the effect of the proposed discharges on flooding, groundwater use, erosion, river levels, public use, and other factors had not been determined. *Id.* at 3105. It argued that these factors “are relevant to determining whether the permit would in fact benefit social or economic development in the area.” *Id.* Citing public interest in the proposed permit, Petitioners commented that a hearing should address questions including “the impacts of the ongoing pumping of groundwater at the mine and its potential effect on social and economic development in the area” and “[w]hether coal production can properly be considered as a benefit given the effects of coal combustion on the global climate.” *Id.* at 3106-07.

Also on August 12, 2019, Joyce Blumenshine of Peoria questioned whether IEPA can require “a new Antidegradation Statement that includes the current commercial, recreational, environmental and ecosystem social and economic benefits and has more of a total assessment instead of only what is of benefit to the mine?” R. at 3233.

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comment asserted that the permit violates Board rules by allowing new discharges “that are not necessary to accommodate important social and economic development.” *Id.* at 4351. It added that the permit would be detrimental to development by tying the community to an “an industry without a long-term future and a

company likely to leave the community with a large environmental hazard.” *Id.*; *see id.* at 4359-61.

Response. IEPA responded that “[t]he purpose of ongoing groundwater pumping at the mine is to control the amount of water in the mine so that the mine workers can safely operate the mine.” R. at 60. It added that it expects groundwater impacts near the mine to be “minimal.” *Id.* IEPA asserted that “community water supply in the area of the mine is a surface water supply, thus not impacted by water usage.” R. at 59. It stated that “[t]he few private wells in the area are generally less than 200 feet in depth.” *Id.* Because the formation supplying saline water is approximately 450 to 600 feet in depth, IEPA asserted that “[a]ny impact of water withdrawal from this depth on the more shallow private wells would be expected to be minimal.” *Id.*

IEPA responded that the Antidegradation Assessment complied with 35 Ill. Adm. Code 302.105. R. at 90, 109. It cites projected economic benefits, various data and surveys, and supplemental information submitted by Williamson Energy. *Id.*

Williamson Energy responded that its proposed discharge “will support a mining operation that employs over 235 direct, highly-paid employees and supports as additional 705 indirect jobs, using industry-standard metrics for measuring indirect impacts of coal mining. The mine supports an additional 100 jobs directly through the use of contractors.” R. at 207. To the extent comments address environmental harms and other risks, Williamson Energy responded that these are not expected to result from the discharge “as it will comply with water quality standards.” *Id.*

Reasonable Potential Analysis

Comment. On August 12, 2019, Petitioners submitted comments to IEPA. R. at 3101-07. Petitioners argued that the reasonable potential analysis was improper because IEPA “did not use the multipliers recommended by U.S. EPA” to assure measurement or require adequate testing. *Id.* at 3103, 3015, citing Des Plaines Watershed Alliance v. IEPA, 2007 Ill. Env. LEXIS 149, *138 (2007); PCB 04-88 (Apr. 19, 2007). They asserted that USEPA’s technical support document establishes multipliers “to properly analyze the risk of toxic discharges.” R. at 3105. While IEPA “believes the multipliers are too large when there are few samples,” Petitioners asserted that the way to avoid this “is to require more samples. This will bring down the U.S. EPA multiplier without risking the environment.” *Id.*

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comment argued that the proposed permit would violate Board regulations because the reasonable potential test “was not properly performed at least with regard to mercury, copper, iron, nickel, and selenium. It appears that cadmium and manganese have also not been tested properly.” R. at 4353.

Response. IEPA stated that it considered a 1991 USEPA technical support document when it calculated reasonable potential to exceed. R. at 74. It argued that this guidance document “does not require 10 samples to perform a reasonable potential analysis” and instead “recommends a higher multiplier should be used when fewer samples are taken.” *Id.* “As an

example, with a coefficient of variation of 0.6, if ten samples are taken, the multiplier is 1.7 and if five samples are taken, the multiplier is 2.3.” *Id.*

IEPA responded that its reasonable potential analysis for Outfall 011 determined that “the following contaminants do not have a reasonable potential to exceed the WQS in the effluent: arsenic, chromium (total), cyanide (available), iron (dissolved), lead, manganese, mercury, phenols, silver, zinc, and selenium.” R. at 48, 57, 73, 75, 83-84, 85, 86. It also determined that there is “no reasonable potential to exceed the WQS outside of the mixing zone for cadmium, copper, nickel, sulfate, and chloride.” *Id.* IEPA also determined that “there is no reasonable potential to exceed the acute WQS outside of the ZID for cadmium, copper, and nickel.” *Id.*

IEPA asserted that, based on comments addressing Outfalls 001 through 008, Williamson Energy at IEPA’s request performed additional sampling. R. at 75. Based on data obtained through that additional sampling, IEPA modified the permit to additional limits “for mercury at Outfall 001, copper and nickel at Outfall 002, iron (dissolved) at Outfall 003, copper at Outfall 004, nickel at Outfall 006, iron (dissolved), nickel, and zinc at Outfall 007, and cadmium, copper, nickel, and zinc at Outfall 008.” *Id.* at 75, 85, 110. IEPA added that “[m]anganese is regulated in the permit at Outfalls 006, 007, 008, and 011.” *Id.* at 111.

Williamson Energy responded that, based on its additional sampling for mercury with an MDL of 0.5 nanograms per liter, the effluent “does not have the reasonable potential to exceed the WQS for mercury.” R. at 189, 208.

Pond Creek

Comment. At the public hearing, Barbara McKasson asked IEPA why it was “proposing to grant the mine a mixing zone for chloride at the Pond Creek Outfall if the Big Muddy River is already impaired?” R. at 2705. She commented that the chloride level in Pond Creek “already has been measured at or near the maximum of 500 milligrams per liter.” *Id.*; *see id.* at 2644.

Also, following the public hearing, Petitioners and SAFE commented that the permit violated Board rules “by allowing a mixing zone in Pond Creek where no dilution is available.” R. at 4353.

Response. In its Responsiveness Summary, IEPA stated that it “has removed the proposed mixing zone in Pond Creek from the NPDES permit.” R. at 71; *see id.* at 41, 109. IEPA reported that between May and October of 2019, it had collected six samples for chloride concentrations, which ranged from 687 mg/L to 1,100 mg/L. *Id.* at 71. IEPA added that Pond Creek is still listed as “impaired for aquatic life with potential cause given as chloride.” *Id.* IEPA stated that, “[b]ecause of that impaired status, the permit has been modified to not authorize discharges from the proposed Outfalls 009 and 009ES into Pond Creek and the unnamed tributary of Pond Creek respectively.” *Id.* IEPA added that it has also modified the permit by requiring Williamson Energy to install and operate a 1.0 MGD RO unit. *Id.*; *see id.* at 109.

Cumulative Effects

Comment. Comments submitted to IEPA addressed the issue of cumulative effects of the proposed discharge. Kathy Livingston of Carbondale cited the Sierra Club to assert that “[n]o assessment is provided of the cumulative water quality impacts on the Big Muddy River from this proposal over the many years of continued coal mining.” R. at 2901. At the public hearing, Christina Krost on behalf of Faith in Place asked that the permitting process “consider cumulative impacts of pollution on vulnerable communities and on plants and animals.” *Id.* at 2757.

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments. R. at 4349-71. The comments argued that the permit fails to protect existing uses in the Big Muddy River because it has not considered the effect of increased discharges of numerous pollutants, “and the cumulative effect of the increased concentrations of all of these pollutants has been totally ignored.” *Id.* at 4353-54. The comment also argued that analysis of the discharge should consider “the cumulative effects of all of the pollutants and stresses that it is proposed to increase together” and also consider DO levels “that regularly fall below applicable Illinois water quality standards.” *Id.* at 4357. It asserted that “[t]he proposed discharge is very likely to exacerbate the existing aquatic life use impairment.” *Id.*

Dr. Baker’s comment asserted that “IEPA has not taken these cumulative or synergistic effects into account at all in the proposed permit.” R. at 4377-78. His comment noted that the Sugar Camp mine will be discharging chloride upstream from Outfall 011. *Id.* at 4378. Dr. Burkholder’s comment noted that the Pond Creek mine is not the only coal mine in the Big Muddy watershed. *Id.* at 4420. Her comment provided examples to “illustrate the high potential for synergistic and additive, adverse effects to beneficial aquatic life” in stream segments affected by the discharge. *Id.* at 4419-20. She asserted that these effects “underscore the need to have a margin of safety in the permit.” *Id.* at 4420.

Response. IEPA states that “it shall be the duty of the Agency to issue such a permit upon proof by the applicant that the facility will not cause a violation of the Act or of regulations hereunder.” R. at 82, citing 415 ILCS 5/39(a) (2020). IEPA argued that, because Illinois’ WQSs are based on individual constituents, those individual constituents do not address cumulative impacts on designated uses. R. at 82.

However, IEPA asserted that it modified the draft permit by removing the proposed Outfalls 009 and 009E, requiring an RO unit, and adding a TSS limit for Outfall 011. R. at 92. IEPA argues that each outfall must comply with WQS, so “there will not be any cumulative effects of discharges from those eight outfalls.” *Id.* IEPA further argues that, “[s]ince the discharge is required to comply with all applicable WQS prior to discharge or after mixing in the mixing zone and ZID, the designated uses will be fully protected.” *Id.*

Phosphorus

Comment. Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comment asserted that the permit would

violate Board regulations by increasing levels of phosphorus in the Big Muddy River. *Id.* at 4351. Comments by Dr. Burkholder argued that high levels of sulfate in the permitted discharge will result in releasing phosphorus from sediment into the water column. *Id.* at 4417-18 (citations omitted).

Response. IEPA stated that the discharge does not have sufficient phosphorus to contribute to a potential impairment for it. R. at 70, 105, 108. IEPA elaborated that “the mine discharge doesn’t contain phosphorus.” *Id.* at 105.

Williamson Energy asserted that the discharge was not expected to result in increased phosphorus concentrations. R. at 187, 204. It responded that comments suggested that phosphorus would be released from sediments by increased concentrations of salt and chloride. *Id.* It disputed the apparent suggestion that “the sediments represent an infinite source of phosphorus.” *Id.*

Cyanobacteria

Comment. On August 12, 2019, Petitioners submitted comments to IEPA. R. at 3101-07. The comments asserted that “[i]ncreased chloride levels may increase toxicity of algal blooms in [the] Big Muddy and other waters.” *Id.* at 3103. The comments cited studies “indicating that increased chloride levels may increase the levels of cyanobacteria in water bodies.” *Id.* at 3106. The comment asserted that “IEPA must thoroughly consider this issue before allowing the levels of chloride discharge contemplated by this draft permit.” *Id.*

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. Petitioners comment that the permit would violate Board regulations by allowing increased pollutant discharges, leading to chemical and biological processes that will increase cyanobacteria in the water column. *Id.* at 4351. In her comments, Dr. Burkholder asserted that high concentrations of chloride and sulfate in the permitted discharge “have been shown to enhance phosphorus release from the sediments.” *Id.* at 4415. She argued that toxigenic cyanobacteria “have high P optime and would be expected to be stimulated by the enhanced sediment P release.” *Id.* She added that toxic cyanobacteria “have been shown to be capable of withstanding major increases in salinity,” and “tend to have high tolerance for limited light in comparison to many other algae,” and also tend to have “high tolerance of toxic heavy metals.” *Id.* at 4415-16. She stated that these traits provide advantages to cyanobacteria over other algae in freshwaters affected by alkaline effluents from coal mining. *Id.* at 4416.

Response. IEPA stated that “[c]yanobacteria have the ability to convert nitrogen gas into inorganic forms of nitrogen needed for growth.” R. at 105. IEPA asserted that “[t]he claim that there will be an increase in cyanobacteria is based on the assumption that there will be an increase in phosphorus.” *Id.* IEPA argued that this increase will not occur “because the mine discharge doesn’t contain phosphorus.” *Id.* It concluded that “there will not be an increase of cyanobacteria.” *Id.*

Williamson Energy responded that cyanobacteria may have an advantage over algal species because they can convert nitrogen gas. R. at 187, 204. It argues that, because the discharge is not expected to increase downstream phosphorus, an increase in cyanobacteria is not expected. *Id.*

Mercury

Comment. Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comment asserted that the reasonable potential test regarding mercury was not properly performed and could not determine whether permitted discharges have a reasonable potential to cause or contribute to violations of the applicable mercury standard. R. at 4353; *see id.* at 4365, 4366.

Response. IEPA responded that Williamson Energy conducted additional sampling of Outfalls 001 through 008 with an MDL of 0.5 nanograms per liter. R. at 74, 111. Based on data obtained at this MDL, IEPA modified the permit by adding a mercury limit for Outfall 001. R. at 69, 74, 111. IEPA added that its data show “no reasonable potential for Outfalls 002 through 008 to exceed the WQS for mercury.” *Id.* at 72, 74. IEPA also noted that Special Condition 18 requires monitoring Outfalls 006, 007, 008, and 011 for mercury monthly for one year and then semi-annually. *Id.* at 72, 111. IEPA concluded that the permit as drafted meets the requirements of the Board’s rules. *Id.* at 111.

Williamson Energy responded that it performed additional testing as IEPA requested. R. at 189, 208. With an MDL of 0.5 nanograms per liter, it argued that this testing shows that the “effluent does not have the reasonable potential to exceed the WQS for mercury.” *Id.*

Methylmercury

Comment. Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments. R. at 4349-71. The comment asserted that “[i]t is well-established that the Big Muddy is already impaired by methyl-mercury pollution.” *Id.* at 4356; *see id.* at 4379 (Baker comment). The comments argued that the permitted discharges will violate Board rules by triggering chemical and biological processes that increase methylmercury in the water column. *Id.* at 4351; *see id.* at 4365. Dr. Burkholder’s comment asserted that permitted concentrations of chloride and sulfate added to the water column of the mixing zones “would significantly increase mercury release from the sediments.” *Id.* at 4413-14, 4417.

The comment asserted that the permit may violate the requirement that a mixing zone is not allowed when the standard for the constituent is already violated in the receiving water. R. at 4365, citing 35 Ill. Adm. Code 302.102(b)(9). The comment argued that testing was “not adequate to determine whether the discharge will directly increase the bioavailable toxic form of mercury.” R. at 4365. It also argued that permitted discharges of chloride and sulfate “will increase the level of bioavailable methyl mercury and other toxic forms.” *Id.*

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments. R. at 4349-71. The comment asserted that the reasonable potential test regarding

mercury was not properly performed and could not determine whether permitted discharges have a reasonable potential to cause or contribute to violations of the applicable mercury standard. R. at 4353; *see id.* at 4365, 4366.

Public comments submitted for the hearing also addressed this issue. Barbara McKasson of Carbondale commented that “[m]ethyl mercury is known to cause serious nerve and organ problems in humans.” R. at 3322; *see id.* at 2705-06 (hearing transcript). She questioned whether increased chloride and dissolved solids in the Big Muddy River would cause higher levels of methylmercury and whether the permitted discharge would increase conversion of mercury to methylmercury. *Id.* She cited the presence of commercial and recreational fishing and bioaccumulation of heavy metals to ask whether IEPA had “evaluated the possible harm to humans from increased methyl mercury that could be caused by granting this permit.” *Id.*; *see id.* at 3377 (Amorelli comment), 3491 (Stearns comment). On behalf of the Bird Conservation Network, Bob Fisher commented that “[t]he draft permit and anti-degradation assessment fail to take into consideration potential increases of Methyl-Mercury levels.” *Id.* at 3681. A petition submitted by the Sierra Club (*id.* at 3746) states that “[i]ncreased salt levels in river water can increase the bio-available form of toxic mercury, harming aquatic life in the waterway.” *Id.* at 3748.

Response. IEPA asserted that “[m]ethylmercury is formed primarily under anaerobic conditions.” R. at 72. Although IEPA expects deeper sediments in the Big Muddy River to be anaerobic or anoxic, it does not expect the overlying water to affect the deeper sediments or for methylation to occur there. *Id.* IEPA asserted that effluent in the mixing zone, where it expects the highest concentrations of chloride, is not expected to interact with bottom sediments. *Id.* IEPA asserted that “there is minimal risk of increased release of methylmercury within the mixing zone area.” *Id.* IEPA added that the concentration of chloride will decrease downstream from the discharge, “reducing any risk of mercury release.” *Id.*

IEPA stated that Williamson Energy conducted additional sampling at its request. For this additional sampling, the MDL was 0.5 nanograms per liter. Based on the additional data obtained at that MDL, IEPA modified the permit by adding a mercury limit at Outfall 001. R. at 72. IEPA added that the additional data “indicate that there is not reasonable potential for Outfalls 002 through 008 to exceed the WQS for mercury.” *Id.* IEPA added that for Outfalls 006, 007, 008, and 011 the permit requires monthly effluent monitoring for one year and then semi-annual sampling for parameters including mercury. R. at 72.

IEPA responded that “[m]ethylmercury does bond with chloride (Cl⁻); however, it also bonds with hydroxide (OH⁻) and nitrate (NO₃⁻).” R. at 72,

IEPA concluded that “the increased chloride and total dissolved solids level in the Big Muddy River or the discharge from the mine will not increase the methylmercury levels. R. at 71.

Williamson Energy responded that comments projecting “increased methylmercury releases due to the increased chloride concentrations are unsubstantiated.” R. at 195. It argued

that anaerobic conditions are expected in deeper sediments that will not be affected by the overlying water column. *Id.*

Williamson Energy also noted that “atmospheric deposition of mercury is the primary source of mercury in the Big Muddy River.” *Id.* It argued that elevated chloride concentrations have been shown to “prevent inorganic mercury from sorbing to sediments.” *Id.* (citation omitted). It asserted that the presence of chloride “is expected to reduce the potential deposition of mercury to the sediment beds.” *Id.* With reduced sorption, “deposited mercury would be expected to migrate downstream within the water column.” *Id.* at 196. Williamson Energy added that, “[w]ithout a new source of mercury to the sediments, the mercury concentration that may be present in the sediments could decrease so that the potential for methylmercury production in the sediments would be reduced.” *Id.* It further argued that, even if elevated chloride and TDS concentrations increase the rate of methylation in sediments, “the rate of production of methyl mercury would be expected to decline overall since the source of new mercury to the sediments would be reduced.” *Id.*

Conductivity

Comment. On August 19, 2019, Petitioners submitted comments to IEPA. R. at 3101-07. Citing public interest in the proposed permit, Petitioners commented that a hearing should address questions including “[w]hether there should be a total dissolved solids or conductivity limit given the science presented in the U.S. EPA conductivity guidance?” R. at 3107 (citation omitted).

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comment asserted that “[t]here is abundant scientific evidence to suggest that total conductivity itself is a parameter that may affect existing uses.” R. at 4356, citing *id.* at 4377 (Baker comment). The comment argued that neither Williamson Energy, nor IEPA have apparently considered the effect of increased conductivity on existing uses of the Big Muddy River or Pond Creek. *Id.* at 4356. It concluded that the proposed permit allows discharges that may cause or contribute to violations of standards for conductivity and TSS. *Id.* at 4366, citing 35 Ill. Adm. Code 302.210 (Other Toxic Substances).

Response. IEPA responded that the permit should not include a limit, “because there are no WQS for total dissolved solids or conductivity.” *Id.* at 87. IEPA noted that Board “removed the total dissolved solids WQS and replaced it with a sulfate WQS.” IEPA added that “conductivity will be monitored in the effluent, upstream, and downstream for Outfall 011 to ensure that the chloride WQS is met.” *Id.*

DO

Comment. Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comments stressed that the Big Muddy River is listed as impaired by low DO in the receiving segment and downstream segments. *Id.* at 4351, 4357. The comment argued that permitted discharges would trigger processes that will decrease DO in the water column. *Id.* It also argued that these decreased DO levels would violate Board

rules. *Id.* It asserted that the permit had not considered “the impact of the discharge in raising Biochemical Oxygen Demand levels in the mixing zone and outside the mixing zone.” *Id.* at 4366. Dr. Burkholder’s comment cited studies concluding that effluent from coal mines will result in the death of various fauna. She asserted that “[t]he resulting biochemical oxygen demand for decomposition of these organisms will exacerbate the low dissolved oxygen conditions.” *Id.* at 4416.

Response. IEPA asserted that the effluent does not have sufficient deoxygenating chemicals to contribute to the DO impairment. R. at 105, 108; *see id.* at 70.

