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: John Therriault, Assistant 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 Respondent, Midwest Generation LLC's Motion to Strike the Discussion of the Federal CCR Rules and a Memorandum in Support of Its Motion, copies of which are herewith served upon you.

MIDWEST GENERATION, LLC

By: /s/ Jennifer T. Nijman

Dated: December 22, 2015

Jennifer T. Nijman
Susan M. Franzetti
Kristen L. Gale
NIJMAN FRANZETTI LLP
10 South LaSalle Street, Suite 3600
Chicago, IL 60603
(312) 251-5255

SERVICE LIST

Bradley P. Halloran, Hearing Officer
Illinois Pollution Control Board
100 West Randolph Street
Suite 11-500
Chicago, IL 60601

Keith Harley
Chicago Legal Clinic, Inc.
211 West Wacker Drive, Suite 750
Chicago, IL 60606

Faith E. Bugel
Attorney at Law
Sierra Club
1004 Mohawk
Wilmette, IL 60091

Jennifer L. Cassel
Lindsay P. Dubin, also for Prairie Rivers Network and Sierra Club
Environmental Law & Policy Center
35 East Wacker Drive, Suite 1600
Chicago, IL 60601

Abel Russ
For Prairie Rivers Network
Environmental Integrity Project
1000 Vermont Avenue, Suite 1100
Washington, DC 20005

Greg Wannier, Associate Attorney
Sierra Club
85 Second Street, 2nd Floor
San Francisco, CA 94105

CERTIFICATE OF SERVICE

The undersigned, an attorney, certifies that a true copy of the foregoing Notice of Filing and Respondent, Midwest Generation LLC's Motion to Strike the Discussion of the Federal CCR Rules and a Memorandum in Support of Its Motion was filed electronically on December 22, 2015 with the following:

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

and that true copies were mailed by First Class Mail, postage prepaid, on December 22, 2015 to the parties listed on the foregoing Service List.

/s/ Jennifer T. Nijman

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	)	
Respondent.	)	

RESPONDENT, MIDWEST GENERATION, LLC'S
MOTION TO STRIKE THE DISCUSSION OF THE FEDERAL CCR RULES

Pursuant to 35 Ill. Adm. Code 101.614, Respondent, Midwest Generation, LLC ("MWG"), by its undersigned counsel, respectfully requests that the Hearing Officer enter an order to strike the discussion of the Federal CCR Rules, 40 CFR §§257.50-257.107, from the *Rebuttal Report to Expert Report of John Seymour, P.E.*, prepared by Complainants' expert James Kunkel, Ph.D. ("Reply Report"). The Reply Report presents opinions in violation of the "law of the case" doctrine and presents new opinions not disclosed in Dr. Kunkel's original expert report. In support of its Motion, MWG submits a Memorandum in Support of Motion to Strike and states as follows:

1) On June 9, 2014, the Hearing Officer entered an order establishing the discovery schedule, which has been periodically modified.

2) Pursuant to the discovery schedule, on July 1, 2015, Complainants submitted an expert report by James Kunkel, Ph.D., P.E., on the groundwater conditions and the quality of the ash

pond liners at the MWG Stations ("Kunkel Report" attached as Ex. A). In the Kunkel Report, Dr. Kunkel repeatedly opines that the liners in the ash ponds at all of the MWG Stations are leaking and insufficient. (Ex. A, pp. 9-10, 15-16, 19-21, 23, 30, and 35).

3) On November 2, 2015, MWG submitted an expert report by Mr. John Seymour, P.E., on the groundwater conditions at the Stations and the quality of the ash pond liners at the MWG Stations ("Seymour Report" attached as Ex. B). In the Seymour Report and in direct response to Dr. Kunkel's opinions, Mr. Seymour specifically addressed the quality and sufficiency of the liners. He concluded that the relining of the active ash ponds eliminated a potential exposure pathway and that the relining of the ponds with 60-mil think HDPE liners is an industry-accepted remediation approach to reduce the potential for groundwater impacts. (Ex. B, p. 4).

4) On December 8, 2015, Complainants submitted a reply report by Dr. Kunkel ("Reply Report" attached as Ex. C). In the Reply Report, Dr. Kunkel included a new opinion on the applicability of the Federal Coal Combustion Residual Rules, 40 CFR §§257.50-257.107. ("Federal CCR Rules"). In particular, Dr. Kunkel alleges that the ponds and liners at the MWG Stations do not meet the standards set forth in the Federal CCR Rules, 40 CFR §§257.50-257.107. (Ex. C, pp. 7-10).

5) The allegations of violations of the Federal CCR Rules, 40 CFR §§257.50-257.107, in the Reply Report should be stricken because they are in direct contradiction to the Board's order dismissing the Federal allegations in the Complaint. In its Order, the Board stated that "the Board lacks authority to hear claims for violation of 40 C.F.R**. part 257**." *Sierra Club et al v. Midwest Generation*, No. 13-15, slip op. at 25 (October 3, 2013). Part 257 is the same part Complainants' Reply Report now includes.

6) Additionally, the allegations of violations of the Federal CCR Rules, 40 CFR §§257.50-257.107, should be stricken because they are new opinions that should and could have been introduced in the Kunkel Report, allowing for MWG's expert to respond to them.

7) MWG has contacted Complainants notifying of them our objections to the inclusion of the Federal CCR Rules, 40 CFR §§257.50-257.107, and requesting that they resubmit the Reply Report with the sections discussing the Federal CCR Rules stricken; however, Complainants declined to modify the Reply Report.

WHEREFORE, Respondent, Midwest Generation, LLC, respectfully requests that the Hearing Officer enter an order striking all references and descriptions of the Federal CCR Rules from the Reply Report.

Respectfully submitted,

Midwest Generation, LLC

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

Jennifer T. Nijman
Susan M. Franzetti
Kristen L. Gale
NIJMAN FRANZETTI LLP
10 South LaSalle Street, Suite 3600
Chicago, IL 60603
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RESPONDENT, MIDWEST GENERATION, LLC'S MEMORANDUM IN SUPPORT OF ITS MOTION TO STRIKE THE DISCUSSION OF THE FEDERAL CCR RULES

Respondent, Midwest Generation, LLC. ("MWG"), submits this Memorandum in Support of its Motion to Strike the Discussion of the Federal Coal Combustion Residual ("CCR") Rules, 40 CFR §§257.50-257.107, from the *Rebuttal Report to Expert Report of John Seymour, P.E.*, prepared by Complainants' expert James Kunkel, Ph.D. ("Reply Report"). The Hearing Officer should grant this motion because the inclusion of the Federal CCR Rules, 40 CFR §§257.50-257.107, in the Expert's Reply Report is: (1) in direct contradiction to the Board's Oct. 3, 2013 Order dismissing the Federal allegations in the Complaint; and, (2) a new opinion that should and could have been introduced in Dr. Kunkel's initial expert report.

I. BRIEF PROCEDURAL BACKGROUND

On October 3, 2012, Complainants filed a seven count complaint against MWG. Counts 1, 2 and 3 alleged violations of Section 21(a) of the Illinois Environmental Protection Act ("Act") (415 ILCS 5/21(a)) and 40 C.F.R. §§257.1 and 257.3-4, at the MWG Generating Stations in:

Pekin, Tazewell County, Illinois ("Powerton Station"); Waukegan, Lake County, Illinois ("Waukegan Station"); and, Romeoville, Will County, Illinois ("Will County Station"). Counts 4, 5, 6, and 7 allege violations of Sections 12(a) and 12(d) of the Act (415 ILCS 5/12(a), (d)), and the underlying regulations, at the Powerton Station, Waukegan Station, Will County Station, and the MWG Generating Station in Joliet, Will and Kendall Counties, Illinois ("Joliet 29 Station" collectively the "Stations" or the "MWG Stations").

On November 5, 2012, Respondents filed a Motion to Dismiss the Complaint in part because the allegations of violations of 40 CFR §§ 257.1 and 257.3-4 were outside the Board's authority. After receiving the final briefs on the Motion to Dismiss, on October 3, 2013, the Board struck the portions of Counts 1, 2, and 3 that alleged violations of 40 C.F.R. §§257.1 and 257.3-4 on the basis that the Board did not have the authority to enforce the Federal regulations. *Sierra Club et al v. Midwest Generation*, No. 13-15, slip op. at 25 (October 3, 2013).

On January 23, 2014 the Board accepted the Complaint for hearing and on May 5, 2014, MWG filed an Answer and Affirmative Defenses to the Complaint. On June 9, 2014, the Hearing Officer established a Discovery Schedule, which the parties have modified four times. Pursuant to the Discovery Schedule, Complainants submitted their *Expert Report on Ground-water Contamination* on July 1, 2015 ("Kunkel Report" attached as Ex. A). In response to the Kunkel Report, MWG submitted its *Expert Report of John Seymour, P.E.,* on Nov. 2, 2015 ("Seymour Report" attached as Ex. B[1]), and in reply to the Seymour Report, Complainants submitted their *Rebuttal Report to Expert Report of John Seymour, P.E.* on Dec. 8, 2015 ("Reply Report" attached as Ex. C).

[1] Due to the size of the Seymour Report, MWG has attached only the cited pages as evidence to this motion and memorandum. However, if the Hearing Officer requests, we will submit the entire report.

II. DISCUSSION

In the Reply Report, Complainants' expert presented a new opinion that the ash ponds and the liners at the Stations do not comply with the standards set forth in the Federal CCR Rules, 40 CFR §§257.50 – 257.107. Pursuant to the Board's Oct. 3, 2013 order, the Board may not enforce Federal Rules under 40 CFR §257. *Sierra Club et al v. Midwest Generation*, No. 13-15, slip op. at 25 (October 3, 2013). Thus, it is improper for Complainants, through their expert, to allege violations of the Federal CCR Rules, 40 CFR §§257.50 – 257.107. Additionally, the allegations of violations of the Federal CCR Rules, 40 CFR §§257.50 – 257.107, are new opinions and should have been included in the Kunkel Report.

A. Dr. Kunkel's Allegations of Violations of the Federal CCR Rules are in Violation of the Law of the Case Doctrine

Dr. Kunkel's allegations of violations of the Federal CCR Rules, 40 CFR §§257.50-257.107, should be stricken from the Reply Report because they are in violation of the law of the case doctrine. Pursuant to the Board's Order dismissing the allegations of violations of 40 CFR §257, the law of the case is that the Board "lacks authority to hear claims for violation of 40 C.F.R. part 257." *Sierra Club et al v. Midwest Generation*, No. 13-15, slip op. at 25 (October 3, 2013). Therefore, Complainants' allegations of violations of the Federal CCR Rules, 40 CFR §§257.50-257.107, in the Reply Report are contrary to the Board's Order dismissing the allegations of violations of 40 CFR §257.

The law of case doctrine "posits that when a court decides upon a rule of law, that decision should continue to govern the same issues in subsequent stages in the same case." *Pepper v. United States*, 562 U.S. 476, 506, 131 S. Ct. 1229, 1250, 179 L. Ed. 2d 196 (2011). The Board has similarly stated that the law of the case doctrine provides that "a rule established as controlling in a particular case will continue to be the law of the case in the absence of error or a change of facts." *Elmhurst Memorial Healthcare and Elmhurst Memorial Hospital v. Chevron USA, Inc. and Texaco, Inc.*, PCB 09-66, slip op, at 27, July 7, 2011. The doctrine applies to both issues of law and issues of fact and it "protects settled expectations of the parties, ensures uniformity of decisions, maintains consistency during the course of a single case, effectuates proper administration of justice, and brings litigation to an end." *Bjork v. Draper,* 404 Ill. App. 3d 493, 501, 936 N.E.2d 763, 770 (2010), *citing, Petre v. Kucich*, 356 Ill.App.3d 57, 63, 291 Ill.Dec. 867, 824 N.E.2d 1117 (2005).

In the Reply Report, Dr. Kunkel repeatedly states that ash ponds and the liners do not meet the standards set forth in the USEPA Federal CCR Rules, 40 CFR §§257.50-257.107. In particular, he states that "[n]one of the coal ash pond liners meet the engineering standards given by the USEPA (2015) coal ash rule." (Ex. C, p. 7). He continues and states that it is his opinion that "the existing ponds at the four plant sites do not meet the engineering standards set by the USEPA (2015) coal ash rule for lined ponds." (Ex. C, p. 8). After citing to various sections of the Federal CCR Rule, 40 CFR §§257.50-257.107, including two extended excerpts of the definitions of a composite liner and an alternative liner, Dr. Kunkel states: "There is no evidence in the record that MWG's coal ash ponds meet the above definitions of a lined pond in the USEPA (2015) coal ash rule." (Ex. C, p. 9). Moreover, he alleges that the ponds to not meet the location requirements under the Federal CCR Rule, 40 CFR §§257.50-257.107, by stating that under the Federal Rule the liners must be 5 feet above the highest groundwater elevation and "none of the MWG coal ash ponds can attain" that distance. (Ex. C, p. 10). As these examples show, Dr. Kunkel is not using the Federal CCR Rules as a mere basis for his opinion, but rather he is affirmatively alleging violations of the Federal CCR Rules, 40 CFR §§257.50-257.107.

By stating that the liners do not meet the Federal CCR standards, Complainants are alleging that the liners are in violation of the Federal CCR Rule, 40 CFR §§257.50-257.107. Per the Board Order dismissing the Federal allegations, the Board stated that it "lacks authority to enforce provisions of federal law that have not been incorporated into the Act or the Board's regulations." *Sierra Club et al v. Midwest Generation*, No. 13-15, slip op. at 23 (October 3, 2013), *citing*, *Arendovich v. Illinois State Toll Highway Authority*, PCB 09-102, slip op. at 2 (Dec. 17, 2009); *Rulon v. Double D Gun Club*, PCB 03-7, slip op. at 4 (Aug. 22, 2002). The Board concluded in its order that it had not adopted through general or identical-in-substance-rulemaking 40 CFR §257, and therefore found that it lacked authority to enforce 40 CFR §257. *Sierra Club et al v. Midwest Generation*, No. 13-15, slip op. at 23, 25 (October 3, 2013). It is improper and in violation of the law of the case doctrine for Complainants to attempt to re-insert allegations of violations of Federal regulations through its expert's Reply Report. Therefore, we ask that the Hearing Officer grant the motion to exclude the all references to violations of the Federal CCR Rules, 40 CFR §257.50-257.107, in the Reply Report.

B. Dr. Kunkel's Presented a New and Previously Undisclosed Opinion in the Reply Report

Dr. Kunkel's discussion of the Federal CCR Rules should also be stricken because it is a new opinion which was improperly included the Reply Report. The purpose of a reply is for rebuttal. In fact, Dr. Kunkel entitles his Reply Report as the *Rebuttal Report to Expert Report of John Seymour, P.E.* (Ex. C).

Rebuttal evidence is admissible if it explains, repels, contradicts or disproves the evidence of defendant. *Lagestee v. Days Inn Mgmt. Co.*, 303 Ill. App. 3d 935, 942, 709 N.E.2d 270, 276 (1st Dist. 1999). However, it is "not to provide a second opportunity to introduce evidence that could have been introduced in a plaintiff's case-in-chief." *Naleway v. Agnich*, 386 Ill. App. 3d 635, 649, 897 N.E.2d 902, 917 (2nd Dist. 2008).

This very issue recently arose in a discovery dispute in front of Judge St. Eve in *Sloan Valve Co. v. Zurn Industries, Inc. et al,* 10 C 204, U.S. Northern District of Illinois (Attached as Exhibit D). In this case, Defendants moved the Court to strike new arguments improperly presented in the reply damages expert report. In the order, the Court states:

> "Similar to reply briefs, advocates cannot advance new arguments for the first time in a reply expert report. Experts must limit their reply reports to the scope of the issues raised in the rebuttal reports. The reply report is not the appropriate vehicle for presenting new opinions." (Ex. D, p. 2).

Following an evaluation of the expert reports, the Court found that one of the opinions was new and based upon data that was available to the Plaintiff's expert before completion his first report. *Id* at p. 4. Accordingly, the Court struck the new opinion from the Reply Report. *Id* at p. 4.

Here, throughout Dr. Kunkel's July 1, 2015 Report, he alleged that there were leaks in the liners. (Ex. A, pp. 9-10, 15-16, 19-21, 23, 30, and 35). In particular, Dr. Kunkel stated that 90 percent of the liner installation defects occurred at a frequency greater than 1 defect per acre, relying upon a 1994 Hydrologic Evaluation of Landfill Performance (HELP) Model. (Ex. A, p. 10). Based upon that calculation, he concluded that the Joliet 29 Station ash ponds had more than one construction defect per acre which cause liner leakage. (Ex. A, p. 10). Moreover, he states that the Powerton Station ash ponds have a "history of liner issues which most likely have caused and continue to cause leaks." (Ex. A, p. 16) He concludes that at the two stations "[c]ontinued groundwater monitoring will not eliminate the ash pond liner leaks…" (Exhibit A, pp. 15 and 20). Additionally, Dr. Kunkel states "I conclude…that the HDPE liners installed in 2003 and 2005 in the East and West ponds [at the Waukegan Station], respectively, have most likely leaked since their initial installation and also most likely will continue to leak." (Ex. A, p. 23).

