Electronic Filing: Received, Clerk's Office 3/18/2022

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

In the Matter of:	)	
	)	
SIERRA CLUB, ENVIRONMENTAL LAW AND POLICY CENTER, PRAIRIE RIVERS NETWORK, and CITIZENS AGAINST RUINING THE ENVIRONMENT	)	
	)	**PCB 2013-015**
Complainants,	)	**(Enforcement – Water)**
	)	
v.	)	
	)	
MIDWEST GENERATION, LLC,	)	
	)	
Respondent.	)	

NOTICE OF FILING

TO: Don Brown, Clerk
Illinois Pollution Control Board
James R. Thompson Center
100 West Randolph Street, Suite 11-500
Chicago, IL 60601

Attached Service List

PLEASE TAKE NOTICE that I have filed today with the Illinois Pollution Control Board, Midwest Generation, LLC's Motion for Leave to File, *Instanter*, Its Reply in Support of Its Motion in Limine to Exclude Jonathan Shefftz Opinion, a copy of which is hereby served upon you.

MIDWEST GENERATION, LLC

By: /s/ Jennifer T. Nijman

Dated: March 18, 2022

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CERTIFICATE OF SERVICE

The undersigned, an attorney, certifies that a true copy of the foregoing Notice of Filing, Certificate of Service and Midwest Generation, LLC's Motion for Leave to File, *Instanter*, Its Reply in Support of Its Motion in Limine to Exclude Jonathan Shefftz Opinion, a copy of which is hereby served upon you was filed on March 18, 2022 with the following:

Don Brown, Clerk
Illinois Pollution Control Board
James R. Thompson Center
100 West Randolph Street, Suite 11-500
Chicago, IL 60601

and that true copies of the Notice of Filing, Certificate of Service and Midwest Generation, LLC's Motion for Leave to File, *Instanter*, Its Reply in Support of Its Motion in Limine to Exclude Jonathan Shefftz Opinion were emailed on March 18, 2022 to the parties listed on the foregoing Service List.

/s/ Jennifer T. Nijman

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BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

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	)	**PCB 2013-015**
Complainants,	)	**(Enforcement – Water)**
	)	
v.	)	
	)	
MIDWEST GENERATION, LLC,	)	
	)	
Respondent.	)	

MIDWEST GENERATION, LLC'S MOTION FOR LEAVE TO FILE, *INSTANTER*, ITS REPLY IN SUPPORT OF ITS MOTION *IN LIMINE* TO EXCLUDE JONATHAN SHEFFTZ OPINION

Respondent, Midwest Generation, LLC ("MWG"), requests that the Hearing Officer grant this Motion for Leave to File, *Instanter*, its Reply (to Complainants' Response) in support of MWG's Motion *In Limine* to Exclude Jonathan Shefftz Opinions, pursuant to Sections 101.500 and 101.514 of the Illinois Pollution Control Board's ("Board") Procedural Rules. 35 Ill. Adm. Code 101.500(e), 101.514. A reply brief is warranted because Complainants raised new claims in its Response concerning the ability to challenge Mr. Shefftz' opinions, and MWG will be materially prejudiced if it is not allowed to reply. In support of its motion seeking leave to file, *instanter*, MWG submits its Reply and states:

1. In their response to MWG's Motion *in limine* to exclude Jonathan Shefftz Opinion ("Response"), Complainants wrongly claim that that the assumptions relied on by Mr. Shefftz are based upon evidence in the record and that MWG will be able to "challenge the assumptions" in the hearing. The opposite is true. Each of the assumptions Mr. Shefftz relies upon for his opinion

are either from a former expert's report that Complainants have asserted is *not* a part of the record, or from statements made to Mr. Shefftz by *Complainants' attorneys*. Because neither the former expert (Mr. Kunkel) nor Complainants' counsel will be testifying at the hearing, MWG has no ability to challenge any of Mr. Shefftz's assumptions at the hearing.

2. On February 4, 2022, MWG filed its Motion *in Limine* to exclude the opinions of Jonathan Shefftz because his opinions are (i) based upon speculative information provided by Complainants' counsel and (ii) based on information from their prior expert's report that was never reviewed or relied on by their new groundwater expert.

3. On March 4, 2022, Complainants filed their Response to MWG's Motion *In Limine* to Exclude Jonathan Shefftz Opinions. Complainants' Response incorrectly claims that the assumptions Mr. Shefftz relies upon are in the record and that MWG can challenge the assumptions during the hearing.

4. Complainants' claim that MWG can challenge Mr. Shefftz's assumptions is inaccurate and MWG will suffer material prejudice if it is not permitted to explain, in its reply, that there is no expert or other witness being produced by Complainants who can or will testify to or even discuss the assumptions made by Mr. Shefftz.

5. Complainants first suggest that the Board should allow Mr. Shefftz to rely on remedy cost estimates provided by their former expert, Mr. Kunkel. Yet Complainants withdrew Mr. Kunkel as a witness, over MWG's objections, and replaced him with Mr. Quarles.[1] MWG cannot cross examine Mr. Kunkel about his remedy estimates, process, or proposal because he is no longer a witness in this case, and cannot be compelled to appear due to his distance from

[1] *Sierra Club v. Midwest Generation, LLC*, PCB13-15, Complainants' Motion for Leave to Designate Substitute Expert Witnesses and Memorandum in Support of Motion (April 1, 2020), and Complainants' Notice of Expert Witnesses for Remedy Phase (Nov. 16, 2020), attached as Ex. 1.

Illinois. *Hulsey v. Scheidt*, 258 Ill. App. 3d 567, 576, 196 Ill. Dec. 740, 746 (1st Dist. 1994) (Court found that out of state witnesses could not be compelled to testify because a subpoena is not enforceable unless issued by a court which had *in personam* jurisdiction over the individual). MWG cannot cross examine Complainants' new expert, Mr. Quarles, about the Kunkel remedy estimates (relied on by Mr. Shefftz) because Mr. Quarles neither reviewed nor relied on the Kunkel reports in any way, and he did not review Kunkel's deposition or even Mr. Kunkel's hearing testimony. Ex. 2, Quarles Dep., p. 53:24-54:20. MWG also cannot cross examine Mr. Shefftz about the basis for the remedy cost estimates because Mr. Shefftz repeatedly stated he had no opinion on the estimates that form the basis of his entire opinion, and was simply told to use them. Ex. 3, Shefftz Jan. 2021 Rpt. p. 22, Ex. 4, Shefftz Rebuttal Rpt. p. 14, Shefftz Dep, Ex. 5, pp., 61:3-15; 73:12-75:19; 110:18-22.

6. This inability to cross-examine the underlying assumptions is precisely the reason that Illinois Courts, and the Hearing Officer in this case, require that any new expert in a case be limited to expounding and adding to the opinions of the former expert – so that there is a witness available to be examined.

7. Complainants then suggest that Mr. Shefftz should be allowed to rely on statements made by Complainants' counsel because of "*counsel's knowledge*" in similar situations. Comp. Resp. p. 7. Presumedly, Complainants' counsel is not offering to be a witness in this case. MWG cannot cross examine the basis for each of the assumptions Complainants' counsel provided to Mr. Shefftz. As such, it would be arbitrary and capricious to allow an expert to rely on unsupported statements from counsel, without factual basis in the record and without a witness to examine.

8. Contrary to Complainants' statements, none of the assumptions Mr. Shefftz relies upon are in the record. Complainants affirmatively state, in their response to MWG's motion in *limine* to exclude opinions by Mr. Quarles, that Kunkel's Remedy Report, "is not a part of the record in the liability phase proceeding…" Comp. Quarles Resp. p. 5 (emphasis added), and excerpt attached as Ex. 2. Similarly, the remaining statements -- made by Complainants' counsel to Mr. Shefftz -- concerning the timeframe for a removal remedy, when it should have commenced, whether the alleged violations are continuing, and whether MWG would have had to reline the ponds, are solely assumptions from Complainants' attorneys and either based on "*counsel's knowledge*" or unrelated to facts in the record.

9. MWG will suffer material prejudice if Mr. Shefftz's opinion, which is premised on assumptions that MWG cannot challenge, is admitted. MWG is unable to even establish the weight that could be given to Mr. Shefftz's opinions because there is no one available to question. Complainants' statement that it is somehow MWG's burden to offer witnesses to counter each of their expert's assumptions improperly shifts the burden of proof. Comp. Rep. p. 7. It is not MWG's burden to estimate the duration, cost, start time or duration of a purported remedy that MWG contends is not required, not technically practicable, and not reasonable. It is Complainants' burden to prove their case, including the details for the remedy Complainants' expert relies on (at least for the purposes of Mr. Shefftz's opinion; though Complainants reverse course, when convenient, for Mr. Quarles). Complainants' attempts to shift the burdens of proof in this matter are baseless.

10. MWG has prepared its Reply in support of its Motion *in Limine* which is attached hereto.

11. MWG respectfully submits that the filing of the attached Reply will prevent material prejudice and injustice by disputing the new arguments by Complainants that Mr. Shefftz's assumptions "can be challenged" or are "in the record."

12. This Motion is timely filed on March 18, 2022, within fourteen (14) days after service of Complainants' Response on MWG, in accordance with 35 Ill. Admin. Code §101.500(e).

WHEREFORE, MWG respectfully requests that the Board grant Respondent's Motion for Leave to File Instanter, its Reply (to Complainants' Response) in support of its Motion *In Limine* to Exclude Jonathan Shefftz Opinions, and accept the attached Reply as filed on this date.

Respectfully submitted,

MIDWEST GENERATION, LLC

By: /s/ Jennifer T. Nijman
One of Its Attorneys

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Electronic Filing: Received, Clerk's Office 3/18/2022

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

In the Matter of:	)	
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SIERRA CLUB, ENVIRONMENTAL LAW AND POLICY CENTER, PRAIRIE RIVERS NETWORK, and CITIZENS AGAINST RUINING THE ENVIRONMENT	)	
	)	**PCB 2013-015**
Complainants,	)	**(Enforcement – Water)**
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v.	)	
	)	
MIDWEST GENERATION, LLC,	)	
	)	
Respondent.	)	

MIDWEST GENERATION, LLC'S REPLY IN SUPPORT OF ITS MOTION *IN LIMINE* TO EXCLUDE JONATHAN SHEFFTZ OPINIONS

Mr. Shefftz's opinion is built upon a house of cards of assumptions, and if MWG could cross examine those assumptions, the entire "house" would fall. But because the assumptions are from non-testifying witnesses (such as Complainants' counsel themselves), MWG has no way to interrogate the basis for or reliability of the assumptions. For that reason alone, it would be arbitrary and capricious to admit Mr. Shefftz's opinion and MWG will suffer material prejudice. An expert "opinion" without reliable inputs that can be properly examined is just a spreadsheet, and does not help the Illinois Pollution Control Board ("Board"). Because MWG cannot cross-examine the assumptions Mr. Shefftz relies upon and because Mr. Shefftz's opinion is of no help to the Board, Mr. Shefftz's opinion must be excluded.