Williamson Energy’s response added that “treated discharge is not expected to decrease the dissolved oxygen concentration in the Big Muddy River.” R. at 187, 204. The response asserted that increased turbulence should increase reaeration, “although it is not expected to have a significant impact to the DO concentration.” *Id.*

Williamson Energy stated that “[h]istoric records of carbonaceous BOD from the Big Muddy River indicted concentrations less than 2.5 mg/L. It argued that “[t]his indicates that there is not a significant concentration of biomass present in the Big Muddy River.” R. at 204-05. It asserted that “[t]here is not enough biomass present in the River or within the mixing zone to cause an impact on the dissolved oxygen if all of the biomass was killed.” *Id.* at 187, 204.

Narrative Standard

Comment. Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comments asserted that the proposed discharge would lead to violations of Board rules by “causing violations of narrative standards in the Big Muddy.” R. at 4351. It argued that the permit must require monitoring sufficient to detect any violations of narrative standards. *Id.* at 4368.

Response. IEPA cited the narrative standard requiring that “[w]aters of the State shall be free from sludge or bottom deposits, floating debris, visible oil, odor, plant or algal growth, color or turbidity of other than natural origin.” R. at 108, citing 35 Ill. Adm. Code 302.203. IEPA asserted that there is “[n]othing in this discharge that would cause a narrative standard violation.” R. at 108.

Mussels

Comment. On August 12, 2019, Petitioners submitted comments to IEPA. R. at 3101-07. Citing public interest in the proposed permit, Petitioners commented that a hearing should address questions including species now using the area of the proposed discharge and whether there are downstream locations that have mussel populations. R. at 3107.

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comments asserted that neither the Antidegradation Assessment nor the permit attempts to address impact on mussels “or even assess if mussels are present in the area.” *Id.* at 4358; *see id.* at 4365. It added that “[s]ensitive mussels have been

shown to be killed in chloride/sulfate mixtures when sulfate is much lower than what would be allowed in the permit.” *Id.* at 4358, citing *id.* at 4419-20 (Burkholder comment). The comment stated that a 2012 study “found their presence in nearly all of the nearby tributaries in the Big Muddy, which likely indicates that they are present in the main stem of the river.” *Id.* at 4359, citing *id.* at 5117-5135 (INHS survey). It argued that, if mussels are present, harming them would improperly affect an existing use. *Id.* at 4359; *see id.* at 4365. The comment added that this permit proposes to discharge and mix near the bed of the river, “subjecting any mussel bed there to the highest of chloride concentrations.” *Id.*

Response. IEPA acknowledged that mussels live within the Big Muddy River and its basin. It cited a 2012 INHS study describing the mussel population. R. at 87, 94. It stated that, “[a]ccording to the study, no threatened or endangered mussels were found in the Big Muddy River or the Big Muddy River basin.” *Id.*

IEPA reported that a mussel survey was performed April 22-26 and June 5, 2020, in an area the width of the river from 50 meters upstream to 150 meters downstream of the proposed outfall. R. at 62, 67, 94-95, 108; *see id.* at 151-64 (unionid survey). The survey collected 46 live individuals from 11 species. *Id.* at 62, 67, 94-95, 108. The study found that overall abundance was low, although greater toward the downstream end of the site. Only one live mussel and no mussel bed was found within the mixing zone. *Id.* at 62-63, 67, 95, 109. “No state listed species (live individuals or dead shell material) were observed in this area.” *Id.* at 63, 67, 95, 109. IEPA concluded that the mixing zone satisfies 35 Ill. Adm. Code 302.102(b)(4).

IEPA stated that it has required a mussel and invertebrate survey before construction of the diffuser. R. at 66. It added that the permit includes “a condition that the mussel and invertebrate survey on the Big Muddy River will be repeated one year after commencement of the discharge.” R. at 53, 66, 68, 70.

Williamson Energy responded by noting that a mussel survey is to be conducted before the diffuser is constructed. R. at 182, 194. It argued that, “[i]n the unlikely event that a mussel bed is found within the diffuse[r] construction location or mixing zone, this would be addressed with IEPA prior to construction.” *Id.*

Williamson Energy also argued that IEPA relied on an IDNR study showing that “no particularly sensitive species of mussel are present in the main stem of the Big Muddy River that would be adversely impacted by this discharge.” R. at 185, 200. It also cites the 2020 study showing no mussel bed in the area of the mixing zone. *Id.*

Altered Stream Flows

Comment. On August 10, 2019, Cade Bursell of Murphysboro commented that the permit does not refer to the impacts of infiltrating groundwater being piped to the Big Muddy River. R. at 3066. He questioned “[w]hat are the long-term impacts of continual water usage and water withdrawal on nearby communities?” *Id.*

On August 12, 2019, Petitioners submitted comments to IEPA. R. at 3101-07. The comments argued that “[t]he potential effect of the increased discharge has not been determined as to flooding, groundwater use and other factors.” *Id.* at 3104. Among issues to address at hearing, the comment listed “the impacts of the ongoing pumping of groundwater at the mine.” *Id.* at 3106.

On January 15, 2020, Matt Battaglia commented that the discharge “is nothing more than salt water” and that it will back up into fields and “create dead spots.” R. at 3677. He asserted that, with annual flooding, salt water will “build up in the ground.” *Id.* He questioned “who will be responsible for the decline in our crop yields?” *Id.*

On January 17, 2020, Laurel Toussaint of Carbondale commented that the permit application did not analyze or project “what will happen when the Big Muddy flood water flows backwards and water covers the flood plain and backs up into tributaries.” R. at 3771. She questioned whether the discharge could continue into the Big Muddy River during backward flow. *Id.* at 3771. She also questioned how Williamson Energy would monitor the discharge during backward flow. *Id.* Ms. Toussaint also asked whether, if contaminants in the discharge don’t flow downstream, “will they spread out over fields and forests and how will the applicant monitor the distribution of mine wastes?” *Id.*

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comments asserted that existing uses of creeks that do not receive a discharge may be affected by “reduced stream flow caused by groundwater moving downward to fill areas vacated by groundwater filling the mine.” *Id.* at 4351. It also asserted that these existing uses could be affected “by drawdowns of groundwater and surface waters that may be connected to the saline aquifer the mine is now draining.” *Id.* at 4358; *see id.* at 4364.

Response. IEPA responded that it had evaluated the discharge to the Big Muddy River and determined that it “will not be of sufficient volume to have an adverse effect on flooding which may already be occurring on a seasonal basis.” R. at 56. IEPA added that the permit authorizes a discharge only when the flow in the Big Muddy River is between 30 cfs and 2,350 cfs, “except after a one-year, 24-hour precipitation event of 2.97 inches at this location, which allows discharging from Outfall 011 for six consecutive days. *Id.*

IEPA added that, since the permit requires meeting WQS outside of the ZID and mixing zone, “farm soils and wildlife are not expected to be impacted by the constituents” in any floodwater. R. at 102. IEPA asserted that dissolved constituents will move with floodwater as it recedes. *Id.* IEPA asserted that any floodwaters “are not expected to concentrate the discharge. In fact, flooding will reduce the concentration of the parameters.” *Id.* at 101-02.

IEPA also responded by noting two circumstances in which the Big Muddy River may flow backward. R. at 101. “The first is when the parent stream is low and a tributary is flowing hard, the parent will back up and flow backward on a very localized level. This is usually less than 100 yards or so from where the tributary enters.” *Id.* In the second, a rising parent stream can back up into a tributary with low flow. For the Big Muddy River, IEPA reported that it “has witnessed this occur up to several miles from the mouth.” IEPA argued that “this discharge is

approximately 85 miles from the Mississippi River, so backflow from the Mississippi River is not possible” to the vicinity of the discharge. *Id.* IEPA added that the permit authorizes the discharge only if the flow in the Big Muddy River is at least 30 cfs. *Id.* It stated that, “[i]f the Big Muddy is flowing backwards, the flow will be less than 30 cfs, therefore, any discharge while the Big Muddy River is flowing backward would be prohibited.” *Id.*

IEPA also responded that comment on the possibility of reduced stream flow by asserting that water generally “recharges into the ground in upland areas and discharges to surface water in lowland areas.” R. at 105. It argued that “[w]ater recharging to the depth of the mine would be coming from upland areas further away, not from local creeks.” *Id.*

Williamson Energy also responded that no nearby communities are known to withdraw drinking water from aquifers affected by the mine. R. at 180, 190. It argued that “long-term impacts of the water continuously infiltrating and removed from the underground mine is not anticipated.” *Id.*

Williamson Energy responded that the discharge will meet WQS at the edge of the mixing zone, and constituents discharged through the diffuser will be transported downstream. R. at 186. It argued that, in the event of flooding, “the constituent concentrations will be further reduced by the volume of water present.” *Id.* It added that “[f]lood waters tend to leach salts from soils, rather than depositing them.” *Id.*

Williamson Energy argued that constituents in the discharge are not expected to affect farm soils or wildlife. R. at 186, 202. Although it acknowledged that excess salt may be an issue for crops, it asserted that concentrations downstream from the mixing zone are not expected to affect farm soil or wildlife. *Id.* It added that any floodwaters would reduce those concentrations and would not be expected to concentrate the discharge. *Id.*

Williamson Energy discounted the position that nearby creeks will lose water as groundwater flows to the saltwater aquifer and then to the mine. R. at 205. It asserted that the aquifer “is not likely connected to the freshwater system feeding the surface drainage.” *Id.*

Williamson Energy also responded to comment on backward flow. It stated that, since 1995, elevations for the gage at Murphysboro during flow reversal ranged from 339.36 to 366.45 feet. R. at 201. It asserted that the proposed diffuser location has a minimum elevation of 357.21 feet, so it concluded that flow reversal in the mixing zone is not likely to occur. *Id.*

Permitting and Compliance History

Comment. On August 12, 2019, Petitioners submitted comments to IEPA. R. at 3101-07. It cited IEPA’s ECHO database and argued that the facility was then in noncompliance with its permit and had been in noncompliance for five of the preceding 12 quarters. *Id.* at 3103. The comment argued that the Detailed Facility Report shows additional issues related to inspections and complying with pollutant limits. *Id.* It argued that Williamson Energy does not appear to be complying with its current reporting requirements. *Id.* The comments asserted that “IEPA

should not issue a new and expanded permit without determining whether permittee has been filing DMRs properly under its existing permit.” *Id.*

At hearing, Lucia Amorelli commented that between 2015 and 2017, Williamson Energy had 45 outfall effluent violations, seven for sulfate and ten for chloride in Pond Creek. R. at 2642. She questioned whether the permitted discharge would result in water quality issues when “they’re repeatedly violating the standards.” *Id.*

Other comments submitted to IEPA addressed this compliance history. Joyce Blumenshine of Peoria cited a review of the ECHO database and stated that “it does not appear that this mine is meeting water quality standards and that it has had repeated problems in doing so for some time.” R. at 3233. She added that the mine was subject to a Board enforcement case filed by the Attorney General. *Id.*, citing People v. Williamson Energy, PCB 19-85; *see id.* at 3284, 3373 (Amorelli comment). She questioned whether IEPA considers “the history of permit compliance before approving new NPDES permits? If not, why is that?” R. at 3233.

Barbara McKasson cited Williamson Energy’s record of violations and questioned why it is “not required to put up a bond for repairing damage that may be caused by their operations?” R. at 3320-21. On behalf of the Bird Conservation Network, Bob Fisher commented that given “the company’s history of past violations, the proposed monitoring plan is insufficient and infeasible.” *Id.* at 3681.

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. It asserted that Williamson Energy is “a frequent violator of their current NPDES permit.” *Id.* at 4369. The comments argued that Williamson Energy is not able to properly report its discharges and has faced an enforcement action filed by the Attorney General. *Id.*, citing *id.* at 5451-54 (IEPA Field Inspection Report), 5457-85 (complaint); *see id.* at 6870 (Blumenshine comment). Commenters acknowledged that self-monitoring is the norm for NPDES permits. However, the comment argued that “it would be irresponsible to rely on self-monitoring in this case, given the mine’s history or reporting issues and especially with the complex monitoring scheme proposed in this permit.” *Id.* at 4369. The comment concluded that the permit should instead rely on a third party such as the USGS to monitor chloride, “and independent monitoring should be required at the discharge points.” *Id.*

Response. IEPA reported that “Williamson Energy has a total of 78 effluent violations from July 1, 2005, through September 30, 2021,” 27 of which occurred since 2017. R. at 49. IEPA reported that it has and does refer cases involving the Pond Creek Mine to the Illinois Attorney General’s Office. *Id.* at 54, 58. It stated that its routine stream sampling would note impacts on aquatic life, and “additional biological sampling can be conducted as needed.” *Id.* at 50. IEPA added that results of this sampling determine stream impairment. On the Big Muddy River, five downstream segments are listed as impaired for various uses with various potential causes. *Id.* at 50-51.

IEPA responded that the Act requires it “to issue a permit to an applicant upon proof that the proposed facility or equipment will not cause a violation of the Act or promulgated regulations.” R. at 55, citing 415 ILCS 5/39(a) (2020). Although IEPA acknowledged that its

“deliberation of certain aspects of the permit may be grounded in the exercise of discretion, the broader legal standard governing permit issuance or denial limits the discretion of the Illinois EPA.” R. at 55-56. IEPA asserted that Williamson Energy in this case provided data showing that its application met that standard. *Id.* at 56.

IEPA stated that it generally does not consider “the enforcement-related history of an applicant as part of the permit review process.” R. at 46. It asserted that the Act divides enforcement and permitting authorities into separate programs. *Id.* IEPA added that appellate court and Board caselaw reflect this separation. *Id.* at 46-47. IEPA cited 2003 statutory amendments that provide limited exceptions. It argued that those amendments did not alter the statutory framework or overrule caselaw. *Id.* at 51. The first exception added IEPA discretion to consider adjudicated noncompliance with the Act for environmental releases. *Id.* IEPA stated that it rarely exercises this discretion because adjudication of these cases is not common. *Id.* The second exception allows IEPA discretion to impose reasonable permit conditions relating to a compliance history as necessary to address noncompliance. *Id.* at 52, citing 415 ILCS 5/39(a) (2020). IEPA stated that it does not often exercise this discretion, as it cannot be based on alleged noncompliance. R. at 52.

IEPA responded that it added Special Condition 16 in response to this comment. R. at 52. It also stressed that it has modified the permit to require installing an operating an RO system. *Id.* at 61. IEPA concluded that the permit includes limits and conditions that protect the existing uses of Pond Creek and the Big Muddy River. R. at 61.

IEPA responded to comments regarding requiring a bond by stating that “[a]ll bonding requirements are regulated by IDNR OMM.” R. at 42, 56, citing 62 Ill. Reg. 1800. IEPA elaborated that “IDNR’s mine permit considers the financial assurance of the mining company in granting its permit.” R. at 55. It added that “IDNR/OMM does in fact require a bond to be posted for the Pond Creek facility, although IEPA deferred to IDNR “regarding the specifics of the bonding requirements and what material damages are covered.” *Id.* at 99.

Williamson Energy responded by acknowledging that it “has had water quality excursion noted on NPDES Discharge Monitoring Reports over the past few years.” R. at 191. It stated that it determined that its proposed mixing zone is the safest and most effective way to remove most discharges from Pond Creek and maintain its water quality. *Id.*

Mixing Zone

Comment. At the public hearing, Barbara McKasson observed that “downstream monitoring shall be performed a sufficient distance downstream of the associated outfall to ensure that complete mixing has occurred.” R. at 2704. She commented that “[i]f the mine places the probe further downstream, they gain additional mixing.” *Id.* She questioned why “they are not required to monitor as close as possible to the edge of the designated mixing zone, which is the point of compliance?” *Id.* at 2704-05.

Ms. McKasson also questioned what would occur if there was a fish kill in the Big Muddy River. “Can Williamson Energy be held responsible and charge them reparations for the

damage. Can Williamson Energy be held responsible for restoring fish populations?” R. at 3321.

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comment argued that the permit violates Board rules by allowing a mixing zone that results in violations of WQS outside of the mixing zone. *Id.* at 4353. It asserted that, although the permit proposes a plan to prevent violating the WQS outside of the mixing zone, that plan “is unlikely to be implemented” and is based on criteria that are not protective. *Id.* at 4353.

The comment asserted that the Board’s rules do not allow a mixing zone “when the water quality standard for the constituent in question is already violated in the receiving water.” R. at 4365, citing 35 Ill. Adm. Code 302.102(b)(9). It argued that the permit may violate that requirement in a number of ways. R. at 4365-66.

Response. IEPA responded that the permit requires Williamson Energy “to calculate the concentration at the edge of the mixing zone.” R. at 41. To verify the calculations there, the permit also required installing a conductivity meter downstream from the mixing zone. *Id.* IEPA asserted that the modified permit addresses these factors by requiring “the downstream continuous monitor to be located within 10 feet of the edge of the mixing zone.” *Id.*

IEPA stated that the permit defines the ZID and mixing zone for each of the diffuser ports. “The ZID for Ports 1 and 2 has a length of 4.5 feet by a width of 1.12 feet. The ZID for Port 3 has a length of 5.68 feet by a width of 1.38 feet. The ZID for Port 4 has a length of 7.64 feet by a width of 1.97 feet. The ZID for Port 5 has a length of 9.18 feet by a width of 2.23 feet. The mixing zone has a length of 46 feet by a width of 25 feet.” R. at 52, 68-69. IEPA added that “[t]he Big Muddy River has a depth of approximately 8-12 feet at the proposed diffuser site, Outfall 011, during baseline flow conditions, which is sufficient for the diffuser at this location.” *Id.* at 64; *see id.* at 181, 192.

IEPA also noted several factors protecting the diffuser from damage. The modified permit required signs indicating the outfall. The site is not located on a public road, and the opposite bank of the river is private property, reducing the risk of dumping. Also, “[t]he diffuser ports will be installed in a way to minimize damage due to strikes such as natural objects such as logs.” *Id.* at 65; *see id.* at 181, 192.

Williamson Energy responded that it does not anticipate a fish kill to result from discharges to the mixing zone “because the water leaving the mixing zone boundaries will meet all relevant water standards.” R. at 201. It stated that the mixing zone cannot use more than one-fourth of the stream width, and it is required to leave safe passage for fish. *Id.*; *see id.* at 182, 194. Williamson Energy stated that, “[s]hould there be an unanticipated fish kill directly related to the mixing zone the State of Illinois will investigate and take appropriate actions under existing laws.” *Id.* at 201.

Monitoring

Comment. On August 12, 2019, Petitioners submitted comments to IEPA. R. at 3101-07. The comment argued that, “[i]n view of the frequent violations and the danger of discharges of chemicals that are toxic to aquatic life, the monitoring is inadequate.” *Id.* at 3103, 3104.

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comments asserted that the permit violates Board rules because it does not require monitoring sufficient to determine whether Williamson Energy is complying with “the complex dilution scheme contemplated by the permit.” *Id.* at 4353. The comment argued that the permit limits the discharge based on a mixing equation, but “it fails to identify how all the inputs to that mixing equation will be monitored, how often that monitoring will occur, how they will be reported, and how often reporting will occur.” *Id.* at 4367. Dr. Burkholder’s comment asserted that “[m]ost parameters will not be monitored adequately for assessment of compliance,” based on location, scope, and frequency. *Id.* at 4418-19.

The comment argued that the permit should include additional requirements. Among those, the comment first asserted that the permit should require Williamson Energy to conduct monitoring and “report enough information to evaluate whether the mixing equation is being met.” R. at 4368. It also asserted that the permit should “[s]pecify the location of the downstream monitoring to be as close to the estimated boundary of the mixing zone as possible.” *Id.* It also argued that the permit should “[r]equire accurate monitoring of all of the constituents of the discharge using methods sufficiently sensitive to detect any violations of numeric or narrative water quality standards.” *Id.*

The comment also noted that the permit allows Williamson Energy “to reduce or eliminate monitoring requirements.” R. at 4368. It argued that “[t]he permit should anticipate an increase in the amount and toxicity of the discharge, never allow an elimination of monitoring, and explicitly require an increase in monitoring.” *Id.*

The comment concluded, based on the mine’s history and the proposed chloride monitoring, that “a third-party monitor should be used to monitor chloride.” R. at 4369. It also concluded that “independent monitoring should be required at the discharge points.” *Id.*

Response. IEPA responded that the permit includes monitoring that adequately characterizes the effluent and ensures meeting the WQS in receiving streams. R. at 52, 86. Since it issued the draft permit, IEPA stated that it modified the permit with additional monitoring requirements. First, Special Condition 16 increased monitoring for Outfall 011 for sulfate, nickel, copper, and iron (dissolved). *Id.* at 53, 87. Second, it included monthly effluent monitoring for the first year and then semi-annual monitoring at Outfalls 006, 007, 008, and 011 for specified parameters. *Id.* at 53, 86. Third, the permit included additional effluent sampling three times per week at Outfall 011 for sulfate, iron, and chloride. *Id.* at 53. Based on these factors, IEPA concluded that monitoring “is adequate to determine the potential effects of the discharge.” *Id.* at 87.

