Colorado Regional Haze Update

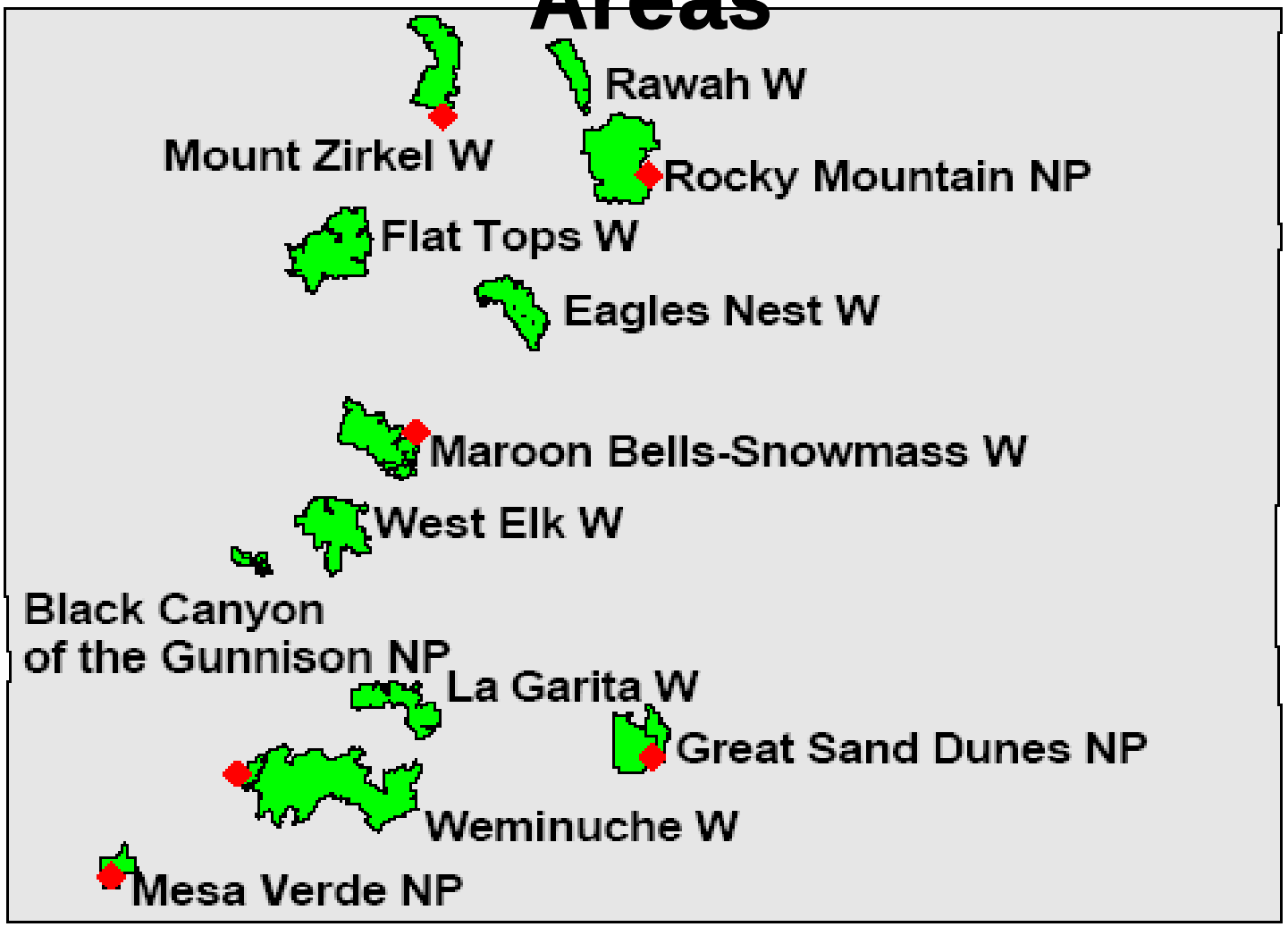
Four Corners Air Quality Group

May 30, 2012

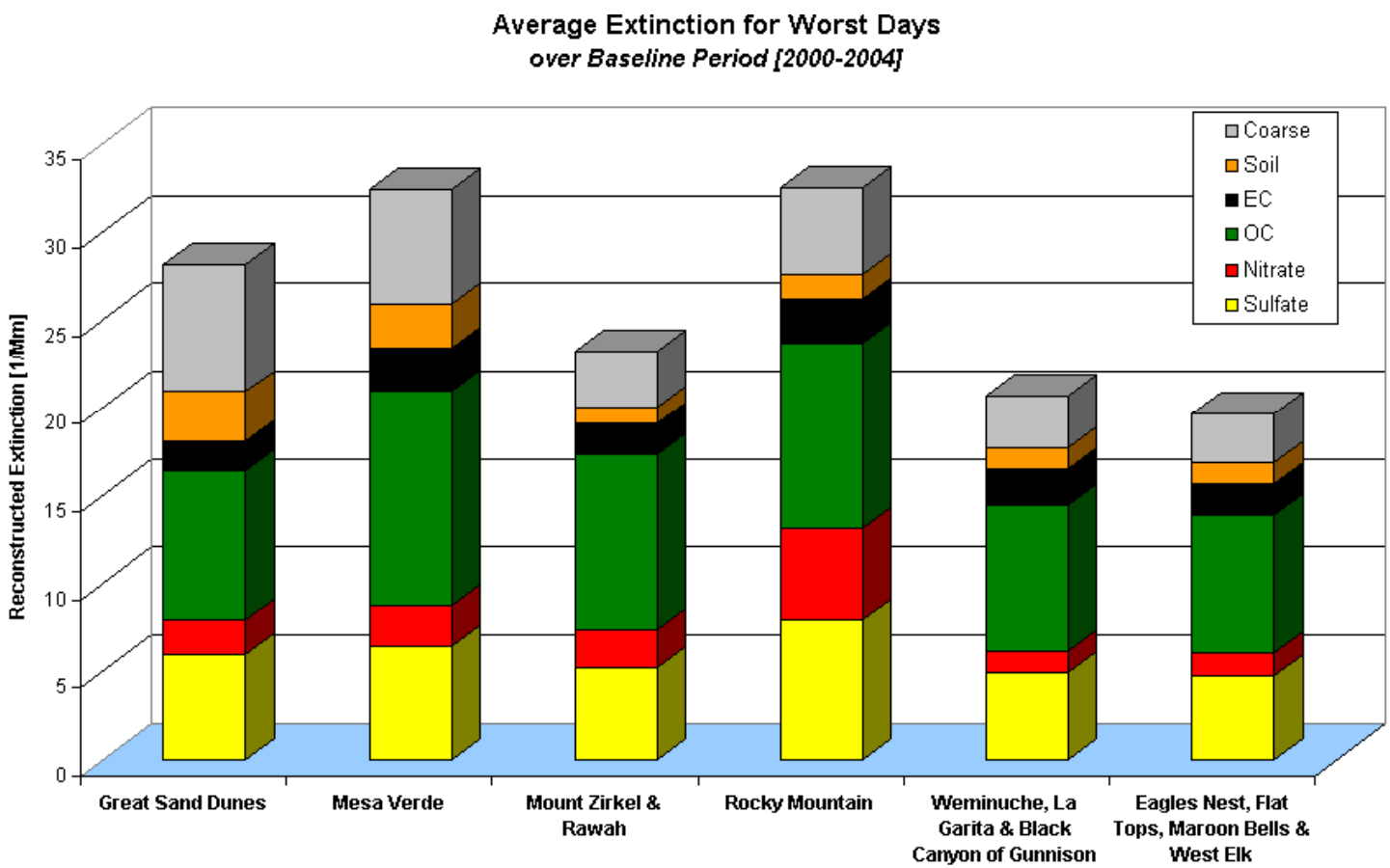
Regional Haze – The National Goal

Congress… ***"declares as a national goal the prevention of any future and remedying of any existing impairment of visibility in any mandatory Class I Federal areas which impairment results from man-made air pollution"*** **(1977 Clean Air Act, §169A)**

Colorado Class I Areas



Visibility Conditions in Colorado: What Contributes?



