



Statement of Basis

**Title V Air Quality Operating Permit
Renewal**

**GCC Dacotah
Rapid City, South Dakota**

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1.0 Background

On December 19, 2005, the South Dakota Department of Environment and Natural Resources (DENR) renewed GCC Dacotah’s Title V air quality operating permit #28.1121-02. The permit covered GCC Dacotah’s Portland cement plant operations in Rapid City, South Dakota and includes a quarry operation. The following revisions were made to the Title V air quality operating permit since it was renewed in December 2005:

1. November 6, 2006 – Permit modification for the addition of an air separator (baghouse) to the kiln #6 feed system;
2. December 5, 2006 – Minor permit amendment for the addition of four baghouses;
3. August 7, 2008 – Minor permit amendment to include fly ash storage and handling to the existing silo (Unit #21) and truck load out (Unit #35);
4. October 10, 2008 – Minor permit amendment to include fly ash storage and handling to the existing silo (Unit #19);
5. December 1, 2008 – Minor permit amendment to correct the operating descriptions and applicable limits of kiln 4’s and 5’s clinker coolers and address an EPA order signed June 15, 2007;
6. September 30, 2013 – Modification to add two new baghouses to capture and control particulate matter emissions. The new baghouses are associated with plans to begin the sale of cement kiln dust; and
7. October 28, 2013 – Minor amendment to include the operation to produce S-Sorb as a new product.

In accordance with permit condition 4.2, GCC Dacotah is required to submit an application to renew its Title V air quality operating permit 180 days prior to the permit expiration date. If this occurred, the permit does not expire and remains in effect until the Secretary takes final action on the renewal application. DENR received the renewal application on June 21, 2010, which meets the 180 day schedule. Therefore, GCC Dacotah is able to operate under its existing Title V air quality operating permit until DENR takes final action on the renewal application.

1.1 Existing Equipment

Table 1.1 provides a list of the units presently permitted which was taken from the current Title V air quality operating permit issued October 28, 2013.

Table 1.1 – Description of Permitted Units, Operations, and Processes

	Unit	Description of Process	Maximum Operating Rate	Control Device	Maximum Flow Rate ¹
1	EDC101	Primary and secondary crushers	1,000 tons per hour	Baghouse	7,500 acfm
2	EDC102	Screen	1,000 tons per hour	Baghouse	7,500 acfm
3	EDC402	Rotary kiln #4 fired on coal or natural gas	550 tons clinker per day	Electrostatic Precipitator	-
4	EDC403	Rotary kiln #5 fired on coal or natural gas	550 tons clinker per day	Electrostatic Precipitator	-

Unit		Description of Process	Maximum Operating Rate	Control Device	Maximum Flow Rate ¹
5a	EDC416	Kiln #4 and #5 clinker coolers	1,100 tons clinker per day	Baghouse	-
5b		Kiln #4 and #5 clinker coolers		Baghouse	-
6	EDC652	Raw material storage building to two kiln feed storage silos	180 tons per hour	Baghouse	7,500 acfm
6a	EDC501	Rock silo to Loesche Mill	180 tons per hour	Baghouse	10,000 acfm
6b	EDC602	Kiln feed storage silo to kiln #6	160 tons per hour	Baghouse	4,100 acfm
7	EDC420	Penthouse storage #1 (south)	1100 tons clinker per day	Baghouse	-
7a	EDC421	Penthouse storage #1 (south)	1100 tons clinker per day	Baghouse	-
7b	EDC710	Clinker shed to finish mills	500 tons per hour	Baghouse	15,000 acfm
7c	EDC706	Raw Shed to Loesche Mill	40 tons per hour	Baghouse	1,500 acfm
7d	EDC701	Raw material transferred from belt conveyor 107 to belt conveyor 108	800 tons per hour	Baghouse	2,000 acfm
7e	EDC705	Gypsum raw shed to old clinker building	350 tons per hour	Baghouse	2,000 acfm
7f	EDC703	Raw shed to Loesche Mill	40 tons per hour	Baghouse	1,500 acfm
7g	EDC704	Gypsum raw shed to old clinker building	350 tons per hour	Baghouse	2,000 acfm
8	EDC614	Penthouse storage #2 (north)	2,250 tons clinker per day	Baghouse	5,000 acfm
8a	EDC627	Penthouse storage #2 (north)	2,250 tons clinker per day	Baghouse	3,500 acfm
8b	EDC613	Penthouse storage #2 (north)	2,250 tons clinker per day	Baghouse	5,000 acfm
8c	EDC707	Rock silo discharge	1,000 tons per hour	Baghouse	5,000 acfm
9	EDC619	Rotary kiln #6 fired on coal or natural gas	2,250 tons clinker per day	Preheater/ Precalcinator/ Baghouse	240,000 acfm
10	EDC615	Dry process clinker cooler	2,250 tons clinker per day	Baghouse	153,000 acfm
11	EDC623	Alkali bypass and alkali waste to waste bin transfer system	2,250 tons clinker per day	Baghouse	60,000 acfm
12	EDC731	Finish mill #3	35 tons per hour	Baghouse	15,000 acfm
13	EDC741	Finish mill #4	40 tons per hour	Baghouse	15,000 acfm
14	EDC751	Finish mill #5	45 tons per hour	Baghouse	15,000 acfm
15	EDC761	Finish mill #6	45 tons per hour	Baghouse	15,000 acfm
16	EDC771	Finish mill #7 (mill sweep)	85 tons per hour	Baghouse	28,000 acfm
16a	EDC772	Finish mill #7 (mill separator)	85 tons per hour	Baghouse	80,000 acfm
16b	EDC708	Finish mill #7 (transfer)	500 tons per hour	Baghouse	4,500 acfm
16c	EDC709	Finish mill #7 (transfer)	500 tons per hour	Baghouse	8,000 acfm

Unit		Description of Process	Maximum Operating Rate	Control Device	Maximum Flow Rate ¹
16d	EDC713	Clinker transfer system	500 tons per hour	Baghouse	10,000 acfm
17	EDC804	Bulk storage silos	125 tons per hour	Baghouse	4,000 acfm
18	EDC821	Bulk storage silos	125 tons per hour	Baghouse	4,000 acfm
19	EDC805	Bulk cement or fly ash storage silos	125 tons per hour	Baghouse	4,000 acfm
20	EDC832	Bulk storage silos	125 tons per hour	Baghouse	10,000 acfm
21	EDC824	Bulk cement or fly ash storage silos	200 tons per hour	Baghouse	5,000 acfm
24	EDC827	Rail storage silos	125 tons per hour	Baghouse	4,000 acfm
25	EDC828	Rail storage silos	125 tons per hour	Baghouse	4,000 acfm
26	EDC834	Rail storage silos	125 tons per hour	Baghouse	10,000 acfm
27	EDC853	Bulk rail load outs	500 tons per hour	Baghouse	1,688 acfm
28	EDC854	Bulk rail load outs	500 tons per hour	Baghouse	6,416 acfm
35	EDC825	East bulk cement or fly ash truck load out	500 tons per hour	Baghouse	3,000 acfm
36	EDC826	West bulk truck load out	500 tons per hour	Baghouse	4,000 acfm
37	EDC801	Cement bagging	114 tons per hour	Baghouse	5,900 acfm
38	EDC802	Cement bagging	114 tons per hour	Baghouse	5,900 acfm
39	EDC803	Cement bagging	114 tons per hour	Baghouse	5,900 acfm
41	ECD628E DC629	Coal mill	20 tons coal per hour 5.3 MMBtus per hour heat input	Single stage cyclone and two baghouses operated in parallel	42,000 acfm
41b	EDC274	Coal stacker top	400 tons per hour	Baghouse	1,300 acfm
41c	EDC275	Coal surge bin top	400 tons per hour	Baghouse	450 acfm
41d	EDC702	Coal tunnel to coal stacker	400 tons per hour	Baghouse	2,000 acfm
41e	EDC276	Coal surge bin top	400 tons per hour	Baghouse	4,000 acfm
41f	EDC277	Coal transfer	400 tons per hour	Baghouse	1,300 acfm
41g	EDC280	Coal bin #4	9 tons per hour	Baghouse	-
41h	EDC279	Coal bin #5	9 tons per hour	Baghouse	-
41i	EDC278	Coal bin #6	400 tons per hour	Baghouse	600 acfm
62b	EDC272E DC273	Coal – hopper to conveyor	400 tons per hour	Two baghouses operated in parallel	500 acfm per baghouse
63		Air separator – kiln #6 feed system	2,250 tons clinker per day	Baghouse	1906 acfm
64		Belt transfer from kiln #4 and #5, kiln #4 and #5 weigh feeder, and kiln #4 bucket elevator	Not applicable	Baghouse	12,200 acfm
65		Raw material transfer point from secondary crusher to a belt conveyor	Not applicable	Baghouse	2,000 acfm