Sulfate

Comment. On August 19, 2019, Petitioners submitted comments to IEPA. R. at 3101-07. In listing issues to address at hearing, the comments questioned the effect that proposed discharges of sulfates would have on aquatic life in the Big Muddy River and other downstream uses. *Id.* at 3106.

In comments submitted to IEPA on December 11, 2019, Lucia Amorelli of Carbondale stated that the Big Muddy River Total Maximum Daily Load Report characterized the Big Muddy River as compromised and impaired in part due to mining operations. R. at 3285. The report added that mining activities contributing to sulfate concentrations should be identified. *Id.* She questioned whether IEPA goes against its own implementation plans by granting a permit that would elevate sulfate levels in the river. *Id.* at 3287.

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. Dr. Baker's comment argued that the permit gives "little to no consideration" of adding pollutants including sulfates. "What consideration that exists is implicitly focused entirely on concentrations and not also on the impact of loads." *Id.* at 4377. He suggested that the permit also overlooks "a robust literature linking the methylation of mercury to the presence of high concentrations of sulfate and sulfate-reducing bacteria." *Id.* at 4379 (citations omitted). Dr. Burkholder's comment asserted that high sulfate concentrations added to the water column of the mixing zone "would significantly increase mercury release from the sediments." *Id.* at 4413-14. She added that high sulfate concentrations in the water would produce hydrogen sulfide in the sediments and also result in releasing phosphorus. *Id.* at 4417-18.

Response. IEPA responded that, based on monitored hardness and chloride, it calculated a sulfate WQS of 1,312 mg/L. R. at 43. IEPA adds that, "from January 2000 to January 2020, there have been no exceedances of the updated WQS for sulfate. The highest sulfate result of 809 mg/L was taken on September 30, 2003. The second highest sulfate result of 591 mg/L was taken on October 21, 2008." *Id.* at 44. IEPA asserted that data from preparing the TMDL and Load Reduction Strategy indicated "sulfate impairment may not currently exist." IEPA added that "[s]ulfate is not listed as an impairment in the 2018 Integrated Report." *Id.* Based on these factors, IEPA asserted that sulfate limits in the permit do not conflict with TMDLs. *Id.*

IEPA stated that Special Condition 16 of the permit increased sulfate monitoring to three times per week for Outfall 011. R. at 48, 53. IEPA added that Special Condition 16 requires that the discharge from Outfall 011 cease under circumstances including "when the sulfate samples are 40 percent above the sulfate WQS in more than three of the samples taken within the month." *Id.* at 53.

Cadmium

Comment. Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comment argued that the permit violated Board regulations because the reasonable potential analysis had not been properly performed for

a number of parameters and that cadmium had “not been tested properly.” R. at 4353. The comment asserted that “[i]t is clear that there are high levels of cadmium coming from the mine.” *Id.* at 4367, citing *id.* at 5011-20 (IEPA memorandum). It argued that Williamson Energy reports finding “only low levels of cadmium in its very limited monitoring of what it now dubiously claims will be water representative of the discharge.” *Id.* at 4367, citing *id.* at 8363 (Water Holding Cell Data). The comment discounted this conclusion, asserting that it “must be treated with great caution by IEPA and only be accepted after independent verification.” *Id.* at 4367. Although it acknowledged cadmium limits for Outfalls 001 through 007, the comment asserted that cadmium “should be limited at all outfalls given the very limited testing, the history of this applicant’s non-compliance, and the uncertainties caused by lack of knowledge regarding future operations.” *Id.*

Response. IEPA responded that the permit regulates cadmium at Outfalls 001-008. R. at 73. IEPA stated that Williamson Energy conducted additional sampling at its request. Based on that data, IEPA stated that it modified the permit to include additional limits including cadmium at Outfall 008. R. at 53, 110; *see id.* at 189, 208. IEPA asserted that for cadmium at Outfall 011 there is no reasonable potential to exceed the WQS outside the mixing zone and no reasonable potential to exceed the acute WQS outside of the ZID. *Id.* at 48, 57. IEPA added that the modified permit requires monthly effluent monitoring for one year and then semi-annual sampling at specified outfalls for parameters including cadmium listed in Special Condition 18. *Id.* at 47, 63, 73, 111.

Iron

Comment. In comments submitted before the public hearing, Lucia Amorelli of Carbondale asked why the draft permit lists a WQS for iron of 3 mg/L and 6 mg/L “when the standard on the IEPA Water Quality Standard Report 2019 states that the acceptable level is 1 mg/L?” R. at 3375.

Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comments asserted that “[t]he proposed limit for total iron (3 mg/L daily average, 6 mg/L daily max) has not been shown to meet the applicable water quality standard of 1 mg/L dissolved iron.” R. at 4366. It noted that the Big Muddy River is impaired for iron and argues that the permit should not include a mixing zone to meet iron limits. *Id.*

Response. IEPA’s Responsiveness Summary asserted that “[t]he 3 mg/L monthly average and 6 mg/L daily maximum effluent limitations for iron (total) are effluent standards which must be met at the end of the pipe whereas the WQS is 1.0 mg/L for iron (dissolved).” R. at 92.

IEPA stated that Williamson Energy conducted additional sampling at its request. Based on that data, IEPA stated that it modified the permit to include additional limits including iron (dissolved) at Outfalls 003 and 007. R. at 53, 110; *see id.* at 189, 208. IEPA added that Special Condition 16 of the permit increased iron (dissolved) monitoring to three times per week for Outfall 011. *Id.* at 48, 53. IEPA also stated that Special Condition 16 requires that the discharge

from Outfall 011 cease under circumstances including “when the iron (dissolved) samples are 40 percent above the iron (dissolved) WQS in more than three of the samples taken within the month.” *Id.* at 53.

Nickel

Comment. Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comment stated that the impact of increased nickel “has not been properly considered and the cumulative effect of the increased concentrations of all of these pollutants together has been totally ignored.” R. at 4353-54; *see id.* at 4357, 4366.

Response. IEPA responded that it “did consider the additional loading for nickel in the December 12, 2016 antidegradation assessment.” R. at 105. IEPA’s antidegradation memorandum stated that “nickel loading will range from 1 to 8 lbs/day at a concentration ranging from 0.004 to 0.014 mg/L.” *Id.*, citing *id.* at 8272.

IEPA added that Williamson Energy “sampled its expected effluent for total and dissolved nickel.” R. at 106. IEPA determined for Outfall 011 “that there is no reasonable potential to exceed the WQS outside of the mixing zone for nickel” and “that there is no reasonable potential to exceed the acute WQS outside of the ZID for nickel.” *Id.* at 57, 106; *see id.* at 205. Because it found a reasonable potential to exceed the WQS at Outfall 002, 006, 007, and 008, IEPA modified the permit to include a nickel limit at each of them. *Id.* at 53, 57, 106. IEPA added that the permit requires monthly effluent monitoring for one year and then semi-annual sampling of Outfalls 006, 007, 008, and 011 for parameters including nickel. *Id.* In addition, Special Condition 16 requires monitoring for nickel three times per week for Outfall 011. *Id.* at 53. Special Condition 16 also requires that the discharge from Outfall 011 cease under circumstances including “when the nickel samples are 20 percent above the nickel WQS in more than three of the samples taken within the month.” *Id.*

Williamson Energy acknowledged that, while nickel can be found in coal, it “is not a constituent of concern for site surface pond operations.” R. at 205. It stated that “the source of the salt water is from an aquifer in the sandstone layer above the operating unit of the mine and is not expected to have a nickel concentration above water quality criteria.” *Id.* It added that the discharge “will be a mix of the saltwater aquifer and the surface water collected on site.” *Id.* It argued that the final holding pond will control the discharge of solids and “limit the amount of coal and therefore, metals that may be found in coal, that could be discharged.” *Id.*

TSS

Comment. Following the public hearing, Petitioners and SAFE on January 17, 2020, submitted comments to IEPA. R. at 4349-71. The comment stated that the Big Muddy River was already listed as impaired by TSS. *Id.* at 4361. It asserted that the permit has not properly considered the impact of increased TSS. *Id.* at 4353-54. It argued that the permit would allow an increase in TSS that will exacerbate current violations of the TSS standard in the Big Muddy River. *Id.* at 4365; *see id.* at 4414-15 (Burkholder comment).

Response. IEPA responded that a May 2019 TMDL report prepared a load reduction strategy for the sedimentation/siltation impairment, “as there are no numeric WQS for these constituents.” R. at 44. The strategy “identified a target of 32.2 mg/ for TSS as an average concentration.” *Id.* IEPA stated that the permit includes “a limit of 32.2 mg/L for Outfall 011, applied as a yearly average.” *Id.* IEPA asserted that the permit does not violate Board rules addressing TMDLs. *Id.* at 107, citing 35 Ill. Adm. Code 309.141(d).

Manganese

Comment. Following the public hearing, Petitioners and SAFE on January 17, 2020, commented that the permit violated Board regulations because the reasonable potential analysis had not been properly performed for a number of parameters and that manganese had “not been tested properly.” R. at 4353.

Response. IEPA reported that, based on monitored hardness, it calculates an acute WQS for manganese of 5.62 mg/L and a chronic WQS of 2.39 mg/L. R. at 43. IEPA added that, “from January 2000 to January 2020, there have been no exceedances of the updated WQS for manganese. The highest manganese result of 2.56 mg/L was taken on September 13, 2010. The second highest manganese result of 1.5 mg/L was taken on July 26, 2007.” *Id.* IEPA asserted that, with permitted effluent standards for manganese of 2.0 mg/L as a 30-day average and a 4.0 mg/L as a daily maximum, “the effluent will meet the current manganese WQS.” *Id.* IEPA added that the permit regulates manganese at Outfalls 006-008 and 011. R. at 73. IEPA also reported that the modified permit requires monthly effluent monitoring for the first year, after which it requires semi-annual sampling at Outfalls 006-008 and 011 for parameters including manganese. *Id.* at 47, 53, 73, 111. IEPA concluded that it properly conducted this analysis for manganese and that the permit meets the requirements of the Board’s rules. *Id.* at 111.

Copper

Comment. Following the public hearing, Petitioners and SAFE on January 17, 2020, commented that the permit violated Board regulations because the reasonable potential analysis had not been properly performed for a number of parameters including copper. R. at 4353.

Response. IEPA reported that it directed Williamson Energy to conduct additional sampling for Outfalls 001-008. Based on data obtained, IEPA modified the permit to include additional limits for copper at Outfalls 002, 004, and 008. R. at 57, 110. IEPA also reported that the modified permit requires monthly effluent monitoring for the first year, after which it requires semi-annual sampling at Outfalls 006-008 and 011 for parameters including copper. *Id.* at 53. IEPA added that Special Condition 16 of the permit increased copper monitoring to three times per week for Outfall 011. *Id.* at 48, 53. For Outfall 011, IEPA concluded that there is no reasonable potential to exceed the copper WQS outside of the mixing zone or to exceed the acute WQS for copper outside of the ZID. *Id.* at 57.

Proposed Pipeline

Comment. In a comment submitted to IEPA on January 17, 2020, Michael D. Covell of Union County asked “what is the exact and total chemical composition, and the safety and regular inspection of the proposed 12 mile pipeline”? R. at 3774.

Response. In its Responsiveness Summary, IEPA responded that “[t]he pipeline will be constructed of high-density polyethylene (HDPE) material.” R. at 102. IEPA stated that the permit adds pipeline requirements “including construction with new material, pressure control sensors (or other type of equipment) to stop the pumps when there is a loss of pressure in the pipeline, and inspection reports available to the inspectors when requested.” *Id.*; *see id.* at 19 (Big Muddy River mixing zone), 28 (Special Condition 15).

Williamson Energy responded that “[t]he discharge pipe will be constructed using PVC material of an appropriate gauge and will be inspected according to good engineering practices, permit, and agency requirements.” R. at 203.

Reissued NPDES Permit

By letter dated April 15, 2022 (R. at 1-2), IEPA issued renewed NPDES Permit No. IL 0077666 to Williamson Energy. R. at 3-33; *see* Pet. at 6; Pet. Exh. A. Both IEPA’s letter and its Responsiveness Summary list changes IEPA made to the draft permit in response to comments. R. at 1-2, 37-39.

RO. IEPA added Special Condition 14 requiring Williamson Energy to install and operate a 1.0 MGD RO unit by December 31, 2023. R. at 1, 33; *see id.* at 26. “The RO permeate (treated water) will discharge through Outfalls 001-008.” R. at 37; *see id.* at 26. “The RO reject will discharge to the Big Muddy River through Outfall 011.” *Id.*,

Outfalls 009 and 009ES. Because of the impaired status of Pond Creek, “Outfalls 009 and 009ES have been removed.” R. at 2, 37.

TSS Limit. IEPA applied to Outfall 011 “[a] yearly average concentration limit of 32.2 mg/L for TSS (total suspended solids).” R. at 1, 38; *see id.* at 13.

Additional Limits. IEPA also added limits for additional parameters at specified outfalls. For discharges from Outfall 001, IEPA required a mercury limit. R. at 1, 38; *see id.* at 5. For discharges from Outfall 002, IEPA required copper and nickel limits. *Id.* at 1, 38; *see id.* at 6. For discharges from Outfall 003, IEPA required limits for iron (dissolved). *Id.* at 1, 38; *see id.* at 7.

For discharges from Outfall 004, IEPA required copper limits. R. at 1, 38; *see id.* at 8. For discharges from Outfall 006, IEPA required nickel limits. *Id.* at 2, 38; *see id.* at 10. For discharges from Outfall 007, IEPA required limits for iron (dissolved), nickel, and zinc. *Id.* at 2, 38; *see id.* at 11. For discharges from Outfall 008, IEPA required limits for cadmium, copper, nickel, and zinc. *Id.* at 2, 38; *see id.* at 12.

Ceasing Discharge from Outfall 011. IEPA also established conditions under which the discharge from Outfall 011 must cease until the WQS can be met in the mixing zone.

Under subsection (c) of Special Condition 16, the discharge must cease “[i]f the measured concentration of Chloride, at the downstream monitoring location, exceeds 700 mg/L (this equals 40% over the water quality standard) more than 20 percent of the time in any month.” R. at 28; *see id.* at 3, 38.

Under subsection (d)(1), the discharge must cease “[w]hen the sulfate samples are 40 percent above the sulfate water quality standard in more than 3 of the samples taken within the month.” *Id.* at 3; *see id.* at 28, 38.

Under subsection (d)(2), the discharge must cease “[w]hen the iron (dissolved) samples are 40 percent above the iron (dissolved) water quality standard in more than 3 of the samples taken within a month.” *Id.* at 3; *see id.* at 28, 39.

Under subsection (e)(1), the discharge must cease “[w]hen the copper samples are 20 percent above the copper water quality standard in more than 3 of the samples taken within the month.” *Id.*

Under subsection (e)(2), the discharge must cease “[w]hen the nickel samples are 20 percent above the nickel water quality standard in more than 3 of the samples taken within the month.” *Id.*

Conditions on Outfall 011. IEPA added Special Condition 15 addressing Outfall 011 with a number of provisions. R. at 1, 37-38; *see id.* at 27-28.

Signage. First, an undesignated provision of section (a) provides that “Outfall 011 should include signage on the bank of the Big Muddy River to inform people on the Big Muddy River that the outfall is present.” R. at 28; *but see id.* at 1, 37 (stating sign or signs required).

Monitoring. Second, an undesignated provision of subsection (a) provides that “[m]onthly chloride samples and conductivity measurements, in the Big Muddy River (upstream and downstream) and in the effluent is required to ensure that the calibration curves remain accurate. The calibration curves should be approved by the Agency before discharge, after six months of operation, and yearly thereafter.” R. at 27; *see id.* at 1, 37.

Third, an undesignated provision of subsection (a) provides that “[s]ulfate, chloride and Iron (dissolved) shall be monitored from the effluent three (3) times per week when discharging.” R. at 27; *see id.* at 1, 37.

Mussels. Fourth, an undesignated provision of subsection (a) provides that “[a] mussel survey and a macroinvertebrate survey is required 1 year after commencement of the discharge from Outfall 011, during the next sampling period.” R. at 28; *see id.* at 1, 37.

ZIDs. Fifth, an undesignated provision of subsection (a) provides that:

[t]he zone of initial dilution for Ports 1 and 2 has a length of 4.5 feet by a width of 1.12 feet. The zone of initial dilution for Port 3 has a length of 5.68 feet by a width of 1.38 feet. The zone of initial dilution for Port 4 has a length of 7.64 feet by a width of 1.97 feet. The zone of initial dilution for Port 5 has a length of 9.18 feet by a width of 2.23 feet. The mixing zone has a length of 46 feet by a width of 25 feet. R. at 27; *see id.* at 1, 37.

Flow. Sixth, an undesignated provision of subsection (a) provides that “[t]he permit allows discharge from Outfall 011 when the Big Muddy River is between 30 to 2350 cfs, except after a 1-year, 24-hour precipitation event, Outfall 011 can discharge for 6 consecutive days. The 1-year, 24-hour precipitation event for this area is considered to be 2.97 inches.” R. at 27; *see id.* at 1, 37, 39.

IEPA accounted for allowing a six-day duration for the discharge. Over 507 acres, the one-year, 24-hour precipitation event “results in 40,888,598 gallons falling on site.” R. at 149. At a discharge rate of 7.2 MGD, it would take “5.68 days to discharge everything that fell onto the site. This would allow the mine to discharge the equivalent of all of the precipitation from a 1-year, 24-hour event and store the equivalent of the mine pumpage.” *Id.*

Inspections. Seventh, an undesignated provision of subsection (a) provides that “[f]low & chloride concentrations should be available for the inspector during inspections.” R. at 27; *see id.* at 1, 38 (naming IEPA and IDR staff).

Pipeline. Eighth, an undesignated provision of subsection (a) provides that “[t]he pipeline should be constructed with new material, pressure control sensors (or other type of equipment) to stop the pumps when there is a loss of pressure in the pipeline should be installed.” R. at 28; *see id.* at 1, 38

Reports. Ninth, an undesignated provision of subsection (a) provides that “[i]nspection reports of the pipeline should be available to the Agency’s inspector when requested.” R. at 28; *see id.* at 1, 38 (stating availability required).

Chloride Concentration. Tenth, an undesignated provision of subsection (a) “[r]educed the maximum chloride concentration at Outfall 011 from 12,000 mg/L to 5,000 mg/L.” R. at 1, 38; *see id.* at 27. IEPA stated that this change “[r]educed the dilution ratio needed from 34:1 to 13.3:1” and “[r]educed the length of the mixing zone from 251 feet to 46 feet.” R. at 1, 38; *see id.* at 27.

Downstream Monitoring. IEPA added Special Condition 16 to establish requirements for monitoring the Big Muddy River downstream from Outfall 011. In subsection (a), IEPA required that “[a] continuous conductivity monitor (correlated to chloride) shall be installed within 10 feet downstream of the edge of the mixing zone.” R. at 28; *see id.* at 2, 38. In subsection (b), IEPA required that “[t]he facility shall collect three samples per week from the receiving stream of Sulfate, Nickel, Copper, and Iron (dissolved) within 10 feet downstream of the edge of the mixing zone.” *Id.* at 28; *see id.* at 2, 38.

Metals Monitoring. IEPA also added Special Condition 18 “to require discharges from Outfalls 006, 007, and 008, into Pond Creek, and Outfall 011, into the Big Muddy River, include metals monitoring at a frequency of once per month for the first year and then twice annually spaced approximately every six months apart for the remainder of the permit term.” R. at 38; *see id.* at 3, 29. Special Condition 18 lists 14 parameters to be sampled and the detection limit or minimum reported limit for each of them. *Id.* at 29.

Special Condition 14

This special permit condition provides in its entirety that:

The Permittee shall install and operate a 1.0 MGD (million gallon per day) reverse osmosis (RO) unit with operation to begin no later than December 31, 2023.

