DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

Permit Application Analysis
AP-4703

April 13, 2007

NAME OF FIRM:	American Colloid Company
NAME OF FACILITIES:	Colony East & Colony West
FACILITY LOCATIONS:	SE¼ Section 3, T56N, R61W – <u>Colony East</u> SE¼ Section 3 & NE¼ Section 10, T56N, R61W – <u>Colony West</u> Crook County, Wyoming
TYPE OF OPERATION:	Bentonite Processing
RESPONSIBLE OFFICIAL:	Bill Rhoads – Colony East Chuck McAulay – Colony West
MAILING ADDRESS:	HC 69 Box 53 Belle Fourche, SD 57717
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REVIEWING ENGINEER:	Andrew Keyfauver, Air Quality Engineer Josh Nall, Air Quality Engineer

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PURPOSE OF APPLICATION:

American Colloid Company submitted an application to modify operations at the Colony East and Colony West Plants. The modifications will allow American Colloid to more efficiently operate the Colony Plants and will consist of the following:

<u>Colony East</u>
Replacement of Feed Hopper
Replacement of Pan Conveyor
Replacement of Crusher
Replacement of Miscellaneous Conveyors
Replacement of Rotary Dryer Burner
Increase Coal Consumption limit to 40,600 tpy
Lower outlet grain loading of baghouses to 0.01 gr/dscf
Addition of Clay Loadout Spout

<u>Colony West</u>
Addition of Feed Hopper
Addition of Pan Conveyor
Addition of Crusher
Addition of Bar Disintegrator
Addition of Miscellaneous Conveyors
Replacement of Rotary Dryer Burners
Lower outlet grain loading of baghouses to 0.01 gr/dscf

PERMIT HISTORY:

Colony East

On August 25, 2005, American Colloid Company was issued permit waiver AP-3678. This waiver authorized the installation of a 3,000 cfm bin vent for the ventilation of an MCC room.

On June 23, 2004, American Colloid Company was issued permit waiver AP-2074. This waiver authorized the replacement of the #47 Regis Packer Baghouse with a 16,000 cfm unit and to change the pickup points.

On October 21, 2003, American Colloid Company was issued permit waiver AP-1119. This waiver authorized the installation of a 3-sided storage bunker.

On September 30, 2003, American Colloid Company was issued Operating Permit 3-1-090. This permit authorized the operation of a major source of emissions under Chapter 6, Section 3 of the Wyoming Air Quality Standards and Regulations.

Colony West

On July 2, 2004, American Colloid Company was issued Operating Permit 3-1-137-1. This permit authorized the operation of a major source of emissions under Chapter 6, Section 3 of the Wyoming Air Quality Standards and Regulations.

ESTIMATED EMISSIONS:

Emissions of concern from the Colony East and West Plants consist primarily of nitrogen dioxide, carbon monoxide, and sulfur dioxide from the coal fired dryers and particulate emissions from bentonite handling. The following tables show the emissions for the Colony East and Colony West Plants.

- **Colony East Plant**

Table I
American Colloid Company
Colony East Plant Dryer Emission Rates

ID	Source	Size	NO_x lb/MMBtu	CO lb/MMBtu	SO_2 lb/MMBtu	PM/PM_{10} gr/dscf
BH-08	Fluid Bed Dryer	50 MMBtu/hr	0.47	0.03	0.58	0.01
RD-1	Rotary Dryer	40 MMBtu/hr	0.47	0.03	0.58	0.01

Note: The dryers at the Colony East plant are controlled with baghouses.

Table II American Colloid Company Colony East Facility Emissions (tpy) After Modification						
ID	Source	NO_x	CO	VOC	SO_2	PM/PM_{10}
BH-08	Fluid Bed Dryer	103.8	6.5	0.9	127.4	13.1
RD-1	Rotary Dryer	83.0	5.2	0.7	101.9	13.1
RD-2	RD Nuisance	–	–	–	–	2.1
PS1	Primary System	–	–	–	–	3.1
PD1	Pre-Dried Clay System	–	–	–	–	4.5
17A	Granular System	–	–	–	–	1.9
17B	Raymond Mill #1	–	–	–	–	1.0
17C	Raymond Mill #2	–	–	–	–	1.2
17D	Nuisance Dust	–	–	–	–	3.4
18	Storage Silos	–	–	–	–	1.9
19	Draco-Air Slides	–	–	–	–	0.2
26	#47 Regis Packer	–	–	–	–	2.2
27	#22 Air Conveying System	–	–	–	–	6.6
3SB	3-Sided Bunker	–	–	–	–	1.1
HTRS	Unit and Belt Heaters	0.6	0.3	–	–	–
BLT1	Bulk Truck Loadout [1]	–	–	–	–	–
SP1	Storage Piles	–	–	–	–	6.8
FD1	Fugitives – Roads	–	–	–	–	39.3
BRL	Fugitives – Rail Loadout	–	–	–	–	12.0
CB1	Coal Bunker	–	–	–	–	1.8
BV-24	North Loadout Baghouse [2]	–	–	–	–	–
DC-25	North Loadout Baghouse [2]	–	–	–	–	–
BV-01	Coal Silo	–	–	–	–	0.4
MT1	Material Transfers	–	–	–	–	0.2
	Totals	**187.4**	**12.0**	**1.6**	**229.3**	**115.9**

[1] Controlled by #47 Regis Packer
[2] These units are located inside an enclosure.

Table III American Colloid Company Net Emission Change at Colony East Plant (tpy)					
	NO_x	CO	VOC	SO_2	PM/PM_{10}
Existing	198.6	10.2	1.6	211.8	236.0
Proposed	187.4	12.0	1.6	229.3	115.9
Net Change	**-11.2**	**1.8**	**0.0**	**17.5**	**-120.1**

- **Colony West Plant**

Table IV American Colloid Company Colony West Plant Dryer Emission Rates						
ID	Source	Size	NO_x lb/MMBtu	CO lb/MMBtu	SO_2 lb/MMBtu	PM/PM_{10} gr/dscf
DC-01	Rotary Dryer	37.7 MMBtu/hr	0.47	0.03	0.58	0.01
DC-02	Rotary Dryer	37.7 MMBtu/hr	0.47	0.03	0.58	0.01

Table V American Colloid Company Colony West Plant Emissions (tpy) After Modification						
ID	Source	NO_x	CO	VOC	SO_2	PM/PM_{10}
DC-01	#1 Rotary Dryer	78.3	4.9	0.7	96.1	15.0
DC-02	#2 Rotary Dryer	78.3	4.9	0.7	96.1	15.0
DC-03	Mill 1 and 2	–	–	–	–	2.6
DC-04	Granular System	–	–	–	–	3.8
DC-05	Granular Nuisance	–	–	–	–	2.0
DC-06	Packer System	–	–	–	–	3.8
DC-07	Bulk Loadout	–	–	–	–	4.5
BS-08	Belt Scale #1	–	–	–	–	0.8
BS-09	Belt Scale Hopper #1	–	–	–	–	0.4
DC-10	Transfer System [1]	–	–	–	–	–
DC-11	Packaging System [1]	–	–	–	–	–
DC-12	Granular Loadout	–	–	–	–	1.9
HTRS	Unit & Belt Heaters	1.4	0.6	0.1	–	–
DC-13	Triangle Packer	–	–	–	–	0.9
DC-14	Fines Tank/Nuisance	–	–	–	–	3.0
DC-15	Granular Nuisance	–	–	–	–	3.0
DC-16	Nuisance Baghouse	–	–	–	–	7.1
CH-12	Coal Handling (fugitives)	–	–	–	–	12.5
BL-13	Truck Loadout (fugitives)	–	–	–	–	6.0
BL-15	PD Bulk Loadout (fugitives)	–	–	–	–	6.0
SP1	Storage Piles (fugitivies)	–	–	–	–	4.6
MT1	Material Transfers (fugitives)	–	–	–	–	0.3
FD1	Fugitive Dust – Roads	–	–	–	–	16.1
	Totals	**158.0**	**10.4**	**1.5**	**192.2**	**109.3**

[1] These units are located inside an enclosure.

Table VI
American Colloid Company
Net Emission Change at Colony West Plant (tpy)

	NO_x	CO	VOC	SO_2	PM/PM_{10}
Existing	216.0	11.3	1.5	160.1	264.5
Proposed	158.0	10.4	1.5	192.2	109.3
Net Change	**-58.0**	**-0.9**	**0.0**	**32.1**	**-155.1**

CHAPTER 6, SECTION 4 – PREVENTION OF SIGNIFICANT DETERIORATION (PSD):

The Division has determined that the American Colloid – Colony East and West Plants are contiguous and adjacent; therefore, the emissions from both facilities are considered together for PSD applicability. Since the modifications to these facilities increase the efficiency of the plants an actual to potential emission test was used to determine if the modification triggered a significant emissions increase as defined under Chapter 6, Section 4 of the WAQSR. Past actual emission rates, potential emission rates, net change, and significant emission rates are shown in the following table:

Table VII
American Colloid Company
PSD Applicability (tpy)

	NO_x	CO	VOC	SO_2	PM/PM_{10}
Colony East & West Actual	195.5	13.2	1.7	131.2	159.7
Colony East & West Potential	345.4	22.4	3.1	421.5	225.2
Net Emissions Change	**158.9**	**9.2**	**1.4**	**290.3**	**65.5**
PSD Significant Emission Levels	40	100	40	40	15
PSD Review Required	YES	NO	NO	YES	YES

The Colony East and West Plant modifications are subject to a Prevention of Significant Deterioration (PSD) review consisting of the following:

- A Best Available Control Technology (BACT) analysis is required for all regulated pollutant emitted in significant amounts.
- An ambient air quality impact determination is required for all regulated pollutants emitted in significant amounts and any other pollutants required by the Administrator.
- An increment consumption analysis is required for regulated pollutants based on allowable emission rates as well as increment consuming emissions from other sources in the region. The total deterioration determined from this analysis must comply with the allowable increments established for PM_{10}, SO_2, and NO_x for the classification of the area (i.e. Class I or Class II) in which the increment consumption is predicted.
- An analysis is required to assess the impairment to visibility, soils, and vegetation resulting from the facility and general commercial, residential, industrial, and other growth associated with the facility.

CHAPTER 6, SECTION 4 – TOP DOWN BEST AVAILABLE CONTROL TECHNOLOGY (BACT):

Per the requirements of Chapter 6, Section 4 of the WAQSR, American Colloid Company conducted a top-down BACT analysis for control of pollutants (NO_x, SO_2, and PM_{10},) which are greater than PSD significant emission increase levels.

- **NO_x Emissions**

Control Options

American Colloid Company identified the following technologies for the control of NO_x emissions from the dryers at the Colony East and West Plants:

Combustion Optimization
Low NO_x Burner
Combustion Reburn
NO_x tempering
Selective Catalytic Reduction (SCR)
Selective Non-Catalytic Reduction (SNCR)

Low-NO_x burners control the formation of NO_x by controlling the mixing of air and fuel, causing off-stoichiometric combustion (uses excess air). LNBs are designed to reduce peak flame temp, and residence time which is the main cause of NO_x formation. The most common forms of LNBs are staged air or staged fuel burners usually designed for boilers. The dryers at the Colony East and West Plants are currently equipped with LNBs.

Combustion reburn destroys NO_x through chemically reducing conditions shortly after it is formed rather than minimizing its formation. From a practical standpoint, this is accomplished by introducing the reburn fuel into the dryer above the main burner region. This rich-fuel environment reacts with and destroys the NO_x formed in the main burners. Reburn performance has been shown to range from 35% to 60% percent depending on such factors as percentage of reburn fuel heat input, reburn fuel type and quantity, and initial NO_x level.

NO_x tempering systems utilize discrete targeting injection equipment to deliver tiny quantities of a cooling medium (usually water) directly into the high NO_x production zones to reduce NO_x formation temperatures.

SCR is a post-combustion control technique in which the flue gas is combined with vaporized ammonia in the presence of a catalyst and NO_x is reduced to nitrogen and water. SCR requires a minimum temperature of 500°F to be an effective emissions control device.

SNCR is similar to SCR in that it involves the injection of a reducing agent such as ammonia or urea into the flue gas stream. The reduction chemistry, however, takes place without the aid of a catalyst. SNCR systems rely on appropriate injection temperatures, proper reagent/gas mixing and prolonged retention time in place of a catalyst. The effective temperature range for SNCR systems is 1600°F to 2200°F.

Eliminate Technically Infeasible Options

Reburn was eliminated as a control technology for the dryers as the primary fuel is coal and natural gas which is typically used as the reburn fuel is not readily available for these units. Due to the low operating temperatures of the dryers, NO_x tempering was also considered to be an infeasible control option. SNCR was also considered to be technically infeasible for the Colony East and West Plants as the dryers operate at temperatures below that necessary for the ammonia or urea to react with the NO_x.

Rank Remaining Technologies

The following NO_x control technologies are ranked according to the level of emission rates achievable (control effectiveness):

Table VIII
American Colloid Company
Ranking of NO_x Control Technologies

Control Technology	Percent Control
SCR	90%
Low NOx Burners	40%
Combustion Optimization	none

Evaluate Remaining Technologies

American Colloid Company conducted an analysis of the environmental, energy, and economic impacts of installing the technically feasible control technologies. For the installation of SCR, safety and environmental concerns are associated with the storage and use of ammonia. In addition, there are energy penalties in terms of power needed to operate the SCR unit. Low NO_x burners are proposed for the dryers at the Colony East and West Plants and were considered the base case. American Colloid Company estimated the cost to control each dryer with SCR at approximately $6,300 per ton of NO_x removed with an annual cost of $424,000.

Select NO_x BACT (Conclusion)

The applicant reports the costs to control as being unreasonable. While these costs are in the upper range, the Division does not necessarily agree that the costs are unreasonable. However, the Division questions the applicant's technical discussion. The dryer stacks have an exhaust temperature of 200°F. In order for SCR to be a viable emission control device, a minimum exhaust gas temperature of 500°F is needed. While this is probably possible, there are other issues with reheating the exhaust, such as an increase in energy requirements as well as adding another source of emissions. In addition, the Division has reviewed the BACT/RACT/LEAR Clearinghouse and did not find the application of an SCR control device on any similar dryers in the bentonite industry. Based on the technical issues in conjunction with the costs to control, the Division considers low NO_x burners with proper dryer design and operation as being representative of BACT for this type of operation.