A. MWG is Precluded from Cross Examining Any of Mr. Shefftz's Assumptions

Complainants' cursory dismissal of MWG's objection on the grounds that MWG can somehow "challenge those assumptions in the course of a hearing" is false. Comp. Resp. p. 9. The assumptions Mr. Shefftz relies on are from sources that MWG has no way to challenge at the

hearing. The assumptions are either from Complainants' attorneys or from the non-testifying former expert the Complainants withdrew. It is arbitrary and capricious to allow the admission of expert testimony based solely on assumptions that the opposing party has no way to cross-examine or interrogate.

1. MWG Cannot Cross-Examine Remedy Cost Estimates Presented by Complainants' Former Expert (Mr. Kunkel)

Complainants simply ignore the fact that Mr. Shefftz relies upon an expert opinion (by Mr. Kunkel) that Complainants have rejected in another response brief and that is based on a remedy that Complainants will not be presenting at the hearing. Complainants are playing hide the ball -- they want to rely on Mr. Kunkel's remedy estimates for the purpose of this motion, reject Mr. Kunkel's remedy for the purposes of their Response to MWG's motion to exclude the opinions of their new expert (Mr. Quarles),[1] and ultimately preclude MWG from cross examining anyone on the basis for Mr. Shefftz's opinions.

Complainants suggest that the Board should allow Mr. Shefftz to rely on remedy estimates provided by their former expert, Mr. Kunkel. Yet Complainants have withdrawn Mr. Kunkel as a witness, over MWG's objections, and replaced him with Mr. Quarles. *Sierra Club v. Midwest Generation, LLC*, PCB13-15, Complainants' Motion for Leave to Designate Substitute Expert Witnesses and Memorandum in Support of Motion (April 1, 2020), and Complainants' Notice of Expert Witnesses for Remedy Phase (Nov. 16, 2020), attached as Ex. 1. MWG cannot cross examine Mr. Kunkel about his remedy estimates, process, or proposal because he is no longer a witness in this case, and cannot be compelled to appear because he does not live in Illinois.[2] *Hulsey v. Scheidt*, 258 Ill. App. 3d 567, 576, 196 Ill. Dec. 740, 746 (1st Dist. 1994) (Court found that out

[1] *See* Comp. Quarles Resp. pp. 4-5, and excerpt attached as Ex. 2. (Dr. Kunkel's Remedy Report "is not a part of the record in the liability phase proceeding…"

[2] Mr. Kunkel testified he lives in Colorado. 1/29/2018 Hearing Tr. p. 94:21.

of state witnesses could not be compelled to testify because a subpoena is not enforceable unless issued by a court which had *in personam* jurisdiction over the individual). MWG cannot cross examine Complainants' new expert, Mr. Quarles, about the Kunkel remedy estimates (relied on by Mr. Shefftz) because Mr. Quarles neither reviewed nor relied on the Kunkel reports in any way, he did not review Mr. Kunkel's deposition testimony, and he did not review Mr. Kunkel's hearing testimony. Quarles Dep., Ex. 3, p. 53:24-54:20. MWG also cannot cross examine Mr. Shefftz about the basis for the remedy cost estimates because Mr. Shefftz repeatedly stated he had no opinion on the estimates that form the basis of his entire opinion, and was simply told to use them. Ex. 4, Shefftz Jan. 2021 Rpt. p. 22, Ex. 5, Shefftz Rebuttal Rpt. p. 14,[3] Shefftz Dep, Ex. 6, pp., 61:3-15; 73:12-75:19; 110:18-22. This inability to cross-examine is the exact reason that Illinois Courts, and the Hearing Officer in this case, require that any new expert be limited to expounding and adding to the opinions of the former expert – so that there is a witness available to be examined. *Sierra Club v. Midwest Generation, LLC*, PCB13-15, H.O. Order (Sept. 14, 2020); *People v. Pruim*, PCB 04-207 (Sept. 24, 2008) (Hearing Officer allowed substitution of expert witness because the new expert worked to develop the supplemental opinion, indicating that there was little difference between the old and new expert opinions.)

In fact, when MWG asked Mr. Kunkel about his cost estimates during Mr. Kunkel's sworn deposition, the cost estimates completely fell apart. Mr. Kunkel admitted that both his high and low unit costs were inaccurate and not representative of the actual costs. Ex. 7, Kunkel Dep. pp. 190:19-197:16. Because Mr. Kunkel will not be testifying at the hearing, and no other witness has reviewed his remedy or cost estimates, MWG has no ability to challenge the testimony, or explain to the Board why no weight should be given to it.

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[3] While Mr. Shefftz Report is marked as Non-Disclosable Information ("NDI"), the excerpted pages are not NDI and do not needed to be treated as NDI.

For example, in addition to being unable to challenge the appropriateness of a "removal" remedy in the first place (because Complainants' new expert Mr. Quarles does not adopt a removal remedy), there is no witness available to ask:

- How Mr. Kunkel's proposed removal remedy comports with the Board's findings at each Station.
- Whether Mr. Kunkel's analysis of the location of removals is appropriate in light of the Board's findings at each Station.
- Why Mr. Kunkel's excavation and backfilling estimates for a municipality are reliable estimates for the removal project he is recommending?
- How far Mr. Kunkel's potential ash disposal locations are from the MWG Stations and whether estimated disposal costs reflect that distance?
- Whether Mr. Kunkel investigated landfills that would accept the CCR?
- If so, what landfills and what was the result of his investigation?
- Whether a landfill's refusal to accept the CCR would change the cost estimates?
- Whether alternative transportation methods were investigated, and if so, the results?
- Whether Mr. Kunkel's cost estimated accounted for the costs of tipping fees for disposal at a landfill?
- What was the source of the material to be used to backfill following the extensive, proposed excavation?
- How far away was the source of the backfill material?
- What was the estimated cost of the backfill material and the costs for transportation?
- Whether Mr. Kunkel's costs fail to include the disposal costs?
- Whether Mr. Kunkel's estimates fail to include the costs of excavation and backfilling?

And there are many more questions that *could* go to the weight of Mr. Shefftz's opinions *if* there were a witness available. In a shocking statement, Complainants assert that Mr. Kunkel's estimates can be "defended easily" because they are "drawn directly from an expert report that was submitted by Complainants' expert Mr. Kunkel, and which is heavily supported by extensive documentation

and expert analysis." Comp Resp. p 6. But Complainants specifically withdrew Mr. Kunkel as a witness in this case (apparently out of concern about his opinions) and replaced him. Complainants also ignore Mr. Kunkel's deposition testimony to the contrary, and completely ignore the fact that there is *nobody* who can or will "defend easily" these cost estimates at the hearing. Every subsequent expert for Complainants denies any knowledge. MWG is not required to accept Mr. Kunkel's opinion AS IS without cross examination, and allowing Mr. Shefftz to rely on it, without challenge, does not allow MWG to demonstrate the lack of any weight that should be given to these estimates.

2. MWG Cannot Cross-Examine Complainants' Counsel's Assumptions

In another astounding statement, Complainants state that the Board should allow Mr. Shefftz to rely on Complainants' counsel's assumptions because of "*Complainants' Counsel's knowledge of how long similar cleanup projects have taken*." (Comp. Resp. p. 7). Presumedly, Complainants' counsel is not offering to be a witness in this case. Complainants' counsel readily admit that they are the sole source of Mr. Shefftz's assumptions, without a source in the record. MWG cannot cross examine Complainants' counsel on the basis for each of the assumptions provided to Mr. Shefftz. As such, it would be arbitrary and capricious to allow an expert to rely on unsupported assumptions, without factual basis in the record, as the basis for expert opinions.

In addition to the statement about "*counsel's knowledge*" of how long similar cleanups take to conduct, and counsel's statement to Mr. Shefftz that violations are "continuing" *according to counsel*, Complainants state in their Response that Mr. Shefftz "assumed that the coal ash removal should have begun when MWG first began GW sampling," *based upon information from Complainants' counsel*. (Comp. Resp. p. 6-7). In order to challenge these bold assumptions, MWG is entitled to know, and to explain to the Board, among other questions:

- What "similar projects" are they referring to? What states? What sites? How are the sites "similar"? Did the sites contain CCR? If not – what did the sites contain? How big were the sites? What was the remedy? Where were the disposal locations that the waste went to and how far was the transportation? What other remedies were considered?

- The basis for the assumption that ash removal would occur within one month after the first round of sampling occurred at the MWG Stations?

- How counsel's assumptions comport with requirements (timing, permitting, assessments etc.) of 35 Ill. Adm. Code 845 ("Illinois CCR Rule")?

- How counsel's assumptions fit within the rules and practices of the Illinois EPA and the Illinois Site Remediation Program ("SRP") process under 35 Ill. Adm. Code Part 740?

- The basis for counsel's statements that the violations are continuing in light of the Board's interim opinions, including the Board's opinions concerning groundwater management zones.

Many more questions would serve to challenge *counsel's* assumptions, and MWG is highly prejudiced if it is required to accept the Shefftz assumptions AS IS. Complainants' statement that it is somehow MWG's burden to offer how long it would take to conduct a removal action, or when it should begin, is beyond the pale. Comp. Rep. p. 7. It is not MWG's burden to estimate the duration or other details of a purported remedy that MWG contends is not required, not technically practicable, and not reasonable. It is Complainants' burden to prove their case, including the details for the removal project their expert relies on (at least for the purposes of Mr. Shefftz's opinion; though Complainants reverse course, when convenient, for Mr. Quarles). Complainants' attempts to shift the burdens of proof in this matter are baseless.

Complainants' counsel next attempts to justify Mr. Shefftz's reliance on *counsel*'s explanation that MWG would have had to reline its ponds in any case. Comp. Resp. p.8. Again, *counsel's* explanation is not enough, and it is patently incorrect. First, counsel assumes that the removal of ash suggested by their former expert Mr. Kunkel simply referred to removing ash from ponds, and that the ponds would then be relined and reused. Comp. Resp. p. 7-8. That is purely fictional and

is *not* the basis Mr. Kunkel's proposed remedy. Mr. Kunkel repeatedly referred to the "removal, hauling and backfilling of the existing ash ponds" – *not* simply removing the ash from the ponds so that they could be relined and used again. Kunkel Remedy Rpt. p. 2, attached as Ex. 8. Counsel's statement is yet another assumption, without basis. In fact, Mr. Kunkel opined that all liners leak, and made no suggestion that the ponds should or could be relined or reused following the ash removal. 10/27/2017 Hr. Tr. p. 35:1; 10/27/2017 Hr. Tr. p. 171:4-5.

