

Missouri Public Service Commission
Environmental Regulations Overview

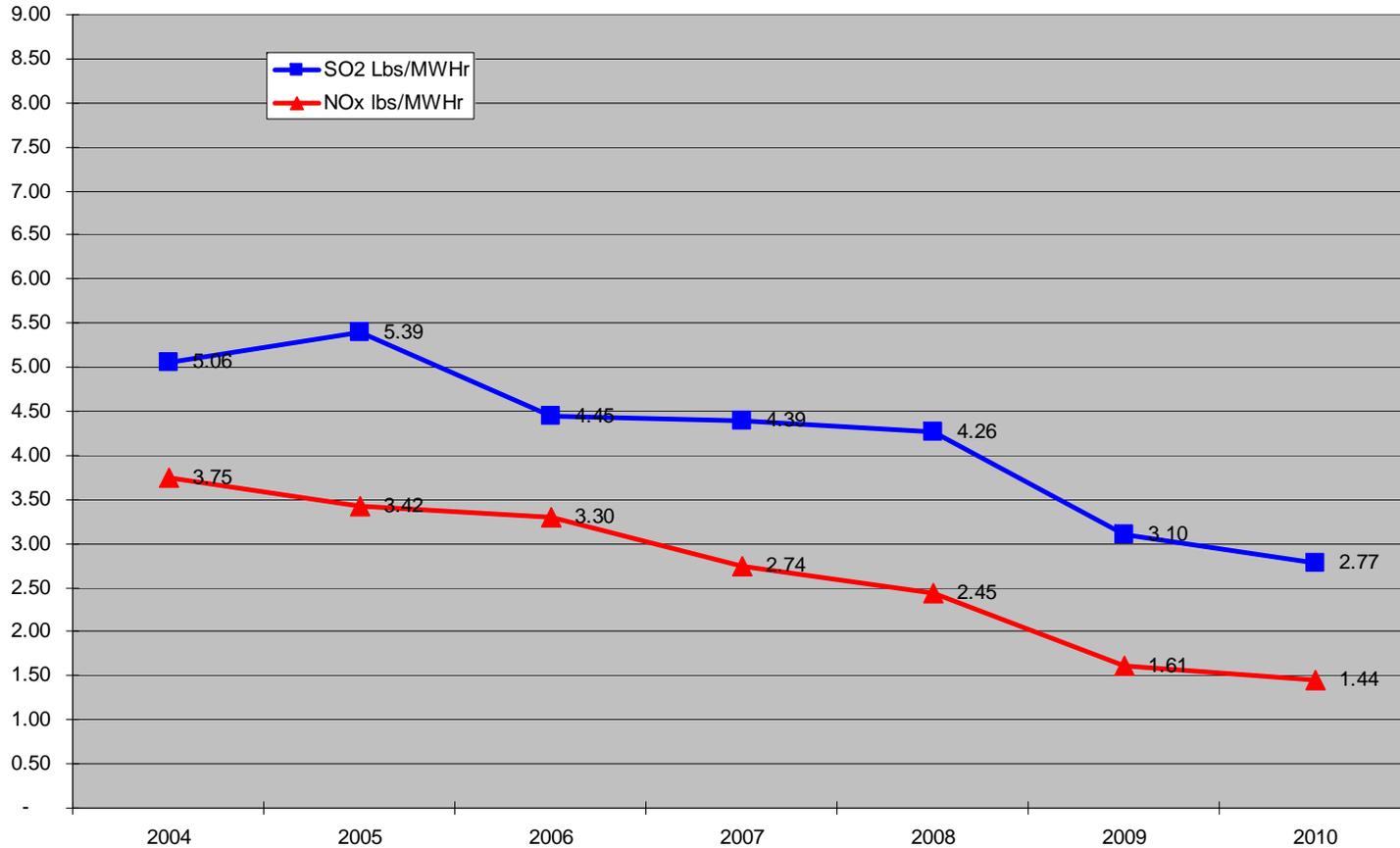
October 26, 2011 Staff Workshop

In the Matter of an Investigation of the Cost to Missouri's Electric
Utilities Resulting from Compliance with Federal Environmental
Regulations