- **SO_2 Emissions**

Control Options

American Colloid Company identified the following technologies for the control of SO_2 emissions from the dryers at the Colony East and West Plants:

Dry Scrubber
Spray Drying
Advanced Silicate Process
Dry Sorbent Injection
Wet Scrubber
Bentonite Absorbency

In the dry scrubber process, hydrated lime is injected directly into a circulating fluid bed reactor. Water is also injected into the bed to obtain an operation close to the adiabatic saturation temperature. Flue gas enters the bottom of the vessel and exits the top.

In spray drying, the flue gas enters an absorber tower where the flue gas contacts finely atomized lime slurry. The SO_2 reacts with the slurry and reacts to form solids which are then captured by a particulate control device.

Advanced silicate process is an add-on technology that injects a sorbent into ductwork upstream of a particulate control device.

Dry sorbent injection involves the addition of sorbent material into the gas stream to react with the SO_2. The sorbent can be injected into several locations: combustion area, flue gas duct, or an open reaction chamber. The SO_2 reacts with the sorbent to form solids which are removed in a particulate control device.

Wet scrubbers utilize calcium, sodium, or ammonia based solvents in a slurry mixture which is injected into a vessel to react with SO_2 in the flue gas.

Bentonite which is processed at the facility has the ability to absorb SO_2 (65% control efficiency) from the flue gas due to the minerals contained in the clay.

Eliminate Technically Infeasible Options

American Colloid Company eliminated all control options except for benonite absorbency, due to the fact that the Colony East and West Plants recycle the bentonite captured in the baghouses. The addition of a sorbent would not allow captured bentonite to be recycled in the process, and the addition of water to the flue gas stream through these control technologies would tend to foul the baghouses by creating a bentonite based mud.

Rank/Evaluate/Select BACT:

Based on the removal of the infeasible options the only remaining control option is bentonite absorbency which American Colloid considered to represent BACT. Based on the technical difficulties associated with the other SO_2 control technologies evaluated, the Division considers bentonite absorbency (65% control efficiency) as being representative of BACT for this type of operation.

- **PM/PM_{10} Emissions**

The Colony East and West Plants are currently controlled with various baghouses with outlet grain loadings varying between 0.01 gr/dscf to 0.04 gr/dscf. The dryer baghouses at each facility are subject to BACT review due to the proposed modifications; however, American Colloid Company has proposed to lower the outlet grain loading from all baghouses down to 0.01 gr/dscf. Based on the sizes of the baghouses, the Division considers lowering the outlet grain loading of the baghouses to 0.01 gr/dscf as being representative of BACT. The following table shows the sizes of the baghouses and their respective outlet grain loading.

Table IX
American Colloid Company
Baghouse Size and Outlet Grain Loading

ID	Source	Size scfm	Existing gr/dscf	Proposed gr/dscf
Colony East				
BH-08	Fluid Bed Dryer Baghouse*	35,000	0.04	0.01
RD-1	Rotary Dryer Baghouse*	35,000	0.025	0.01
RD-2	RD Nuisance	5,500	0.02	0.01
PS1	Primary System	8,200	0.02	0.01
PD1	Pre-Dried Clay System	12,000	0.02	0.01
17A	Granular System	5,032	0.02	0.01
17B	Raymond Mill #1	2,735	0.02	0.01
17C	Raymond Mill #2	3,234	0.02	0.01
17D	Nuisance Dust	9,000	0.01	0.01
18	Storage Silos	5,000	0.02	0.01
19	Draco-Air Slides	640	0.02	0.01
26	#47 Regis Packer	5,786	0.02	0.01
27	#22 Air Conveying System	17,640	0.02	0.01
3SB	3-Sided Bunker	3,036	0.02	0.01
Colony West				
DC-01	Rotary Dryer Baghouse*	40,000	0.028	0.01
DC-02	Rotary Dryer Baghouse*	40,000	0.028	0.01
DC-03	Mill 1 and 2	7,000	0.028	0.01
DC-04	Granular System	10,000	0.028	0.01
DC-05	Granular Nuisance	5,278	0.02	0.01
DC-06	Packer System	10,000	0.02	0.01
DC-07	Bulk Loadout	12,000	0.02	0.01

* Sources subject to BACT review.

Table IX American Colloid Company Baghouse Size and Outlet Grain Loading				
ID	Source	Size scfm	Existing gr/dscf	Proposed gr/dscf
Colony West (cont.)				
BS-08	Belt Scale #1	2,000	0.02	0.01
BS-09	Belt Scale Hopper #1	1,000	0.02	0.01
DC-12	Granular Loadout	5,000	0.02	0.01
DC-13	Triangle Packer	2,500	0.02	0.01
DC-14	Fines Tank/Nuisance	8,000	0.02	0.01
DC-15	Granular Nuisance	7,900	0.01	0.01
DC-16	Nuisance Baghouse	19,000	0.02	0.01

* Sources subject to BACT review.

With a decrease in the potential emissions for sources 17A, 17B, 18, 26, and 27 at the Colony East Plant, the Division is proposing to lower the allowable opacity from these units to 20 percent. Sources 17A, 17B, 18, 26, and 27 currently have opacity limits of 40 percent as determined by Method 9 of 40 CFR part 60.

STARTUP AND SHUTDOWN OPERATIONS:

The Division requested that American Colloid Company address startup and shutdown operations at the Colony East and West Plants.

NO_x and CO Emissions

The dryers at the Colony East and West Plants are fired on natural gas during startup. NO_x emissions from firing natural gas are lower than firing coal, and CO emissions during startup are comparable to firing coal.

SO_2 and PM_{10} Emissions

The dryers are fired on natural gas during startup; therefore, SO_2 emissions will be lower during startup. In addition, before the fuel is switched over to coal, bentonite is being fed through the dryers to prevent the fabric filters in the baghouses from burning and bentonite naturally controls SO_2 emissions. Particulate emissions are controlled at all times as the baghouses are operating during startup and shutdown.

Opacity

The dryers are fired on natural gas during startup, and the baghouses are in operation during this period. Therefore, the opacity from each dryer baghouse during startup should show compliance with the applicable opacity limits for each unit.

The Division proposes to include as a condition that emission and opacity limits at the Colony East and West Plants will apply at all times, based on the operation of the dryers during startup and shutdown.

CHAPTER 6, SECTION 3 – MAJOR SOURCE APPLICABLITY:

American Colloid Company was issued Operating Permit 3-1-090 for the Colony East Plant and Operating Permit 3-1-137-1 for the Colony West Plant. With the modifications proposed at the Colony East and West Plants, American Colloid Company will need to modify these operating permits in accordance with Chapter 6, Section 3 of the WAQSR.

NATIONAL EMISSION STANDARDS FOR HAZARDOUS AIR POLLUTANTS (MACT):

The Colony East and West Plants are not considered a major source of HAPs, as HAP emissions are less than 10 tpy of any individual HAP, and less than 25 tpy of any combination of HAPs. Therefore, the Colony East and West Plants are not subject to any NESHAPs currently promulgated by the EPA and a case-by-case MACT review is not required.

CHAPTER 5, SECTION 2 – NEW SOURCE PERFORMANCE STANDARDS (NSPS):

- **Colony East Plant**

The rotary dryer (RD-1) at the Colony East Plant is subject to Subpart UUU of 40 CFR part 60. Under this subpart, particulate emissions from the dryer baghouse are limited to 0.025 gr/dscf and the opacity is limited to ten percent (10%). Subpart UUU requires that the dryers be equipped with a continuous opacity monitor to monitor the opacity of emissions discharged into the atmosphere from the control device (baghouse). In lieu of an opacity monitor, the facility may have a certified visible emissions observer measure and record three 6-minute averages of the opacity of visible emissions to the atmosphere each day of operation in accordance with Method 9 of 40 CFR, Part 60, Appendix A. American Colloid Company currently conducts daily observations of the rotary dryer. Since the fluid bed dryer is not being physically modified it will not become subject to this subpart.

The Colony East Plant is subject to the requirements of Subpart OOO of 40 CFR part 60 for some of the sources at the facility. Subpart OOO limits baghouses/bin vents to 0.022gr/dscf and to an opacity no greater than seven (7) percent. Fugitive emissions from process equipment are limited to no greater than 10 percent opacity.

The following table shows the baghouses/bin vents which are subject to this subpart. In addition, sources not being physically modified will not become subject to this subpart.

Table X
Colony East Plant
40 CFR Part 60, Subpart OOO Sources

Source ID#	Source Description	Source ID#	Source Description
RD-2	RD Nuisance	3SB	3-Sided Bunker
19	Draco-Air Slides		

- **Colony West Plant**

The rotary dryers at the Colony West Plant are not subject to Subpart UUU of 40 CFR part 60, and the replacement of the burners does not trigger a modification under NSPS.

The Colony West Plant is subject to the requirements of Subpart OOO of 40 CFR part 60 for some of the sources at the facility. Subpart OOO limits baghouses/bin vents to 0.022gr/dscf and to an opacity no greater than seven (7) percent. Fugitive emissions from process equipment are limited to no greater than 10 percent opacity.

The following table shows the baghouses/bin vents which are subject to this subpart. In addition, sources not being physically modified will not become subject to this subpart.

Table XI
Colony West Plant
40 CFR Part 60, Subpart OOO Sources

Source ID#	Source Description	Source ID#	Source Description
DC-10	Transfer System	DC-14	Fines Tank/Nuisance
DC-11	Packaging System	DC-15	Granular Nuisance
DC-13	Triangle Packer	DC-16	Nuisance Baghouse

PROJECTED IMPACT ON EXISTING AMBIENT AIR QUALITY:

PSD Modeling Applicability

An applicant submitting a permit application for a proposed major source or modification under Prevention of Significant Deterioration (PSD) regulations must demonstrate compliance with Wyoming Ambient Air Quality Standards (WAAQS), National Ambient Air Quality Standards (NAAQS), and PSD increments. Additionally, an applicant may be required to assess Air Quality Related Values (AQRVs) at the nearest Class I areas. In this case, the Division requested that the applicant determine the impacts at Wind Cave and Badlands National Parks (NP) in South Dakota and Northern Cheyenne Indian Reservation (NCIR) in southern Montana.

NEAR-FIELD MODELING ANALYSIS

The applicant performed a near-field (within 50 kilometers [km]) modeling analysis to determine the air quality impacts from the proposed modification for the criteria pollutants that showed a potential to exceed the PSD significant emissions rate. These pollutants were: nitrogen oxides (NO_x), sulfur dioxide (SO_2), and particulate matter 10 microns or less (PM_{10}). Additional analyses were performed to assess the air quality impacts from growth due to the project and the impacts on soils, water and vegetation.

Model Justification

Modeling was conducted with the EPA's Industrial Source Complex Short Term (ISCST3, Version 02035) model for the near-field analyses. Recommended regulatory default options were used in all model runs.

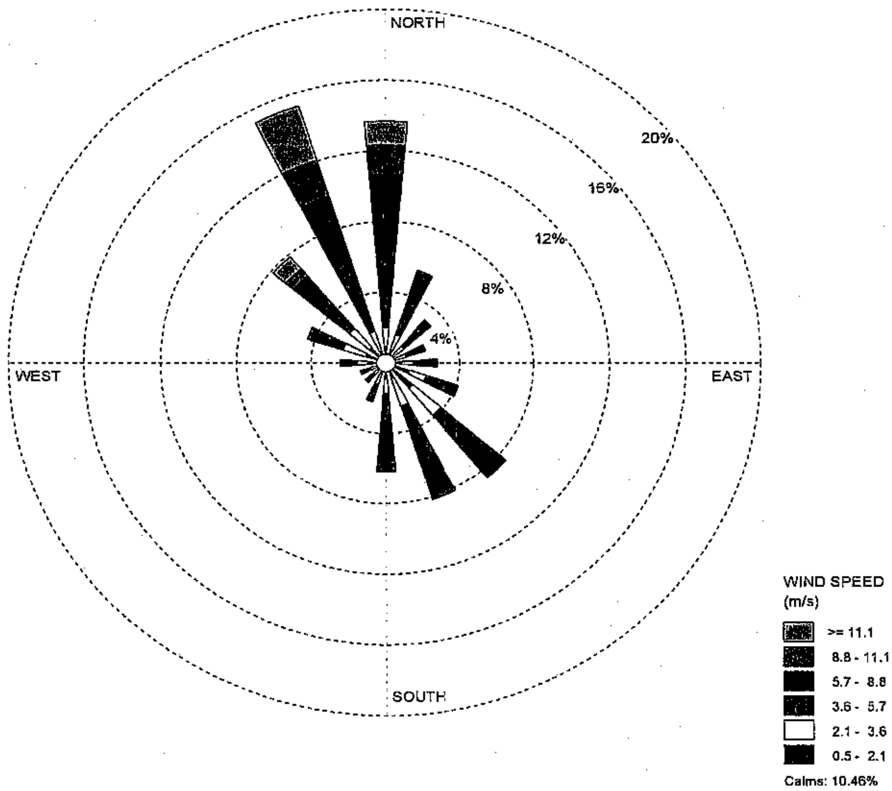
The ISC model has historically been the EPA-preferred model for near-field assessments in complex terrain with multiple sources. On November 9, 2005, the EPA published a revision to 40 CFR Part 51 Appendix W (*Guideline on Air Quality Models, [GAQM]*) that introduced a model developed by the American Meteorological Society/Environmental Protection Agency Regulatory Model Improvement Committee (AERMIC). Their model, AERMOD, replaces ISC as the EPA-preferred model for near-field assessments. The rule became effective on December 9, 2005. EPA authorized a one-year implementation period granting the reviewing authority the discretion to approve the use of ISC for modeling analyses through December 9, 2006. American Colloid submitted modeling protocols and the modeling analyses prior to the December 9, 2006 deadline, and therefore the use of the ISCST3 model is acceptable.

