

IOWA UTILITIES BOARD
Energy Section

Docket No.: EPB-2014-0150
Utility: Interstate Power and Light
File Date: April 1, 2014
Memo Date: March 3, 2015

TO: The Board

FROM: Ellen Shaw, Kerri Johannsen

SUBJECT: Review of Interstate Power and Light Company’s Emissions Plan and Budget and Settlement Agreement

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I. Background

Iowa Code § 476.6(20) requires Iowa's rate-regulated utilities to develop a multi year emissions plan and associated budget for managing regulated emissions from their coal-fired facilities in a cost-effective manner, with updates filed at least every two years. Interstate Power and Light Company (IPL) made its initial filing in 2002 and has filed biennial updates since. On April 1, 2014, IPL filed its updated Emissions Plan and Budget (2014 Plan Update) with the Iowa Utilities Board (IUB).

On August 19, 2014, the Iowa Department of Natural Resources, Air Quality Bureau (IDNR) filed direct testimony¹ stating that IDNR believes the filing meets the applicable state environmental requirements. On September 17, 2014, IPL filed budget information that was inadvertently omitted from its initial filing. On December 3, 2014, the Board issued an order requiring additional information. IPL filed the additional information on December 19, 2014, and filed a supplement to the additional information on February 6, 2015.

On January 16, 2015, IPL filed a Joint Motion and Settlement Agreement between IPL, the Consumer Advocate Division of the Department of Justice (Consumer Advocate), and the Environmental Law & Policy Center and the Iowa Environmental Council (jointly the "Environmental Intervenors").

IPL's 2014 Plan Update describes emission reduction projects that will occur beginning in 2015 through 2019. However, IPL requests approval specifically for activities and associated budgets for 2015-2016. IPL also provides a status report on activities and budgets associated with its 2012 Plan Update (pertaining to 2013-2014).

For the 2015-2016 time period, the Plan Update includes [REDACTED] in capital expenditures for ongoing projects. IPL's share of this capital is [REDACTED]. The Plan Update also includes [REDACTED] in operations and maintenance (O&M) expenses, with IPL's share [REDACTED].

For the 2015-2019 time period, the Plan Update projects capital expenditures of approximately \$123.0 million of which IPL's share is approximately \$100.0 million. O&M costs for this time period total [REDACTED], with IPL's share [REDACTED]. MidAmerican Energy Company (MidAmerican) and IPL jointly own Ottumwa Unit 1; thus, each utility has a share of capital and O&M expenses for the unit.

¹ IDNR's August 19, 2014, direct testimony was a revision of its August 7, 2014, testimony.

II. Legal Standards

Iowa Code § 476.6(20) states:

20. *Electric power generating facility emissions.*

a. It is the intent of the general assembly that the state, through a collaborative effort involving state agencies and affected generation owners, provide for compatible statewide environmental and electric energy policies with respect to regulated emissions from rate-regulated electric power generating facilities in the state that are fueled by coal. Each rate-regulated public utility that is an owner of one or more electric power generating facilities fueled by coal and located in this state on July 1, 2001, shall develop a multiyear plan and budget for managing regulated emissions from its facilities in a cost-effective manner.

(1) The initial multiyear plan and budget shall be filed with the board by April 1, 2002. Updates to the plan and budget shall be filed at least every twenty-four months.

(2) Copies of the initial plan and budget, as well as any subsequent updates, shall be served on the department of natural resources.

(3) The initial multiyear plan and budget and any subsequent updates shall be considered in a contested case proceeding pursuant to chapter 17A. The department of natural resources and the consumer advocate shall participate as parties to the proceeding.

(4) The department of natural resources shall state whether the plan or update meets applicable state environmental requirements for regulated emissions. If the plan does not meet these requirements, the department shall recommend amendments that outline actions necessary to bring the plan or update into compliance with the environmental requirements.

b. The board shall not approve a plan or update that does not meet applicable state environmental requirements and federal ambient air quality standards for regulated emissions from electric power generating facilities located in the state.

c. The board shall review the plan or update and the associated budget, and shall approve the plan or update and the associated budget if the plan or update and the associated budget are reasonably expected to achieve cost-effective compliance with applicable state environmental requirements and federal ambient air quality standards. In reaching its decision, the board shall consider whether the plan or update and the associated budget reasonably balance costs, environmental requirements, economic development potential, and the reliability of the electric generation and transmission system.

d. The board shall issue an order approving or rejecting a plan, update, or budget within one hundred eighty days after the public utility's filing is deemed complete; however, upon good cause shown, the board may extend the time for issuing the order as follows:

- (1) The board may grant an extension of thirty days.
- (2) The board may grant more than one extension, but each extension must rely upon a separate showing of good cause.
- (3) A subsequent extension must not be granted any earlier than five days prior to the expiration of the original one-hundred-eighty-day period, or the current extension.

e. The reasonable costs incurred by a rate-regulated public utility in preparing and filing the plan, update, or budget and in participating in the proceedings before the board and the reasonable costs associated with implementing the plan, update, or budget shall be included in its regulated retail rates.

f. It is the intent of the general assembly that the board, in an environmental plan, update, or associated budget filed under this section by a rate-regulated public utility, may limit investments or expenditures that are proposed to be undertaken prior to the time that the environmental benefit to be produced by the investment or expenditure would be required by state or federal law.

III. Summary of IPL's 2014 Plan Update

A. Current Air and Water Compliance Rules

IPL noted that emissions requirements under the Clean Air Act regulatory framework are generally implemented using one of two policy approaches:

- (1) The command-and-control approach mandates specific standards of performance, applied to each emitting unit individually or by averaging of emissions at the facility-level.
- (2) The market-based cap-and-trade approach sets an overall limit, or "cap," for the allowed emissions level. Each regulated facility receives authorizations to emit in the form of emissions allowances and must surrender allowances equal to its actual emissions in order to comply. Each regulated facility can determine its own compliance strategy to meet the overall reduction requirement, including sale or purchase of allowances, installation of pollution controls, or other operational changes that will reduce emissions.

National Ambient Air Quality Standards (NAAQS)

The U.S. Environmental Protection Agency (EPA) established the NAAQS under the Clean Air Act (CAA) for six criteria pollutants, which it uses as indicators of air quality. Four of these criteria pollutants are particularly relevant to IPL's electric utility operations: Nitrogen oxides (NO_x), sulfur dioxide (SO₂), particulate matter (PM), and ozone. Ozone is not directly emitted from IPL's generating facilities; however, NO_x emissions contribute to its formation. Fine particulate matter

(PM_{2.5}) may also be formed in the atmosphere from SO₂ and NO_x emissions that react to form sulfate and nitrate aerosols.

In 2009 the EPA commenced regulation of six greenhouse gases (GHGs) including carbon dioxide (CO₂), methane (CH₄), nitrous oxide (N₂O), sulfur hexafluoride (SF₆), hydrofluorocarbons (HFCs), and perfluorocarbons (PFCs).

The NAAQS are enforced through State Implementation Plans (SIPs), which are filed by state enforcement agencies (in Iowa, the IDNR) and approved by the EPA. The New Source Review permitting program requires new or modified sources to obtain Prevention of Significant Deterioration (PSD) permits to ensure that air quality is not significantly degraded in areas that currently achieve the NAAQS.