File No. EW-2012-0065

KCP&L and KCP&L GMO's Emission Reductions

KCP&L and KCP&L GMO Trend Lines



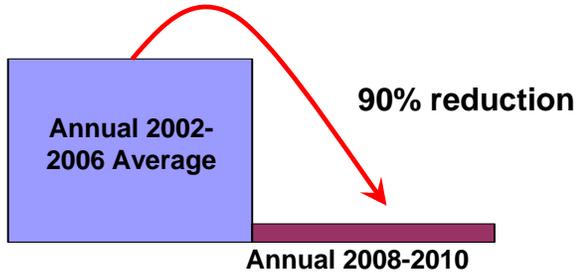
Footnotes:

1. Data shown above is for share of jointly owned generation facilities including coal, gas, oil, nuclear and wind generation.
2. Emissions are from reported CEM data for all units except small units without CEM where the emissions are calculated and reported from fuel usage.
3. Rate is derived from emissions over the gross megawatt hours reported in CEM data, and the reported net megawatt hours for Wolf Creek and Spearville.

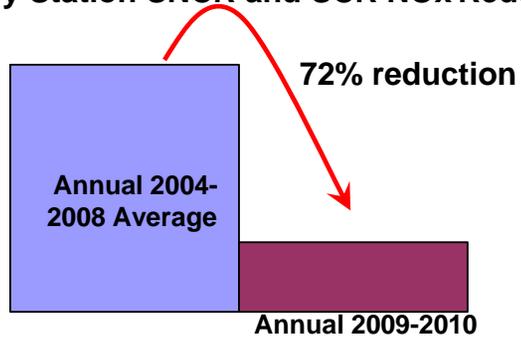


KCP&L and KCP&L GMO's Recent Environmental Control Additions

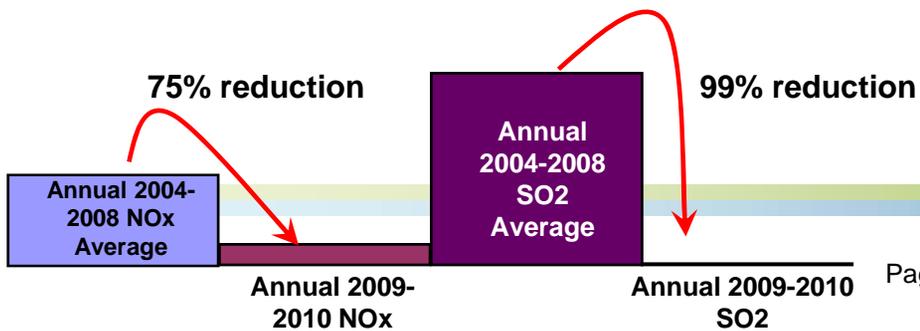