Also Dr. Kunkel states that there is "liner failure [at the Will County Station] due to the groundwater moving up and down in response to changes in Des Plaines river water-surface elevations." (Ex. A, p. 33). Finally, in his conclusions he states "At all of the power plant sites, coal ash has been deposited in ash ponds whose liners have leaked and continue to leak due to poor liner construction techniques…"(Ex. A, p. 35).

MWG's expert, John Seymour, P.E., responded directly to these conclusions in his expert report. In particular, Mr. Seymour stated that the relining of the CCR ponds is an industry-accepted remediation approach to reduce the potential for groundwater impacts, and the relining was completed under quality assurance protocols and inspected by qualified third parties. (Ex. B, pp. 4-5). Mr. Seymour reviewed the design specifications and construction documentation for the pond liners and concluded that they are "consistent with remediation-industry-accepted approaches." (Ex. B, p. 28). Additionally, he concluded that the current pond liners "are effective to preclude quantifiable groundwater impacts." (Ex. B, p. 28). In direct rebuttal to Dr. Kunkel's reliance on the HELP model to estimate liner leakage rates, Mr. Seymour stated that "when HDPE liners are installed with property construction quality assurance, the number of liner defects or tears are significantly reduced from the values cited by Kunkel." (Ex. B, p. 36).

The Federal CCR Rules, 40 CFR §257.50-257.107, were published by the USEPA on December 19, 2014. Thus, Dr. Kunkel had over seven months to evaluate the Federal CCR Rules, 40 CFR §§257.50-257.107, and use them as a basis for his opinions in the Kunkel Report submitted on July 1, 2015. If Dr. Kunkel had included mere references to the Federal CCR Rules, 40 CFR §257.50-257.107, as the basis for his opinion as required by rule, our expert would have been provided the opportunity to respond to his conclusions. Instead, Complainants waited until MWG would have no opportunity to respond. This the exact situation Judge St. Eve sought to avoid in her Order. To allow Complainants to include the Federal CCR Rules now as either a basis of his opinion, or otherwise, would result in a significant delays in this matter, and could potentially re-open discovery to address MWG's compliance with the Federal CCR Rules, 40 CFR §§257.50-257.107. Because Dr. Kunkel failed to include the Federal CCR Rules in the Kunkel Report, we ask that the Hearing Officer grant the motion to exclude the all references to violations of the Federal CCR Rules, 40 CFR §257.50-257.107 in the Reply Report.

III. CONCLUSION

It is improper for Complainants to have included allegations of violations of the Federal CCR Rules, 40 CFR §§257.50-257.107, in the Reply Report because it is in direct violation of the Board's Oct. 3, 2013 Order and is a new opinion should and could have been in the Kunkel Report. Based on the above, Respondent, Midwest Generation, LLC respectfully requests that the Hearing Officer grant Respondent's Motion to Exclude all of the paragraphs and references to the Federal CCR Rule, 40 CFR §§257.50-257.107, from the Reply Report.

Respectfully submitted,

MIDWEST GENERATION, LLC.

By ____/s/ Jennifer T. Nijman_________
One of Its Attorneys

Jennifer T. Nijman
Kristen L. Gale
NIJMAN FRANZETTI LLP
10 South LaSalle Street, Suite 3600
Chicago, IL 60603
312-251-5255

LIST OF EXHIBITS

A. Expert Report on Ground-water Contamination, James R. Kunkel, Ph.D., P.E., July 1, 2015
B. Midwest Generation's Expert Report of John Seymour, P.E., Nov. 2, 2015 (*cover page and cited pages*)
C. Rebuttal Report to Expert Report of John Seymour, P.E., James R. Kunkel, Ph.D., P.E., Dec. 8, 2015
D. *Sloan Valve Co. vs. Zurn Industries, Inc. et al* , 10 C 204, Document #569, June 19, 2013

SIERRA CLUB, ET AL. V. MIDWEST GENERATION, LLC **PCB 13-15**

MOTION TO STRIKE

EXHIBIT A

EXPERT REPORT ON GROUND-WATER CONTAMINATION BY JAMES KUNKEL, Ph.D, P.E.

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,	)	
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	)	
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

some sites the areal extent and depth of coal ash outside the ash ponds is extensive, as discussed below. I calculated the volumes of coal ash-impacted soil outside the ash ponds at each site by multiplying the total area defined by soil borings times the average thickness of coal ash-impacted soils based on those borings. If the ash ponds were removed, removal of the area outlined by the soil borings adjacent to the ash ponds, except at the Joliet #29 and Waukegan sites, would constitute a minimal remedy for those sites. At Joliet, the remedy is removal of not only the ash ponds, but also the northeast ash landfill. At Waukegan, the remedy is removal of not only the ash ponds, but also additional ash outside the ash ponds.

Continued use of ash ponds at the Joliet #29, Powerton, Waukegan and Will County generating stations is limited due to geographical restrictions contained in the USEPA (2014) coal combustion residual rule. That rule, in part, states that existing ash ponds must have their "base located no less than five feet above the uppermost aquifer" and "that there will not be an intermittent, recurring, or sustained hydraulic connection between any portion of the base of the pond and uppermost aquifer due to normal fluctuations in groundwater elevations (including groundwater elevations during the wet season)." Ash ponds constructed without a composite (or alternative composite) liner that meets the USEPA (2014) rule must either be retrofitted with an acceptable composite liner or closed. None of the MWG ash ponds at the four sites of interest meet either of the above requirements.

In-place capping of existing ash ponds is not a remedy due to the high likelihood that the existing ash pond liners at all four sites are either leaking, likely to leak due to high water table elevations, or do not meet the geographical restrictions of USEPA (2014). Rather, adequately addressing the contamination at the four sites requires the complete removal of the existing ash ponds and selected areas of coal ash deposited outside the ash ponds as the remedy. Coal ash from the ash ponds, coal ash used in construction activities at each site and the coal ash deposited on the ground surface outside the existing ash ponds must be placed in an appropriate landfill for the four MWG power plant sites.

The cost of removing the coal ash at each site, whether site-wide or only for the ash ponds, was based on local bid tabulations for removal and disposal of contaminated soils in northern Illinois and southern Wisconsin. Eleven different contractor bids were utilized for the years 2013 and 2014 which are representative of current soil removal and disposal costs. The unit costs utilized include the cost for a volume of uncontaminated soil equal to the volume of coal ash-impacted soil that would replace the contaminated soil removed. Pond removal costs at the four MWG power plant sites were estimated as though the ponds were coal ash-impacted soil having the same thickness defined by nearby soil borings. These soil borings were typically at the pond sites.

At all of the sites, I recommend that additional soil borings be done to better define the areal extent and thickness of coal ash-impacted soils. The number and locations of additional soil borings are based on engineering judgement. The unit cost of these additional soil borings assumes a geoprobe with a two-person crew. Additional monitoring also is recommended at the four MWG power plant sites as part of the remedies. The cost of these additional monitoring wells also assumed a drill rig with a two person crew.

<u>Cost Bases</u>

Local Bid Tabulations for Removal Existing Coal Ash-Impacted Soils and Ash Ponds. The cost basis for excavation, hauling, and backfilling with uncontaminated soil is based on 11 bid tabulations for northern Illinois and southern Wisconsin in 2013 and 2014 as shown in Table 1. The average unit cost from the bid tabulations is $29.27 per ton of material excavated, hauled and backfilled. The average unit cost for similar excavation and hauling of coal ash/soil estimated for MWG by Patrick Engineering. Inc. (Bates Nos. 6823-6843) was given as $42.95 per ton for loading and hauling only to a municipal solid waste (MSW) landfill in Illinois. The Patrick unit cost of $42.95 per ton is credible based on the off-site disposal at a MSW facility. The average bid tabulation unit cost of $29.27 per ton for soil contaminated with coal ash was utilized as a

reasonable value in estimating the cost to remove and dispose of coal ash-impacted soils from the four power plant sites; whereas, the Patrick unit cost of 42.95 was utilized as a higher estimate. Therefore, a range of unit costs from $29.27 to $42.95 per ton were utilized at each power plant site to estimate the costs to remove the existing ash ponds and ash-impacted soils at each site, haul the material removed to an existing landfill and backfill the excavated areas. An additional contractor mobilization cost of approximately $25,000 was added to the total excavation, hauling and backfilling cost at each site, although this mobilization cost is small compared to the excavation, hauling and backfilling cost.

Additional Soil Borings. The cost of additional soil borings at each site was assumed based on the existing soil borings already completed at the site as well as the locations of suspected or known site coal ash disposal which had not been well documented either in its areal extent or thickness. I assumed that a daily geoprobe cost was $1,500.00 per day for a two-person crew. No mobilization or de-mobilization costs were assumed in addition to this daily rate. I assumed that 8 geoprobe soil borings per day could be completed. This cost also is small compared to the excavation, hauling and backfilling costs for ash-impacted soils at each site.

Additional Ground-water Monitoring Wells. The cost of additional ground-water monitoring wells is not estimated in this report, because the numbers and locations of these monitoring wells are unknown at this time. However, additional ground-water monitoring is not a necessary prerequisite for the minimal remedy discussed above.

JOLIET #29

Coal Ash-Impacted Soil Estimates

The quantity of coal ash impacted soils at the Joliet site is based on the total land area inside the solid red perimeter line shown on Figure 1. This total area was estimated to be 251 ac including the areas described for the ponds and the old coal ash landfills (Bates Nos. 48403-48414). Within this 251-ac site area is a smaller pond area located inside the dashed red perimeter line. This pond area was estimated to be 15 ac. Additionally, within the 251-ac site area, there are two old coal ash landfill areas northeast and southwest of the power plant and ponds as shown on Figure 1. These two coal ash landfills are estimated to have areas of 44 and 34 ac respectively. The coal ash-impacted soil area for the pond area and northeast landfill is summarized for the Joliet #29 site on Table 6.An estimate of the coal ash-impacted soil volumes for the site area and the ash pond area was made from existing soil borings shown on Figure 1 and the average estimated thickness of coal ash-impacted soils from the borehole logs summarized in Table 2. Because no definitive soil borings showing coal ash thickness are available for the northeast coal ash landfill, it is not possible to make precise estimates of the coal ash volumes at that site. However, it was assumed that, on average, the coal ash-impacted soil thickness at the northeast ash landfill was 4 ft. This assumption is based upon spreading dump truck loads of ash using a dozer.

Utilizing the site area (251 ac) and its average coal ash thickness of 1.4 ft as shown in Table 2, the total site-wide coal ash-impacted soils is calculated to be on the order of 567,000 yds^3 as shown in Table 6. However, there may be over 281,000 yds^3 in just the old northeast coal ash landfill depending on future soil boring data. The ash pond area of 15 ac is estimated to have approximately 33,880 yds^3 of coal ash-impacted soils (Table 6). The total volume of coal ash-impacted soils at the Joliet #29 power plant site may range from approximately 33,900 to 567,200 yds^3. Approximately 314,000 yds^3 may be in the pond area and northeast landfill areas. Removal of the coal ash-impacted soils and the ash ponds in these two areas would significantly reduce the potential ground-water contamination source-term at the Joliet #29 plant site in my opinion.

Additional Soil Borings

Visual inspection of Figure 1 indicates that only about one-half of the Joliet #29 total site area has soil borings which could characterize the thickness of coal ash-impacted soils. Thus, I conclude that additional soil borings are required at the site, especially in the northeast coal ash landfill area. I recommend that at least one geoprobe soil boring per two acres be completed with 20 around the perimeter of the northeast coal ash landfill and 22 in the interior of the landfill for a total of 42 soil borings. An additional 15 soil borings should be completed in the area north and east of the existing coal pile at the Joliet #29 site. A minimum 57 total additional soil borings for the Joliet #29 site are necessary to assess the thickness of coal ash-impacted soils in areas without any soil borings.

Additional Ground-water Monitoring

Leaching of coal ash at the old northeast coal ash landfill is most likely partly responsible for the ground-water contamination seen in the Joliet #29 ground-water monitoring wells. Additionally, it is likely that ground-water contamination from leaching of coal ash at the old southwest coal ash landfill also is occurring but is not monitored by the existing up-gradient ground-water monitoring wells. To confirm this, additional ground-water monitoring wells should be installed in the northeast coal ash landfill area. The number and cost of these additional ground-water monitoring wells are not estimated.

Coal Ash-Impacted Soil Remedy Cost for Joliet #29

For the Joliet #29 power plant site, the remedy is the removal of coal ash-impacted soil as well as the existing ash ponds. The cost of this remedy is the cost of coal ash-impacted soil excavation and hauling to an approved off-site landfill and backfilling with soil to achieve the pre-removal ground-surface contours. This remedy also would include 57 additional soil borings to better characterize the coal ash-impacted soil thickness of the northeast coal ash landfill as well as the area north and east of the existing coal storage area.

The volume of coal ash-impacted soils is the volume shown in Table 6 for the northeast coal ash landfill and the pond areas (a total of 59 ac) totaling approximately 314,000 yds^3. Assuming a dry unit weight per yd^3 of 1.25 tons and a low unit cost of $29.27 per ton, the estimated cost to excavate, haul and backfill this volume of coal ash-impacted soil is approximately $11.5 million as shown in Table 6. If the high unit cost of $42.95 per ton is used, the estimated cost to excavate, haul and backfill this volume of coal ash-impacted soil is approximately $16.9 million, also as shown in Table 6.

The cost of 57 additional geoprobe soil borings at the site, assuming 8 borings per day and $1,500 per day for a geoprobe unit, is estimated to be $11,000. The average mobilization cost for the coal ash-impacted soil equipment is estimated to be approximately $25,000, also as shown in Table 1. Therefore the total estimated cost for the coal ash-impacted soil remedy ranges from approximately $11.6 to $16.9 million for the Joliet #29 site. If only the pond areas are reclaimed, the coal ash-impacted soil remedy ranges from approximately $1.3 to $1.8 million. These estimates are highly dependent on the coal ash-impacted soil thickness assumed for the northeast coal ash landfill. A rather small change in this thickness will significantly change the total estimated cost for this remedy.

POWERTON

Coal Ash-Impacted Soil Estimates

The quantity of coal ash impacted soils at the Powerton site is based on the total land area inside the solid blue perimeter line shown on Figure 2. The total land area of the Powerton site is 2,314 ac (Bates Nos. 48415-48426) which includes Powerton Lake. Only the land area shown in the solid blue perimeter line was utilized as the site area where coal ash-impacted soils may be present. This site area was estimated to be 349 ac, which includes the area described for the ponds and the former ash pond shown inside the solid

red line. Within this 349-ac area is a smaller pond area located inside the dashed blue line. This pond area was estimated to be 73 ac. Additionally, within the 73-ac total area, there is the unlined Former Ash Pond area shown inside the solid red line on Figure 2. These coal ash-impacted areas are summarized for the Powerton site on Table 6.

From existing soil borings shown on Figure 2 and the average estimated thickness of ash-impacted soils from the borehole logs summarized in Table 3, an estimate of the coal ash-impacted soil volumes for the site area and the ash pond area was made. Because no definitive soil borings showing coal ash thickness are available for the northeast and southwest areas of the site, it is not possible to make precise estimates of the coal ash volumes at these two sites. However, it was assumed that the average coal ash-impacted soil thickness shown in Table 3 for the site area is representative and is equal to 6.6 ft.

Utilizing the average total site area (349 ac) and its average coal ash thickness of 6.6 ft, as shown in Table 3, the total site-wide coal ash-impacted soils is calculated to be on the order of 3,720,000 yds^3 as shown in Table 6. The ash pond area of 73 ac is estimated to have approximately 1,084,000 yds^3 of coal ash-impacted soils (Table 6) based on an average coal ash-impacted soil thickness of 9.2 ft for the pond area. The total volume of coal ash-impacted soils at the Powerton power plant site may range from approximately 1,084,000 to 3,720,000 yds^3. Removal of the 1,084,000 yds^3 of coal ash-impacted soils and the ash ponds at Powerton would reduce the ground-water contamination source-term at the Powerton plant site.

Additional Soil Borings

Visual inspection of Figure 2 indicates that only the extreme northeast and southwest portions of the Powerton total site area lack soil borings which could characterize the thickness of coal ash-impacted soils. Thus, additional soil borings are required at the site especially in these two areas. I recommend that at least one geoprobe soil boring be completed every 300 ft around the perimeter of the northeast and southwest extremes of the site for a total of 15 soil borings. These would be the minimum total additional soil borings for the Powerton site in order to assess the thickness of coal ash-impacted soils in those areas.

Additional Ground-water Monitoring

Monitoring Well MW-16 is an up-gradient ground-water monitoring well. However, to better assess potential down-gradient ground-water quality impacts and to establish whether removal of the existing ash ponds is an acceptable remedy at the Powerton site, I recommend that at least one or more ground-water monitoring wells be located north of the site between MW-4 and the Illinois River and at least one ground-water monitoring well be located southwest of soil boring B-31. Additional ground-water monitoring also should be located near the location of soil boring GT-2. Figure 2 shows the locations of the existing ground-water monitoring wells and soil borings. The number and cost of these additional ground-water monitoring wells are not estimated in this report.