Second, *counsel's* assumption, relied on by Mr. Shefftz, that the ponds would have been relined anyway after a removal is directly contrary to the evidence. As Complainants well know, the routine process of removing ash from a pond that will be reused is completely different from a complete removal. 10/24/17 Hearing Tr. pp. 131:3-16, 224:3-9, 1/31/18 Hearing Tr. p. 236:16-20. Routine removals only remove CCR from the sides of the ponds, to prevent damaging the liners. To suggest that the removal on the scale stated by Mr. Kunkel is the same as a routine cleanout is contrary to the record in this case, and false. *Id*. Complainants' further assumption that MWG would have had to reline the ponds because MWG had to continue to manage ash wet ash is also baseless. There are other methods to manage CCR, including a submerged scrapper conveyer for offsite removal, or managing ash via a dry system.[4]

But the key, repeated concern with Mr. Shefftz's opinions is that there is no one to testify as to any of these assumptions upon assumptions. Mr. Kunkel is not available to explain what he meant by "pond removal", or whether he assumed the ponds would be relined and reused. Mr. Quarles, the replacement for Mr. Kunkel, never reviewed the Kunkel reports, depositions, or

[4] See Ex. 9 (submerged scrapper conveyer) and Ex. 10 (dry management system). In fact, MWG's Alternative Closure Demonstrations for Will County and Waukegan stated that MWG intended to use a submerged scrapper conveyer system. The Alternative Closure Demonstrations are each approximately 450 pages, and can be found at MWG's publicly available website: https://midwestgenerationllc.com/illinois-ccr-rule-compliance-data-and-information/#title2.

hearing testimony and has no opinions about them. Ex. 3, Quarles Dep, p. 53:19-54:20. Counsel, presumedly, is not agreeing to be a witness to have counsel's assumptions challenged. In fact, Complainants' counsel even denies that the Kunkel reports are part of the record in this case. Complainants specifically state in their Response to MWG's Motion *in Limine* to exclude Mr. Quarles's report that Mr. Kunkel's Remedy Report is *not* in the record. Comp. Quarles Resp. p. 4, and excerpt attached as Ex. 2.[5] And Mr. Shefftz simply accepted the assumptions without question. Mr. Shefftz specifically stated that he *only* used the cost figures in a single table of Mr. Kunkel's report, and the date of the report. Ex. 6, Shefftz Dep. p. 60:7-23.

While the Board may generally prefer to allow testimony and assess its weight, this situation is particularly egregious and a clear exception. Just like the courts in Illinois, the Hearing Officer and ultimately the Board has a responsibility for expert "gatekeeping" when the circumstances require it. *Soto v. Gaytan*, 313 Ill. App. 3d 137, 147, 245 Ill. Dec. 769, 776 (2nd Dist. 2000) (Court found trial court abused its discretion allowing unreliable expert testimony stating "[a]s the gatekeeper of expert opinions disseminated to the jury, the trial court plays a critical role in excluding testimony that does not bear an adequate foundation of reliability"); *Sw. Ill. Dev. Auth. v. Masjid Al-Muhajirum,* 348 Ill. App. 3d 398, 401, 284 Ill. Dec. 164, 167, 809 N.E.2d 730, 733 (5th Dist. 2004) (Court approved trial court, as "gatekeeper," striking of the defendant's expert opinion because it was based upon speculative information). Here, the Board is faced with opinions presented by an expert that are based on *assumptions from counsel or a withdrawn and unavailable expert*, and there is no witness available to allow the assumptions to be questioned for their relative weight. The Board cannot allow the testimony to proceed.

3. None of the Assumptions Are Supported by Evidence in the Record

[5] Complainants' Response to MWG's Motion *in Limine* Regarding Quarles is difficult to cite because Complainants fail to sequentially number the pages, in violation of 35 Ill. Adm. Code 101.302.

None of Mr. Shefftz's assumptions are supported by the record. An expert may make assumptions, but they must be reliable and based on evidence in the record. *Carter v. Johnson*, 247 Ill. App. 3d 291 (1st Dist. 1993) (Court found that the expert's assumptions were based upon three facts in the record, which supported the expert's assumptions). But, when an expert opinion is "totally lacking in factual support, it is nothing more than conjecture and guess and should not be admitted as evidence." *Harris Tr. & Sav. Bank v. Otis Elevator Co.*, 297 Ill. App. 3d 383, 393, 231 Ill. Dec. 401, 696 N.E.2d 697, 705 (1998). For example, in *Modelski v. Navistar Int'l Transp. Corp.*, 302 Ill. App. 3d 879, 236 Ill. Dec. 394 (1st Dist. 1999), the defendant's expert speculated on the sequence of events that caused the decedent's death with no factual basis. The court found that the expert's factually baseless opinion "should have been stricken as unreliable and totally irrelevant." *Id.* at 886. Because admission of the opinion was not harmless error, the court ordered a new trial.

Here, none of the assumptions fed to Mr. Shefftz are supported by evidence "in the record" and totally lack factual support. On the one hand, Complainants attempt to specifically exclude Mr. Kunkel's Remedy Report from the record, and state in their brief in response to the Quarles motion in *limine* that the Kunkel Remedy Report "*is not part of the liability phase record*." Comp. Quarles Resp. p. 4 (emphasis added), and excerpt attached as Ex. 2. They repeat that Kunkel's Remedy Report, "*is not a part of the record in the liability phase proceeding*…" *Id*. at 5.

On the other hand, Complainants argue that Mr. Shefftz may blindly accept the costs provided in Mr. Kunkel's Remedy Report for Mr. Shefftz's opinions, and imply that because it was relied on it is "in the record." As MWG has repeatedly stated, Complainants want to have their cake and eat it too. Either Mr. Kunkel's Remedy Report is "in the record" and Mr. Quarles must only elaborate from it (so he can be cross examined), ***OR*** Mr. Kunkel's Remedy Report is not "in the

record" and Mr. Shefftz cannot make opinions based upon it. But Complainants cannot have it both ways. Allowing Complainants to continue pursue this diametrically opposed position is arbitrary and capricious.

Similarly, the assumptions from Complainants' counsel are also not based on facts "in the record." In fact, Complainants do not even cite to any document or testimony in the record for the assumption that the removal action should have begun one month after the initial sampling event or that the removal action would take 10 years. Comp. Resp. pp. 6-7. There are no facts to support these assumptions. Complainants' counsel's additional assumption that MWG would have had to reline the ponds is only a statement made by counsel in their brief, and is disputed by the record. Comp. Resp. p. 8. Certainly, Complainants cite to no part of the record that assumes that if MWG was going to continue to manage the wet ash, it would have continued to use the CCR surface impoundments. *Id.* As MWG has demonstrated, there are alternative methods to manage bottom ash, and there is no evidence in the record that MWG would not have pursued the alternative ash management methods.

4. Complainants' Authorities Are of No Avail

The cases Complainants cite -- in an effort to support the notion that Mr. Shefftz may rely on Mr. Kunkel's remedy estimates and statements from Complainants' counsel -- are entirely inapplicable. In each case cited, the assumptions the expert was making were founded in the same subject as the expert's expertise. For example, in *People v. Negron*, 2012 IL App (1st) 101194, ¶ 13, 368 Ill. Dec. 545, 548, 984 N.E.2d 491, 494, the testifying expert was the former director and technical leader of the lab that conducted the DNA test at issue. *Id.* While she did not conduct the actual test, she performed the technical review of the analysis and the final data. *Id.* at ¶14. Thus, even though she did not conduct the DNA test, she had direct knowledge and experience with the

methodology and the results. *Id.* Similarly, in *People v. Williams*, 38 Ill. 2d 125, 131, 345 Ill. Dec. 425, 428, 939 N.E.2d 268, 271 (2010) (upheld by U.S.S.Ct. on other grounds), the testifying expert was an expert in forensic biology and forensic DNA analysis. The court allowed the expert to rely upon the DNA analysis conducted by a third party, because the expert reviewed the DNA data, "used her own expertise to compare the two [DNA] profiles before her," and made her own visual and interpretive comparisons of the data. *Id*. at 138-139.

Here, Mr. Shefftz states often that he is not an engineer and cannot testify as to the accuracy of any of the assumptions he is relying upon. Ex. 4, Shefftz Jan. 2021 Rpt., p. 22, Ex. 6, Dep p. 61:6-8 ("*As I am an economist, not an engineer, I have no independent expert opinion on the cost estimates that were prepared in that report*."). He similarly stated that "*I am an economist, not an engineer, I have no independent expert opinion on the cost estimates prepared in that report. So, same thing here regarding the ten-year schedule, both number of years and the timing of it*." Ex. 6 p. 75:2-8. He also stated, "*I'm relying upon petitioners' counsel. I'm not forming any independent expert opinion on the legal issues here or the engineering aspects, monitoring issues or whatever*." Ex. 6, p. 110:19-22 (emphasis added). He has no direct knowledge or expertise in corrective actions, large scale removal actions, the duration the removal action should take, the date the removal action should have occurred, and the legal expertise to distinguish whether the violations are continuing. Because he has no expertise in these topics, he cannot (nor did he) use his own expertise or knowledge to interpret the data and make the resulting assumptions.

Even *Nelson v. Speed Fastener, Inc.*, 101 Ill. App. 3d 539 is of no help to Complainants. There, the court stated that the better course of was to allow extensive cross examination of <u>*the expert*</u> for the basis of his opinion. That is not the case here. Mr. Shefftz admittedly knows nothing about the assumptions, MWG will have no opportunity to cross examine Mr. Kunkel (or any other witness)

on Kunkel's calculations of the remedy cost estimates, and MWG has no ability to cross examine Complainants' counsel on their assumptions.

B. Complainants' Cannot Feed Mr. Shefftz a Remedy Cost that Complainants' Expert (Mr. Quarles) does Not Support

Complainants have asked their expert, Mr. Shefftz, to submit an opinion about a remedy that Complainants do not present or justify to the Board. Complainants admit that they are not presenting a "remedy" at the remedy hearing and state that there is not sufficient data to determine an economic benefit. Complainants state that the timeline of a remedy depends "…on the Board's future decisions in this proceeding and the length of time it takes to begin remedial action…." Comp. Resp. p. 11. Complainants specifically state, in their response to MWG's Motion *in Limine* regarding Mr. Quarles's opinion, that Mr. Quarles is *not* providing an opinion on a remedy. Rather they state that Mr. Quarles is recommending a remedial process and the first step is an investigation. Comp. Quarles Resp., p. 9. Because Mr. Quarles is not presenting a remedy, they state that "the Board could order Mr. Shefftz to update his calculations to account for new or updated inputs." Comp. Resp. p. 11. It appears that Complainants want the Board to make a decision on remedy (even though they do not present a remedy for the Board to consider), and then have Mr. Shefftz return to apply his "methodology", only for the hearing to be reopened to allow MWG to challenge his opinions yet again? Mr. Shefftz specifies that he is making opinions about costs and purported economic benefit based on his assumed cost inputs, and he reaches total recommended alleged "benefit" figures that he opines the Board should apply. Ex. 4, Shefftz Jan 2021 Rpt., p. 1. He does not state that he is only presenting a methodology.

In sum, what is the point of Mr. Shefftz's opinion? If he has no opinion on the type of remedy required, no opinion on the estimated cost of that remedy, no opinion on its duration, no opinion

on when the remedy should have begun – then he is not providing testimony to aid the Board; he is merely providing an unsupported excel spreadsheet.

Fundamentally, Complainants' Response suggests that they foresee no end to this matter. They admit that they are not proposing a remedy for the remedy hearing, and that they will instead seek to return to the Board again and again – which is of no help to the Board. Because Mr. Shefftz's opinion is premised on baseless assumptions and does not help the Board, the opinion must be excluded. [6]

CONCLUSION

MWG respectfully requests that the Hearing Officer exclude Mr. Shefftz's report because it is solely based on assumptions not in the record and information MWG cannot interrogate or cross examine, and because the report will not assist the Board in its decision.