Meteorological Data

All ISCST3 modeling was conducted with five years (2000-2004) of surface and upper-air data collected by the National Weather Service (NWS) at the Rapid City Municipal Airport in South Dakota. A wind rose for the data from 2004 is presented in the figure below. An examination of the terrain to the south of Rapid City airport shows that Rapid Creek slopes in a general northwest to southeast direction. A similar configuration is in place with the Belle Fourche River to the south of the Colony plants. Although located more than 100 km from the Colony plants, the Rapid City data would meet the GAQM's definition of "adequately representative" of the Colony area due to the terrain and base elevation similarities. In addition, the use of five years of meteorological data, as suggested in the GAQM, should serve to capture worst-case meteorological conditions. The anemometer height for the Rapid City airport is 21 feet (6.4 meters) above ground level, and this height was input to the ISCST3 model runs.

The upper-air station at Rapid City is the nearest such station to the Colony area, and yields hourly mixing heights that are representative of the Colony area.

WIND ROSE PLOT:	DISPLAY:
Station #24090 - RAPID CITY/REGIONAL ARPT, SD	Wind Speed Direction (blowing from)



COMMENTS:	DATA PERIOD:	COMPANY NAME:	
	2004 Jan 1 - Dec 31 00:00 - 23:00	MODELER:	
	CALM WINDS: 10.46%	TOTAL COUNT: 8784 hrs.	
	AVG. WIND SPEED: 4.69 m/s	DATE: 1/8/2007	PROJECT NO.:

WRPLOT View - Lakes Environmental Software

Good Engineering Practice Analysis

Section 123 of the Clean Air Act defines Good Engineering Practice (GEP), with respect to stack heights, as "the height necessary to insure that emissions from the stack do not result in excessive concentrations of any air pollutant in the immediate vicinity of the source as a result of atmospheric downwash, eddies or wakes which may be created by the source itself, nearby structures or nearby terrain obstacles". In accordance with Chapter 6, Section 2(d) of the WAQSR, sources cannot model stack heights above GEP when attempting to show compliance with an air quality standard or increment.

The following equation, listed in Chapter 6, Section 2(d)(i)(B) of WAQSR, was used to determine GEP for sources associated with the Colony East and Colony West modifications:

$H_{(GEP)} = H + 1.5L$

Where:
H = the height of nearby structure(s) measured from the ground level elevation at the base of the stack
L = the lesser dimension (height or width) of nearby structure

For the four dryer stacks, the GEP stack heights are all in excess of 40 m, and this height is well above the stack heights that were modeled. All other point sources were also modeled with stack heights that were less than GEP.

Modeling Receptor Grids

The applicant used a base Cartesian receptor grid that included 2,378 receptors. Spacing and configuration for the receptors was as follows:

- 25-meter (m) spacing along the property boundary that encompasses Colony East and Colony West
- A rectangle of 50-m spacing that provides at least two rows of receptors beyond the property boundary
- 100-m spacing from beyond the 50-m grid to a distance of approximately 1 km from the ambient boundary
- 500-m spacing from beyond 100-m grid to a distance of approximately 5 km from the ambient boundary
- 1000-m spacing from beyond the 500-m grid to a distance of 10 km from the approximate center of the grid

Receptor elevations used in the modeling analyses were obtained from USGS Digital Elevation Model (DEM) files.

WYOMING AMBIENT AIR QUALITY STANDARDS (WAAQS) AND PSD INCREMENT ANALYSIS

WAAQS Analysis for Sulfur Dioxide (SO_2)

The applicant modeled the emissions from the sources of SO_2 at the Colony East and West plants along with a single source at the nearby Colony Plant belonging to Bentonite Performance Minerals (BPM). Modeling results were compared to the 3-hour, 24-hour, and annual WAAQS 1,300 $\mu g/m^3$, 260 $\mu g/m^3$, and 60 $\mu g/m^3$, respectively. Sources included in the model runs were as follows:

- Colony East Fluid Bed Dryer (Source ID - ACEBH08)
- Colony East Rotary Dryer (ACERD1)
- Colony West Rotary Dryer #1 (ACWDC01)
- Colony West Rotary Dryer #2 (ACWDC02)
- BPM Electrostatic Precipitator Stack (ESP)

Emission rates and stack parameters for these SO_2 sources are listed in the table below.

Total predicted impacts for comparison to the WAAQS are determined by adding the modeled impacts to background levels that represent ambient concentrations from all of the sources not explicitly modeled. Background for this project was provided to American Colloid by the South Dakota Department of Environment and Natural Resources, as measured at Badlands and Wind Cave National Parks:

3-hour SO_2: 98.1 $\mu g/m^3$
24-hour SO_2: 21.2 $\mu g/m^3$
Annual SO_2: 2.7 $\mu g/m^3$

Because the 3-hour and 24-hour WAAQS are based on concentrations "not to be exceeded more than once per year" at a given receptor, the second-high modeled impact at each receptor for a given year is compared to the WAAQS for those averaging periods. The overall highest second-high modeled 3-hour SO_2 concentration from all modeled sources was 223.5 $\mu g/m^3$. This modeled impact occurred on the eastern property boundary, a few hundred meters east of the Colony East plant sources. With the addition of the background level of 98.1 $\mu g/m^3$, the total predicted impact is 321.6 $\mu g/m^3$. This total predicted impact is 25% of the 3-hour WAAQS for SO_2.

For 24-hour SO_2, the highest second-high modeled concentration from all sources was 57.9 $\mu g/m^3$. This modeled impact occurred at the property boundary approximately 300 m north-northwest of the Colony East sources. With the addition of the background level of 21.2 $\mu g/m^3$, the total predicted impact is 79.1 $\mu g/m^3$, which is only 30% of the 24-hour WAAQS for SO_2.

The maximum modeled impact for annual SO_2 was 8.7 $\mu g/m^3$. This modeled impact occurred at the property boundary, approximately 300 m south of the Colony East sources. With the addition of the background level of 2.7 $\mu g/m^3$, the total predicted impact is 11.4 $\mu g/m^3$, which is well below the annual WAAQS for SO_2.

Point Sources Modeled for SO_2

Source ID	Description	NAD 27, UTM-E (Zone 13)	NAD 27, UTM-N (Zone 13)	Base Elev. (m)	Stack Ht. (m)	Release Temp. (K)	Exit Vel. (m/s)	Stack Diam. (m)	Emission Rate (g/s)	Emission Rate (tpy)
Colony West Sources										
ACWDC01	#1 Rotary Dryer	566298.4	4968664.8	1061	22.86	372.0	24.00	0.98	2.765	96.1
ACWDC02	#2 Rotary Dryer	566297.4	4968651.4	1061	22.86	372.0	26.53	0.98	2.765	96.1
Colony East Sources										
ACEBH08	Fluid Bed Dryer	567205.2	4968131.5	1039	25.30	394.3	39.53	0.91	3.665	127.4
ACERD1	Rotary Dryer	567184.5	4968121.5	1039	18.29	394.3	10.35	1.52	2.931	101.9
Bentonite Performance Minerals - Colony Plant										
ESP	Elec. Precipitator	567750	4967600	1036	24.38	359	26.34	1.37	6.552	52 lb/hr

Modeling results from the WAAQS analysis for SO_2 indicate that the ambient air quality impacts from all SO_2 sources in the project area, including the applicable background concentrations, are below the WAAQS for SO_2. Based on the results of this analysis, the Division concludes that the WAAQS/NAAQS for SO_2 will be protected during operation of the modified Colony East and West plants. Results of the WAAQS modeling analysis for SO_2 are provided in the following table.

Results of WAAQS/NAAQS Analysis for SO_2

Met Data Year	Averaging Time	Modeled Impact (µg/m³)[1]	Background Concentration (µg/m³)[2]	Total Modeled Impact (µg/m³)	WAAQS/NAAQS (µg/m³)
2000	3-Hour	176.6	98.1	274.7	1,300
2001		195.9		294	
2002		223.5		321.6	
2003		187.9		286	
2004		181.2		279.3	
2000	24-Hour	57.2	21.2	78.4	260/365
2001		57.9		79.1	
2002		50.0		71.2	
2003		56.8		78	
2004		50.7		71.9	
2000	Annual	8.5	2.7	11.2	60/80
2001		8.1		10.8	
2002		8.1		10.8	
2003		8.2		10.9	
2004		8.7		11.4	

[1] The reported impacts for 3-hour and 24-hour are the highest second-high impacts
[2] Pollutant background obtained from the South Dakota Department of Environment and Natural Resources
NAAQS = National Ambient Air Quality Standards
SO_2 = sulfur dioxide
µg/m³ = micrograms per cubic meter
WAAQS = Wyoming Ambient Air Quality Standards

Class II PSD Increment Analysis for Sulfur Dioxide (SO_2)

The applicant performed a cumulative 3-hour, 24-hour, and annual Class II SO_2 increment modeling analysis for the area near the project, as required in Chapter 6 Section 4(b)(i)(A)(I) of the WAQSR. Modeled sources included the same group of sources that was modeled for the WAAQS/NAAQS analysis. Permit allowable emissions were modeled for all of the American Colloid sources. For the BPM ESP source, the highest pound per hour emission rate measured from a May 2006 stack test (14.33 lb/hr) was used to represent actual emissions.

Because the 3-hour and 24-hour PSD increments are based on concentrations "not to be exceeded more than once per year" at a given receptor, the second-high modeled impact at each receptor is compared to the allowable increments for those averaging periods. Results of the analysis are presented in the table below. These results indicate that the Class II PSD increments for SO_2 will not be threatened in the vicinity of the Colony plants.

Results of PSD Increment Analysis for SO_2

Met Data Year	Averaging Time	Modeled Impact (μg/m³)[1]	PSD Increment (μg/m³)
2000	3-Hour	176.6	512
2001		195.9	
2002		223.5	
2003		187.9	
2004		181.21	
2000	24-Hour	56.8	91
2001		56.9	
2002		45.0	
2003		55.3	
2004		50.6	
2000	Annual	8.0	20
2001		7.6	
2002		7.9	
2003		7.6	
2004		8.4	

[1] The reported impacts for 3-hour and 24-hour are the highest second-high impacts
PSD = Prevention of Significant Deterioration
SO_2 = sulfur dioxide
μg/m³ = micrograms per cubic meter

WAAQS Analysis for Nitrogen Dioxide (NO_2)

The applicant modeled the emissions from all sources of NO_2 at the Colony East and West plants along with the ESP source from the BPM plant to determine compliance with the annual WAAQS for NO_2 of 100 μg/m³. Sources included in the model runs were as follows:

- Colony East Fluid Bed Dryer (ACEBH08)
- Colony East Rotary Dryer (ACERD1)
- Colony West Rotary Dryer #1 (ACWDC01)
- Colony West Rotary Dryer #2 (ACWDC02)
- BPM Electrostatic Precipitator Stack (ESP)

Emission rates and stack parameters for these sources are listed in the table below.

Point Sources Modeled for NO_2										
Source ID	**Description**	**NAD 27, UTM-E (Zone 13)**	**NAD 27, UTM-N (Zone 13)**	**Base Elev. (m)**	**Stack Ht. (m)**	**Release Temp. (K)**	**Exit Vel. (m/s)**	**Stack Diam. (m)**	**Emission Rate (g/s)**	**Emission Rate (tpy)**
Colony West Sources										
ACWDC01	#1 Rotary Dryer	566298.4	4968664.8	1061	22.86	372.0	24.00	0.98	2.2525	78.3
ACWDC02	#2 Rotary Dryer	566297.4	4968651.4	1061	22.86	372.0	26.53	0.98	2.2525	78.3
Colony East Sources										
ACEBH08	Fluid Bed Dryer	567205.2	4968131.5	1039	25.30	394.3	39.53	0.91	2.9860	103.8
ACERD1	Rotary Dryer	567184.5	4968121.5	1039	18.29	394.3	10.35	1.52	2.3877	83.0
Bentonite Performance Minerals - Colony Plant										
ESP	Elec. Precipitator	567750	4967600	1036	24.38	359	26.34	1.37	10.52	83.5 lb/hr

Total predicted impacts for comparison to the WAAQS are determined by adding the modeled impacts to background levels that represent ambient concentrations from all sources not explicitly modeled. Background for this project (1.9 μg/m^3) was provided to American Colloid from the South Dakota Department of Environment and Natural Resources, as measured at Badlands and Wind Cave National Parks. The overall highest predicted impact from all modeled sources was 6.1 μg/m^3. This modeled impact occurred on the northern property boundary, approximately 500 m north-northwest of the Colony West plant sources. With the addition of the background level of 1.9 μg/m^3, the total predicted impact is 8.0 μg/m^3. This total predicted impact is only 8% of the annual WAAQS for NO_2.

Modeling results from the WAAQS analysis for NO_2 indicate that the ambient air quality impacts from all sources in the project area, including the applicable background concentrations, are well below the WAAQS for NO_2. Based on the results of this analysis, the Division concludes that the WAAQS/NAAQS for NO_2 will be protected during operation of the modified Colony East and West plants. Because the source list and emission rates used for the WAAQS analysis can be conservatively applied to a modeling analysis of PSD increment consumption, the Division can also conclude that the PSD increment for NO_2 of 25 μg/m³ will also be protected.

Results of the modeling analysis for NO_2 are provided in the following table.