Coal Ash-Impacted Soil Remedy Cost for Powerton

For the Powerton site, the remedy is the removal of coal ash-impacted soil as well as the existing ash ponds. The cost of this remedy is the cost of coal ash-impacted soil excavation and hauling to an approved off-site landfill and backfilling with soil to achieve the pre-removal ground-surface contours. This remedy also would include 15 additional soil borings to better characterize the coal ash-impacted soil thickness of the northeast and southwest areas of the site as well as the area north and east of the existing coal storage area.

I assumed that the volume of coal ash-impacted soils is the volume shown in Table 6 for the pond areas (73 ac) totaling approximately 1,084,000 yds^3. Assuming a dry unit weight per yd^3 of 1.25 tons and a low unit cost of $29.27 per ton, the estimated cost to excavate, haul and backfill this volume of coal ash-impacted soil is approximately $39.6 million as shown in Table 6. If the high unit cost of $42.95 per ton is

used, the estimated cost to excavate, haul and backfill this volume of coal ash-impacted soil is approximately $58.2 million, also as shown in Table 6.

The cost of 15 additional geoprobe soil borings at the site, assuming 8 borings per day and $1,500 per day for a geoprobe unit, is estimated to be $3,000. The average mobilization cost for the coal ash-impacted soil equipment is estimated to be approximately $25,000 also as shown in Table 1. Therefore, the total estimated cost for the coal ash-impacted soil remedy ranges from approximately $39.7 to $58.2 million for the Powerton site. These estimates are highly dependent on the assumed coal ash-impacted soil thickness estimated for the ash pond area.

WAUKEGAN

Coal Ash-Impacted Soil Estimates

The quantity of coal ash-impacted soils at the Waukegan site is based on the total land area inside the red perimeter line shown on Figure 3. This site area was estimated to be 249 ac (Bates Nos. 48427-48432), including the area described for the ponds and the former coal ash/slag storage area shown inside the solid blue line. Within this 249-ac area is a smaller pond and coal ash/slag storage area located inside the dashed red and solid red perimeter line. This pond and coal ash/slag area was estimated to be 44 ac, as shown on Figure 3. These coal ash-impacted areas are summarized for the Waukegan site on Table 6.

I calculated the coal ash-impacted soil volumes for the site area and the ash pond area from existing soil borings shown on Figure 3 and the average estimated thickness of coal ash-impacted soils from the borehole logs summarized in Table 4. The average coal ash-impacted soil thickness for the site area, based on the available soil borings, is 5.3 ft. Utilizing the average site area (249 ac) and its average coal ash thickness of 5.3 ft as shown in Table 4, the site-wide coal ash-impacted soils is calculated to be on the order of 2,129,000 yds^3, as shown in Table 6. The ash pond and coal ash/slag storage areas of 44 ac is estimated to have approximately 774,000 yds^3 of coal ash-impacted soils (Table 6), based on an average coal ash-impacted soil thickness of 10.9 ft for these areas. The total volume of coal ash-impacted soils at the Waukegan power plant site may range from approximately 774,000 to 2,129,000 yds^3. Removal of the 774,000 yds^3 of coal ash-impacted soils, the ash ponds and coal ash/slag storage area would significantly reduce the ground-water contamination source-term at the Waukegan plant site.

Additional Soil Borings

Visual inspection of Figure 3 indicates that the Waukegan total site area most likely has sufficient soil borings to adequately characterize the thickness of coal ash-impacted soils. Thus, no additional soil borings are required at the site.

Additional Ground-water Monitoring

Visual inspection of Figure 3 indicates that the Waukegan total site area likely has sufficient ground-water monitoring to adequately monitor the impacts of removal of the ash ponds and the coal ash/slag storage area. Thus, no additional ground-water monitoring wells are required at the Waukegan site.

Coal Ash-Impacted Soil Remedy Cost for Waukegan

For the Waukegan power plant site, the removal of coal ash-impacted soils in the coal ash/slag storage area as well as the existing ash ponds is assumed to be the remedy. The cost of this remedy is the cost of coal ash-impacted soil excavation and hauling to an approved off-site landfill and backfilling with soil to achieve the pre-removal ground-surface contours.

I assumed that the volume of coal ash-impacted soils is the volume shown in Table 6 for the coal ash/slag and ash pond areas (a total of 44 ac) totaling approximately 774,000 yds^3. Assuming a dry unit weight per yd^3 of 1.25 tons and a unit cost of $29.27 per ton, the estimated cost to excavate, haul and backfill this volume of coal ash-impacted soil is approximately $28.3 million, as shown in Table 6. If the high unit cost of $42.95 per ton is used, the estimated cost to excavate, haul and backfill this volume of coal ash-impacted soil is approximately $41.5 million, also as shown in Table 6.

The average mobilization cost for the coal ash-impacted soil equipment is estimated to be approximately $25,000, also as shown in Table 1. Therefore, the total estimated cost for the coal ash-impacted soil remedy ranges from approximately $28.3 to $41.5 million for the Waukegan site. This estimate is highly dependent on the assumed coal ash-impacted soil thickness.

WILL COUNTY

Coal Ash-Impacted Soil Estimates

The quantity of coal ash-impacted soils at the Will County site is based on the total land area inside the red perimeter line shown on Figure 4. This total area was estimated to be approximately 215 ac (Bates Nos. 48433-48438) including the area described for the ponds shown inside the dashed red line. Within this 215-ac area is a smaller pond area located inside the dashed red and solid red perimeter line. This pond area was estimated to be 20 ac, as shown on Figure 4. These coal ash-impacted areas are summarized for the Will County site on Table 6.

From existing soil borings shown on Figure 4 and the average estimated thickness of coal ash-impacted soils from the borehole logs summarized in Table 5, I made an estimate of the coal ash-impacted soil volumes for the total area and the ash pond area. The average coal ash-impacted soil thickness for the site area, based on the available soil borings, is 2.1 ft. Utilizing the average total site area (215 ac) and its average coal ash thickness of 2.1 ft, as shown in Table 5, the total site-wide coal ash-impacted soils are calculated to be on the order of 728,000 yds^3, as shown in Table 6. The ash pond area of 20 ac is estimated to have approximately 148,000 yds^3 of coal ash-impacted soils (Table 6) based on an average coal ash-impacted soil thickness of 4.6 ft for that area. The total volume of coal ash-impacted soils at the Will County power plant site may range from approximately 148,000 to 728,000 yds^3. Removal of the 148,000 yds^3 of coal ash-impacted soils and the ash ponds would significantly reduce the ground-water contamination source-term at the Will County plant site.

Additional Soil Borings

Visual inspection of Figure 4 indicates that the Will County total site area most likely has sufficient soil borings to adequately characterize the thickness of coal ash-impacted soils. Thus, no additional soil borings are required at the site.

Additional Ground-water Monitoring

Visual inspection of Figure 4 indicates that the Will County total site area most likely has ground-water monitoring to adequately assess the impacts of removal of the ash ponds area. I recommend that one up-gradient ground-water monitoring well be installed at the north boundary of the site near East Romeo Road and the Des Plaines River to assess overall ground-water flow direction at the site. However, this is not a prerequisite for the remedy discussed above.

Coal Ash-Impacted Soil Remedy Cost for Will County

For the Will County site, the remedy is the removal of coal ash-impacted soils in the existing ash pond area. The cost of this remedy is the cost of coal ash-impacted soil excavation and hauling to an approved off-site landfill and backfilling with soil to achieve the pre-removal ground-surface contours.

For purposes of this report, the volume of coal ash-impacted soils is assumed to be the volume shown in Table 6 for the ash pond area (a total of 20 ac) totaling approximately 148,000 yds[3]. Assuming a dry unit weight per yd[3] of 1.25 tons and a low unit cost of $29.27 per ton, the estimated cost to excavate, haul and backfill this volume of coal ash-impacted soil is approximately $5.4 million, as shown in Table 6. If the high unit cost of $42.95 per ton is used, the estimated cost to excavate, haul and backfill this volume of coal ash-impacted soil is approximately $8.0 million, also as shown in Table 6.

The average mobilization cost for the coal ash-impacted soil equipment is estimated to be approximately $25,000, also as shown in Table 1. Therefore, the total estimated cost for the coal ash-impacted soil remedy would range from approximately $5.5 to $8.0 million for the Will County site. This estimate is highly dependent on the assumed coal ash-impacted soil thickness.

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.

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ATTACHMENTS

Table 1	Summary of Bid Tabulation Unit Costs for Removal of Contaminated Soils
Table 2	Summary of Joliet #29 Ash Deposits Located Outside the Ash Ponds Based on Monitoring Well and Soil Boring Logs
Table 3	Summary of Powerton Ash Deposits Located Outside the Ash Ponds Based on Monitoring Well and Soil Boring Logs
Table 4	Summary of Waukegan Ash Deposits Located Outside the Ash Ponds Based on Monitoring Well and Soil Boring Logs
Table 5	Summary of Will County Ash Deposits Located Outside the Ash Ponds Based on Monitoring Well and Soil Boring Logs
Table 6	Summary of Ash-Impacted Soil Volumes and Removal Costs for each MWG Power Plant
Figure 1	Joliet #29 Soil Boring Locations
Figure 2	Powerton Soil Boring Locations
Figure 3	Waukegan Soil Boring Locations
Figure 4	Will County Soil Boring Locations

Table 1

Summary of Bid Tabulation Unit Costs for Removal of Contaminated Soils (Case No. PCB 2013-015)

	Unit Cost ($)[3]			
	Item 1	Item 2		
Contractor	Mobilization (Lump Sum)	Contaminated Soil Excavation, Hauling & Backfilling ($/Ton)	Contractor Location (State)	Source
1	6,829.00	18.50	WI	(1)
2	44,000.00	40.00	WI	(1)
3	12,000.00	25.07	WI	(1)
4	17,750.00	25.00	WI	(1)
5	45,000.00	26.40	WI	(1)
6	36,000.00	25.00	WI	(1)
7	23,000.00	41.00	IL	(1)
8	16,800.00	35.00	IL	(1)
9	--	26.00	WI	(2)
10	--	31.00	WI	(2)
11	--	29.05	WI	(2)
Average	$25,172.38	$29.27		
Std. Dev	$14,661.66	$6.91		
Max.	$45,000.00	$41.00		
Min.	$6,829.00	$18.50		
N	8	11		
Patrick[4]	--	$42.95	Illinois	Bates Nos. 6823-6843

(1) Project 13-2032 KEP Interim Action Soil Remediation. Bid Date: October 16, 2013.
(2) Project 14-2033 Soil Remediation. Bid Date: November 12, 2014.
(3) The unit cost includes the cost of contaminated soil excavation, hauling, and backfilling.
(4) Not included in the statistics and does not include backfilling.

Table 2

Summary of Joliet #29 Ash Deposits Located Outside the Ash Ponds
Based on Monitoring Well and Soil Boring Logs (Case No. PCB 2013-015)

Boring or Monitoring Well ID[(1)]	Depths of Ash[(2)] (ft. bgs)	Thickness of Ash[(3)] (ft)	Source[(4)]
MW-1	N/A[(5)]	--	Patrick (2011a)
MW-2	N/A	--	Patrick (2011a)
MW-3	N/A	--	Patrick (2011a)
MW-4	N/A	--	Patrick (2011a)
MW-5	N/A	--	Patrick (2011a)
MW-6	N/A	--	Patrick (2011a)
MW-7	N/A	--	Patrick (2011a)
MW-8	N/A	--	Patrick (2011a)
MW-9	N/A	--	Patrick (2011a)
MW-10	N/A	--	Patrick (2011a)
MW-11	N/A	--	Patrick (2011a)
B-1	N/A	--	ENSR (1998b)
B-3	A[(6)]	Unknown	ENSR (1998b)
B-4	A	Unknown	ENSR (1998b)
B-6	A		ENSR (1998b)
B-8	N/A	--	ENSR (1998b)
B-9	A	Unknown	ENSR (1998b)
B-10	A	Unknown	ENSR (1998b)
B-11	A	Unknown	ENSR (1998b)
B-12	N/A	--	ENSR (1998b)
B-13	A	Unknown	ENSR (1998b)
B-14	N/A	--	ENSR (1998b)
B-15	N/A	--	ENSR (1998b)
B-16	A	Unknown	ENSR (1998b)
B-17	A	Unknown	ENSR (1998b)
B-18	N/A	--	ENSR (1998b)
B-19	A	Unknown	ENSR (1998b)
B-20	N/A	--	ENSR (1998b)
JS29-GT-1	0 - 1	1	KPRG (2005a)
JS29-GT-2	0 - 1	1	KPRG (2005a)
JS29-GT-3	0 - 1	1	KPRG (2005a)
JS29-GT-4	N/A	--	KPRG (2005a)
JS29-GT-5	N/A	--	KPRG (2005a)
JS29-GT-6	0 - 2.5	2.5	KPRG (2005a)
Former Ash Disposal Area (Northeast of Plant Site and Ash Ponds)	Unknown	Unknown	KPRG (2009a, b), KPRG (2010), KPRG (2012a, b), KPRG (2013), ENSR (1998b)
Former Ash Disposal Area (Southwest of Plant Site and Ash Ponds)	Unknown	Unknown	ENSR (1998b)
	Mean	1.4	
	Std. Dev.	0.75	
	Max.	2.5	
	Min.	1	
	N	4	

(1) MW designates a monitoring well. All other designations are borings.
(2) Depth below ground surface from boring logs.
(3) Difference in maximum and minimum depth bgs.
(4) Reference or Bates Numbers.
(5) N/A = no ash in boring log.

Table 3

Summary of Powerton Ash Deposits Located Outside the Ash Ponds
Based on Monitoring Well and Soil Boring Logs (Case No. PCB 2013-015)

Boring or Monitoring Well ID[1]	Depths of Ash[2] (ft. bgs)	Thickness of Ash[3] (ft)	Source[4]
MW-1	N/A[5]	0	Patrick (2011b)
MW-2	N/A	0	Patrick (2011b)
MW-3	N/A	--	Patrick (2011b)
MW-4	N/A	--	Patrick (2011b)
MW-5	0 - 12.5	12.5	Patrick (2011b)
MW-6	0 - 18	18	Patrick (2011b)
MW-7	0 - 13.5	13.5	Patrick (2011b)
MW-8	0 - 24.5	24.5	Patrick (2011b)
MW-9	0 - 17	17	Patrick (2011b)
MW-10	N/A	0	Patrick (2011b)
MW-11	0 - 16	16	Bates Nos. 40059-40062
MW-12	0 - 18.5	18.5	Bates Nos. 40059-40062
MW-13	0 - 15	15	Patrick (2011e)
MW-14	0 - 18.5	18.5	Patrick (2011e)
MW-15	0 - 20	20	Patrick (2011e)
MW-16	N/A	0	REF?
B-1	N/A	0	ENSR (1998c)
B-4	N/A	0	ENSR (1998c)
B-5	N/A	0	ENSR (1998c)
B-6	N/A	0	ENSR (1998c)
B-9	0 - 8	8	ENSR (1998c)
B-10	0 - 6	6	ENSR (1998c)
B-11	0 - 7	7	ENSR (1998c)
B-12	0 - 6	6	ENSR (1998c)
B-13	0 - 8	8	ENSR (1998c)
B-14	4 - 16	12	ENSR (1998c)
B-15	N/A	0	ENSR (1998c)
B-16	N/A	0	ENSR (1998c)
B-17	N/A	0	ENSR (1998c)
B-18	N/A	0	ENSR (1998c)
B-19	0 - 12	12	ENSR (1998c)
B-21	0 - 3.5	3.5	ENSR (1998c)
B-22	0 - 4	4	ENSR (1998c)
B-23	0 - 12	12	ENSR (1998c)
B-25	0 - 4	4	ENSR (1998c)
B-26	4 - 8	4	ENSR (1998c)
B-27	8 - 20	12	ENSR (1998c)
B-30	0 - 0.5	0.5	ENSR (1998c)
B-31	4 - 20	16	ENSR (1998c)
B-32	N/A	0	ENSR (1998c)
B-33	16 - 20	4	ENSR (1998c)
B-34	N/A	0	ENSR (1998c)
B-35	N/A	0	ENSR (1998c)
B-36	N/A	0	ENSR (1998c)
PS-GT-1	N/A	0	KPRG (2005a)
PS-GT-2	N/A	0	KPRG (2005a)
PS-GT-3	0 - 1	1	KPRG (2005a)
PS-GT-4	N/A	0	KPRG (2005a)

Table 3

Summary of Powerton Ash Deposits Located Outside the Ash Ponds
Based on Monitoring Well and Soil Boring Logs (Case No. PCB 2013-015)

Boring or Monitoring Well ID[(1)]	Depths of Ash[(2)] (ft. bgs)	Thickness of Ash[(3)] (ft)	Source[(4)]
PS-GT-5	2 - 4	2	KPRG (2005a)
PS-GT-6	1 - 6	5	KPRG (2005a)
PS-GT-7	2 - 13	11	KPRG (2005a)
PS-GT-8	2.5 - 15	12.5	KPRG (2005a)
PS-GT-9	3 - 14	11	KPRG (2005a)
AP-3	0 - 2	2	Bates Nos. 14225-14269
AP-4	0 - 19	19	Patrick (2008)
AP-5	0 - 9.7	9.7	Patrick (2008)
AP-6	0 - 10	10	Patrick (2008)
AP-8	0 - 5.3	5.3	Patrick (2008)
AP-9	0.5 - 10	9.5	Patrick (2008)
AP-10	0.5 - 10	9.5	Patrick (2008)
AP-11	N/A	0	Patrick (2008)
AP-12	0 - 3	3	Patrick (2008)
AP-13	0 - 8	8	Patrick (2008)
AP-14	0 - 7.5	7.5	Patrick (2008)
AP-15	0 - 5	5	Patrick (2008)
AP-16	0 - 9.5	9.5	Patrick (2008)
APB-1-08	1 - 31	30	Patrick (2008)
APB-2-08	1 - 23	22	Patrick (2008)
APB-3-08	N/A	0	Patrick (2008)
APB-4-08	N/A	0	Patrick (2008)
APB-5-08	N/A	0	Patrick (2008)
APB-6-08	N/A	0	Patrick (2008)
APB-7-08	N/A	0	Patrick (2008)
APB-8-08	N/A	0	Patrick (2008)
APB-9-08	1 - 4.5	3.5	Patrick (2008)
APB-10-08	N/A	0	Patrick (2008)
	Mean	6.6	
	Std. Dev.	7.30	
	Max.	30	
	Min.	0	
	N	74	

(1) MW designates a monitoring well. All other designations are borings.
(2) Depth below ground surface from boring logs.
(3) Difference in maximum and minimum depth bgs.
(4) Reference or Bates Numbers.
(5) N/A means no ash identified in boring log.