Colorado Regional Haze Plan Overview

- Extensive process involving analysis of dozens of emissions units
  - Primarily coal-fired power plants
  - SO_2 and NO_x controls
- Innovative process for Public Service Company of Colorado's Units under HB10-1365
  - Better than BART alternative relying on combination of facility shutdowns, conversion to natural gas and advanced controls
  - Review and approval by Public Utilities Commission prior to inclusion in Regional Haze SIP
- Significant emission reductions from other sources using traditional SIP process

Attachment 2

Emission Reductions Resulting from the Regional Haze Program

Facility or Unit	Location	Emissions Control Approach			NOx Reductions (tons/year)	SO2 Reductions (tons/year)	HB 10-1365 Source	Total Emissions Reductions (tons/year)
Black Hills Clark Station	Canon City	Shut Down			861	1,457	yes	2,390
PSCo Cherokee - Unit 1	Denver Metro	Shut Down			1,556	2,221	yes	3,814
PSCo Cherokee - Unit 2	Denver Metro	Shut Down			2,895	1,888	yes	4,818
PSCo Cherokee - Unit 3	Denver Metro	Shut Down			1,866	743	yes	2,674
PSCo Cherokee - Unit 4	Denver Metro	Natural Gas Operation			2,211	2,127	yes	4,338
PSCo Arapahoe - Unit 3	Denver Metro	Shut Down			1,770	925	yes	2,751
PSCo Arapahoe - Unit 4	Denver Metro	Natural Gas Operation			248	1,764	yes	2,012
PSCo Valmont - Unit 5	Denver Metro	Shut Down			2,314	758	yes	3,114
PSCo Pawnee Station	E. Colorado	NOx - SCR	SO2 - LSD	PM - baghouse*	3,135	11,066	yes	14,201
PSCo Comanche - Unit 1	Pueblo	NOx - LNB*	SO2 - LSD*	PM - baghouse*	0	0	no	0
PSCo Comanche - Unit 2	Pueblo	NOx - LNB*	SO2 - LSD*	PM - baghouse*	0	0	no	0
PSCo Hayden - Unit 1	NW Colorado	NOx - SCR	SO2 - LSD*	PM - baghouse*	3,032	61	no	3,093
PSCo Hayden - Unit 2	NW Colorado	NOx - SCR	SO2 - LSD*	PM - baghouse*	3,120	39	no	3,159
PSCo Cameo Station	W Colorado	Shut Down			1,140	2,618	no	3,983
TriState Craig - Unit 1	NW Colorado	NOx - SNCR	SO2 - WS*	PM - baghouse*	727	0	no	727
TriState Craig - Unit 2	NW Colorado	NOx - SCR	SO2 - WS*	PM - baghouse*	3,975	0	no	3,975
TriState Craig - Unit 3	NW Colorado	NOx - SNCR	SO2 - LSD*	PM - baghouse*	854	0	no	854
TriState Nucla	W Colorado	NOx - SNCR*	SO2 - LI*	PM - baghouse*	0	0	no	0
PRP Rawhide - Unit 101	Larimer County	NOx - ECC	SO2 - LSD*	PM - baghouse*	448	0	no	448
CSU Drake - Unit 5	Colo. Springs	NOx - ULNB+OFA	SO2 - DSI	PM - baghouse*	215	762	no	977
CSU Drake - Unit 6	Colo. Springs	NOx - ULNB+OFA	SO2 - LSD	PM - baghouse*	509	2,368	no	2,877
CSU Drake - Unit 7	Colo. Springs	NOx - ULNB+OFA	SO2 - LSD	PM - baghouse*	749	3,764	no	4,513
CSU Nixon	Fountain	NOx - ULNB+OFA	SO2 - LSD	PM - baghouse*	707	3,215	no	3,922
Holcim Cement Plant	Florence	NOx - SNCR	SO2 - WLS*	PM - baghouse*	1,028	0	no	1,028
Cemex Cement Plant	Denver Metro	NOx - SNCR	SO2 - none	PM - baghouse*	846	0	no	846
CENC - Boiler 3	Denver Metro	NOx - none	SO2 - none	PM - baghouse*	0	0	no	0
CENC - Boiler 4	Denver Metro	NOx - LNB+SOFA	SO2 - none	PM - baghouse*	214	0	no	214
CENC - Boiler 5	Denver Metro	NOx - LNB+SOFA+SNCR	SO2 - none	PM - baghouse*	354	0	no	354
Total Emissions Reductions (by 2018)					*34,774*	*35,776*		*70,550*