Clean Air Interstate Rule/Cross State Air Pollution Rule

In 2005 the EPA issued the Clean Air Interstate Rule (CAIR), commonly referred to as the "good neighbor" provision, to limit the transport of NO_x and SO₂ emissions from certain states in the eastern United States, including Iowa. These emissions were found to contribute to the downwind formation of PM_{2.5} and ozone levels above the EPA's NAAQS. The EPA issued emissions budgets for SO₂ and NO_x in order to limit emissions coming from each CAIR-regulated state. CAIR included an option for states to achieve compliance through participation in an EPA-administered market-based cap-and-trade system.

In 2008 the United States Court of Appeals for the District of Columbia (D.C. Circuit) vacated CAIR and later that year, issued a ruling to keep CAIR in place until the EPA issues new rules to replace CAIR. In 2011 the EPA issued the Cross State Air Pollution Rule (CSAPR) to replace CAIR and address state obligations to reduce the transport of emissions which prevent downwind states from attainment of the EPA's NAAQS. Similar to CAIR, CSAPR established NO_x and SO₂ emissions budgets for fossil-fueled electric generating units (EGUs) located in the eastern half of the United States, including Iowa.

CSAPR was stayed by the D.C. Circuit in December 2011 and subsequently vacated by the same court in August 2012. At the time of IPL's Plan Update filing, the EPA had successfully petitioned the U.S. Supreme Court to review the CSAPR decision, oral arguments had been made, and a decision was expected in the first half of 2014; in the meantime, CAIR was still in place. IPL's December 18, 2014, response to Board questions reports that the U.S. Supreme Court reversed the D.C. Circuit's decision to vacate CSAPR, and in October 2014, the D.C. Circuit lifted the stay on CSAPR. The EPA issued a ministerial rule that updates CSAPR compliance dates and emissions allocations for Phase I to 2015 and Phase II to 2017. CAIR will no longer be applicable beginning in 2015.

Mercury and Air Toxics Standards (MATS)

In 2009 the EPA announced its intention to develop Maximum Achievable Control Technology (MACT) rules for EGUs to reduce emissions of mercury and other federal hazardous air pollutants. The MACT standards follow a command-and-control technology-driven approach. The EPA issued the proposed MACT rule for coal-fired EGUs, also referred to as MATS, which became final in 2012 and requires units to comply with emission limits for mercury, PM, and hydrogen chloride (HCl). Compliance is required by April 16, 2015; however, an entity can request an additional year of compliance from the state permitting authority (IDNR).

In December 2013 oral arguments took place in the D.C. Circuit regarding MATS, and a decision is anticipated in June 2014. In June 2013 the EPA re-opened the public comment for the startup and shutdown provisions of the MATS rule. At the time of the 2014 Plan Update filing, IPL did not anticipate significant changes to the MATS emissions limitations or compliance deadlines as a result of the litigation or rule reconsideration.²

Greenhouse Gas Reporting and Permitting

In October 2009 the EPA issued a rule requiring greenhouse gas sources emitting above a certain threshold to monitor and report emissions. In June 2010 the EPA issued the greenhouse gas (GHG) Tailoring Rule which established a GHG emissions threshold for major sources under the prevention of significant deterioration (PSD) permitting program. IPL's December 18, 2014, response to Board questions indicated that the U.S. Supreme Court's ruling in June 2014 which partially invalidated the Tailoring Rule has no impact on IPL's requirements under the PSD program.

Thermal Discharge

Section 316(a) of the Federal Clean Water Act (CWA) requires the EPA to regulate thermal impacts of wastewater discharges from industrial facilities, including EGUs, to minimize adverse impacts to aquatic life. Temperature variance provisions are allowed if the permittee demonstrates protection and propagation of a balanced, indigenous population of shellfish, fish, and wildlife in the receiving water. As each EGU's National Pollutant Discharge Elimination System (NPDES) permit becomes subject to renewal, if thermal limits are not attainable, then thermal modeling studies are conducted and submitted to the IDNR for review.

² IUB staff notes that on April 15, 2014, the D.C. Circuit upheld MATS. On November 25, 2014, the U.S. Supreme Court announced that it will review the decision by the D.C. Circuit.

B. Emerging Environmental Regulation

IPL's EPB summarizes emerging air emissions and water compliance rules. The emerging air emission rules, which do not impact the 2015-2016 period plan, include the Clean Air Visibility Rule, Industrial Boiler and Process Heater MACT Standard, revisions to NAAQS, and regulatory actions intended to reduce GHG emissions. IPL's plan includes expenditures for activities in anticipation of emerging cooling water rules (316(b) of the CWA), Effluent Limitation Guidelines, and federal Coal Combustion Residuals rules. Appendix A contains detailed descriptions of these emerging regulations.

C. IPL's Budget

IPL's 2014 Plan Update proposes approximately \$123.0 million for ongoing environmental investments to existing coal-fueled power plants operated by IPL for 2015 through 2019. IPL's share is approximately \$100 million, with the other joint owner of Ottumwa Unit 1, MidAmerican, responsible for the remaining costs.³

IPL's share of proposed O&M expenses total [REDACTED] for 2015 through 2019. However, IPL seeks approval only for IPL's share of expenses scheduled to occur in the 2015-2016 timeframe, which total [REDACTED] in capital and [REDACTED] in O&M. The Plan update does not include IPL's ownership share of expenses at the Neal Generating Station or the Louisa Generating Station, both of which are operated by MidAmerican and addressed in Docket No. EPB-2014-0156.

IPL commented that its Plan Update meets the policy objectives outlined in Iowa Code § 476.6(21).⁴ The plan will reasonably achieve cost-effective compliance with current environmental compliance requirements and promulgated, but not yet effective environmental compliance requirements.

Status of IPL's 2012 Plan Update (pertaining to 2013-2014)

IPL commented that its 2012 Plan Update reflected the company's continued approach for compliance with CAIR or CSAPR (or any successor rule) and MATS for mercury and other hazardous air pollutants. The filing also detailed the company's approach on emerging water and ash rules. The Board approved the 2012 Plan Update on February 26, 2013.

³ IPL and MidAmerican Energy Company jointly own the Ottumwa Unit 1, with IPL operating the generating station.

⁴ IUB staff notes that after IPL's filing, Iowa Code § 476.6 was renumbered for the 2015 edition, and the relevant paragraph is now (20).

IPL reported the progress of specific activities at various IPL coal-fired generating stations. IPL commented that the projects are on schedule and within budget. Appendix B contains a brief description of the technologies referenced by IPL.

Burlington Unit 1:

The Activated Carbon Injection (ACI) system will be installed in 2014. When combined with Calcium Bromide and liquid flue gas conditioning, the system will obtain the mercury removal levels required by MATS prior to the rule's April 2015 compliance date. New cold end air heater baskets will be installed in 2014 to maximize heat efficiency and mercury collection.

Lansing Unit 4:

IPL plans to add a third layer of catalyst in 2014 to the Selective Catalytic Reduction (SCR) installation and replace an existing layer of catalyst in 2015. IPL will evaluate the SCR performance/ NO_x reduction and may replace additional catalyst layers between 2016 and 2019.