Respectfully submitted,

MIDWEST GENERATION, LLC

By: /s/ Jennifer T. Nijman
One of Its Attorneys

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[6] In comparison, MWG's expert, Gayle Koch, provided an economic benefit opinion based upon the Weaver Opinion, which included their estimated costs of the remediation. Ms. Koch included in her analysis consideration MWG's history of compliance and financial history. Ms. Koch's opinion on MWG will be helpful to the Board because it is based upon facts that will be in the record, based upon a recommended remedy by testifying experts, and provides the Board context of MWG's history to determine the economic reasonableness of a remedy and penalty.

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EXHIBIT 1

Electronic Filing: Received, Clerk's Office 3/18/2022

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

In the Matter of:	)	
	)	
SIERRA CLUB, ENVIRONMENTAL LAW AND POLICY CENTER, PRAIRIE RIVERS NETWORK, and CITIZENS AGAINST RUINING THE ENVIRONMENT	)	
	)	PCB No-2013-015 (Enforcement – Water)
Complainants,	)	
v.	)	
MIDWEST GENERATION, LLC,	)	
Respondent.	)	

COMPLAINANTS' NOTICE OF EXPERT WITNESSES FOR REMEDY PHASE

Pursuant to the Hearing Officer Order dated October 19, 2020, Complainants Sierra Club, Environmental Law and Policy Center, Prairie Rivers Network, and Citizens Against Ruining the Environment (collectively "Complainants") hereby offer notification of Complainants' expert witnesses and the subject area of each experts' opinions/testimony in the remedy phase of the above-captioned proceeding.

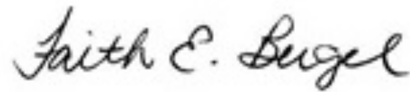
(1) Mark Quarles, BBJ Group, Nashville, TN. The subject area of Mr. Quarles' testimony will be the duration and gravity of the violations; the need to assess the nature and extent of contamination at the four sites; the process by which a remedy should be selected; the technical practicability and economic reasonableness of reducing or eliminating the discharges or deposits resulting from the pollution sources; the effectiveness of any steps respondent has taken or claims to have taken to remedy the violations; the steps needed to control the source of the pollution to

restore the sites to compliance with the Illinois Environmental Protection Act; and any additional issues in reply to Respondent's expert reports.

(2) Jonathan Shefftz, d/b/a/ JShefftz Consulting, Amherst, MA. Mr. Shefftz will opine on economic and financial considerations underpinning the reasonableness factor listed in Section 33(c)(iv), and the penalty factors listed in Section 42(h)(3) and 42(h)(4), of the Illinois Environmental Protection Act; and any additional issues in reply to Respondent's expert reports.

Dated: November 16, 2020

Respectfully submitted,



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Attorney for CARE

EXHIBIT 2

BEFORE THE ILLINOIS POLLUTION CONTROL BOARD

In the Matter of:	)	
	)	
SIERRA CLUB, ENVIRONMENTAL LAW AND POLICY CENTER, PRAIRIE RIVERS NETWORK, and CITIZENS AGAINST RUINING THE ENVIRONMENT	)	
	)	PCB No-2013-015
Complainants,	)	(Enforcement – Water)
	)	
v.	)	
	)	
MIDWEST GENERATION, LLC,	)	
	)	
Respondent.	)	

COMPLAINANTS' RESPONSE TO RESPONDENT MIDWEST GENERATION, LLC'S MOTION *IN LIMINE* TO EXCLUDE QUARLES OPINIONS

Pursuant to 35 Ill. Adm. Code 101.500, Complainants offer the following response to Midwest Generation, LLC's Motion *in Limine* to Exclude Quarles Opinions ("MWG's Quarles Motion").

I. MWG Misrepresents the Hearing Officer's Sept. 14, 2020 Order.

a. The Hearing Officer Order Does Not Limit Mr. Quarles' Opinions and Testimony to Only Elaboration and Amplification.

MWG misrepresents the Hearing Officer's Sept. 14, 2020 Order on substitution of experts and suggests that it places constraints on remedy-phase expert testimony that are nowhere to be found in the Order. Specifically, Respondent claims that the "Hearing Officer . . . order[ed] that the existing expert reports stand, and new experts were only permitted to 'elaborate and amplify'" the opinions of Complainants' liability-phase expert, Dr. James Kunkel. MWG's Quarles Mot. at 6 (citing *Sierra Club v. Midwest Generation, LLC*, PCB 13-15, Hearing Officer's Order (Sept. 14, 2020) ("Sept. 14, 2020 Order")). However, the Hearing Officer's Sept.

on, and amplify the testimony from the liability phase proceedings.

MWG incorrectly suggests that Mr. Quarles was required to elaborate on Dr. Kunkel's opinions with respect to remedy. This is false, for at least three reasons. First, Dr. Kunkel's report on remedy is not "testimony." Hearing Officer Halloran ordered that "[a]ny testimony already given stands and the parties must proceed to build on that information and present more information, including elaboration and amplification." Sept. 14, 2020 Order, at 3 (emphasis added). While Dr. Kunkel's report on remedy is reliable, relevant evidence in regards to remedy in this proceeding, the report is not "testimony." *Sierra Club v. Midwest Generation, LLC*, PCB 13-15, James R. Kunkel, Ph.D., P.E. Expert Report on Remedy for Ground-water Contamination (July 1, 2015) ("Kunkel Remedy Report", Ex. 5 to MWG's Quarles Mot.). A witness's statements only rise to the level "testimony" if they are provided under oath. Black's Law Dictionary defines "testimony" as "[e]vidence that a competent witness under oath or affirmation gives at trial or in an affidavit or deposition." Black's Law Dictionary (11th ed. 2019). Dr. Kunkel's Remedy Report was not provided under oath or penalty of perjury, is not signed, and is not notarized. *Id.* Dr. Kunkel's Remedy Report, therefore, is not testimony. While Dr. Kunkel's Remedy Report may be relevant, reliable evidence that is admissible during remedy phase, it is outside the scope of the Hearing Officer's order.

Second, Dr. Kunkel's Remedy Report is not part of the liability phase record. *See, e.g.*, Comp's Ex. 401 James Kunkel Expert Report, Groundwater Contamination-July 1, 2015; Comp's Ex. 407, Kunkel Expert Rebuttal Report-December 8, 2015; 408, Kunkel Expert Rebuttal Report-March 16, 2016; Resp.'s Ex 412, James Kunkel Supplemental Rebuttal Report-December 8, 2015 (comprising all of Kunkel's reports that are exhibits in the record). No hearings have yet been held on remedy, and the existing record is related to liability. While Dr.

Kunkel's Remedy Report is reliable, relevant evidence in regards to remedy in this proceeding, it is not part of the record in the liability phase proceeding and is outside the scope of the Hearing Officer's order.

Third, Dr. Kunkel's deposition testimony, while it is "testimony" in the everyday use of the term, is not part of the formal liability-phase record, and therefore does not qualify as the kind of testimony that the Hearing Officer was referring to. Dr. Kunkel provided no hearing testimony on remedy because the Hearing Officer ordered a separate hearing on remedy. *Sierra Club v. Midwest Generation, LLC*, PCB 13-15, Hearing Officer's Order, at 1 (Feb. 9, 2017) (ordering that argument on scope of remedy be deferred "until when and if a hearing on remedy is held"). The Board also ordered a separate hearing on remedy. "[T]he Board directs the hearing officer to hold additional hearings to determine the appropriate relief and any remedy, considering Sections 33(c) and 42(h) of the Act (415 ILCS 5/33(c) and 42 (h) (2016))." *Sierra Club v. Midwest Generation, LLC*, PCB 13-15, Interim Board Order, at 93 (June 20, 2019). The testimony that is part of the record is Dr. Kunkel's liability hearing testimony. As a result, it would be difficult to see how liability-phase deposition testimony, particularly with respect to remedy, could or should stand pursuant to the Hearing Officer's Sept. 14, 2020 Order. Testimony as referenced in the Hearing Officer's Order should be limited to hearing testimony. Sept. 14, 2020 Order, at 3.

Further, there is no requirement from the Hearing Officer's Order that Mr. Quarles' testimony adhere lock-step to Dr. Kunkel's prior testimony, although Mr. Quarles did appropriately refer to, rely upon, and build upon liability phase testimony, evidence, findings and conclusions in the Board's Interim Order. Nevertheless, Mr. Quarles' opinions and testimony are in no way inconsistent with Dr. Kunkel's positions, and simply present "more information"

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EXHIBIT 3

1
ILLINOIS POLLUTION CONTROL BOARD
2

3
SIERRA CLUB, ENVIRONMENTAL LAW)
4 AND POLICY CENTER, PRAIRIE RIVERS)
NETWORK, AND CITIZENS AGAINST)
5 RUINING THE ENVIRONMENT,)
)
6 Complainants,)
) PCB 2013-015
7 vs.) Enforcement-Water
)
8 MIDWEST GENERATION, LLC,)
)
9 Respondent.)

10

11

12 Zoom video conference, evidence deposition,
13 of MARK QUARLES, pursuant to notice, commencing
14 at 10:00 a.m., Tuesday, October 12, 2021, before
15 Connie L. James, CSR.

16

17

18

19

20

21

22 Reported by: Connie L. James
23 CSR No. 084.002510

24

25

1 A. Yes.
2 Q. And Mark Quarles, P.G. --
3 A. Can you blow that up?
4 Q. Yeah. And the Mark Quarles, P.G., listed as
5 an author, that's you, right?
6 A. It is, yeah.
7 Q. Did you ever question or formally renounce
8 any of the conclusions in this report?
9 MR. WANNIER: Objection. Vague.
10 THE WITNESS:
11 A. I have no idea. I don't recall ever
12 renouncing anything, but I don't recall that report
13 that was written fifteen years ago, the particulars of
14 it.
15 MS. NIJMAN:
16 Q. Are you aware that Dr. Anne Maest renounced
17 the conclusions in the report?
18 A. I'm not.
19 Q. Do you recognize the name James Kunkle?
20 A. I do recognize that name.
21 Q. From what?
22 A. I think he had some involvement in the prior
23 phase of this case.
24 Q. Did you review any of the reports Mr. Kunkle

1 prepared for this case?
2 A. No, not in detail.
3 Q. What do you mean by not in detail?
4 A. I can't even -- I didn't even review his
5 entire report.
6 Q. Okay. Are you aware he wrote three reports
7 in this case?
8 A. I'm not.
9 Q. Do you know if Mr. Kunkle's reports are in
10 your files?
11 A. It's quite possible that it is in an
12 electronic file.
13 Q. You don't know?
14 A. I don't.
15 Q. Did you review Mr. Kunkle's deposition
16 transcript for this case?
17 A. I did not.
18 Q. Did you review his hearing transcript for
19 this case?
20 A. I did not.
21 Q. So you have not attempted to elaborate or
22 amplify Mr. Kunkle's opinions?
23 MR. WANNIER: Objection. Vague.
24

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EXHIBIT 4

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CONTAINS NON-DISCLOSABLE INFORMATION

Deletions Pursuant to Hearing Officer Order

EXPERT OPINION

on

Economic Benefit of Noncompliance

and

Economic Impact of Penalty Payment and Compliance Costs

In:

Sierra Club,
Environmental Law and Policy Center,
Prairie Rivers Network, and
Citizens Against Ruining the Environment
v.
Midwest Generation, LLC

Pollution Control Board of the State of Illinois
PCB No-2013-015

Submitted on:
January 25, 2021

Expert Report of:
Jonathan S. Shefftz

d/b/a JShefftz Consulting
14 Moody Field Road
Amherst MA 01002

Expert Opinion of Jonathan S. Shefftz

Economic Benefit of Noncompliance
and
Economic Impact of Penalty Payment and Compliance Costs

January 25, 2021

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1. Summary of Opinion

I have been asked by Counsel for Petitioners in this matter to provide an expert analysis of financial economic factors relevant to the setting of a civil penalty and the determination of compliance costs.