Table 4

Summary of Waukegan Ash Deposits Located Outside the Ash Ponds Based on Monitoring Well and Soil Boring Logs (Case No. PCB 2013-015)

Boring or Monitoring Well ID[(1)]	Depths of Ash[(2)] (ft. bgs)	Thickness of Ash[(3)] (ft)	Source[(4)]
MW-1	0 - 20	20	Patrick (2010c)
MW-2	0 - 11	11	Patrick (2010c)
MW-3	0 - 18.5	18.5	Patrick (2010c)
MW-4	0 - 18.5	18.5	Patrick (2010c)
MW-5	0.5 - 17	16.5	Patrick (2010c)
MW-6	N/A[(5)]	0	IEPA (2012c)
MW-7	1 - 9.5	8.5	IEPA (2012c)
MW-8	3 - 4.5	1.5	Bates No. 45648
MW-9	6 - 9.5	3.5	Bates No. 45649
MW-10	?	?	?
MW-11	?	?	?
MW-12	?	?	?
MW-13	?	?	?
MW-14	?	?	?
MW-15	0 - 5	5	Bates No. 11932
B-1	0 - 4	4	ENSR (1998d)
B-2	N/A	0	ENSR (1998d)
B-3	N/A	0	ENSR (1998d)
B-4	0 - 4	4	ENSR (1998d)
B-6	0.5 - 1	0.5	ENSR (1998d)
B-7	0 - 1	1	ENSR (1998d)
B-8	0 - 2	2	ENSR (1998d)
B-9	0 - 3	3	ENSR (1998d)
B-10	0 - 2	2	ENSR (1998d)
B-11	0.5 - 3	2.5	ENSR (1998d)
B-12	Borehole not logged		ENSR (1998d)
B-13	0 - 4	4	ENSR (1998d)
B-14	0 - 3	3	ENSR (1998d)
B-15	0 - 2	2	ENSR (1998d)
B-16	0 - 2	2	ENSR (1998d)
B-17	0 - 4	4	ENSR (1998d)
B18	N/A	0	ENSR (1998d)
B19	0 - 4	4	ENSR (1998d)
B20	0 - 6	6	ENSR (1998d)
B-21	N/A	0	ENSR (1998d)
B-22	0 - 1.5	1.5	ENSR (1998d)
B-23	N/A	0	ENSR (1998d)

Table 4

Summary of Waukegan Ash Deposits Located Outside the Ash Ponds Based on Monitoring Well and Soil Boring Logs (Case No. PCB 2013-015)

Boring or Monitoring Well ID[(1)]	Depths of Ash[(2)] (ft. bgs)	Thickness of Ash[(3)] (ft)	Source[(4)]
WS-GT-1	1 - 3	2	KPRG (2005a)
WS-GT-2	N/A	0	KPRG (2005a)
WS-GT-3	1.5 - 4	2.5	KPRG (2005a)
WS-GT-4	1 - 19.5	18.5	KPRG (2005a)
WS-GT-5	1 - 22	21	KPRG (2005a)
	Mean	5.3	
	Std. Dev.	6.58	
	Max.	21	
	Min.	0	
	N	36	

(1) MW designates a monitoring well. All other designations are borings.
(2) Depth below ground surface from boring logs.
(3) Difference in maximum and minimum depth bgs.
(4) Reference or Bates Numbers.
(5) N/A means no ash indicated in boring log.

Table 5

Summary of Will County Ash Deposits Located Outside the Ash Ponds Based on Monitoring Well and Soil Boring Logs (Case No. PCB 2013-015)

Boring or Monitoring Well ID[(1)]	Depths of Ash[(2)] (ft. bgs)	Thickness of Ash[(3)] (ft)	Source[(4)]
MW-1	0 - 5	5	Patrick (2011d)
MW-2	0 - 12	12	Patrick (2011d)
MW-3	0 - 7.5	7.5	Patrick (2011d)
MW-4	0 - 6	6	Patrick (2011d)
MW-5	N/A[(5)]	0	Patrick (2011d)
MW-6	0 - 8	8	Patrick (2011d)
MW-7	N/A	0	Patrick (2011d)
MW-8	N/A	0	Patrick (2011d)
MW-9	N/A	0	Patrick (2011d)
MW-10	N/A	0	Patrick (2011d)
B-1	1 - 3	3	ENSR (1998e)
B-2	0.5 - 3	2.5	ENSR (1998e)
B-3	0 - 1	1	ENSR (1998e)
B-4	1 - 2	1	ENSR (1998e)
B-5	0 - 1.3	1.3	ENSR (1998e)
B-6	N/A	0	ENSR (1998e)
B-7	0 - 1	1	ENSR (1998e)
B-8	N/A	0	ENSR (1998e)
B-9	0 - 0.5	0.5	ENSR (1998e)
B-10	0 - 1	1	ENSR (1998e)
B-11	0 - 0.75	0.75	ENSR (1998e)
B-12	0 - 2	2	ENSR (1998e)
B-13	0 - 1	1	ENSR (1998e)
B-14	N/A	0	ENSR (1998e)
B-15	N/A	0	ENSR (1998e)
B-16	N/A	0	ENSR (1998e)
B-17	Bore Hole not Logged		ENSR (1998e)
B-18	N/A	0	ENSR (1998e)
WC-GT-1	N/A	0	KPRG (2005a)
WC-GT-2	0 - 2.5	2.5	KPRG (2005a)
WC-GT-3	0 - 9.5	9.5	KPRG (2005a)
WC-GT-4	0 - 2	2	KPRG (2005a)
WC-GT-5	N/A	0	KPRG (2005a)
	Mean	2.1	
	Std. Dev.	3.16	
	Max.	12	
	Min.	0	
	N	32	

(1) MW designates a monitoring well. All other designations are borings.
(2) Depth below ground surface from boring logs.
(3) Difference in maximum and minimum depth bgs.
(4) Reference or Bates Numbers.
(5) N/A means no ash indicated in boring log.

Table 6

Summary of Ash-Impacted Soil Volumes and Removal Costs for each MWG Power Plant (Case No. PCB 2013-015)

Plant Site and Area	Potentially Impacted Site Area (ac)	Estimated Depth of Ash-Impacted Soils (ft)	Estimated Volume of Ash-Impacted Soils (yds^3)	Estimated Weight of Ash-Impacted Soils[7] (tons)	Low Unit Cost[5] ($/ton)	High Unit Cost[8] ($/ton)	Low Estimated Cost for Excavation, Hauling and Backfilling ($)	High Estimated Cost for Excavation, Hauling and Backfilling ($)
Joliet #29[1]								
Site-wide	251	1.4	566,925	708,657	$29.27	$42.95	$20,742,381	$30,436,804
NE Ash Landfill[6]	44	4	280,916	351,145	$29.27	$42.95	$10,278,011	$15,081,672
Pond Areas	15	1.4	33,880	42,350	$29.27	$42.95	$1,239,585	$1,818,933
Powerton[2]								
Site-wide	349	6.6	3,716,152	4,645,190	$29.27	$42.95	$135,964,711	$199,510,911
Pond Areas	73	9.2	1,083,515	1,354,393	$29.27	$42.95	$39,643,093	$58,171,194
Waukegan[3]								
Site-wide	249	5.3	2,129,116	2,661,395	$29.27	$42.95	$77,899,032	$114,306,915
Pond Areas	44	10.9	773,755	967,193	$29.27	$42.95	$28,309,749	$41,540,954
Will County[4]								
Site-wide	215	2.1	728,420	910,525	$29.27	$42.95	$26,651,067	$39,107,049
Pond Areas	20	4.6	148,427	185,533	$29.27	$42.95	$5,430,561	$7,968,657

(1) Figure 1 and Table 2
(2) Figure 2 and Table 3
(3) Figure 3 and Table 4
(4) Figure 4 and Table 5
(5) The unit cost includes the cost of contaminated soil excavation, hauling, and backfilling based on 11 bid tabulations in northern Illinois and southern Wisconsin for 2013 and 2014.
(6) Assumed 4 ft ash thickness.
(7) Assumed 1.25 tons per yd^3.
(8) From Patrick (Bates Nos. 6823-6843).

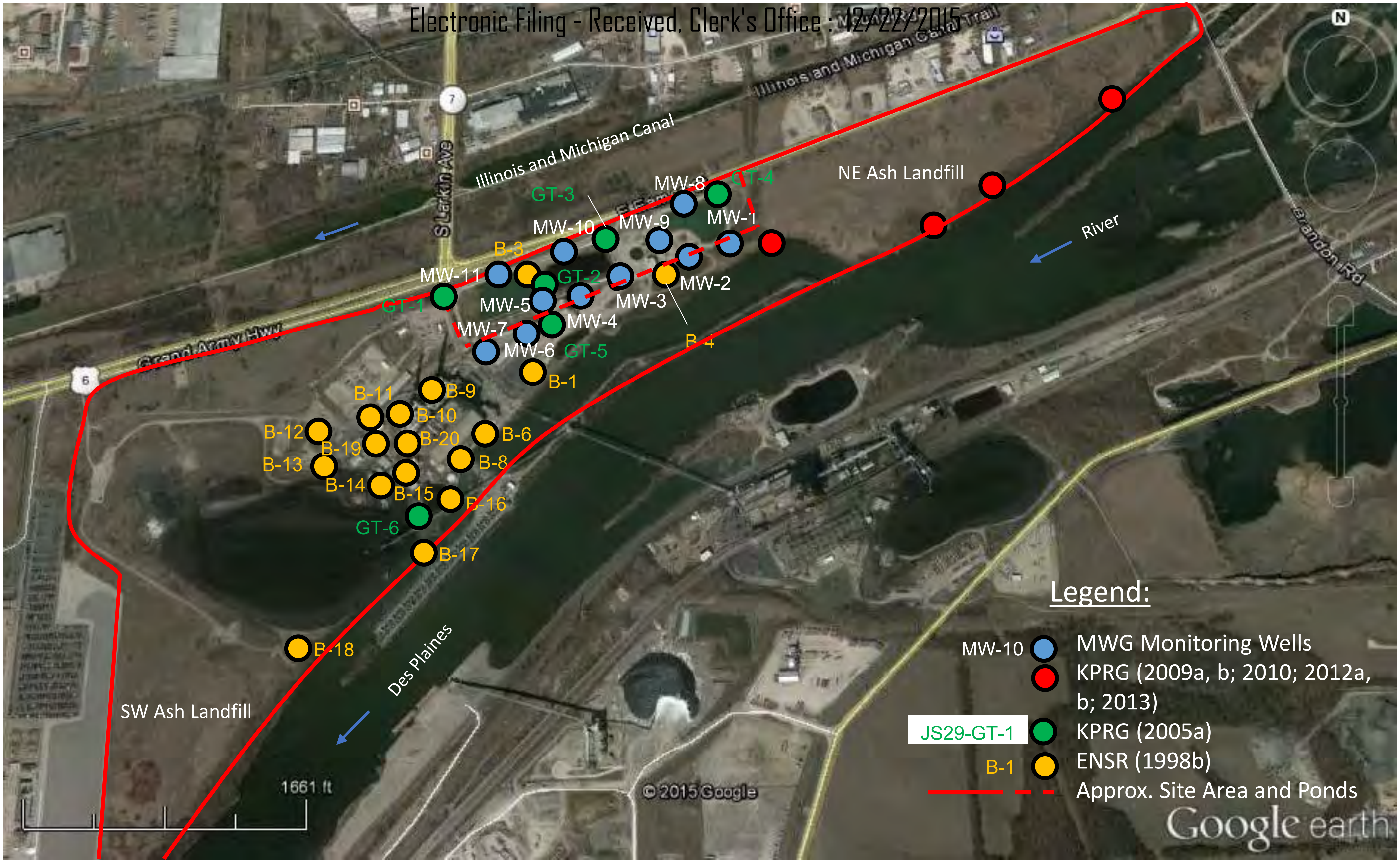

Figure 1 Joliet #29 Soil Boring Locations (PCB 2013-015)

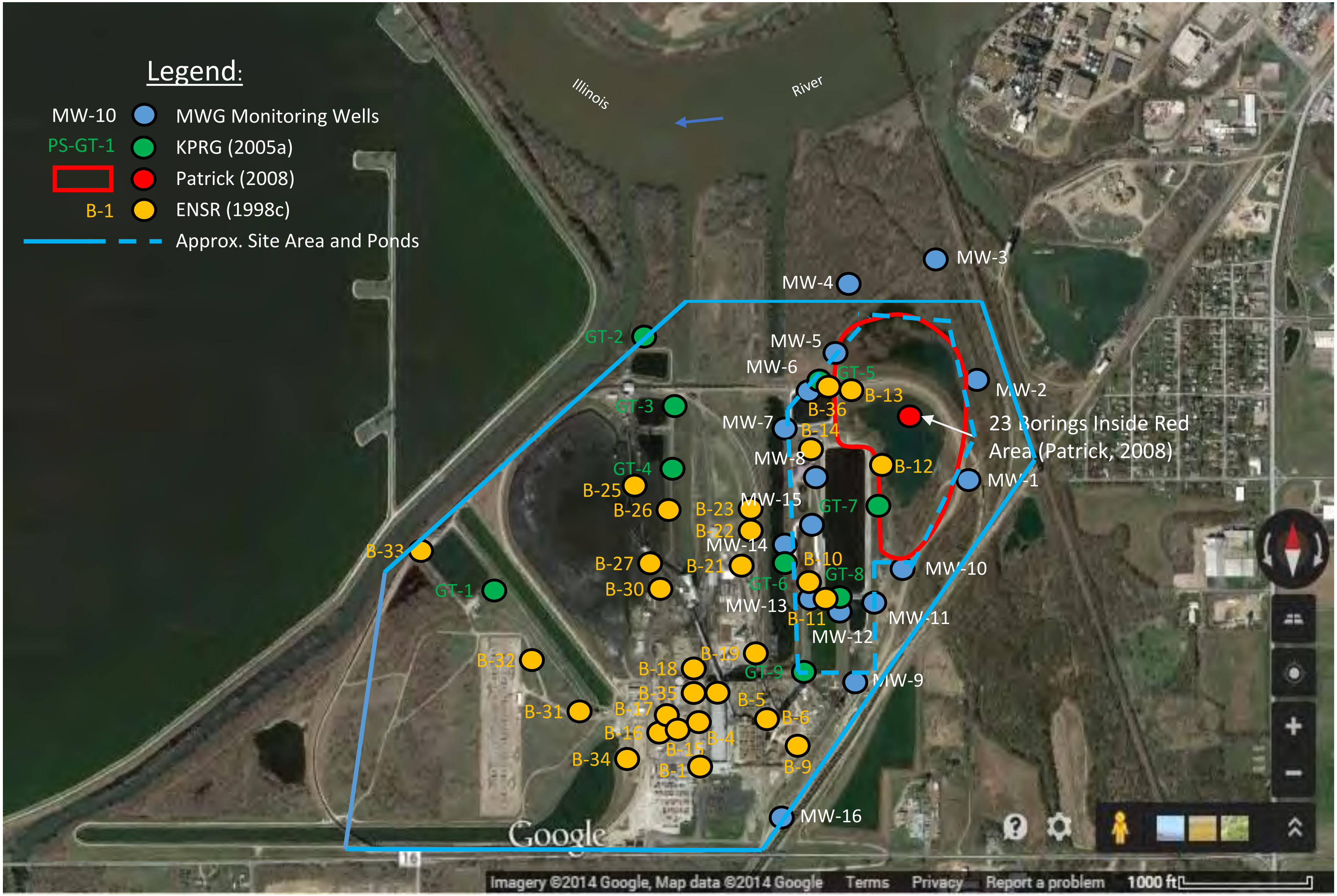

Figure 2 Powerton Soil Boring Locations (PCB 2013-015)