In IPL's response to Board questions, IPL explained that catalyst reactivity decreases over time and requires routine replacement. IPL provided the update that the third layer was purchased and installed in September 2014. IPL commented that its timing of installation of the third layer enabled the plant to extend the life expectancy of the installed/aging catalyst to the high-end of the manufacturer's estimated replacement window.

Construction of the Circulating Fluidized Bed (CFB) to reduce SO_2 emissions will start during the summer of 2014 and the project is expected to go into service in 2015.

IPL continues to evaluate energy efficiency projects (under the Comprehensive Asset Management Plan, or "CAMP") to off-set the negative impact of the emissions controls to plant efficiency. Project costs pertaining to Lansing Unit 4 are not included in this Plan Update.

Ottumwa Unit 1:

Fabrication and construction of the ACI system and pulse jet fabric filler (PJFF) baghouse (BH) will be completed in November 2014; following the tie-in outage completion, the start-up and commissioning will take place. The project will reduce mercury and particulate matter emissions, which will enable compliance with MATS.

Fabrication and construction of the spray dryer absorber (SDA) flue gas desulfurization technology will continue until November 2014; following tie-in

outage completion, start-up and commissioning will take place. The project will reduce SO₂ emissions and help IPL comply with CAIR requirements.

Installation of the Steam Turbine/Generator Upgrade Project ("CAMP") will be performed during the tie-in outage completion in November 2014. The project will improve the plant heat rate, plant output, and steam/generator reliability.

M.L. Kapp Unit 2:

IPL's 2012 Plan Update indicated that for certain units, the company would undertake an evaluation of precipitator improvements for PM emission reductions and install mercury emission reduction technologies, retire the unit, or fuel switch. Subsequently, IPL determined that fuel switching the M.L. Kapp Unit 2 to 100 percent natural gas was the most cost-effective option for the unit to attain MATS compliance.⁵ The unit currently has a capacity of 200 MW when running on coal and is also equipped to burn natural gas. After the fuel switch to natural gas in the second quarter of 2015, the unit will be limited to approximately 95 MW because of limited fuel availability.

In IPL's response to Board questions filed December 19, 2014, and IPL's Supplemental Response filed February 6, 2015, IPL stated that the reduced capacity at M.L. Kapp that would result from fuel switching was a consideration in the cost-effectiveness evaluation. IPL also considered the reduced capacity at the unit relative to IPL's overall capacity position. The generation verification test capacity of M.L. Kapp conducted in December 2014 demonstrated 98.6 MW (higher than the 95 MW previously reported), and IPL believes the unit can perform at a higher output level during the summer of 2015. Based upon final aggregation of its capacity position, IPL concluded that it has the resources to meet its 2015-2016 Planning Year capacity obligation. [REDACTED]

During a discussion between Alliant Energy and the Midcontinent Independent System Operator, Inc. (MISO) in January 2015, MISO advised that a reduction in capacity of M.L. Kapp necessitated an Attachment Y Notice, even though the unit will not be suspended for more than two months or retired.⁶ IPL submitted the Attachment Y Notice to MISO on January 30, 2015, and requested expedited review. MISO must determine if the generating unit is required for transmission system reliability and, if so, the unit may be designated a System Support Resource to remain operational (with the owner compensated for certain costs) until the reliability issues are otherwise alleviated.

⁵ IPL provided a summary of its cost-effective analysis in its response to Board questions.

⁶ IPL commented that MISO may view the reduction in capacity as the retirement or suspension of a portion of M.L. Kapp.

Prairie Creek Unit 3 and Prairie Creek Unit 4:

Upgrades to the existing precipitators were completed in late 2013 in order to accommodate the increased particle loading from the ACI systems and to lower the PM emission rates to achieve compliance with MATS. The ACI systems will be installed in 2014. When combined with Calcium Bromide and liquid flue gas conditioning, the systems will obtain the mercury removal levels required by MATS prior to the rule's April 2015 compliance date.

Development of IPL's 2014 Budget Plan (for 2015-2016)

IPL noted that it is not proposing any new, significant emission control projects in the 2014 Plan Update; IPL is implementing projects that were proposed and discussed as part of its strategic plan in previous Plan Update filings. IPL described actions to be taken at its coal-fired generation facilities based on known and prospective environmental compliance requirements, plus related costs and timing for each action during 2015-2019; however, IPL is requesting approval in this docket for the 2015-2016 time period only.

IPL commented that it routinely reviews compliance options and alternatives as it undertakes air emissions rules and water rule compliance implementation. IPL has developed its environmental compliance and balanced portfolio plans with future rule impacts in mind, providing flexibility to comply with a range of rule assumptions. IPL proactively manages the timing, cost, and customer rate impact of the actions it takes in the implementation of this strategy.

IPL continues to support and review findings from the collaborative research that the Electric Power Research Institute and other utility support organizations conduct with combustion and post-combustion emissions control technologies. Through its support and review of this research, IPL also obtains information on the actual performance of various technologies at utility-scale generating units.

In IPL's response to Board questions, IPL described Alliant Energy's⁷ process to select contractors associated with environmental emissions projects. Phase 1 is the prequalification phase, and Phase 2 involves a comprehensive RFP sent to the pre-qualified prospective bidders. All bid criteria and standards for scoring are determined before any bids are received, and bid response data is evaluated

IPL's long-term strategy in its Plan Updates uses a tiered structure with respect to its coal-fired generation facilities, which corresponds to various planning assumptions:

Tier I: Assumptions include, but are not limited to, implementation of full

⁷ Alliant Energy Corporation is the parent company of IPL.

controls for NO_x, SO₂, mercury, and PM, as well as consideration of efficiency upgrades to improve heat rate and lower emissions for these larger units. Fuel switching is less economic for these units because of the impact on plant efficiency and the possibility of added fuel cost following conversion from coal to natural gas. Tier I units are Ottumwa Unit 1 and Lansing Unit 4.

Tier II: Assumptions include, but are not limited to low-cost emissions control options or fuel switching to natural gas for these units which are smaller and generally less efficient than Tier I units. Tier II units are Burlington Unit 1, M.L. Kapp Generating Station Unit 2, and Prairie Creek Units 3 and 4.

Tier III: IPL no longer has any coal-fired Tier III units remaining in its generating fleet that are covered within this Plan Update. (The units were typically older, smaller, and less efficient.)

IPL's Plan Update covers known and prospective compliance requirements during 2015-2019, which include CAIR/CSAPR (NO_x and SO₂); MATS mercury, PM, HCl, and other HAPs; Sections 316(a) and 316(b) of the CWA and Effluent Limitation Guidelines; and the expected final Coal Combustions Residuals (CCR) rule.

IPL projects that implementation of its plan will decrease air emissions by the end of 2016 by the following amounts, using 2012 as the baseline year:

Nitrogen Oxide: [REDACTED]
Sulfur Dioxide: [REDACTED]
Mercury: [REDACTED]
Filterable particulate matter: [REDACTED]

NO_x Emission Reductions – Approach and Budget: No additional NO_x emission reductions are required for IPL to meet CAIR/CSAPR requirements at this time. IPL has significantly reduced NO_x emissions through previous installation of emission controls, unit retirement, and fuel switching. IPL anticipates additional NO_x emissions reductions as projects are completed: the SCR catalyst bed at Lansing Unit 4, the fuel switch to natural gas at M.L. Kapp 2, the minimal heat input increase at Ottumwa Unit 1, and the Selective Non-Catalytic Reduction (SNCR) coming online at the George Neal Unit 3 (operated and partly owned by MidAmerican).