Specifically, in this report I address:

- The economic benefit of environmental regulatory noncompliance that potentially accrued to Respondent Midwest Generation, LLC.

- ~~The economic impact on Respondent and on its ultimate parent company, NRG Energy, Inc., from a penalty payment and from the costs of compliance with a Board order~~.

My opinion is as follows:

- Based on my analysis of compliance measures and associated costs estimates that have been provided to me by Petitioners' counsel, Respondent's economic benefit from failing to implement these measures in a timely manner is approximately $66 million.

- All of my economic benefit calculations and results are present value figures calculated as of January 25, 2021, i.e., the date of this expert report. Therefore the economic benefit will continue to grow after this date until Respondent effectively pays back its economic benefit in the form of a civil penalty. I provide details in my report for the monthly increase in my

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CONTAINS NON-DISCLOSABLE INFORMATION

f. Case-Specific Economic Benefit Inputs and Calculation Components: Delayed and Avoided Expenditures

In addition to the weighted-average cost of capital to use as the rate for the present value adjustments (as described in the prior subsections and previously displayed in Table 2), my economic benefit calculations for the delayed remedy costs use the following inputs, as shown in Table 3 and Table 4 (on successive pages).

- *Compliance Measures, Cost Estimates, and Estimate Dates:* The remedy cost estimates are taken from the expert repot of James R. Kunkel, Ph.D., P.E., dated July 1, 2015. Specifically, I use the low-end estimates from Table 6 of the expert report. As I am an economist, not an engineer, I have no independent expert opinion on the cost estimates that were prepared in that report. The associated dates for all four sites are all based on information that Petitioners' Counsel provided to me in response to my requests.

- *Expenditure Dates:* Table 3 provides the dates for when the various remedy costs should have been expended and can reasonably be anticipated to be expended eventually, based on a ten-year cleanup schedule at each of the four sites. This schedule is based on information that Petitioners' Counsel provided to me in response to my requests. In general, and with all else being equal, the earlier the date for an expenditure, then the higher its present value. And were I to analyze any annually recurring costs that are entirely avoided over some period of time, then the longer the period between the start and end dates, the higher the economic benefit.

- *Inflation Adjustments and Cost Indices:* The next step is to adjust the compliance cost estimates for inflation from when they are estimated to when they are modeled as occurring. To perform this adjustment, I rely on the same cost indices that I have previously programmed into the U.S. EPA BEN economic benefit computer model, which provides the complete data series and also explanations of their composition.[11]

- *Tax Rates:* For taxation adjustments (i.e., Column "l" and Column "r" in Table 3, and also section "c" in Table 4), I use the highest year-specific combined U.S. federal and Illinois state corporate income tax rates. I follow this approach regardless

[11] In more detail, in Table 3 I use these cost indices to adjust the cost estimates for inflation to the relevant dates in the economic benefit calculations. To perform these inflation adjustments, I use the monthly values from each cost index. I then apply the ratio between the different values to the initial cost estimate.

For example, suppose that as of the month for when an initial cost estimate was developed, a cost index has a value of 100. The initial cost estimate needs to be adjusted to a later date, as of when the cost index reported a value of 110. The initial cost estimate is divided by 100, then multiplied by 110, i.e., a ratio of 110 divided by 100, or 1.1 in this example. The net effect in this simple illustrative example is to increase by initial cost estimate by 10 percent.

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EXHIBIT 5

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CONTAINS NON-DISCLOSABLE INFORMATION

Deletions Pursuant to Hearing Office Order

Supplemental and Rebuttal:
EXPERT OPINION

on

Economic Benefit of Noncompliance

and

Economic Impact of Penalty Payment and Compliance Costs

In:

Sierra Club,
Environmental Law and Policy Center,
Prairie Rivers Network, and
Citizens Against Ruining the Environment
v.
Midwest Generation, LLC

Pollution Control Board of the State of Illinois
PCB No-2013-015

Submitted on:
July 16, 2021

Expert Report of:
Jonathan S. Shefftz

d/b/a JShefftz Consulting
14 Moody Field Road
Amherst MA 01002

b. Evaluation of Alternative Compliance Costs and Compliance-Related Dates

The Koch report asserts that economic benefit calculations should be based on the least-cost means of compliance. As a general concept, I agree: the lowest-cost compliance measures should form the basis for the economic calculations, so long as those measures are technically feasible, reasonably foreseeable at the time of the initial noncompliance, sufficiently reliable to achieve compliance, and also truly lowest-cost in terms of not merely the initial out-of-pocket expenditures but also longer-term costs and any indirect financial repercussions. I have also written text to that effect for the U.S. Environmental Protection Agency (either as an employee while at Industrial Economics, Incorporated – "IEc" – under contract to EPA, or as a subcontractor to IEc) in many different guidance-related documents on economic benefit issues, including the help system for the BEN economic benefit computer model and its training materials.

However, as I wrote in my initial expert report, I am an economist, not an engineer. Hence I have no independent expert opinion on the dispute among the parties and their various witnesses as to what compliance measures would constitute the least-cost means of compliance in this matter according to the criteria outlined in the preceding paragraph. Petitioners' counsel though has provided me with the following assessment of the cost-related tables in the Koch report:

- Table 2, for "Weaver Remedy Cost Estimates (in 2021 dollars)," presents costs for groundwater monitoring, additional wells, additional groundwater sampling, and a cap, which Petitioners have informed me is inadequate to prevent the violations at issue in this matter.

- Table 3, for "MWG Ash Liner Costs," presents costs for measures that Respondent actually has undertaken, but which Petitioners have informed me would have needed to be taken even had Respondent already achieved compliance. As a result, such costs are essentially a 'wash" in my analysis between the on-time scenario versus the delay scenario. More specifically, Petitioners have informed me that the ash liners would have been replaced regardless of the coal ash cleanup, and nothing recommended in the report by Petitioners' expert Dr. James R. Kunkel would have eliminated the use of active ponds or eliminated the need for the actually implemented ash liners.

- Table 4, for "MWG Incurred Groundwater Monitoring Costs," presents costs for measures that Respondent actually has undertaken, but which Petitioners once again inform me would have needed to be undertaken even had Respondent already achieved compliance. As a result, such costs are essentially a 'wash" in my analysis between the on-time scenario versus the delay scenario.

Regarding the compliance-related dates, the Koch report states, in part (p. 25), "While Mr. Shefftz employs noncompliance dates from 2010 to present in his economic benefit analysis, the

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EXHIBIT 6

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1 BEFORE THE ILLINOIS POLLUTION CONTROL BOARD
2 IN THE MATTER OF:)
3 SIERRA CLUB, ENVIRONMENTAL LAW AND)
4 POLICY CENTER, PRAIRIE RIVERS)
5 NETWORK, AND CITIZENS AGAINST)
6 RUINING THE ENVIRONMENT,)
7 COMPLAINANTS,)
8 -VS-)NO. PCB 2013-015
9 MIDWEST GENERATION, LLC,)(ENFORCEMENT - WATER)
10 RESPONDENT.)
11 DISCOVERY DEPOSITION OF
12 JONATHAN S. SHEFFTZ
13 CHICAGO, ILLINOIS
14 OCTOBER 28, 2021
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17
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19
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21
ATKINSON-BAKER, A VERITEXT COMPANY
22 (800) 288-3376
WWW.DEPO.COM
23
REPORTED BY: CHERYL LYNN MOFFETT, CSR NO. 084-002218
24 FILE NO. 4949402

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1 A. It doesn't appear like I did.
2 Q. And --
3 A. Actually let me go look at my second report
4 and see if I mentioned anything like that.
5 No, I don't see any reference to a subsequent
6 report by him in my July 2021 report.
7 Q. Okay. We can certainly go to the pages
8 reviewed, but I believe you state in your report that you
9 reviewed and relied upon Table 6 of Dr. Kunkel's report?
10 Is that correct?
11 A. I can look at my report to see where I
12 specifically mention that.
13 So, on Page 22.
14 Q. Yes.
15 A. I say specifically -- so, we're on the first
16 bullet point, second sentence. Specifically I used the
17 low-end estimates from Table 6 of the expert report.
18 Q. Okay. Thank you. Did you rely on anything
19 else in this remedy report for your opinion in your
20 January 2021 report?
21 A. Yes. I used the date of his report as my cost
22 estimate date. Otherwise, my recollection is that was
23 it.
24 Q. Okay. And, you know, you do not have an

1 opinion independent about Dr. Kunkel's remedy as outlined
2 in this 2015 report. Correct?
3 A. As I stated here, and I quote, this is the
4 second sentence. I'm sorry, the third sentence
5 immediately following the second sentence that I
6 previously quoted. Quote, "As I am an economist, not an
7 engineer, I have no independent expert opinion on the
8 cost estimates that were prepared in that report," end of
9 quote.
10 Q. Okay. And you don't have to -- excuse me.
11 Strike that. You don't have a plan to do so, correct?
12 A. I have no plans to become an engineer and
13 develop an understanding that would allow me to develop
14 an alternative opinion or verify the information in
15 Dr. Kunkel's report.
16 Q. Very good. Do you recognize the name of John
17 Seymour.
18 A. No.
19 Q. Okay. Do you recognize the name of Mark
20 Quarrels?
21 A. No.
22 Q. Do you recognize the name of Weaver
23 Consultants?
24 A. We're 0 for 3 so far. It does not strike a

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1 sites."
2 So, that corresponds to Column I and O
3 respectively in Table 3 on Page 25. By contrast, the
4 bullet point that you originally were asking me about,
5 the cost estimate dates, that's just always July 2015
6 based upon the date of the Kunkel report. It's much,
7 much easier. So, that actually was not relied upon the
8 information from petitioners' counsel, it's just the date
9 of Dr. Kunkel's report. Sorry about that.
10 Q. Thank you. No, thank you for the
11 clarification.
12 So, on to that second bullet, the expenditure
13 dates on Page 22. So, I think you just -- you just
14 answered that.
15 So, you state in the second sentence, "The
16 schedule is based on information that petitioners'
17 counsel provided me in response to my request." Do you
18 see that there?
19 A. Yes.
20 Q. And right before that, sorry, is the phrase,
21 "Based on a ten-year cleanup schedule at each of the four
22 sites." Right?
23 A. Yes.
24 Q. And that's the schedule you're talking about

