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VIA FEDERAL EXPRESS AND ELECTRONIC MAIL

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RE: Additional Information and Supplementation in Support of Request for Partial Reconsideration and Stay of EPA's Final Rule titled "Federal Implementation Plans to Reduce Interstate Transport of Fine Particulate Matter and Ozone in 27 States" signed July 6, 2011 (Docket No. EPA-HQ-OAR-2009-0491); 76 Fed. Reg. 48,208 (Aug. 8, 2011)

Dear Administrator Jackson and Assistant Administrator McCarthy:

Please accept this letter and enclosure as additional information and supplementation in support of the request that Luminant¹ submitted to you on August 5, 2011, to reconsider and stay the U.S. Environmental Protection Agency's ("EPA") Final Transport Rule signed on July 6, 2011. The rule has since been published in the *Federal Register*. 76 Fed. Reg. 48,208 (Aug. 8, 2011).

¹ The request was submitted by Luminant Generation Company LLC, Sandow Power Company LLC, Big Brown Power Company LLC, Oak Grove Management Company LLC, Luminant Mining Company LLC, Big Brown Lignite Company LLC, Luminant Big Brown Mining Company LLC, and Oak Grove Mining Company LLC. Two additional Luminant entities—Luminant Holding Company LLC and Luminant Energy Company LLC—hereby join in the initial request and this supplementation. All of these entities are collectively referred to here as "Luminant."

As noted in the request, Luminant has continued its review and analysis of the Final Transport Rule and related docket materials posted by EPA after it issued the final rule. Other entities, including the Electric Reliability Council of Texas ("ERCOT"), have conducted further analyses of the rule and its impacts as well. The purpose of this letter is to provide EPA with the details of those additional available analyses, which further support the relief requested by Luminant and underscore the harm that will occur if EPA does not reconsider and stay the rule as to Texas.

ERCOT's Analysis Confirms Reliability Impacts. Luminant's concerns about the impact of the Final Transport Rule on reliability in Texas have been confirmed by ERCOT, the independent system operator charged by law to ensure the reliability of electricity supply in Texas, and by the State of Texas in its Petition for Reconsideration and Stay, submitted to EPA on September 8, 2011. At the request of the Public Utility Commission of Texas, ERCOT evaluated the impacts of the Final Transport Rule on the reliability of the ERCOT grid. ERCOT's assessment and conclusions are contained in a report issued September 1, 2011, a copy of which is enclosed for inclusion in the record. *See* ERCOT, *Impacts of the Cross-State Air Pollution Rule on the ERCOT System* (Sept. 1, 2011) (Exh. 15). ERCOT has concluded that, even under the "best case" scenario, the Final Transport Rule will result in reduced generating capacity of approximately 3,000 megawatts (MW) during the off-peak months of March, April, October, and November, and 1,200-1,400 MW during the other months of the year, including the peak load months of June, July, and August. *Id.* at 4. ERCOT concludes that "had this incremental reduction been in place in 2011, ERCOT would have experienced rotating outages during days in August." *Id.* at 5. Further, ERCOT's assessment underscores the need for a stay of the impending compliance deadline by concluding that the "truncated period" provided by EPA for compliance provides "no realistic opportunity to take steps that could even partially mitigate the substantial losses of available operating capacity." *Id.* at i.

The New Seasonal NOx Budget for Texas is Flawed Like the Annual Budget. Luminant's further analysis of EPA's final Texas budget for seasonal NOx, and its final rationale for including Texas in the seasonal NOx program, raises significant additional concerns beyond those raised by Luminant in its prior comments that could not have been addressed during the public comment period.² In the final rule, EPA has substantially and unexpectedly lowered the seasonal NOx budget for Texas, and Luminant's units in particular, in a manner that diverges from the agency's approach in the proposed rule. From the proposed to final rule, EPA

² Luminant submitted comments on the seasonal NOx budget proposed for Texas and Luminant's units. Among other things, Luminant commented that the alleged linkage between Texas and Baton Rouge was in error because Baton Rouge was already in attainment; EPA's compliance deadline was unreasonable; and EPA must give the State of Texas the first opportunity to address alleged downwind contribution before EPA issues a Federal Implementation Plan. Comments of Luminant, Document EPA-HQ-OAR-2009-0491-2729 at 6-8 (submitted Oct. 1, 2010). These errors not only persist with the final rule, but have been exacerbated by the final rule due to the significant changes made by EPA as discussed herein.