IPL will incur limited capital expenditures associated with the operation of existing NO_x reduction technologies in 2015-2019, which will include replacement of SCR catalyst layers at Lansing Unit 4. IPL's projected O&M costs include chemical reagent and auxiliary power.

SO₂ Emission Reductions – Approach and Budget: IPL is not proposing any new SO₂ emission control projects and will continue to pursue the SO₂ compliance activities laid out in its previous Plan Update that was approved by the Board. The final aspect of IPL's SO₂ emission reduction plan is the completion and commissioning of the dry scrubbers for Ottumwa Unit 1, Lansing Unit 4, and George Neal Unit 3 (operated and partly owned by MidAmerican). Though the fuel switching project at M.L. Kapp Unit 2 is being done primarily to comply with MATS, it will also result in SO₂ emissions reductions.

The primary O&M costs are the cost of the lime reagent used as a consumable in the scrubbing process and the cost to dispose of the scrubbing by-products. IPL will use allocated, purchased, and banked emission allowances as needed to comply with CAIR/CSAPR.

Emission Allowance Management: At the time of IPL's Plan Update filing, CAIR was in place until the legal challenges to CSAPR were resolved. After the U.S. Supreme Court issued its decision to uphold CSAPR, IPL reiterated in its response to Board questions that it expects to receive sufficient NO_x and SO₂ allowances in its allocation from the EPA to comply with CSAPR requirements and, therefore, the U.S. Supreme Court's decision has no impact on this Plan Update. IPL will actively manage its allowances to ensure adequate allowances are available to support its ongoing generation options.

IPL noted

Mercury Emission Reductions – Approach and Budget: MATS requires unit-by-unit mercury emission rate reductions from existing units, or possible emission averaging of units at a common site. IPL's compliance approach to address mercury emission reduction requirements under MATS includes the operation of the powder activated carbon (PAC) injection at Lansing Unit 4 and Ottumwa Unit 1, the operation of ACI at Burlington Unit 1 and Prairie Creek Units 3 and 4, and the fuel switch M.L. Kapp Unit 2 to natural gas.

The capital expenditures are associated with the startup and commissioning of the mercury reduction technologies, which include requisite mercury monitoring and testing equipment at Ottumwa Unit 1. Cost estimates and schedules may change due to a variety of reasons, including outage schedules beyond the control of IPL, lessons learned at other generating stations, changing plant requirements, unidentified design issues, market conditions, changing

technologies, inflation, and changing regulatory requirements. Incremental O&M costs for mercury reduction include the cost of the sorbent, auxiliary power, compliance monitoring, and disposal of by-products.

PM Emission Reductions – Approach and Budget: IPL's compliance approach to address PM emission reduction requirements under MATS are to operate the existing BH at Lansing Unit 4, operate the BH at Ottumwa Unit 1 in concert with the SDA/PAC project, fuel switch M.L. Kapp Unit 2 to natural gas, and evaluate PM reductions as a result of recent electrostatic precipitator (ESP) upgrades at [REDACTED]. IPL's compliance approach will achieve the PM reductions required by MATS by the April 2015 compliance deadline.

The capital expenditures include completion of the Ottumwa Unit 1 BH and PM Continuous Emission Monitoring System (CEMS) installation (the data of which is used for reporting and demonstrating compliance with emissions limits). Cost estimates and schedules may change due to reasons similar to those listed under *Mercury Emissions Reductions - Approach and Budget*. Incremental O&M costs for PM control technologies include the cost for the flue gas conditioning agent, auxiliary power, and CEMS maintenance (calibration gases, replacement parts, and in some cases vendor support).

HCl Emission Reductions – Approach and Budget: It appears all IPL coal-fired units can meet the MATS limit for HCl with existing fuels and equipment, primarily because all IPL units combust sub-bituminous coal, which is low in chlorine. Data collected during testing also indicates that ACI, which is used to lower mercury emissions, also lowers HCl emissions. MATS allows units with a wet or dry flue gas desulfurization system (i.e., a scrubber) to meet alternative SO₂ limits in lieu of the HCl limits; Lansing Unit 4 and Ottumwa Unit 1 are anticipated to comply via the SO₂ limits.

While HCl emissions may decrease as a secondary impact of other emission reduction projects, IPL is not proposing any capital expenditures specific to reductions in HCl emissions. IPL's coal-fired units already comply with the MATS HCl limit. IPL will continue to combust primarily sub-bituminous coal and will evaluate HCl emissions after completion of emission control projects. IPL will incur O&M expenditures associated with HCl quarterly stack testing required at units that do not meet the alternative SO₂ limits.

Greenhouse Gas Emission (GHG) Reductions - Approach and Budget: IPL has generally incorporated risks resulting from potential future GHG rules, though they are very uncertain, into the approach it uses for selecting non-GHG emission control projects. Some emission control equipment can increase GHG emissions intensity through parasitic load and reduced unit performance. However, efficiency improvement projects, as an ancillary benefit, reduce plant GHG intensity. At this time, the majority of IPL's emission controls, compliance

approaches, and investments are not directly focused on GHG emissions compliance requirements. IPL's CAMP projects involve efficiency improvement of the energy production cycle so that the quantity of GHGs emitted per kWh generated is reduced.

With limited exception for turbine upgrades at the Ottumwa facility, IPL is not including costs of CAMP projects in the 2014 Plan Update, as settled in Docket No. EPB-2012-0150. Start-up and commissioning of the CAMP project at the Ottumwa facility will follow the tie-in outage completion in November 2014. IPL continues to evaluate efficiency improvement projects at Lansing Unit 4, including a turbine steam path redesign, but has not included the costs in this Plan Update.

IPL's Plan Update included a discussion of possible options to evaluate as GHG regulations emerge. The options include post-combustion CO₂ capture technologies, the addition of more natural gas-fired combined cycle generating capacity, the addition of renewable generating resources, and the reduction of energy consumption through energy efficiency programs.

Continuous Emissions Monitors: IPL includes O&M expenses for CEMS. CEMS captures certified emissions data from a generating facility that is used for reporting and demonstrating compliance with required emission limits for each facility's air permit. In IPL's response to Board questions, IPL indicated that the O&M costs for CEMS vary among generating stations because stations may have different equipment configurations. Furthermore, the O&M costs can vary from year to year for the same generating station because of differences in compliance testing requirements or equipment maintenance and/or because of a cost escalation factor used to represent projected cost increases over time. The O&M costs include calibration gases, replacement parts, and in some cases, vendor support.

Federal Clean Water Act Compliance – Approach and Budget: Several rules will continue to evolve, and IPL will continue to evaluate the impact of rule outcomes on its generating plants.

Section 316(a): Thermal Water Quality Standards. IPL's generating plants are receiving renewal wastewater discharge permits (NPDES) from the IDNR which contain new thermal discharge water quality limits. If thermal limits are not attainable, thermal modeling studies are conducted and submitted to the IDNR for review as part of the 316(a) variance application. IPL is obtaining variances for M.L. Kapp and Prairie Creek Generating Stations. IPL expects that modeling and variances will be necessary for the Burlington, Dubuque, and Lansing facilities. The IDNR may not grant a thermal variance for a given facility.