La Cygne Unit 1 SCR NOx Reductions



Average Sibley Station SNCR and SCR NOx Reductions

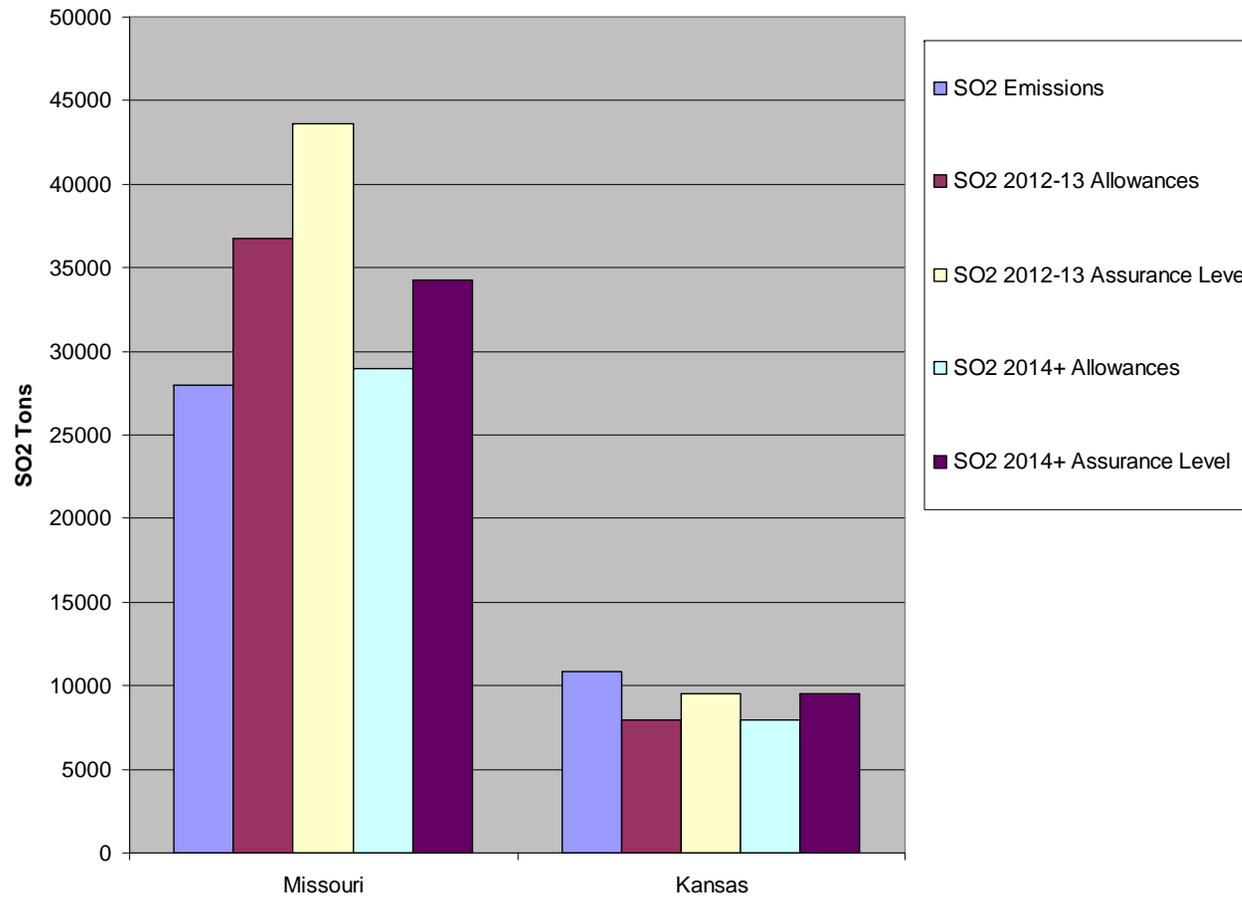


Iatan Unit 1 SCR and Scrubber NOx and SO2 Reductions



Cross-State Air Pollution Rule - SO2 Emissions vs. Allowances

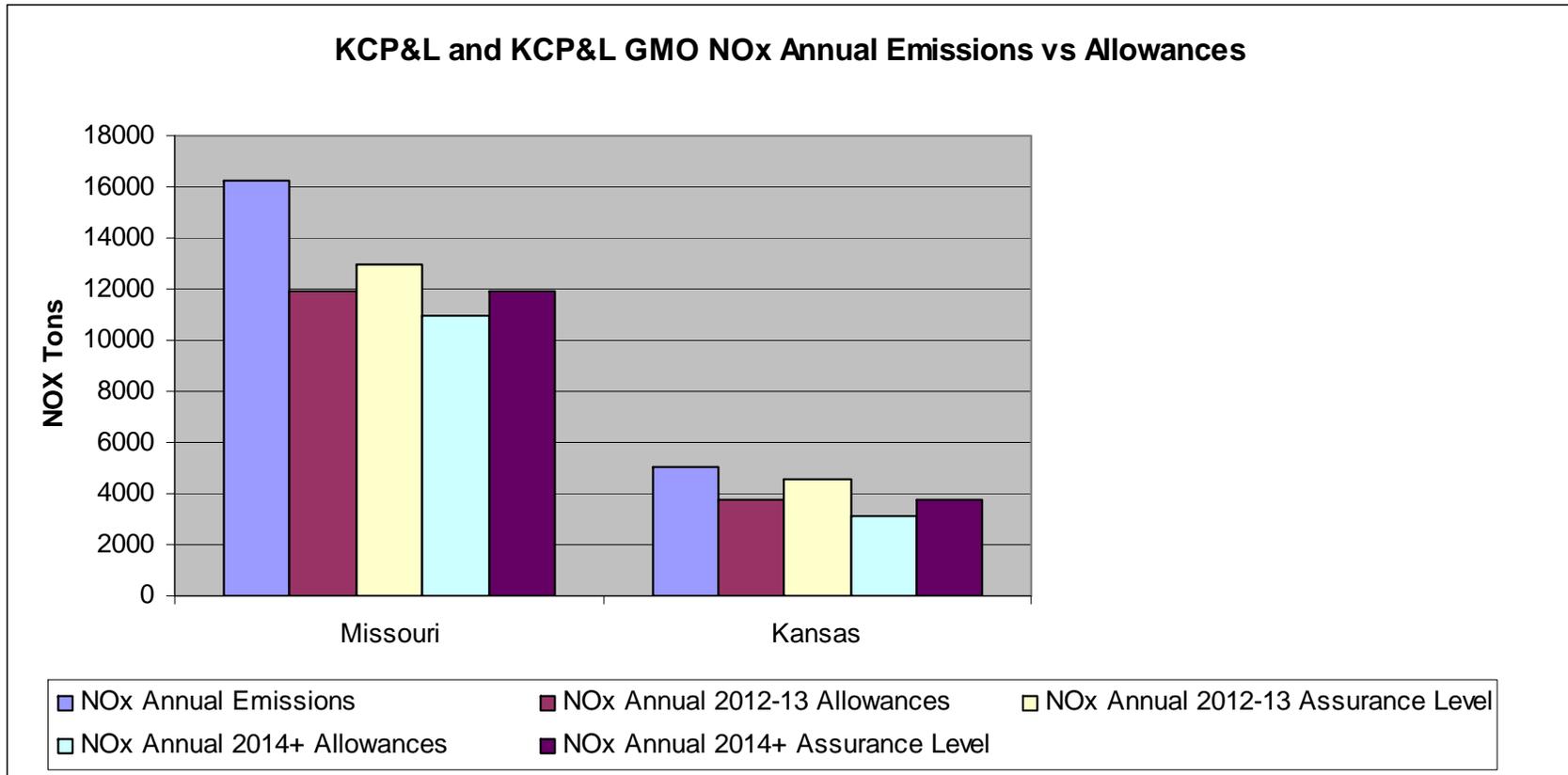
KCP&L and KCP&L GMO SO2 Emissions vs Allowances