drastically reduced the seasonal NO_x budget for Texas from 75,574 tons to 63,043 tons—a 16.5% reduction. *Compare* 76 Fed. Reg. at 48,236 with 75 Fed. Reg. 45,210, 45,291 (Aug. 2, 2010). As to the allowances allocated to Luminant's units in particular, the seasonal NO_x budget has been reduced even more severely from 19,520 tons to 14,891 tons—a 23.7% reduction. This final allocation to Luminant is not simply a change in the numbers—it is a qualitatively different compliance obligation than that proposed by EPA, and it suffers from several critical flaws.

First, in the final rule, EPA claims to have established the new seasonal NO_x limitations based on “all feasible 2012 reductions up to a threshold of . . . \$500/ton for ozone-season NO_x.” 76 Fed. Reg. at 48,252. EPA asserts that “[t]hese cost per ton levels do not precipitate advanced post-combustion control installation in 2012 (as EPA acknowledges that such installations are not feasible by 2012)[.]” *Id.* Instead, EPA claims that compliance in 2012 can be met with reductions from “operating existing controls, installing combustion controls, fuel switching, and increased dispatch of lower-emitting generation.” *Id.* In its request for reconsideration, Luminant explained why these compliance options do not work for the annual SO₂ and NO_x emission limitations that must be met in 2012.

The same is true for the new, more restrictive seasonal ozone NO_x limitations revealed for the first time in the final rule. EPA has allocated Luminant's EGUs only 14,891 tons of seasonal NO_x. Luminant would have been able to meet the seasonal NO_x allocation that EPA originally proposed by May 2012 without installing advanced post-combustion controls, but it cannot meet the allocation in the final rule without idling generating units. Luminant has already achieved significant NO_x reductions over prior years (73% reduction from 1997 levels) by installing combustion controls such as low NO_x burners, installing post-combustion controls such as selective catalytic reduction systems (SCRs), and taking other measures. Luminant's units cannot reduce further down to 14,891 tons using the compliance options assumed by EPA. The new ozone limit requires Luminant to achieve approximately 4,600 tons of additional seasonal NO_x reductions. Only about 600 tons of further reductions can be achieved by operating existing SCRs. As ERCOT explained for Texas sources generally, “[m]ost of the low cost options to reduce NO_x emissions have been utilized to comply with existing air quality regulations.” ERCOT at 3. This is true for Luminant. Additional advanced post-combustion controls would need to be installed to meet EPA's limits, which, as even EPA admits, cannot be done by 2012 (a minimum of approximately three years is required for construction alone). *See* 75 Fed. Reg. at 45,273. Even taking all available measures (for example, operating existing NO_x control equipment at maximum capacity and installing temporary selective non-catalytic reduction equipment in the near term), Luminant could not achieve the levels mandated in the Final Transport Rule. Furthermore, Luminant's analysis and information from other sources indicates that Luminant has no realistic expectation of being able to close the gap by obtaining seasonal NO_x allowances through trading. Luminant's only realistic compliance option to meet the ozone season limits will be to idle facilities. By imposing significant emissions reductions that go well beyond those in the proposed rule and that cannot be met by the mid-2012 compliance deadline set in the Final Transport Rule, EPA has acted in an arbitrary and capricious manner in violation of section 307 of the Clean Air Act, 42 U.S.C. § 7607.