Unit	Description of Process	Maximum Operating Rate	Control Device	Maximum Flow Rate ¹
66	Clinker transfer point from kiln #5 clinker cooler to two bucket elevators	Not applicable	Baghouse	2,500 acfm
67	Clinker transfer point from kiln #4 clinker cooler to pan conveyor	Not applicable	Baghouse	2,500 acfm
68	EDC850 Alkali bypass dust, cement and kiln dust storage silo - Silo 39	500 tons per hour	Baghouse	2,100 acfm
69	EDC851 Alkali bypass dust, cement and kiln dust storage Silo 39, transfer to truck load out	60 tons per hour	Baghouse	1,300 acfm

¹ – “acfm” means actual cubic feet per minute

Unit #40 consists of the alkali waste bin and associated baghouse and was accidental removed from Table 1-1 of the existing permit during the last permit revision and will be added back in during the renewal process.

1.2 Proposed Revisions

GCC Dacotah identified changes to the equipment and permit conditions in the application. The following is a list of changes being proposed:

1. Unit #37 and #39 will be removed from Table 1.1 because these units were decommissioned;
2. Correct the maximum operating rates for Unit #41g and #41h from 9 to 8.5 tons per hour;
3. Correct the maximum operating rates for Units #14 and #15 from 45 to 50 tons per hour;
4. Correct the maximum operating rates for Units #16 and #16a from 85 to 100 tons per hour;
5. Add maximum operating rates for Unit #64 through #67;
6. Add Plant ID for Unit #63 (EDC606) and #65 (EDC104);
7. Correct the description of the control device for Unit #9 from “Preheater/precalcinator/baghouse” to “Preheater/precalciner/baghouse”
8. Correct the description of Unit #40 from “Wet kiln waste to waste bin” to “Alkali waste bin”, Unit #68 from “Alkali bypass dust and cement storage silo” to “Bulk storage silo” and Unit #69 from “Kiln dust (Silo 39) transfer to...” to “Silo 39 bulk...”; and
9. Correct the maximum air flow rates for several control devices (see Table 1.2).

Table 1.2 – Corrected Maximum Air Flow Rates

Unit	Description of Process	Control Device	Maximum Flow Rate ¹
#3	Rotary kiln #4 fired on coal or natural gas	Electrostatic Precipitator	140,000 acfm
#4	Rotary kiln #5 fired on coal or natural gas	Electrostatic Precipitator	140,000 acfm
#5	Kiln #4 and #5 clinker coolers	Two baghouses operated in parallel	55,585 acfm each
#7	Penthouse storage #1 (south)	Baghouse	2,300 acfm

Unit	Description of Process	Control Device	Maximum Flow Rate ¹
#7a	Penthouse storage #1 (south)	Baghouse	3,400 acfm
#7c	Raw Shed to Loesche Mill	Baghouse	2,000 acfm
#8a	Penthouse storage #2 (north)	Baghouse	5,000 acfm
#20	Bulk storage silos	Baghouse	10,000 acfm
#40	Alkali waste bin	Baghouse	2,500 acfm
#41	Coal mill	Single stage cyclone and two baghouses operated in parallel	21,000 acfm each
#41g	Coal bin #4	Baghouse	1,300 acfm
#41h	Coal bin #5	Baghouse	2,500 acfm
#41i	Coal bin #6	Baghouse	1,300 acfm

¹ – “acfm” means actual cubic feet per minute

In addition to the changes proposed by GCC Dacotah, DENR is recommending the following changes:

1. Unit #5a and #5b are listed in the existing permit as two units each with a separate stack. However, the baghouses associated with these two units are in parallel but emit out of a single stack. Therefore, Unit #5a and #5b will be combined into Unit #5.

1.3 Construction Permit

During the term of the permit, GCC Dacotah applied for and was issued the following air quality construction permits:

1. November 18, 2011 – Construction of two storage silos each equipped with a baghouse to control dust emissions (#28.1121-02-01C);
2. February 12, 2012 – Construction of an overland conveyor system using water suppression and the installation of a mobile crusher equipped with a baghouse (#28.1121-02-02C); and
3. June 28, 2012 – Construction of a kiln #6 upgrade (#28.1121-02-03C).

On January 11, 2013, GCC Dacotah submitted an application to revise its Title V air quality operating permit to include the permitted equipment and permit requirements associated with the first construction permit. DENR is in the process of including the permit conditions for the November 18, 2011 construction permit in the Title V air quality operating permit.

The equipment associated with the second and third construction permit have not been installed yet and an application to include them in the Title V air quality operating is not required until one year after initial startup of the equipment associated with the construction permit. Therefore, the equipment associated with the second and third construction permit will not be included in this permit review.

2.0 New Source Performance Standards

DENR reviewed the New Source Performance Standards listed in 40 CFR Part 60 to determine if any of the federal New Source Performance Standards are applicable to this facility. The following may be applicable.

2.1 Standards for Portland Cement Plants

The provisions 40 CFR Part 60, Subpart F are applicable to the following units and processes at Portland cement plants that commence construction or modifications after August 17, 1971: kiln, clinker cooler, raw mill system, finish mill system, raw mill dryer, raw material storage, clinker storage, finish product storage, conveyor transfer points, bagging and bulk loading and unloading systems.

In accordance with 40 CFR § 63.1356, each affected source subject to 40 CFR Part 63, Subpart LLL is exempt from the applicable new source performance standards contained in 40 CFR Part 60, Subpart F. Each affected source in 40 CFR Part 60, Subpart F is an affected source under 40 CFR Part 63, Subpart LLL. As noted in the National Emission Standards for Hazardous Air Pollutant (MACT – Part 63) section of this review, GCC Dacotah is applicable to 40 CFR Part 63, Subpart LLL. Therefore, 40 CFR Part 60, Subpart F is not applicable.

2.2 Standards for Coal Preparation Plants

The provisions of 40 CFR Part 60, Subpart Y are applicable to coal preparation and processing plants that process more than 181 megagrams (200 tons) of coal per day. Unit #41 is capable of processing 20 tons per hour or 480 tons per day of coal and is applicable to this subpart. In accordance with 40 CFR § 60.250(b), the following processes constructed, reconstructed or modified after October 27, 1974 and on or before April 28, 2008 have applicable requirements in this subpart: thermal dryers, pneumatic coal cleaning equipment, coal processing and conveying equipment, coal storage systems, and coal transfer and loading systems.

The standard applies to the equipment operated between the unloading of the coal on site to the coal mill/dryer system. The coal transferring systems were installed in 1976 and the indirect coal feed system (coal mill/dryer) was installed on kiln #6 in 1996. Therefore, coal transferring systems prior to and including the coal mill/dryer are applicable to this standard. The units applicable to this standard are listed in Table 2.1.

Table 2.1 – Applicable Emission Points to Subpart Y

Unit	Process Identification and Description	Control Device
#41	EDC628 EDC629 1995 ABB Raymond coal mill	Single stage cyclone followed by two baghouses operated in parallel
#41b	EDC274 Coal stacker top	Baghouse
#41c	EDC275 Coal surge bin top	Baghouse
#41d	EDC702 Coal tunnel to coal stacker	Baghouse
#41e	EDC276 Coal surge bin top	Baghouse
#41f	EDC277 Coal transfer	Baghouse
#41g	EDC280 Coal bin #4	Baghouse
#41h	EDC279 Coal bin #5	Baghouse

#41i	EDC278	Coal bin #6	Baghouse
#62b	EDC272 EDC273	Coal – hopper to conveyor	Two baghouses operated in parallel

Originally, the coal mill (Unit #41) was thought to be applicable to the particulate matter and opacity limit in 40 CFR § 60.252(a) and (c) because it includes the exhaust gases from Kiln #6 to dry the coal. However, according to the definition of a thermal dryer in 40 CFR § 60.251(r), units constructed on or before May 27, 2009 only pertains to drying bituminous coal and GCC Dacotah only uses subbituminous coal. Therefore, Unit #41 is not subject to 40 CFR § 60.252(a) and (c) and will not be included in the permit. Although it is not considered a thermal dryer, Unit #41 is a coal mill that processes coal and is applicable to the opacity requirement in 40 CFR § 60.254(a). The remaining equipment in Table 2.1 is subject to the opacity limit in 40 CFR § 60.254(a).