Results of WAAQS/NAAQS Analysis for NO_2

Met Data Year	Averaging Time	Modeled Impact (μg/m³)[1]	Background Concentration (μg/m³)[2]	Total Modeled Impact (μg/m³)	WAAQS/NAAQS (μg/m³)
2000	Annual	6.1	1.9	8.0	100
2001		5.9		7.8	
2002		5.3		7.2	
2003		5.9		7.8	
2004		5.5		7.4	

[1] Maximum modeled NO_x impact multiplied by the ARM default scaling factor of 0.75
[2] Pollutant background obtained from the South Dakota Department of Environment and Natural Resources
NAAQS = National Ambient Air Quality Standards
NO_2 = nitrogen dioxide
μg/m^3 = micrograms per cubic meter
WAAQS = Wyoming Ambient Air Quality Standards

WAAQS Analysis for Particulate Matter Less Than 10 Microns (PM_{10})

Modeling was conducted by the Division for all sources of PM_{10} at the Colony East and West plants along with all sources at the nearby BPM plant to determine compliance with the 24-hour and annual WAAQS of 150 μg/m^3 and 50 μg /m^3, respectively. Emission rates and stack parameters for all modeled sources are listed in the tables below. Point sources with release temperatures that vary with the ambient conditions were modeled with release temperatures of zero Kelvin (0 K) to allow the ISCST3 model to use the ambient temperature in the meteorological input file as the release temperature for a given hour.

Fugitive emissions for handling bentonite at the American Colloid plants were estimated by using an emission factor of 0.04 pounds of PM_{10} per ton of bentonite handled. This factor was derived from Section 13.2.4 of AP-42 (*Aggregate Handling and Storage Piles, 11/06)*. Variables included in the formula for a drop operation (Equation 1) are material moisture and wind speed. A conservative value for material moisture (0.3%, crushed limestone, Table 13.2.4-1) and an average wind speed of 10 miles per hour were input to the formula.

Total predicted impacts for comparison to the WAAQS are determined by adding modeled impacts to background levels that represent the ambient concentrations from all sources not explicitly modeled. Background for this project was provided to American Colloid by the South Dakota Department of Environment and Natural Resources, as measured at Badlands and Wind Cave National Parks:

24-hour PM_{10}: 37.0 $\mu g/m^3$
Annual PM_{10}: 12.0 $\mu g/m^3$

The volume sources representing the fugitive emissions at the American Colloid and BPM facilities were included in the annual model runs, but were not included in the 24-hour runs. This is consistent with the Division's policy to model fugitive PM_{10} emissions for the annual averaging period only because of the high uncertainty associated with modeling short-term impacts with near-field models such as ISCST3.

Because the 24-hour WAAQS/NAAQS for PM_{10} are based on concentrations "not to be exceeded more than once per year" at a given receptor, the second-high modeled impact at each receptor is compared to the standards. The results of the modeling for the 24-hour and annual averaging periods were all below the WAAQS and NAAQS, as shown in the table below.

Results of WAAQS/NAAQS Analysis for PM_{10}

Meteorological Data Year	Averaging Time	Modeled Impact ($\mu g/m^3$)[1]	Background Concentration ($\mu g/m^3$)[2]	Total Modeled Impact ($\mu g/m^3$)	WAAQS/NAAQS ($\mu g/m^3$)
2000	24-Hour	74.8	37.0	111.8	150
2001		76.3		113.3	
2002		62.8		99.8	
2003		102.3		139.3	
2004		70.5		107.5	
2000	Annual	29.3	12.0	41.3	50 [3]
2001		29.1		41.1	
2002		26.6		38.6	
2003		27.0		39.0	
2004		25.1		37.1	

[1] The reported impacts for 24-hour are the highest second-high impacts
[2] Pollutant background obtained from the South Dakota Department of Environment and Natural Resources
[3] WAAQS only, as the PM_{10} Annual NAAQS was revoked by EPA effective December 18, 2006.
NAAQS = National Ambient Air Quality Standards
PM_{10} = particulate matter less than 10 microns
$\mu g/m^3$ = micrograms per cubic meter
WAAQS = Wyoming Ambient Air Quality Standards

Class II PSD Increment Analysis for Particulate Matter Less Than 10 Microns (PM_{10})

The Division also performed a cumulative 24-hour and annual Class II PM_{10} increment modeling analysis for the area near the project. Modeled sources included the increment-consuming sources at the Colony East and Colony West plants, as well as the increment-consuming sources from the nearby BPM plant. The tables below list the modeled sources. For Colony East and Colony West, the following "baseline sources" were not included in the increment modeling because they were in operation prior to the minor source baseline date and current actual emissions estimates have not increased from the baseline levels:

- ACWCH12 – Colony West Coal Handling Fugitives
- ACWBL13 – Colony West Truck Bulk Loadout
- ACWBL15 – Colony West PD Bulk Loadout
- ACWSP1 – Colony West Storage Piles
- ACEBRL – Colony East Rail Loadout Fugitives
- ACECB1 – Colony East Coal Bunker
- ACESP1 – Colony East Storage Piles

The following units have experienced emission reductions since the baseline date, and therefore expand increment. These sources were represented in the model with a negative emission rate based on the actual emissions (and stack parameters) from the period immediately prior to modification of the sources:

- ACWESP – Colony West DC-01 ESP
- ACWMIL – Colony West DC-03 Baghouse
- ACWLOA – Colony West DC-07 Baghouse
- ACEDRY – Colony East BH-08 ESP
- ACEGRA – Colony East 17A Baghouse
- ACEMI2 – Colony East 17B Baghouse
- ACEMI1 – Colony East 17C Baghouse
- ACESLY – Colony East 26 Baghouse

For the BPM Colony facility, several sources expand increment, and as such were modeled with the negative emission rates shown in the tables below. Results of stack testing at the BPM plant were used to represent current actual emission rates that were input for the PSD increment modeling runs, as shown below:

ESP:	8.09 lb/hr (stack test in May 2006)
DDBH:	0.3 lb/hr (Mar 2005)
DPJ:	0.1 lb/hr (Dec 2001)
PPPSP:	0.2 lb/hr (Dec 2001)
BRLSP:	0.1 lb/hr (Mar 2004)
GBH3:	0.008 lb/hr (Aug 2004)
BV8:	0.004 lb/hr (Sep 2004)
Sly4:	0.04 lb/hr (Dec 2001)

The volume source representing the fugitive emissions at the BPM facility was included in the annual model runs, but was not included in the 24-hour runs. This is consistent with the Division's policy to model fugitive PM_{10} emissions for the annual averaging period only because of the high uncertainty associated with modeling short-term impacts with near-field models such as ISCST3.

Because the 24-hour PSD increment for PM_{10} is based on concentrations "not to be exceeded more than once per year" at a given receptor, the second-high modeled impact at each receptor is compared to the allowable increment. Results of the analysis are presented in the table below. These results indicate that the Class II PSD increments for PM_{10} will not be threatened in the vicinity of the Colony plants.

Results of PSD Increment Analysis for PM_{10}

Met Data Year	Averaging Time	Modeled Impact (μg/m³)[1]	PSD Increment (μg/m³)
2000	24-Hour	20.5	30
2001		24.0	
2002		20.6	
2003		24.6	
2004		24.2	
2000	Annual	13.3	17
2001		14.2	
2002		11.6	
2003		12.2	
2004		11.9	

[1] The reported impacts for 24-hour are the highest second-high impacts
PSD = Prevention of Significant Deterioration
PM_{10} = particulate matter less than 10 microns
μg/m³ = micrograms per cubic meter

PM_{10} Emission Sources for the Colony East and Colony West Plants

Point Sources

Source ID	Description	NAD 27 UTM-E (Zone 13)	NAD 27 UTM-N (Zone 13	Base Elev. (m)	Stack Ht. (m)	Release Temp. (K)	Exit Vel. (m/s)	Stack Diam. (m)	Emission Rate (g/s)	Emission Rate (tpy)
Colony West Sources										
ACWBS08	Belt Scale #1	566301.4	4968628.6	1061	9.14	ambient	12.94	0.30	0.022	0.75
ACWBS09	Belt Scale Hopper #1	566311.2	4968643.8	1061	9.14	ambient	6.47	0.30	0.011	0.4
ACWDC01	#1 Rotary Dryer	566298.4	4968664.8	1061	22.86	372.0	24.00	0.98	0.432	15.0
ACWDC02	#2 Rotary Dryer	566297.4	4968651.4	1061	22.86	372.0	26.53	0.98	0.432	15.0
ACWDC03	Mill 1 and 2	566294.2	4968630.7	1061	9.14	ambient	16.23	0.51	0.076	2.6
ACWDC04	Granular System	566273.8	4968660.9	1061	7.62	ambient	16.98	0.61	0.108	3.75
ACWDC05	Granular Nuisance	566276.3	4968643.4	1061	24.38	ambient	15.17	0.46	0.057	2.0
ACWDC06	Packaging System	566278.6	4968606.5	1061	7.62	ambient	23.19	0.51	0.108	3.75
ACWDC07	Bulk Loadout	566298.4	4968641.5	1061	6.10	ambient	19.40	0.61	0.130	4.5
ACWDC12	Granular Loadout	566286.8	4968605.6	1061	10.67	ambient	14.37	0.46	0.054	1.9
ACWDC13	Triangle Packer	566270.9	4968594.1	1061	4.57	ambient	8.73	0.30	0.027	0.9
ACWDC14	Fines Tank/Nuisance	Not modeled, vents inside a building								
ACWDC15	Granular Nuisance	566262.4	4968631.7	1061	4.57	ambient	12.77	0.61	0.085	3.0
ACWDC16	Nuisance Baghouse	566259.1	4968620.9	1061	10.06	ambient	19.66	0.76	0.205	7.1
Colony West Baseline Sources										
ACWCH12	Coal Handling	566204.9	4968667.2	1061	4.57	ambient	0.01	0.91	0.360	12.5
ACWBL13	Truck Bulk Loadout	566309.9	4968621.8	1061	4.57	ambient	0.01	0.91	0.173	6.0
ACWBL15	PD Bulk Loadout	566315.8	4968633.9	1061	4.57	ambient	0.01	0.91	0.173	6.0
Colony West Increment Expanding Sources										
ACWESP	DC-01 ESP	566298.4	4968664.8	1061	15.24	363.2	14.89	1.42	-0.769	-13.73 (annual)
ACWMIL	DC-03 Baghouse	566294.2	4968630.7	1061	9.14	ambient	16.23	0.51	-0.252	-1.6 (annual)
ACWLOA	DC-07 Baghouse	566298.4	4968641.5	1061	6.10	ambient	19.40	0.61	-0.214	-1.6 (annual)

Source ID	Description	NAD 27 UTM-E (Zone 13)	NAD 27 UTM-N (Zone 13	Base Elev. (m)	Stack Ht. (m)	Release Temp. (K)	Exit Vel. (m/s)	Stack Diam. (m)	Emission Rate (g/s)	Emission Rate (tpy)
Colony East Sources										
ACE17A	Granular System	567208.4	4968153.6	1039	18.59	ambient	16.67	0.46	0.054	1.9
ACE17B	Mill #1	567224.9	4968163.5	1039	18.59	ambient	31.00	0.34	0.030	1.0
ACE17C	Mill #2	567221	4968167.9	1039	16.15	ambient	31.00	0.34	0.035	1.2
ACE17D	Nuisance	567215.9	4968168.2	1039	16.76	ambient	28.75	0.46	0.097	3.4
ACE18	Storage Silos	567201.5	4968187.2	1039	28.96	ambient	11.58	0.55	0.054	1.9
ACE19	Draco-Air Slides	567205.2	4968185.2	1039	6.10	ambient	14.37	0.18	0.007	0.2
ACE26	Regis Packer	567229.3	4968181.6	1039	13.72	ambient	16.67	0.46	0.063	2.2
ACE27	Loadout	567240.8	4968167.7	1039	19.81	ambient	18.26	0.76	0.190	6.6
ACEBH08	Fluid Bed Dryer	567205.2	4968131.4	1039	25.30	394.3	39.53	0.91	0.378	13.1
ACEBV01	Coal Silo	567210.6	4968071	1039	21.34	ambient	19.76	0.18	0.012	0.4
ACEPD1	Bunker	567155.7	4968086.3	1039	4.57	ambient	19.81	0.61	0.130	4.5
ACEPS1	Primary System	567193.7	4968144.5	1039	16.76	ambient	16.67	0.46	0.089	3.1
ACERD1	Rotary Dryer	567184.5	4968121.4	1039	18.29	394.3	10.35	1.52	0.378	13.1
ACERD2	RD Nuisance	567174.3	4968097.8	1039	7.62	ambient	16.23	0.51	0.059	2.1
ACE3SB	3-Sided Bunker	567152.3	4968076.8	1039	10.67	ambient	19.64	0.30	0.031	1.1
Colony East Baseline Sources										
ACEBRL	Rail Loadout Fugitives	567237.9	4968206.1	1039	4.57	ambient	0.001	0.91	0.345	12.0
ACECB1	Coal Bunker	567124.4	4968200.2	1039	4.57	ambient	0.001	0.91	0.050	1.8
Colony East Increment Expanding Sources										
ACEDRY	BH08 ESP	567205.2	4968131.4	1039	11.31	363.7	31.70	1.07	-1.890	-36.09 (annual)
ACEGRA	17A Baghouse	567208.4	4968153.6	1039	18.59	ambient	16.40	0.46	-0.124	-0.515 (annual)
ACEMI2	17B Baghouse	567224.9	4968163.5	1039	18.59	338.7	20.21	0.33	-0.069	-1.169 (annual)
ACEMI1	17C Baghouse	567221	4968167.9	1039	16.31	338.7	17.10	0.33	-0.059	-1.165 (annual)
ACESLY	26 Baghouse	567229.3	4968181.6	1039	19.66	ambient	18.87	0.46	-0.141	-1.088 (annual)

Volume/Area Sources

ID	Description	UTM-E (Zone 13)	UTM-N (Zone 13)	Base Elev. (m)	Release Ht (m)	Horiz. Dim. (m)	Vert. Dim. (m)	Emission Rate (g/s)	Emission Rate (tpy)
ACWSP1	Colony West Storage Piles	566236.1	4968665	1061	6.10	54.864	3.048	0.132	4.6
ACESP1	Colony East Storage Piles	567146.7	4968163	1039	6.10	58.864	3.048	0.196	6.8
SRC2-10	Colony E-W Haul Roads	various	various	1050	3.048	15.24	152.4	1.60	55.7