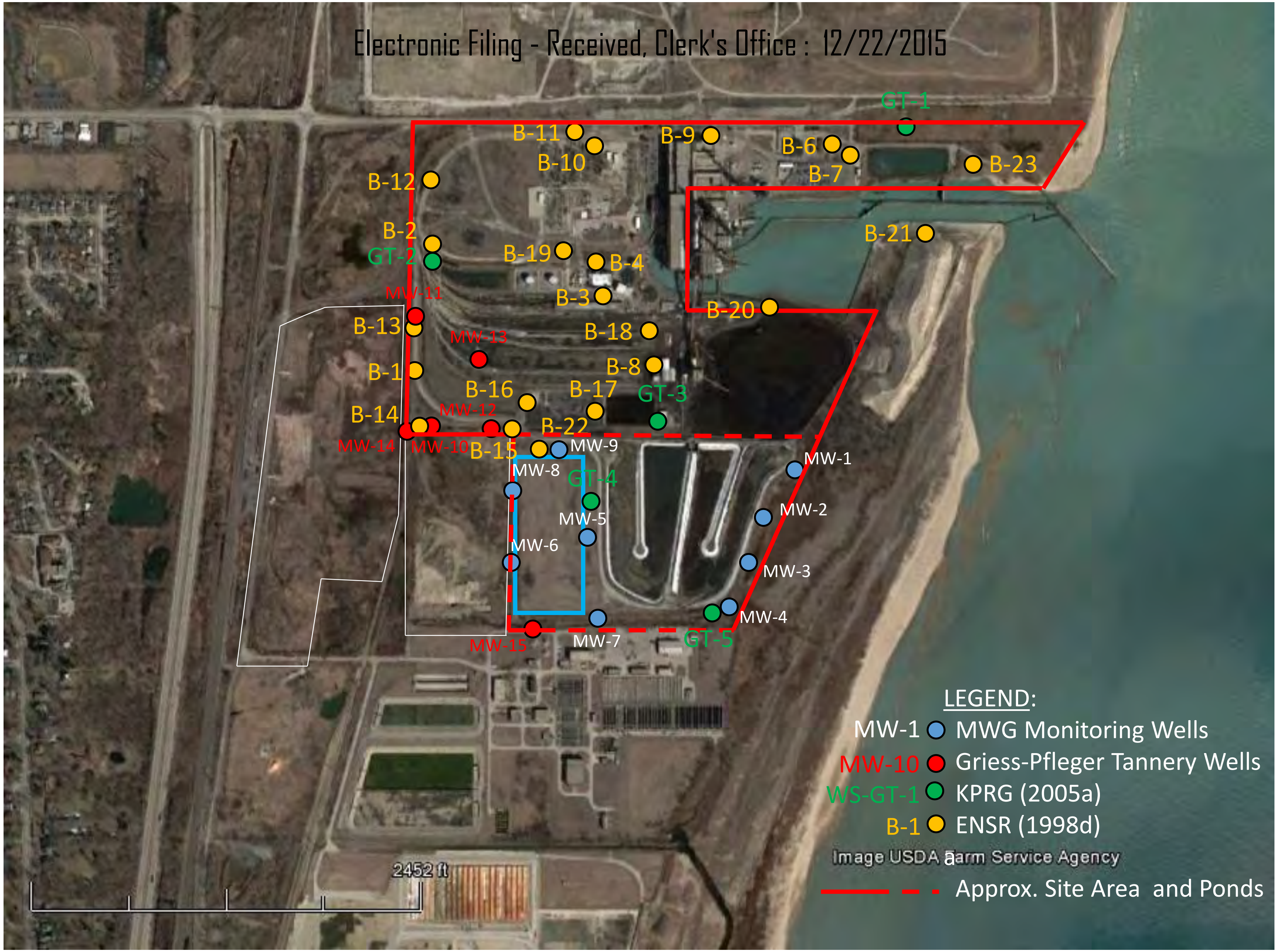

Figure 3 Waukegan Soil Boring Locations (PCB 2013-015)

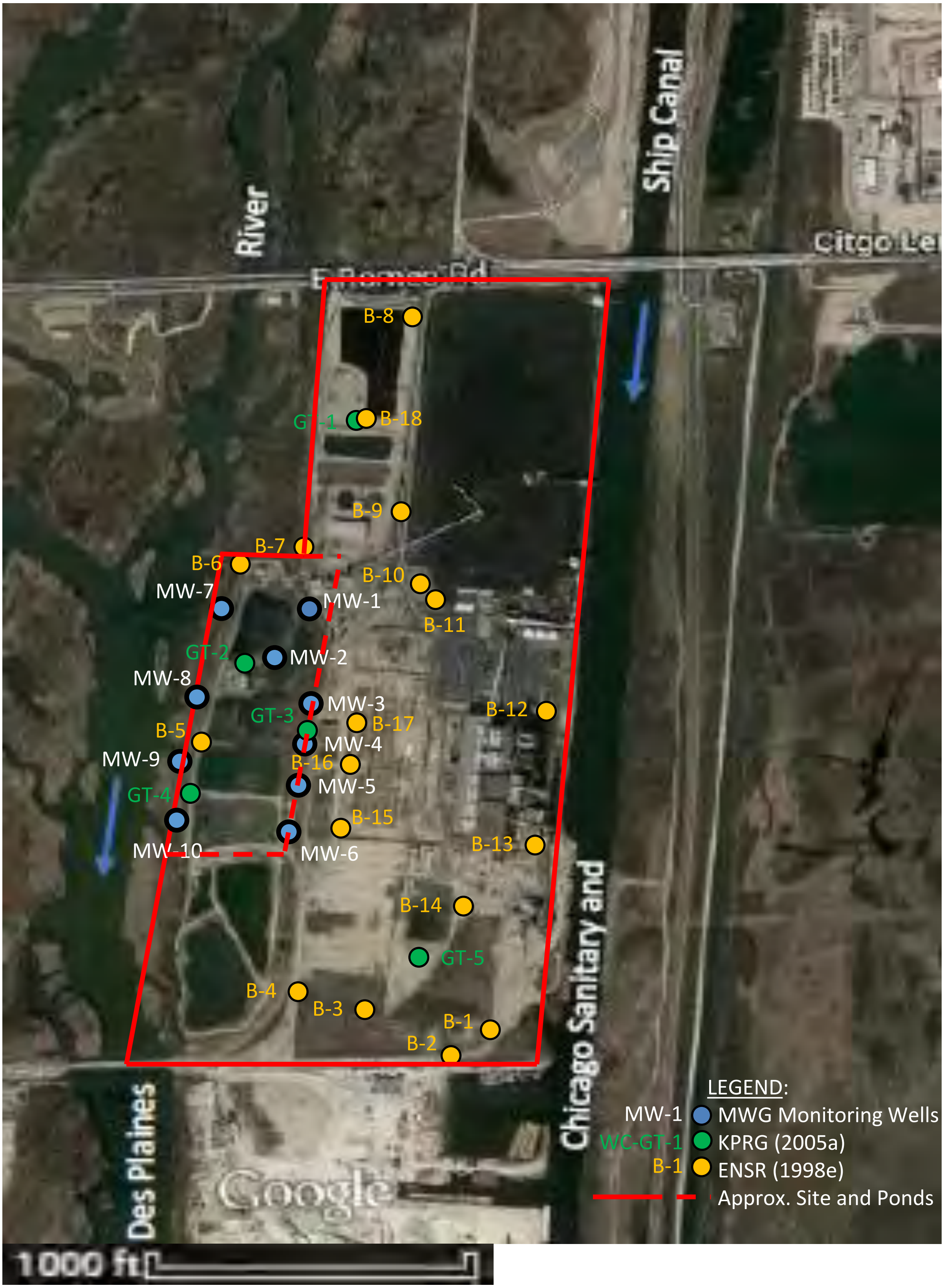

Figure 4 Will County Soil Boring Locations (PCB 2013-015)

***SIERRA CLUB, ET AL. V. MIDWEST GENERATION, LLC* PCB 13-15**

MOTION TO STRIKE

EXHIBIT B

EXPERT REPORT OF JOHN SEYMOUR, P.E.

Expert Report of John Seymour, P.E.

I have prepared this Expert Report on behalf of Midwest Generation, LLC (MWG) to present my opinions and to address the two expert reports issued by M. James R. Kunkel in the Matter of:

SIERRA CLUB, ENVIRONMENTAL LAW AND POLICY CENTER, PRAIRIE RIVERS NETWORK, and CITIZENS AGAINST RUINING THE ENVIRONMENT
Complainants,
v
MIDWEST GENERATION, LLC,
Respondent
PCB 2013-0015

Section 1: INTRODUCTION

1.1. Background

Since 1999, MWG has operated four electric generating stations at issue in this matter: the Joliet #29 Generating Station ("Joliet #29") located in Joliet, Will County, Illinois; the Powerton Generating Station ("Powerton") located in Pekin, Tazewell County, Illinois; the Waukegan Generating Station ("Waukegan") located in Waukegan, Lake County, Illinois; and the Will County Generating Station ("Will County") located in Romeoville, Will County, Illinois. Prior to 1999, the stations were operated by other entities and pre-1999 documents identify historic areas where ash was placed.[1]

Each of the generating stations includes active ash ponds as an integral part of the generating stations' wastewater treatment systems (MWG Facility NPDES Permits).[2] All of the ash ponds are permitted pursuant to MWG's NPDES permits (IL0064254, IL0002232, IL0002259, and IL0002208) and operate pursuant to the limits, terms, and conditions of the permits. All of the active ash ponds at the MWG facilities are fully lined with 60 mil-thick high density polyethylene (HDPE) liners.

In 2010, MWG voluntarily agreed to Illinois EPA's request to perform hydrogeological assessments around the ash ponds at its generating stations.[3] On June 11, 2012, based on the results of the hydrogeological assessments, Illinois EPA issued Violation Notices (VN) to MWG alleging violations of

[1] MWG13-15_8502-8536, MWG13-15_11966-12040, MWG13-15_29502-29532, MWG13-15_25139-25167

[2] MWG's Answer and Defenses to Second Complaint, Answers to Complaint ¶¶1, 3, 5, 7

[3] MWG13-15_364; MWG13-15_384; MWG13-15_407; MWG13-15_421

Section 2: Overview of Opinions

Opinion 1: MWG's Actions are Appropriate for the Sites and are Protective of Human Health and the Environment.

It is my opinion that MWG's actions at each plant site are appropriate for the measured groundwater impacts and are protective of human health and the environment. This opinion is based on the following:

- An approach that eliminates the exposure pathways to address the potential groundwater impacts is appropriate.
- Establishment of administrative controls such as Groundwater Management Zones (GMZ) and/or Environmental Land Use Controls (ELUC) are effective remedial approaches to reduce the exposure of potential groundwater impacts, are remediation industry-accepted approaches, and are approved State of Illinois methods.
  - GMZs are specified for sites undergoing corrective actions under Title 35, IAC Sections 620 (Bureau of Water) and 740 (Bureau of Land).
  - A minimum of 10 sites in Illinois currently have GMZs established by the IEPA Bureau of Water. IEPA Bureau of Water has not reported any groundwater violations for sites with GMZs.
  - The IEPA Bureau of Land has implemented on the order of 100 ELUCs.[10]
  - ELUCs and GMZs allow control of groundwater use along the exposure pathways by eliminating the ingestion pathway and dermal contact pathway while corrective action is underway.
    - The groundwater ingestion pathway is eliminated by restricting the installation of potable water wells in the area of the GMZs and ELUCs.
    - The dermal contact pathway is eliminated by restricting the access of the industrial properties to only trained workers.
- All of the active ponds were relined to eliminate a potential exposure pathway.
  - The relining of the CCR Ponds with 60-mil thick HDPE is an industry-accepted remediation approach to reduce the potential for groundwater impacts.

[10] The IEPA Bureau of Land also has approved GMZs for many sites.

- The relining of the CCR Ponds was completed and inspected by an independent third party under construction quality assurance protocols and documented to be completed in accordance with the design documents or subsequently inspected by a qualified third party.

- The lined ponds are properly operated and maintained, which is the industry-accepted standard approach to preclude groundwater impacts. The operation and maintenance is being completed under consistent protocols.
- Groundwater monitoring is an accepted method to assess a remedial approach.
- I reviewed recent groundwater monitoring data and literature on liners to identify if liner defects were likely and if leaks of leachate through alleged liner defects could be impacting groundwater at the subject sites. It is my opinion that groundwater concentrations are not the result of leaks of leachate from the ash currently stored in lined ponds, as outlined below.
  - The leachate from bottom ash currently stored in ash ponds contains constituents at levels that do not exceed IEPA Class I groundwater standards based on neutral leaching analyses of site-specific samples, indicating that the bottom ash in the ponds is not a source of impact to groundwater.
  - The characteristics of ash leachate were identified based on site-specific impounded ash data or on published leachate data from ponds of subbituminous CCR sourced from the Powder River Basin (PRB) in Wyoming that is the source of coal ash from the Plants.
  - The profiles of the constituents in the groundwater do not match the profiles of leachate constituent indicators in the ponds at all four plant sites. This is based on a comparison of the occurrence of groundwater constituents detected in 2014 compared to minimum and maximum sets of indicators of leachate from ash stored in ponds.
- Groundwater conditions do not pose risks to surface water based on Illinois Water Quality Standards and Illinois Water Quality Criteria that are issued by the State of Illinois to be protective of human health and the environment. An assessment of human and ecological receptors in surface water indicates that there is no risk to the surface water environment at each site based on regulatory risk standards and standards of practice for risk assessments. The potential surface water risks were evaluated using a screening level

- At Joliet #29, construction permits were obtained to reline Ash Ponds 1, 2, and 3 with 60-mil thick, high density polyethylene ("HDPE") liners, and the work has been completed. Ash Pond 1 was taken out of service on October 12, 2015.
- At Powerton, construction permits were obtained to reline the Ash Surge Basin, the Secondary Ash Settling Basin, Metal Cleaning Basin, and Bypass Basin, with 60-mil thick, HDPE liners, and the work has been completed.
- The Powerton East Yard Run-off Basin is not part of the ash sluicing flow system and is not used for ash storage.[70]
- At Waukegan, the East Ash Pond and West Ash Pond were relined with HDPE liners in 2003 and 2004, respectively.
- At Will County, Ash Ponds 1 North (1N) and 1 South (1S) were removed from service in 2010.[71] All process water has been diverted from ponds 1N and 1S to existing Ash Ponds 2 South (2S) and 3 South (3S). A dewatering system was implemented in 2013 that is designed to not allow water to exceed a depth of one foot above the bottom of Ponds 1N and 1S.[72]
- Construction permits were obtained to reline Will County Station Ash Ponds 2S and 3S with 60 mil thick, HDPE liners, and the work has been completed.

5.3.2. Pond Liners are Effective at Precluding Groundwater Impacts

I reviewed the design specifications and construction documentation for current pond liners used for active ash ponds at the sites, as summarized in Sections 5.3.2.1 through 5.3.2.4. The current pond liners are consistent with remediation-industry-accepted approaches, which are further described in Section 5.3.2.5. I reviewed the construction quality assurance and quality control (QA/QC) documentation in Section 5.3.2.6. Properly operating and maintaining lined ponds are the industry-accepted approach to preclude groundwater impacts; based on my review of site-specific records in Section 5.3.2.7, operation and maintenance is being conducted under appropriate and consistent protocols. It is my opinion that the current pond liners are effective to preclude quantifiable groundwater impacts, as described further below.

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[70] Mark Kelly Deposition pp 113-4
[71] Fredrick Veenbaas Deposition p. 33-34
[72] MWG13-15_29339; MWG13-15_560-563

(1996). NRT calculated the overburden stresses on behalf of MWG and found that the resulting stress on HDPE with 18 inches of soil cover would be within the range of conservative design standards.[113]

5.3.2.6. Construction Quality Assurance and Quality Control

Construction quality assurance (CQA) for HDPE geomembrane liners follows two classes of protocols: (1) material testing, installation quality control, and finished product destructive testing; and (2) non-destructive electrical leak location surveys after liners have been installed and covered with a protective material (Darilek and Laine, 2001). Electrical leak location surveys at the completion of liner installation discover more leaks than testing-based protocols because they are conducted after all potential construction damage has occurred but also prior to placement of overlying materials such as protective materials or waste layers. When the electrical leak location survey is conducted after liner installation, the density of leaks discovered in 2.0 millimeter (approximately 79 mil) HDPE was 0.2 leaks per hectare (approximately 0.08 leaks per acre, or 1 leak per 12 acres) based on 170,190 square meters (approximately 42 acres) of liners that had CQA with electrical leak location surveys (Forget et al., 2005). The electrical leak location surveys identify leaks prior to the completion of all liner construction project, so identified leaks are repaired prior to completion of the liner construction project. In summary, when HDPE liners are installed with CQA, the numbers of liner defects or tears are significantly reduced from values cited by Kunkel. Furthermore, there was no correlation between the number of leaks and geomembrane thickness for liner systems (Forget, et al., 2005).