In accordance with 40 CFR § 63.1356, if a unit subject to 40 CFR Part 63, Subpart LLL is also subject to another federal standard, the owner or operator must comply with the most stringent emission limit or requirement and is exempt from the less stringent requirement. This will be discussed in Section 6.2.

2.3 Standards for Non-Metallic Mineral Processing Plants

The provisions of this subpart are applicable to the following units and processes at non-metallic mineral processing plants not subject to Subpart F or follow any process subject to Subpart F that commences construction or modifications after August 31, 1983: crusher, grinding mill, screening operation, bucket elevator, belt conveyor, bagging operating, storage bin, enclosed truck or rail car loading station.

In accordance with 40 CFR §§ 63.1340(c) and 63.1356, each affected source subject to 40 CFR Part 63, Subpart LLL is exempt from the applicable new source performance standards contained in 40 CFR Part 60, Subpart OOO. Each affected source after the raw material storage applicable to 40 CFR Part 60, Subpart OOO is an applicable source under 40 CFR Part 63, Subpart LLL. As noted in the National Emission Standards for Hazardous Air Pollutant (MACT – Part 63) section of this review, GCC Dacotah is applicable to 40 CFR Part 63, Subpart LLL. Therefore, the affected sources after raw material storage are not applicable to 40 CFR Part 60, Subpart OOO.

The affected sources prior to the raw material storage need to be reviewed for applicability to this standard. The crushing and screening operations were constructed in 1954. Therefore, the crushing and screening operations were constructed prior to August 31, 1984. In 1976, kiln #6 and the associated raw material transfer systems were constructed. This modification to the cement plant occurred prior to August 31, 1984. Since the crushing and screening operations and any modifications due to the installation of kiln #6 were constructed prior to 1984, Subpart OOO is not applicable to the affected sources prior to the raw material storage.

2.4 Other Applicable New Source Performance Standards

DENR reviewed the other New Source Performance Standards and determined there are no other standards applicable to GCC Dacotah's operations.

3.0 New Source Review

In accordance with ARSD 74:36:10:01, the new source review regulations apply to areas of the state which are designated as nonattainment pursuant to the Clean Air Act for any pollutant regulated under the Clean Air Act. This facility is located in Rapid City, South Dakota, which is in attainment or unclassifiable for all the criteria air pollutants regulated under the Clean Air Act. Therefore, GCC Dacotah is not subject to new source review.

4.0 Prevention of Significant Deterioration

A prevention of significant deterioration (PSD) review applies to new major stationary sources and major modifications to existing major stationary sources in areas designated as attainment under Section 107 of the Clean Air Act for any regulated air pollutant. The following is a list of regulated air pollutants under the PSD program:

1. Total suspended particulate (PM);
2. Particulate with a diameter less than or equal to 10 microns (PM10);
3. Particulate with a diameter less than or equal to 2.5 microns (PM2.5);
4. Sulfur dioxide (SO₂);
5. Nitrogen oxides (NO_x);
6. Carbon monoxide (CO);
7. Ozone – measured as volatile organic compounds (VOCs);
8. Lead;
9. Fluorides
10. Sulfuric acid mist;
11. Hydrogen sulfide;
12. Reduced sulfur compounds;
13. Total reduced sulfur; and
14. Greenhouse gases (carbon dioxide, methane, nitrous oxide, etc.).

If the source is considered one of the 28 named PSD source categories listed in Section 169 of the federal Clean Air Act, the major source threshold is 100 tons per year of any regulated air pollutant, except for greenhouse gases. The major source threshold for all other sources is 250 tons per year of any regulated air pollutant, except for greenhouse gases. GCC Dacotah is considered one of the 28 named PSD source categories; therefore, the major source threshold is 100 tons per year.

According to the Clean Air Act, once a pollutant is regulated under any part of the Act, (as was the case with greenhouse gas emissions after the motor vehicle regulations were finalized in March 2010) major new sources or major modifications are subject to the PSD program and Title V air quality operating permit program. Under the Clean Air Act, PSD and Title V air quality operating permits are required for all sources that emit a regulated air pollutant above 100 or 250 tons per year, depending on the source. This threshold, if applied to greenhouse gases,

would greatly increase the number of facilities requiring a PSD review or Title V air quality operating permit. Based on administrative necessity, EPA increased these thresholds through the “Tailoring Rule.”

On May 13, 2010, EPA issued the final version of the “Tailoring Rule” for greenhouse gas emissions. The major source threshold for greenhouse gases is listed below:

1. New PSD source because of a criteria air pollutant, the major source threshold for greenhouse gases is 75,000 tons per year of carbon dioxide equivalent or more;
2. New PSD source if greenhouse gas emissions are 100,000 tons per year of carbon dioxide equivalent or more;
3. For an existing PSD source because of a criteria air pollutant, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more;
4. For an existing non-PSD source that has the potential to emit 100,000 tons per year of carbon dioxide equivalent emissions or more, a major modification for greenhouse gases is an increase of 75,000 tons per year of carbon dioxide equivalent or more; and
5. In addition to subsection (2) and (4), a specific greenhouse gas, without calculating the carbon dioxide equivalent, also needs to emit greater than 100 or 250 tons per year, whichever is applicable, to be regulated.

There are six regulated greenhouse gases which are listed below:

1. Carbon dioxide;
2. Nitrous oxide;
3. Methane;
4. Hydrofluorocarbons;
5. Perfluorocarbons; and
6. Sulfur hexafluoride.

In accordance with ARSD 74:36:01:15(6), the hydrofluorocarbons and perfluorocarbons pertain to a category and not a single specific compound.

4.1 Potential to Emit

DENR has calculated the potential emissions from GCC Dacotah’s operations in Rapid City and determined their potential emissions are greater than the major source threshold under the Title V air quality operating permit program for particulate matter, sulfur dioxide, nitrogen oxide, and carbon monoxide. In addition, GCC Dacotah’s potential emissions of particulate matter 10 microns in diameter or less (PM10), sulfur dioxide, nitrogen oxide and carbon monoxide are greater than the major source threshold under the PSD program. Table 4.1 and the footnotes were derived from GCC Dacotah’s state of basis for the permit issued December 19, 2005.

Table 4.1 – Potential Uncontrolled Emissions (tons per year)

Unit	TSP	PM10	PM2.5	SO ₂	NO _x	VOC	CO
#1	2,910	1,218	1,218	-	-	-	-

Unit	TSP	PM10	PM2.5	SO₂	NO_x	VOC	CO
#2	2,910	1,218	1,218	-	-	-	-
#3	13,049	3,112	3,112	438	999	3.0	202
#4	13,049	3,112	3,112	438	999	3.0	202
#5a	924	81	81	-	-	-	-
#5b	924	81	81	-	-	-	-
#6	254	106	106	-	-	-	-
#6a	203	85	85	-	-	-	-
#6b	254	106	106	-	-	-	-
#7	72	30	30	-	-	-	-
#7a	72	30	30	-	-	-	-
#7b	220	92	92	-	-	-	-
#7c	51	21	21	-	-	-	-
#7d	81	34	34	-	-	-	-
#7e	18	7.3	7.3	-	-	-	-
#7f	51	21	21	-	-	-	-
#7g	18	7.3	7.3	-	-	-	-
#8	148	62	62	-	-	-	-
#8a	148	62	62	-	-	-	-
#8b	148	62	62	-	-	-	-
#8c	148	62	62	-	-	-	-
#9	102,656	43,116	43,116	885	2,267	74	2,002
#10	3,778	329	329	-	-	-	-
#11	1	1	1	1	1	1	1
#12	1,103	1,103	1,103	-	-	-	-
#13	2	2	2	-	-	-	-
#14	2	2	2	-	-	-	-
#15	2	2	2	-	-	-	-
#16	2	2	2	-	-	-	-
#16a	2	2	2	-	-	-	-
#16b	238	99	99	-	-	-	-
#16c	238	99	99	-	-	-	-
#16d	238	99	99	-	-	-	-
#17	475	304	304	-	-	-	-
#18	3	3	3	-	-	-	-
#19	3	3	3	-	-	-	-
#20	3	3	3	-	-	-	-
#21	3	3	3	-	-	-	-
#24	3	3	3	-	-	-	-
#25	3	3	3	-	-	-	-
#26	3	3	3	-	-	-	-
#27	317	132	132	-	-	-	-
#28	4	4	4	-	-	-	-
#35	4	4	4	-	-	-	-
#36	4	4	4	-	-	-	-