- a. The RO permeate (treated water) will discharge through Outfalls 001 thru 008. Discharge may be through any single or combination of multiple outfalls at any given time.
- b. The RO reject will discharge to the Big Muddy River through Outfall 011. R. at 26; *see id.* at 88, 106, 109 (Responsiveness Summary)

Special Condition 15

Under the heading “Sediment Pond Operation and Maintenance (Outfall 011)”, this special permit condition provides in its entirety that:

- a. Pursuant to 35 Ill. Adm. Code Part 302.102, discharges from the referenced outfalls that otherwise would not meet the water quality standards of 35 Ill. Adm. Code Part 302 may be permitted if sufficient flow exists in the receiving stream to ensure that applicable water quality standards are met. That is, discharges not meeting the water quality standards of 35 Ill. Adm. Code Part 302 may only be discharged at such times that sufficient flow exists in the receiving stream to ensure that water quality standards in the receiving stream beyond the area of allowed mixing will not be exceeded. The permittee shall determine the effluent limitation for chloride and/or the maximum effluent flow rate allowable to maintain water quality in the receiving stream. The following equations shall be used to make such determinations;

$$C_{DS} = [C_E Q_E + 0.25 C_{US} Q_{US}] / (0.25 Q_{US} + Q_E)$$

Where:

C_E = Effluent concentration (mg/L)

Q_E = Effluent flow rate (cfs) for Outfall 011

Q_{US} = Upstream flow rate (cfs)

C_{US} = Upstream concentration (mg/L)

C_{OS} = Downstream concentration

The “calculated” downstream concentration (C_{DS}) shall be less than 500 mg/L for chloride and reported on the discharge monitoring reports (DMRs).

Chloride is limited in the NPDES permit at the limits described below. The maximum flow from Outfall 011 is 5,000 gpm and the maximum chloride concentration is 5,000 mg/L.

Sulfate, chloride and Iron (dissolved) shall be monitored from the effluent three (3) times per week when discharging.

The maximum dispersion required for all water quality parameters is 13.3:1. Model predictions have been made for a maximum effluent total flow rate of 11.1 cfs. At the maximum chloride concentration of 5,000 mg/L, this maximum discharge requires a river flow of 1.734 cfs to meet a dispersion of 13.3:1 in less than 25 % of the river volume. The maximum distance to meet the water quality standard for all scenarios is 46 feet downstream with a plume width of 25 feet.

The zone of initial dilution for Ports 1 and 2 has a length of 4.5 feet by a width of 1.12 feet each. The zone of initial dilution for Port 3 has a length of 5.68 feet by a width of 1.38 feet. The zone of initial dilution for Port 4 has a length of 7.64 feet by a width of 1.97 feet. The zone of initial dilution for Port 5 has a length of 9.18 feet by a width of 2.23 feet. The mixing zone has a length of 46 feet by a width of 25 feet.

The permit allows discharge from Outfall 011 when the Big Muddy River is between 30 to 2350 cfs, except after a 1-year, 24- hour precipitation event, Outfall 011 can discharge for 6 consecutive days. The 1-year, 24- hour precipitation event for this area is considered to be 2.97 inches.

The upstream flow (O_{US}) should be based on the full flow measurement upstream of the proposed Outfall 011 that shall be approved by the Agency.

Flow & chloride concentrations should be available for the inspector during inspections.

The upstream and downstream conductivity monitoring locations need to be approved by the Agency.

The permittee shall install a conductivity monitor upstream of the discharge to determine a chloride concentration (C_{US}) correlated to the conductivity value. In addition, the permittee shall install a continuous conductivity monitor located within ten (10) feet of the edge of the mixing zone downstream of Outfall 011 to ensure that the chloride concentration (correlated to the conductivity value) stays within the chloride water quality standard. The daily maximum downstream chloride concentration controlled to conductivity shall be reported on the DMR's.

Monthly chloride samples and conductivity measurements, in the Big Muddy River (upstream and downstream) and in the effluent is required to ensure that the calibration curves remain accurate. The calibration curves should be approved by the Agency before discharge, after six months of operation, and yearly thereafter.

Outfall 011 should include signage on the bank of the Big Muddy River to inform people on the Big Muddy River that the outfall is present.

A mussel survey and a macroinvertebrate survey is required 1 year after commencement of the discharge from Outfall 011, during the next sampling period.

The pipeline should be constructed with the new material, pressure control sensors (or other type of equipment) to stop the pumps when there is a loss of pressure in the pipeline should be installed. Inspection reports of the pipeline should be available to the Agency's inspector when requested.

- b. The following sampling and monitoring requirements are applicable to flow in Big Muddy River, which receives the discharges from Outfall 011.
 - i. All sampling and monitoring required under 15(b)(ii) and (iii) below shall be performed during a discharge and monitoring event from the associated outfall.
 - ii. The Big Muddy River shall be monitored and reported quarterly for Discharge Rate, Sulfate, Chloride and Hardness downstream of the associated outfall. This downstream monitoring shall be performed a sufficient distance downstream of the associated outfall to ensure that complete mixing has occurred. At such time that sufficient information has been collected regarding stream flow characteristics and in-stream contaminant concentrations, the permittee may request a re-evaluation of the monitoring frequency

required herein for possible reduction or elimination. For the purpose of re-evaluating the downstream monitoring frequency of the receiving stream, "sufficient information" is defined as a minimum of ten (10) quarterly sampling events.

In the event that downstream monitoring of the receiving waters is eliminated during the term of this permit based on an evaluation of the quarterly data, a minimum of three (3) additional samples analyzed for the parameters identified above must be submitted with the permit renewal application a minimum of 180 days prior to expiration of this permit.

- iii. The Big Muddy River shall be monitored and reported annually for Discharge Rate, Sulfate, Chloride and Hardness upstream of the associated outfall. R. at 27-28; *see id.* at 68-69, 104, 149.

Special Condition 16

Under the heading "Outfall 011 downstream monitoring," this special permit condition provides in its entirety that:

- a. A continuous conductivity monitor (correlated to chloride) shall be installed within 10 feet downstream of the edge of the mixing zone.
- b. The facility shall collect three samples per week from the receiving stream of Sulfate, Nickel, Copper, and Iron (dissolved) within 10 feet downstream of the edge of the mixing zone.
- c. If the measured concentration of Chloride, at the downstream monitoring location, exceeds 700 mg/l (this equals 40% over the water quality standard) more than 20 percent of the time in any month, the discharge from Outfall 011 shall cease until the water quality standard can be met within the mixing zone.
- d. If the water quality standard, based on a hardness of 91 mg/L as CaCO₃, for Sulfate and Iron (dissolved) exceeds the numbers below at the downstream monitoring location, in more than 3 of the samples taken within the month, the discharge from Outfall 011 shall cease until the water quality standards can be met within the mixing zone.
 - i. Sulfate= 700 mg/l (this is 40% over the WQS)
 - ii. Iron (dissolved)= 1.4 mg/l (this is 40% over the WQS)
- e. If the water quality standard, based on a hardness of 91 mg/L as CaCO₃, for Copper (dissolved) and Nickel (dissolved) exceeds the numbers below

at the downstream monitoring location, by 20 percent in more than 3 of the samples taken within the month, the discharge from Outfall 011 shall cease until the water quality standards can be met within the mixing zone.

- i. Copper (dissolved) = 0.0126 mg/l (this is 20% over the WQS)
- ii. Nickel (dissolved) = 0.0055 mg/l (this is 20% over the WQS). R. at 28; *see id.* at 69, 104-05

Special Condition 18

This special permit condition provides in its entirety that:

[d]ischarges from Outfalls 006, 007, 008 and 011 shall be monitored once per month for the first year and then twice annually spaced at approximately every 6-month apart for the remaining 5-year term of this NPDES Permit. Sampling of the discharges shall be performed utilizing the grab sampling method and analyzed for total (unfiltered) concentrations. The results of the sampling required under this Special Condition shall be submitted twice annually to the Agency in January and July of each calendar year to the addresses indicated in the Special Condition No. 3 above. The parameters to be sampled and the detection limits (minimum reported limits) are as follows:

<u>Parameter</u>	<u>Detection Limit</u>
Arsenic	0.05 mg/L
Barium	0.50 mg/L
Cadmium	0.001 mg/L
Chromium (hexavalent)	0.01 mg/L
Chromium	0.05 mg/L
Copper	0.005 mg/L
Lead	0.05 mg/L
Manganese	0.50 mg/L
Mercury*	1.00 ng/L**
Nickel	0.005 mg/L
Phenols	0.005 mg/L
Selenium	2.000 µg/l***
Silver	0.003 mg/L
Zinc	0.025 mg/L

* Utilize USEPA Method 1631E and the digestion procedure described in Section 11.1.1.2 of 1631E.

** 1.00 ng/l (nanogram/liter) = 1 part per trillion.

*** µg/l = micrograms/liter. R. at 29; *see id.* at 106

Special Condition 3 provides that “[a]ll periodic monitoring and reporting forms, including Discharge Monitoring Report (DMR) forms, shall be submitted to the Agency” according to schedules listed separately and to specified addresses. R. at 25. This condition also provides that “[t]he Permittee will be required to submit electronic DMRs (NetDMR) instead of mailing paper DMRs to the IEPA unless a waiver is approved by the Agency.” *Id.*

LEGAL BACKGROUND

The Act prohibits discharging any contaminant to surface waters in Illinois without an NPDES permit or in violation of the terms and conditions of such permit. 415 ILCS 5/12(f) (2020). Section 402 of the Federal Water Pollution Control Act (33 U.S.C. §1342) established the NPDES permit program as the national framework for permitting wastewater discharges. With its 1977 amendments, the Federal Water Pollution Control Act became commonly known as the “Clean Water Act.”² Under the NPDES regulations, a facility that discharges from a point source directly to surface waters is required to obtain a permit.³

In Illinois, the IEPA is the authority responsible for administering regulatory programs to protect the environment, including NPDES permits. If the IEPA denies a permit or grants one with conditions, the permit applicant may appeal the IEPA’s determination to the Board. 415 ILCS 5/4, 5, 39, 40(a)(1) (2020); 35 Ill. Adm. Code 105. Also, if the IEPA grants or denies a permit, a third party other than the permit applicant or the IEPA may appeal IEPA’s decision. 415 ILCS 5/40(e)(1) (2020).

Standard of Review

The Board’s scope of review and standard of review are the same whether a permit applicant or a third party brings a petition for review of an NPDES permit. Des Plaines River Watershed Alliance, et al. v. IEPA and Vill. of New Lenox, PCB 04-88, slip op. at 12 (Apr. 19, 2007) (New Lenox), *aff’d. sub nom. IEPA v. IPCB*, 386 Ill. App. 3d 375, 896 N.E.2d 479 (3rd Dist. 2008)).

The question before the Board in permit appeal proceedings is: (1) whether the applicant proves that the application, as submitted to the IEPA, demonstrated that no violation of the Act would have occurred if the requested permit had been issued; or (2) whether the third party proves that the permit as issued will violate the Act or Board regulations. Joliet Sand & Gravel,

² “‘CWA’ means the Federal Water Pollution Control Act, as amended, (33 U.S.C. 1251 et seq., Public Law 92-500 enacted by Congress October 18, 1972 as amended by the ‘Clean Water Act’, Public Act 95-217, enacted December 12, 1997, as amended.)” 35 Ill. Adm. Code 301.240.

³ “‘Point source’ means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm waste runoff.” 40 C.F.R. §122.2.

163 Ill. App. 3d at 833, 516 N.E.2d at 958; Prairie Rivers Network, 335 Ill. App. 3d at 401; 781 N.E.2d at 380.

Under Section 40(e)(3) of the Act, the Board hears a third-party petition “exclusively on the basis of the record before the Agency.” 415 ILCS 5/40(e)(3) (2020). The Board’s review of permit appeals is limited to information before the IEPA during the IEPA’s statutory review period and is not based on information developed by the permit applicant or the IEPA after the IEPA’s decision. Prairie Rivers Network, PCB 01-112, *aff’d*. at 335 Ill. App. 3d 391, 401; 781 N.E.2d 372, 380 (4th Dist. 2002); Alton Packaging Corp. v. PCB, 162 Ill. App. 3d 731, 738, 516 N.E.2d 275, 280 (5th Dist. 1987).

IEPA’s decision to issue a permit must be supported by “substantial evidence.” IEPA v. IPCB, 386 Ill. App. 3d at 382, 896 N.E.2d at 486. The Board reviews the entirety of the record to determine whether 1) the record supports the IEPA’s decision, and 2) IEPA’s procedures are consistent with the Act and Board regulations. The Board does not affirm the IEPA’s decision on the permit unless the record supports the decision. IEPA’s decision is not awarded any special deference by the Board. *See* IEPA v. PCB, 115 Ill. 2d 65, 70; 503 N.E.2d 343, 345 (1986). Therefore, the Board’s standard in reviewing the IEPA’s decision is whether the record demonstrates that issuing the permit violates the Act or Board regulations. New Lenox, PCB 04-88, slip op. at 12.

Burden of Proof

While the standard of review is the same whether a permit applicant or third-party appeals, the two types of NPDES permit appeals place the burden of proof on different parties. Under Section 40(a)(1) of the Act, the burden of proof is on the permit applicant if the permit applicant appeals. 415 ILCS 5/40(a)(1) (2020). Under Section 40(e)(3), however, the burden of proof is on the third party in a third party NPDES permit appeal. 415 ILCS 5/40(e)(3) (2020). Petitioners must show that the issued permit would violate the Act or regulations. Prairie Rivers Network v. IPCB, 335 Ill. App. 3d 391, 401; 781 N.E.2d 372, 379 (4th Dist. 2002)

Although the IEPA’s decision to issue a permit must be supported by substantial evidence, this does not shift the burden of proof from petitioners, who must prove that the issued permit violates the Act or Board regulations. IEPA v. IPCB, 386 Ill. App. 3d at 382, 896 N.E.2d at 486.

Summary Judgment

Summary judgment is appropriate when the pleadings, depositions, admissions, affidavits, and other items in the record show that there is no genuine issue of material fact and that the moving party is entitled to judgment as a matter of law. Adames v. Sheahan, 233 Ill. 2d 276, 295, 909 N.E.2d 742, 753 (2009); Dowd & Dowd, Ltd. v. Gleason, 181 Ill. 2d 460, 483, 693 N.E.2d 358, 370 (1998); 35 Ill. Adm. Code 101.516(b). A genuine issue of material fact precluding summary judgment exists when “the material facts are disputed, or, if the material facts are undisputed, reasonable persons might draw different inferences from the undisputed

facts.” Adames, 233 Ill. 2d at 296, 909 N.E.2d at 753; Adams v. N. Ill. Gas Co., 211 Ill. 2d 32, 43, 809 N.E.2d 1248, 1256 (2004).

When determining whether a genuine issue of material fact exists, the record “must be construed strictly against the movant and liberally in favor of the opponent.” Adames, 233 Ill. 2d at 295-96, 909 N.E.2d at 754; Purtill v. Hess, 111 Ill. 2d 229, 240, 489 N.E.2d 867, 871 (1986). “It is well established that in deciding a motion for summary judgment the court may draw inferences from undisputed fact.” Makowski v. City of Naperville, 249 Ill. App. 3d 110, 119, 617 N.E. 2d 1251 (1993); Loyola Acad. v. S & S Roof Maint., 146 Ill. 2d 263, 272, 586 N.E.2d 1211 (2d Dist. 1992).

Summary judgment “is a drastic means of disposing of litigation, and therefore, should be granted only when the right of the moving party is clear and free from doubt.” Adames, 233 Ill. 2d at 296, 909 N.E.2d at 754; Purtill, 111 Ill. 2d at 240, 489 N.E.2d at 871. “Even so, while the nonmoving party in a summary judgment motion is not required to prove [its] case, [it] must nonetheless present a factual basis, which would arguably entitle [it] to a judgment.” Gauthier v. Westfall, 266 Ill. App. 3d 213, 219, 639 N.E.2d 994, 999 (2d Dist. 1994).

The parties agree that the record presents no genuine issue of material fact.

Petitioners assert that they are “entitled to summary judgment” because “undisputed facts” show that the IEPA violated the Act and Board regulations by reissuing Williamson Energy’s ND PES permit. Pet. Mot. at 1, citing 35 Ill. Adm. Code 101.516(b); *see* Pet. Resp. at 3.

IEPA asserts that “there exist no genuine issues of material fact.” IEPA Mot. at 1; *see* IEPA Reply at 16. IEPA argues that Petitioners failed to meet and cannot meet their burden of proving that the permit as issued would violate the Act or Board regulations. *Id.* IEPA concludes that the permit must be upheld and that it is entitled to judgement as a matter of law. IEPA Mot. at 1, 17; *see* IEPA Reply at 17.

Williamson Energy asserts that “[t]he facts before the Board are not in dispute (Williamson Memo. at 5) and that “there exist no genuine issues of material fact” (Williamson Mot. at 1; Williamson Memo. at 3, 4). It argues that the record does not support Petitioners’ allegations and that it is entitled to summary judgment. Williamson Mot. at 1; Williamson Memo. at 3, 4.

However, “[t]he mere filing of cross-motions for summary judgment does not establish that there is no issue of material fact, nor does it obligate the Board to render summary judgment.” Prairie Rivers Network v. PCB, 2016 Ill. App. (1st) 150971 (Feb. 26, 2016).

DISCUSSION

In the following sections of the opinion, the Board separately discusses the contested issues and decides the motions for summary judgment on them. The Board addresses protection of existing uses at pages 78-80; the chloride limit at pages 80-82; chloride monitoring at pages

83-86; compliance with sulfate, nickel, iron, and copper limits at pages 86-88; the Antidegradation Assessment at pages 88-96; the reasonable potential analysis at pages 96-99; Pond Creek discharges at pages 99-100; cumulative effects at pages 100-101; mussels at pages 101-102; altered stream flow at pages 102-104; and permitting history and violations at 104-107.

Protection of Existing Uses

Under 35 Ill. Adm. Code 302.105(c)(2), IEPA “must assess any proposed increase in pollutant loading that necessitates a new, renewed or modified NPDES permit . . . to determine compliance with this Section. The assessment to determine compliance with this Section must be made on a case-by-case basis.” When making this assessment, IEPA “must assure” that “[t]he applicable numeric or narrative water quality standard will not be exceeded as a result of the proposed activity” and that “[a]ll existing uses will be fully protected.” 35 Ill. Adm. Code 302.105(c)(2)(B)(i, ii).

The record shows that the Big Muddy River and Pond Creek and its tributaries are classified as General Use waters. R. at 6201, 6204, 6207. Under 35 Ill. Adm. Code 302.202, “[t]he general use standards will protect the State’s water for aquatic life, wildlife, agricultural use, secondary contact use, and most industrial uses and ensure the aesthetic quality of the State’s aquatic environment.” IEPA’s Responsiveness Summary states that “WQS are a set of water quality criteria sufficient to support the designated uses of each waterbody.” R. at 49.

Numeric Standards

Petitioners argue that the permit is based upon meeting applicable WQS and the expectation that meeting those standards will protect existing uses. Pet. Memo. at 32; Pet. Resp. at 4, 26. Petitioners argue that it is not correct that IEPA considers only the numeric WQS. Pet. Memo. at 32. They argue that meeting numeric and narrative standards and protecting existing uses are separate requirements, each of which must be met. Pet. Memo. at 33; Pet. Resp. at 27, 29, citing 35 Ill. Adm. Code 302.105(c)(2). Petitioners further argue that the record shows IEPA has “failed to ensure that existing uses of the Big Muddy will be protected from a number of serious threats.” Pet. Memo. at 33.

IEPA responds that the record supports its conclusion that “numeric water quality standards will be met outside the mixing zone, thereby protecting existing uses in the Big Muddy River.” IEPA Memo. at 10-11, citing *id.* at 4-7 (Section (V)(A)(1): Outfall 011); *see* Pet. at 4 (¶6).

IEPA challenges Petitioners’ position that relying on the general use chloride WQS negates the word “and” in 35 Ill. Adm. Code 302.105(c)(2)(B). IEPA Reply at 10-11, citing Pet. Resp. at 28-29. IEPA asserts that, if Petitioners identified “detrimental impacts on an existing use not protected by the general use water quality standard, then Section 302.105(c)(2)(B) would require the Agency to ensure that such use is additionally protected.” IEPA Reply at 11. IEPA argues that Petitioners “fail to identify *any* existing use that would be impacted by the proposed Outfall 011 chloride discharges.” *Id.* (emphasis in original). To the extent Petitioners assert that the discharge would have a negative effect on aquatic life, IEPA responds that the chloride WQS

“was set to be protective of aquatic life.” *Id.*, citing 35 Ill. Adm. Code 302.202 (Purpose), 302.208; Water Quality Standards Revisions, R 71-14, slip op. at 6 (Mar. 7, 1972).

