NACAA Fall Meeting
October 2012

Innovative and Replicable Initiatives -
The Colorado Clean Air/Clean Jobs Act

Colorado Department of Public Health and Environment

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CDPHE Air Pollution Control Division

HB10-1365

"A coordinated plan of emission reductions from these coal-fired power plants will enable Colorado rate-regulated utilities to meet the requirements of the federal Clean Air Act and protect public health and the environment at a lower cost than a piecemeal approach."

"The air quality provisions of this emissions reduction plan…are intended to fulfill the requirements of the state and federal acts and shall be proposed…to the Air Quality Control Commission…for incorporation into the Regional Haze element of the State Implementation Plan"

West Elk Wilderness Area

CACJA had widespread support

- Bipartisan legislation
- Diverse stakeholders – including utilities, environmental groups, oil and gas industry, local governments, American Lung Association
- Coal and mining industries opposed

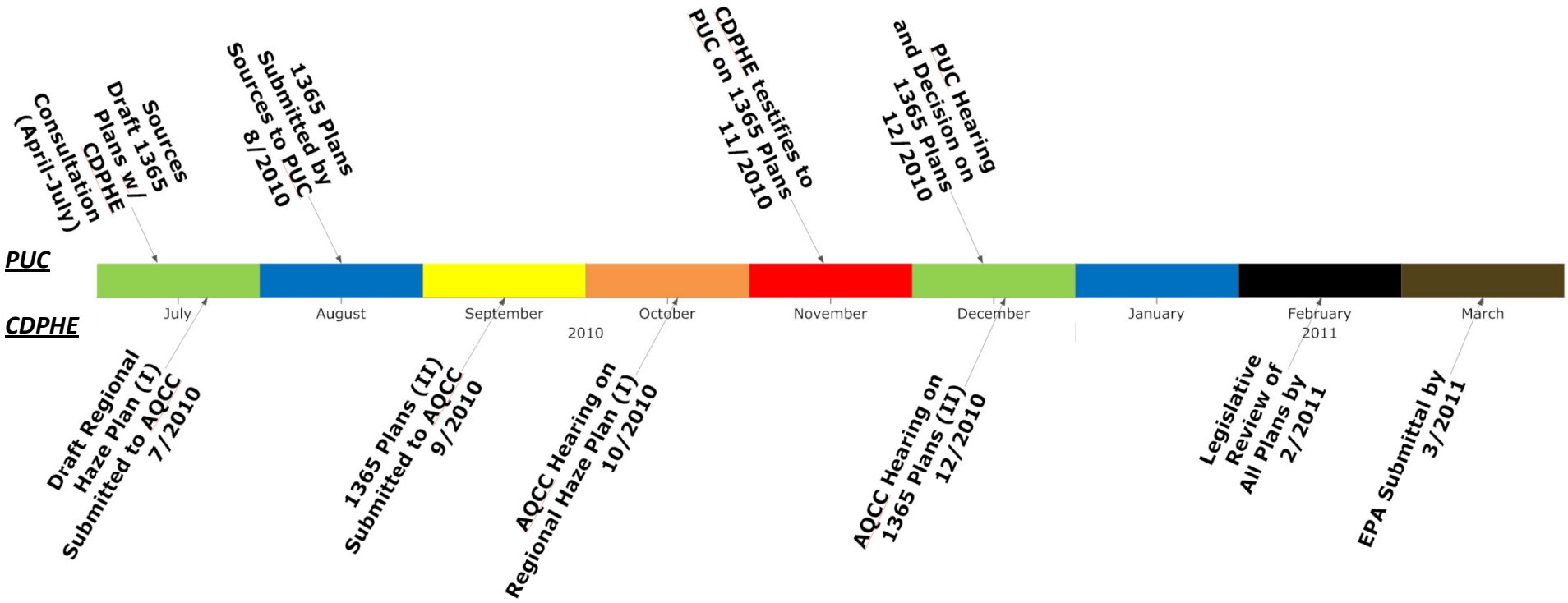
Department Role and Participation with P.U.C.