Unit	TSP	PM10	PM2.5	SO ₂	NO _x	VOC	CO
#38	4	4	4	-	-	-	-
#40	13	5.6	5.6	-	-	-	-
#41	1	1	1	1	1	1	1
#41b	55	23	23	-	-	-	-
#41c	55	23	23	-	-	-	-
#41d	55	23	23	-	-	-	-
#41e	55	23	23	-	-	-	-
#41f	55	23	23	-	-	-	-
#41g	14	5.7	5.7	-	-	-	-
#41h	14	5.7	5.7	-	-	-	-
#41i	27	11	11	-	-	-	-
#62b	55	23	23	-	-	-	-
#63	0.6	0.6	0.6	-	-	-	-
#64	4.0	4.0	4.0	-	-	-	-
#65	0.7	0.7	0.7	-	-	-	-
#66	0.8	0.8	0.8	-	-	-	-
#67	0.8	0.8	0.8	-	-	-	-
#68	0.7	0.5	0.1	-	-	-	-
#69	1.1	0.3	0.1	-	-	-	-
Fugitive	281	118	118	-	-	-	-
Total	145,383	55,182	55,182	1,761	4,265	80	2,406

¹ – The emissions from the alkali bypass and coal are represented in the emission total noted for the Loesche mill and rotary kiln #6.

² – The maximum amount of clinker produced that could be processed through the finish mills is known. If the maximum process rate is used for each finish mill, the emission will be overestimated because the finish mills may process more than GCC Dacotah may produce through the kilns. Therefore the emissions from all the finish mills are represented in the emission total noted for finish mill #3.

³ – The maximum amount of cement produced that could be stored in the silos is known. If the maximum process rate is used for each storage silo, the emissions will be overestimated because the storage silos may process more than GCC Dacotah may produce through the kilns. Therefore, the emissions from all the silos are represented by the first bulk storage silo.

⁴ – The maximum amount of cement produced that could be loaded out is known. If the maximum process rate is used for each loadout, the emissions will be overestimated because the load outs may process more than GCC Dacotah may produce through the kilns. Therefore, the emissions from all the load outs are represented by the first bulk loadout.

⁵ – The fugitive emissions were based on the PSD application and increased to account for the material used for rotary kiln #4 and rotary kiln #5. Rotary kiln #6 accounts for about 66 percent of all the raw material used.

⁶ – The TSP emission calculation was back calculated from the PM10 emissions. AP42 indicates that approximately 42 percent of particulate emissions are TSP.

The potential emission rates for Unit #63 through #67 are based on an assumed emission rate of 0.01 grains per dry standard cubic foot. Without the use of the baghouses, these four units would emit indoors. Therefore, potential uncontrolled and controlled are equal. Equation 4.1 was used to calculate the potential emissions based on the maximum flow rate identified in Table 1.1 for

each unit. The maximum flow rate in actual cubic feet per minute in Table 1.1 was converted to dry standard cubic feet per minute using Equation 4.2 and assuming an actual temperature of 70 degrees Fahrenheit (294.3 Kelvin), actual pressure of 0.88 atmospheres, and moisture of 0. The potential emissions using Equation 4.1 and 4.2 are displayed in Table 4.1.

Equation 4.1 – Potential emission based on flow rate

$$PTE = 0.01 \frac{gr}{dscf} \times \frac{dscf}{min} \div 7,000 \frac{gr}{lb} \times 60 \frac{min}{hr} \times 8,760 \frac{hrs}{yr} \div 2,000 \frac{lbs}{ton}$$

Equation 4.2 – Converting acfm to dscfm

$$dscfm = acfm \times \frac{293 (K)}{294.3 (K)} \times \frac{0.88 (atm)}{1 (atm)} \times \frac{100 - 0 (\%)}{100}$$

Based on the potential emission in Table 4.1, GCC Dacotah is considered a major source under the PSD program for particulate, sulfur dioxide, nitrogen oxide, and carbon monoxide. Therefore, any proposed changes need to be reviewed to determine if the proposed change is a major modification, including greenhouse gases.

4.2 Existing PSD Permit

GCC Dacotah was issued a PSD permit on April 10, 2003. A PSD review was required for particulate, sulfur dioxide, nitrogen oxide, and carbon monoxide emissions associated with the Kiln #6 system. The permit conditions in the PSD permit are currently incorporated in the Title V air quality permit, except for permit conditions 2.1, 2.1, 2.3, 2.4, 3.4, 3.5, 4.6, 5.6, and 5.7. These permit conditions were not included because the requirements have been satisfied by GCC Dacotah, except for permit condition 4.6. Permit condition 4.6 was required because of a federal regulation under 40 CFR § 60.11(c), and is no longer a requirement in the existing federal regulations.

5.0 National Emission Standards for Hazardous Air Pollutants

DENR reviewed 40 CFR Part 61 to determine the applicability of this facility to any of the subparts. Currently, there are no finalized or promulgated National Emissions Standards for Hazardous Air Pollutants standards in 40 CFR Part 61 applicable to GCC Dacotah.

6.0 Maximum Achievable Control Technology Standards

6.1 Potential HAP Emissions

The federal Maximum Achievable Control Technology Standards are applicable to both major and area sources of hazardous air pollutants. A major source of hazardous air pollutants is defined as having the potential to emit 10 tons or more per year of a single hazardous air pollutant or 25 tons per year or more of a combination of hazardous air pollutants. An area source is a source that is not a major source of hazardous air pollutants.

DENR calculated the potential hazardous air pollutant emissions from GCC Dacotah's operations in Rapid City and determined their potential emissions are greater than the major source threshold under the Title V air quality operating permit program. Table 6.1 was derived from GCC Dacotah's state of basis for the permit issued December 19, 2005.

Table 6.1 – Potential HAP Emissions

Unit	Hazardous Air Pollutants
#3	4.0 tons per year
#4	7.7 tons per year
#9	14.8 tons per year
#11	1.0 tons per year
#41	3.5 tons per year
Total	31 tons per year

DENR reviewed the maximum achievable control technology standards and determined the following may be applicable.

6.2 MACTs for Portland Cement Plants

The provisions of this subpart are applicable to each new and existing Portland cement plant that is a major source or area source of hazardous air pollutants. GCC Dacotah's potential hazardous air pollutant emissions are greater than 25 tons per year for a combination of hazardous air pollutants. Therefore, GCC Dacotah is considered a major source of hazardous air pollutant emissions and applicable to this subpart. GCC Dacotah is considered an existing source because it commenced construction prior to May 6, 2009. The units that are applicable to this standard are listed in Table 6.2.

Table 6.2 – Applicable Emission Points to Subpart LLL

Unit and Process Description			Control Device
#3	EDC402	Rotary kiln #4	Electrostatic Precipitator
#4	EDC403	Rotary kiln #5	Electrostatic Precipitator
#5	EDC416	Wet process clinker cooler	Baghouse
#6	EDC652	Raw material storage building to two kiln feed storage silos	Baghouse
#6a	EDC501	Rock silo to Loesche mill	Baghouse
#6b	EDC602	Kiln feed storage silo to kiln #6	Baghouse
#7	EDC420	Penthouse storage #1 (south)	Baghouse
#7a	EDC421	Penthouse storage #1 (south)	Baghouse
#7b	EDC710	Clinker shed to finish mills	Baghouse
#7c	EDC706	Raw shed to Loesche mill	Baghouse
#7d	EDC701	Raw material transferred from belt conveyor 107 to belt conveyor 108	Baghouse
#7e	EDC705	Gypsum raw shed to old clinker building	Baghouse
#7f	EDC703	Raw shed to Loesche mill	Baghouse
#7g	EDC704	Gypsum raw shed to old clinker building	Baghouse
#8	EDC614	Penthouse storage #2 (north)	Baghouse