IPL is not requesting approval in this 2014 Plan Update for

capital expenditures associated specifically with Section 316(a) activities. IPL is seeking approval for O&M expenses related to compliance studies and variance applications.

Section 316(b): Cooling Water Intake Standards. The EPA issued a revised proposed rule in 2011 and is expected to publish a final rule in 2014. Under the proposed rule, facilities can install technology to meet the impingement standard or reduce the cooling water intake velocity below a set standard. The IDNR will determine the best approach to comply with the entrainment standard. The generating facilities in this Plan Update that may be impacted by the revised rule are Burlington, M.L. Kapp, Ottumwa, Lansing, and Prairie Creek. IPL anticipates commencing field studies to prepare for the final rule starting in 2014. IPL requests approval for estimated capital costs that would likely be required for affected facilities (though IDNR might require cooling towers as the best technology available, IPL has not included them in its compliance plan) and for O&M expenses related to compliance studies, variance applications, and maintenance of impingement and entrainment controls. After studies are completed, variance applications are submitted and IPL engages in discussions with IDNR, IPL will evaluate potential outcomes and revise its compliance plan accordingly.

The final Effluent Limitation Guidelines (ELGs) will have varying impacts on IPL generating facilities. IPL's 2014 Plan Update addresses the management of water discharges from ash ponds at its coal-fired facilities. Information from the EPA suggests that "no discharge" from ash ponds may be designated as the standard for best available technology, which suggests that closing ash ponds and converting them to "dry" or circulating ash management systems may be necessary for compliance. IPL provided estimated capital costs associated with projects that could likely be required for affected facilities; however, only one project is included within the 2015-2016 period. IPL will evaluate the final ELGs when they are published and adjust its compliance plan accordingly. IPL is not seeking approval for O&M expenses related to compliance with the ELGs because IPL cannot reasonably estimate these costs at this time.

The National Pollutant Discharge Elimination System (NPDES) permit program controls water pollution by regulating point sources (such as pipes or man-made ditches) that discharge pollutants into waters. Updated changes to water quality standards are incorporated into NPDES permits when they come due for renewal, typically a five-year cycle. Prairie Creek received its renewal permit which requires the facility to meet revised water quality standards, specifically for aluminum and zinc. The conversion of the Prairie Creek ash handling system was included in the compliance strategy for the ELGs and is a solution to current and long-term compliance with wastewater discharge requirements associated with the wet ash handling process and would allow the facility to meet the new NPDES requirements. (IPL noted that, though it cited the Prairie Creek project twice, it only accounted for the project cost once in its budget.)

Coal Combustion Residue – Approach and Budget: IPL has developed a compliance plan based on the assumption that the final rule will continue to regulate CCR as a non-hazardous waste. IPL's compliance plan for the ELGs will also allow IPL to comply with the proposed CCR rule. In addition, IPL plans to bring all CCR landfills up to minimum engineering standards to comply with the rule. IPL has included capital costs for CCR compliance at its coal-fired units and has only included O&M expenses related to interim landfill closure at the Ottumwa-Midland Landfill because IPL cannot reasonably estimate other O&M expenses related to CCR compliance at this time.

Other Plan Considerations

Economic Development: According to IPL, reducing emissions can have both direct and indirect economic development benefits for Iowa. Reducing emissions from electric generating facilities allows for increased emissions from other industrial processes. More importantly, reduced air emissions will maximize the opportunity for Iowa to avoid nonattainment⁸ status. Reducing emissions allows IPL to continue to operate the affected units and preserve tax revenues in communities where the units are located. Finally, the installation of controls creates jobs and demand for associated services. IPL recognizes that increased customer rates resulting from emission controls can have an effect on economic development as well and strives to manage its compliance plan in a cost-effective manner.

Generation and Transmission System Reliability: Planned plant outages are reviewed and coordinated with MISO, which assures system reliability is maintained during outages. IPL plans to stagger unit outages as much as possible in terms of location and timing. Emission control installations requiring long outages will have schedules coordinated as much as possible with pre-planned, major outages, and IPL works with MISO to ensure that such outages are scheduled appropriately; units with such projects include Ottumwa and Lansing. Projects at IPL's other affected units will be completed within normal maintenance outages.

IV. IDNR Testimony

On August 19, 2014, the IDNR filed testimony stating it had reviewed IPL's Plan Update and determined that, in conjunction with continued compliance with all permitting requirements and permit conditions, the filing meets applicable state environmental requirements for regulated emissions.

⁸ IPL indicated that the CAA defines a "nonattainment area" as a locality where air pollution levels persistently exceed NAAQS, or that contributes through emissions transport to ambient air quality in a nearby area that fails to meet standards.

IDNR commented that the Plan Update accurately reflects the current status of federal requirements at the time of IPL's filing. IDNR provided updates on a few environmental regulations since IPL's filing:

The U.S. Supreme Court issued a ruling to uphold CSAPR.

The EPA issued a pre-publication release of the federal register notice for the Cooling Water Intake Structures Rulemaking under Section 316(b) of the CWA. The pre-publication release no longer includes the eight year deadline for compliance, and discretion is given to the permitting authority (IDNR) to determine the length of schedule necessary for compliance with the standards.

The EPA proposed the rule making known as the Data Requirements Rule for the 1-Hour SO₂ NAAQS, which includes an option for states to use modeling, monitoring or a combination to characterize the impacts of SO₂ air emissions. The proposed rule would require IDNR to submit its planned approach and a list of sources to be evaluated by January 15, 2016.

V. Joint Motion and Settlement Agreement

The January 16, 2015, Joint Motion and Settlement Agreement (Settlement) filed by IPL, Consumer Advocate and the Environmental Intervenors states that the parties agree and stipulate that IPL's 2014 Plan Update, as amended, complies with Iowa Code § 476.6(21)⁹ and requests that the Board immediately issue an order approving the Settlement in its entirety without condition or modification. The term of the Settlement commences from the date of its approval by the Board through and including December 31, 2016.

The Settlement provides that IPL will file Periodic Reports with the IUB every 12 months. The first report will be filed by April 1, 2015, and a Periodic Report will not be required in 2016 so long as IPL includes an update of its 2015-2016 EPB in its 2016 Plan Update. The Periodic Reports will follow a format that:

- 1) summarizes the actions taken by IPL to implement its plan and budget,
- 2) explains how IPL's actions are reasonable and prudent, and
- 3) shows how IPL minimizes costs.

Parties will attempt to resolve any implementation issues or disputes before seeking relief from the Board. The Settlement also provides that the parties will meet at least twice a year to exchange information on potential changes in regulations, including the EPA's proposed and finalized 111(d) rules, and potential emissions control measures. IPL will use reasonable efforts to inform the parties between meetings of any regulatory changes that may have material effect on IPL's emission control strategy.

⁹ IUB staff notes that Iowa Code § 476.6 was renumbered for the 2015 edition, and the relevant paragraph is now (20).