- Consult with utility to design a plan to meet the current and reasonably foreseeable requirements of the federal act and state law
- Submit commentary to the PUC during PUC proceedings
  - Comment to the PUC on the air quality and emissions reductions of the plan
  - Report on whether the plan is likely to achieve at least a seventy to eighty percent reduction, or greater, in annual emissions of NOx as necessary to comply with the current and reasonably foreseeable requirements of the federal act and the state act
  - Evaluate and determine as part of the PUC proceedings whether the plan is consistent with the current and reasonably foreseeable requirements of the federal act

Department Role and Participation with AQCC

- Propose the air quality elements of the plan to the Colorado AQCC by September 16, 2010 for incorporation into the Regional Haze element of the State Implementation Plan.
  - The AQCC shall then initiate a SIP proceeding on the plan
  - The AQCC shall not act on the plan, or the Regional Haze SIP element that reflects the plan, until after PUC approval of the plan
- Vacate and re-notice an alternate proposal for the Regional Haze element of the SIP for the facilities covered by the plan if the PUC deadlines for action are not met, the utility withdraws its plan application because it is altered by the PUC, or the AQCC rejects any portion of the plan as approved by the PUC
- Ensure full implementation of the plan no later than December 31, 2017

Timeline for HB-1365 and Regional Haze



Current and Foreseeable Air Quality Requirements Applicable to Coal-Fired Plants (2010 – 2018)

- Regional Haze – BART, Reasonable Progress (SO2, NOx)
- Regional Haze, (SO2, NOx)
- Ozone Standards and Non-Attainment (NOx)
- NO2 Standards – (NOx)
- SO2 Standard – (SO2)
- Fine Particulate (PM2.5) Standard – (SO2, NOx, PM)
- Carbon Monoxide Standard – CO)
- Utility MACT for Utilities (Hg, Acid Gases, HAPs)
- Greenhouse Gases including Carbon Dioxide, tailoring rule, emissions reporting regulation (CO2)
- Nitrogen Deposition Reduction Plan, Colorado/EPA/Nat'l Park Service (NOx)
- Colorado Mercury Reduction Regulation for EGUs (2012, 2014, 2018) (Hg)

Significant NOx, SO2, Hg, & CO2 Emission Reductions Can Provide:

Immediate Direct Benefits

- ✓ Regional Haze
- ✓ Ozone
- ✓ RMNP N Deposition
- ✓ Colorado Mercury Reduction
- ✓ Carbon Dioxide Reductions