Second, for the first time in the final rule, EPA claims that Texas EGUs will interfere with “maintenance” of the 8-hour ozone standard in Allegan County, Michigan. 76 Fed. Reg. at 48,236. In the proposed rule, EPA made no such downwind maintenance linkage between Texas and Allegan County, depriving Luminant and other Texas stakeholders the opportunity to comment on this alleged linkage. 75 Fed. Reg. at 45,270. Nevertheless, this new linkage does not justify Texas’s inclusion in the ozone season program any more than the linkage to East Baton Rouge that EPA used in the proposed rule. *See* Comments of Luminant at 6. Allegan County, like East Baton Rouge, is in attainment, as measured by actual air quality monitoring. *See* 75 Fed. Reg. 58,312 (Sept. 24, 2010) (redesignating Allegan County to attainment for ozone standard). Moreover, NOx emissions have been steadily falling, and EPA projects that this trend will continue going forward, both on a nationwide basis and for Texas sources. Emissions Inventory Final Rule TSD, Document EPA-HQ-OAR-2009-0491-4522 at 99-106. In this regard, EPA specifically found that air quality improvements in Allegan County were the result of “permanent and enforceable reductions in emissions,” 75 Fed. Reg. 42,018, 42,021 (July 20, 2010), and that it would be able to maintain these improvements even absent imposition of cross-state transport rules, *id.* at 42,026-28. Given that EPA found that, even absent regulatory intervention, Texas NOx emissions from all sources are expected to continue to decrease from 2012 to 2014, it is not plausible that Texas NOx emissions could force Allegan County into nonattainment. Emission Inventory Final Rule TSD at 100, 102; *see also* Transport Rule Primary Response to Comments, Document EPA-HQ-OAR-2009-0491 at 564. Not surprisingly then, EPA’s own modeling shows Allegan County in attainment in 2014 even without the Final Transport Rule.³ Thus, no regulation is necessary for Allegan County to achieve full attainment by 2014. EPA fails to explain this inconsistency within its rulemaking, much less to correct it.⁴ This failure independently renders the Final Transport Rule arbitrary.

³ For Allegan County, EPA’s modeled 2014 base case average and maximums are 80.9 and 83.6, respectively, and the 2014 remedy case average and maximums are 80.4 and 83.1, respectively. Air Quality Modeling Final Rule TSD at B-16. EPA uses the maximum values to indicate interference with maintenance of the ozone NAAQS (which is 85 ppb). 76 Fed. Reg. at 48,236.

⁴ For similar reasons, seasonal NOx limits cannot be based on Texas’ supposed “contribution” to East Baton Rouge. *See* Comments of Luminant at 6. If, as is the case here, that area is in attainment today and NOx emissions are projected to decrease in the future even absent seasonal NOx emissions budgets in the Final Transport Rule, then EPA has no authority under section 110(a)(2)(D)(i)(I) to limit emissions further. In this regard, even EPA’s own (flawed) air quality projections show that East Baton Rouge will come into attainment in 2014 without any regulatory intervention. Air Quality Modeling Final Rule TSD at B-14. Although East Baton Rouge is still (incorrectly) projected to have “maintenance” issues, EPA’s own data show that the Final Transport Rule’s seasonal NOx emissions limits are having no impact on “maintenance” (and only trivial impact on attainment). *See id.* (showing a 2014 base case average value of 84.1 and a 2014 base case maximum value of 87.7 for East Baton Rouge and a 2014 remedy case average value of 84.0 and a 2014 remedy case maximum value of 87.7). It

These flaws are symptomatic of broader errors that render the seasonal NO_x limits as to Texas contrary to section 110(a)(2)(D)(i)(I) as well as arbitrary and capricious. EPA has imposed limits that would result in emissions reductions far greater than necessary to bring areas into attainment for the 8-hour ozone NAAQS. *See generally* Air Quality Modeling Final Rule TSD, Document EPA-HQ-OAR-2009-0491-4140 at B-4 to B-32. Indeed, as noted, EPA has imposed limitations intended to prevent “significant contribution” to downwind locations that, even according to EPA’s own modeling, would achieve attainment without any emissions limitations at all. Moreover, even where real attainment problems might exist (unlike Allegan County and East Baton Rouge), EPA never examined whether lower emissions limitations would have been sufficient to achieve attainment for these locations. *See* 76 Fed. Reg. at 48,256-57.⁵

Likewise, the Final Transport Rule adopts an arbitrary downward ratchet on emissions budgets. In the final rule, EPA recognized that NO_x emissions (like SO₂ emissions) by EGUs will be declining in some States even absent federally imposed controls. *Id.* at 48,261. But EPA determined that it did not want to reflect these likely emissions reductions in the budgets it was setting for EGUs. Thus, after determining the amount of NO_x that could (purportedly) be eliminated for \$500 per ton, EPA subtracted that amount from the 2014 “base case”—rather than subtracting it from the 2012 “base case”—to set the emissions budgets for 2014.⁶ In this way, EPA ensured that the emissions budgets it was adopting would not be offset in any way by emissions decreases that it was expecting to occur between 2012 and 2014 independent of the Final Transport Rule. *Id.* By requiring its emissions budgets effectively to be in addition to emissions reductions that would be occurring anyway, EPA further exacerbated its basic flaw of setting emissions limitations for many upwind States beyond levels necessary for downwind areas to achieve attainment for seasonal NO_x. *See generally* Air Quality Modeling Final Rule TSD, at B-4 to B-32. Indeed, as noted, in the case of Allegan County and East Baton Rouge, *no*