I reviewed the CQA documentation or a third party inspection report for the installation of HDPE liners for the following ash ponds:

- Joliet #29 Ash Ponds No. 1[114], No. 2[115], and No. 3[116]
- Powerton Ash Surge Basin[117], Secondary Ash Settling Basin[118], Metal Cleaning Basin[119], and Bypass Basin[120]
- Waukegan East and West Ash Ponds[121]

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[113] MWG13-15_49296-49298
[114] MWG13-15_49362-49507
[115] MWG13-15_49362-49507
[116] MWG13-15_33867-33997
[117] MWG13-15_33998-34157
[118] MWG13-15_34158-34267
[119] MWG13-15_49099-49256
[120] MWG13-15_49099-49256
[121] MWG13-15_12827-12845

SIERRA CLUB, ET AL. V. MIDWEST GENERATION, LLC **PCB 13-15**

MOTION TO STRIKE

EXHIBIT C

REBUTTAL REPORT TO EXPERT REPORT OF JOHN SEYMOUR, P.E.

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

Rebuttal Report to
Expert Report of John Seymour, P.E.

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

December 8, 2015

Tel: 303-986-0562 Cel: 720-443-9136

INTRODUCTION,

This expert rebuttal report provides my responses to expert opinions of John Seymour, P.E. related to my Expert Report on Ground-water Contamination (Kunkel, 2015a) and my Expert Report on Remedy for Ground-water Contamination (Kunkel 2015b) for Midwest Generation, LLC's (MWG's) Joliet #29, Powerton, Waukegan, and Will County coal-fired power plants.

My rebuttal responses will emphasize, but not necessarily be limited to, the following:

- Much of Seymour's expert report (Seymour, 2015) is unsound and incorrectly interprets the available data and information;
- The indicator pollutants I use for ground-water contamination from coal ash are consistent with USEPA, EPRI and IEPA documents;
- The concentrations of the indicator pollutants in ground water at the four plant sites are much higher than background. This shows that the ground water at the four sites is likely contaminated by a coal ash source. I utilized the same background data for the indicator pollutants as IEPA utilized in their coal ash assessment, except at Powerton where background data at MW-16 (the only true background well at the four plant sites) agrees with the IEPA background for sand and gravel aquifers;
- At Joliet #29, Powerton and Will County sites, no other potential sources of indicator pollutants, except coal ash, are present up-gradient. At Waukegan, ground-water from the Greiss-Phleger Tannery site is not reaching the monitoring well network. Even if boron from the tannery site were reaching the monitoring network, the concentrations of boron in the tannery ELUC wells (up-gradient) are much lower than in monitoring wells located within the old ash storage area just west of the ash ponds. Therefore, I conclude that none of the boron is coming from the tannery;
- The ground-water concentrations are temporally and spatially consistent at each of the four plant sites;
- Ground-water contamination at all four plant sites has generally remained the same, at high concentrations for the monitoring period between Dec. 2010 through present, which confirms my opinion that the actions taken by MWG will not solve the ground-water contamination issues at the four sites;
- MWG's actions will not significantly reduce or eliminate ground-water contamination from coal ash at the four sites; and
- My proposed remedy (Kunkel, 2015b) is economically reasonable compared to other source-term removal remedies or ground-water remediation.

CONTAMINATION IN THE MONITORING WELLS AT THE FOUR SITES IS COMING FROM COAL ASH

I chose the correct indicator pollutants, which are those accepted by other experts and regulators (Kosson and others, 2009; EPRI, 2012; IEPA, 2013; USEPA, 2015). These indicator pollutants, comprised of boron (B), manganese (Mn) and sulfate (SO_4), are known to be the result of leaching of coal ash. As I indicated in my contamination report (Kunkel, 2015a), it is highly unlikely that the presence of these indicator pollutants together in the high concentrations found in the ground water at the four sites is the result of naturally occurring hydrogeologic formations or industrial processes other than coal-fired power plants. USEPA (2015) proposes using the following indicator constituents of ground-water contamination: B, chloride (Cl), conductivity, fluoride (F), pH, SO_4, sulfide (S^{2-}), and total dissolved solids. EPA makes special note of B and SO_4: "The high mobility of boron and sulfate explains the prevalence of these constituents in damage cases that are associated with groundwater impacts." (USEPA, 2015, p. 21456). In its technical support document for coal combustion waste impoundments in Illinois, IEPA (2013) states that "Boron, sulfate, and manganese are the same contaminants that have been found in recent hydrogeologic assessments of groundwater in multiple confirmed sample results collected from down-gradient dedicated monitoring wells adjacent to surface impoundment units containing

CCW at power generating facilities in Illinois. These contaminants were found to be attributable to these surface impoundment units".

I chose the correct background concentrations. IEPA (2013), in its technical support document for coal combustion waste impoundments in Illinois, utilized certain ground-water background concentrations for sand and gravel aquifers and bedrock aquifers to assess if contamination was present. I utilized these same background concentrations for my indicator pollutants at the Joliet #29, Waukegan and Will County sites because there are no up-gradient, background wells at these sites. The monitoring wells at these sites are immediately adjacent to the coal ash ponds and cannot be considered to be either up-gradient or background, because they are impacted by the coal ash ponds. At Powerton, MW-16 is likely up-gradient and has background ground-water concentrations of the indicator pollutants which closely match IEPA's background concentrations for sand and gravel aquifers. In my contamination report, the concentrations of indicator pollutants in MW-16 were utilized as up-gradient, background ground-water concentrations at Powerton.

The indicator contaminants are present in ground water in concentrations much higher than background. There is no evidence that there are up-gradient, off-site sources for the indicator pollutants at the four sites. Seymour (2015, numerous pages) opines that the post-2013 continuing ground-water contamination at the four sites is being caused by up-gradient, off-site sources. My ground-water contamination report (Kunkel, 2015a) describes the historical land uses up-gradient and off-site at each of MWG plant areas. At Joliet, the historical land use north and east of the property was mostly undeveloped land with the Des Plaines River on the south border of the property. There is no evidence of sources of B, Mn or SO_4 that could migrate on-site from adjacent properties. At Joliet #29, B concentrations are up to 21.7 times higher than the background B concentration of 0.12 mg/L. Mn concentrations are up to 22.2 times higher than the background Mn concentration of 0.072 mg/L. SO_4 concentrations are up to 7.4 times higher than the background SO_4 concentration of 54 mg/L. I conclude from this that there is past and continuing ground-water contamination by the indicator pollutants of B, Mn and SO_4 at the Joliet #29 site and this contamination is from on-site sources.

At Powerton, the historical and current land use comprises the Illinois River to the north, industrial and residential properties to the east, agricultural land to the south, and Lake Powerton (Powerton Fish and Wildlife Area) to the west. There is no indication that these land uses could be sources for B, Mn, and SO_4 at the site. This is confirmed by Well MW-16, which is considered to be an up-gradient, background well. At Powerton, B concentrations are up to 21.5 times higher than the background B concentration of 0.20 mg/L. Mn concentrations are up to 4,330 times higher than the background Mn concentration of 0.003 mg/L. SO_4 concentrations are up to 32.6 times higher than the background SO_4 concentration of 43 mg/L at MW-16. I conclude from this that there is past and continuing ground-water contamination by the indicator pollutants of B, Mn and SO_4 at the Powerton site and this contamination is from on-site sources.

At Waukegan, the historical land use of interest was the Greiss-Phleger Tannery, which MWG alleges is the up-gradient source of B at the coal ash pond monitoring wells. This is highly unlikely for three reasons: (1) the ground-water flow away (down-gradient) from the tannery site is not toward the coal ash ponds or the monitoring wells, (2) the concentrations of B in the MW-10 through MW-14 (MW-13 is inactive) ELUC monitoring wells are the direct result of these wells having their screens completed in coal ash, and (3) the B concentrations in MW-10 through MW-14 are much less than those in the MW-5, MW-6, MW-7, MW-8, MW-9 and MW-15.

For example, Figure 1 shows recent MWG ground-water B concentration data for monitoring wells MW-5 through MW-15. Wells MW-10 through -14 (MW-13 is inactive) are ELUC wells which are up-gradient from the old coal ash storage area, and wells MW-5 through -9 and MW-15 are downgradient from the old coal ash storage area. Interpretation of the B concentrations on Figure 1 clearly show that the up-gradient wells (dashed lines) have B concentrations much lower than the down-gradient wells (solid lines). ENSR (1998d) boreholes

located near wells MW-10 through MW-14 (MW-13 is inactive) show that there is ash present in the soil which can account for the B and Mn concentrations at these monitoring wells, which were not part of the ash pond ground-water monitoring network.

At Waukegan, B concentrations in MW-1 through MW-9 are up to 408 times higher than the background B concentration of 0.12 mg/L. Mn concentrations are up to 13.8 times higher than the background Mn concentration of 0.072 mg/L. SO_4 concentrations are up to 22.2 times higher than the background SO_4 concentration of 54 mg/L. I conclude from this that there is past and continuing ground-water contamination by the indicator pollutants of B, Mn and SO_4 at the Waukegan site and this contamination is from on-site sources.

At Will County, the historical and current land uses consist of undeveloped land to the north, the Chicago Sanitary and Ship (CSS) Canal to the east, a quarry to the south, and the Des Plaines River to the west. There is no indication that these land uses could be sources for B, Mn and SO_4 in ground water at the site. At Will County, B concentrations are up to 22.1 times higher than the background B concentration of 0.12 mg/L. Mn concentrations are up to 34.5 times higher than the background Mn concentration of 0.072 mg/L. SO_4 concentrations are up to 45.3 times higher than the background SO_4 concentration of 54 mg/L. I conclude from this that there is past and continuing ground-water contamination by the indicator pollutants of B, Mn and SO_4 at the Will County site and this contamination is from on-site sources.

My rebuttal responses above to Seymour’s allegations regarding the ground-water contamination at the four MWG plant sites include several important facts which show Seymour is incorrect in his allegations or has misinterpreted the ground-water quality data and other information which universally has been agreed to by MWG and IEPA since before the site characterization in late 2010.

The Leachate Test that Seymour Utilized is not Representative of Field Conditions in the Coal Ash Ponds

Seymour (2015, p. 40) claims that *“Recent Groundwater Concentrations are Not the Result of Ash Stored in Lined Ponds”,* but rather ground-water contamination is from up-gradient, off-site sources entering each site. Seymour (2015, p. 51) concludes that *“Bottom Ash Indicator Constituents from Leachate Do Not Match the Groundwater Chemistry”.* Seymour bases these conclusions on the neutral leaching procedure from the American Society for Testing and Materials (ASTM) given in its D3987 test. This test, as established by IEPA in *415 Illinois Compiled Statutes 5/3.135* to determine if coal ash may be classified for beneficial use, is not appropriate or valid for establishing long-term leaching of coal ash (ASTM, 2012), which is occurring at the four plant sites. In its most recent publication of the neutral leaching test, ASTM (2012), in part, states the following in the Significance and Use section of the ASTM D3987-12 procedure:

- “4.1 This practice is intended as a rapid means for obtaining an extract of solid waste. The extract may be used to estimate the release of constituents of the solid waste under the laboratory conditions described in this procedure”.
- “4.2 This practice is not intended to provide an extract that is representative of the actual leachate produced from a solid waste in the field or to produce extracts to be used as the sole basis of engineering design”.
- “4.3 This practice is not intended to simulate site-specific leaching conditions. It has not been demonstrated to simulate actual disposal site leaching conditions”.

Hattaway and others (2013) have proposed guidelines for a suite of test methods for coal ash which are more representative of field conditions. This suite of tests is known as the Leaching Environmental Assessment Framework (LEAF) and is designed to replace the single-point pH tests such as the Toxicity Characteristic Leaching Procedure (TCLP), Synthetic Precipitation Leaching Procedure (SPLP) and ASTM D3987, which

typically utilize large liquid to solids (by weight) ratios which are not representative of field conditions. An appropriate LEAF test for the ash pond solids is EPA 1313 (Hattaway and others, 2013). LEAF tests were utilized by the USEPA (Kosson and others, 2009) in their coal ash characterization report. I relied on Kosson and others (2009) for my opinions in my ground-water contamination report (Kunkel, 2015a).

The two main reasons that the ASTM D3987 test does not accurately measure field leaching of coal ash is that (1) the liquid to solids ratio within the ponds and in the ground water is much lower than the 20 (liquid) to 1 (solids) ratio of the laboratory test, and (2) the pH of the laboratory test (pH = 7) is not representative of either the coal ash in the ponds or outside the ponds.

I conclude from the above that the use of ASTM D3987 by Seymour and other MWG consultants is incorrect and gives concentrations in the resulting test extracts which are much lower than would be expected from field conditions.

Seymour's Matching Analysis of Coal Ash Leachate is Flawed

Seymour's matching analyses is flawed for two reasons. Firstly, detection monitoring does not work on the assumption that you must match each ground-water constituent; instead the principle is that any one of the indicator pollutants can suggest the presence of coal ash leachate (EPRI, 2012). Secondly, a pollutant is not absent just because it is present at a concentration less than the detection limit. The detection limits used in the ASTM D3987-85 test procedure were sometimes 200 times higher than the quarterly ground-water detection limits. The constituents that were not detected in the ASTM test were, in fact, shown to be detected in the MWG 2014 quarterly ground water as well as in actual coal ash pond leachate for subbituminous/lignite impoundment leachate values (Seymour, 2015, Table 5-2). Seymour should have utilized those pond leachate data found in his Table 5-2 for his matching analyses.

Not only was Seymour's approach to matching flawed, but it was misapplied. If he had applied his approach correctly, he would have found a near-100 percent match to all the MWG 2014 quarterly ground-water sampling data. For example, I reanalyzed the "matching" of the ASTM D3987-85 test procedure results obtained by Seymour (Table 5-1) to the 2014 MWG quarterly ground-water sampling data at the Waukegan plant site. Seymour (2015, Table 5-5) indicated that there was a match of between 74 and 84 percent of the time between the ASTM D3987-85 test procedure results and the Waukegan ground-water results for wells MW-1 through MW-7 for the 2014 quarterly data. I have reanalyzed the match because the detection limits used in the ASTM D3987-85 test procedure were sometimes 200 times higher than the quarterly ground-water detection limits. I also utilized the EPRI (Seymour, 2015, Table 5-2) subbituminous/lignite impoundment leachate values and detection limits for comparison to the MWG 2014 quarterly ground-water values to determine if there was a match to ground-water concentrations if the ASTM D3987-85 test procedure results in Seymour's (2015) Table 5-1 showed a non-detect.

The attached Table 1 is my reanalysis of the Waukegan 2014 quarterly ground-water data to Seymour's list of indicator constituents which are found in impoundment coal ash leachate. My interpretation is that there is a nearly perfect match of the Waukegan 2014 quarterly ground-water data to indicator constituents of coal ash leachate presented by Seymour (2015) in his Tables 5-1 and 5-2. This match varies from a 95 percent match to the impoundment leachate indicator constituents for wells MW-2, MW-5, MW-6 and MW-7, to a 100 percent match for wells MW-1, MW-3 and MW-4.

Analyses of my Table 1 shows that the ASTM D3987-85 test procedure results (Seymour, 2015, Table 5-1) and the EPRI impoundment leachate results (Seymour, 2015, Table 5-2) showed consistency for all the leachate indictor constituents except for iron. Therefore, my method of matching using MWG's 2014 quarterly ground-

water data and Seymour's (2015) Tables 5-1 and 5-2 provide near perfect matches to the observed ground-water contamination at Waukegan.

Additionally, if only my three indicator pollutants (B, Mn and SO_4) are analyzed, there is a 100 percent match to Seymour's leachate indicator constituents. Therefore, I further conclude that Seymour's use of the results from the ASTM D3987 to determine if the leachate "matches" the chemistry of the ground water underlying the ponds is incorrect and a gross misuse of the ASTM D3987 procedure and that there were leachate data available from his Table 5-2 which should have been utilized for these matches.

The Leachate Test that Seymour Utilized is not Representative of Field Conditions in Coal Ash Deposits Outside the Ash Ponds

Seymour (2015, p. 45) claims that *"Historical Ash in Fill Materials Outside of the Ponds is Not Adversely Impacting Groundwater",* but rather ground-water contamination is from up-gradient, off-site sources entering each site. Seymour (2015, p. 52) concludes that *"There is No Evidence That Historical Coal Ash Outside of the Ash Ponds is a Source of Groundwater Impacts".* Leaching of coal ash deposits outside the ash ponds at the four plant sites involves two possible scenarios: (1) leaching of coal ash by percolating rainfall and snowmelt, and (2) leaching of coal ash by the rising and falling of seasonal ground-water levels.