IEPA disputes Petitioners’ position that the general use WQS for chloride of 500 mg/L is “grossly inadequate to protect the designated use of the Big Muddy for aquatic life.” IEPA Resp. at 12, citing Pet. Memo. at 32. IEPA argues that the Act provides the Board authority to adopt WQS, including site-specific rules and adjusted standards. IEPA Resp. at 13, citing 415 ILCS 5/13(a)(1), 27, 28.1 (2020). IEPA asserts that the Act does not authorize it “to reassess the Board’s judgment with respect to water quality standards.” IEPA Resp. at 13. IEPA notes that the Board has adopted numeric general use WQS for chloride, sulfate, iron (dissolved), nickel, copper, and mercury. *Id.*, citing 35 Ill. Adm. Code 302.208(e-h).

IEPA disputes Petitioners’ position that it should “seek out alternative water quality standards for chloride, such as federal recommended chloride criteria.” IEPA Resp. at 12, citing Pet. at 7 (¶11); Pet. Memo. at 32. IEPA stresses that “[t]he Board adopted the current numeric water quality standard for chloride in 1972.” IEPA Resp. at 14, citing Water Quality Standards Revisions, R71-14, slip op. at 6 (Mar. 7, 1972). USEPA has approved this single-value WQS of 500 MG/L for chloride. IEPA Mot. at 8. IEPA argues that it cannot ignore this standard “because Petitioners believe that federal recommended criteria instead should apply to a specific discharger.” IEPA Resp. at 14. IEPA suggests that Petitioner’s appropriate course is to submit a rulemaking proposal to revise the chloride WQS. *Id.*

IEPA also disputes Petitioners’ position that it should seek out an alternative WQS such as a TDS standard. IEPA Resp. at 12, citing Pet. Memo. at 32. IEPA argues that it “may not simply substitute a TDS standard for the chloride standard.” IEPA Resp. at 14. IEPA asserts that the Board has determined that chloride and sulfate WQS “adequately address toxicity of dissolved salts” and that “a TDS standard is not necessary.” *Id.*, citing Triennial Review of Sulfate and Total Dissolved Solids Water Quality Standards, R07-9, slip op. at 26 (Sept. 20, 2007).

Narrative Standards

Under 35 Ill. Adm. Code 302.203, “[w]aters of the State must be free from sludge or bottom deposits, floating debris, visible oil, odor, plant or algal growth, and color or turbidity of other than natural origin.”

Petitioners assert that permits must meet narrative standards in addition to numeric standards. Pet. Mot. at 32-33, citing 35 Ill. Adm. Code 302.105(c)(2)(B)(i); Pet. Resp. at 26, 29. IEPA responds that the record supports its determination that narrative standards will not be affected either inside or outside of the mixing zone. IEPA Mot. at 10-11. Williamson Energy asserts that IEPA determined that “the mine’s discharges contain nothing that will cause a violation” of the Board’s narrative standard. Williamson Memo. at 11, citing R. at 106-09. IEPA attributes this to factors including meeting numerical WQS, a lack of interaction between the mixing plume and bottom sediments, and “low concentrations of phosphorus and deoxygenating compounds.” IEPA Mot. at 11.

Discussion

The Board notes that the general use WQS under 35 Ill Adm Code 302, Subpart B include both numeric and narrative standards. Section 302.202 specifies that “[t]he general use standards will protect the State's water for aquatic life, wildlife, agricultural use, secondary contact use, and most industrial uses and ensure the aesthetic quality of the State's aquatic environment.” 35 Ill. Adm. Code 302.202. The Board agrees with IEPA that the general use WQS are intended to protect existing uses. If those standards do not protect an existing use from a detrimental impact, then Section 302.105(c)(2)(B) would require the Agency to ensure that the use is additionally protected. *See* IEPA Reply at 11. As IEPA noted, the Board’s single-value chloride standard was established to protect aquatic life in general use waters and has been approved by USEPA for that purpose.

The Board’s narrative standard requires that “[w]aters of the State must be free from sludge or bottom deposits, floating debris, visible oil, odor, plant or algal growth, color or turbidity of other than natural origin.” 35 Ill. Adm. Code 302.203.

The Board notes that Petitioners question the adequacy of the chloride WQS but have not identified an existing use that would be affected by the proposed discharge and would not be protected by the WQS. Petitioners argue that Illinois’ 500 mg/L chloride limit is “grossly inadequate” to protect aquatic life. The Board cannot agree that IEPA was required to establish an alternate WQS for chloride or another constituent in this permit. In addition, the record does not persuasively identify an existing use that requires protection by an alternative standard. The Board agrees with IEPA that any re-examination of the adequacy of the current chloride WQS must be addressed in a rulemaking procedure and not in a permit appeal addressing a specific discharge.

Based on these factors, the Board finds that meeting the numeric WQS outside of the mixing zone and meeting the narrative WQS inside and outside of the mixing zone will protect existing uses. However, because the Board below finds a genuine issue of material fact concerning compliance with the applicable WQS in both Pond Creek and the Big Muddy River, the Board denies the parties’ motions for summary judgment and will decide the issue of protecting existing uses after hearing.

Chloride Limit

Petitioners assert that it is not sufficient for IEPA to rely on meeting WQS, particularly the 500 mg/L chloride standard, to protect existing uses from Williamson Energy’s discharges. Pet. Memo. at 32. Petitioners argue that the record includes recent scientific work showing that the 500 mg/L chloride standard is not sufficiently protective. Pet. Resp. at 27, 32, citing R. at 4580, 4603, 4688, 4702. They note that Illinois does not have a chronic chloride standard. Pet. Reply at 18.

Petitioners state that USEPA’s chronic standard for chloride is 230 mg/L, “not to be exceeded as a four-day average more than once every three years on the average,” although the permit allows concentrations of 500 mg/L at all times. *Id.* at 10; Pet. Resp. at 32; Pet. Reply at

18. Petitioners cite recent studies indicating that the federal criterion is too high to protect aquatic life. Pet. Resp. at 32, citing R. at 4358.

IEPA argues that “the Board has adopted – and the federal government has approved – a single value water quality standard of 500 mg/L for chloride.” IEPA Mot. at 8, citing 35 Ill. Adm. Code 302.208(g). IEPA adds that “the Permit requires that Outfall 011 discharges comply with the applicable 500 mg/L water quality standard for chloride outside of the mixing zone.” IEPA Mot. at 8.

IEPA counters petitioners’ argument that the permit lacks an effective chloride limit because it “does not have a fixed concentration or load limit.” Petitioners argue that the permit has a narrative limit based on Williamson Energy “determining what it can discharge without causing a violation of the water quality standards.” IEPA Reply at 3-4, citing 35 Ill. Adm. Code 309.143(b), Pet. Resp. at 11. IEPA argues that the Special Condition 15 of the permit sets a quantitative limit on chloride discharges from Outfall 011 and cites the mixing zone equation

$$C_{DS} = [C_E Q_E + 0.25 C_{US} Q_{US}] / (0.25 Q_{US} + Q_E),$$

which can be re-written as

$$Q_E = [0.25 Q_{US} (C_{US} - C_{DS})] / (C_{DS} - C_E),$$

and in which C_{DS} is the downstream concentration in mg/L, C_E is the effluent concentration in mg/L, Q_E is the effluent flow rate in cfs for Outfall 011, C_{US} is the upstream concentration in mg/L, and Q_{US} is the upstream flow rate in cfs. IEPA Reply at 4, n.1; *see* R. at 27. IEPA argues that the instream conditions are independent variables established by monitoring required by Special Condition 15. *Id.*, citing R. at 27. IEPA further argues that the effluent chloride concentration is also established by monitoring under that condition. *Id.* IEPA adds that the downstream concentration is a constant 500 mg/L representing the chloride WQS at the edge of the mixing zone. IEPA Reply at 4. It concludes that “[t]he dependent variable, Q_E , represents effluent flow and constitutes the effluent limitation on chloride discharges in the Permit, which is specified and calculable based on instream conditions and effluent concentration.” *Id.*

The Board agrees that Special Condition 15 establishes a formula for demonstrating compliance with the chloride WQS. While the Board separately addresses the monitoring that would provide data for this formula, the Board is not persuaded that the permit lacks an effective limit. The Board agrees that this permit provision would require Williamson Energy to meet the chloride WQS at the edge of the mixing zone.

IEPA argues that, “[a]t the heart of this matter, petitioners are unhappy with the Board’s statewide water quality standard for chloride.” IEPA Resp. at 12. IEPA stresses that the Board adopted the current numeric chloride WQS in 1972. *Id.* at 14, citing Water Quality Standards Revisions, R 71-14 (Mar. 7, 1972). IEPA asserts that Illinois’ general use WQS “will protect the State’s water for aquatic life, wildlife, agricultural use, secondary contact use, and most industrial uses and ensure the aesthetic quality of the State’s aquatic environment.” IEPA Resp. at 13, citing 35 Ill. Adm. Code 302.202. IEPA argues that, when it issues a permit, it “may not simply

choose to ignore a standard adopted by the Board because Petitioners believe the federal recommended criteria should apply to a specific discharger.” IEPA Resp. at 14.

The Board is not persuaded that the permit must include chloride limits more restrictive than WQS under 35 Ill. Adm. Code 302. As IEPA has stressed, the Board’s general use WQS are established to protect specific uses including aquatic life. The Board recognizes that there is a different USEPA water quality guidance criteria for chloride and that the parties differ on the chloride regulatory level that is sufficiently protective. The Board notes that the chronic chloride standard of 230 mg/L recommended by the Petitioners is based on the 1988 Ambient Water Quality Criteria for chloride adopted by USEPA under Section 304(a)(1) of the Clean Water Act (CWA) of 1971 (P.L. 95-217). The USEPA’s ambient criteria also includes an acute chloride standard of 860 mg/L. USEPA’s chloride water quality criteria document clarifies that, when the criteria are adopted by a State as water quality standards under Section 303 of the CWA, they become enforceable maximum acceptable pollutant concentrations in ambient waters within that State. *See* “Ambient Aquatic Life Water Quality Criteria For Chloride -1988” EPA 440/5-88-001, February 1988 at iii.⁴ USEPA notes that, while the water quality criteria adopted in State water quality standards could have the same numerical values as criteria developed under Section 304 of CWA, in many situations States might want to adjust water quality criteria developed under Section 304 to reflect local environmental conditions and human exposure patterns before incorporation into water quality standards.

The Board notes that Illinois has not adopted the 1988 federal chloride criteria. Instead, the Board’s single-value 500 mg/L general use chloride WQS under Part 302, Subpart B, which has been approved by USEPA, is being implemented statewide to protect general use waters. As noted above, the Board found this standard to be sufficiently protective of the existing uses in the Big Muddy River. Therefore, the Board agrees with respondents that Board rules do not require replacing the chloride WQS with an alternate standard. The Board concludes that the record supports IEPA’s determination to establish a chloride permit limit based on the general use WQS of 500 mg/L.

Additionally, the Board agrees with IEPA that any revision of the chloride WQS should be conducted through a statewide general rulemaking that allows for participation of the public as well as affected entities and not in a permit determination by IEPA or an appeal to the Board. IEPA Mot. at 8; IEPA Reply at 14.

The parties agree that the record presents no genuine issue of material fact. Pet. Mot. at 1; IEPA Mot. at 1; Williamson Memo. at 5. Construing the record against IEPA and Williamson Energy as the moving parties, the Board finds that they are entitled to summary judgment on the issue of whether the chloride limit of 500 mg/L is sufficient to protect existing uses. The Board denies Petitioners’ motion for summary judgment on this issue and grants IEPA’s and Williamson Energy’s motions for summary judgment on this issue.

⁴ <https://www.epa.gov/wqc/national-recommended-water-quality-criteria-aquatic-life-criteria-table>

Chloride Monitoring

The petition alleges that IEPA apparently has not developed “the calibration curves necessary to monitor chloride levels.” Pet. at 8 (¶13), citing R. at 27-28. The petition also alleges that IEPA and Williamson Energy “intend in the future to develop key portions of the Permit regarding chloride and other pollutants without allowing public participation or review by the Board.” *Id.* The petition argues that this violates rights of public participation. Pet. at 8 (¶13). The Petitioners assert that the Board should vacate the Permit and remand the matter to the IEPA with instructions to “[f]inish developing the monitoring scheme with calibration of the critical conductivity/chloride system for Outfall 011 to the Big Muddy and a detailed explanation as to how it will be implemented.” Pet. Mot. at 3.

To decide the motions for summary judgment on this issue, the Board must decide whether IEPA was required to include the calibration curves correlating conductivity and chloride concentrations upstream and downstream from Outfall 011. The Board agrees with the Petitioners that a complete permit should be available to allow public participation during the permitting process. As noted by Petitioners, the Clean Water Act provides that “[p]ublic participation in the development, revision, and enforcement of any regulation, standard, effluent limitation, plan or program established by the Administrator or any State under this Act shall be provided for, encouraged, and assisted by the Administrator and the States.” Pet. Memo. at 27, citing 33 U.S.C. § 1251(e).

Williamson Energy highlights the importance of the calibration curves by noting that it must develop a site-specific database that correlates conductivity and chloride concentrations for the Big Muddy River and the treated effluent to ensure that the calibration curves remain accurate. Williamson Memo. at 17-18. Calibration curves must be accurate because they are used to demonstrate compliance with the chloride WQS. Williamson Energy argues that IEPA must approve these calibration curves prior to discharge, after six months of operation, and annually thereafter to ensure compliance with permit conditions and protect aquatic life from toxicity. *Id.* at 17-18, citing R. at 98, 509, 511. Williamson Energy also argues that Petitioners have overlooked that the permit requires sampling and monitoring requirements in addition to real-time monitoring. Williamson Resp. at 7. It states that Special Condition 15 requires assessing chloride and conductivity in lab-analyzed samples. *Id.*, citing R. at 27-28.

IEPA also disputes the Petitioner’s allegations by noting that the permit allows for compliance with the chloride standard in two ways. IEPA Mot. at 6. First, IEPA states that Special Condition 15 provides a formula by which the downstream chloride concentration can be determined at the edge of the mixing zone. *Id.*, citing R. at 27-28. IEPA adds that the permit requires measuring effluent chloride concentrations as well as flow measurements for the formula. *Id.* Second, IEPA states that Special Condition 15 requires installing a downstream conductivity monitor within 10 feet of the edge of the mixing zone to monitor downstream chloride concentrations correlated to the conductivity value. IEPA Mot. at 6, citing R. at 27-28. IEPA adds that DMRs must report both the calculated downstream chloride concentration using the formula and the daily maximum concentration based on conductivity. *Id.*

Further, IEPA argues that the calibration curves are intended to be revised on an ongoing basis to more accurately reflect field data and are to be reassessed by the Agency over the term of the permit to ensure that the calibration curves remain accurate. IEPA Mot. at 16, citing R. at 27. Therefore, the permit specifies a plan to develop and reassess calibration curves. IEPA Mot. at 16. Williamson Energy adds that the chloride monitoring program in the permit is fully developed and contains procedures to ensure that chloride levels are not monitored just daily or weekly, but continuously. Williamson Resp. at 5. Williamson adds that this requirement exceeds “the one or two samples per month normally required in an NPDES permit.” *Id.* at 2.

The Board agrees with IEPA that Special Condition 15 specifies two methods to demonstrate compliance with the chloride WQS at the edge of the mixing zone. However, both methods rely on conductivity monitoring. The first method uses the concentration/flow formula to demonstrate compliance on a periodic basis depending on when all four parameters (upstream flow, effluent flow, and upstream and effluent chloride concentrations) in the formula are measured under the permit.

$$C_{DS} = [C_E Q_E + 0.25 C_{US} Q_{US}] / (0.25 Q_{US} + Q_E)$$

Where:

C_E = Effluent concentration (mg/L)

Q_E = Effluent flow rate (cfs) for Outfall 011

Q_{US} = Upstream flow rate (cfs)

C_{US} = Upstream concentration (mg/L)

C_{OS} = Downstream concentration

The Board notes that while the permit requires periodic monitoring of flow (Q_E and Q_{US}) and chloride concentration in the effluent (C_E), the permit requires conductivity measurement upstream of Outfall 011 to determine upstream chloride concentration (C_{US}). *See* R. at 27. Thus, this method of demonstrating compliance depends on establishing a conductivity/chloride correlation curve upstream of Outfall 011.

The second method relies on conductivity measurements within 10 feet downstream of the edge of the mixing zone to determine chloride concentration correlated to the conductivity values. While this method, as noted by Williamson Energy, allows for compliance demonstration on a daily basis, it depends on establishing conductivity/chloride correlation curve. Thus, both methods of compliance required by the permit rely on chloride concentrations correlated with conductivity measurements upstream or downstream of Outfall 011. In effect, the conductivity/chloride calibration curves are an integral component of compliance demonstration with chloride WQS under Special Condition 15.

IEPA supports the use of conductivity/chloride calibration curves by noting that “[t]he general relationship between chloride and conductivity is well-understood.” IEPA Resp. at 2, citing R. at 4834. IEPA maintains that studies submitted by the Petitioners also acknowledge a “strong correlation between chloride ions and conductivity.” IEPA Resp. at 2, citing R. at 3163. While Petitioners cite data showing that conductivity varies in the Big Muddy River, IEPA argues that “variability in conductivity in the river does not in any way entail variability in the correlation between conductivity and chloride concentrations in the river.” IEPA Resp. at 2, citing Pet. Memo. at 26. IEPA further argues that Petitioners have not refuted this relationship. IEPA Resp. at 2.

Additionally, IEPA maintains that the permit does not allow any discharge from Outfall 011 “unless and until calibration curves demonstrating a strong correlation between chloride and conductivity and incorporating a protective margin of error have been developed and approved by the Agency.” IEPA Resp. at 3. The Board agrees that Special Condition 15 requires the calibration curves to be established prior to discharge from Outfall 011 based on conductivity and chloride monitoring downstream of the outfall and approved by the Agency. The permit also requires the calibration curves to be revised on an ongoing basis to accurately reflect field data and are to be reassessed and approved by the Agency annually.

While the Board recognizes IEPA’s oversight on the use of the calibration curves, the Board agrees with the Petitioners that IEPA should have included the initial calibration curves correlating conductivity measurements with chloride concentrations both upstream and downstream of Outfall 011 for public review as part of the draft permit. As noted by IEPA, the Board recognizes that the general relationship between chloride and conductivity is well-understood. However, the Petitioners’ concerns relate to applying that general relationship to establish site-specific permit limits for chloride in the discharge from Outfall 011. Including calibration curves in the draft permit would have allowed the Petitioners to review and confirm the relationship between chloride and conductivity in the Big Muddy River. This relationship is particularly important because conductivity monitoring is an integral part of demonstrating compliance with the chloride WQS under both compliance methods specified in the permit.

Williamson Energy states that in November 2016 it submitted to IEPA a mixing zone study including chloride and conductivity sampling data and modeling results. Williamson Resp. at 5, citing R. at 8372-8453. It adds that, in December 2019 and January 2020, it submitted updated results and calculations to IEPA. Williamson Resp. at 5, citing R. at 1656-1844, 5971-6154. Williamson Energy argues that Petitioners have not countered this data but only claim that real-time monitoring will be difficult because chloride and conductivity levels will vary. Williamson Resp. at 6, citing Pet. Mot. at 26. Williamson Energy maintains that the record shows IEPA considered sufficient evidence to approve the real-time monitoring provisions in the permit. However, the Board notes that the mixing zone study does not include calibration curves for determining chloride concentrations based on conductivity measurements.

The parties agree that the record presents no genuine issue of material fact. Pet. Mot. at 1; IEPA Mot. at 1; Williamson Memo. at 5. Construing the record against Petitioners as the moving parties, the Board finds that they are entitled to summary judgment on the issue of whether the permit must include calibration curves to allow meaningful public participation on a

critical element of demonstrating compliance with the chloride WQS meeting the numeric WQS outside of the mixing zone and meeting the narrative WQS inside and outside of the mixing zone will protect existing uses. The Board denies IEPA's and Williamson Energy's motion for summary judgement on this issue and grants Petitioners' motion for summary judgment on this issue.

Compliance with Sulfate, Nickel, Iron, and Copper Limits

The petition alleges that provisions of Special Condition 16 are not clear and may contain errors. Pet. at 9 (¶16). Petitioners' motion for summary judgment also argues that these provisions include errors. Pet. Memo. at 27-29.