Immediate Co-Benefits

- ✓ NO2 NAAQS
- ✓ PM2.5 NAAQS
- ✓ Air Toxics
- ✓ Brown Cloud

Reasonably-Foreseeable Benefits

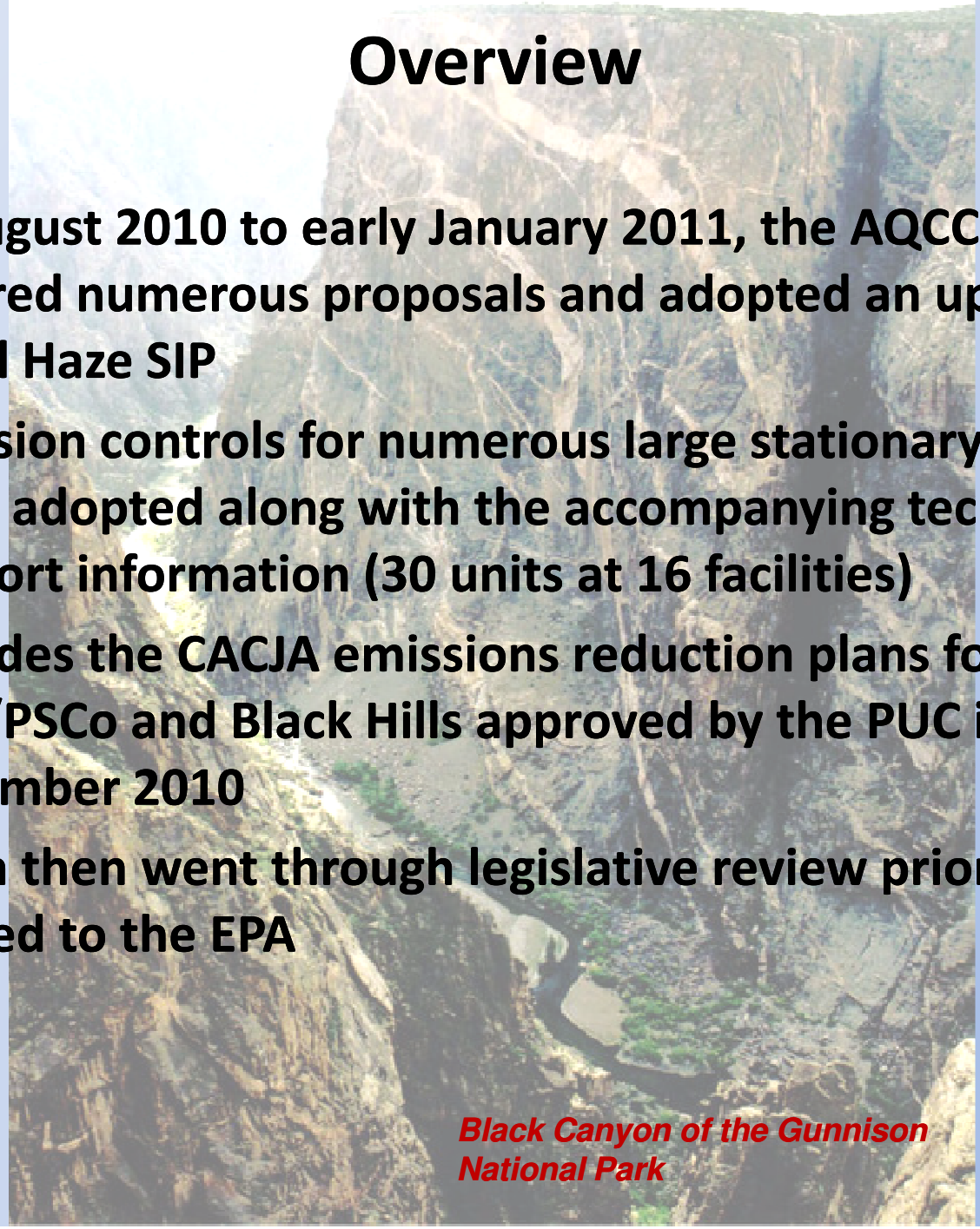
- ✓ EGU MACT/Federal Mercury
- ✓ Revised NAAQS for SO2, PM2.5
- ✓ Federal CO2
- ✓ Collateral Benefits for Waste Management, Clean Water Act Requirements

CACJA Requirements Complemented Ongoing Air Quality Planning

- Federal requirements, especially for Regional Haze and ozone, call for large pollutant reductions
  - The 70-80% NOx reduction requirements in CACJA will make a very significant contribution towards meeting the goal
- State and federal mercury reduction requirements and potential federal greenhouse gas reduction requirements will also drive large emission reductions
- CACJA allowed us to achieve or make significant progress for subject facilities in a coordinated manner
- These air quality improvements will be achieved with a combination of emission control technology, retirement, and repowering with natural gas and low- or non-emitting sources

Overview

- From August 2010 to early January 2011, the AQCC considered numerous proposals and adopted an updated Regional Haze SIP
  - Emission controls for numerous large stationary sources were adopted along with the accompanying technical support information (30 units at 16 facilities)
  - Includes the CACJA emissions reduction plans for Xcel/PSCo and Black Hills approved by the PUC in December 2010
- The plan then went through legislative review prior to being submitted to the EPA