Leachate from this intermittent wetting and drying of coal ash will be significantly different than the extractant resulting from the ASTM D3987 procedure. Therefore, the ASTM D3987 procedure utilized by Seymour and other MWG consultants to characterize the coal ash outside the ponds is not applicable. In fact, the chemical process going on beneath the ponds, which leaked in the past and may continue to leak now, is one of pore-water equilibrating with the ash and or soil/ash mixtures in the ground water. This means that there are much lower liquid-to-solids ratios in the coal ash within the ponds and in the coal ash/soil outside the ponds. Additionally, a variable pH depending on the expected initial liquid pH, i.e. rain water, higher pH ground water, or other leaching solutions also is different than the neutral pH of 7 utilized in the ASTM D3987 test procedure.

Values of pH in the environment vary with both space and time. Rainfall pH (typically acidic; pH <7) is very different from ground-water pH (typically basic; pH >7) as well as coal ash leachate pH (typically basic). All rainfall ranges in pH from about 5.6 to 6.0 (nationwide) due to dissolution of CO_2 which forms carbonic acid (Skilling, 2002). In and near Chicago, June and August rainfall is most acidic with a pH of about 4.65. At other times during the year pH varies from about 4.79 to 5.68. Thus, using a neutral pH of 7.0 for the ASTM D3987 leach test will underestimate the concentrations of inorganics in leachate produced by the test procedure. Additionally, the ASTM D3987 procedure's Significance and Use item 4.1 through 4.3 above indicate that the test is not representative of field conditions (ASTM, 2012).

Time series data of ground-water quality collected at the four sites since late 2010 also shows that the existing ground water at all four sites is typically greater than pH 7 and often is greater than pH 8. As with lower (acidic) pH values, higher, more basic pH can facilitate greater leaching than neutral pH. This indicates that the use of the ASTM D3987 procedure to assess leachate concentrations from coal ash is invalid. As indicated above, the processes occurring both at the ground surface and beneath the ground surface relative to coal ash leaching are not single-point pH related but rather chemical equilibration of the liquid phase with the solid coal ash phase to produce the site-specific concentrations of contaminants presented in MWG's quarterly reports. An appropriate LEAF test for the coal ash within and outside the ash ponds is EPA 1313 (Hattaway and others, 2013), the same test procedure utilized by Kosson and others (2009) to characterize coal ash leachate. I relied on Kosson and others (2009) for my opinions in my ground-water contamination report (Kunkel, 2015a).

<u>Seymour is Incorrect that there is no Evidence of Spatial and Temporal Consistency in Ground-Water Impacts</u>

Seymour (2015, pp. 15, 18, 21 and 23) claims that there is no "… evidence that there is spatial or temporal consistency in groundwater impacts, [and] it is my opinion that there is no plume …" at the four MWG plant sites. This is incorrect. A contaminant plume can exist without spatial or temporal consistency but in this case there is both spatial and temporal consistency as well as a contaminant plume at each of the four plant sites. The monitoring networks at each plant site show consistently high ground-water contamination by the indicator pollutants since monitoring began. Nearly all the monitoring wells are downgradient from the coal ash ponds and other coal ash deposits.

What variability there is in the ground-water concentrations is consistent with continued contamination from coal ash. Continued leaching of coal ash outside the ponds by rising and falling ground-water levels will contribute to the observed ground-water contamination at each of the plant sites. Seasonal variations in ground-water contamination from the indicator pollutants would be expected at each site due to these rising and falling ground-water levels. There is both spatial and temporal consistency in accordance with seasonal variability.

MWG'S ACTIONS ARE NOT APPROPRIATE TO SIGNIFICANTLY REDUCE OR ELIMINATE GROUND-WATER CONTAMINATION FROM COAL ASH AT THE FOUR SITES

My rebuttal responses to MWG's past actions at the four power plant sites include the following:

- The Compliance Commitment Agreement (CCA) remedies for each of the four sites will not reduce existing or future ground-water contamination from coal ash deposits and leaky liners;
- Liner construction did not follow normally acceptable engineering standards;
- Dredging of coal ash from the ponds will continue to be a potential source of liner tears and leaks;
- GMZ's and ELUC's do not address the continuing ground-water contamination at the four sites; and
- Monitoring is not addressing the reduction or elimination of ground-water contamination.

The CCA remedies for each of the four sites will not reduce existing or future ground-water contamination from coal ash deposits and leaky liners. The CCAs (IEPA, 2012a, b, c and d) set forth various supposedly remedial actions by MWG to eliminate ground-water contamination at the four sites. Ground water at the four sites is contaminated with constituents including Sb, As, B, Cl, Fe, Mn, NO_3, Hg, SO_4 and Se. Additionally, ground-water at the sites is affected by high pH and TDS immediately up-gradient and down-gradient from the ash ponds. The CCA remedies will not, in my opinion, reduce the ground-water contamination at any of the four sites because:

(1) Continued ground-water monitoring will not eliminate the ash pond liner leaks nor leaching of contaminants from past coal ash placement outside the existing ash ponds;
(2) None of the coal ash pond liners meet the engineering standards given by the USEPA (2015) coal ash rule;
(3) There is no provision in the CCA for cessation of use and removal of coal ash from the three ash ponds;
(4) There is no provision in the CCA for clean-up and removal of fill/construction coal ash placed outside the ash ponds nor for coal ash disposed of on land surface;
(5) Since MWG is continuing to use the same ash dredging techniques as in the past, relining the ash ponds will not reduce liner damage and subsequent liner leakage; and
(6) Hydrostatic uplift of plastic liners can occur at high ground-water levels.

Without removal of the coal ash sources at the four plant sites, ground-water contamination will continue unabated into the future. Creation of a Groundwater Management Zone (GMZ) or an Environmental Land Use Control (ELUC) area and installation of additional ground-water monitoring wells will not prevent the existing coal

ash sources from continuing to cause ground-water contamination into the future. Only partial or total removal of the coal ash sources can reduce ground-water contamination at the four power plant sites.

Liner construction during lining or relining of the coal ash ponds at the four sites did not follow normally acceptable engineering standards. Seymour (2015, p. 54) says that *"Ash Ponds are not Leaking and Construction Quality is Consistent with the Ash Pond Lining Quality Management Standards for Long-Term Use"*. Seymour (2015, p. 54. Footnote 158) claims that "… Schroeder (1994) […] does not consider the frequency of leaks when certain construction quality assurance protocols are followed". This is untrue. Schroeder and others (1994) relate the frequency of liner construction defects to the degree of contact the plastic liner makes with the underlying subbase as summarized in Kunkel (2015a). They define this contact as either poor, fair, good or excellent. No matter how good the construction quality assurance is, there is a small likelihood that the degree of contact will be excellent, which can be achieved only in the laboratory or in small field lysimeters. Good contact is defined by Schroeder and others (1994) as good field installation with well-prepared, smooth soil surface and geomembrane wrinkle control to insure good contact between geomembrane and adjacent soil that limits the drainage rate through a liner defect.

Schroeder and others (1994) also discusses a liner placement quality known as "geotextile separating geomembrane liner and drainage limiting soil" which assumes liner leakage spreading, with the rate of leakage determined by the in-plane transmissivity of the geotextile separating the geomembrane and the adjacent soil or Poz-o-Pac layer that would have otherwise limited the drainage (Schroeder and others, 1994). In the case of the four MWG plant sites, the subbase is either unspecified prepared subgrade or Poz-o-Pac (Seymour, 2015, pp. 28–35). It is well documented by MWG that when some of the ponds were relined, the Poz-o-Pac was partially removed and geotextile placed between the Poz-o-Pac and/or soil subbase and the HDPE liner (Bates Nos. 9584, 9642, , 28418-28586, 49477-49478). The surface of the remaining Poz-o-Pac could not have been smooth enough to ensure a "good" contact with the HDPE liner. This conclusion is strongly supported by Bates Nos. 66-69, which mention that the MWG Poz-o-Pac liners are in "poor" condition. This type of construction is not standard engineering practice.

My opinion is that the existing ponds at the four plant sites do not meet the engineering standards set by the USEPA (2015) coal ash rule for lined ponds. That rule states (p. 21474) that, for existing coal ash surface impoundments, "… the owner or operator of an existing CCR surface impoundment must document whether or not such unit was constructed with any one of the following: (i) A liner consisting of a minimum of two feet of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} cm/sec; (ii) A composite liner that meets the requirements of §257.70(b); or (iii) An alternative composite liner that meets the requirements of §257.70(c). (2) The hydraulic conductivity of the compacted soil must be determined using recognized and generally accepted methods".

§257.70(b) of the rule states:

> "… A *composite liner* must consist of two components; the upper component consisting of, at a minimum, a 30-mil geomembrane liner (GM), and the lower component consisting of at least a two foot layer of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} centimeters per second (cm/sec). GM components consisting of high density polyethylene (HDPE) must be at least 60-mil thick. The GM or upper liner component must be installed in direct and uniform contact with the compacted soil or lower liner component. The composite liner must be: (1) Constructed of materials that have appropriate chemical properties and sufficient strength and thickness to prevent failure due to pressure gradients (including static head and external hydrogeologic forces), physical contact with the CCR or leachate to which they are exposed, climatic conditions, the stress of installation, and the stress of daily operation; (2) Constructed of materials that provide appropriate shear resistance of the upper and lower component interface to

prevent sliding of the upper component including on slopes; (3) Placed upon a foundation or base capable of providing support to the liner and resistance to pressure gradients above and below the liner to prevent failure of the liner due to settlement, compression, or uplift; and (4) Installed to cover all surrounding earth likely to be in contact with the CCR or leachate".

§257.70(c) of the rule states:

"If the owner or operator elects to install an alternative composite liner, all of the following requirements must be met: (1) An *alternative composite liner* must consist of two components; the upper component consisting of, at a minimum, a 30-mil GM, and a lower component, that is not a geomembrane, with a liquid flow rate no greater than the liquid flow rate of two feet of compacted soil with a hydraulic conductivity of no more than 1×10^{-7} cm/sec. GM components consisting of high density polyethylene (HDPE) must be at least 60-mil thick. If the lower component of the alternative liner is compacted soil, the GM must be installed in direct and uniform contact with the compacted soil. (2) The owner or operator must obtain certification from a qualified professional engineer that the liquid flow rate through the lower component of the alternative composite liner is no greater than the liquid flow rate through two feet of compacted soil with a hydraulic conductivity of 1×10^{-7} cm/sec. The hydraulic conductivity for the two feet of compacted soil used in the comparison shall be no greater than 1×10^{-7} cm/sec. The hydraulic conductivity of any alternative to the two feet of compacted soil must be determined using recognized and generally accepted methods. The liquid flow rate comparison must be made using Equation 1 of this section, which is derived from Darcy's Law for gravity flow through porous media.

(Eq. 1) $$\frac{Q}{A} = q = k\left(\frac{h}{t} + 1\right)$$

Where, Q = flow rate (cubic centimeters/second);
A = surface area of the liner (squared centimeters);
q = flow rate per unit area (cubic centimeters/second/squared centimeter);
k = hydraulic conductivity of the liner (centimeters/second);
h = hydraulic head above the liner (centimeters); and
t = thickness of the liner (centimeters).

(3) The alternative composite liner must meet the requirements specified in paragraphs (b)(1) through (4) of this section".

There is no evidence in the record that MWG's coal ash ponds meet the above definitions of a lined pond in the USEPA (2015) coal ash rule.

Seymour (2015, p. 55) says that *"O&M of the Ash Ponds are Not Expected to Cause Leaks and O&M are Conducted in Accordance with Consistent Operating Procedures".* Dredging of coal ash from the ponds will continue to be a potential source of liner tears and leaks. Excavators can damage plastic liners if less than 2-ft of soil overlies the plastic. Seymour's use of static load bearing calculations of equipment is not acceptable to assess the potential for liner damage from equipment because movement of the equipment, especially turning the equipment or suddenly braking the equipment, is a dynamic load which can cause stresses which will tear the liner. Even with 2 ft of protective soil over the liner, turns and sudden braking by trucks, excavators, and even pickups is discouraged (Narejo and Corcoran, 1996, Bates Nos. 49293-49361). MWG has photographs

and other documentation showing construction equipment on the pond liners covered only with the 1-ft sand "cushion" layer (Bates Nos. 49495, 49504). This is not acceptable engineering practice for liner construction.

GMZ's and ELUC's do not address the continuing ground-water contamination at the four sites. The GMZ's and ELUC's may not be large enough to ensure that they are effective in eliminating ground-water exposure pathways at the four sites. During establishment of the GMZ's/ELUC's, no consideration was given to the extent of other coal ash deposits at each site. GMZ's and ELUC's generally have not and will not lead to reductions in ground-water contamination at the four plant sites because they do not provide partial or total removal of the coal ash source terms which lead to ground-water contamination. At Will County, retirement of the Ponds 1-N and 1-S did not remove all of the coal ash and water and thus coal ash leachate has continued to enter the ground water.

Monitoring is not addressing the reduction or elimination of ground-water contamination. There were and are pathways for contamination from the ponds to enter the ground water prior to and after ash pond lining. The evidence does not show that site characterization, ground-water analytics, and implementation of administrative controls have eliminated exposure pathways nor ground-water impacts at any of the four sites. Kunkel (2015a) on Figures 5 through 7, 13 through 15, 22 through 25, and 29 through 31 shows the time series of the indicator pollutants at the four plant sites since monitoring began at the end of 2010. These figures show the following:

(1) At Joliet #29, the indicator pollutant concentrations in ground-water have increased in four monitoring wells and stayed essentially the same in seven monitoring wells.
(2) At Powerton, the indicator pollutant concentrations in ground-water have increased in six monitoring wells and stayed essentially the same in 10 monitoring wells.
(3) At Waukegan, the indicator pollutant concentrations in ground-water have increased in five monitoring wells and essentially stayed the same in 10 monitoring wells.
(4) At Will County, the indicator pollutant concentrations in ground water have increased in seven monitoring wells and essentially stayed the same in three monitoring wells.

The monitoring data do not show that contamination has been significantly reduced, let alone eliminated, after lining the ponds. My opinion is that ground-water monitoring does not show mitigation of ground-water contamination or exposure pathways.

Temporary or seasonal water table elevations at or above the pond liners (not necessarily the pond bottoms) are causes for concern due to the potential for hydrostatic uplift, reduction of the load-bearing capacity of the underlying soils, and ground-water inflows through cracks in the old Poz-o-Pac liners. Additionally, temporary or seasonal water table elevations at or above the pond liners are not permitted under the USEPA (2015) coal ash rule. Under the rule, the liners must be 5 ft above the highest ground-water elevation of the uppermost aquifer (§257.60 of the rule). Thus, except for possibly the Joliet #29 site, none of the MWG coal ash ponds can attain this 5-ft distance under their present locations.

It is untrue that hydrostatic uplift is a potential issue only for soil liners and not geomembrane liners. I have personal experience at the Colstrip Montana Steam Electric Station where ground-water hydrostatic uplift on a plastic liner caused the liner to fail. A rock underdrain was installed to reduce the ground-water hydrostatic uplift pressures. Also see §257.70(b) of the USEPA (2015) coal ash rule.

Seymour's evaluation of hydrostatic uplift assumed that the Poz-o-Pac liners were impermeable and added weight to offset the hydrostatic uplift. We have documentation at the Will County site that the Poz-o-Pac is cracked and allows ground-water to percolate upward into at least one ash pond (Bates Nos. 28850, 28862). We know that, as of 2006, all of the Poz-o-Pac liners dated from the late 1970s and were in poor condition (Bates

66-69). It is therefore reasonable to expect that other Poz-o-Pac liners are cracked, especially those ponds where part of the Poz-o-Pac was removed to maintain ash storage capacity when they were relined. If the ground-water rises above the bottom of the ponds only temporarily, there could still be hydrostatic uplift and the potential for liner failure.

Seymour (2015, p. 37) states that liner leak testing was done either prior to or after placement of the 1-ft sand "cushion" layer. Evidence (Bates Nos. 49495, 49504) shows that trucks drove on this 1-ft sand cushion layer to place the 6-in crushed limestone warning layer. This is not good engineering practice because the turning trucks, dozer spreading of the crushed limestone, and sudden braking or reversals of equipment could cause liner tears. No additional liner leak testing was done after placement of the 6-in crushed limestone warning layer in the ponds.

After dredging of the ash ponds using heavy equipment, there is no visual method to check for liner leaks caused by the dredging equipment. MWG has documented liner tears during dredging (for example, Bates No. 44621), but it is highly likely that some liner tears have gone unnoticed because of coal ash and the warning layer covering these liner failures.

ECONOMIC REASONABLENESS OF THE PROPOSED REMEDY

My remedy report (Kunkel, 2015b) has the only economically reasonable remedy to reduce the source terms for the indicator pollutants at the four plant sites. This remedy removes the coal ash ponds and selected ash storage areas outside the ash ponds. MWG's remedies of establishing GMZ's, ELUC's and ground-water monitoring does nothing to reduce the source terms. Lining of the coal ash ponds at the four plant sites also has not significantly reduced the indicator pollutant ground-water contamination at the four sites.