Unit and Process Description			Control Device
#8a	EDC627	Penthouse storage #2 (north)	Baghouse
#8b	EDC613	Penthouse storage #2 (north)	Baghouse
#8c	EDC707	Rock silo discharge	Baghouse
#9	EDC619	Loesche mill and rotary kiln #6	Preheater, Precalciner, and Baghouse
#10	EDC615	Dry process clinker cooler	Baghouse
#11	EDC623	Alkali bypass and alkali waste to waste bin transfer system	Baghouse
#12	EDC731	Finish mill #3	Baghouse
#13	EDC741	Finish mill #4	Baghouse
#14	EDC751	Finish mill #5	Baghouse
#15	EDC761	Finish mill #6	Baghouse
#16	EDC771	Finish mill #7 (mill sweep)	Baghouse
#16a	EDC772	Finish mill #7 (mill separator)	Baghouse
#16b	EDC708	Finish mill #7 (transfer)	Baghouse
#16c	EDC709	Finish mill #7 (transfer)	Baghouse
#16d	EDC713	Clinker transfer system	Baghouse
#17	EDC804	Bulk storage silos	Baghouse
#18	EDC821	Bulk storage silos	Baghouse
#19	EDC805	Bulk storage silos	Baghouse
#20	EDC832	Bulk storage silos	Baghouse
#21	EDC824	Bulk storage silos	Baghouse
#24	EDC827	Rail storage silos	Baghouse
#25	EDC828	Rail storage silos	Baghouse
#26	EDC834	Rail storage silos	Baghouse
#27	EDC853	Bulk rail loadouts	Baghouse
#28	EDC854	Bulk rail loadouts	Baghouse
#35	EDC825	East bulk truck loadout	Baghouse
#36	EDC826	West bulk truck loadout	Baghouse
#38	EDC802	Cement bagging	Baghouse
#40	EDC419	Alkali waste bin	Baghouse
#41	EDC628/ EDC29	Coal mill	Single stage cyclone and two baghouses operated in parallel
#63	EDC606	Air separator – kiln #6 feed system	Baghouse
#64		Belt transfer from kiln #4 and #5, kiln #4 and #5 weigh feeder, and kiln #4 bucket elevator	Baghouse
#65	EDC104	Raw material transfer point from secondary crusher to a belt conveyor	Baghouse
#66		Clinker transfer point from kiln #5 clinker cooler to two bucket elevators	Baghouse
#67		Clinker transfer point from kiln #4 clinker cooler to pan conveyor	Baghouse

The definition of kiln includes the alkali bypass.

As stated earlier, in accordance with 40 CFR § 63.1356, if a unit subject to 40 CFR Part 63, Subpart LLL is also subject to another federal standard, the owner or operator must comply with the most stringent emission limit or requirement and is exempt from the less stringent requirement. GCC Dacotah’s coal handling system is subject to 40 CFR Part 60, Subpart Y. The only unit that is subject to both is Unit #41 and both subparts have a particulate emission limit. Under Subpart Y, Unit #41 is applicable to a particulate limit of 0.031 grains per dry standard cubic foot. In Subpart LLL, the particulate limit is 0.07 pounds per ton of produced clinker.

The maximum flow rate for the system is 42,000 actual cubic feet per minute which converts to 11.2 pounds per hour. The maximum process rate is 2,250 tons per day or 93.75 tons per hour. The conversion of this to pounds per hour results in an emission limit of approximately 6.6 pounds per hour. Therefore, Subpart LLL is more stringent. Since the emission limit is not applicable until on or after September 9, 2015, Unit #41 will be subject to Subpart Y until that date.

6.3 Other Applicable MACT Standards

DENR reviewed the other Maximum Achievable Control Technology Standards and determined there are no other standards applicable to GCC Dacotah’s operations.

7.0 State Requirements

7.1 State Particulate Emission Limits

ARSD 74:36:06:02(1) and 74:36:06:03(1), establish state emission limits for total suspended particulate matter. In addition, ARSD 74:36:12:01 establishes a visible emission limit of 20 percent opacity for each unit.

In accordance with ARSD 74:36:06:01, if the unit subject to a state particulate limit is also subject to a particulate limit associated with the New Source Performance Standards, Maximum Achievable Control Technology Standard or Prevention of Significant Deterioration Program, then the state’s particulate limit is not applicable. Table 7.1 provides a list of Units subject to a particulate emission limit in at least one of the above programs and not subject to the state’s particulate limit. Compliance with these particulate emission limits are based on stack tests and the results are displayed in Table 7.5.

Table 7.1 – Units Subject to Other Particulate Limits

Unit	Emission Limit	Regulation
#1	0.01 grains per dry standard cubic foot	Prevention of Significant Deterioration
#2	0.01 grains per dry standard cubic foot	Prevention of Significant Deterioration
#3	0.30 pounds per ton feed	40 CFR Part 63, Subpart LLL
#4	0.30 pounds per ton feed	40 CFR Part 63, Subpart LLL
#5a	0.10 pounds per ton feed ¹	40 CFR Part 63, Subpart LLL
#5b		
#6	0.01 grains per dry standard cubic foot	Prevention of Significant Deterioration

Unit	Emission Limit	Regulation
#41d	0.01 grains per dry standard cubic foot	Prevention of Significant Deterioration
#41e	0.01 grains per dry standard cubic foot	Prevention of Significant Deterioration
#41f	0.01 grains per dry standard cubic foot	Prevention of Significant Deterioration
#41i	0.01 grains per dry standard cubic foot	Prevention of Significant Deterioration
#62b	0.01 grains per dry standard cubic foot	Prevention of Significant Deterioration

¹ – The limit for Unit #5a and #5b are combined and Unit #9 and #11 are combined.

In accordance with ARSD 74:36:06:02(1)(a), a fuel burning unit with a heat input less than 10 million Btus per hour heat input may not exceed a particulate emissions rate of 0.6 pounds per million Btu of heat input. GCC Dacotah does not have any equipment subject to this requirement.

In accordance with ARSD 74:36:06:02(1)(b), a fuel burning unit with a heat input equal to or greater than 10 million Btus per hour heat input may not exceed the particulate emissions rate determined by Equation 7.1. GCC Dacotah does not have any equipment subject to this requirement.

Equation 7.1 – Particulate Emissions Limit for Fuel Burning Units

$$E_{TSP} = 0.811 \times H^{-0.131} =$$

Where:

- E_{TSP} = emission rate, in pounds per million Btu heat input, and
- H = heat input, in million Btus per hour.

The particulate emission limits for process units are derived from ARSD 74:36:06:03(1). Equation 7.2, taken from ARSD 74:36:06:03(1)(a), is used to calculate the state particulate limit for each process unit with an operating rate equal to or less than 30 tons per hour. Equation 7.3, taken from ARSD 74:36:06:03(1)(b), is used to calculate the state particulate limit for each process unit with an operating rate equal greater than 30 tons per hour. Table 7.2 provides a maximum process rate for each unit and the corresponding particulate emission limit for those units subject to the particulate limit calculated under Equation 7.2 and 7.3.

Equation 7.2 – State Particulate Limit for Process Units \leq 30 tons per hour

$$E_{TSP} = (4.10 \times P^{0.67})$$

Where:

- E_{TSP} = Emission limit for total suspended particulate matter, in pounds per hour; and
- P = Design process rate, in tons per hour.

Equation 7.3 – State Particulate Limit for Process Units $>$ 30 tons per hour

$$E_{TSP} = (55.0 \times P^{0.11}) - 40$$

Where:

- E_{TSP} = Emission limit for total suspended particulate matter, in pounds per hour; and
- P = Design process rate, in tons per hour.

Table 7.2 – State Particulate Limit

Unit	Maximum Rate	Emission Limit
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Unit	Maximum Rate	Emission Limit	
#7	45.8 tons per hour	43.8 pounds per hour	1.0 pounds per ton
#7a	45.8 tons per hour	43.8 pounds per hour	1.0 pounds per ton
#40	12 tons per hour	21.7 pounds per hour	1.8 pounds per ton
#41g	9 tons per hour	17.8 pounds per hour	2.0 pounds per ton
#41h	9 tons per hour	17.8 pounds per hour	2.0 pounds per ton
#63	¹	0.01 grains per dry standard cubic foot	-
#64	¹	0.01 grains per dry standard cubic foot	-
#65	¹	0.01 grains per dry standard cubic foot	-
#66	¹	0.01 grains per dry standard cubic foot	-
#67	¹	0.01 grains per dry standard cubic foot	-

¹ – GCC Dacotah accepted particulate matter limits more stringent than required by the state; therefore, the maximum rate is not applicable.

Compliance with the particulate limit for Unit #63 through #67 is based on stack tests and the results displayed in Table 7.5. Table 7.3 provides a comparison of the state emission limit to the potential emissions to determine if the remaining units are in compliance with the state emission limits. The potential emissions for these units is based Equation 7.4 which uses the potential uncontrolled emissions from the appropriate unit displayed in Table 4.1.