Sources: Emission data from EPA Clean Air Markets website

Allowance and Assurance level data from EPA CSAPR website and resource materials

Cross-State Air Pollution Rule - NOx Emissions vs. Allowances

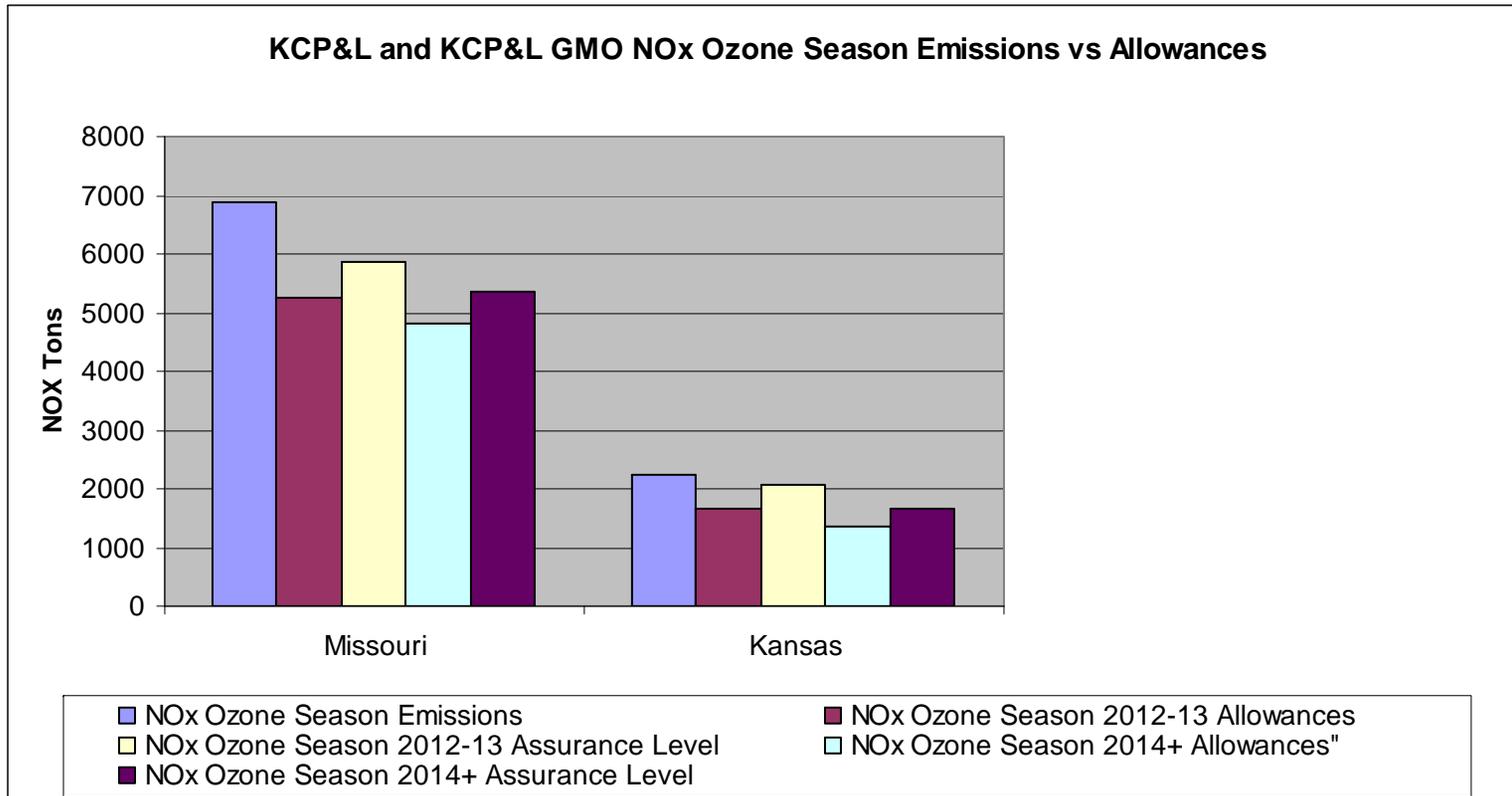


All values are % share

Sources: Emission data from EPA Clean Air Markets website

Allowance and Assurance level data from EPA CSAPR website and resource materials

Cross-State Air Pollution Rule - NOx Ozone Season Emissions vs. Allowances



Sources: Emission data from EPA Clean Air Markets website

Allowance and Assurance level data from EPA CSAPR website and resource materials



Cross-State Air Pollution Rule - Impact on KCP&L and KCP&L GMO Units

Annual SO₂ Allowances

Group 1 (Missouri):

KCP&L – Projected to have excess SO₂ allowances in 2012 and beyond, so no additional SO₂ controls are anticipated for compliance.