was not “practicable” for Luminant to raise this latter argument during the comment period because EPA’s initial modeling indicated that the emission limitations it was considering would have some impact on maximum value ozone levels in East Baton Rouge. *See* Analysis to Quantify Significant Contribution TSD, Document EPA-HQ-OAR-2009-0491-0048 at 103 (posted to docket Aug. 2, 2010).

⁵ Instead, in the Final Transport Rule, EPA asserts that it did not “consider” cost curves less than \$500 per ton because the agency “believe[d]” it might allow some EGUs to reduce use of existing emission controls they are using. *Id.* This is patently arbitrary. EPA points to no evidence demonstrating that EGUs would materially reduce use of existing controls if budgets were set based on cost curves below \$500 per ton. Further, even if EPA’s speculation were correct, to the extent that a State would not be “significantly contributing” or an area would not experience any “attainment” or “maintenance” problems even if EGUs were to reduce the use of some existing pollution control equipment, EPA would have no basis under section 110(a)(2)(D)(i)(I) to impose more stringent emissions limitations.

⁶ As noted, the “base case” is the amount of emissions projected even in the absence of the Final Transport Rule (or CAIR).

further emissions reductions beyond those that would be achieved in the absence of the Final Transport Rule are necessary to bring those areas into attainment. On the other hand, where EPA concluded emissions from EGUs in a State would be increasing from 2012 to 2014, EPA did not use the higher 2014 levels as the baseline for determining State budgets as this would have made the budgets *less* stringent. *See* 76 Fed. Reg. at 48,261.

Further Analysis has Uncovered Additional Flaws in EPA's Modeling for its Remedy Case. In its initial request for reconsideration, Luminant detailed a litany of errors in EPA's modeling that resulted in the overly stringent emissions budget for Texas—a budget that is impossible to comply with in the manner projected by EPA. Further analysis of EPA's modeling and the voluminous information disclosed by EPA only after issuance of the final rule reveals further flaws. These include:

▶ EPA wrongly concludes that switching from locally-mined lignite to western low sulfur coal is achievable below the \$500 per ton SO₂ cost threshold set by EPA. This is not accurate. In fact, just for the cost of fuel, the cost differential between using lignite and western coal for Luminant's impacted units is on average approximately \$1,500 per ton of SO₂ removed. This is obviously far in excess of the cost threshold set for Texas and other Group 2 States.

▶ EPA models Luminant's Martin Lake Plant as burning 100% western coal. However, the supply contract for that facility includes a constraint that prevents delivery of sufficient western coal to allow a switch to 100%. This is due to a railroad bottleneck that the railroad has informed Luminant cannot be resolved in less than 18 months.

▶ EPA's remedy case inexplicably assumes that aggregate heat input to Texas EGUs will be 14% lower in 2012 than the actual heat input in 2010. EPA's model assumes 2,632,727,343 mmBtu in the 2012 remedy case and approximately that same amount in the 2012 base case. However, 2010 actual heat input was 3,075,026,062 mmBtu. Given that ERCOT is a self-contained electrical system and that demand has been increasing year over year, forecasting a decrease in aggregate heat input from 2010 to 2012 is illogical and does not reflect reality. This illogical assumption drives much of the erroneously forecasted decrease in NO_x emissions.

▶ Also for NO_x compliance, EPA's remedy case wrongly assumes unrealistically low NO_x emissions rates for SCRs—in several cases as low as 0.05 lb/mmBtu, when the units' actual performance has been approximately 0.07 or higher.

▶ EPA's remedy case erroneously assumes several units burn biomass, including Luminant's Sandow 4 and Sandow 5. These units do not burn biomass. Further, the model assumes that Gibbons Creek, Oklaunion, and San Miguel burn biomass. Luminant is unaware that these units are permitted to burn biomass.

If EPA had given adequate public notice of its analysis and conclusions for Texas, Luminant could have provided comment on these issues and corrected the agency's mistakes. EPA, however, failed to do so, necessitating a reconsideration to consider these critical issues.