Black Canyon of the Gunnison National Park

…and these controls were adopted:

- NOx control upgrades: 15 units
- SO2 control upgrades: 5 units
- Gas operation: 2 units
- Shut down: 9 units

NOx Reductions (tons/year)	SO2 Reductions (tons/year)	PM Reductions (tons/year)	Total Emissions Reductions (tons/year)
34,774	35,776	532	71,082
(95.3 tons/day)	(98.0 tons/day)	(1.5 tons/day)	(194.8 tons/day)

…by the year 2018.

Emission Reductions Resulting from the Regional Haze Program

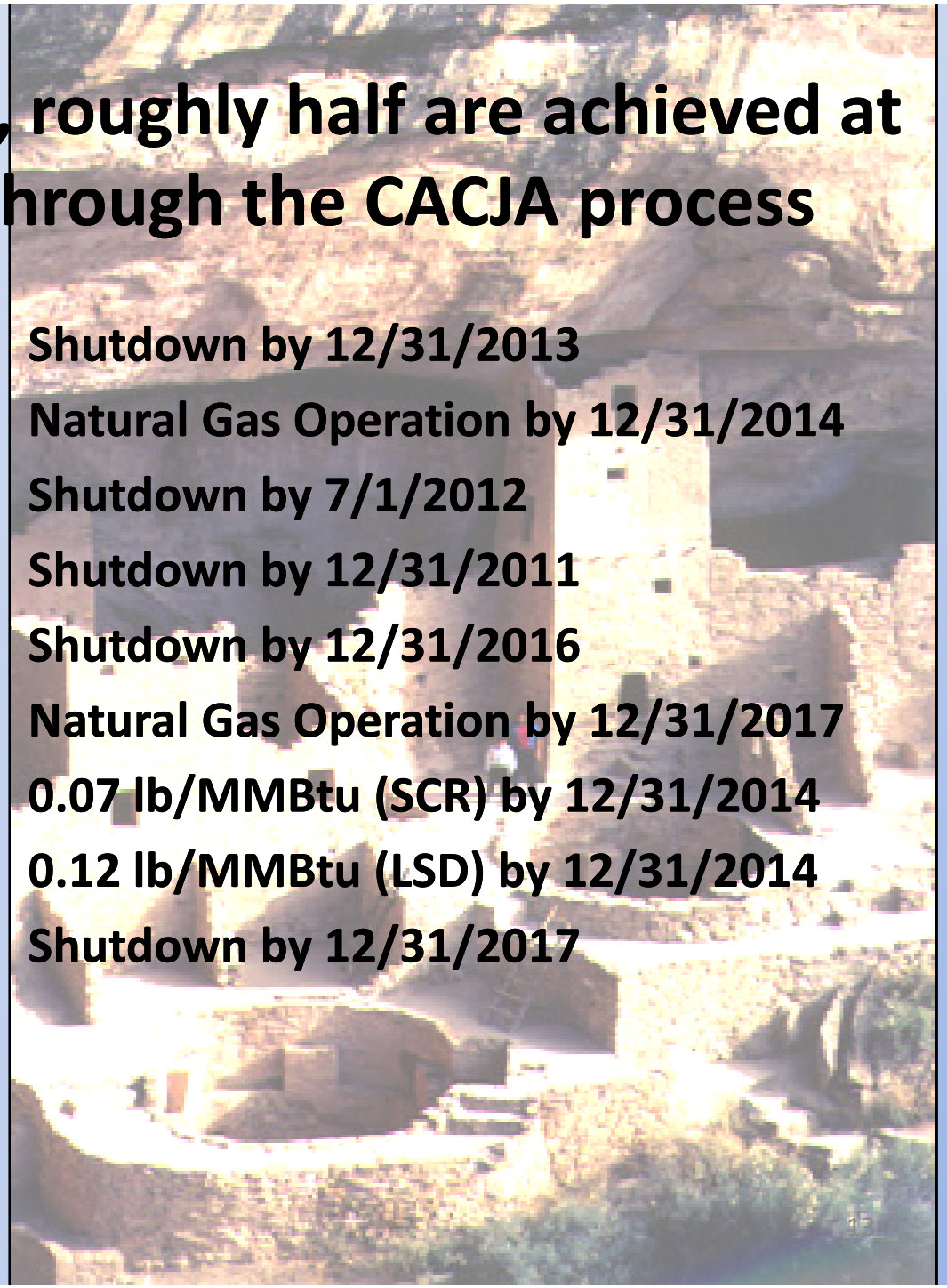
Facility or Unit	Location	Emissions Control Approach			NOx Reductions (tons/year)	SO2 Reductions (tons/year)	PM Reductions (tons/year)	Total Emissions Reductions (tons/year)
Black Hills Clark Station*	Canon City	Shut Down			861	1,457	72	2,390
PSCo Cherokee-Unit 1*	Denver Metro	Shut Down			1,556	2,221	37	3,814
PSCo Cherokee-Unit 2*	Denver Metro	Shut Down			2,895	1,888	35	4,818
PSCo Cherokee-Unit 3*	Denver Metro	Shut Down			1,866	743	65	2,674
PSCo Cherokee-Unit 4*	Denver Metro	Natural Gas Operation			2,211	2,127	0	4,338
PSCo Arapahoe-Unit 3*	Denver Metro	Shut Down			1,770	925	56	2,751
PSCo Arapahoe-Unit 4*	Denver Metro	Natural Gas Operation			248	1,764	0	2,012
PSCo Valmont-Unit 5*	Denver Metro	Shut Down			2,314	758	42	3,114
PSCo Pawnee Station*	E Colorado	NOx - SCR	SO2 - LSD	PM - baghouse**	3,135	11,066	0	14,201
PSCo Comanche-Unit 1	Pueblo	NOx - LNB**	SO2 - LSD**	PM - baghouse**	0	0	0	0
PSCo Comanche-Unit 2	Pueblo	NOx - LNB**	SO2 - LSD**	PM - baghouse**	0	0	0	0
PSCo Hayden-Unit 1	NW Colorado	NOx - SCR	SO2 - LSD**	PM - baghouse**	3,032	61	0	3,093