KCP&L GMO – Projected to be short SO₂ allowances in 2014 and beyond but the shortfall could be covered by KCP&L's excess allowances without installing additional SO₂ controls for compliance.

Group 2 (Kansas):

KCP&L – La Cygne Station projected to be short SO₂ allowances starting in 2012. Compliance options include, but are not limited to, reducing annual generation and fuel switching to lower sulfur coal.

Annual and Ozone Season NO_x Allowances

Missouri:

KCP&L – Projected to be short NO_x annual allowances starting in 2012. Compliance options include, but are not limited to, installing low-NO_x burners, reducing annual generation and/or getting greater reduction when possible from existing SCRs.

KCP&L GMO – Projected to be short NO_x annual allowances starting in 2012. Compliance options include, but are not limited to, reducing annual generation and/or getting greater reduction when possible from existing SNCRs and SCR.

Kansas:

KCP&L – La Cygne Station is projected to be short NO_x allowances starting in 2012. Compliance options include, but are not limited to, installing low-NO_x burners, reducing annual generation and/or getting greater reduction when possible from existing SCR.

Regional Haze / Best Available Technology Rule (BART) – Impacts on KCP&L and KCP&L GMO

- ❑ MDNR’s Regional Haze Plan relied on the Clean Air Interstate Rule for compliance. No additional emission controls were identified in the Plan for KCP&L’s Missouri units.

- ❑ KDHE’s Regional Haze Plan is a driver for the emission control installation at La Cygne Generating Station.

- ❑ La Cygne Environmental Retrofit Controls:
 - Unit 1:
 - Baghouse with PJFF technology and fly ash conveying equipment;
 - New induced draft (ID) fans; and
 - Wet scrubber for FGD.
 - Activated carbon injection

 - Unit 2:
 - Baghouse with PJFF technology and fly ash conveying equipment;
 - New ID fans;
 - Wet scrubber for FGD;
 - SCR system ductwork and reactors;
 - LNBS; and
 - OFA system.
 - Activated carbon injection

 - Common equipment:
 - Dual-flue chimney;
 - Reagent (limestone) preparation building and equipment;
 - Gypsum dewatering building and equipment;
 - Gypsum storage pile and handling equipment;
 - Electrical buildings;
 - Limestone reclaim/storage and material handling equipment;
 - Scrubber and air oxidation building;
 - Paint shop; and
 - Warehouse(s).

Power Plant Mercury and Air Toxics Standards - Impact on KCP&L and KCP&L GMO Units

KCP&L and KCP&L GMO Units Minimally Impacted

- Iatan Units 1 and 2 – No additional controls anticipated.
- La Cygne Units 1 and 2 - No additional controls anticipated (assuming completion of Environmental Retrofit Project).
- Hawthorn Unit 5 – mercury control anticipated (activated carbon injection).

KCP&L and KCP&L GMO Units Significantly Impacted

- Montrose Units 1, 2 and 3 - mercury (activated carbon injection), particulate matter control (baghouses), and potentially dry sorbent injection (acid gases) anticipated.
- Sibley Units 1, 2 and 3 - mercury (activated carbon injection), particulate matter control (improved precipitators or baghouses), and potentially dry sorbent injection (acid gases) anticipated.
- Lake Road Boiler 6/Unit 4 - mercury (activated carbon injection), particulate matter control (baghouses), and potentially dry sorbent injection (acid gases) anticipated or fuel conversion to natural gas.

Since rule has not been finalized, impacts are only initial predictions.