The Settlement specifies that IPL will not sell SO₂ allowances in the near term for the purpose of accelerating recovery of the costs from customers; the SO₂ emission allowance costs resulting from the normal course of operations will flow through the energy adjustment clause via routine accounting. IPL may elect to raise the issue of any remaining unrecovered balance in the anticipated 2017 IPL retail electric base rate case. IPL will undertake appropriate cost mitigation actions and report on the efforts to minimize or eliminate its SO₂ allowance obligations in the Periodic Reports and periodic meetings.

The parties agree that routine O&M expenses unrelated to emissions control shall not be eligible for inclusion in any Plan Update or any periodic update. Nothing in the agreement shall impact IDNR's responsibilities under § 476.6.

VI. Analysis

Iowa Code § 476.6(20)"a" provides that the Board shall issue an order approving or rejecting a plan, update, or budget within 180 days after the public utility's filing is deemed complete. Staff recommends that the Board deem IPL's 2014 Plan Update, as supplemented by its response to Board questions filed on December 18, 2014, and the additional information filed on February 6, 2015, complete.

Concurrent with deeming the filing complete, staff recommends that the Board find IPL's 2014 Plan Update and supplemental information complies with the requirements of Iowa Code § 476.6(20) by addressing cost-effectiveness, environmental requirements, economic development, and the reliability of the electric generation and transmission system.

The majority of air emission control projects in IPL's 2014 Plan Update involve the completion of projects in early 2015 which were approved in prior Plan Updates. The SCR at Lansing Unit 4 went into service in July 2010. IPL indicated in prior Plan Updates that the SCR would require periodic capital expenditures for catalyst replacement. IPL's 2014 Plan Update includes replacement of one of the catalyst layers in 2015 (following installation of a third layer of catalyst in 2014), since the original two catalyst layers have shown signs of routine deactivation.

Though IPL had not specifically proposed the fuel switching project for M.L. Kapp in its 2012 Plan Update, IPL's decision to switch fuels is consistent with its long-term strategy identified in prior Plan Updates regarding Tier II units. IPL indicated in its Periodic Report filed October 1, 2013, that testing had been performed to evaluate M.L. Kapp's capabilities and performance on natural gas. IPL's response to Board questions for the 2014 Plan Update provided an analysis of the cost effectiveness of four options to address MATS compliance at M.L. Kapp, and IPL chose the most cost-effective option. The fuel switch to natural

gas will reduce NO_x and SO₂ emissions in IPL's generation fleet, in addition to achieving MATS compliance for the unit.

IPL had anticipated that the M.L. Kapp fuel-switching project would be completed by the second quarter of 2015, until MISO recommended that IPL file the Attachment Y Notice. MATS requires compliance by April 16, 2015; however, IDNR may grant a one-year extension for: 1) units that are needed to assure power reliability, 2) units repowering to gas, or 3) units that need additional time to install air pollution control technology.

The studies, variance applications, and other actions that IPL identified as necessary to comply with current and emerging water rules are generally similar to those in its 2012 Plan Update, with updated schedules of activities. IPL indicated in its Periodic Report filed on October 1, 2013, that most of the proposed activities were postponed due to IDNR's delay in issuing facility wastewater permits under Section 316(a), the delay in the EPA issuing a final 316(b) rule, and the one-year delay of the EPA issuing its proposed ELGs.

IPL indicated that its compliance plan assumption for the final CCR rule is that the EPA will regulate CCR as a non-hazardous waste. Staff notes that IPL's plan assumption is consistent with the final rule signed by the EPA Administrator on December 19, 2014, and submitted for publication in the Federal Register.

Staff believes that the Settlement is reasonable. The Periodic Reports that IPL is to file between biennial Plan Updates are to explain how IPL's actions are reasonable and how IPL minimizes cost incurrence as the company implements its plan and budget. The Periodic Reports will include actions of IPL to minimize or eliminate its SO₂ allowance obligations. The parties will exchange information on potential changes in state and federal environmental regulations and potential emissions control measures during the periodic meetings.

Staff recommends that the Board, when approving IPL's 2014 Plan Update, specify that IPL's Periodic Reports, in addition to the information specified in the settlement, include an update on the status of the fuel switching project at M.L. Kapp, and an explanation of whether or not the unit will achieve compliance with MATS by its compliance deadline.

VII. Recommendation

Staff believes IPL's 2014 Plan Update and the Joint Motion and Settlement Agreement adequately address the issues of cost-effectiveness, environmental requirements, economic development, and the reliability of the electric generation and transmission system.

Staff recommends that the Board direct General Counsel to draft for Board review an order: 1) finding IPL's 2014 Emissions Plan and Budget to be

complete, and 2) approving the 2014 Emissions Plan and Budget and granting the Joint Motion and Settlement Agreement filed by Interstate Power and Light Company, the Consumer Advocate Division of the Department of Justice, and the Environmental Law & Policy Center and the Iowa Environmental Council.

RECOMMENDATION APPROVED

IOWA UTILITIES BOARD

/es

<u>/s/ Elizabeth S. Jacobs</u>	<u>3-12-15</u>
	Date
<u>/s/ Nick Wagner</u>	<u>3/9/15</u>
	Date
<u>/s/ Sheila K. Tipton</u>	<u>3-5-2015</u>
	Date

Appendix A

Emerging Environmental Regulations

Clean Air Visibility Rule (CAVR)

The EPA issued the CAVR, also referred to as the Regional Haze Rule, in 1999 to address visibility impairment in designated national parks and wilderness areas through regulating haze-forming pollutants (SO₂, NO_x and PM) at a regional level. In 2005, the EPA finalized amendments to the 1999 CAVR, which require regulated EGUs to install best available retrofit technology (BART). IPL-operated units eligible to be regulated include Burlington Unit 1, Lansing Unit 4, M.L. Kapp Unit 2, and Prairie Creek Unit 4. However, BART requirements could be deemed to be met through compliance with CAIR requirements for NO_x and SO₂, a "CAIR equals BART" determination.

In March 2008, the IDNR submitted a CAVR state implementation plan (SIP) to the EPA that recommended no additional BART or regional haze controls for EGUs beyond the applicable CAIR requirements. After CAIR was remanded to the EPA without vacatur by the D.C. Circuit, the EPA issued a disapproval in 2012 for the portion of Iowa's CAVR plan that relied on CAIR to satisfy the CAVR BART requirements. In June 2012, the EPA issued a federal implementation plan (FIP) specifying that the state's compliance with CSAPR would satisfy the CAVR BART requirements. However, the D.C. Circuit Court vacated CSAPR in August 2012. In addition, several groups have legally challenged the EPA's reliance on CSAPR to satisfy the CAVR BART requirements. At the time of IPL's Plan Update filing, it was unknown whether BART could be fulfilled by CAIR, CSAPR, or another future transport rule.

Industrial Boiler and Process Heater Maximum Achievable Control Technology (MACT) Rule

In January 2013, the EPA published a reconsideration rule that revised the Industrial Boiler and Process Heater MACT regulation, with a compliance deadline of January 2016. Generating units that are subject to MATS are not subject to this MACT regulation; all of IPL's electric generation coal fleet are subject to the MATS rule. However, there are certain auxiliary boilers and process heaters at these facilities which will be subject to work practice requirements to conduct periodic combustion tune-ups under the MACT rule. In August 2013, the EPA granted several petitions for another reconsideration on limited aspects of the regulation and expected to issue a rule by the end of 2014. IPL does not expect significant financial investments for compliance; however, this assessment will be updated in future EPB submissions due to the ongoing reconsideration of certain issues for this rule.