For these reasons and those in Luminant's initial request, EPA should take prompt action to stay the final rule as it applies to Texas pending judicial review and to grant reconsideration. Although over a month has elapsed since Luminant submitted its initial request, EPA has not taken any action on it, nor has it provided a timeline for doing so. In the meantime, others have requested reconsideration as well, and at least one judicial petition for review has been filed. The information before the agency is overwhelming that reconsideration and a stay must be granted. There is no need or justification for further delaying the initiation of a reconsideration proceeding. Luminant's continued analysis of the final rule confirms that, given the impending compliance deadlines and the regulatory steps that must be taken by Luminant and others in advance of that compliance deadline, an expeditious stay by EPA is necessary to avoid the cascade of harms that will result from the rule's implementation in Texas.

Sincerely,

A handwritten signature in black ink, appearing to read 'William A. Moore', is centered on the page.

William A. Moore

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List of Exhibits (cont'd)

Exhibit

Description

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| 15 | ERCOT, <i>Impacts of the Cross-State Air Pollution Rule on the ERCOT System</i> (Sept. 1, 2011) |
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**Luminant's Additional Information and Supplementation
in Support of Petition for Reconsideration and Stay of EPA's Final Rule
titled "Federal Implementation Plans to Reduce Interstate Transport of Fine
Particulate Matter and Ozone in 27 States"**

Docket No. EPA-HQ-OAR-2009-0491

Exhibit 15



Impacts of the Cross-State Air Pollution Rule on the ERCOT System

September 1, 2011

Executive Summary

ERCOT was asked by the Public Utility Commission of Texas (PUCT) in the Open Meeting on July 8, 2011, to evaluate the impacts of the Cross-State Air Pollution Rule (CSAPR) on the reliability of the ERCOT grid. The ERCOT analysis included meetings with representatives of the Texas Commission on Environmental Quality and the U.S. Environmental Protection Agency, review of the compliance strategies provided by the owners of coal-fired resources in the ERCOT region, and consolidation of these compliance strategies for purposes of evaluating system-wide impacts.

Based on the information provided by the resource owners, ERCOT developed three scenarios of potential impacts from CSAPR. The first scenario, derived directly from the compliance plans of individual resource owners, indicates that ERCOT will experience a generation capacity reduction of approximately 3,000 MW during the off-peak months of March, April, October and November, and 1,200 – 1,400 MW during the other months of the year, including the peak load months of June, July and August. Scenario 2, which incorporates the potential for increased unit maintenance outages due to repeated daily dispatch of traditionally base-load coal units, results in a generation capacity reduction of approximately 3,000 MW during the off-peak months of March and April; 1,200 – 1,400 MW during the remainder of the first nine months of the year; and approximately 5,000 MW during the fall months of October, November and possibly into December. Scenario 3 includes the impacts noted for Scenario 2, along with potential impacts from limited availability of imported low-sulfur coal. This scenario results in a generation capacity reduction of approximately 3,000 MW during the off-peak months of March and April; 1,200 – 1,400 MW during the remainder of the first nine months of the year; and approximately 6,000 MW during the fall months of October, November and possibly into December.

When the CSAPR rule was announced in July, it included Texas in compliance programs that ERCOT and its resource owners had reasonably believed would not be applied to Texas. In addition, the rule required implementation within five months – by January 2012. The implementation timeline provides ERCOT an extremely truncated period in which to assess the reliability impacts of the rule, and no realistic opportunity to take steps that could even partially mitigate the substantial losses of available operating capacity described in the scenarios examined in this report. In short, the CSAPR implementation date does not provide ERCOT and its resource owners a meaningful window for taking steps to avoid the loss of thousands of megawatts of capacity, and the attendant risks of outages for Texas power users.

If the implementation deadline for CSAPR were significantly delayed, it would expand options for maintaining system reliability. ERCOT is advancing changes in market rules – such as increasing ERCOT's ability to control the number and timing of unit outages and expanding demand response – that could help avert emergency conditions. These measures will not, however, avoid the losses in capacity due to CSAPR that increase the risk of such emergencies. As discussed in this report, those losses will, at best, present significant operating challenges for ERCOT, both in meeting ever-increasing peak demand and in managing off-peak periods in 2012 and beyond.