PSCo Hayden-Unit 2	NW Colorado	NOx - SCR	SO2 - LSD**	PM - baghouse**	3,120	39	0	3,159
PSCo Cameo Station	W Colorado	Shut Down			1,140	2,618	225	3,983
TriState Craig-Unit 1	NW Colorado	NOx - SNCR	SO2 - WS**	PM - baghouse**	727	0	0	727
TriState Craig-Unit 2	NW Colorado	NOx - SCR	SO2 - WS**	PM - baghouse**	3,975	0	0	3,975
TriState Craig-Unit 3	NW Colorado	NOx - SNCR	SO2 - LSD**	PM - baghouse**	854	0	0	854
TriState Nucla	W Colorado	NOx - SNCR**	SO2 - LI**	PM - baghouse**	0	0	0	0
PRP Rawhide-Unit 101	Larimer County	NOx - ECC	SO2 - LSD**	PM - baghouse**	448	0	0	448
CSU Drake-Unit 5	Colo. Springs	NOx - ULNB+OFA	SO2 - DSI	PM - baghouse**	215	762	0	977
CSU Drake-Unit 6	Colo. Springs	NOx - ULNB+OFA	SO2 - LSD	PM - baghouse**	509	2,368	0	2,877
CSU Drake-Unit 7	Colo. Springs	NOx - ULNB+OFA	SO2 - LSD	PM - baghouse**	749	3,764	0	4,513
CSU Nixon	Fountain	NOx - ULNB+OFA	SO2 - LSD	PM - baghouse**	707	3,215	0	3,922
Holcim Cement Plant	Florence	NOx - SNCR	SO2 - WLS**	PM - baghouse**	1,028	0	0	1,028
Cemex Cement Plant	Denver Metro	NOx - SNCR	SO2 - none	PM - baghouse**	846	0	0	846
CENC-Boiler 3	Denver Metro	NOx - none	SO2 - none	PM - baghouse**	0	0	0	0
CENC-Boiler 4	Denver Metro	NOx - LNB+SOFA	SO2 - none	PM - baghouse**	214	0	0	214
CENC-Boiler 5	Denver Metro	NOx - LNB+SOFA+SNCR	SO2 - none	PM - baghouse**	354	0	0	354
* HB 10-1365 Source		** existing controls						
Total Emissions Reductions (by 2018)					*34,774*	*35,776*	*532*	*71,082*
2009 Statewide Emissions (all sources)					*284,037*	*61,229*	*293,738*	
Benefit of RH Emission Reductions - Percentage Reduction from 2009 Statewide Emissions					*-12.2%*	*-58.4%*	*-0.2%*	