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1 in the second sentence?
2 A. Both, yes, both the number of years of the
3 schedule and when the start date should be for each
4 schedule.
5 Q. Okay. What is your basis for using ten years?
6 MR. WANNIER: Objection: Asked and answered,
7 mischaracterizes.
8 MS. GALE: I don't know how I've asked this
9 before.
10 MR. WANNIER: You can answer the question.
11 THE WITNESS: The answer is the second
12 sentence that we've just been reading. "This schedule is
13 based on information that petitioner's counsel provided
14 to me in response to my request."
15 So, I said, "Okay. We have these total costs.
16 What's the expenditure pattern and timing look like?"
17 And I was told ten years, and here are the start dates
18 for both the on-time scenario and the delayed-compliance
19 scenario.
20 BY MS. GALE:
21 Q. So, you have no independent opinion on the
22 start date. Right?
23 A. That's correct --
24 Q. And you're --

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1 A. I'm still talking, please.
2 Although I didn't repeat it in this bullet
3 point, it's the same as in the prior bullet points where
4 I write both as I am an economist, not an engineer, I
5 have no independent expert opinion on the cost estimates
6 prepared in that report. So, same thing here regarding
7 the ten-year schedule, both number of years and the
8 timing of it.
9 Q. And I think you answered this, but I just want
10 to make sure because that answer was long. I want to
11 make sure. You said timing of ten years. I think my
12 question was you have no opinion on the start date.
13 That's also true?
14 A. Correct.
15 Q. Okay. And you do not plan to have an opinion
16 on the start date. Correct?
17 A. I -- I have a hard time envisioning any
18 scenario under which I develop an opinion on the start
19 date.
20 Q. Very good. And you don't plan to have an
21 opinion on the ten years either. Correct?
22 A. You never --
23 MR. WANNIER: Objection, asked and answered.
24 THE WITNESS: You never know what might happen

1 petitioners' counsel for the dates. Correct?
2 MR. WANNIER: Objection: Vague, asked and
3 answered.
4 THE WITNESS: I'm sorry. You're talking about
5 the schedule? Well, being that -- you're talking about
6 the schedule being over ten years and the start date for
7 both the -- the schedules for both the on-time and
8 delayed scenario?
9 BY MS. GALE:
10 Q. Look at Page 15 of your report, Exhibit 2,
11 which we already discussed. "Because I understand from
12 petitioners' counsel that respondent continues to be in
13 violation of the Act." You're relying upon petitioners'
14 counsel for that. Correct?
15 MR. WANNIER: Objection: Vague, asked and
16 answered.
17 THE WITNESS: Well, right, that's what it
18 says. I understand petitioners' counsel, so that means
19 I'm relying upon petitioners' counsel. I'm not forming
20 any independent expert opinion on the legal issues here
21 or the engineering aspects, monitoring issues or
22 whatever.
23 BY MS. GALE:
24 Q. Okay. Great. Continuing on with Page 15.

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EXHIBIT 7

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1 BEFORE THE ILLINOIS POLLUTION CONTROL BOARD
- - -
2
SIERRA CLUB, ENVIRONMENTAL)
3 LAW AND POLICY CENTER,)
PRAIRIE RIVERS NETWORK, and)
4 CITIZENS AGAINST RUINING THE)
ENVIRONMENT,)
5)
Complainants,)
6)
vs.)No. PCB 2013-015
7)
MIDWEST GENERATION, LLC,)
8)
Respondent.)
9 ______________________________)
10
11
12 DEPOSITION OF
13 JAMES R. KUNKEL, Ph.D., P.E.
14 CHICAGO, ILLINOIS
15 MARCH 17, 2016
16
17
18
19
20
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23 REPORTED BY: HEATHER PERKINS, CSR NO. 84-3714
24 FILE NO.: AA02A71

1 landfill? 13:43:45
2 A. Yes. 13:43:45
3 Q. That's hauling. 13:43:46
4 You dispose of the material in the 13:43:47
5 landfill? 13:43:48
6 A. Yes. 13:43:49
7 Q. And then you would backfill? 13:43:49
8 A. With clean material, yes, from 13:43:52
9 somewhere. 13:43:53
10 Q. So those are the steps we are talking 13:43:54
11 about? 13:43:56
12 A. Yes. 13:43:56
13 Q. Okay. And you have stated here 13:43:57
14 that -- and we have talked about this 13:43:59
15 already -- that the remedy that you propose is 13:44:00
16 the removal, hauling, and backfilling of the 13:44:02
17 ponds and certain areas around the ponds, right? 13:44:05
18 A. Uh-huh. 13:44:08
19 Q. Okay. Mr. Seymour pointed out to you 13:44:09
20 that disposal costs don't appear to be included, 13:44:14
21 and I think in your rebuttal report, you state 13:44:17
22 that that's part of hauling? 13:44:19
23 A. Well, if I take it to a landfill, 13:44:21
24 that's the disposal, yes. So it is 13:44:24

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1 either -- hauling, yes. 13:44:26
2 Q. But hauling is different than disposal? 13:44:28
3 A. Let's not get into semantics because 13:44:30
4 the idea, and we just went through those -- 13:44:34
5 Q. Yes. 13:44:34
6 A. -- is we dig it up, we haul it to a 13:44:37
7 landfill -- 13:44:40
8 Q. Right. 13:44:40
9 A. -- and then we backfill. So hauling to 13:44:40
10 the landfill is disposal. 13:44:43
11 Q. Understood, except you have detailed a 13:44:45
12 certain level of costs, and I do not believe 13:44:47
13 that you have included disposal costs in your 13:44:50
14 assertions. 13:44:54
15 A. That's your opinion. That's your 13:44:55
16 opinion. I think I have. 13:44:56
17 Q. I would like you to show me where you 13:44:57
18 have included disposal costs. 13:45:00
19 A. Okay. Well, I used two sets of -- two 13:45:02
20 sets of costs -- unit costs, I'm sorry. 13:45:05
21 One -- actually, I lumped a lot of things 13:45:17
22 together; excavation, hauling, and backfill. 13:45:19
23 Q. So tell me what you are looking at, 13:45:21
24 sir. 13:45:23

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1 A. I'm looking at Table 3 -- or, I'm 13:45:24
2 sorry, Table 1. 13:45:26
3 Q. Right. 13:45:28
4 So where does that say "disposal"? 13:45:28
5 A. I'm sorry, just a minute. 13:45:30
6 Well, you know, disposal is included in 13:45:36
7 the whole thing of soil excavation, hauling, and 13:45:39
8 backfill. That's my interpretation of that. 13:45:46
9 Q. And what's your basis for saying that? 13:45:48
10 A. These are from Patrick. 13:45:50
11 Q. Well, one of them is from Patrick? 13:46:01
12 A. Right. One of them is from Patrick. 13:46:03
13 The other ones are from BidTabs where they 13:46:06
14 actually dug up the soil, hauled it to a 13:46:08
15 landfill, and then backfilled, and I have given 13:46:11
16 those -- I have given those documents that I 13:46:14
17 used, those BidTabs. 13:46:17
18 Q. Well, we will get to the BidTabs in a 13:46:18
19 second. Let's talk about the Patrick that you 13:46:21
20 just mentioned. 13:46:23
21 Patrick, you cite a cost of 42.95, and 13:46:24
22 you note in the footnote that that does not 13:46:28
23 include backfilling. 13:46:30
24 A. That's correct. 13:46:31

1 Q. So you use that as a high cost? 13:46:32
2 A. Yes. 13:46:32
3 Q. Even though it doesn't include a large 13:46:34
4 portion of what it would cost to remedy this 13:46:37
5 property? 13:46:40
6 A. I don't know whether I would use a 13:46:40
7 large portion, but it does include a portion, 13:46:42
8 possibly, yes. But backfilling could be on-site 13:46:44
9 soils, too. We don't know -- I don't know that 13:46:48
10 for sure. 13:46:49
11 Q. Do you believe there are on-site soils 13:46:50
12 available for backfilling? 13:46:54
13 A. Maybe one site, Powerton. 13:46:56
14 Q. Which would that be? 13:46:57
15 A. Powerton. 13:46:57
16 Q. So your high figure does not include 13:47:02
17 backfilling? 13:47:04
18 A. Correct. But, remember, the idea here 13:47:04
19 was to compare the sites and kind of compare 13:47:07
20 what it would cost. 13:47:13
21 Q. Right. 13:47:14
22 But using a high of 42.95, that doesn't 13:47:15
23 include the component of backfilling. It is 13:47:18
24 not, then, the high. 13:47:21

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1 A. Right. 13:47:22
2 Q. Now, the Patrick report -- we can pull 13:47:23
3 it out -- also doesn't include costs for 13:47:26
4 excavation, correct? 13:47:30
5 A. I don't think so. I don't know 13:47:31
6 why -- I don't know why it wouldn't. What 13:47:33
7 doesn't it include at $42.95? 13:47:35
8 Q. Tipping, the landfill costs. 13:47:38
9 A. Oh, it is just the tipping costs? 13:47:38
10 Q. That's the disposal costs. 13:47:42
11 A. Okay. 13:47:45
12 MS. NIJMAN: So let me show you Kunkel 13:47:45
13 Exhibit 19. And, I'm sorry, I don't have any 13:47:45
14 copies of it. 13:47:45
15 13:47:47
16 (Kunkel Exhibit 19 marked for 13:47:47
17 identification.) 13:48:01
18 MS. GALE: We're printing it right now. 13:48:01
19 BY MS. NIJMAN: 13:48:06
20 Q. Okay. Do you recognize that document 13:48:06
21 as the document you relied upon? 13:48:07
22 A. Yes, yes. 13:48:09
23 Q. And you refer to the 42.95 cost, which 13:48:11
24 is on Page 6824, right, in the chart Figure E-2? 13:48:17

1 A. I don't think I rely on a chart. 13:48:24
2 Wasn't there a number somewhere? 13:48:28
3 Q. The second page of the document. 13:48:32
4 A. Oh, here, the 42.95, yes. 13:48:34
5 Q. Do you see that? 13:48:39
6 A. Yes. 13:48:39
7 Q. And do you see how it says "Disposal at 13:48:40
8 Third-Party MWS Landfills" for 42.95? 13:48:43
9 A. Yes, yes. 13:48:46
10 Q. And then if you look in the starred 13:48:47
11 footnote below, it says those costs include the 13:48:48
12 estimated transportation and landfill disposal 13:48:51
13 costs. 13:48:54
14 A. Okay. 13:48:55
15 Q. So that doesn't include excavation? 13:48:55
16 A. Okay. 13:48:58
17 Q. So that high number you used of 42.95 13:48:59
18 is missing both backfilling and excavation. 13:49:02
19 Does that make you question, then, the 13:49:08
20 low, the very low numbers you reached? 13:49:10
21 A. No, because the low number, I know, 13:49:12
22 includes excavation from the BidTabs. 13:49:14
23 Q. But does it include disposal? 13:49:15
24 Probably not, right? Wouldn't you 13:49:18