* existing controls

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

Regional Haze in the Four Corners

- Largest anthropogenic source categories
  - Power plants
  - Oil and gas sources
- Organic carbon major contributor for Mesa Verde
  - Fire contribution being researched through modeling and monitoring
- Length of time necessary for Mesa Verde to achieve natural conditions:
  - 164 years (2168)
  - Does not account for reductions from Regional Haze controls outside Colorado

Regional Haze Plan Status

- Colorado submitted plan to EPA on May 25, 2011
- EPA proposed full approval on March 26, 2012
- Public Comment period closed May 25, 2012
- Awaiting final rulemaking from EPA

Navajo Nation Position on Regional Haze BART

Four Corners
Air Quality Group Update Meeting
May 30, 2012
Farmington, New Mexico

Coal Fired EGU's Surrounding Navajo Nation

NGS

- BART (PENDING)
  - NOx
- NREL & ASU economic study

EPA R9

FCPP

- Better than BART (PROPOSED)
  - NOx
- SCR Unit 4-5

SJGS

- EPA R6 BART (FINALIZED)
  - NOx
- Support for NM RH SIP BART

Four Corners Power Plant
Better Than BART Proposal

~~APS – 100% unit 1,2,3~~, Unit 4,5 : ~~SCE 48 %~~, APS **48+15=63%**, PNM 13%, SRP 10%, EPE 7%, TEP 7%

Unit 4 &5
750MW per unit

Unit 3
280MW

Unit 1 &2
185MW
per unit

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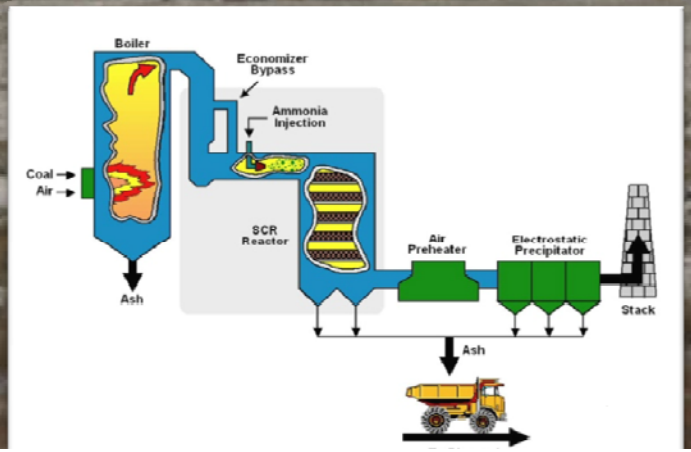

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Navajo Nation Position
BART for FCPP

- The Nation Generally Supports Alternative Emission Control Strategy (AECS).
- The AECS will achieve greater visibility improvements than October 2010 EPA BART FIP Proposal
- The AECS seems realistically achievable with a phased approach
- EPA still must analyze the ***adverse economic impacts on the Navajo Nation*** by closing units 1-3
- EPA must consider the cumulative effects of the BART FIP for FCPP Regionally

NGS Studies

NREL
NATIONAL RENEWABLE ENERGY LABORATORY

Energy Analysis

Navajo Generating Station

Navajo Generating Station and Air Visibility Regulations: Alternatives and Impacts

David J. Hurlbut, Scott Haase, Gregory Brinkman,
Kip Funk, Rachel Gelman, Eric Lantz,
Christina Larney, David Peterson,
Christopher Worley
National Renewable Energy Laboratory

Ed Liebsch
HDR Engineering, Inc.

Prepared under Task No. WFJS.1000

Technical Report
NREL/TP-6A20-53024 • January 2012
Contract No. DE-AC36-08GO28308

Produced under direction of the U.S. Department of the Interior by the National Renewable Energy Laboratory (NREL) under Interagency Agreement R11PG30024 and Task No. WFJS.3000.