Petitioners argue that, although Special Condition 15 refers to complying with WQS under 35 Ill Adm Code 302, it does not establish discharge limits for sulfate, nickel, iron, and copper for Outfall 011. Pet. Memo. at 28, citing R. at 13, 27-28. Petitioners also argue that the limitations in Special Condition 16 allow violation of WQS for sulfate, nickel, iron, and copper for long periods outside of the mixing zone. Pet. Memo. at 28, n.17; *see* R. at 28. Petitioners ask the Board to remand the permit to IEPA for it to explain what the effluent limits are for Outfall 011 for sulfate, nickel, copper, and iron; clarify that WQS must be met at the edge of the mixing zone; and provide necessary monitoring. Pet. Resp. at 21. Petitioners also request that the Board direct IEPA to clarify Special Condition 16 and allow for public comment on these provisions that it argues IEPA has not fully developed in the permit. *Id.* at 22.

Under the heading "Outfall 011 downstream monitoring," Special Condition 16 provides in its entirety that:

- a. A continuous conductivity monitor (correlated to chloride) shall be installed within 10 feet downstream of the edge of the mixing zone.
- b. The facility shall collect three samples per week from the receiving stream of Sulfate, Nickel, Copper, and Iron (dissolved) within 10 feet downstream of the edge of the mixing zone.
- c. If the measured concentration of Chloride, at the downstream monitoring location, exceeds 700 mg/l (this equals 40% over the water quality standard) more than 20 percent of the time in any month, the discharge from Outfall 011 shall cease until the water quality standard can be met within the mixing zone.
- d. If the water quality standard, based on a hardness of 91 mg/L as CaCO₃, for Sulfate and Iron (dissolved) exceeds the numbers below at the downstream monitoring location, in more than 3 of the samples taken within the month, the discharge from Outfall 011 shall cease until the water quality standards can be met within the mixing zone.
 - i. Sulfate= 700 mg/l (this is 40% over the WQS)

- ii Iron (dissolved)= 1.4 mg/l (this is 40% over the WQS)
 - e. If the water quality standard, based on a hardness of 91 mg/L as CaCO₃, for Copper (dissolved} and Nickel (dissolved) exceeds the numbers below at the downstream monitoring location, by 20 percent in more than 3 of the samples taken within the month, the discharge from Outfall 011 shall cease until the water quality standards can be met within the mixing zone.
 - i. Copper (dissolved)= 0.0126 mg/l (this is 20% over the WQS)
 - ii Nickel (dissolved}= 0.0055 mg/l (this is 20% over the WQS).
- R. at 28

Based on the reasonable potential to exceed analysis and mixing zone calculations, IEPA decided to not include discharge limits for sulfate, nickel, iron, and copper under Special Condition 15. Under 35 Ill. Adm. Code 309.143, discharge (effluent) limits must be specified if the Agency determines that constituents “are, or may be, being discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State water quality standard, including State narrative criteria for water quality.” IEPA determined that there is no reasonable potential to exceed the WQS for iron at the outfall and outside of the mixing zone for sulfate, nickel, and copper. R. at 48, 57. IEPA also determined that there is no reasonable potential to exceed the acute WQS outside of the ZID for copper and nickel. *Id.*

Based on mixing zone calculations, IEPA determined that dilution necessary to meet the chloride WQS significantly exceeds the dilution required for sulfate, nickel, copper, and iron (dissolved). IEPA Resp. at 7-8, citing R. at 5972 (mixing zone study). IEPA notes that the revision of chloride discharge limit from 12,000 mg/L to 5,000 mg/L reduced the dilution ratio needed for compliance with the WQS from 34:1 to 13.3:1 while also reducing the length of the mixing zone from 251 feet to 46 feet. R. at 1, 38. Mixing zone calculations also show that the dilution ratios required to comply with the WQS for sulfate (1.8:1), nickel (chronic 3.25:1, acute 3.3:1), copper (chronic 2.7:1, acute 2.1:1), and iron (dissolved) (5.8:1) are significantly lower than that required for chloride (34.0:1 at background concentration of 151 mg/L and 25.5:1 at background concentration of 31.2 mg/L). R. at 5972. IEPA concluded that meeting the chloride limitation at the edge of the mixing zone “ensures that there is no reasonable probability that sulfate, nickel, copper, and iron (dissolved) water quality standards will be violated.” IEPA Resp. at 8.

While the Board understands IEPA’s decision to not include permit limits for sulfate, nickel, copper, and iron (dissolved), it agrees with Petitioners that Special Condition 16(d) and (e) raise questions about complying with WQS for these constituents. IEPA asserts that these requirements are not numeric effluent limits that allow discharges to cause exceedances of WQS outside of the mixing zone. Instead, IEPA argues that they are automatic “cease and desist” provisions that require “Outfall 011 discharges to cease when associated monitoring reveals specific instream conditions.” IEPA Motion at 8. Based on its mixing zone calculations and reasonable potential analysis, IEPA did not include permit limits for sulfate, nickel, copper, and iron (dissolved) in Special Condition 15. By adding Special Condition 16 (d) and (e), however, IEPA appears to acknowledge that specific instream conditions may result in violating the WQS.

Also, because sulfate, nickel, copper, and iron (dissolved) are monitored within 10 feet within the edge of the mixing zone for chloride, exceeding WQS at the monitoring location may follow violating the WQS in the mixing zones.

In addition, the Board agrees with Petitioners that the record does not explain or provide a basis for the automatic “cease and desist” provisions under Special Condition 16. The record does not establish why the permit sets triggers to “cease and desist” at 20 or 40 percent above the applicable WQS and not at any other level or levels. *See* R. at 28. To avoid exceedances of the WQS due to specific instream conditions, IEPA could have established discharge limits for the subject constituents instead of the “cease and desist” provisions.

Based on the factors above, the Board finds that there are genuine issues of material fact on complying with the WQS for sulfate, nickel, copper, and iron (dissolved) without specifying discharge limits. At hearing, additional discussion of the record would allow the Board to determine whether the permit requires discharge limits for these constituents. It also provides an opportunity to examine the record on the trigger levels for the “cease and desist” provisions under Special Condition 16.

Antidegradation Assessment

IEPA’s Antidegradation Assessment must comply with specified procedures including permit application requirements. 35 Ill. Adm. Code 302.105(f). Petitioners state that the Board should remand the permit to IEPA and direct it to “[c]onsider carefully the alternatives to the proposed discharges and the potential social and economic effects of the proposed discharges as required by 35 Ill. Adm. Code 302.105(c)(2)(B)(iii) and (iv).” Pet. Mot. at 4. These requirements, the Board notes, must be considered in the Antidegradation Assessment under Section 302.105(f)(2)(A). For the reasons discussed below, the Board finds with one exception relating to the reasonable potential analysis that the record includes substantial evidence that supports IEPA’s determination regarding the Antidegradation Assessment. As discussed below, the Board finds that there is a genuine issue of material fact concerning the reasonable potential analysis for both Pond Creek (Outfalls 001 through 008) and the Big Muddy River (Outfall 011) that precludes granting summary judgement on IEPA’s Antidegradation Assessment. *See infra* at 96-99. In the following subsections of the opinion, the Board reviews the record to determine whether IEPA met the antidegradation requirements of 35 Ill. Adm. Code 302.105.

35 Ill. Adm. Code 302.105(f)(1)

Subsection (f)(1) requires that a permit application for any proposed increase in pollutant loading that requires a new, renewed, or modified NPDES permit must include information listed in subsections (A) through (F) “to the extent necessary for the Agency to determine that the permit application meets the requirements of this Section.” 35 Ill. Adm. Code 302.105(f)(1).

Subsection (f)(1)(A). This provision requires the permit application to identify and characterize “the water body affected by the proposed load increase or proposed activity and the existing water body’s uses. 35 Ill. Adm. Code 302.105(f)(1)(A). “Characterization must address physical, biological and chemical conditions of the water body.” *Id.*

IEPA asserts that the permit application identifies and characterizes the affected water bodies. IEPA Mot. at 11, citing R. at 8318-20 (Big Muddy River), 8338-39 (Pond Creek), 8788-89 (2015 assessment); *see id.* at 6200, 8360 (maps).

Subsection (f)(1)(B). The permit application must identify and quantify “the proposed load increases for the applicable parameters” and “potential impacts of the proposed activity on the affected waters.” 35 Ill. Adm. Code 302.105(f)(1)(B).

IEPA asserts that the permit application identifies and quantifies the proposed load increases and potential impacts. IEPA Mot. at 11-12, citing R. at 8320-23 (Big Muddy River), 8339 (Pond Creek), 8363-8453, 8455-8475, 8789 (2015 assessment).

Subsection (f)(1)(C). This provision requires the permit application to include information addressing “[t]he purpose and anticipated benefits of the proposed activity.” Under subsection (C)(iv), these may include “[a]n increase or the retention of current employment levels at a facility.” IEPA asserts that it “considered the local employment and tax revenue provided by the mine.” IEPA Mot. at 12, 13, citing R. at 90, 5888-89, 6181, 8323-24, 8327-28, 8339-41, 8787-88.

Williamson Energy asserts that it has operated the mine since 2005. Williamson Memo. at 13. It states that its assessment included data showing that the mine “directly employs over 235 persons with a payroll of \$20.2 million annually” with approximately 100 additional persons employed through its operations. Williamson Memo. at 12, citing R. at 90; *see* R. at 5888, 8327-28, 8334-35, 8344, 8351 (2016 assessment). Williamson Energy argues that IEPA accepted a formula showing indirect employment of an additional 705 persons. *Id.* IEPA also cited Williamson’s federal, state, and local tax payments. IEPA Mot. at 15, citing R. at 90, 5888.

Petitioners argue that IEPA appears to have uncritically accepted Williamson Energy’s projected employment and tax revenue from its operations. Pet. Memo. at 22, citing R. at 90. They add that “it is unclear from the record how those estimates were calculated.” Pet. Memo. at 22. In addition, Petitioners argue that these projections “did not consider potential damage to neighbors, subsidence or recreational fishers, or the climate.” *Id.* at 36; *see id.* at 4-5, 23; Pet. Mot. at 2. IEPA responds that Petitioners cite no authority for their expansive view of the required information. IEPA Reply at 16.

The Board agrees that the language of subsection 302.105(f)(1)(C) requires in a permit application information concerning the “purpose and anticipated benefits” of a proposed activity. These benefits specifically may include “[a]n increase or the retention of current employment levels at a facility.” 35 Ill. Adm. Code 302.105(f)(1)(C)(iv). Williamson Energy has operated the mine since 2005 and placed into the record information on its current direct and indirect employment and payroll consistent with subsection 302.105(f)(1)(C) allowing this information as a factor in IEPA’s assessment. Separately under 35 Ill. Adm. Code 302.105(c)(2)(B)(iv), for example, the assessment must assure that there is a benefit to the community at large. Based on these factors, the Board concludes that the record includes sufficient information to comply with 35 Ill. Adm. Code 302.105(f)(1)(C).

Subsection (f)(1)(D). The permit application must include information on “[a]ssessments of alternatives to proposed increase in pollutant loading . . . that result in less of a load increase, no load increase or minimal environmental degradation.” 35 Ill. Adm. Code 302.105(f)(1)(D). Subsection (D)(i) provides that the assessment may include listed alternatives, one of which is “[a]dditional treatment levels, including no discharge alternatives.” *Id.*

IEPA argues that the permit application included information assessing alternatives to increases in pollutant loading. *See* IEPA Mot. at 12, citing R. at 8324-8337 (Big Muddy River), 8341-54 (Pond Creek), 8791-98 (2015 assessment). Above, the Board reviewed this information, which considers a number of alternatives and variously addresses factors including technical feasibility, operational difficulties, creation of additional waste streams, and economic reasonableness. *See supra* at 18-24, 27-30. Williamson Energy asserts that IEPA’s Antidegradation Assessment satisfies the Board’s rules, and it cites the “supplemental information it submitted for the required alternatives analysis. Williamson Memo. at 12, citing R. at 87-90, 5888-94.

The Board notes that the language of subsection (f)(1)(D) requires in a permit application information on assessments of alternatives to proposed increases in pollutant loadings. The Board has reviewed the record on these alternatives, including Williamson’s supplemental information. This requirement makes the information an element of IEPA’s assessment. Separately under 35 Ill. Adm. Code 302.105(c)(2)(B)(iii), for example, the assessment must assure that “[a]ll technically and economically reasonable measures to avoid or minimize the extent of the proposed increase in pollutant loading have been incorporated into the proposed activity.” Based on these factors, the Board concludes that the record includes information sufficient to comply with 35 Ill. Adm. Code 302.105(f)(1)(D).

Subsection (f)(1)(E). The permit application must include “[a]ny additional information the Agency may request.” 35 Ill. Adm. Code 302.105(f)(1)(E).

IEPA asserts that the permit application “is supplemented by copious additional information requested by the Agency.” IEPA Mot. at 12, citing R. at 151-64 (mussel survey), 226-501 (additional water samples), 503-2584 (supplemental information), 5886-5969, 5971-6154 (mixing zone calculations), 6238-40 (Outfalls 009 and 009ES), 6246-48 (Pond 009 effluent results).

Subsection (f)(1)(F). The permit application must include “[p]roof that a copy of the application has been provided to the Illinois Department of Natural Resources.” 35 Ill. Adm. Code 302.105(f)(1)(F). The record indicates that a consultation with IDNR began on November 2, 2016, through its Eco-CAT website. R. at 8355; *see* 35 Ill. Adm. Code 302.105(f)(1)(F).

35 Ill. Adm. Code 302.105(f)(2)

Subsection (f)(2) requires that IEPA must complete an Antidegradation Assessment on a case-by-case basis according to the requirements of subsections (A) through (C). 35 Ill. Adm. Code 302.105(f)(2).

Subsection (f)(2)(A). This subsection requires IEPA’s case-by-case assessment to consider criteria in 35 Ill. Adm. Code 302.105(c)(2).

Under subsection (c)(2), IEPA must assess the proposed increase in pollutant loading to determine whether it complies with antidegradation requirements. In doing so, IEPA must meet requirements in subsections (A) through (C).

Subsection (c)(2)(A). IEPA must “[c]onsider the fate and effect of any parameters proposed for an increased pollutant loading.” 35 Ill. Adm. Code 302.105(c)(2)(A). IEPA asserts that it “reviewed sampling data characterizing the Outfall 011 discharge.” IEPA Mot. at 12, citing R. at 226-501 (additional water samples), 1240-1375 (supplemental water data), 8363 (Water Holding Cell Data), IEPA Mot. at 4-8 (Outfall 011). IEPA states that it also “conducted an analysis of the reasonable potential for violation of water quality standards.” IEPA Mot. at 12, citing R. 21204-65. It adds that it also “considered modeling data of the proposed mixing of effluent in the Big Muddy River.” IEPA Mot. at 12, citing R. at 1656-84, 5971-6154, 8372-8453 (diffuser and mixing zone).

As evidence that it considered increased pollutant loading, IEPA cites and relies upon the reasonable potential analysis it performed. Below, however, the Board separately addressed the analysis and found that it presents genuine issues of material fact both for Outfalls 001 through 008 and for Outfall 011. *See infra* at 96-99. For Outfall 001 through 008, the Board found that there is a disputed issue whether they are intermittent discharges to which acute WQS might apply. For Outfall 011, the Board found a disputed issue of the reasonable potential to exceed WQS with the addition of RO reject water. Although this finding precludes granting summary judgment on the Antidegradation Assessment as a whole, the Board reviews the other elements of the assessment to identify issues for hearing.

Subsection (c)(2)(B). This provision requires IEPA’s case-by-case assessment to assure results listed in subsections (i) through (iv).

Subsections (i) and (ii). IEPA’s assessment must assure that “[t]he applicable numeric or narrative water quality standard will not be exceeded as a result of the proposed activity” and that “[a]ll existing uses will be fully protected.”

Above, the Board concluded that the record shows that numeric and narrative WQS will protect existing uses in the Big Muddy River. *See supra* at 78-80, IEPA Mot. at 13. IEPA asserts that the data and analyses it considered and the conditions it included in the permit support these conclusions. IEPA Mot. at 13, citing IEPA Mot. at 4-8 (discharges from Outfall 011), 10-11 (existing uses in Big Muddy River). However, the Board above found a genuine issue of material fact regarding compliance with the applicable WQS in both Pond Creek and the Big Muddy River.

Subsection (iii). Under 35 Ill. Adm. Code 302.105(c)(2)(B)(iii), IEPA must assure that “[a]ll technically and economically reasonable measures to avoid or minimize the extent of the proposed increase in pollutant loading have been incorporated into the proposed activity.”

IEPA asserts that it considered nine alternatives evaluated by Williamson Energy. IEPA Mot. at 13, citing R. at 5886-94, 8324-31. Williamson Energy adds that it provided supplemental information on various alternatives, and it argues that “[t]he Responsiveness Summary fully addresses this concern.” Williamson Memo. at 24, citing R. at 87-90, 5886-5969. IEPA concluded that there were no viable alternatives to avoiding the discharge. IEPA Mot. at 13, citing R. at 87-90, 6181-82 (IEPA Fact Sheet).

Petitioners argue that IEPA’s Antidegradation Assessment “did not seriously consider alternatives for addressing chloride discharges” and did not genuinely evaluate the cost of those options. Pet. Memo. at 35; *see* Pet. Mot. at 2; Pet. Memo. at 4. Petitioners assert that IEPA simply rejected alternatives that Williamson Energy or its consultant considered too expensive. Pet. Memo. at 35. Petitioners acknowledge that the record includes cost estimates for alternatives from December 2019 in addition to those considered by Williamson Energy’s consultants and IEPA in 2016. Pet. Reply at 21, citing R. at 5887-94. Even after reviewing these more recent estimates, they argue that “IEPA did not seriously consider alternatives that would eliminate or minimize the new pollution and that one or more of the alternatives probably should have been adopted.” Pet. Reply at 21.

IEPA asserts that it did not merely accept Williamson Energy’s analysis and did not fail to evaluate alternative treatment technologies. IEPA Resp. at 16, citing Pet. Memo. at 35-36. IEPA asserts that it also relied on a supplemental analysis Williamson Energy submitted in December 2019. IEPA Resp. at 16, citing R. at 87, 5887-94. It states that this supplemental analysis provided additional cost information. IEPA Resp. at 16-17, citing R. at 5890-94.

Williamson Energy disputes Petitioners’ argument that IEPA did not fully evaluate the costs of these options. Williamson Resp. at 22, citing Pet. Mot. at 35-36. It argues that it provided IEPA with updated cost information for each option in 2019, and that IEPA evaluated that information. Williamson Resp. at 22, citing R. at 87-90, 5886-94. Williamson Energy also disputes Petitioners’ position that IEPA failed to consider combinations of alternatives. Williamson Resp. at 23, citing Pet. Mot. at 36. It asserts that it provided analysis and costs estimates for combinations and that IEPA considered this information. Williamson Resp. at 22, citing R. at 87-90, 5886-94.

IEPA emphasizes that it included in the permit “measures to minimize the pollutant loading by reducing the maximum concentration of Outfall 011 chloride discharges from 12,000 mg/L to 5,000 mg/L and by reducing the length of the mixing zone from 251 feet to 46 feet.” IEPA Mot. at 13, citing R. at 27, 38, 2840. The permit also includes Special Condition 14, “which requires that Williamson [Energy] install and operate a 1.0 million [gallons per day] RO unit for outfalls to Pond Creek.” R. at 26, 88; *see* Williamson Memo. at 12.

Above, the Board reviewed the record on alternatives to the proposed discharge. *See supra* at 18-24, 27-30. This information considers numerous alternatives and addresses factors including technical feasibility, operating experience, creation of additional waste streams, and economic reasonableness. Based on this review, the Board is not persuaded that IEPA’s assessment failed to consider discharge alternatives or that IEPA has failed to assure that the permit includes required measures.

Subsection (iv). IEPA must assure that “[t]he activity that results in an increased pollutant loading will benefit the community at large.” 35 Ill. Adm. Code 302.105(c)(2)(B)(iv),

Petitioners argue that, although IEPA considered community benefits from employment and tax revenues, it did not consider potential damage or adverse local economic effects. Pet. Resp. at 5, 44. Petitioners also argue that IEPA ignored “the fact that the coal being mined will fuel climate change that will harm the people of southern Illinois as well as the rest of the planet.” Pet. Resp. at 5.

IEPA asserts that it “it reasonably found a benefit to the community at large based on continuing local employment and tax revenues associated with the mine.” IEPA Resp. at 18, citing R. at 90, 5888-89, 6181, 8323-24, 8327-28. IEPA argues that it addressed “surface water quality and imposed appropriate permit conditions.” IEPA Resp. at 18, citing *id.* at 2-16. IEPA states that, while it shares Petitioners’ concerns with climate change, the Board’s regulations do not “authorize the Agency to deny an NPDES permit application solely because the proposed discharge is connected with fossil fuel use.” *Id.* at 18-19.