NAAQS Revisions

The CAA requires the EPA to review the NAAQS every five years to ensure the standards protect human health and the environment:

Nitrogen Oxides (NO_x): The EPA issued a final rule in 2010 to strengthen the primary NAAQS for NO_x, as measured by NO₂. The final rule maintained the annual standard of 53 parts per billion (ppb) and established a new one-hour standard of 100 ppb. The EPA is expected to re-evaluate NO₂ NAAQS designations in 2016 based on expanded ambient monitoring data.

SO₂: In June 2010, the EPA issued a final rule that established a new one-hour standard for SO₂ at a level of 75 ppb. In 2013, the EPA finalized nonattainment designations that included one area in Iowa, a part of Muscatine County. There are no IPL generating facilities located in the nonattainment area. The EPA plans to re-evaluate SO₂ nonattainment designations in the future based on modeling or monitoring data.

Ozone NAAQS: In 2008, the EPA issued a final rule to revise the primary and secondary NAAQS for ozone from 84 ppb to 75 ppb. In 2012, the EPA finalized nonattainment areas for the 2008 ozone NAAQS, which included no areas in Iowa. At the time of IPL's Plan Update filing, the EPA had indicated that it intends to finish the policy assessment related to the ozone NAAQS review process during the summer of 2014 and potentially propose a revised ozone standard thereafter.¹⁰

Fine Particle Matter NAAQS: In December 2012 the EPA issued a final rule to revise the primary NAAQS for PM_{2.5} from 15 micrograms per cubic meter to 12 micrograms per cubic meter. In 2013, the IDNR recommended that the EPA designate that all Iowa counties meet the standard, with the exception of a portion of Muscatine County. There are no IPL generating facilities located in that portion of the county.

Greenhouse Gases (GHG) – New Source Performance Standards

In 2009, the EPA issued a finding that GHG emissions contribute to climate change and, therefore, threaten public health and welfare. The finding enabled the EPA to issue rules to report and regulate GHG emissions under the CAA. In December 2010, the EPA announced the future issuance of GHG standards established as New Source Performance Standards (NSPS) for new and existing fossil-fueled EGUs under CAA Section 111(b) and 111(d), respectively. Under Section 111(b), new source requirements are generally established as numerical

¹⁰ IUB staff notes that on December 17, 2014, the EPA published in the Federal Register a proposed rule to strength the NAAQS to a standard of 65 to 70 ppb, with a proposed implementation period starting in 2020. Written comments on the proposed rule are due March 17, 2015.

emissions limitations, i.e., a rate-based standard.¹¹ Under Section 111(d), the EPA's role is to issue the "emissions guidelines" that are used to develop state-specific plans to achieve the required emissions reductions for existing sources.

In June 2013, President Obama announced a Climate Action Plan and issued a Presidential Memorandum that directed the EPA to work expeditiously to complete the GHG reduction standards for CO₂ emissions from EGUs at power plants:

Section 111(b) of the CAA: In January 2014, the EPA republished proposed NSPS under Section 111(b) of the CAA for CO₂ emissions from new EGUs greater than 25 MW; there is no established date for the EPA to issue the final Section 111(b) rulemaking. The EPA has chosen not to propose standards as part of this rulemaking to regulate CO₂ emissions from modified or reconstructed fossil-fueled EGUs at this time.¹² IPL noted that its proposed plans for the Marshalltown Generating Station includes the latest combustion turbine technology and will be designed to comply with the EPA's proposed NSPS CO₂ emissions limit for new electric generating units. At this time, IPL does not have plans to build any new coal-fired EGUs that would be subject to this NSPS rule.

Section 111(d) of the CAA: The proposed rule that is to be issued by the EPA in June 2014 is expected to include emission guidelines that states must use to develop plans for existing EGU GHG reductions including CO₂ emissions. IPL will continue to monitor the EPA's actions and participate in related rulemaking discussions with IDNR, the Board, and other agencies. At the time of IPL's Plan Update filing, the implications of the yet-to-be-proposed rules were highly uncertain, and legal challenges and litigation may add to the uncertainty. IPL will provide updates to its EPB filing as part of its periodic reporting as the issue further develops.¹³

Cooling Water Intake

Section 316(b) of the CWA requires that NPDES permits for facilities with cooling water intake structures ensure that the location, design, construction, and capacity of the structures reflect the "best technology available" or "BTA" to minimize harmful impacts to fish and other aquatic life. The EPA's rules would involve national performance standards to reduce the mortality of fish and shellfish caused by entrainment and impingement. Entrainment occurs when organisms are drawn into the facility; as the organisms pass through the plant,

¹¹ IUB staff notes that in March 2012, the EPA issued proposed NSPS for new fossil-fueled EGUs; the EPA received public comment but never finalized the proposed rules.

¹² IUB staff notes that in June 2014, the EPA proposed standards of performance for emissions of greenhouse gases from affected modified and reconstructed fossil fuel-fired units.

¹³ IUB staff notes that 111(d) proposed rules were published in the Federal Register on June 18, 2014, and the comment period was extended to December 1, 2014.

they are subjected to numerous sources of damage. Impingement occurs when fish and other organisms are trapped against screens when water is drawn into the system; the fish may suffocate or suffer damage because the water current prevents gill covers from opening. The EPA's rules would require existing power plants to demonstrate how these sites currently meet or will meet national performance standards.

Following a 2007 court opinion that invalidated aspects of the regulation, the EPA suspended the Section 316(b) regulation. In 2009, the U.S. Supreme Court granted the EPA authority to use a cost-benefit analysis when setting technology-based requirements under Section 316(b). In April 2011, the EPA issued a revised proposed Section 316(b) rule which would require large steam EGUs that withdraw greater than two million gallons of cooling water per day to meet both impingement and entrainment standards. At the time of IPL's Plan Update filing, it was anticipated that a final rule would be issued in April 2014.¹⁴ Final compliance will be required within eight years of the effective date of the final rule. However, studies and interim compliance requirements must be initiated within six months after the final rule is promulgated and, therefore, IPL anticipates commencing field studies starting in 2014.

The IDNR will be responsible for determining the best compliance approach for the entrainment standard, including consideration of costs and social benefits.¹⁵ IPL has identified seven facilities that may be impacted by the revised rule: Burlington, Dubuque, Fox Lake, Lansing, M.L. Kapp, Ottumwa, and Prairie Creek.

Effluent Limitation Guidelines (ELGs)

The EPA last updated the relevant guidelines for wastewater effluent discharges in 1982. In 2010, the EPA completed an Information Collection Request to consider various wastewater sources and levels of pollutants in these discharges, such as metals, total dissolved solids and total suspended solids. Proposed rule changes were issued in June 2013 and a final rule was anticipated in May 2014; however, the EPA announced that it would not be able to meet the May 2014 deadline.