Abbreviation Key			
DSI = dry sorbent injection	LSD = lime spray dryers	SNCR = selective non-catalytic reduction	WLS = wet lime scrubber
ECC = enhanced combustion control	NOx = Nitrogen Oxides	SOFA = separated overfire air	WS = wet scrubbers
LI = limestone injection	PM = Particulate Matter	SO2 = Sulfur Dioxide	
LNB = low NOx burners	SCR = selective catalytic reduction	ULNB+OFA = ultra LNB plus overfire air	

Of these reductions, roughly half are achieved at PSCo/Xcel units through the CACJA process

- Arapahoe Unit 3: Shutdown by 12/31/2013
- Arapahoe Unit 4: Natural Gas Operation by 12/31/2014
- Cherokee Unit 1: Shutdown by 7/1/2012
- Cherokee Unit 2: Shutdown by 12/31/2011
- Cherokee Unit 3: Shutdown by 12/31/2016
- Cherokee Unit 4: Natural Gas Operation by 12/31/2017
- Pawnee NOx: 0.07 lb/MMBtu (SCR) by 12/31/2014
  SO2: 0.12 lb/MMBtu (LSD) by 12/31/2014
- Valmont Unit 5: Shutdown by 12/31/2017

SO2: 21,493 tons per year
NOx: 15,995 tons per year



Electric Generating Unit Repowering

Coal-Fired Power Plant (550 MW)

- NOx ~ 9,326 tons/year
- SO2 ~ 5,837 tpy
- CO ~ 411 tpy
- VOC ~ 48 tpy
- PM ~ 173 tpy
- Hg ~ 106 pounds
- Pb ~ 63 pounds
- CO2 ~ 4.3 million tpy

Natural Gas-Fired Power Plant (550 MW)*

- NOx ~ 355 tons/year
- SO2 ~ 13 tpy
- CO ~ 177 tpy
- VOC ~ 20 tpy
- PM ~ 59 tpy
- Hg ~ 0
- Pb ~ 0
- CO2 ~ 1.2 million tpy

** 75% Capacity Factor*

EPA approved Colorado's RH SIP

- September 10, 2012
- "EPA acknowledges that Colorado's approach appears to be a novel and comprehensive strategy for addressing regional haze requirements and other air quality goals. This approach . . .will yield significant emissions reductions not only of pollutants that affect visibility in Class I areas, but also significant reductions in pollutants that contribute to ozone formation, nitrogen deposition, and mercury emissions and deposition. The State spent considerable time and conducted sequential and extended hearings to develop a plan which seeks to balance a number of variables beyond those that would be involved in a simpler and narrower regional haze determination."