Bentonite Performance Minerals - Colony Plant: Modeled PM_{10} Sources

Source ID	Source Description	NAD 27, Zone 13 UTM E (m)	NAD 27, Zone 13 UTM N (m)	Base Elev. (m)	St Ht (m)	T (K)	Exit Vel (m/s)	St Dia. (m)	PM_{10} (g/s)	PM_{10} (lb/hr)
PMFURN	Elec. Precipitator	567750	4967600	1036	24.38	359	26.34	1.37	2.61	20.7
BV1	Fuel Coal Silo Baghouse	567750	4967640	1036	21.34	0	20	0.18	0.01	0.10
CDRLB	C&D Rail Loadout BH	567729	4967573	1036	6.10	0	20	1.47	0.70	5.6
MEGBH	Megatex Screen System BH	567760	4967613	1036	7.62	0	20	1.5	0.16	1.3
Bulk Process										
DDBH	C&D Stockpiling									0.9
BV2	Bulk Silo #1									0.07
BV3	Bulk Silo #2									0.1
BV4	Bulk Silo #3									0.1
BV13	200 Mesh Surge Bin									0.01
BV14	200 Mesh Silo									0.1
DPJ	200 Mesh Loadout									0.8
PPPSP	Powder Packer Palletizer									2.0
BRLSP	Powd Rail & Truck, Gran Trk									0.8
PPPSP	Bulk Process Composite Stack	567748	4967613	1036	7.62	301	12.65	0.60	0.61	
Granular Process										
GBH1	Granular Silo #1									0.2
GBH2	Granular Silo #2									0.2
GBH3	Granular Silo #3									0.2
BV6	Granular Receive Bins									0.14
PACKER	Granular Process Composite Stack	567765	4967666	1036	5.49	298	12.50	0.37	0.08	

Source ID	Source Description	NAD 27, Zone 13 UTM E (m)	NAD 27, Zone 13 UTM N (m)	Base Elev. (m)	St Ht (m)	T (K)	Exit Vel (m/s)	St Dia. (m)	PM_{10} (g/s)	PM_{10} (lb/hr)
Quik-Gel										
MK1	Quik-Gel Baghouse									1.2
BV15	Quik-Gel Silo 5									0.08
MK-1	Quik-Gel Composite Stack	567756	4967652	1036	7.62	298	16.46	0.51	0.16	
Baramix Process										
BV7	Crude Coal Silo #1									0.1
BV8	Coal Mill/Silo #4 Baghouse									0.3
BV5	Baramix Silo #2									0.1
BV9	Baramix Silo #3									0.1
DC3	Baramix Silo #5									0.2
DC4	Baramix Silo #6									0.2
BV12	Baramix Blender									0.1
DC5	Baramix Packer Bin Vent									0.1
BV11	Baramix Finished Silo #7									0.03
BV10	Baramix Truck Loadout BH									0.1
Sly4	Baramix Rail Loadout BH									1.0
BARP	Baramix Process Composite Stack	567760	4967583	1036	3.05	0.0	12.80	0.30	0.29	
Fugitives										
HTRS	All Heaters									0.03
SP1	Storage Piles									0.71
GRL	Granular Rail Loadout Fug									0.18
MT1	Material Transfer Fug									0.07
FD1	Haul Roads									12.44
CDRLO	C&D Rail Loadout									0.64
CB1	Fuel Coal Bunkers									0.18

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Source ID	Source Description	NAD 27, Zone 13 UTM E (m)	NAD 27, Zone 13 UTM N (m)	Base Elev. (m)	St Ht (m)	T (K)	Exit Vel (m/s)	St Dia. (m)	PM_{10} (g/s)	PM_{10} (lb/hr)
CB2	Baramix Coal Bunker Fug									0.05
FUG	Composite Volume Source for Fugitives	567751	4967627	1036	6.10	74.7 (hor. dim)	5.67 (vert. dim)		1.80	
Baseline Sources										
PMFURN	Elec. Precipitator	567750	4967600	1036	24.38	359	26.34	1.37	-0.748	
MK-1	Quik-Gel Process	567756	4967652	1036	7.62	298	16.46	0.51	-0.288	
PPPSP	Bulk Process	567748	4967613	1036	7.62	301	12.65	0.60	-0.624	
BRTBH	Bulk Rail and Truck Loadout	567755	4967686	1036	4.57	307	14.08	0.28	-0.011	
GM1BH	Grinding Mill 1	567749	4967662	1036	13.41	336	12.07	0.58	-0.114	
GM2BH	Grinding Mill 2	567749	4967662	1036	14.63	336	12.07	0.61	-0.114	
GM3BH	Grinding Mill 3	567749	4967662	1036	14.63	336	12.07	0.61	-0.114	
CDLO	Crushed and Dried Loadout	567750	4967651	1036	4.57	0	9.27	0.46	-0.041	
BARP	Baramix Process	567760	4967583	1036	3.05	0	12.80	0.30	-0.078	
PACKER	Granular Process	567765	4967666	1036	5.49	298	12.50	0.37	-0.009	

PRE-CONSTRUCTION MONITORING

Section 2, Chapter 6 of the WAQSR states that pre-construction monitoring may be required for a PSD applicant to assure that adequate data are available for purposes of establishing existing concentration levels of affected pollutants. Representative background concentrations for the affected pollutants for this project (SO_2, NO_2, and PM_{10}) were provided by the South Dakota Department of Environment and Natural Resources, as measured at Badlands and Wind Cave National Parks. Therefore, pre-construction monitoring was not required by the Division.

ADDITIONAL IMPACTS

As described in Chapter 6, Section 4(b)(i)(B)(I) and (II) of the WAQSR, an applicant must provide additional analyses to assess the impact of the source or modification on the following:

- Impairment to visibility, soils, and vegetation
- Air quality impacts from commercial, residential, and industrial growth

The visibility impacts from the proposed modifications are assessed through an analysis of light extinction in Class I and Class II areas, as described in the section on far-field CALPUFF modeling.

Growth Analysis

No additional personnel will be required by American Colloid to maintain and operate the equipment proposed for the modifications at the Colony East and Colony West plants. Therefore, the proposed modifications will not result in appreciable residential, commercial, or industrial growth that would impact air quality. Emissions from construction will also be minimal because the proposed new equipment will be housed in existing enclosures.

Soils and Vegetation Analysis

The applicant conducted a survey of soil types within 13.7 square miles of the Colony plants. None of the 26 soil types were found to be sensitive to the air pollutants emitted from the two plants.

An analysis of impacts to vegetation focused on vegetation with economic value. According to the *2002 Census of Agriculture*, Crook County had 1,387 acres devoted to grains (corn, oats, and wheat) and 33,360 acres devoted to forage hay.

Predicted impacts of NO_2, SO_2, and PM_{10} from the Colony East and West modifications were compared to damage thresholds for crops and vegetation that were found in literature. The tables below show a comparison of the modeled impacts to the damage thresholds. In all cases, the impacts predicted for the modifications were below the damage thresholds. Because background NO_2 values for the Colony area are not available for 2-hour and 24-hour averaging periods, the modeled NO_2 impacts listed in the table below have not been adjusted (downward) by the ARM default scaling factor. This results in very conservative estimates of the total impacts on the area.

Predicted Impacts of NO_2 Compared to Vegetation Impact Thresholds

Averaging Period	Modeled Impact ($\mu g/m^3$)[1]	Damage Threshold ($\mu g/m^3$)	Comments
2-Hour	315.3	1,130	Photosynthesis rate is suppressed in alfalfa[2]
2-Week	54.5 (24-hour)	76.4	Negligible impacts to barley along with 106 $\mu g/m^3$ SO_2[3]
Annual	6.1	100	Protective of vegetation[4]

[1] Modeled 2-hour and 24-hour impacts are not adjusted by the ARM default scaling factor.
[2] From *Synergistic Inhibition of Apparent Photosynthesis Rate of Alfalfa by Combinations of SO_2 and NO_2* (Environmental Science and Technology, vol. 8(6), 1975)
[3] From *Responses of Spring Barley to SO_2 and NO_2 Pollution* (Environmental Pollution Series A Ecological and Biological, 38 [1], 1985)
[4] Secondary National Ambient Air Quality Standard

Predicted Impacts of SO_2 Compared to Vegetation Impact Thresholds

Averaging Period	Modeled Impact ($\mu g/m^3$)	Damage Threshold ($\mu g/m^3$)	Comments
3-Hour	322	390	Injury to sensitive plants[1]
2-Week	79.1 (24-hour)	106	Negligible impacts to barley along with 76.4 $\mu g/m^3$ NO_2[2]
Annual	11.4	130	Injury to sensitive plants[1]

[1] From *Impacts of Coal-Fired Power Plants on Fish, Wildlife, and Their Habitats* (Dvorak, A.J., Argonne National Laboratory, Fish and Wildlife Service Publication No. FWS/OBS-78/29, 1978)
[2] From *Responses of Spring Barley to SO_2 and NO_2 Pollution* (Environmental Pollution Series A Ecological and Biological, 38 [1], 1985)

Predicted Impacts of PM_{10} Compared to Vegetation Impact Thresholds

Averaging Period	Modeled Impact (µg/m³)[1]	Damage Threshold (µg/m³)	Comments
24-Hour	139.3	150	Protective of vegetation[1]
Annual	41.3	50	Protective of vegetation[1]

[1] Secondary National Ambient Air Quality Standard

FAR-FIELD MODELING ANALYSIS

Congress has designated certain areas for the highest level of air-quality protection. These areas, known as "Class I" areas, include national parks larger than 6,000 acres and wilderness areas larger than 5,000 acres that were in existence in 1977. A total of 158 areas were classified by Congress as "mandatory" (Federal) Class I areas that cannot be redesignated to a level with a lesser degree of protection. The Federal Land Managers (FLMs) are given, through the PSD title of the Clean Air Act (CAA), a role in the protection of Class I areas from air quality impairment due to anthropogenic/man-made air pollution.

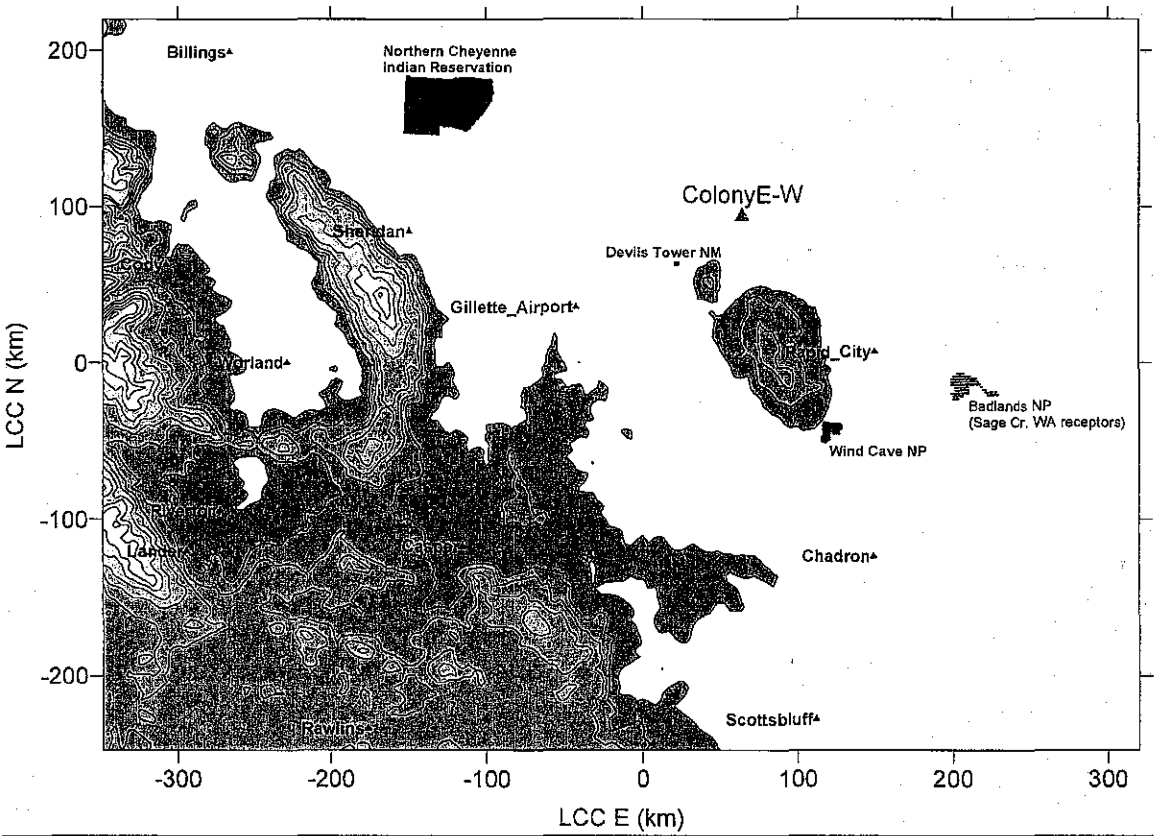
A workgroup consisting of representatives from the three FLMs that manage the Federal Class I areas has developed a guidance document for conducting analyses of the impact of PSD sources on those Class I areas. This workgroup, called the Federal Land Managers' Air Quality Related Values Work Group (FLAG), released their *FLAG Phase I Report* in December of 2000. The analyses conducted for the project described here made use of the recommended procedures from the FLAG report.

The Colony East and Colony West plants are located at a distance greater than 100 kilometers (km) from the three nearest Class I areas, which are Wind Cave and Badlands National Parks (NP) in South Dakota, and Northern Cheyenne Indian Reservation (NCIR) in southern Montana. Wind Cave and Badlands National Parks are mandatory Class I areas managed by the National Park Service (NPS). The NCIR is formerly a Class II area that was granted Class I area status by the EPA.

The approximate distances from the two plants to the modeling receptors that comprise the three Class I areas in question are provided below and shown graphically in the figure below:

- Wind Cave NP: 145 km
- Badlands NP: 170 km
- NCIR: 175 km

The applicant submitted a Class I area significant impact analysis, as well as analyses of the impacts to visibility and nitrogen/sulfur deposition from the proposed project at the three Class I areas using the CALPUFF modeling system. A significant impact analysis at Devils Tower National Monument (NM), a Class II area located approximately 50 km from the proposed project, were also reported by the applicant.