Williamson Energy asserts that IEPA’s assessment must consider pollutant loading in Illinois bodies of water and assure that the activity benefits the community at large. Williamson Memo. at 13. Although Williamson Energy notes Petitioners’ comment that “coal being mined will fuel climate change,” it argues that it “is not proper grounds to deny an NPDES permit.” Williamson Reply at 20.

The Board recognizes Petitioners’ concern with climate change associated with fossil fuel use. However, the Board finds merit in IEPA’s position that that the antidegradation requirements do not support the scope of the assessment suggested by Petitioners. Subsection 302.105(c)(2)(B)(iv) requires IEPA to assure that the increased loading will benefit the community at large. Above, the Board reviewed permit application requirements and concluded that the record includes sufficient information to address the “anticipated benefits of the proposed activity” under Section 302.105(f)(1)(C). *Supra* at 89-90. Based on continuing local employment and tax revenues, IEPA asserts that it appropriately concluded that Williamson Energy’s proposed operations would benefit the community at large. Based on its review of the record, the Board is not persuaded that IEPA’s assessment of this factor failed to make the required assurance.

Subsection (c)(2)(C). This provision specifies that IEPA’s case-by-case assessment must use sources of information listed in subsections (i) through (iv) when they are available. The rule provides that these sources include information supplied by an applicant, information from IEPA’s own sources, IEPA’s permitting experience, and “[a]ny other valid information available to the Agency.” 35 Ill. Adm. Code 302.105(c)(2)(C).

Petitioners have not cited this provision to challenge IEPA’s use of available sources of information. Having reviewed the record, the Board is not persuaded that IEPA’s assessment failed to meet this requirement.

Subsection (f)(2)(B). Under 35 Ill. Adm. Code 302.105(f)(2)(B), IEPA “must consider the information provided by the applicant pursuant to subsection (f)(1).” *See supra* at 88-90 (reviewing permit application requirements).

IEPA asserts that it performed the required consideration of the information submitted to it by Williamson Energy. IEPA Mot at 12.

Subsection (f)(2)(C). Under 35 Ill. Adm. Code 302.105(f)(2)(C), IEPA after performing its assessment “must produce a written analysis addressing the requirements of this Section and provide a decision” based on the result.

IEPA asserts that it produced a written analysis meeting the requirements for its assessment and providing the results of its decision. IEPA Mot. at 12, citing R. at 6167-83.

35 Ill. Adm. Code 302.105(f)(3).

This provision requires IEPA to provide public notice and public participation through procedures in 35 Ill. Adm. Code 309.109. IEPA must then incorporate into a fact sheet information listed in subsections (A) through (E). This information includes the proposed activity, the affected surface water body, and an overview of alternatives.

IEPA asserts that it provided the required public notice and participation on the permit application. IEPA Mot. at 13. IEPA argues that it issued the required fact sheet. *Id.*, citing R. at 6167-83. IEPA notes that it “received nearly 400 public comments on the issued draft permit.” IEPA Mot. at 13, citing R. at 2843-5884. It also “conducted a public hearing on the draft permit and made changes to the draft permit based on comments received from the public.” IEPA Mot. at 13, citing R. at 37-39, 2800-01, 2596-2796 (hearing transcript).

35 Ill. Adm. Code 302.105(c)(1)

This subsection requires any lowering of the quality of “high quality waters” must be “necessary to accommodate important economic or social development.” IEPA Mot. at 14. IEPA asserts that, after conducting an Antidegradation Assessment complying with 35 Ill. Adm. Code 302.105(f), it concluded that the discharge from Outfall 011 is necessary to accommodate development. IEPA Mot. at 14.

Petitioners assert that “[p]ollution is not necessary to accommodate an economic activity if one can have the activity without the pollution.” *Id.* They also assert that pollution has not been minimized under the antidegradation rules “if there are feasible steps available to reduce it.” Pet. Reply at 21, citing 35 Ill. Adm. Code 302.105(c)(2)(B)(iii).

IEPA asserts that it found the proposed discharge is necessary. IEPA Mot. at 14. It noted that the mine experiences an influx of groundwater from an overlying saline aquifer. *Id.*, citing R. at 8313. The assessment concluded that “[i]t is necessary to remove the water from the mine to protect the health and safety of the workforce” and the overall operation. R. at 8313. The mine “experiences up to 3.5 million gallons per day of groundwater infiltration, and its existing

water retention does not provide a long-term solution for amounts this large. IEPA Mot. at 14, citing 8313-14, 8329-30. Although Williamson Energy considered nine alternatives to its proposed discharge, IEPA “determined that the proposed discharge is the only practicable or economically viable long-term means of addressing the issue of groundwater infiltration.” IEPA Mot. at 14, citing R. at 87-90, 6181-82.

Williamson Energy asserts that IEPA’s Antidegradation Assessment satisfies Board rules. Williamson Memo. at 12, citing R. at 87-90, 5888-94. It argues that this assessment shows that “[n]o alternative was feasible as a long-term solution” for a flow of 3.5 MGD from the mine. Williamson Memo. at 12.

Above, the Board considered IEPA’s review of alternatives to the proposed discharge. *Supra* at 18-24, 27-30. IEPA concluded that there were no viable alternatives to avoiding the discharge, and the Board determined that IEPA’s analysis met the requirements for the assessment. Based on this record, the Board concludes that the record supports IEPA’s determination.

Next, IEPA asserts that it concluded that continuing to operate the Pond Creek mine “is an important economic or social development.” IEPA Mot. at 14. IEPA cited both direct and indirect employment and purchasing goods and services from local suppliers. *Id.*, citing R. at 90, 5888. It also cited Williamson’s federal, state, and local tax payments. IEPA Mot. at 15, citing R. at 90, 5888. Based on these factors and other information in the record, IEPA argues that it “reasonably concluded that continued operation of the mine is an important economic or social development.” IEPA Mot. at 15, citing R. at 90, 5888-89, 6181, 8323-24, 8327-28.

Williamson Energy notes Petitioners’ allegation that the permit would violate Board regulations because “it would harm social and economic development in the community at large by further wedding the local economy to the coal mining industry.” Williamson Memo. at 12; *see* Pet. at 5 (¶6). Williamson Energy disputes that employment benefits may be temporary. Williamson Memo. at 13, citing Pet. at 10 (¶20). It asserts that it “has operated this mine since 2005, successfully emerged from bankruptcy in 2020 without disrupting its mining operations, and has a considerable future given today’s coal market.” Williamson Memo. at 13. Williamson Energy also argues that “the Act and Board regulations do not provide IEPA authority “to consider the financial assurance of a mining company in granting an NDPES permit. *Id.*, citing R. at 55-56.

Williamson Energy also notes Petitioners’ allegation that the permit would harm social and economic development “by increasing the emission of greenhouse gases.” Williamson Memo. at 12; *see* Pet. at 5 (¶6). It argues that this “is not proper grounds to deny an NPDES permit.” Williamson Reply at 20. Williamson Energy argues that the Act requires IEPA “to issue a permit upon proof that the proposed facility or equipment will not cause a violation of the Act or promulgated regulations.” Williamson Memo. at 13-14, citing 415 ILCS 5/39(a) (2020).

Above, the Board considered anticipated benefits of Williamson Energy’s proposed activity. *Supra* at 88. The Board concluded that the record supports IEPA’s conclusion that the activity would benefit the community at large, particularly through continued direct and indirect

employment and tax revenues. The Board concludes that the record supports IEPA's determination that the activity is necessary to accommodate an important economic or social development. The Board again stresses the concern with climate change that it shares with parties. However, it can only conclude that Board rules do not clearly provide a basis for this concern to reverse IEPA's determination on this point.

Conclusion

For the reasons discussed above, the Board finds with one exception concerning the reasonable potential analysis that the record includes substantial evidence that supports IEPA's determination on the Antidegradation Assessment. As noted above, however, the Board found that there are genuine issues of material fact concerning the reasonable potential analysis for both Outfalls 001 through 008 and for Outfall 011. *See infra* at 96-99. For Outfall 001 through 008, the Board found that there is a disputed issue whether they are intermittent discharges to which acute WQS might apply. For Outfall 011, there is a disputed issue of the reasonable potential to exceed WQS with the addition of RO reject water.

Addressing the Antidegradation Assessment as a whole, the Board finds that there is one genuine issue of material fact regarding the reasonable potential analysis that precludes granting summary judgment. The Board denies the parties' motions for summary judgment on the Antidegradation Assessment. At hearing, the parties can address whether the record supports classifying Outfall 001 through 008 as intermittent discharges and, if so, whether relying on acute WQS for them is consistent with the Act and regulations. The parties can also address whether the record supports a conclusion that there is no reasonable potential to exceed the WQS in the discharge from Outfall 011 with the addition of RO reject water.

Reasonable Potential Analysis

Petitioners have raised two separate objections to the analysis of the reasonable potential as to whether the proposed discharges may violate the WQS. In their petition, Petitioners question the analysis performed for Outfalls 001 through 008. Petitioners' motion for summary judgment also challenges the analysis for Outfall 011. The Board separately reviews the issues in the following subsections.

Outfalls 001-008

In their petition, Petitioners first alleged that the reasonable potential test violated the Board's regulations because it "was not properly performed at least with regard to mercury, copper, iron, nickel, and selenium, and failed to properly consider the combined effects of these pollutants and others." Pet. at 5-6 (¶6), citing R. at 4353-57 (Petitioners' comment dated Jan. 17, 2020).

In its Responsiveness Summary, IEPA reported that, in response to comments, Williamson Energy conducted additional sampling for Outfalls 001 through 008. R. at 110. With data from this sampling, IEPA revised the permit by adding "limits for mercury at Outfall 001, copper and nickel at Outfall 002, iron (dissolved) at Outfall 003, copper at Outfall 004,

nickel at Outfall 006, iron (dissolved), nickel, and zinc at Outfall 007, and cadmium, copper, nickel, and zinc at Outfall 008.” *Id.* IEPA also struck proposed Outfalls 009 and 009ES from the permit. *Id.* The permit also requires Williamson Energy to install and operate a 1.0 MGD RO unit and discharge treated water through sedimentation basins that discharge through Outfalls 001 through 008. *Id.* at 110-11. IEPA adds that the permit regulates manganese at Outfalls 006, 007, and 008. *Id.* at 111.

Williamson Energy specifically notes Petitioners’ allegation that the permit violates Board regulations because “the testing done for mercury was not done with sufficient sensitivity to determine whether there was a reasonable potential for permitted discharges to cause or contribute to violations of the applicable 12 ng/L water quality standard.” Williamson Memo. at 18, citing Pet. at 6 (¶6). It asserts that, in response to public comments, it conducted additional sampling for mercury with a minimum detection limit of 0.5 ng/L. Williamson Memo. at 19, citing R. at 111, 208. Williamson Energy argues that, based on the results of this additional sampling, IEPA modified the permit to include a mercury limit of 12 ng/L for Outfall 001. It adds that these data indicated no reasonable potential for Outfalls 002-008 to exceed the mercury WQS. Williamson Memo. at 19, citing R. at 72.

Petitioners assert that IEPA’s analysis “calculates the reasonable potential to violate as to a number of pollutants and sets limits based on the acute standard even where a reasonable potential was found.” Pet. Reply at 15, citing R. at 211-20. Petitioners argue that the permit sets limits for Outfalls 001 through 008 at acute toxicity levels and does not ensure that the chronic WQS will not be violated. Pet. Reply at 15, citing R. at 5, 6, 7, 8, 9, 10, 11, 12.

Below, the Board concluded that there is a genuine issue of material fact whether Outfalls 001 through 008 are intermittent discharges to which acute standards might apply. *See infra* at 99-100. Based on this conclusion, the Board finds that there is a genuine issue of material fact on whether IEPA’s analysis correctly determines the reasonable potential for Outfalls 001 through 008 to violate WQS standard. At hearing, the parties can address whether the record supports IEPA’s analysis and permit provisions based on it.

Outfall 011

As noted above in summarizing the reasonable potential analysis (*supra* at 30-35), IEPA concluded that there was no reasonable potential to exceed the WQS at Outfall 011 for arsenic, chromium (total), cyanide (available), iron (dissolved), lead, manganese, mercury, phenols, silver, zinc, and selenium. R. at 48, 57. IEPA determined that “there is no reasonable potential to exceed the WQS outside of the mixing zone for cadmium, copper, nickel, sulfate, and chloride.” *Id.* IEPA also determined that there is no reasonable potential to exceed the acute WQS outside of the ZID for cadmium, copper, and nickel.” *Id.* IEPA modified the draft permit to reduce the maximum chloride concentration from Outfall 011 from 12,000 mg/L to 5,000 mg/L. *Id.*

IEPA states that Williamson Energy submitted a mixing zone study in November 2016 (R. at 8372-8453) and also submitted updated modeling information in December 2019 and January 2020 (*id.* at 1656-1844, 5971-6154). Based on this modeling, a chloride discharge of

12,000 mg/L required a dispersion ratio of 34:1. IEPA Mot. at 5, citing R. at 1656. The permit included a chloride effluent limit of 5,000 mg/L with a dispersion ratio of 13.3:1. IEPA Mot. at 5, citing R. at 27, 38. IEPA asserts that the study identified chloride as the limiting parameter requiring the most dispersion, with sulfate, iron, nickel, and copper requiring “far less dispersion.” IEPA Mot. at 5, citing R. at 5972, 8392. IEPA concluded that WQS for these parameters “will be met well before the edge of the mixing zone.” IEPA Mot. at 5. For these four parameters, IEPA states that that permit requires sufficient stream flow to ensure that WQS will be met outside the mixing zone. *Id.* at 6, citing R. at 27-28.

IEPA argues that there is no reasonable probability that discharges from Outfall 011 will violate the WQS for dissolved iron, sulfate, nickel, and copper “if chloride discharges comply with Special Condition 15.” IEPA Mot. at 7; *see* R. at 27-28. IEPA states that this condition “requires that effluent concentrations of sulfate and iron (dissolved) be measured three times per week when Outfall 011 is discharging.” *Id.* It adds that Special Condition 18 “requires that Outfall 011 effluent concentrations of copper and nickel be measured once per month for the first year and twice per year thereafter.” IEPA Mot. at 7, citing R. at 29. Under Special Condition 16(b), the permit requires collecting three samples of sulfate, iron (dissolved), nickel, and copper per week within 10 feet downstream of the edge of the mixing zone. IEPA argues that this sampling will allow it “to determine if the discharge is causing exceedances outside of the mixing zone for these parameters.” IEPA Mot. at 7, citing R. at 28.

IEPA adds that it “analyzed additional sampling data from Cell 417 at Pond Creek Mine, which retains the on-site water that will be discharged through Outfall 011.” IEPA Mot. at 5, citing R. at 226-501, 1240-1375, 8363. IEPA argues that these data support its conclusion that discharges from Outfall 011 will comply with the WQS at or before the edge of the mixing zone. IEPA Mot. at 5-6, citing R. at 21204-65.

In their motion for summary judgment, Petitioners note that the permit required “Reverse Osmosis (RO) treatment of 1 million gallons per day to restore Pond Creek – with the RO reject water to be added to the Outfall 011 discharge to the Big Muddy.” Pet. Memo. at 18, citing R. at 37, 106. Petitioners argue that the record does not show whether IEPA performed a new reasonable potential analysis that reflects adding this reject water to the outfall or relied on the previous analysis. Pet. Memo. at 18, citing R. at 8363; *see* Pet. Memo. at 34.

IEPA stated the reject water from the RO plant will be treated by the sedimentation ponds before it is mixed with Outfall 011 effluent. IEPA Reply at 11. That effluent must meet all conditions and limits in the permit, which IEPA argues will meet the WQS and protect existing uses. *Id.*

Williamson Energy states that the RO reject water is not discharged directly through Outfall 011 and “instead flows into RDA No. 3 where it will be combined with permeate, then treated in a water holding cell before being discharged into the Big Muddy.” Williamson Resp. at 20. It argues that both RDA No. 3 and the water holding cell will “settle out suspended solids and remove turbidity.” *Id.* at 21, citing R. at 47. It adds that the discharge must comply with permit limits and monitoring requirements. Williamson Resp. at 3, 21. It further argues that, because the RO plant does not add constituents to the water, “there is no need to reanalyze the

RO reject water.” Williamson Resp. at 21. It argues that Petitioners failed to show that IEPA’s analysis was deficient and “offer no rule or evidence that would suggest IEPA should reopen the analysis under these circumstances.” *Id.* at 3, 20.

Petitioners argue that Williamson does not provide a basis for its position that IEPA did a reasonable potential analysis that considered RO reject waste. Pet. Reply at 24, n.27. They argue that IEPA’s analysis focused entirely on Cell 417 as the source of the discharge, but Cell 417 does not currently receive RO reject wastes. *Id.* For a reasonable potential analysis of the discharge with the reject water, Petitioners assert that “IEPA would have had to estimate the pollution levels in the reject water and then add that pollution into the reasonable potential analysis done for Cell 417 water. *Id.*”

Ultimately, however, IEPA concedes that the record does not include an analysis “that specifically estimates or otherwise quantifies the RO reject stream’s potential contribution to the proposed Outfall 011 discharge.” IEPA Reply at 11.

The Board does not generally take issue with IEPA’s reasonable potential analysis of the discharges from Outfall 011. However, the Board notes that the permit includes a potentially significant additional contribution of RO reject water to Outfall 011. The Board notes IEPA’s concession that the record does not include an analysis that “specifically estimates or otherwise quantifies the RO rejects stream’s potential contribution to the proposed Outfall 011 discharge.”

The Board does not overlook the treatment in sedimentation ponds that RO reject water would receive, and it does not overlook the general permit condition that the discharge must meet permit limitations. However, in the absence of an analysis of the potential addition of RO reject water to the discharge, the Board concludes that the record falls short of providing substantial evidence that there is no reasonable potential to exceed the WQS in the discharge from Outfall 011. The Board concludes that there is a genuine dispute of material fact on this issue that precludes granting summary judgment and denies the motions for summary judgment. At hearing, the parties can address whether the record supports a conclusion that there is no reasonable potential to exceed the WQS in the discharge from Outfall 011 with the addition of RO reject water.

Pond Creek Discharges

Petitioners note that after the public hearing IEPA required Williamson Energy to conduct effluent testing and then “added new limits to Outfalls 1-4 and 6-8 for mercury, nickel, copper, iron, and zinc.” Pet. Memo. at 18. Petitioners argue that dilution is not available in either the unnamed tributaries or Pond Creek, as “[t]here is no possibility of a legal mixing zone” in them. Pet. Resp. at 22, citing 35 Ill. Adm. Code 302.102; Pet. Memo. at 35. They note that IEPA “removed the proposed mixing zone in Pond Creek.” Pet. Memo. at 21, citing R. at 71.

However, Petitioners assert that, “[e]xcept for mercury, which is set at the human health fish consumption standard, all of the limits for discharges to tributaries to Pond Creek are set at the standard to protect against *acute* toxicity. *Id.* (emphasis in original), citing R. at 5, 6, 7, 8, 10, 11, 12, 211-20. Petitioners argue that the permit allows discharges of cadmium, copper, nickel,

and zinc to Pond Creek at concentrations up to the acute standard even though Board rules include a chronic standard for them. Pet. Memo. at 34-35, Pet. Resp. at 4, 22, citing 35 Ill. Adm. Code 302.208, R. at 211-20.

IEPA states that it conducted a reasonable potential analysis for discharges to the tributary of Pond Creek from Outfall 001 through 008. IEPA Mot. at 9, citing R. at 211-20, 8241-8250, 21204-65. IEPA asserts that discharges from Outfalls 001 through 008 are “non-continuous, intermittent discharges.” IEPA Mot. at 10. IEPA argues that “[c]hronic water quality standards protect aquatic life against long-term effects from prolonged exposure. Consistent with its longtime practice for intermittent discharges, IEPA required “daily maximum effluent limits based on acute water quality standards.” IEPA Mot. at 10. The permit includes limits based on the acute WQS for copper at Outfalls 002, 004, 007, and 008, for nickel at Outfalls 002, 006, 007, and 008, and for zinc at Outfall 008. *Id.* citing R. at 6, 8, 10, 11, 12.

Petitioners discount IEPA’s position that these discharges are non-continuous and intermittent. Pet. Resp. at 22, Pet. Reply at 15, citing IEPA Mot. at 10. They argue that the permit does not limit discharges to those that are non-continuous and intermittent, does not establish load limits on the discharges, and sets concentration limits based on acute WQS. Pet. Resp. at 22-23, Pet. Reply at 15.