NREL is a national laboratory of the U.S. Department of Energy,
Office of Energy Efficiency and Renewable Energy, operated by the Alliance for Sustainable Energy, LLC.

ASU W. P. CAREY SCHOOL of BUSINESS
ARIZONA STATE UNIVERSITY

NAVAJO GENERATING STATION AND KAYENTA MINE:

An Economic Impact Study

Dr. Matt Croucher, Dr. Anthony Evans and Dr. Tim James
L William Seidman Research Institute,
W. P. Carey School of Business,
Arizona State University

February 2, 2012

Navajo Nation
Phased Approach for NGS

- The recently installed Advanced Combustion Controls (New LNB/ SOFA) meet the BART presumptive limit with respect to each unit.
- Revisit the BART for NGS in 2017 and review whether the power plants current emission control strategies will achieve the EPA 2064 goal and reasonable progress.
- 2010- 2017 will help EPA, Facilities, NNEPA to review the following issues
  - Lease Renewal Negotiations.
  - New regulations such as GHG, MACT (mercury) which will require the facilities to come up with new control equipment's which will further reduce NOx and PM (BART pollutant).
  - Ammonia Monitoring Plan between facilities, EPA , NNEPA , FLMs , and conduct more detail visibility modeling analysis .
  - Explore other new pollution control equipment by 2017 and upgrade older units.

San Juan Generating Station
BART-Nation Position

EPA R6 BART FIP

- NMED Failed to Submit RH SIP
- SCR on all Four Units
- **BART FIP will have No Tribal Implications**
- **No Economic Impacts Analyzed**
- Compliance timeline increased from 3 to 5 years

NMED RH SIP

- SNCR on all Four Units
- Meet Presumptive BART Limits
- Visibility Improvement aligns with SIP
- Economic Impact to NM ratepayers analyzed
- SCR cost too high compared to SNCR