Equation 7.4 – Calculating Potential Uncontrolled Emission Rate

$$\text{Potential Emission Rate} \frac{\text{pounds}}{\text{hour}} = \text{Potential} \frac{\text{tons}}{\text{year}} \times 2,000 \frac{\text{pounds}}{\text{ton}} \div 8,760 \frac{\text{hours}}{\text{year}}$$

Table 7.3 – Particulate (TSP) Limit Comparison

Unit	Emission Limit	Potential Emission Rate	In Compliance
#7	43.8 pounds per hour	16.4 pounds per hour	Yes
#7a	43.8 pounds per hour	16.4 pounds per hour	Yes
#40	21.7 pounds per hour	3.0 pounds per hour	Yes
#41g	17.8 pounds per hour	3.2 pounds per hour	Yes
#41h	17.8 pounds per hour	3.2 pounds per hour	Yes

7.2 State Sulfur Dioxide Emission Limits

In accordance with ARSD 74:36:06:01, if the unit subject to a state sulfur dioxide limit is also subject to a sulfur dioxide limit associated with the New Source Performance Standards, Maximum Achievable Control Technology Standard or Prevention of Significant Deterioration Program, then the state’s sulfur dioxide limit is not applicable. Unit #9 is subject to a sulfur dioxide limit under the Prevention of Significant Deterioration program and not subject to the state’s sulfur dioxide limit.

In accordance with ARSD 74:36:06:02(2) and ARSD 74:36:06:03(2), the permitted units may not emit sulfur dioxide emissions to the ambient air in an amount greater than three pounds of sulfur dioxide per million Btus of heat input. The other units considered fuel burning units and subject to the state’s sulfur dioxide emission limit are Unit #3 and #4.

Potential sulfur dioxide emission rates for comparing with the state’s sulfur dioxide emission limit is based on past stack tests for Unit #4. In June 2011, stack test results were 100 pounds of sulfur dioxide per hour. Stack test results from Unit #3 at the same time was 6.6 pounds per hour. DENR elected to use the worst case to determine if these units can comply with the state’s limit. Equation 7.5 was used to convert the pounds per hour emission limit to pounds per million Btus heat input. The maximum coal feed rate is 8 tons per hour and the subbituminous coal has a maximum heat input rate of 16.4 million Btus per ton. The results are displayed in Table 7.4.

Equation 7.5 – Calculating Sulfur Dioxide Emission Rate

$$\text{Potential Emission Rate} \frac{\text{lbs}}{\text{MMBtus}} = 100 \frac{\text{lbs}}{\text{hour}} \div \text{Coal feed} \frac{\text{tons}}{\text{hour}} \div \text{Heat input} \frac{\text{MMBtus}}{\text{ton}}$$

Table 7.4 – Sulfur Dioxide Limit Comparison

Unit	Emission Limit	Potential Emission Rate	In Compliance
#3	3 lbs/MMBtus heat input	0.8 lbs/MMBtus heat input	Yes
#4	3 lbs/MMBtus heat input	0.8 lbs/MMBtus heat input	Yes

7.3 Performance Tests

GCC Dacotah conducted performance tests required by its PSD permit and Title V air quality operating permit to demonstrate compliance with the New Source Performance Standards, the Maximum Achievable Control Technology Standards, and state emission limits. Table 7.5 summarizes the most recent test results for each unit.

Table 7.5 – Stack Test Results

Unit	Pollutant	Stack Test Date	Limit	Stack Test Results	Percentage of Limit
#1	PM ¹	07/26/05	0.01	0.0008	8%
#2	PM ¹	07/26/05	0.01	0.0009	9%
#3	PM ⁴	01/15/08	0.30	0.06	20%
	SO ₂ ⁷		3.0	²¹	
	D/F ⁵		1.7 x 10 ⁻¹⁰ (8.7 x 10 ⁻¹¹)	²²	
#4	PM ⁴	01/15/08	0.30	0.17	57%
	SO ₂ ⁷		3.0	²¹	
	D/F ⁵		1.7 x 10 ⁻¹⁰ (8.7 x 10 ⁻¹¹)	²²	
#5a	PM ⁴	04/24/08	0.10	0.007	7%
#5b					
#6	PM ¹	06/22/11	0.01	0.0017	17%
#6a	PM ¹	07/26/05	0.01	0.001	10%
#6b	PM ¹	08/04/04	0.01	0.0008	8%
#7	PM ⁶		1.0	²¹	
#7a	PM ⁶		1.0	²¹	
#7b	PM ¹	08/04/04	0.01	0.001	10%

Unit	Pollutant	Stack Test Date	Limit	Stack Test Results	Percentage of Limit
#7c	PM ¹	07/26/05	0.01	0.0003	3%
#7d	PM ¹	07/26/05	0.01	0.0007	7%
#7e	PM ¹	07/26/05	0.01	0.0003	3%
#7f	PM ¹	06/22/11	0.01	0.0005	5%
#7g	PM ¹	06/22/11	0.01	0.0007	7%
#8	PM ¹		0.01	¹¹	
#8a	PM ¹	11/01/11	0.01	0.006	60%
#8b	PM ¹		0.01	¹¹	
#8c	PM ¹	07/26/05	0.01	0.0006	6%
#9	PM	05/12/09	0.01 ¹	0.0074 ¹	74%
			0.30 ^{4,10}	0.051 ⁴	17%
			11.95 ²		
	SO ₂ ⁹	³	632 ²		
	NOx ⁹	³	2,267 ⁸		
CO ⁹	³	3,250 ²			
D/F ^{5,10}	06/21/11	1.7 x 10 ⁻¹⁰ (8.7 x 10 ⁻¹¹)	5.36 x 10 ⁻¹³ (1.52 x 10 ⁻¹²)	0.3% (1.7%)	
#10	PM	01/27/09	0.01 ¹	0.003 ¹	30%
			8.59 ²		
			0.30 ⁴	0.01 ⁴	3%
#11	PM	01/27/09	0.01 ¹	0.004 ¹	40%
			2.36 ²	0.96 ²	41%
	SO ₂	08/16/12	⁹	18.8 ²	
	NOx	08/16/12	⁹	79.0 ²	
CO	08/16/12	⁹	0.1 ²		
#12	PM ¹		0.01	¹²	
#13	PM ¹		0.01	¹²	
#14	PM ¹	07/26/05	0.01	0.005	50%
#15	PM ¹	08/16/11	0.01	0.0036	36%
#16	PM ¹	11/16/05	0.01	0.004	40%
#16a	PM ¹	11/01/11	0.01	0.0009	9%
#16b	PM ¹	12/13/05	0.01	0.009	90%
#16c	PM ¹	11/01/11	0.01	0.0016	16%
#16d	PM ¹		0.01	¹³	
#17	PM ¹		0.01	¹⁴	
#18	PM ¹	08/16/11	0.01	0.0008	8%
#19	PM ¹		0.01	¹⁴	
#20	PM ¹	07/26/05	0.01	0.0007	7%
#21	PM ¹		0.01	¹⁴	
#24	PM ¹	08/16/11	0.01	0.0002	2%
#25	PM ¹		0.01	¹⁵	
#26	PM ¹	07/26/05	0.01	0.001	10%
#27	PM ¹	11/01/11	0.01	0.0001	1%

Unit	Pollutant	Stack Test Date	Limit	Stack Test Results	Percentage of Limit
#28	PM ¹		0.01	¹⁶	
#35	PM ¹	08/16/11	0.01	0.0003	3%
#36	PM ¹		0.01	¹⁷	
#37	PM ¹		0.01	¹⁸	
#38	PM ¹	07/26/05	0.01	0.0002	2%
#39	PM ¹		0.01	¹⁸	
#40	PM ⁶		1.8	²¹	
#41	PM	04/05/05	0.01 ¹ 0.031 ¹ 2.09 ²	0.002 ¹	20%
	SO ₂	³	⁹		
	NO _x		⁹		
	CO		⁹		
#41b	PM ¹		0.01	¹⁹	
#41c	PM ¹		0.01	¹⁹	
#41d	PM ¹	07/26/05	0.01	0.0005	5%
#41e	PM ¹	11/01/11	0.01	0.0054	54%
#41f	PM ¹		0.01	¹⁹	
#41g	PM ⁶		2.0	²¹	
#41h	PM ⁶		2.0	²¹	
#41i	PM ¹		0.01	¹⁹	
#62b	PM ¹		0.01	²⁰	
#63	PM ¹	01/03/07	0.01	0.0006	6%
#64	PM ¹		0.01	²⁰	
#65	PM ¹		0.01	²⁰	
#66	PM ¹		0.01	²⁰	
#67	PM ¹		0.01	²⁰	