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1 agree? 13:49:19
2 A. I don't think so. I don't think that 13:49:20
3 they bid on a project if they weren't going to 13:49:23
4 charge the client for disposing. 13:49:26
5 Q. So it is your assumption that it is in 13:49:31
6 there? 13:49:41
7 A. Yes. 13:49:41
8 MS. NIJMAN: Okay. We will take a look at 13:49:42
9 those once Kristen gets back. 13:49:44
10 MS. CASSEL: This was Exhibit 19. 13:49:53
11 THE WITNESS: Well, in fact, hauling and 13:49:55
12 backfill. 13:49:57
13 BY MS. NIJMAN: 13:50:03
14 Q. Okay. Let me show you your bid 13:50:03
15 documents that you referred to. 13:50:06
16 A. I have it here, and it clearly says 13:50:07
17 soil excavation, hauling, and backfilling, but 13:50:10
18 they have to haul it somewhere and dump it. 13:50:13
19 They can't just haul it. 13:50:16
20 Q. They do have to haul it somewhere, and 13:50:17
21 then they have to pay for it to be disposed of 13:50:19
22 when they get to that location, correct? 13:50:21
23 A. Why wouldn't they include that in a 13:50:23
24 BidTab? That's -- that's my question. 13:50:24

1 Q. Well, isn't it true for hauling, it is 13:50:25
2 going to depend upon the distance of the 13:50:29
3 landfill, correct? The hauling costs are the 13:50:31
4 transportation costs of how far you have to 13:50:33
5 travel to the landfill? 13:50:35
6 A. But these are final bid tabulations 13:50:36
7 that were presented to the client, and the 13:50:39
8 client would certainly like to know what it is 13:50:41
9 going to cost him. 13:50:43
10 Q. And isn't it true that in many cases 13:50:44
11 the client pays the disposal costs directly to 13:50:48
12 the landfill? 13:50:51
13 A. It is possible, yes. 13:50:52
14 Q. So you can't assume, then, that 13:50:53
15 disposal costs are included in these bids? 13:50:54
16 A. Possibly not. 13:50:57
17 Q. Turning to Page 4 of your 13:51:22
18 rebuttal -- excuse me, I'm turning now to your 13:51:26
19 rebuttal report. I am on Page 4 of that report, 13:51:30
20 and we have marked this Deposition Exhibit 5. 13:51:48
21 All right. On Page 4, you say on the 13:51:53
22 first line, under "Leachate Tests That Seymour 13:52:07
23 Utilized" -- do you see that heading in the 13:52:11
24 middle of the page? 13:52:13

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EXHIBIT 8

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James R. Kunkel, Ph.D., P.E.
11341 West Exposition Drive
Lakewood, CO 80226

In the Matter of:	)	
	)	
SIERRA CLUB, ENVIRONMENTAL LAW AND POLICY CENTER, PRAIRIE RIVERS NETWORK, and CITIZENS AGAINST RUINING THE ENVIRONMENT	)	
	)	PCB 2013-015
Complainants,	)	
	)	(Enforcement – Water)
v.	)	
	)	
MIDWEST GENERATION, LLC,	)	
	)	
Respondent.	)	

Expert Report on Remedy for Ground-water Contamination

James R. Kunkel, Ph.D., P.E.

July 1, 2015

This expert report provides my professional technical analyses of possible remedy opinions and costs related to stopping or minimizing on-going ground-water contamination caused by leaky ash ponds and coal ash deposition on the ground surface outside the ash ponds at four coal-fired power plants (Joliet #29, Powerton, Waukegan, and Will County) in Illinois owned by Midwest Generation, LLC (MWG). My professional analyses and opinions are presented in the following paragraphs for each of the four power plants with emphasis on remedy options which, if implemented, would stop or minimize the continuing ground-water contamination from MWG's ash ponds and/or other coal ash disposal areas at the four power plant sites.

SUMMARY OF CONCLUSIONS

- The remedy at all four power plant sites is the removal, hauling and backfilling of the existing ash ponds and selected areas of ash–impacted soils in order to reduce the ground-water contamination source terms;
- At Joliet #29, the remedy includes the ash ponds and the northeast ash landfill comprising approximately 393,000 tons of material. This remedy is estimated to cost between approximately $11.6 and $16.9 million;
- At Powerton, the remedy includes the ash ponds comprising approximately 1,354,000 tons of material. This remedy is estimated to cost between approximately $39.7 and $58.2 million;
- At Waukegan, the remedy includes the ash ponds and the ash/slag storage area comprising approximately 967,000 tons of material. This remedy is estimated to cost between approximately $28.3 and $41.5 million;
- At Will County, the remedy includes the ash ponds comprising approximately 186,000 tons of material. This remedy is estimated to cost between approximately $5.5 and $8.0 million; and
- For all four sites combined, the total remedy cost range is between approximately $84.9 and $124.6 million.

INTRODUCTION

General

The remedy for continued long-term ground-water contamination at the four power plant sites is removal of the leaking ash ponds as well as all or a portion of the coal ash which has been deposited outside the ash ponds. The conclusions in my previous report (Kunkel, 2015) form the bases for this remedy report. Those conclusions were that continued use of the ash ponds results in liner leaks due primarily to liner damage from dredging of the coal ash, liner leaks due to high ground-water tables in the vicinity of the ash ponds cause hydrostatic uplift when the pond water levels are below the water table, and ash deposits leached by rainfall, snowmelt and rising/falling ground-water levels. Poor liner construction is an initial cause of liner defects which results in leaking ponds and release of contaminated fluids into the underlying ground water. Existing unlined or Poz-o-Pac lined ash ponds also have caused ground-water contamination.

Also, coal ash was utilized in the construction of roadways, pond dikes and also for general land leveling at all four power plants (Kunkel, 2015). Coal ash also was stored or disposed of outside the ash ponds as a method of temporary or final coal ash disposal and placed on the ground surface. This coal ash is subject to leaching by rainfall and snowmelt, rising and falling ground-water levels, and this leachate is transported downward causing contamination of the ground water.

Methodology

Based on existing soil borings and written documentation by MWG at the four power plant sites, I have been able to compile a database of estimated coal ash-impacted soil thickness for coal ash outside the ash ponds. I utilized this database to estimate the quantities of coal ash subject to leaching for each site. At

EXHIBIT 9

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SUBMERGED SCRAPER CONVEYOR

Wet bottom ash handling

Continuous Removal Technology

The Submerged Scraper Conveyor (SSC) has been supplied as an alternate to traditional wet bottom ash hoppers and slurry systems. The SSC can be used in both new applications and as an upgrade on bottom ash hopper retrofit projects.

Clyde Bergemann's SSC is used for the continuous removal of bottom ash from conventional Pulverized Coal fired boilers and is particularly suited when high ash rates and boiler slag falls are expected. The SSC has also been used on Waste to Energy plants, Biomass and many other combustion technologies.

The SSC is capable of quenching, dewatering and transporting high rates of ash and offers greater energy efficiency than hydraulic systems of comparable capacity. Factory assembly and a trial prior to shipment ensures an accelerated installation and start-up program, avoiding timely delays.

Typical SSC Operation

The SSC is a heavy duty dual drag flight chain conveyor. The conveyor is submerged in a water trough below the furnace which quenches hot bottom ash as it falls from the combustion chamber. The bottom ash is then dewatered as it travels up the inclined section before it discharges. Double roll crushers can be used for final particle reduction at the discharge of the SSC. The discharge of the SSC can be fed into removable containers or onto a transfer conveyor to storage, for by-product reuse or landfill.

The SSC can be driven via single or twin hydraulic or electro-mechanical drives to suit the application or customer requirements. Optional discharge slide gates can be provided depending on the application requirements, and removable or static conveyors can be engineered to suit boiler geometry or operator requirements.

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Superior continuous removal technology

Design Features

Automatic chain tensioning unit:
SSC chain tension is automatically adjusted based on an oil/inert gas differential system. This system correctly tensions the chain under all load conditions and is fully automated. It has the ability to send data back to the PLC for visual or audible indication in the control center.

Hydraulic drive and power pack:
Utilizing the inherent torque characteristics of this technology, we normally arrange twin motors providing excellent start-up performance and allowing better flexibility during upset conditions.

Driving chain:
To meet demanding duties placed on the SSC, we use three types of sprockets and chain wheels with our proprietary heavy duty case hardened round link chain.

Applications

- Boilers typically ranging from 5 -1000 MW
- Pulverized coal-fired units
- Waste-to-energy units
- Retrofit for plant increased life cycle

Benefits

- Reduction in water usage
- Reduction in power consumption
- Lower operational and maintenance costs
- Continuous removal technology superior to hydraulic systems
- Automatic chain tensioning increases chain life
- Reduced complexity compared to using conventional recirculating dewatering bin technology

CBMAL-2013/08. We reserve the right to make technical changes without notice.

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EXHIBIT 10

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Dry bottom ash handling system
– Improving maintainability and economic efficiency

Since 2002, Kawasaki has been receiving increased orders from customers around the world for its dry bottom ash handling system, which adopts a new process for handling clinkers in coal-fired power plant boilers.

Following initial deliveries, further improvements have been made to the system, including seals that require no maintenance, reducing its cost of ownership.

Preface

While conventional wet bottom ash handling systems used to process bottom ash, or clinkers, from coal-fired thermal power plant boilers use an enormous amount of water, today we are witnessing a shift to dry bottom ash handling systems designed to meet increasingly strict environmental requirements.

In these systems the bottom ash is air-cooled as it is being removed from a boiler and transported, eliminating

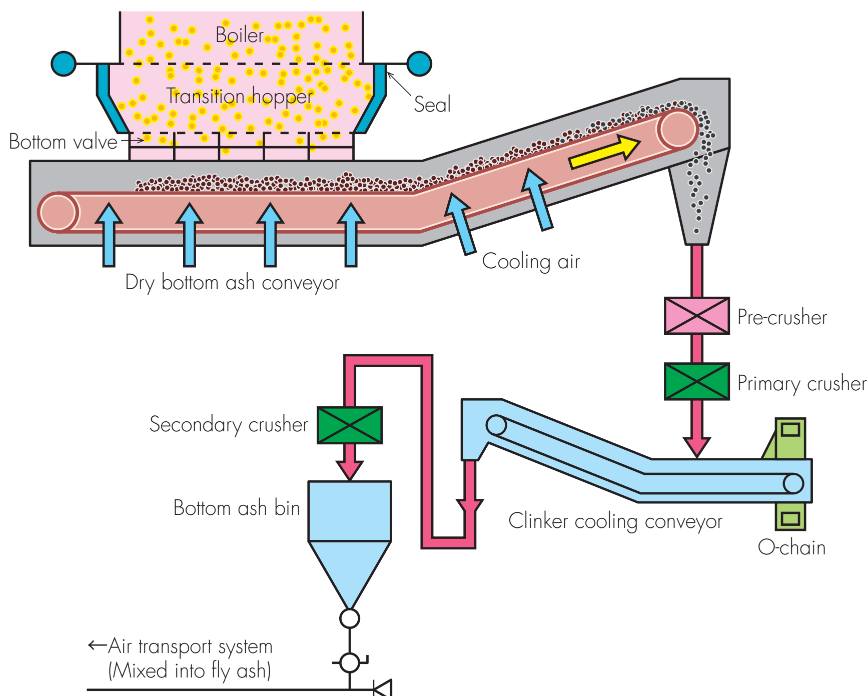

Fig. 1 Overview of dry bottom ash handling system

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the need to use water. Kawasaki formed a technological alliance with Magaldi, the Italian firm that developed the dry bottom ash handling system, in 1994 and has been steadily building a solid track record since delivering the first system to a Japanese power plant in 2002.