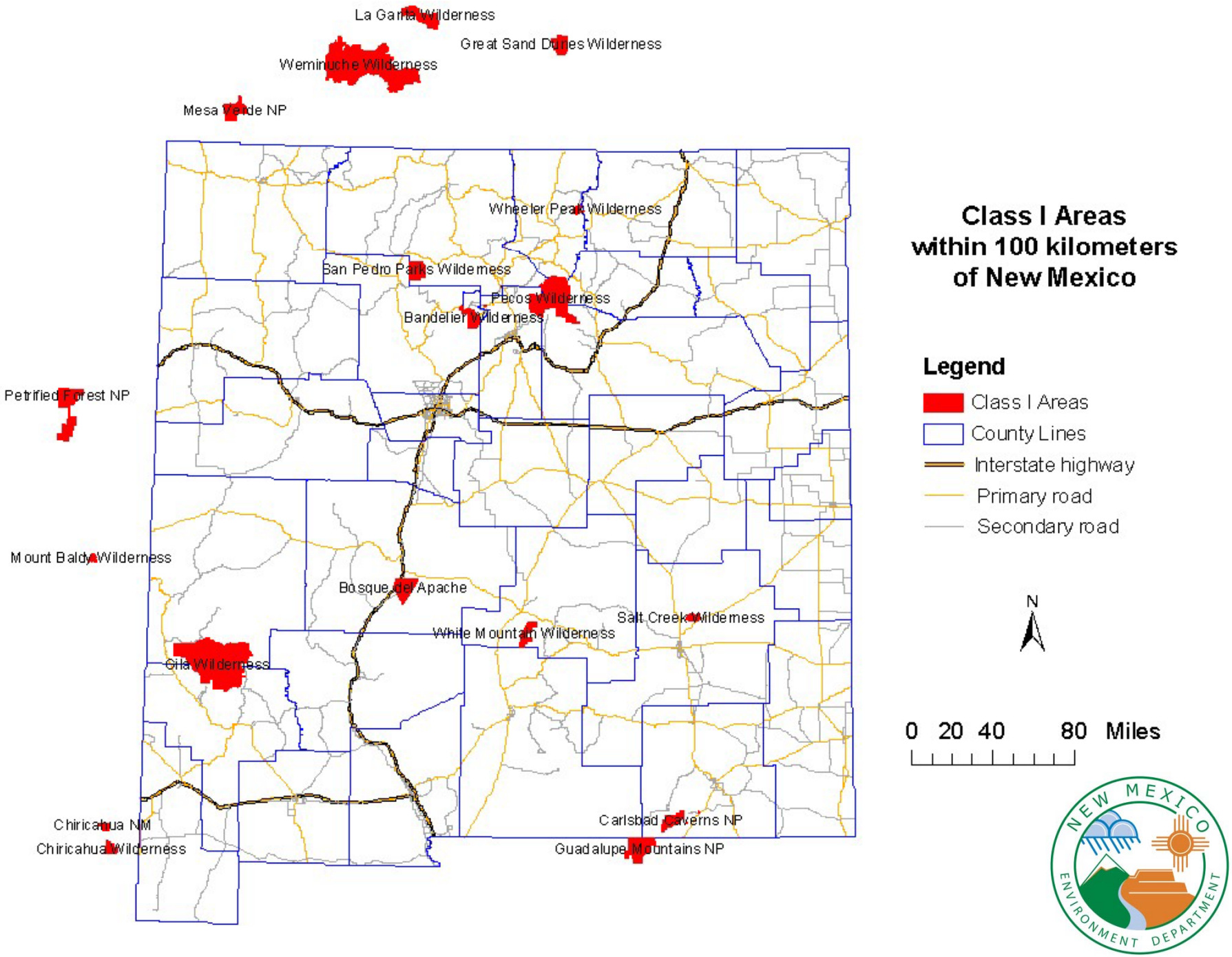
Navajo Nation Position

- EPA Consider NM RH SIP
- EPA failed to conduct full five factor analysis
- **EPA analysis of no Tribal implications is not valid**
- Economic Impacts, Regional Cumulative Benefits

New Mexico Regional Haze Update

Four Corners Air Quality Group

May 30, 2012


Class I Areas
within 100 kilometers
of New Mexico
Legend
Class I Areas
County Lines
Interstate highway
Primary road
Secondary road
N
0 20 40 80 Miles
La Garita Wilderness
Great Sand Dunes Wilderness
Weminuche Wilderness
Mesa Verde NP
Wheeler Peak Wilderness
San Pedro Parks Wilderness
Pecos Wilderness
Bandelier Wilderness
Petrified Forest NP
Mount Baldy Wilderness
Bosque del Apache
Salt Creek Wilderness
White Mountain Wilderness
Gila Wilderness
Chiricahua NM
Chiricahua Wilderness
Carlsbad Caverns NP
Guadalupe Mountains NP
NEW MEXICO
ENVIRONMENT DEPARTMENT

State Implementation Plan Status

- NMED submitted the Regional Haze SIP to EPA on June 29, 2011
- EPA has not yet taken action on that submittal
- Consent decree deadline for proposed action is May 30 (today)
- Consent decree deadline for final action is August 15

Best Available Retrofit Technology for San Juan Generating Station

- NM adopted selective non-catalytic reduction (SNCR) as BART for NOx for San Juan Generating Station
- SNCR reduces NOx emissions by 4,900 tons per year
- Improves visibility:
  - 0.25 dv at San Pedro Parks Wilderness Area
  - 0.22 dv at Mesa Verde National Park
  - 0.21 dv at Bandelier National Monument

Other Provisions in Regional Haze SIP

- Sulfur dioxide (SO_2) backstop trading program
  - Applies to all sources >100 tons per year of SO_2 emissions
  - Triggered only if milestones are exceeded
  - Includes sources in New Mexico, Utah and Wyoming
- Smoke Management Program
  - In effect in NM since December 31, 2003
  - Applies to all burns over 10 acres or 100 cubic feet of pile volume
  - Open burning applies to smaller burns
- Others (long term strategy, EE/RE, others)

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Next Steps

- 2013 Progress Report
  - In the form of a SIP revision
  - Public hearings on the progress report will be held
- 2018 Major SIP Revision
- EPA is considering revisions to the Regional Haze Rule