IEPA notes Petitioners’ argument that the permit “allows chronic violation” of WQS for cadmium, copper, nickel, and zinc. IEPA Reply at 7, citing Pet. Resp. at 22. IEPA acknowledges that, “for discharges from Outfalls 001 through 008, the Agency only assessed the reasonable potential to exceed acute water quality standards due to the intermittent nature of such discharges.” IEPA Reply at 8, citing IEPA Mot. at 9-10. IEPA asserts that this assessment reflects “longstanding Agency practice.” IEPA Reply at 8. It explains that intermittent discharges including stormwater discharges are limited in duration, “either by permit condition of natural conditions, and therefore cannot reasonably cause exceedances of chronic water quality standards.” *Id.* However, it acknowledges that “the administrative record and the Permit itself do not precisely define Outfalls 001 through 008 as intermittent or stormwater-only discharges.” *Id.*

The Board does not generally take issue with IEPA’s practice for addressing intermittent discharges. However, it can’t overlook IEPA’s acknowledgment that the record and permit do not “precisely define Outfalls 001 through 008 as intermittent” discharges that support this practice. IEPA Reply at 8. Since this definition is the basis for relying on acute WQS, the Board concludes that there is a genuine dispute of material fact that precludes granting summary judgment. The Board concludes to deny the motions for summary judgment. At hearing, the parties can address whether the record supports this definition and, if so, whether IEPA’s practice of relying on acute WQS is consistent with the Act and Board regulations.

Cumulative Effects

Petitioners assert that the permit must also consider “interactive effects of the numerous pollutants in the mine waste.” Pet. Memo. at 32. They argue that Williamson Energy and IEPA reached their conclusions on the permit by considering the discharge from Outfall 011 “in

isolation” and ignoring any of its possible effects other than chloride in and near the mixing zone. Pet. Resp. at 30; *see* Pet. Reply at 18.

Petitioners emphasize that chloride “cannot be considered in isolation.” Pet. Reply at 18. Petitioners argue that the permit fails to protect from the cumulative effects of pollutants including chloride, sulfur, copper, ammonia, phosphorus, iron, and nickel “and instead relies on a chloride standard known to be unprotective.” Pet. Resp. at 4. They argue that chloride must be considered with these cumulative effects. *Id.* at 31, citing R. at 3288, 4354-48. Petitioners assert that the record includes comments and studies objecting that the chloride standard is not sufficient to protect the Big Muddy River and other waters. Pet. Resp. at 31.

IEPA explains that the WQS at 35 Ill. Adm. Code 302 are based on “individual constituents; therefore, the individual constituents do not address cumulative impacts on designated uses.” R. at 82. IEPA asserts that designated uses will be fully protected because the discharge is required to comply with all applicable WQS at the edge of any applicable mixing zone or at the ZID. *Id.* IEPA argues that, because discharges must comply with the WQS, there will not be cumulative effects of those discharges. *Id.* at 92.

In addition, IEPA asserts that the Petitioners effectively seek to revisit Illinois’ chloride standard by reassessing chloride’s cumulative effects with other pollutants. IEPA Resp. at 12, citing Pet. Memo. at 32. IEPA asserts that Petitioners consider the chloride WQS inadequate and insist that IEPA must impose heightened chloride standards through NPDES permitting. Pet. Resp. at 13. IEPA argues that this would require it to set site-specific water quality standards for chloride and other pollutants in a broad subset of waters to which general use numeric WQS apply. *Id.* at 15. IEPA argues that it cannot ignore adopted general use numeric WQS and incorporate site-specific standards as Petitioners recommend. IEPA Resp. at 16. IEPA asserts that this should be addressed in a Board rulemaking proceeding. *Id.*

The Board agrees with IEPA that the general use WQS at 35 Ill. Adm. Code 302 are based on the toxicity effects of individual constituents and that complying with those WQS will protect existing uses. The Board also agrees with IEPA that the appropriate forum for addressing proposed revisions to the WQS is a rulemaking and not a permit appeal. However, the Board above found a genuine issue of material fact regarding compliance with the applicable WQS in both Pond Creek and the Big Muddy River. Therefore, the Board denies the motions for summary judgment and will decide the issue of cumulative effects after hearing.

Mussels

Petitioners argue that “recent scientific work has shown that the 500 mg/L chloride standard is simply not protective of mussels or other species that are (or could be) present in the Big Muddy watershed.” Pet. Memo. at 10, Pet. Resp. at 32, citing R. at 4580, 4603, 4688, 4702. Petitioners stress that USEPA’s chronic standard for chloride is 230 mg/L. Pet. Memo. at 10, citing R. at 3288.

Williamson Energy argues that Petitioners overlook comprehensive mussel studies addressed in the Responsiveness Summary and the revised permit. Williamson Memo. at 15,

citing R. at 66-68. Williamson Energy states that it provided a mussel study of the Big Muddy River basin published in 2012. Williamson Memo. at 15, Williamson Resp. at 11, citing R. at 66-67. It adds that it conducted an additional mussel study in April and June of 2020. Williamson Memo. at 15, Williamson Resp. at 11, citing R. at 151-64. The 2020 study concluded that abundance was low. It found no mussel beds in the mixing zone and found no state-listed species in this area. R. at 67.

In addition, the permit requires Williamson Energy to repeat a mussel study one year after the initial discharge from Outfall 011. R. at 28; *see id.* at 68.

Williamson Energy also cites Dr. Yeager-Armstead's review of the permit, which stated that "[t]he potential for biological effects resulting from the discharge mixing in the Big Muddy River is low due to poor habitat conditions, heavy sedimentation, and historic and ongoing anthropogenic impacts in the watershed." She stated that "it is not likely that mussel communities will be adversely affected by the discharge." Williamson Memo. at 16, citing R. at 510-11. She concluded that existing mussel communities "are likely to continue to persist" if the proposed discharge complies with permit conditions. *Id.*

Above, the Board discussed the chloride limit and granted summary judgment for IEPA and Williamson Energy on that issue. *Supra* at 80-82. The Board has reviewed the record on mussels, including their current presence as shown in the 2020 study and the permit requirement for an additional study. This review persuades the Board that the record supports IEPA's determination on protecting mussels.

The parties agree that the record presents no genuine issue of material fact. Pet. Mot. at 1; IEPA Mot. at 1; Williamson Memo. at 5. Construing the record against IEPA and Williamson Energy as the moving parties, the Board finds that they are entitled to summary judgment on the issue of whether the permit protects mussels. The Board denies Petitioners' motion for summary judgment on this issue and grants IEPA's and Williamson Energy's motions for summary judgment on this issue.

Altered Stream Flow

The petition alleges that the permit violates Board regulations by overlooking damage resulting from altered stream flow. Pet. at 7 (¶10), 10 (¶19). Petitioners' motion for summary judgment also challenged the effect of the proposed discharge on stream flows near the mine. Pet. Memo. at 14.

Petitioners argue that the permit fails to protect against the potential effect that groundwater being pumped out of the mine may have upon the existing uses of creeks in the region of the mine. Pet. Resp. at 5. Petitioners stress their comment that, "with 3 million gallons of groundwater flowing into the mine each day, stream flows in the region of the mine might be affected." Pet. Memo. at 14, citing R. at 4357-59. They argue that "[a] stream cannot maintain existing uses if it does not have any water." Pet. Memo. at 14.

IEPA responds that “Petitioners’ concern does not violate – or implicate – Section 302.105(a) [Existing Uses].” IEPA Mot. at 11. IEPA asserts that the issue with this permit “is whether such waters may be discharged in the proposed manner, not whether they should be removed from the mine.” *Id.* IEPA argues that Petitioners cite no authority that the Board’s antidegradation rules applies to “secondary, attenuated impacts completely disconnected from the antidegradation analysis’ primary concern: increased pollutant loading from discharges permitted by and regulated pursuant to the NPDES program.” IEPA Reply at 15, citing 35 Ill. And. Code 302.105.

IEPA also cites its Responsiveness Summary, which states that “water recharging to the depth of the mine would be coming from upland areas further away, not local creeks.” IEPA Mot. at 11, citing R. at 105. IEPA stresses that “groundwater is already being withdrawn from the mine.” IEPA Mot. at 11.

Williamson Energy argues that Petitioners do not acknowledge that the mine now withdraws saline groundwater. Williamson Resp. at 16, citing R. at 313, 8329-30. It argues that, if the mine drained fresh water from nearby streams, then it would not have the elevated chloride levels addressed by the permit. Williamson Resp. at 16-17.

Petitioners discount IEPA’s response that groundwater would be drawn from more distant creeks. Pet. Resp. at 41, citing R. at 105, IEPA Mot. at 11. Petitioners assert that “it makes no difference under the law how close the dewatered streams are to the mine.” Pet. Resp. at 41. Petitioners also note IEPA’s position that “the creeks to be affected would be affected anyway because the Pond Creek mine is going to withdraw the groundwater in any case.” Pet. Resp. at 42, citing R. at 105, IEPA Mot. at 11. Petitioners assert that it would reduce or eliminate this drawdown if Williamson Energy did not mine at the site or used different methods. Pet. Resp. at 42.

Petitioners also note IEPA’s position that “water recharges into the ground in upland areas and discharges to surface water in lowland areas. Water recharging to the depth of the mine would be coming from upland further away, not from local creeks.” Pet. Memo. at 21, citing R. at 105. They suggest that is it not sufficient “to explain that the creeks in the immediate vicinity would probably not be affected because the groundwater is being drained out of more distant unknown and unsung creeks or groundwater.” Pet. Memo. at 35, citing R. at 105. Petitioners add that IEPA has not explained what “local” means or “whether more distant creeks might be affected.” Pet. Memo. at 22.

Williamson Energy adds that there is no evidence “that the scenario imagined in Petitioners’ brief will come true.” Williamson Reply at 16. As one example, it asserts that no hydrogeologist’s report supports Petitioners’ theory on this argument. *Id.*

The Board generally agrees with IEPA that the antidegradation requirements focus primarily on evaluating increased pollutant loadings from discharges regulated and permitted under the NPDES program. *See* 35 Ill Adm Code 302.105(c)(1). The Board believes that Petitioners’ position that the permit should ensure protection of existing uses in “any creeks that may lose flow as a result of the loss of ground water” is broad and exceeds the scope of an

antidegradation analysis. Pet. Mot. at 5. However, the Board also recognizes that, if 3 million gallons of groundwater flow into the mine each day, that flow may conceivably alter the flow in receiving segments of Pond Creek or the Big Muddy River. If it occurs, that altered flow can affect the extent of mixing zones and complying with WQS and could in turn affect the protection of existing uses.

While IEPA asserts that water recharging to the depth of the mine would come from upland areas and not from local creeks, IEPA did not provide any groundwater flow or stream flow analyses to support its assertions. The Board notes that the record includes flow data for both receiving streams, but there is no analysis to indicate whether the groundwater flow into the mine is causing flow alteration in the receiving streams.

The Board finds that there is genuine issue of material fact when it comes to determining whether groundwater flow into the mine is altering the flow in the receiving streams. The Board finds that additional discussion of the record at hearing would be beneficial to make a final ruling on the issue of altered stream flow. Specifically, a hearing would allow the parties to address flow data and other relevant information in the record to support their position on whether groundwater flow into the mine alters the flow of receiving waters to an extent that poses a threat to protecting existing uses.

For the reasons above, the Board concludes that there is a genuine issue of material fact on this issue and denies the parties' motions for summary judgment.

Permitting History and Violations

Section 39(a) of the Act provides in part that, when "making its determinations on permit applications under this Section the Agency may consider prior adjudications of noncompliance with this Act by the applicant that involved a release of a contaminant into the environment. In granting permits, the Agency may impose reasonable conditions specifically related to the applicant's past compliance history with this Act as necessary to correct, detect, or prevent noncompliance. 415 ILCS 5/39(a) (2020); *see* Pet. Memo. at 8, 30, citing R. at 3284, 3320, 3373, 3489, 3608, 3649, 4369.

Petitioners acknowledge that the Responsiveness Summary recognizes Williamson Energy's history of violations continuing after the December 2019 hearing. Pet. Memo at 18, citing R. at 49-50, 54, 58-59. As the Board noted above in summarizing comments and the Responsiveness Summary, IEPA reports that "Williamson Energy has a total of 78 effluent violations from July 1, 2005, through September 30, 2021," 27 of which occurred since 2017. *See supra* at 58-60, citing R. at 49.

Petitioners note IEPA's position that Special Condition 16 addresses this history. Pet. Memo. at 18, citing R. at 52. Under the heading "Outfall 011 downstream monitoring," Special Condition 16 provides in its entirety that:

- a. A continuous conductivity monitor (correlated to chloride) shall be installed within 10 feet downstream of the edge of the mixing zone.

- b. The facility shall collect three samples per week from the receiving stream of Sulfate, Nickel, Copper, and Iron (dissolved) within 10 feet downstream of the edge of the mixing zone.
- c. If the measured concentration of Chloride, at the downstream monitoring location, exceeds 700 mg/l (this equals 40% over the water quality standard) more than 20 percent of the time in any month, the discharge from Outfall 011 shall cease until the water quality standard can be met within the mixing zone.
- d. If the water quality standard, based on a hardness of 91 mg/L as CaCO₃, for Sulfate and Iron (dissolved) exceeds the numbers below at the downstream monitoring location in more than 3 of the samples taken within the month, the discharge from Outfall 011 shall cease until the water quality standards can be met within the mixing zone.
 - i. Sulfate= 700 mg/l (this is 40% over the WQS)
 - ii. Iron (dissolved)= 1.4 mg/l (this is 40% over the WQS)
- e. If the water quality standard, based on a hardness of 91 mg/L as CaCO₃, for Copper (dissolved) and Nickel (dissolved) exceeds the numbers below at the downstream monitoring location, by 20 percent in more than 3 of the samples taken within the month, the discharge from Outfall 011 shall cease until the water quality standards can be met within the mixing zone.
 - i. Copper (dissolved)= 0.0126 mg/l (this is 20% over the WQS)
 - ii. Nickel (dissolved) = 0.0055 mg/l (this is 20% over the WQS). R. at 28; *see id.* at 69, 104-05

IEPA characterizes this condition as an “automatic cease-and-desist provisions in the Permit, requiring Williamson to automatically cease discharging from Outfall 011 when instream monitoring reveals threshold exceedances of water quality standards for chloride, sulfate, iron (dissolved), copper, or nickel.” IEPA Mot. at 17, citing *id.* at 8.

However, Petitioners argue that, “[i]n establishing monitoring requirements, IEPA appears to have failed to take into account the Permittee’s long history of permit violations.” Pet. at 9 (¶17). Petitioners argue that IEPA addressed Williamson Energy’s non-compliance by requiring it “to file an additional report.” Pet. Resp. at 20, citing R. at 49, 5459-85. Petitioners assert that this requirement does not ensure compliance with WQS or protect the Big Muddy River from “a biased, for-profit operation that has failed to file numerous relatively simple reports.” Pet. Resp. at 20.

Petitioners assert that the Act requires monitoring in addition to self-reporting. Pet. Resp. at 20, citing 415 ILCS 5/39(a) (2020). Petitioners argue that the permit should require Williamson Energy to pay a third party for “continuous monitoring at the edge of the mixing zone and below the Pond Creek discharge for every parameter that might be affected by the operation of the Pond Creek coal mine including at least chloride, copper, dissolved oxygen, iron, nickel and sulfate.” Pet. Memo. at 31; *see id.* at 8; Pet. Mot. at 3; Pet. Resp. at 20-21. Petitioners assert that the permit allows Williamson Energy after repeated violations to implement important aspects of the permit. Pet. Resp. at 3. Petitioners argue that “IEPA could have easily provided for disinterested enforcement of critical permit limits without imposing unnecessary costs.” *Id.*

IEPA disputes Petitioners’ position that Section 39(a) of the Act “plainly requires that there be monitoring in addition to self-reporting.” IEPA Resp. at 11, citing 415 ILCS 5/39(a) (2020); Pet. Memo. at 30. Section 39(a) of the Act provides that IEPA “may impose” reasonable conditions based on a permit applicant’s past noncompliance. IEPA Resp. at 11-12, citing 415 ILCS 5/39(a) (2020); People v. Robinson, 217 Ill. 2d 43, 53 (2005). IEPA argues that it exercised this discretion by incorporating Special Condition 16. IEPA Resp. at 12. IEPA emphasizes that Special Condition 16 does not establish the primary effluent limits on discharges from Outfall 011. Removing it would leave Special Condition 15, and the permit “would still contain effluent limitations ensuring that water quality standards are met beyond the mixing zone.” IEPA Resp. at 10.

IEPA asserts that the national NPDES permitting system “is fundamentally premised on self-monitoring and self-reporting.” *Id.* IEPA concludes that Petitioners have cited no authority that “Section 39(a) requires the Agency to impose any specific conditions through its permitting process, let alone to make an exception to this fundamental premise of the NPDES program.” *Id.*

Petitioners discount IEPA’s position that Section 39(a) of the Act does not require it to include third-party monitoring in the permit. Pet. Reply at 14, citing 415 ILCS 5/39(a) (2020). Although Petitioners acknowledge that IEPA has discretion on this point, they argue that the record “is as crystal clear as it could be that third-party monitoring is needed.” Pet. Reply at 14. They assert that it is “a clear abuse of discretion” for IEPA to rely on self-reporting by “an entity that has at least 15 years of violations, including violations of monitoring requirements.” *Id.*

Petitioners also discount Williamson Energy’s position that third-party monitoring would be “burdensome and costly.” Pet. Reply at 14. They suggest that, if Williamson Energy intends to monitor and report properly, then “there is no reason to believe” that it would be more burdensome or costly for another entity to do so. *Id.*

Although the parties agree that the record presents no genuine issue of material fact (Pet. Mot. at 1; IEPA Mot. at 1; Williamson Memo. at 5), the Board is not persuaded that any party has demonstrated that it is entitled to summary judgment on this issue. While IEPA exercised discretion that it “may impose reasonable conditions specifically related to the applicant’s past performance,” the record does not for purposes of summary judgment persuade the Board that that IEPA specifically tailored Special Condition 16 to address Williamson Energy’s history. The Board found above that there are genuine issues of material fact on complying with the

WQS for sulfate, nickel, copper, and iron (dissolved) without specifying discharge limits and on trigger levels for the “ceases and desist” provisions of Special Condition 16.

While the Board finds considerable merit in the argument that Section 39(a) does not *require* IEPA to include third-party monitoring, for purposes of summary judgment the Board is not convinced that IEPA appropriately rejected it as a reasonable condition specifically related to Williamson Energy’s history.

Construing the record against the moving parties, the Board finds that the parties are not entitled to summary judgment on the issue of whether the permit addresses Williamson Energy permit and compliance history. The Board denies the motions for summary judgement on this issue and directs the parties to hearing on this issue.

CONCLUSION

For the reasons above, the Board concludes to grant IEPA’s and Williamson Energy’s motions for summary judgment and deny Petitioners’ motion on the issues of the chloride limit and the protection of mussels. The Board also concludes to grant Petitioners’ motion for summary judgment and deny IEPA’s and Williamson Energy’s motions on the issue of chloride monitoring. Finally, the Board concludes to deny the parties’ motions for summary judgment on the issues of protection of existing uses; compliance with limits for sulfate, nickel, iron, and copper; the Antidegradation Assessment; the reasonable potential analysis; discharges to Pond Creek; cumulative effects of chloride discharges; and the history of violations. The Board directs its hearing officer to proceed to hearing on the issues that were not resolved by summary judgment.

ORDER

1. The Board grants IEPA’s and Williamson Energy’s motion for summary judgment and denies Petitioners’ motion on the issues of the chloride limit and the protection of mussels.
2. The Board grants Petitioners’ motion for summary judgment and denies IEPA’s and Williamson Energy’s motions on the issue of chloride monitoring.
3. The Board denies the parties’ motions for summary judgment on the issues of protection of existing uses; compliance with limits for sulfate, nickel, iron, and copper; the Antidegradation Assessment; the reasonable potential analysis; discharges to Pond Creek; cumulative effects of chloride discharges; and the history of violations.
4. The Board directs its hearing office to proceed to hearing on issues that were not resolved by summary judgment.

IT IS SO ORDERED.

I, Don A. Brown, Clerk of the Illinois Pollution Control Board, certify that the Board adopted the above opinion and order on May 18, 2023, by a vote of 3-0.

A handwritten signature in cursive script that reads "Don A. Brown". The signature is written in black ink and is positioned above the printed name and title.

Don A. Brown, Clerk
Illinois Pollution Control Board