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Impacts of the Cross-State Air Pollution Rule on the ERCOT System

1. Introduction

ERCOT was asked by the Public Utility Commission of Texas (PUCT) in the Open Meeting on July 8, 2011, to evaluate the impacts of the Cross-State Air Pollution Rule (CSAPR) on the reliability of the ERCOT grid. The final language of the CSAPR was released by the U.S. Environmental Protection Agency (EPA) on July 6, 2011, and was published in the Federal Register on August 8, 2011.

The CSAPR is one of several environmental rules proposed by EPA that affect electric generation. The CSAPR includes three separate compliance programs: an annual SO₂ program, an annual NO_x program, and a peak season NO_x program (for emissions during the peak ozone season of May – September). In the proposed rule (then known as the Clean Air Transport Rule [CATR]), Texas was only included in the peak season NO_x program. Based on the proposed rule, an ERCOT study completed on June 21, 2011, evaluating the expected impacts of the pending regulations, did not include any incremental impacts from the CATR on the ERCOT system.

In the CSAPR rule actually adopted by the EPA, however, Texas is included in all three compliance programs - the peak season NO_x program, the annual NO_x program, and the annual SO₂ program. The implementation date for the CSAPR is January 1, 2012.

In order to accomplish this review, ERCOT undertook several activities.

- ERCOT reviewed documentation published on the EPA web-site regarding the rule.
- ERCOT met with representatives of the Texas Commission on Environmental Quality (TCEQ) and the EPA.
- ERCOT consulted with environmental experts from several of the generating entities in the ERCOT region whose facilities were likely to be affected by the CSAPR regulations. The purpose of these meetings was to ascertain the likely compliance plans for those resources owners.
- These compliance plans were aggregated so that ERCOT could evaluate the likely impacts to grid reliability.

2. Rule Description

The CSAPR is being implemented in order to address the interstate transport of sulfur dioxide (SO₂) and nitrogen oxides (NO_x). The rule is a replacement for the Clean Air Interstate Rule (CAIR), which was implemented in 2005. The CAIR was remanded to the EPA by the United States Court of Appeals for the District of

Resource owners who have emissions in excess of their annual allocations will have their next year's allocations reduced by one emission for each excess ton of emissions, plus a penalty of two additional allowances for each excess ton. In addition, the Clean Air Act includes provisions for civil lawsuits in the event of non-compliance. Non-compliance penalties under the CSAPR program are substantial, and can reach up to \$37,500 per violation per day. In addition to program penalties, failure to comply can subject entities to the risk of civil penalties, lawsuits by private parties, and criminal liability.

3. Compliance Options

Resource owners have several near-term compliance options to meet the emissions limits established by the CSAPR. In order to reduce SO₂ emissions, lower sulfur content fuel can be used. In the case of plants that are currently burning lignite coal, or a mix of lignite and sub-bituminous coals (such as coal from the Powder River Basin [PRB] region of northwest Wyoming), increasing the use of low sulfur western coal will reduce SO₂ emissions. Units that currently are being fueled exclusively by western sub-bituminous coals can be switched in whole or in part to ultra-low-sulfur western coals.

In the near-term, the demand for lower sulfur coal is expected to exceed the mining capacity and/or the railroad capacity necessary to deliver the coal to Texas. In addition, the use of lower sulfur coals can result in unit capacity derates due to increased heat content of the fuel. Unit modifications to resolve any such derates may require modifications to the unit's air emissions permit.

Existing SO₂ control equipment, such as wet-limestone scrubbers, can be utilized more frequently than is current practice, and in some cases the effectiveness of this equipment can be increased. This option only applies to a small subset of coal plants in ERCOT, and the use of scrubbers results in a decrease in maximum net output from the affected units of about 1 to 2 percent.

The use of dry sorbent injection is another compliance option to reduce SO₂ emissions. Dry sorbent compounds, such as sodium bicarbonate and trona, can be injected into a flue duct where they react with SO₂ (and acid gases) to form compounds that can be removed using an electrostatic precipitator (ESP) or baghouse. Resource owners exploring this option anticipate that it will provide a 25 – 30% reduction in emissions of SO₂ on units without existing SO₂ control equipment. The use of dry sorbent injection may require public notice or air permit modification.