Model Justification

Predicted impacts from the proposed project were determined with the EPA CALPUFF modeling system, which is the EPA-preferred model for long-range transport. As described in the EPA Guideline on Air Quality Models (Appendix W of 40 CFR Part 51), long-range (or "far-field") transport is defined as modeling with source-receptor distances of 50 km to several hundred km. Because all modeled areas are located 50 km or more from the project, the CALPUFF system is appropriate for use.

The CALPUFF modeling system consists of a meteorological data pre-processor (CALMET), an air dispersion model (CALPUFF), and a post-processor program (CALPOST) which is used to average and report concentrations or wet/dry deposition flux results. The CALPUFF model was developed as a non-steady-state air quality modeling system for assessing the effects of time- and space-varying meteorological conditions on pollutant transport, transformation, and removal.

Updated versions of the CALPUFF modeling system are made available on the website of the model developers, the Atmospheric Studies Group (ASG) of TRC Companies, Inc. For the project described here, the current "Official EPA-Approved" version of the system was used. Version numbers of the primary models used for this project are listed below:

- CALMET – Version 5.53a (July 16, 2004)
- CALPUFF – Version 5.711a (July 16, 2004)
- CALPOST – Version 5.51 (July 9, 2003)
- POSTUTIL – Version 1.3 (April 2, 2003)

Short descriptions of the key models and pre- and post-processors that comprise the CALPUFF modeling system are provided below.

CALMET Model

CALMET is a diagnostic wind model that develops hourly wind and temperature fields in a three-dimensional gridded modeling domain. Meteorological inputs to CALMET can include surface and upper-air observations from multiple meteorological monitoring stations. Additionally, the CALMET model can utilize gridded analysis fields from various mesoscale models such as MM5 to better represent regional wind flows and slope/valley circulations. Associated two-dimensional fields such as mixing height, land use, and surface roughness of the terrain are included in the input to the CALMET model. The CALMET model allows the user to "weight" various terrain influence parameters in the vertical and horizontal directions by defining the radius of influence for surface and upper-air station observations in the CALMET modeling domain.

CALPUFF Model

CALPUFF is a multi-layer, multi-species, non-steady state, Lagrangian puff dispersion model. CALPUFF can use the three-dimensional wind fields developed by the CALMET model (refined mode), or data from a single surface and upper-air station in a format consistent with the meteorological file used to drive the ISC steady-state dispersion model (screening mode). All far-field modeling assessments for this project, including the significance analysis and acid deposition and visibility modeling analyses, were completed using the CALPUFF model in a refined mode.

POSTUTIL Model

POSTUTIL is a post-processing program that processes CALPUFF concentration and wet/dry flux files. The POSTUTIL model operates on one or more output data files from CALPUFF to sum, scale, repartition, and/or compute species derived from those that are modeled, and outputs selected species to a file for further post-processing. For this application, POSTUTIL was used to post-process the CALPUFF predicted hourly wet and dry deposition fluxes from the proposed project to derive total nitrogen (N) and sulfur (S) deposition.

CALPOST Model

CALPOST is a post-processing program that is designed to read the CALPUFF or POSTUTIL binary-formatted output files, and produce time-averaged concentrations and deposition fluxes. In addition to using CALPOST to post-process the deposition fluxes of total nitrogen (N) and total sulfur (S), the applicant used CALPOST to determine the significant impact (criteria pollutant) and visibility impacts from the proposed project.

Modeling Domain and Map Projection

Due to the size of the modeling domain, the curvature of the earth must be taken into account when calculating distances. To account for the earth's curvature in the modeling domain, the grid cells were identified using a Lambert Conformal Conic (LCC) projection. The locations of sources, meteorological stations, and modeling receptors used in the CALMET/CALPUFF analyses were converted to a LCC projection.

The applicant used a CALMET/CALPUFF modeling domain and map projection that were developed through guidance from the Division and the FLM. There were differences, however, between the applicant's modeling domain and setup and those used by the Division to evaluate other current projects in the same area of Wyoming. To maintain consistency between the analyses for the current projects and to allow for direct comparison of the results between projects, the Division ran CALMET/CALPUFF with the following deviations from the applicant's submittal as described below:

- In defining the vertical resolution of the CALMET wind field, the applicant used nine levels. The nine vertical levels (NZ) that were defined by the applicant in the CALMET simulations were as follows: ZFACE = 0, 20, 50, 100, 250, 500, 750, 1000, 1500, and 3500 meters. The Division, in re-running the CALMET wind field, and subsequent far-field modeling analyses, used the CALMET vertical resolution that was recently developed for BART exemption modeling in Wyoming, which uses ten vertical levels: ZFACE = 0, 20, 40, 100, 200, 350, 500, 750, 1000, 2000, and 3500 meters. The Division's revised wind field enhances the vertical resolution between 200 and 500 meters.

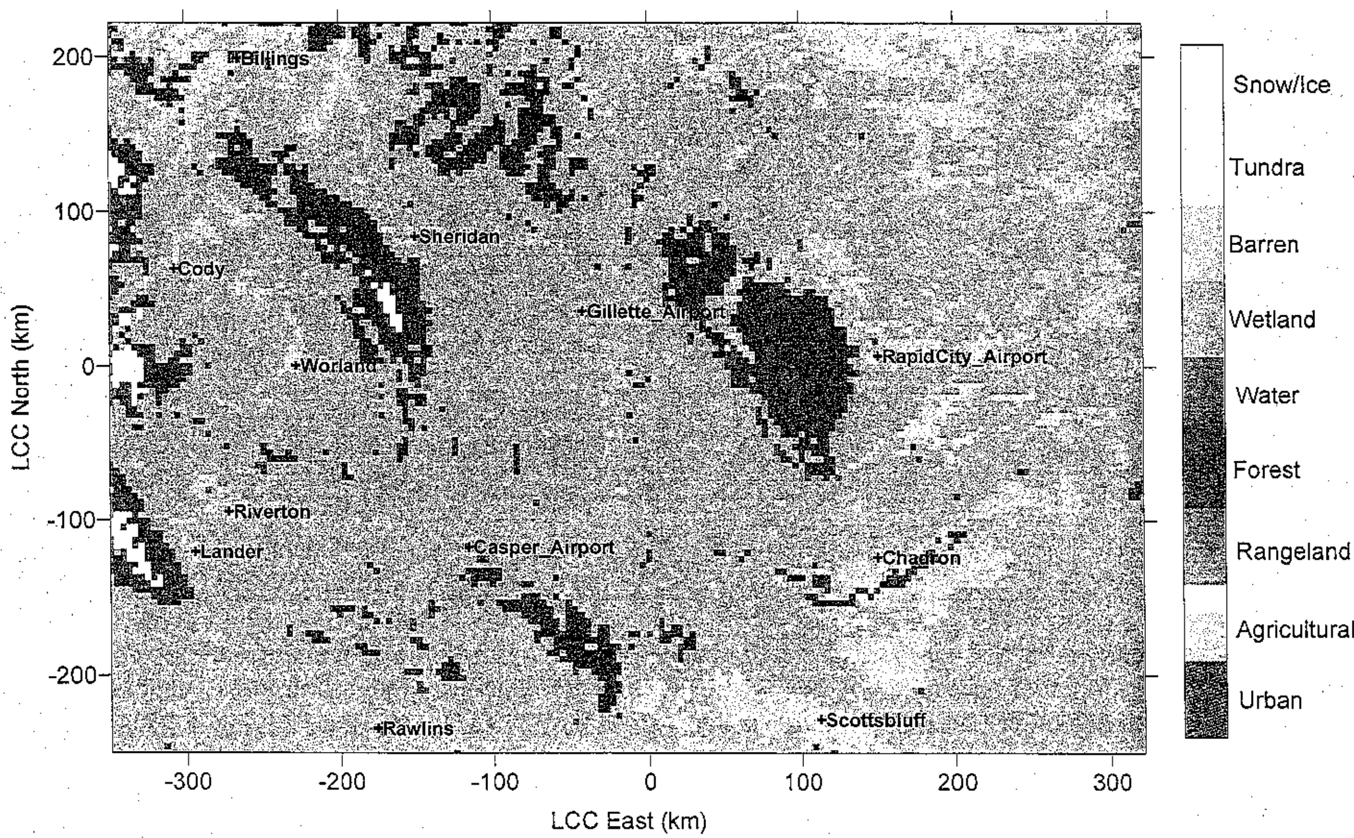
Discrete receptors for CALPUFF modeling of Class I areas have been made available by the National Park Service (NPS). The receptors specified by the NPS for Wind Cave NP and Badlands NP were used by the Division, but the NPS database does not include the Northern Cheyenne Indian Reservation. The receptor grid that was used for the NCIR was employed in a recent modeling analysis using AERMOD, and was reviewed by both the Montana DEQ and EPA Region VIII with respect to Class I SO_2 increment consumption at the NCIR.

The number of receptors used in the CALPUFF modeling analyses for Badlands and Wind Cave National Parks totaled 100 and 189 receptors, respectively. For the NCIR, the number of receptors was 2,044. Additionally, the Division used discrete receptors around Devils Tower NM, a Class II area, that were generated at approximately 1 km resolution along the boundary and throughout the interior of the monument (a total of 19 receptors).

Terrain elevations for the discrete receptors that represent the two NPS Class I areas were based on the extraction routine used by the NPS in developing their Class I area receptor grids. Elevations for NCIR and Devils Tower NM were obtained from United States Geological Survey (USGS) Digital Elevation Models (DEMs).

Geophysical Data

Land use and terrain data for the modeling domain were obtained from the USGS, and then input to the MAKEGEO pre-processor to prepare the geophysical data needed by CALMET. Land use data were obtained in Composite Theme Grid (CTG) format, and the Level I USGS land use categories were mapped into the 14 primary CALMET land use categories. Surface properties such as albedo, Bowen ratio, roughness length, and leaf area index were computed for each grid cell in the domain from the land use values. A value that is representative of "shrub and brush rangeland" (the predominant land use category for the domain) was used for the IMISS parameter, which is used to substitute for missing USGS land use data. The land use pattern is depicted in the figure below.



Meteorological Data

Three years of meteorological data (2001, 2002, and 2003) were used as input to CALPUFF. The modeling domain consisted of 168 (east-west) by 118 (north-south) 4 km x 4 km grid cells covering the source region, and the Class I and Class II sensitive areas of interest with a buffer zone for potential recirculation or flow reversal effects. The extent of the modeling domain was 672 km x 472 km.

Based on EPA guidance on far-field CALPUFF modeling contained in the GAQM, the use of less than five, but at least three years of prognostic mesoscale meteorological data is encouraged. Three years of mesoscale (MM5) data for the years 2001 through 2003 were used to initialize the CALMET wind fields. All three years of MM5 data were developed using 36-km resolution.

Surface and precipitation data within the domain for 2001-2003 were obtained from the National Climatic Data Center (NCDC). The surface data were obtained by the NCDC from the National Weather Service's (NWS) Automated Surface Observation System (ASOS) network. Upper-air observations were obtained from Rapid City, South Dakota. The Rapid City station was chosen because it is located between the proposed source and two of the Class I areas in question. Other upper-air stations in the region were located outside of the CALMET modeling domain or near the edge of the domain, were considered too distant, and consequently not used in the modeling analysis.

Several of the input settings for CALMET are left to the model user to define so that the windfield can be tailored to the particular area that is being modeled. Several of the key settings that were used for the Division's windfields are listed in the table below.

Key CALMET Settings

Parameter	Setting (km)	Description
RMAX1	30	Maximum radius of influence for surface observations
RMAX2	50	Maximum radius of influence for upper-air observations
TERRAD	15	Radius of influence of terrain features
R1	5	Distance at which surface observation and MM5 data equally weighted
R2	25	Distance at which upper-air observation and MM5 data equally weighted

The geophysical, MM5, surface, upper-air, and precipitation data were processed and merged into the CALMET.DAT files needed to run the CALPUFF model simulations. The resulting CALMET.DAT files include (among other parameters), gridded fields of U-V-W wind components, mixing heights, stability categories, and precipitation data.

CALPUFF Inputs

Stack parameters and emissions for the project that were included in the CALPUFF analysis are listed in the tables below. These emissions were used to model the significant impact (criteria pollutant), visibility impacts, and deposition impacts from the proposed project. It is important to note that the modeled emission rates represent the full, maximum short-term emission rates for the main combustion sources (dryers) at both facilities. Therefore, the modeled results represent conservative estimates of the impacts from the modifications to the two plants. Comparisons to Class I modeling significance levels, FLAG visibility thresholds, and NPS depositions thresholds that have all been established for single modifications/projects are also conservative.

Stack Parameters

Source	LCC East (km)	LCC North (km)	Base Elevation (m)	Stack Height (m)	Stack Diameter (m)	Exhaust Temperature (K)	Exit Velocity (m/s)
Colony East							
Fluid Bed Dryer (BH-08)	64.936	93.237	1039	25.3	0.914	394.3	39.53
Rotary Dryer (RD-1)	64.916	93.228	1039	18.29	1.52	394.3	10.35
Colony West							
#1 Rotary Dryer (DC-01)	64.06	93.753	1061	22.86	0.975	372.0	24.0
#2 Rotary Dryer (DC-02)	64.059	93.74	1061	22.86	0.975	372.0	26.53

K = Kelvin
km = kilometers
LCC = Lambert Conformal Conic
m = meters
m/s = meters per second

Emission Rates

Source	SO_2 (g/s)	SO_4 (g/s)	NO_x (g/s)	PM_{10} (g/s)
Colony East				
Fluid Bed Dryer (BH-08)	3.67	0.92	2.99	0.378
Rotary Dryer (RD-1)	2.93	0.73	2.39	0.378
Colony West				
#1 Rotary Dryer (DC-01)	2.76	0.69	2.25	0.43
#2 Rotary Dryer (DC-02)	2.76	0.69	2.25	0.43

g/s = grams per second
NO_x = nitrogen oxides
PM_{10} = particulate
SO_2 = sulfur dioxide
SO_4 = sulfates

Short-term emission rates were used to model both short-term and annual impacts. In this way, the annual impacts for parameters such as sulfur deposition are modeled conservatively. The short-term emission rates for all four dryers were based on 0.58 lb/MMBtu for SO_2 and 0.47 lb/MMBtu for NO_x. Emissions of particulate were based on a grain loading of 0.01 gr/dscf for the baghouses that controls each dryer. For condensable particulate, the applicant assumed that sulfate emissions were 25 percent of the SO_2 emissions for each source.