I conclude that removal of at least some of the coal ash source terms at the four plant sites is the most cost-effective method to reduce continuing ground water contamination. Other ground-water "clean-up" methods such as pump-and-treat or natural attenuation will be effective only if all, or a portion of, the source terms are removed. Additionally, pump-and-treat for B and SO_4 involves elaborate and expensive treatment processes such as membrane technologies and also would involve treatment of large volumes of water because all four plant sites are adjacent to water bodies. I conclude that source removal is more cost-effective than pump-and-treat, because it is more effective in reducing ground-water contamination and less costly. Source removal also is more cost-effective than natural attenuation even though natural attenuation is less costly.

MWG's remedial approach does not address all of the ground-water contamination source terms at the four sites. Seymour misinterprets the Kunkel (2015b) remedy report, which does not recommend removal of all the coal ash at the four plant sites, but rather removal of only the ash ponds and ash immediately adjacent to the ash ponds, the former fly ash disposal area at Waukegan, and, for Joliet #29, additional removal of the northeast ash landfill.

Seymour (2015, p. 63) objects to Kunkel's *"Costs of Soil Disposal at a Permitted Landfill."* Seymour states "It is my opinion that the Kunkel Remedy Report significantly underestimates the cost of proposed cleanup to remove all ash ponds and all CCRs in fill at the plants". He continues that Kunkel's proposed remedy (1) "… fails to incorporate the costs of disposal at a permitted landfill …"; (2) "… does not account for significant and costly disruption at the generating plants …"; (3) "… results in significant impacts to the surrounding communities, including dust, noise, and traffic …"; and (4) "… fails to consider the impact of vehicle carbon dioxide emissions …".

I utilized a cost range of $29.27 (low unit cost) to $42.95 (high unit cost) per ton for estimating the cost to remove the existing coal ash ponds and coal ash-impacted soils at each site, to haul the material removed to an existing landfill and to backfill the excavated areas for the proposed remedy. The unit soil tonnages and costs for the proposed remedy are based on a total impacted area of 196 acres for all four sites rather than the 1,064 acres assumed by Seymour (2015, p. 64). The remedy includes only ash pond removal and ash fill very near the ponds at the four sites, except at Waukegan where the costs include removal of the former fly ash disposal area, and at Joliet #29 where the costs include the removal of ash from the old NE Ash Landfill (Kunkel, 2015b, Table 6). Thus, all of Seymour's objections and his estimated costs and impacts are unwarranted because the remedy at any one of the four sites is most likely no different than a moderate construction project.

CONCLUSIONS

I have shown in this rebuttal report that:

(1) Much of Seymour's expert report (Seymour, 2015) is unsound and incorrectly interprets the available data and information;
(2) The indicator pollutants I use for ground-water contamination from coal ash are consistent with USEPA, EPRI and IEPA documents;
(3) The concentrations of the indicator pollutants in ground water at the four plant sites are much higher than background;
(4) I utilized the same background data for the indicator pollutants as IEPA utilized in their coal ash assessment, except at Powerton where background data at MW-16 (the only true background well at the four plant sites) agrees with the IEPA background for sand and gravel aquifers;
(5) At Joliet #29, Powerton and Will County sites, no other potential sources of indicator pollutants, except coal ash, are present up-gradient;
(6) At Waukegan, ground-water from the Greiss-Phleger Tannery site is not reaching the monitoring well network and, therefore, I conclude that none of the boron is coming from the tannery;
(7) The ground-water concentrations are temporally and spatially consistent at each of the four plant sites;
(8) Ground-water contamination at all four plant sites has generally remained the same, at high concentrations for the monitoring period between Dec. 2010 through present;
(9) MWG's actions will not significantly reduce or eliminate ground-water contamination from coal ash at the four sites; and
(10) My proposed remedy (Kunkel, 2015b) is economically reasonable compared to other source-term removal remedies or ground-water remediation.

Yours truly,

JAMES R. KUNKEL, Ph.D., P.E.

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ATTACHMENTS

Figure 1 — Boron Concentrations in Ground Water at Wells MW-5 through -12 and MW-14 and -15 at Waukegan Site

Table 1 — Summary of Constituents Detected in Ground Water at the Waukegan Site Compared to Detection in Bottom Ash Based on the ASTM D3987-85 Test Procedure and Impoundment Ash Leachate Samples

***SIERRA CLUB, ET AL. V. MIDWEST GENERATION, LLC* PCB 13-15**

MOTION TO STRIKE

EXHIBIT D

JUNE 19, 2013 ORDER BY JUDGE ST. EVE IN *SLOAN VALVE CO. V. ZURN INDUSTRIES, INC. ET AL.*

United States District Court, Northern District of Illinois

Name of Assigned Judge or Magistrate Judge	Amy J. St. Eve	Sitting Judge if Other than Assigned Judge	
CASE NUMBER	10 C 204	**DATE**	6/19/2013
CASE TITLE	Sloan Valve Co vs. Zurn Industries, Inc et al.		

DOCKET ENTRY TEXT

Defendants' motion to strike Sloan's Reply Report and for Leave to Amend Zurn's Expert Report [500] is granted in part and denied in part.

■[For further details see text below.] Notices mailed by Judicial staff.

STATEMENT

Zurn Industries, Inc. and Zurn Industries, LLC. (collectively, "Zurn") have moved the Court to strike the supplemental expert report of Richard F. Bero, Sloan Valve Company's ("Sloan") expert report. They also seek leave to amend the expert report of Ivan Hofmann, Zurn's own expert. The motion is granted in part and denied in part.

BACKGROUND

This case concerns U.S. Patent No. 7,607, 635, entitled "Flush Valve Handle Assembly Providing Dual Mode Operation" (the "'635 Patent" or the "Wilson Patent"), and the corresponding U.S. Patent Application Publication No. 2006/0151729 (the "Published Wilson Patent Application"). On January 13, 2010, Sloan commenced this action against Zurn seeking (a) damages and injunctive relief for Zurn's alleged infringement of the '635 Patent; and (b) provisional damages for Zurn's alleged making, sale, and use of inventions that the Published Wilson Patent Application covers. On December 13, 2012, the Court entered an Agreed Amended Scheduling Order that provided for the following expert discovery deadlines: initial expert reports due by January 28, 2013, rebuttal expert reports by March 4, 2013, and reply expert reports due by April 1, 2013.[1] (R. 443.)

Courtroom Deputy Initials:	KF

[1] The parties first proposed a deadline for Reply expert reports in their sixth Agreed Amended Scheduling Order, entered by the Court on December 13, 2012. (R. 443.)

On January 28, 2013, Sloan served Zurn with the report of its damages expert Richard F. Bero (the "Initial Report"). The report consisted of approximately sixty pages of text and over one hundred pages of additional schedules. On March 8, 2013, Zurn served Sloan with the report of its expert, Dr. Ericksen, a statistician and survey expert. The report of Zurn's damages expert, Ivan Hofmann, was also served on Sloan. On April 5, 2013, Sloan served Bero's reply damages expert report on Zurn ("Reply Report"). Zurn contends that this Reply Report improperly presents new arguments that the Court should strike. Specifically, Zurn argues that the following arguments are new and should be stricken: 1) Bero's calculation of damages based on the "unweighted rations" rather than the "weighted ratios" used in the Initial Report; 2) Bero's addition of "an entirely new Schedule 20.0, which is yet another, alternative collateral sales ratio calculation based on Sloan's previously available sales data": and 3) Bero's "revised and increased estimate of Sloan's incremental costs" based on the inclusion of Sloan's freight-out and scrap costs which were included for the first time in the Reply Report. In addition, Zurn seeks leave to amend Mr. Hofmann's expert report. The Court will address each argument in turn.

LEGAL STANDARD

Federal Rule of Civil Procedure 26(a)(2) governs expert discovery. Rule 26(a)(2)(b)(i) requires a party to disclose to the other parties a written report of a retained expert that includes "a complete statement of all opinions the witness will express and the basis and reasons for them." Fed.R.Civ.P.26(a)(2)(b)(i). An expert rebuttal report is designed to "contradict or rebut evidence" disclosed in the initial expert report. FedR.Civ.P. 26(a)(2)(D)(ii). "The proper function of rebuttal evidence is to contradict, impeach or defuse the impact of evidence offered by an adverse party." *Peals v. Terre Haute Police Dep't,* 535 F.3d 621, 630 (7th Cir. 2008). *See also Butler v. Sears Roebuck & Co.*, No. 06-7023, 2010 WL 2697601, at * 1, (N.D. Ill. July 7, 2010). Although the Rules do not expressly provide for reply expert reports, the parties agreed to such reports in this case. (R. 443.) Similar to reply briefs, advocates cannot advance new arguments for the first time in a reply expert report. Experts must limit their reply reports to the scope of the issues raised in the rebuttal reports. The reply report is not the appropriate vehicle for presenting new opinions.

Local Patent Rule 5.3 provides:

> Amendments or supplementation to expert reports after the deadlines provided herein are presumptively prejudicial and shall not be allowed absent prior leave of court upon a showing of good cause that the amendment or supplementation could not reasonably have been made earlier and that the opposing party is not unfairly prejudiced.

L.P.R. 5.3. The Rule provides for a presumption against supplementation of expert reports after the deadlines. In order to supplement an expert report after the disclosure deadlines provided for in the Local Patent Rules, a party must obtain prior leave of court, show good cause that it could not have made the supplement earlier, and establish that the opposing party will not suffer undue prejudice from the supplementation. Federal Rule of Civil Procedure 26(e) also provides for supplementation of expert reports. "Although Fed.R.Civ.P. 26(e) requires a party to supplement or correct disclosure upon information later acquired, that provision does not give license to sandbag one's opponent with claims and issues which should have been included in the expert witness' report (indeed, the lawsuit from the outset)." *Allgood v. Gen. Motors Corp.*, No. 02 C 1077, 2007 WL 647496, at **3-4 (S.D. Ind. Feb. 2, 2007) (citations and quotations omitted).

ANALYSIS

I. Bero's Reply Report

A. Weighted v. Unweighted Ratios

In his Initial Report, Bero calculated damages based on collateral unit sales ratios, and included both the weighted and unweighted ratios of the total number of collateral units – toilet valves, urinal valves and faucets – in sites investigated by Quest Consultants. Although Mr. Bero included both ratios, he used the weighted ratios as the basis of his collateral sales damages calculation "since use of the weighted ratios appears to represent a more accurate approximation for the ratios of collateral products to manual dual-flush valves." (R. 507, Ex. A, Bero Initial Report at 30.) According to Bero, "the un-weighted ratios simply use the investigated bathrooms and ignore the size differences of the projects." (*Id.*) In response to the Initial Report, Zurn's expert criticized the use of the weighted ratios. Consequently, in his Reply Report, Bero opined "whether one uses weighted or unweighted averages makes little difference." (R. 507-1, Ex. B, Bero Reply Report at 34.) Using the same unweighted numbers he included in his Initial Report, Bero calculated the collateral profit per value using both the weighted (as he had in his Initial Report) and the unweighted ratios to demonstrate that "whether one uses weighted or unweighted averages makes little difference." (*Id.* at 34.) His Reply Report still contains the calculations based on the weighted averages as well. Thus, rather than offering a new opinion and changing the basis for the calculation of the collateral unit sales, Mr. Bero included the calculation based on the unweighted ratios to refute Mr. Hofmann's criticisms. This calculation is responsive to the criticism and proper for Bero's Reply Report.

B. Estimation of Incremental Costs

Zurn further argues that the Court should strike Mr. Bero's revised and increased estimate of incremental costs. Notably, Zurn does not contest that it failed to produce any incremental costs data for manual dual flush valve sales. Bero, therefore, relied on Sloan's incremental costs data to approximate Zurn's incremental costs. Unlike Zurn, Sloan ordinarily does not include freight out and scrap costs in its incremental costs. After including this data in his Initial Report, Mr. Hofmann criticized Mr.Bero for not including Zurn's incremental freight out and scrap costs in his Initial Report. Mr. Bero thereafter added them in his Reply Report. In his Reply Report, Bero notes that he conducted "additional investigation of Sloan's costs" after Hofmann criticized his Initial Report and after Zurn provided them. Based on this investigation, Bero noted in his Reply Report:

> I understand that in addition to Sloan's incremental costs identified in the Bero Report, the only two additional Sloan costs that potentially could be considered incremental that Sloan does not already include in its incremental costs are scrap costs and freight-out costs. These scrap and freight-out costs have both historically been approximately 1%-2% of Sloan's net sales. For purposes of my analysis, I include 4% additional incremental costs to account for the scrap and freight-out costs on the sales of Sloan's valves, packages, handles, collateral products and diaphragms."

(R. 507, Ex. B, Bero Reply Report at 39-40.) Mr. Bero then updates his royalty quantifications to incorporate the incremental freight-out and scrap costs. (*Id.* at 54.)

Zurn appears to back away from its challenge to this aspect of Mr. Bero's Reply Report because it does not address this issue in its Reply brief. Given Zurn's failure to produce the freight out and scrap costs data in the first instance, the Court will not strike this aspect of Bero's Reply Report. His opinion is also directly responsive to Mr. Hofmann's criticism.

C. Schedule 20.0

Next, Zurn criticizes Bero's inclusion of Schedule 20.0 in his Reply Report. According to Zurn, this Schedule is "sandbagging" because it presents a new and "deeply flawed approach to calculating Sloan's alleged damages for collateral sales." (R. 500 at 4; R. 516 at 2.)

Schedule 20.0 is entitled "Rational analysis based on Sloan Valve overall." Sloan contends that this Schedule responds to Mr. Hofmann's concerns regarding the adequacy of the underlying Quest investigation upon which Sloan relies for damages data in that it "summarizes the convoyed sales for all Sloan flushometers sold in 2010 and 2011." (R. 509 at 4.) Sloan's only defense of Schedule 20.0 is one line in its Response that references Schedule 20.0 and notes that "Bero also refuted Hofmann's criticism by noting that the overall ratio of flushometer sales to both urinal valves and faucets (*i.e.*, the convoyed products) was consistent with the unweighted rations resulting from the Quest investigation." (*Id.* at 9.) Sloan does not contest that Schedule 20.0 is a new, alternative collateral sales calculation for sales that Sloan and Zurn would have expected in 2006 while conducting a hypothetical negotiation for a license. In addition, Sloan does not challenge Zurn's assertion that Sloan had access to all of the data at issue in Schedule 20.0 before Bero completed his Initial Report.

Based on the submissions, Zurn has established that Schedule 20.0 is a new opinion regarding damages and thus not appropriate for the Reply Report. Accordingly, the Court strikes Schedule 20.0 from the Reply Report.

II. Hoffman's Proposed Supplemental Report

In addition, Zurn seeks permission under Local Rule 5.3 for its expert Ivan Hofmann to file a supplemental report 1) to address Bero's arguments in his Reply Report; and 2) "to correct an inadvertent error in his calculations." (R. 500 at 5.) Zurn's request is denied.

The Court will not permit Zurn to supplement Mr. Hofmann's report to address Mr. Bero's arguments in his Reply Report. The Court has struck Mr. Bero's Schedule 20.0, thus Zurn's arguments regarding this document are moot. Because the other arguments in Bero's Reply Report are responsive to Mr. Hofmann's rebuttal report as noted above, Zurn does not have the right to supplement Mr. Hofmann's report to address them.

Zurn also seeks to supplement Mr. Hofmann's report regarding an "inadvertent error in the way Mr. Hofmann had presented Zurn's revenues." Zurn claims that Mr. Hofmann presented Zurn's revenues in his March 8 report based on how they appeared in Bero's Initial Report "for comparability purposes." Bero's Initial Report included an approximate six percent reduction of revenues to reflect certain discounts included in Zurn's cost data. Zurn claims that Mr. Bero's accounting for this reduction "was revealed only in footnotes located on pages 159, 166, and 172" of his Initial Report, thus Hoffmann missed it when he prepared his report. Significantly, Zurn's own data would have revealed the numbers that Zurn now wants Mr. Hoffman to include in a supplemental report, yet he elected not to include them. In addition, Zurn learned of Mr. Hoffman's mistake at his deposition on April 3, 2013, yet waited approximately one month before raising it with the Court. Rule 26(e) provides for the supplementation of expert disclosures to correct any errors in a timely manner. It does not, however, permit an expert to correct mistakes based on information that was available to the expert well in advance of the issuance of his report. *Stuhlmacher v. Home Depot USA, Inc.*, No. 07 C 1035, 2012 WL 5866297, at *2, (N.D. Ind. Nov. 19, 2012). Contrary to Zurn's representation, Mr. Hofmann's error is more than just a mathematical – he elected to rely on Sloan's expert's numbers and failed to understand them. Zurn has not established good cause to supplement Mr. Hofmann's report.

CONCLUSION

Zurn's Motion to Strike Sloan's Reply Report and for Leave to Amend Zurn's Expert Report is granted in part and denied in part.