This paper provides an overview of the system as well as the measures taken after its introduction with the aim of improving maintainability and economic efficiency.

1 Overview of the dry bottom ash handling system

This system, which does not use any water to handle bottom ash, boasts the following advantages over conventional hydraulic transport systems:

- Smaller environmental impact
- Wider and more effective uses of dry bottom ash
- Lower equipment and running costs

Figure 1 shows an overview of the dry bottom ash handling system. Bottom ash that fell from the furnace is cooled as it is transported downstream by a dry bottom ash conveyor. While downstream system components vary depending on user requirements, in the most commonly used system in Japan, bottom ash is transported via a downstream primary crusher, clinker cooling conveyor, and secondary crusher. It is then finally air-blown to be mixed with fly ash.

2 Improving maintainability and economic efficiency

Since launching the dry bottom ash handling system on the market, improvements designed to enhance maintainability as well as economic efficiency have been made. The following section describes three major improvements made to the system.

(1) Maintenance-free seal

Since the dry bottom ash handling system is installed under a boiler, the seal on the interface between the boiler and the system must be resistant to internal boiler pressure as well as thermal expansion.

When the dry bottom ash handling system was first introduced, a water seal similar to those used on conventional wet bottom ash handling systems was used for the boiler interface as shown in Fig. 2 (a), meaning the system was not entirely water-free. With an eye to further improving the system, a new mechanical seal was developed.

Figure 2 (b) shows the structure of the mechanical seal. Composed of a multilayer metal fabric and other materials connecting the bottom of the boiler with the dry bottom ash handling system, the mechanical seal can absorb the thermal expansion of the boiler. Since the

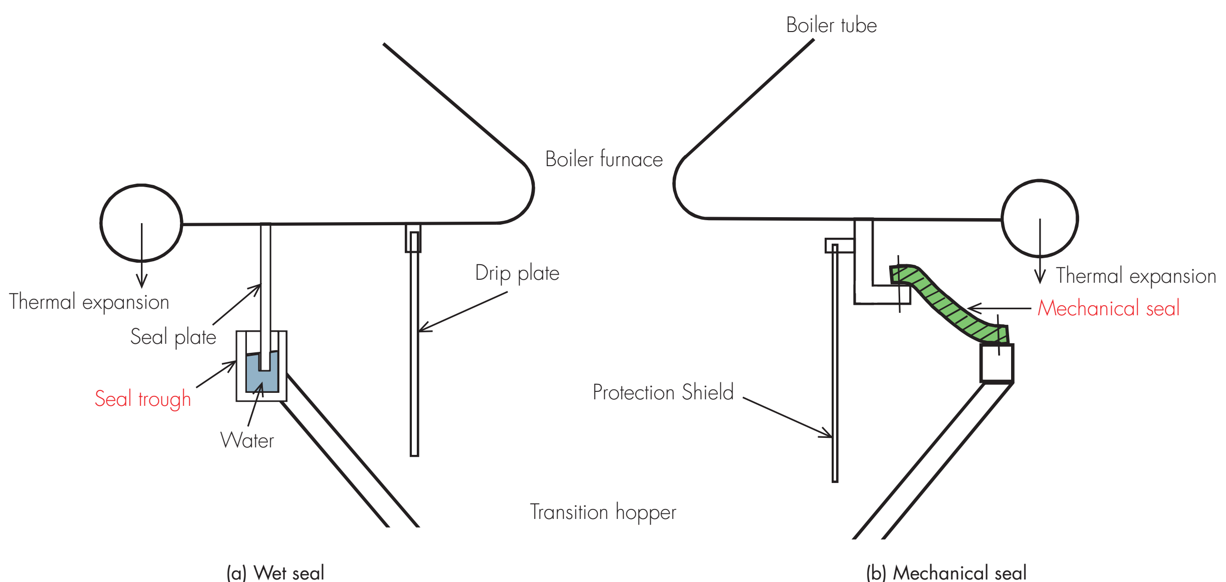

Fig. 2 Boiler interface overview (water/mechanical seal)

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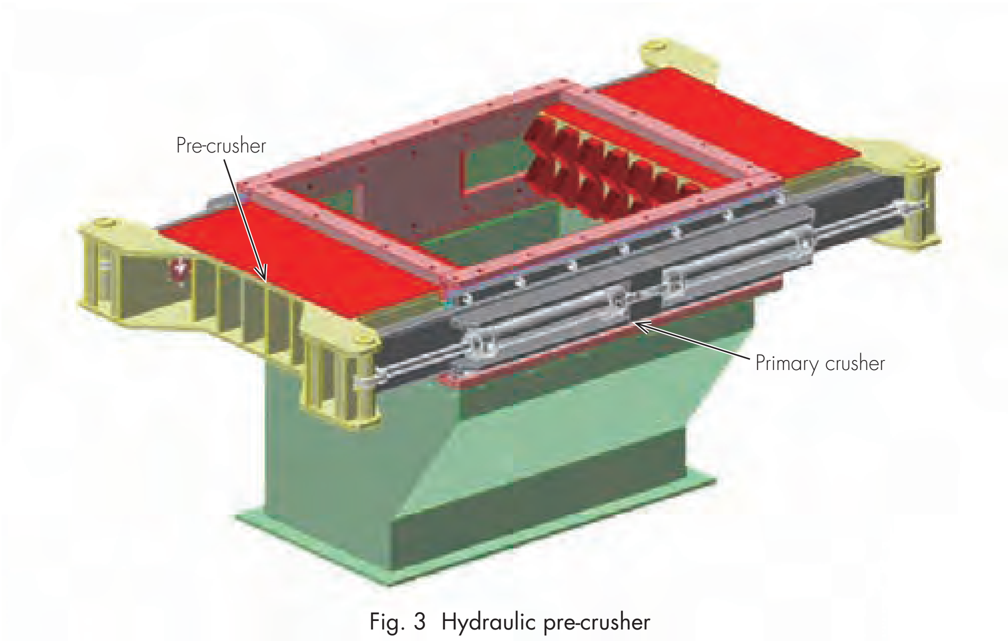

Fig. 3 Hydraulic pre-crusher

mechanical seal is essentially maintenance-free, it eliminates the cost of maintaining and running the kind of circulating water system employed by conventional systems. Replacing the wet seal, it has been adopted as the standard seal since the latter half of 2000.

(2) Preventing bottom ash from clogging

The dry bottom ash handling system uses a primary crusher installed downstream from the dry bottom ash conveyor that coarsely crushes bottom ash. Clinkers of certain sizes and shapes would sometimes build up in the

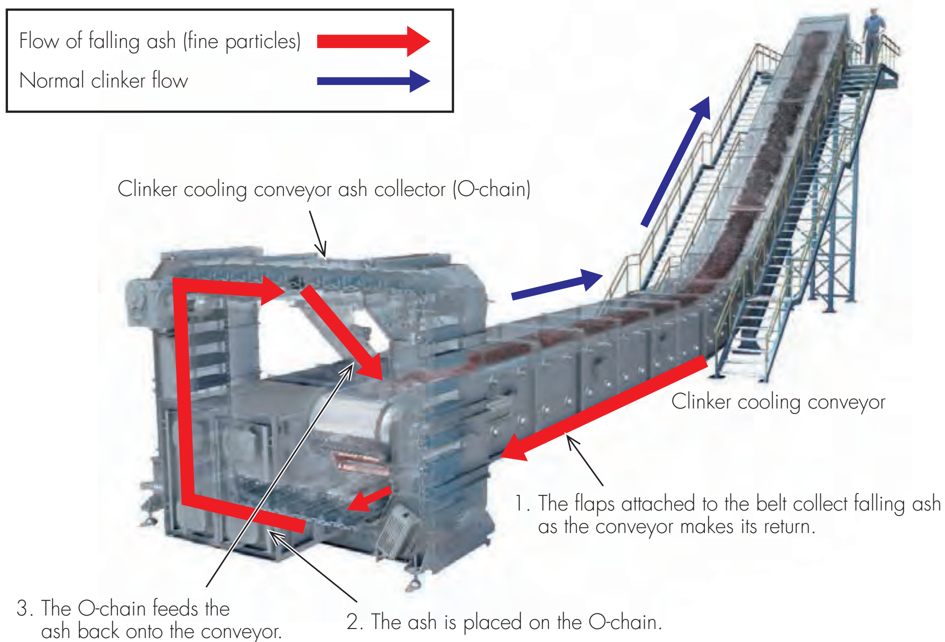

Fig. 4 Clinker cooling conveyor ash collector

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primary crusher, blocking the flow and clogging the system. A hydraulic pre-crusher was developed in order to solve this problem. Figure 3 shows a schematic diagram of the hydraulic pre-crusher.

The hydraulic pre-crusher features a set of jaws (the red area shown in Fig. 3) that open and close to crush lumps of bottom ash. It is installed below the outlet of the dry bottom ash conveyor and crushes any ash that accumulates in the primary crusher. Before installing the hydraulic pre-crusher, ash lumps had to be removed manually by operators whenever they clogged the conveyor outlet. The new feature significantly reduces operators' workload and has earned high marks from customers.

(3) Reduced maintenance cost for the clinker cooling conveyor ash collector

The clinker cooling conveyor, a component of the dry bottom ash handling system, originally had a scraper conveyor installed under the main conveyor to collect falling ash. Since the scraper would wear out relatively quickly, it proved to be a major obstacle to providing a long lasting system. As a solution to this problem, a new ash collector (O-chain) was developed to replace the scraper conveyor.

The O-chain is installed at the tail end of the cooling conveyor as illustrated in Fig. 4. Fine ash particles that have collected at the bottom of the conveyor are swept up by the conveyor belt flaps and onto the O-chain, which puts them back on the cooling conveyor. Eliminating the use of sliding parts that can wear out easily, the O-chain will significantly reduce maintenance costs. Furthermore, O-chain has several merit below: increase the clinker cooling conveyor slope, provide a more compact and cost-effective solution, have the possibility to offer longer conveyor etc.

Postscript

Since Japan's first dry bottom ash handling system was installed at Kobe Steel, Ltd.'s Shinko Kobe No. 1 Power Station, the system has been widely adopted by utilities as well as independent power plants across the country and has set a new standard for bottom ash handling systems. As of April 2015, Kawasaki has delivered seven units in Japan and eight units overseas (South Korea and the Philippines). Add in those delivered by Magaldi and the tally comes to over 150 in use around the world.

The system is in high demand due to its clear advantages over wet systems and is expected to remain the coal ash handling equipment of choice. Kawasaki looks forward to harnessing its years of experience as it continues to deliver optimal systems tailored to customers' needs.

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