Hourly ozone data was input to CALPUFF for chemical transformations. The ozone data were taken from the Division's Thunder Basin National Grasslands station, located approximately 32 miles north of Gillette, and the Robbinsdale site near Rapid City, South Dakota. For periods of missing ozone data, the model relied on monthly default values that were determined from the highest monthly average concentrations from all available data in the domain. A constant background ammonia value of 10 ppb was input to the model.

Class I Area Significant Impact Analysis

Guidance published in the Federal Register (Vol. 61, No. 142, July 1996) by the U.S. EPA establishes a method to determine whether a new source has an insignificant ambient impact on a Class I area. This guidance introduced a set of Class I area Significant Impact Levels (SILs) to be used as the metric for assessing the ambient impacts at Class I areas from potentially insignificant sources. The Class I SILs are based on a percentage of the Class I increments for each respective averaging period. In the proposed rules, a new source or proposed modification which can be shown, using air quality models, to have ambient impacts below the Class I SILs for a given pollutant and averaging period would not be required to conduct a cumulative Class I increment consumption analysis for that pollutant.

The proposed EPA Class I SILs for NO_2, SO_2, and PM_{10} used in this analysis are provided below.

EPA-Proposed Class I Area Modeling Significance Levels

Pollutant	Averaging Period	Class I Significant Impact Level (µg/m³)
NO_2	Annual	0.1
SO_2	3-Hour	1.0
SO_2	24-Hour	0.2
SO_2	Annual	0.1
PM_{10}	24-Hour	0.3
PM_{10}	Annual	0.2

NO_2 = nitrogen dioxide
PM_{10} = particulate matter less than 10 microns
SO_2 = sulfur dioxide

In the Class I area significance analysis, the Division's modeling demonstrated that maximum modeled concentrations from the proposed modifications were below all respective Class I SILs for each pollutant at each Class I area that was analyzed. Emissions of nitrogen oxides (NO_x) were conservatively assumed to convert completely to nitrogen dioxide (NO_2) for comparison to the Class I SIL for NO_2. Therefore, no cumulative analyses were required. The results of the Division's analysis are provided below:

Results of Class I Area Significant Impact Analysis (μg/m³)

Class I Area	Annual NO_2	3-hour SO_2	24-Hour SO_2	Annual SO_2	24-Hour PM_{10}	Annual PM_{10}
2001						
Badlands NP	0.002	0.20	0.08	0.005	0.07	0.005
Wind Cave NP	0.001	0.21	0.05	0.003	0.06	0.004
Northern Cheyenne Indian Reservation	0.0005	0.11	0.04	0.001	0.03	0.001
2002						
Badlands NP	0.002	0.19	0.05	0.005	0.07	0.006
Wind Cave NP	0.001	0.15	0.03	0.002	0.05	0.003
Northern Cheyenne Indian Reservation	0.0004	0.13	0.04	0.001	0.06	0.003
2003						
Badlands NP	0.002	0.20	0.07	0.005	0.09	0.006
Wind Cave NP	0.001	0.20	0.05	0.003	0.09	0.004
Northern Cheyenne Indian Reservation	0.0005	0.12	0.04	0.001	0.07	0.002
Class I Significance Levels	0.1	1.0	0.2	0.1	0.3	0.2
Class I PSD Increments	2.5	25	5	2	8	4

Class II Area Significant Impact Analysis

The CALPUFF model was also used to predict concentrations of criteria pollutants at Devils Tower NM for comparison to the Class II SILs. The review of the significance analysis, based on using the Division's CALMET wind fields, demonstrates that the maximum modeled concentrations from the project are less than the respective Class II SILs for all applicable pollutants at Devil's Tower NM for all three years that were modeled. Therefore, no cumulative analyses were required. The results of this analysis are provided below:

Results of the Class II Area (Devils Tower NM) Significant Impact Analysis (μg/m³)

Year	Annual NO_2	3-hour SO_2	24-Hour SO_2	Annual SO_2	24-Hour PM_{10}	Annual PM_{10}
2001	0.003	0.74	0.14	0.006	0.11	0.005
2002	0.004	0.58	0.21	0.007	0.17	0.006
2003	0.004	0.73	0.17	0.006	0.15	0.005
Class II Significance Levels	1.0	25	5.0	1.0	5.0	1.0
Class II PSD Increments	25	512	91	20	30	17

Class I Area Visibility Analysis

The modeled change in visible light extinction (visibility) from the two plants was based on the CALPUFF-predicted concentrations of primary and secondary pollutants. Secondary pollutants in this case include nitrates and sulfates.

CALPOST Method 2 and Method 6 were both used in the visibility analysis. CALPOST Method 2 uses hourly relative humidity values from the surface observations that are input to CALMET. This is the CALPOST method recommended by the FLM in the FLAG report for all refined CALPUFF visibility analyses. In CALPUFF and CALPOST, relative humidity data are used as a surrogate for cloud water and water vapor to account for the formation and hygroscopic growth of secondarily-formed particles. Specifically, the relative humidity data are used in CALPUFF visibility modeling in two ways: 1) In the CALPUFF chemical transformation module that forms sulfate and nitrate, and 2) to derive the relative humidity adjustment function [f(RH)] that is applied to ammonium sulfate and ammonium nitrate concentrations to estimate hygroscopic particle growth.

Background light extinction ($b_{ext,bkgd}$) is used to determine the percent light extinction due to the emission source in question. As prescribed in the FLAG report, the background must represent "natural background", i.e. background due only to natural aerosols in the atmosphere. Natural background is determined with this equation:

$$b_{ext,bkgd} = b_{hygroscopic} \times f(RH) + b_{NonHygroscopic} + Rayleigh$$

Where: $b_{hygroscopic}$, $b_{NonHygroscopic}$, and Rayleigh light scattering components are provided in Appendix 2.B of the FLAG Phase I report. The values for $b_{hygroscopic}$ (0.6 Mm^{-1}), $b_{NonHygroscopic}$, (4.5 Mm^{-1}), and Rayleigh scattering (10 Mm^{-1}) are identical for the Wind Cave and Badlands National Parks (and all Western Class I areas). The background extinction values are not provided in the FLAG report for NCIR. It was assumed, however, that the background extinction provided in the FLAG document for Badlands NP and Wind Cave NP will also apply to the NCIR.

The model-predicted visibility impacts were based on the maximum 24-hour average concentrations for the following pollutants that reduce visibility: sulfate, nitrate, OC, EC, PMF, and PMC. The nitrate and sulfate transformation rates were computed internally by the CALPUFF model using the MESOPUFF II chemistry scheme, which assumes that all nitrate and sulfate fully convert to ammonium sulfate [$(NH_4)_2SO_4$] and ammonium nitrate [$(NH_4)NO_3$]. The 24-hour source light extinction ($b_{ext,source}$), expressed in inverse Megameters (Mm^{-1}) was determined by the CALPOST model using the following equation:

$$b_{ext,source} = [(1.375*SO_4 + 1.29*NO_3)*f(RH)]*3) + PMF*1.0 + PMC*0.6 + OC*4 + EC*10$$

Where:	1.375	=	ratio of molecular weights for ammonium sulfate to sulfate
	SO_4	=	modeled mass of sulfate
	1.29	=	ratio of molecular weights for ammonium nitrate to nitrate
	NO_3	=	modeled mass of nitrate
	f(RH)	=	relative humidity function
	3	=	light scattering efficiency for nitrates and sulfates (m^2/gram)
	1.0	=	light scattering efficiency for fine $PM_{2.5}$ (m^2/gram)
	0.6	=	light scattering efficiency for coarse PM_{10}-$PM_{2.5}$ (m^2/gram)
	4	=	light scattering efficiency for organic carbon (m^2/gram)
	10	=	light scattering efficiency for elemental carbon (m^2/gram)

The 24-hour average source and background extinction, both expressed in Mm^{-1}, were used to estimate the corresponding 24-hour average change in light extinction by the following equation:

$$\Delta b_{ext}^{\%} = (b_{ext,source}/b_{ext,bkgd})*100$$

Where: $\Delta b_{ext}^{\%}$ is the incremental change in visibility, expressed in percent (%)

The Division also compared the results of CALPOST Method 2 to CALPOST Method 6. Method 6 uses constant f(RH) values for each month that are based on long-term averages from the Class I areas in question. Monthly average f(RH) values for Method 6 were taken from Table A-2 in the EPA document *Guidance for Tracking Progress Under the Regional Haze Rule.* Because the EPA document does not provide f(RH) values for NCIR or Devils Tower NM, the Division used the values for Wind Cave NP as a substitute. The results of the visibility analyses using Methods 2 and 6 are provided below:

Results of Class I Visibility Modeling

	CALPOST Method 2			CALPOST Method 6		
Class I Area	**Maximum (%)**	**# Days > 5%**	**# Days > 10%**	**Maximum (%)**	**# Days > 5%**	**# Days > 10%**
2001						
Badlands NP	3.8	0	0	3.1	0	0
Wind Cave	4.3	0	0	2.2	0	0
N. Cheyenne	4.0	0	0	1.3	0	0
2002						
Badlands NP	4.0	0	0	3.3	0	0
Wind Cave	4.99	0	0	2.3	0	0
N. Cheyenne	3.5	0	0	2.6	0	0
2003						
Badlands NP	4.97	0	0	4.1	0	0
Wind Cave	6.3	1	0	3.7	0	0
N. Cheyenne	6.8	1	0	2.9	0	0

Based on the CALPUFF modeling analysis using 2001-2003 meteorology and using CALPOST Method 2, the results indicate that there is a single day with a modeled change in visibility of 5% or more at Wind Cave NP (6.3%) and NCIR (6.8%). All Method 2 results at Badlands were below 5% (maximum of 4.97%).

Method 6 results showed that the number of days with a modeled change in visibility of 5% or greater was zero for all three Class I areas.

Class I Area Acid Deposition Analysis

Emissions of nitrogen- and sulfur-based pollutants have the potential to convert to nitrate and sulfate compounds in the atmosphere, and can be deposited as nitric and sulfuric acids into sensitive lakes and other water bodies. This effect can increase the acidity of the water bodies. All of the effects of acid deposition are not well known, but large amounts of acidic deposition can significantly affect soils, vegetation, lake chemistry and the aquatic habitats of sensitive species.

The CALPUFF model was used to estimate the wet and dry deposition fluxes of nitrate and sulfate species from the two plants, and those impacts were compared to threshold sensitivity deposition values provided by the National Park Service. Specifically, total nitrogen (N) deposition rates were calculated based on the wet and dry deposition rates of nitrogen oxides (NO_x), nitric acid (HNO_3), ammonium nitrate [$(NH_4)NO_3$], and ammonium sulfate [$(NH_4)_2SO_4$]. Total sulfur (S) deposition rates were calculated based on the wet and dry deposition rates of sulfur dioxide (SO_2) and sulfate (SO_4).

The model-predicted total S and total N deposition rates were compared to the Deposition Analysis Threshold (DAT) values for total S and total N, which are 0.005 kilograms per hectare per year (kg/ha/yr). These DAT values were established by the NPS and the U.S. Fish and Wildlife Service for the areas in the Western United States.

A summary of the modeled N and S deposition impacts from all years of meteorology used in this analysis indicate that the model-predicted deposition rates were below the DAT of 0.005 kg/hectare/year for all Class I areas of interest for all three years that were modeled. The modeled results of the deposition analysis are presented below.

Results of Class I Deposition Modeling

Class I Area	Deposition (kg/ha/yr)	
	Total N Deposition	**Total S Deposition**
2001		
Badlands NP	0.0010	0.0022
Wind Cave	0.0009	0.0022
N. Cheyenne	0.0004	0.0009
2002		
Badlands NP	0.0007	0.0017
Wind Cave	0.0011	0.0022
N. Cheyenne	0.0003	0.0007
2003		
Badlands NP	0.0009	0.0020
Wind Cave	0.0009	0.0019
N. Cheyenne	0.0005	0.0010
NPS Deposition Analysis Threshold (DAT)	0.005	0.005

Summary

Modeling of the near-field (< 50 km) impacts from the proposed modifications at the Colony East/West facilities with an EPA-approved dispersion model indicated that the Wyoming Ambient Air Quality Standards and PSD increments will be protected.

The modeled impacts did exceed the monitoring de minimus levels for PM_{10} and SO_2, but it is important to note that the modeled impacts were for all sources at both plants, and not just the increases that will result from the modifications.

An analysis of additional air quality impacts showed that impairment to any soils and vegetation with commercial value will be negligible. Likewise, air quality impacts from commercial, residential, and industrial growth will be minimal.

The applicant also conducted far-field (CALPUFF) modeling analyses to evaluate the significance of the modeled air quality impacts from the proposed project with respect to the EPA-proposed Class I Significant Impact Levels (SILs) for NO_2, SO_2, and PM_{10}. The far-field analyses also included an assessment of impacts to visibility and deposition from the two plants. Three Class I areas were evaluated (Wind Cave and Badlands national parks and Northern Cheyenne Indian Reservation [NCIR]). Devils Tower National Monument (NM), a Class II area, was also modeled for Class II SILs. The Division repeated the applicant's analysis with revised CALMET windfields that have been developed by the Division for other current projects in northeast Wyoming.