2010 SO₂ National Ambient Air Quality Standard - Impact on KCP&L and KCP&L GMO Units

KCP&L and KCP&L GMO Units Minimally Impacted

- Iatan Units 1 and 2 – No additional controls anticipated.
- La Cygne Units 1 and 2 - No additional controls anticipated (assuming completion of Environmental Retrofit Project).
- Hawthorn Unit 5 – No additional controls anticipated.

KCP&L and KCP&L GMO Units Significantly Impacted

- Montrose Units 1, 2 and 3 – scrubbers or other SO₂ controls with baghouses anticipated.
- Sibley Units 1, 2 and 3 - scrubbers or other SO₂ controls with baghouses anticipated.
- Lake Road Boiler 6/Unit 4 - scrubbers or other SO₂ controls with baghouses anticipated.

Since plan has not been finalized, impacts are only initial predictions.

Costs and Possible Retrofit Projects

- ❑ Approximately \$1 Billion current estimate to comply with current and proposed rules
 - Clean Air Interstate Rule and Cross-State Air Pollution Rule
 - Industrial Boiler Maximum Achievable Technology rule
 - Best Available Retrofit Technology / Regional Haze Rule
 - Power Plant Mercury and Air Toxics Standards
 - SO2 2010 National Ambient Air Quality Standard
- ❑ At the Following Units:
 - Retrofit La Cygne 1 and 2 by June 2015
 - Wet scrubbers, activated carbon injection, SCR, baghouses, low-NOx burners, over-fired air
 - Retrofit Montrose 3 by approximately 2016
 - Possible installation of wet scrubber or other SO2 controls, SNCR, baghouse, activated carbon injection
 - Retrofit Sibley 3 by approximately 2016
 - Possible installation of wet scrubber or other SO2 controls, baghouse, activated carbon injection
- ❑ Other potential retrofits - Montrose 1 and 2, Sibley 1 and 2, and Lake Road Boiler 6/Unit 4 with potential emission control equipment

Emissions Control Equipment – Coal Fleet

Coal Unit	MW	SCR	Scrubber	Bag House	Other Particulate Control	Mercury Controls	Cooling Tower
Iatan 1	621 ^(a)	✓	✓	✓	✓	✓	◇
Iatan 2	618 ^(a)	✓	✓	✓	✓	✓	✓
LaCygne 1	368 ^(a)	✓	✓ (b)	▲	✓ (c)	▲	◇
LaCygne 2	341 ^(a)	▲	▲	▲	✓ (d)	▲	◇
Hawthorn 5	563	✓	✓	✓	✓	◇	◇
Sibley 1 and 2	102	◇ (e)	◇	◇	✓	◇	◇
Sibley 3	364	✓	▲	▲	✓	◇	◇
Montrose 1, 2 and 3	510	▲ (f) ◇	▲ (f) ◇	▲ (f) ◇	✓	◇	◇
Lake Road 4	99	◇	◇	◇	✓	◇	◇
Jeffrey Energy Center 1, 2 and 3	173 ^(a)	▲ (g) ◇	✓	◇	✓	◇	✓

Following anticipated scrubber installation at LaCygne 2, Sibley 3 and Montrose 3, roughly 86 percent of the installed coal capacity would have scrubbers – remaining 14% of installed capacity is currently considered “Less Likely” for retrofit

- (a) KCP&L's share of jointly-owned facility
- (b) LaCygne 1 currently has a scrubber installed; however, 2011-2013 capital expenditure plan includes the installation a new scrubber on the unit
- (c) Existing scrubber removes particulate matter; a baghouse is expected to be installed
- (d) Existing precipitator will be replaced by a baghouse
- (e) Sibley 1 and 2 both have selective noncatalytic reduction systems (“SNCRS”) installed
- (f) Planned for Unit 3 only
- (g) Planned for Unit 1 only
- ✓ Installed
- ▲ Installation planned
- ◇ Not installed