IPL commented that the EPA rule will likely target ash management and wet scrubbers, and new limits are likely for seven wastewater discharges, four of which would impact IPL: wet fly ash transport water, bottom ash transport water, landfill and surface impoundment leachate, and chemical and non-chemical metal cleaning wastewater. Best Available Technology (BAT) is likely to be

¹⁴ IUB staff notes that the EPA finalized the 316(b) rule on May 19, 2014. The rule sets a national standard based on BTA and offers seven compliance alternatives.

¹⁵ IDNR's testimony provided the update that although the EPA expects it will take eight years for compliance, discretion is given to the permitting authority (IDNR) to determine the length of schedule necessary for compliance.

required and information from the EPA suggests that "no discharge" may be BAT, which suggests that closing ash ponds and converting to "dry" or circulating ash management systems may be necessary for compliance. Additionally, it appears that new ELGs limits would have to be met before wastewaters are co-mingled. As IDNR continues to adopt more stringent water quality standards, IPL anticipates that measures implemented for compliance with the EPA's final ELGs and CCR regulations (see below) will also address the requirements for the IDNR's future revisions to water quality standards.

Federal Coal Combustion Residuals (CCR) Rules

Since 1980, CCRs have been designated as a non-hazardous waste under the Resource Conservation and Recovery Act (RCRA) until further study could be completed by the EPA. CCR is what remains after the direct combustion of coal in power plants, and IPL identified three types: fly ash (collected by emissions controls), bottom ash (collected in the bottom of boilers), and boiler slag (coarser than bottom ash and also collected in the bottom of boilers). In 2000, the EPA noted that national regulations for CCRs under the "non-hazardous waste" section of RCRA were appropriate when deposited in landfills or surface impoundments. Following the release of 1.1 billion gallons of coal ash slurry from a coal ash impoundment pond at the Tennessee Valley Authority's plant in December 2008, the EPA declared its intent to move forward with coal ash regulations.

In June 2010, the EPA released a proposed rule with two alternatives. One option would regulate CCRs as a hazardous waste when they are destined for disposal, but continue to allow beneficial uses as a non-hazardous material. The other option would regulate them as non-hazardous for all applications, but create new national standards for CCR management. Both options would require current surface impoundments to either meet more stringent regulatory requirements or to close. If coal ash is managed as a hazardous waste, a number of new hazardous waste landfills would be needed in Iowa. Currently, there are no such landfills in the state. IPL has eight current or former coal EGUs with one or more ash surface impoundments, one facility with a concrete ash collection basin, and two active CCR landfills. All will be subject to the final rule, which is anticipated to be issued in December 2014. Most provisions of the new rule will be effective in Iowa six months after the rule is final, with a five-year period to close or upgrade ash surface impoundments.¹⁶

¹⁶ IUB staff notes that on December 19, 2014, the EPA announced that the final rule would treat coal ash as a solid waste, not as a hazardous waste. The rule will become effective six months after publication in the Federal Register.

Appendix B

Emission Control Technologies and Alternatives, and Water Compliance Technologies

Circulating Fluidized Bed Scrubbers (CFB, or Dry Scrubbers) use lime, introduced as a dry powder, to react with SO₂. Fewer moving parts and more efficient use of lime result in higher reliability and lower operating costs compared to Spray Dryer Absorbers (SDA). Dry scrubbers also remove 95 percent or more of SO₂. CFB is a newer technology in the U.S. than the SDA.

Continuous Emission Monitors (CEMS) capture certified emissions data from the generating facility that is used for reporting and demonstrating compliance with required emission limits for each facility's air permit.

Electrostatic Precipitators (ESPs) capture solid particles that respond to static charge and are used to capture PM_{2.5}.

Fabric Filters (Baghouses) are another established method for capturing particulate matter (PM). They are often installed along with SO₂ removal technologies and considered Best Available Control Technology (BACT). The capital and O&M costs for baghouses are typically higher than ESPs, but the baghouse captures condensable PM and very fine particles, which are not captured by an ESP.

Powdered Activated Carbon Injection (PAC or ACI) removes mercury by injecting a powdered, activated carbon compound into the flue gas, typically upstream of a PM collection device like a baghouse.

Post-Combustion NO_x Emissions Control Technologies include:

Selective Non-Catalytic Reduction (SNCR): Uses a reagent, such as urea, as a reducing agent to convert NO_x to nitrogen and water without the use of a catalyst; less effective on large boilers because of difficulty distributing the reagent into large boiler cross-sections.

Selective Catalytic Reduction (SCR): Uses a reagent, such as urea or ammonia, as a reducing agent to convert NO_x to nitrogen and water with the use of a catalyst.

Spray Dryer Absorbers (SDA, or Semi-Dry Scrubbers) inject a lime slurry into the flue gas stream upstream of a baghouse to remove more than 90 percent of SO₂ emissions.

Environmental Dispatch is available to IPL within the MISO power market to achieve a specified amount of one or more types of emissions. Environmental

dispatch increases the use of lower-emitting units and decreases the use of higher-emitting units for energy production, regardless of the increased incremental cost of doing so. IPL does not regard environmental dispatch as a long-term, least-cost alternative and would use it only on a short-term basis to compensate for other specific operational constraints.

Fuel Switching can reduce fuel-related emissions, such as SO₂, mercury, CO₂ and the fuel-related component of NO_x emissions. Switching from coal to natural gas would greatly reduce SO₂, NO_x, and mercury emissions and reduce CO₂ emissions by approximately 50 percent.

Increased Plant Thermal Efficiency is one tactic for reducing GHG emissions. Optimizing plant design and operational procedures to increase thermal efficiency reduces the amount of fuel combusted to produce a given quantity of electricity. For example, a turbine steam path redesign replaces a combination of the existing low pressure, intermediate pressure, or high pressure steam turbine components with a design providing higher efficiency. Referred to in IPL's plan update as the Comprehensive Asset Management Program (CAMP).

Post-combustion CO₂ capture removes CO₂ from the flue gas after the fuel is burned, but prior to the flue gas exiting the plant through the stack. Component technologies have been employed in industrial processes for many years. The key technological challenge for widespread deployment within the power generation industry is the integration of component technologies into successful large-scale demonstration projects.

Replacing Existing Generating Units with New Generating Units is not a reasonable or prudent strategy for all of IPL's existing baseload coal-fired units that may require emission controls. For smaller, intermediate-load units, IPL will continue to consider replacement with capacity and energy from new units or other sources. Keeping existing generating units in service allows IPL to maintain a balanced generation fleet and fuels portfolio for the benefit of its customers.

Use of the Emissions Allowance Market to comply with CAIR or CSAPR is a viable compliance alternative for NO_x and SO₂. The decision to use allowance purchases for compliance rather than installing emission controls is driven by a number of technological, economic, and administrative factors.

The following technologies are options for complying with 316(b) impingement and entrainment rules:

Wedge-wire screens are bullet-shaped devices that allow water to be withdrawn from a river, lake or stream through small diameter holes (or slots) in the screen. This reduces the velocity of cooling water intake withdrawals at a power plant, resulting in less entrainment and impingement of fish and other aquatic life.

Barrier nets are large mesh nets located up and downstream of the plant's water intake structure that provide reduced velocity across the net, thereby limiting impingement and entrainment. Due to debris present in nearly all water sources, barrier nets are prone to high maintenance.

Travelling screens can be retrofitted with fine mesh screens equipped with wash and fish return systems.