Note that the modeled emission rates represent the full, maximum short-term emission rates for the main combustion sources (dryers) at both plants. Therefore, the modeled results represent conservative estimates of the impacts from the modifications to the two plants. Comparisons to Class I modeling significance levels, FLAG visibility thresholds, and NPS depositions thresholds are also conservative because those thresholds have all been established for the emissions increases associated with single modifications/projects.

Through the far-field modeling analyses, the Division has determined that the proposed project will produce ambient impacts at the three Class I areas of concern that are below the EPA-proposed Class I area SILs, and well below the allowable Class I PSD increments. Predicted impacts at the Class II Devils Tower NM were well below Class II SILs.

CALPUFF-predicted levels of N and S deposition at the three Class I areas were well below the de minimus levels (DAT) that have been established by the NPS for Class I areas

Model-predicted changes in visibility were below the 5% FLAG threshold at Badlands NP for all three years that were modeled using CALPOST Methods 2 and 6. For Wind Cave NP, CALPOST Method 2 yielded one day above 5%, with a maximum of 6.3%. Using Method 6 for Wind Cave NP reduced the number of days above 5% to zero. At NCIR, a single day was predicted to exceed 5% using CALPOST Method 2. With CALPOST Method 6, the number of days above 5% was zero.

PROPOSED PERMIT CONDITIONS:

The Division proposes to issue air quality permits to American Colloid Company for the modification of the Colony East and West Plants with the following conditions:

<u>**Colony East & West**</u>

1. That authorized representatives of the Division of Air Quality be given permission to enter and inspect any property, premise or place on or at which an air pollution source is located or is being constructed or installed for the purpose of investigating actual or potential sources of air pollution and for determining compliance or non-compliance with any rules, standards, permits or orders.

2. That all substantive commitments and descriptions set forth in the application for this permit unless superseded by a specific condition of this permit, are incorporated herein by this reference and are enforceable as conditions of this permit.

3. That all notifications, reports and correspondences associated with this permit shall be submitted to the Stationary Source Compliance Program Manager, Air Quality Division, 122 West 25th Street, Cheyenne, WY 82002 and a copy shall be submitted to the District Engineer, Air Quality Division, 1866 South Sheridan Avenue, Sheridan, WY 82801.

4. That written notification of the anticipated date of initial start-up, in accordance with Chapter 6, Section 2(i) of the WAQSR, is required not more than 60 days or less than 30 days prior to such date. Notification of the actual date of start-up is required 15 days after start-up.

5. That the date of commencement of construction shall be reported to the Administrator within 30 days of commencement. In accordance with Chapter 6, Section 2(h) of the WAQSR, approval to construct or modify shall become invalid if construction is not commenced within 24 months after receipt of such approval or if construction is discontinued for a period of 24 months or more. The Administrator may extend the period based on satisfactory justification of the requested extension.

6. That performance tests be conducted, in accordance with Chapter 6, Section 2(j) of the WAQSR, within 30 days of achieving a maximum design rate but not later than 90 days following initial start-up, and a written report of the results be submitted. The operator shall provide 15 days prior notice of the test date. If a maximum design rate is not achieved within 90 days of start-up, the Administrator may require testing be done at the rate achieved and again when a maximum rate is achieved.

<u>**Conditions for Colony East**</u>

7. That American Colloid Company shall modify their Operating Permit for the Colony East Plant in accordance with Chapter 6, Section 3 of the WAQSR.

8. That performance testing, as required by Condition 6 of this permit, shall be conducted on the following sources:

i. Fluid Bed Dryer Baghouse (BH-08) and Rotary Dryer Baghouse (RD-1):

NO_x Emissions:	Compliance tests shall consist of three (3) 1-hour tests following EPA Reference Methods 1-4 and 7E.
CO Emissions:	Testing shall be conducted to verify that CO emissions are as represented in the application for this permit. Testing for CO shall consist of three (3) 1-hour tests following EPA Reference Methods 1-4 and 10.
SO_2 Emissions:	Compliance tests shall consist of three (3) 1-hour tests following EPA Reference Methods 1-4 and 6C.
PM Emissions:	Testing shall consist of three (3) tests following EPA Reference Methods 1-4 and 5 for source BH-08 and shall follow 40 CFR part 60, §60.736 for source RD-1.
Opacity:	Opacity testing for source BH-08 shall consist of three (3) 6-minute averages of the opacity as determined by Method 9 of 40 CFR part 60, Appendix A, and opacity testing for source RD-1 shall follow the requirements of Chapter 5, Section 2(i) of the WAQSR.

ii. Baghouses PS1, PD1, 17D, and 27:

PM Emissions:	Testing shall consist of three (3) tests following EPA Reference Methods 1-4 and 5.
Opacity:	Opacity testing shall consist of three (3) 6-minute averages of the opacity as determined by Method 9 of 40 CFR part 60, Appendix A.

iii. All Other Baghouses:

PM Emissions:	Testing shall consist of three (3) tests following EPA Reference Methods 1-4 and 5 for sources not subject to Subpart OOO. Sources subject to Subpart OOO shall follow 40 CFR part 60, §60.675.

Opacity: Opacity testing for sources not subject to Subpart OOO shall consist of three (3) 6-minute averages of the opacity as determined by Method 9 of 40 CFR part 60, Appendix A. Source subject to Subpart OOO shall follow the requirements of Chapter 5, Section 2(i) of the WAQSR.

A test protocol shall be submitted to this office for review and approval prior to testing. Fuel flow rates and bentonite throughput shall be recorded during each run. Notification of the test date shall be provided to the Division fifteen (15) days prior to testing. Results shall be submitted to this Division within 30 days of completion.

9. That emissions from the Fluid Bed Dryer Baghouse (BH-08) shall be limited to the following rates:

Pollutant	lb/MMBtu	gr/dscf	lb/hr	tpy
NO_x	0.47	--	23.7	103.8
SO_2	0.58	--	29.1	127.4
PM	--	0.01	3.0	13.1

10. That emissions from the Rotary Dryer Baghouse (RD-1) shall be limited to the following rates:

Pollutant	lb/MMBtu	gr/dscf	lb/hr	tpy
NO_x	0.47	--	18.9	83.0
SO_2	0.58	--	23.3	101.9
PM	--	0.01	3.0	13.1

11. That particulate emissions from all other baghouses at the Colony East Plant shall be limited to the following:

ID	Source	gr/dscf	lb/hr
RD-2	RD Nuisance	0.01	0.5
PS1	Primary System	0.01	0.7
PD1	Pre-Dried Clay System	0.01	1.0
17A	Granular System	0.01	0.4
17B	Raymond Mill #1	0.01	0.2
17C	Raymond Mill #2	0.01	0.3
17D	Nuisance Dust	0.01	0.8
18	Storage Silos	0.01	0.4
19	Draco-Air Slides	0.01	0.1
26	#47 Regis Packer	0.01	0.5
27	#22 Air Conveying System	0.01	1.5
3SB	3-Sided Bunker	0.01	0.3

12. Visible emissions from the Rotary Dryer Baghouse (RD-1) shall not exceed 10 percent opacity. Compliance with the 10% opacity standard shall be determined by a certified visible emissions observer as follows:

    i. A certified visible emissions observer shall measure and record three 6-minute averages of the opacity each day of operation in accordance with Method 9 of 40 CFR part 60, Appendix A.

13. That American Colloid Company shall comply with all applicable requirements of 40 CFR part 60, Subpart UUU and Subpart OOO.

14. American Colloid Company shall, on a daily basis, check for the presence of any visual emissions at each of baghouses (excluding source RD-1) on any day the baghouses are operating. The visual observation shall be conducted at each baghouse by personnel who are educated on the general procedures for determining the presence of visible emissions but not necessarily certified to perform Method 9 observations. Observation of any visible emissions from any of these units shall prompt immediate inspection and, if necessary, corrective action. Records of daily observations shall be kept and maintained for a period of at least five years from the date such records are generated and the records shall be made available to the Division upon request.

15. That coal consumption for the American Colloid Company – Colony East Plant shall be limited to 40,600 tons per year. Records of coal consumption shall be kept and maintained for a period of at least five years from the date such records are generated and the records shall be made available to the Division upon request.

16. That the following sources shall be limited to 20 percent opacity as determined by Method 9 of 40 CFR part 60, Appendix A: PS1, PD1, 17A, 17B, 17C, 17D, 18, 26, and 27.

17. That the following sources shall be limited to 7 percent opacity as determined by Method 9 of 40 CFR part 60, Appendix A: RD-2, 19, and 3SB.

18. Fugitive emissions from all conveyor transfer points and loading operations shall be limited to 10 percent opacity. All other sources not covered by NSPS regulations are subject to a 20 percent opacity limit as determined by Method 9 of 40 CFR part 60, Appendix A.

19. That all unpaved portions of haul roads, access roads, and work areas shall be treated with water and/or chemical suppressants on a schedule sufficient to control fugitive dust from vehicular traffic and wind erosion.

20. That emission and opacity limits at the Colony East Plant apply at all times including startup and shutdown.

21. That all previous valid air quality permits and waivers shall remain in effect unless superseded by a condition of this permit.

Conditions for Colony West

7. That American Colloid Company shall modify their Operating Permit for the Colony West Plant in accordance with Chapter 6, Section 3 of the WAQSR.

8. That performance testing, as required by Condition 6 of this permit, shall be conducted on the following sources:

i. Rotary Dryer Baghouses (DC-01 and DC-02):

NO_x Emissions: Compliance tests shall consist of three (3) 1-hour tests following EPA Reference Methods 1-4 and 7E.

CO Emissions: Testing shall be conducted to verify that CO emissions are as represented in the application for this permit. Testing for CO shall consist of three (3) 1-hour tests following EPA Reference Methods 1-4 and 10.

SO_2 Emissions: Compliance tests shall consist of three (3) 1-hour tests following EPA Reference Methods 1-4 and 6C.

PM Emissions: Testing shall consist of three (3) tests following 40 CFR, Part 60, §60.736.

Opacity: Opacity testing shall follow the requirements of Chapter 5, Section 2(i) of the WAQSR.

ii. Baghouses DC-04, DC-06, DC-07, DC-14, DC-15, and DC-16:

PM Emissions: Testing shall consist of three (3) tests following EPA Reference Methods 1-4 and 5 for sources not subject to Subpart OOO. Sources subject to Subpart OOO shall follow 40 CFR part 60, §60.675.

Opacity: Opacity testing for sources not subject to Subpart OOO shall consist of three (3) 6-minute averages of the opacity as determined by Method 9 of 40 CFR part 60, Appendix A. Source subject to Subpart OOO shall follow the requirements of Chapter 5, Section 2(i) of the WAQSR.

iii. All Other Baghouses:

PM Emissions: Testing shall consist of three (3) tests following EPA Reference Methods 1-4 and 5 for sources not subject to Subpart OOO. Sources subject to Subpart OOO shall follow 40 CFR part 60, §60.675.

Opacity: Opacity testing for sources not subject to Subpart OOO shall consist of three (3) 6-minute averages of the opacity as determined by Method 9 of 40 CFR part 60, Appendix A. Source subject to Subpart OOO shall follow the requirements of Chapter 5, Section 2(i) of the WAQSR.

A test protocol shall be submitted to this office for review and approval prior to testing. Fuel flow rates and bentonite throughput shall be recorded during each run. Notification of the test date shall be provided to the Division fifteen (15) days prior to testing. Results shall be submitted to this Division within 30 days of completion.

9. That emissions from each Rotary Dryer Baghouse (DC-01 and DC-02) shall be limited to the following rates:

Pollutant	lb/MMBtu	gr/dscf	lb/hr	tpy
NO_x	0.47	--	17.9	78.3
SO_2	0.58	--	21.9	96.1
PM	--	0.01	3.4	15.0

10. That particulate emissions from all other baghouses at the Colony West Plant shall be limited to the following:

ID	Source	gr/dscf	lb/hr
DC-03	Mill 1 and 2	0.01	0.6
DC-04	Granular System	0.01	0.9
DC-05	Granular Nuisance	0.01	0.5
DC-06	Packer System	0.01	0.9
DC-07	Bulk Loadout	0.01	1.0
BS-08	Belt Scale #1	0.01	0.2
BS-09	Belt Scale Hopper #1	0.01	0.1
DC-12	Granular Loadout	0.01	0.4
DC-13	Triangle Packer	0.01	0.2
DC-14	Fines Tank/Nuisance	0.01	0.7
DC-15	Granular Nuisance	0.01	0.7
DC-16	Nuisance Baghouse	0.01	1.6

11. That American Colloid Company shall comply with all applicable requirements of 40 CFR part 60, Subpart UUU and Subpart OOO.

12. American Colloid Company shall, on a daily basis, check for the presence of any visual emissions at each of baghouses on any day the baghouses are operating. The visual observation shall be conducted at each baghouse by personnel who are educated on the general procedures for determining the presence of visible emissions but not necessarily certified to perform Method 9 observations. Observation of any visible emissions from any of these units shall prompt immediate inspection and, if necessary, corrective action. Records of daily observations shall be kept and maintained for a period of at least five years from the date such records are generated and the records shall be made available to the Division upon request.

13. That the following sources shall be limited to 20 percent opacity as determined by Method 9 of 40 CFR part 60, Appendix A: DC-01, DC-02, DC-03, DC-04, DC-05, DC-06, DC-07, BS-08, BS-09, and DC-12.

14. That the following sources shall be limited to 7 percent opacity as determined by Method 9 of 40 CFR part 60, Appendix A: DC-13, DC-14, DC-15, and DC-16

15. Fugitive emissions from all conveyor transfer points and loading operations shall be limited to 10 percent opacity. All other sources not covered by NSPS regulations are subject to a 20 percent opacity limit as determined by Method 9 of 40 CFR part 60, Appendix A.

16. That all unpaved portions of haul roads, access roads, and work areas shall be treated with water and/or chemical suppressants on a schedule sufficient to control fugitive dust from vehicular traffic and wind erosion.

17. That emission and opacity limits at the Colony West Plant apply at all times including startup and shutdown.

18. That all previous valid air quality permits and waivers shall remain in effect unless superseded by a condition of this permit.