¹ – Unit is grains per dry standard cubic foot;

² – Unit is pounds per hour;

³ – Continuous emission monitoring system used to demonstrate compliance;

⁴ – Unit in pounds per ton feed;

⁵ – “D/F” means dioxins and furans and the unit is grains per dry standard cubic foot @ 7% oxygen and temperature less than 400 degrees Fahrenheit. Values in parenthesis represent temperatures greater than or equal to 400 degrees Fahrenheit;

⁶ – Unit in pounds per ton processed;

⁷ – Unit in pounds per million Btus heat input;

⁸ – Unit in tons per 12-month period;

⁹ – The limit includes Unit #9, #11, and #41;

¹⁰ – The limit is based on the combined emissions from Unit #9 and #11;

¹¹ – Compliance based on stack test on Unit #8b;

¹² – Compliance based on stack tests on Unit #14 and #15;

¹³ – Compliance based on stack tests on Unit #16b and #16c;

¹⁴ – Compliance based on stack tests on Unit #18 and #20;

¹⁵ – Compliance based on stack tests on Unit #24 and #26;

¹⁶ – Compliance based on stack test on Unit #27;

- ¹⁷ – Compliance based on stack test on Unit #35;
- ¹⁸ – Compliance based on stack test on Unit #38;
- ¹⁹ – Compliance based on stack tests on Unit #41d and #41e;
- ²⁰ – Compliance based on stack tests of similar units;
- ²¹ – Compliance with particulate limit based on using emission factors from EPA’s AP-42 emission factor manual and based on sulfur content of fuel for the sulfur dioxide limit; and
- ²² – These units have not operated since the limit was established and the units are being removed from operation.

GCC Dacotah is currently constructing the equipment under air quality construction permit #28.1121-02-03C, which will result in the shutdown of the equipment in Table 7.6. Based on the stack testing results, the age of the stack test, a review of inspection reports and the units being shutdown, DENR is recommending the following testing:

1. Unit #9 for the 0.01 grains per dry standard cubic foot particulate matter limit and #11 for the 2.36 pounds per hour particulate matter limit during the testing required of these units every five years under the MACT requirements;
2. Unit #12, #13, or #14 for particulate matter;
3. Unit #16b or #16d for particulate matter; and
4. Unit #62b or #65 for particulate matter.

Table 7.6 –Existing Equipment to Be Shutdown

Unit	Description
#3	Rotary kiln #4
#4	Rotary kiln #5
#5a	Kiln #4 and #5 clinker coolers
#5b	Kiln #4 and #5 clinker coolers
#8	Penthouse storage #2 (north)
#8a	Penthouse storage #2 (north)
#8b	Penthouse storage #2 (north)
#10	Dry process clinker cooler
#41g	Coal bin #4
#63	Air separator – kiln #6 feed system
#64	Belt transfer from kiln #4 and #5, kiln #4 and #5 weigh feeder, and kiln #4 bucket elevator
#66	Clinker transfer point from kiln #5 clinker cooler to two bucket elevators
#67	Clinker transfer point from kiln #4 clinker cooler to pan conveyor

7.4 Natural Events Action Plan

GCC Dacotah is located within the area subject to the Rapid City Natural Event Action Plan. The Rapid City Natural Event Action Plan was established to abate exceedances of the 24 hour National Ambient Air Quality Standards for PM10 by requiring Best Available Control Measures (BACM) at operations that emit fugitive dust. DENR will include BACM in the permit for the applicable operations at GCC Dacotah’s facility based on the Rapid City Natural Events Action Plan.

7.5 Compliance Assurance Monitoring

Compliance assurance monitoring is applicable to permit applications received on or after April 20, 1998, from major sources applying for a Title V air quality operating permit. GCC Dacotah's application was received after the applicable date; therefore, compliance assurance monitoring is applicable to any unit that meets the following criteria:

1. The unit is subject to an emission limit or standard for the applicable regulated air pollutant;
2. The unit uses a control device to achieve compliance with any such emission limit or standard; and
3. The unit has potential uncontrolled emissions of the applicable regulated air pollutant that are equal to or greater than 100 percent of the amount, in tons per year, required for a source to be classified as a major source.

The units that have the potential uncontrolled emissions greater than 100 tons per year of a criteria pollutant are listed in Table 7.7 and derived from Table 4.1.

Table 7.7 – Potential Emissions Greater Than Threshold

Particulate Matter			
Unit	Plant ID	Description	Control Device
#1	EDC101	Primary and secondary crushers	Baghouse
#2	EDC102	Screen	Baghouse
#3	EDC402	Rotary kiln #4	Electrostatic Precipitator
#4	EDC403	Rotary kiln #5	Electrostatic Precipitator
#5	EDC416	Wet process clinker cooler	Baghouse
#6	EDC652	Raw storage to kiln feed storage	Baghouse
#6a	EDC501	Rock silo to Loesche Mill	Baghouse
#6b	EDC602	Kiln feed storage silo to kiln #6	Baghouse
#7b	EDC710	Clinker shed to finish mills	Baghouse
#8	EDC614	Penthouse storage #2 (north)	Baghouse
#8a	EDC627	Penthouse storage #2 (north)	Baghouse
#8b	EDC613	Penthouse storage #2 (north)	Baghouse
#8c	EDC707	Rock silo discharge	Baghouse
#9	EDC619	Loesche mill and rotary kiln #6	Baghouse
#10	EDC615	Dry process clinker cooler	Baghouse
#11	EDC623	Alkali bypass	Baghouse
#12	EDC731	Finish mill #3	Baghouse
#13	EDC741	Finish mill #4	Baghouse
#14	EDC751	Finish mill #5	Baghouse
#15	EDC761	Finish mill #6	Baghouse
#16	EDC771	Finish mill #7 (mill sweep)	Baghouse
#16a	EDC772	Finish mill #7 (mill separator)	Baghouse
#16b	EDC708	Finish mill #7 (transfer)	Baghouse
#16c	EDC709	Finish mill #7 (transfer)	Baghouse

Particulate Matter			
#16d	EDC713	Clinker transfer system	Baghouse
#41	EDC628/EDC629	1995 ABB Raymond coal mill	Baghouse
Sulfur Dioxide			
#3	EDC402	Rotary kiln #4	No control
#4	EDC403	Rotary kiln #5	No control
#9	EDC619	Loesche mill and rotary kiln #6	No control
#11	EDC623	Alkali bypass	No control
#41	EDC628/EDC629	1995 ABB Raymond coal mill	No control
Nitrogen Oxide			
#3	EDC402	Rotary kiln #4	No control
#4	EDC403	Rotary kiln #5	No control
#9	EDC619	Loesche mill and rotary kiln #6	Preheater/ Precalciner
#11	EDC623	Alkali bypass	No control
#41	EDC628/EDC629	1995 ABB Raymond coal mill	No control
Carbon Monoxide			
#3	EDC402	Rotary kiln #4	No control
#4	EDC403	Rotary kiln #5	No control
#9	EDC619	Loesche mill and rotary kiln #6	No control
#11	EDC623	Alkali bypass	No control
#41	EDC628/EDC629	1995 ABB Raymond coal mill	No control

All of the units with potential uncontrolled particulate emission greater than 100 tons per year have a control device associated with it. Unit #3, #4 #5a, #5b, #9, #10, #11, and #41 are required to meet a particulate limit and demonstrate continuous compliance based on the monitoring requirements in 40 CFR, Part 63, Subpart LLL. 40 CFR § 64.2(b)(1)(i) states if the applicable standard was proposed by the EPA after November 15, 1990 pursuant to section 111 or 112 of the Act, the unit is exempt from compliance assurance monitoring. 40 CFR, Part 63, Subpart LLL was proposed and promulgated after November 15, 1990, pursuant to section 112 of the Clean Air Act. Therefore, compliance assurance monitoring requirements are not applicable.

Unit #6, #6a, #6b, #7b, #8, #8a, #8b, #8c, #12, #13, #14, #15, #16, #16a, #16b, #16c, and #16d are subject to opacity standards under Subpart LLL and to a particulate limit under the PSD program. The opacity monitoring requirements under Subpart LLL will be used as compliance assurance monitoring for the particulate limit for these units.