Most of the low cost options to reduce NO_x emissions have been utilized to comply with existing air quality regulations. Further reductions will likely require high capital cost unit retrofits, including the addition of selective non-catalytic reduction (SNCR) or selective catalytic reduction (SCR) technologies. Any such unit changes would require several years for permitting, design and construction.

The remaining option for reducing SO₂ and NO_x emissions will be reducing unit output, either through dispatching units down to minimum levels during the off-peak hours and up to maximum capacity during peak afternoon hours, or through extended unit outages. Some of the traditionally base-loaded units will

experience increased maintenance outages due to this daily dispatch pattern. These same base-load units have long start-up requirements, which could make them unavailable for operation during some off-peak extreme weather events.

4. Study Methodology

In order to evaluate the potential impacts associated with implementation of the CSAPR, ERCOT met with representatives of the TCEQ and the EPA to evaluate details of the rule and its implementation. ERCOT also reviewed compliance strategies provided by the owners of coal-fired resources in the ERCOT region. ERCOT consolidated these compliance strategies for purposes of evaluating system-wide impacts.

5. CSAPR Impacts

The compliance strategies of individual resource owners were compiled and consolidated to determine the aggregate impacts on the ERCOT system. This analysis indicates that, of the three CSAPR programs, the annual SO₂ program is likely to be the most restrictive on the ERCOT system. Even though individual units may have emissions in excess of the peak season or annual NO_x limits, Texas as a whole is likely to be below the state-wide limit, indicating that resource owners can achieve compliance through trading of NO_x emissions allowances. An extended hot summer, such as the one experienced in 2011, may result in limited availability of peak season NO_x emissions, and a need to obtain additional allowances from out-of-state.

In consolidating the compliance strategies from the resource owners, it became apparent that each resource owner was assuming a level of effectiveness of the various compliance options identified in Section 3. While many of these compliance plans are likely to be adequate, given the risks associated with each compliance option, it is unlikely that all of the resource owners' plans will function as designed. For example, the use of dry sorbent injection on the scale required to attain compliance at certain facilities may perform as anticipated, but its use in this context is novel and may involve unexpected complications. As a result, ERCOT has developed three compliance scenarios in order to assess the potential risks to the system based on different assumptions regarding implementation of compliance strategies.

The first scenario is derived directly from the compliance plans of individual resource owners. Based on the information that ERCOT has been given, in this scenario, the ERCOT region will experience an incremental reduction in available operating capacity of approximately 3,000 MW in the off-peak months of March, April, October and November, and an operating capacity reduction of 1,200 – 1,400 MW during the other months of the year, including the peak load months of June, July and August. Capacity reductions in the off-peak months are expected to be greater because power prices are lower during these periods, making them a more attractive time for resource owners to take extended outages to conserve allocated allowances.

The second scenario is derived from the first, but includes the additional assumption that the increased dispatching of base-load units will lead to increased maintenance outages, especially in the fall months. Over the course of the spring months it may become increasingly apparent that dispatching specific units is leading to extensive maintenance requirements. In these cases it may be cost-effective to idle these units rather than dispatch them down to minimum levels during off-peak hours. These units would likely be run through the summer peak months, but then would be idled for an extended period in the fall in order to conserve allocated allowances. Given this additional constraint, it is likely that ERCOT would experience an incremental loss of approximately 3,000 MW of capacity in the off-peak months of March and April, approximately 1,200 – 1,400 MW during the remainder of the first nine months of the year, and approximately 5,000 MW of capacity during the fall months of October, November and possibly into December.

The third scenario is derived from the second, with the added consideration of possible near-term market limitations on the availability of imported low-sulfur coals, either due to nationwide demand exceeding mine output capacity or railroad shipping capacity. In the event of such limitations, coal plant resource owners would be forced to rely on higher sulfur coals during the spring and the peak season summer months. As a result, they would be forced to further reduce unit output in the fall months, beyond what is currently included in their compliance strategy, and could be required to decommit additional capacity in October and November in order to conserve allocated allowances. As a result, given these assumptions, it is likely that ERCOT would experience an incremental loss of approximately 3,000 MW of capacity in the off-peak months of March and April, approximately 1,200 – 1,400 MW during the remainder of the first nine months of the year, and approximately 6,000 MW of capacity during the fall months of October, November and possibly into December.