The remaining units (i.e., Unit #1 and #2) in Table 7.7 are required to meet a particulate standard under the PSD permit. Compliance assurance monitoring for these units will be monitoring the visible emissions from the baghouse on a periodic basis and maintenance on the air pollution control device.

The units with sulfur dioxide and carbon monoxide emissions greater than 100 tons per year do not have a control device associated with the unit to control the emissions for that particular air pollutant. Therefore, compliance assurance monitoring is not applicable for sulfur dioxide and carbon monoxide.

Unit #9 is equipped with a preheater/precalciner to control nitrogen oxide emissions. GCC Dacotah is required to install and maintain a continuous emission monitoring system for nitrogen oxide in its PSD permit and Title V air quality operating permit. 40 CFR § 64.2(b)(1)(vi) states that if a part 70 permit specifies a continuous compliance determination method, the unit is exempt from compliance assurance monitoring. Therefore, compliance assurance monitoring is not required for nitrogen oxide. The remaining units do not have a control device for nitrogen oxide; therefore, compliance assurance monitoring is not required.

7.6 Periodic Monitoring

In accordance with ARSD 74:36:05:16.01(9)(b), periodic monitoring is required for each emission unit that is subject to an applicable requirement at a source subject to Title V of the federal Clean Air Act. Those units applicable to compliance assurance monitoring satisfy this requirement. In addition, the New Source Performance Standards and/or Maximum Achievable Control Technology also contain periodic monitoring requirements.

Periodic monitoring is subject to units required to meet emission limits specified in the permit and are not required to monitor using compliance assurance monitoring. Periodic monitoring is applicable to the units and air pollutants listed in Table 7.8.

Table 7.8 – Subject to Periodic Monitoring

Unit	Plant ID	Description	Control Device
#7	EDC420	Penthouse storage #1 (south)	Baghouse
#7a	EDC421	Penthouse storage #1 (south)	Baghouse
#7c	EDC706	Raw Shed to Loesche Mill	Baghouse
#7d	EDC701	Raw material transferred from belt conveyor 107 to belt conveyor 108	Baghouse
#7e	EDC705	Gypsum raw shed to old clinker building	Baghouse
#7f	EDC703	Raw shed to Loesche Mill	Baghouse
#7g	EDC704	Gypsum raw shed to old clinker building	Baghouse
#17	EDC804	Bulk storage silos	Baghouse
#18	EDC821	Bulk storage silos	Baghouse
#19	EDC805	Bulk cement or fly ash storage silos	Baghouse
#20	EDC832	Bulk storage silos	Baghouse
#21	EDC824	Bulk cement or fly ash storage silos	Baghouse
#24	EDC827	Rail storage silos	Baghouse
#25	EDC828	Rail storage silos	Baghouse
#26	EDC834	Rail storage silos	Baghouse
#27	EDC853	Bulk rail load outs	Baghouse
#28	EDC854	Bulk rail load outs	Baghouse
#35	EDC825	East bulk cement or fly ash truck load out	Baghouse
#36	EDC826	West bulk truck load out	Baghouse
#38	EDC802	Cement bagging	Baghouse
#40	EDC419	Alkali waste bin	Baghouse
#41b	EDC274	Coal stacker top	Baghouse
#41c	EDC275	Coal surge bin top	Baghouse
#41d	EDC702	Coal tunnel to coal stacker	Baghouse

Unit	Plant ID	Description	Control Device
#41e	EDC276	Coal surge bin top	Baghouse
#41f	EDC277	Coal transfer	Baghouse
#41g	EDC280	Coal bin #4	Baghouse
#41h	EDC279	Coal bin #5	Baghouse
#41i	EDC278	Coal bin #6	Baghouse
#62b	EDC272EDC273	Coal – hopper to conveyer	Two baghouses operated in parallel
#63	EDC606	Air separator – kiln #6 feed system	Baghouse
#64		Belt transfer from kiln #4 and #5, kiln #4 and #5 weigh feeder, and kiln #4 bucket elevator	Baghouse
#65	EDC104	Raw material transfer point from secondary crusher to a belt conveyer	Baghouse
#66		Clinker transfer point from kiln #5 clinker cooler to two bucket elevators	Baghouse
#67		Clinker transfer point from kiln #4 clinker cooler to pan conveyer	Baghouse
#68	EDC850	Bulk storage silo (Silo 39)	Baghouse
#69	EDC851	Silo 39 bulk truck load out	Baghouse
Sulfur Dioxide			
#3	EDC402	Rotary kiln #4	No control
#4	EDC403	Rotary kiln #5	No control
#9	EDC619	Loesche mill and rotary kiln #6	No control
#11	EDC623	Alkali bypass	No control
#41	EDC628/EDC629	1995 ABB Raymond coal mill	No control
Nitrogen Oxide			
#3	EDC402	Rotary kiln #4	No control
#4	EDC403	Rotary kiln #5	No control
#11	EDC623	Alkali bypass	No control
#41	EDC628/EDC629	1995 ABB Raymond coal mill	No control
Carbon Monoxide			
#3	EDC402	Rotary kiln #4	No control
#4	EDC403	Rotary kiln #5	No control
#9	EDC619	Loesche mill and rotary kiln #6	No control
#11	EDC623	Alkali bypass	No control
#41	EDC628/EDC629	1995 ABB Raymond coal mill	No control

Unit #7, #7a, #7c, #7d, #7e, #7f, #7g, #17, #18, #19, #20, #21, #24, #25, #26, #27, #28, #35, #36, #38, #40, #63, #64, #65, #66, #67, #68, and #69 are subject to opacity standards under Subpart LLL and to a particulate limit under the PSD program. The opacity monitoring requirements under Subpart LLL will be used as particulate monitoring for the particulate limit for these units.

Unit #41b, #41c, #41d, #41e, #41f, #41i, and #62b are subject to opacity standards under 40 CFR Part 60, Subpart Y and to a particulate limit under the PSD program. The opacity monitoring requirements under Subpart Y will be used as periodic monitoring for the particulate limit for these units.

The remaining units (i.e., Unit #41g and #41h) in Table 7.8 are required to meet a particulate standard under the PSD permit. Periodic monitoring for these units will be monitoring the visible emissions from the baghouse on a periodic basis and maintenance on the air pollution control device.

Periodic monitoring for sulfur dioxide, nitrogen oxide and carbon monoxide emissions from Unit #9, #11, and #41 will be based on continuous emission monitoring and annual stack tests. Currently Unit #3 and #4 are shut down and will be decommissioned. If plans change and these units are started up again, stack testing will be required to demonstrate compliance and future testing will be required depending on the results of the stack tests.

7.7 Air Fees

Title V sources are subject to an annual air quality fee. The fee consists of an administrative fee and a per ton fee based on the actual tons per year of pollutant emitted. The pollutants that are charged are particulate matter, sulfur dioxide, nitrogen oxides, volatile organic compounds, and hazardous air pollutants. The actual emissions are calculated by DENR and are based on information provided by the source.

8.0 Recommendation

Any source operating in South Dakota that meets the requirements of the Administrative Rules of South Dakota (ARSD) 74:36:05:03 is required to obtain a Title V air quality operating permit. GCC Dacotah is a major source of particulate, sulfur dioxide, nitrogen oxide, carbon monoxide and hazardous air pollutants under the Title V air quality operating permit program. In addition, GCC Dacotah is subject to both New Source Performance Standards and Maximum Achievable Control Technology Standards. Therefore, GCC Dacotah is required to obtain a Title V air quality operating permit.

GCC Dacotah is required to operate within the requirements stipulated in the following regulations:

1. ARSD 74:36:05 – Operating Permits for Part 70 Sources;
2. ARSD 74:36:06 – Regulated Air Pollutant Emissions;
3. ARSD 74:36:07 – New Source Performance Standards;
4. ARSD 74:36:08 – National Emission Standards for Hazardous Air Pollutants;
5. ARSD 74:36:09 – Prevention of Significant Deterioration;
6. ARSD 74:36:11 – Performance Testing;
7. ARSD 74:36:12 – Control of Visible Emissions; and
8. ARSD 74:37:01 – Air Pollution Control Program Fees.

Based on the information submitted in the air permit application, DENR recommends conditional approval of a Title V air quality operating permit. Any questions pertaining to this permit recommendation should be directed to Kyrik Rombough, Engineer Manager I.