6. Discussion

The scenarios analyzed in this study represent best-case (Scenario 1), and two cases with increasing impacts to system reliability. Scenarios 2 and 3 are based on the occurrence of events that are reasonably foreseeable given the circumstances facing generation resources attempting to comply with the CSAPR. Even in the best-case scenario, ERCOT is expected to experience a reduction in available operating capacity of 1,200 – 1,400 MW during the peak season of 2012 due to implementation of the CSAPR. Had this incremental reduction been in place in 2011, ERCOT would have experienced rotating outages during days in August. Off-peak capacity reductions in the three scenarios evaluated as part of this study, when coupled with the annual maintenance outages that must be taken on other generating units and typical weather variability during these periods, also place ERCOT at increasing risk of emergency events, including rotating outages of customer load.

There are numerous unresolved questions associated with the impacts of the CSAPR on the ERCOT system. It is important to note that the resource owners have had less than two months to develop compliance plans for the new rule. These plans are still preliminary and based on assumptions regarding technology

effectiveness, fuel markets, impacts of altered unit operations on maintenance requirements, and the cost-effectiveness of modifying and operating units to comply with the CSAPR. The overall system impacts noted in this study will change if these individual compliance strategies are adjusted to take into account updated information.

The availability of SO₂ allowances for purchase by resource owners in Texas is a significant source of uncertainty at this time. A lack of allowances for purchase from out-of-state resources will likely increase the severity of the CSAPR rule. Many resource owners expressed their concern that parties that have excess allowances may, at least initially, hold on to their excess, in order to maintain flexibility and future compliance options. As noted in Section 2, given the penalties for non-compliance, resource owners are unlikely to exceed the number of allowances they have in hand, with the expectation that allowance markets will open up later in the year. It may be that some resource owners will keep their excess allowances until it becomes clear that they will not be needed, late in the year. Other resource owners may have to shut units down in the early fall in order to conserve allowances.

In addition, the information ERCOT has received indicates there will not be a liquid market throughout the year for allowances, which will make it difficult to determine the appropriate value of allowances to compensate resource owners for operations associated with reliability commitments, such as through the daily or hourly reliability unit commitment process. It may be necessary to administratively establish a value for these allowances through the market stakeholder review process.

It is also possible that the impacts of CSAPR will increase in 2013 and 2014. In those years, it is unlikely that resource owners will have any additional options for rule compliance. Increased dispatching of base-load units will likely continue to lead to extended maintenance outages, and delivered availability of low sulfur western coals is likely to remain limited. In addition to these factors, some resource owners will be placing units on extended outages to install emission control technologies, such as wet-limestone scrubbers and possibly selective catalytic or selective non-catalytic reduction equipment. These retrofit outages could further reduce the generation capacity available during off-peak months.

Due to the numerous uncertainties, ERCOT cannot confidently estimate a “worst case” scenario at this time. Combinations of particular events may result in reductions in operating capacity that exceed those identified in Scenario 3, and thus further increase the risk of increasingly frequent and unpredictable emergency conditions, including the potential for rotating outages. The best outcome ERCOT can expect occurs if Scenario 1 is realized (*i.e.*, all generation resources’ current plans come to fruition), and, as discussed above, Scenario 1 appreciably increases risks for the ERCOT system, in both the on-peak and off-peak months.

7. Conclusion

When the CSAPR rule was announced in July, it included Texas in compliance programs that ERCOT and its resource owners had reasonably believed would

not be applied to Texas. In addition, the rule required implementation within five months – by January 2012. The implementation timeline provides ERCOT an extremely truncated period in which to assess the reliability impacts of the rule, and no realistic opportunity to take steps that could even partially mitigate the substantial losses of available operating capacity described in the scenarios examined in this report. In short, the CSAPR implementation date does not provide ERCOT and its resource owners a meaningful window for taking steps to avoid the loss of thousands of megawatts of capacity, and the attendant risks of outages for Texas power users.

If the implementation deadline for CSAPR were significantly delayed, it would expand options for maintaining system reliability. ERCOT is advancing changes in market rules – such as increasing ERCOT’s ability to control the number and timing of unit outages and expanding demand response – that could help avert emergency conditions. These measures will not, however, avoid the losses in capacity due to CSAPR that increase the risk of such emergencies. As discussed in this report, those losses will, at best, present significant operating challenges for ERCOT, both in meeting ever-increasing peak demand and in managing off-peak periods in 2012 and beyond.