

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

SOUTHDOWN, INC.
PORTLAND CEMENT FACILITY
PERMIT 0530010-003-AC (PSD-FL-233)
Hernando County

The applicant, Southdown Inc. (SI), owns a portland cement manufacturing facility in Brooksville. It consists of two kilns with a dry process preheater design and two clinker coolers along with raw mill, finish mill, cement and clinker handling equipment, coal handling equipment, silos, and air pollution control equipment. A process description was included in the Technical Evaluation and Preliminary Determination issued on May 6, 1997.

Each kiln/cooler is permitted to feed 165 tons per hour (TPH) of raw material to the preheater, 148 TPH to the kiln, and produce 90 TPH from the cooler on a 1-hr basis. Each is also permitted to feed 145 TPH to the preheater, 130 TPH to the kiln, and produce 84 TPH from the cooler on a 30-day basis.

A single, large, fabric filter system (baghouse) is already in use to capture particulate matter from each kiln and cooler. Baghouses are also used to limit particulate emissions from other process emission points. All the emission units controlled by baghouses are listed in a Best Available Control Technology (BACT) determination performed for Cement Plant 2 in 1980. Kiln No. 2 has three (3) additional BACT determinations on file with the Department (1980, 1988 and 1993). No previous BACT determinations have been performed on Kiln No. 1.

Southdown requested to revise the allowable emissions limits for their kilns and coolers due to an increase in the process rate to the kiln preheater from 145 to 150 TPH (30-day basis). Specifically, it was requested to increase emissions limits for particulate matter (PM/PM₁₀), carbon monoxide (CO), nitrogen oxides (NO_x), visible emissions (VE) and volatile organic compounds (VOC) from Kiln No. 2; decrease PM/PM₁₀ (allowable emissions) and increase NO_x, VOC and CO emission limits for Kiln No. 1; and increase the PM/PM₁₀ limits for Coolers Nos. 1 and 2.

The project and rule applicability are described in the previously issued Technical Evaluation and Preliminary Determination. A Best Available Control Technology (BACT) determination pursuant to Prevention of Significant Deterioration (PSD) is required for each pollutant exceeding the significant emission rates in Table 62-212.400-2, F.A.C., "Regulated Air Pollutants Significant Emissions Rates." The increase in actual emissions will subject Kilns Nos. 1 and 2 to PSD review for particulate matter, nitrogen oxides, volatile organic compounds and carbon monoxide, and Coolers Nos. 1 and 2 to PSD review for particulate matter.

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

BD-1

CEMEX Construction Materials Florida, LLC
Brooksville North Cement Plant

Permit No. 05300010-045-AV
Title V Air Operation Permit Renewal

**APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

Following is the BACT determination proposed by the applicant. These are on the basis of feed to the kiln.

BACT DETERMINATION REQUESTED BY THE APPLICANT - KILN FEED BASIS:

| POLLUTANT | EMISSION LIMIT |
|--|-------------------------------|
| Particulate Matter (PM/PM ₁₀) (kilns) | 0.2 lb./ton of dry kiln feed |
| Particulate Matter (PM/PM ₁₀)(coolers) | 0.1 lb/ton of dry kiln feed |
| Nitrogen Oxides (NO _x) | 2.11 lbs/ton of dry kiln feed |
| Carbon Monoxide (kilns) | 1.30 lb/ton dry kiln feed |
| Volatile Organic Compounds (Kiln No. 2) | 0.1 lb/ton dry kiln feed |
| Visible Emissions (Kiln No. 2) | 20 percent |

The above limits are expressed in terms of pollutant emitted per ton of material reaching the kiln. Following a review of past permits, the exact process, requirements of the applicable NSPS for cement plants, and discussions with Southdown, the Department will limit only raw material fed to the kiln preheater. This is the most accurate and reliable measure of kiln operating rate in a preheater or precalciner kiln, particularly when there are no bypass streams and when little or no cement kiln dust is wasted. All limits will be expressed in terms of pounds of pollutant per ton of material fed to the kiln preheater (kiln_{ph}). Where appropriate, equivalent factors in terms of pounds of pollutant per ton of clinker produced will also be given for reference and comparison with industry or EPA reporting conventions. The above table is therefore adjusted as follows:

BACT DETERMINATION REQUESTED BY THE APPLICANT - PREHEATER BASIS:

| POLLUTANT | EMISSION LIMIT |
|--|---|
| Particulate Matter (PM/PM ₁₀) (kilns) | 0.18 lb./ton of dry kiln _{ph} feed |
| Particulate Matter (PM/PM ₁₀)(coolers) | 0.09 lb/ton of dry kiln _{ph} feed |
| Nitrogen Oxides (NO _x) | 1.9 lb/ton of dry kiln _{ph} feed |
| Carbon Monoxide (kilns) | 1.2 lb/ton dry kiln _{ph} feed |
| Volatile Organic Compounds (Kiln No. 2) | 0.09 lb/ton dry kiln _{ph} feed |
| Visible Emissions (Kiln No. 2) | 20 percent |

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

DATE OF RECEIPT OF A BACT APPLICATION:

February 21, 1997

REVIEW GROUP MEMBERS:

Teresa Heron, and A. A. Linero of the New Source Review Section.

BACT DETERMINATION PROCEDURE:

In accordance with Chapter 62-212, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

- (a) Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants.
- (b) All scientific, engineering, and technical material and other information available to the Department.
- (c) The emission limiting standards or BACT determination of any other state.
- (d) The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical emission unit or emission unit category. If it is shown that this level of control is technically or economically infeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

The air pollutant emissions from this facility can be grouped into categories based upon the control equipment and techniques that are available to control emissions from these emission units. Using this approach, the emissions can be classified as follows:

- o Particulate matter from kilns and coolers (PM/PM₁₀, and VE). This is controlled generally by add-on particulate collection equipment such as baghouses or electrostatic precipitators.

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

- o Products of combustion and incomplete combustion (e.g., SO₂, NO_x, CO, VOC). Control is largely achieved by good combustion practices and reactions with clinker and raw materials.
- o Emissions from materials handling, conveyance, and storage (primarily PM). Controlled generally by fabric filters and reasonable precautions.

Grouping the pollutants in this manner facilitates the BACT analysis because it enables the equipment available to control the type or group of pollutants emitted and the corresponding energy, economic, and environmental impacts to be examined on a common basis. Although all of the pollutants addressed in the BACT analysis may be subject to a specific emission limiting standard as a result of PSD review, the control of "non-regulated" air pollutants is considered in imposing a more stringent BACT limit on a "regulated" pollutant (i.e., PM, SO₂, H₂SO₄, fluorides, etc.), if a reduction in "non-regulated" air pollutants can be directly attributed to the control device selected as BACT for the abatement of the "regulated" pollutants.

BACT ANALYSIS

Particulate Matter (PM/PM₁₀)

Particulate Matter is generated by the various physical and chemical processes at a cement manufacturing plant. Sources of particulate matter at cement plants include (1) quarrying and crushing, (2) raw material storage, (3) grinding and blending, 4) clinker production, 5) finish grinding, and 6) packaging and loading. Additional sources of PM are raw material storage piles, conveyers, storage silos, and unloading facilities.

The largest emission source of PM within cement plants is the pyroprocessing system that includes the kiln and clinker cooler exhaust stacks (in this case, common kiln/cooler stack). Emissions from kilns are affected by several factors, including differences in convective patterns, material movement patterns, burner locations and orientations, heat transfer mechanisms, and the type of clinker cooler that supplies secondary air to the kiln for combustion. Typically, dust from the pollution control equipment servicing the kiln and cooler is collected and recycled into the kiln and thus incorporated into the clinker. Southdown has stated that the great majority of the cement kiln dust (CKD) captured in the baghouse is returned to the pyroprocessing system as raw material.

Common control devices for stack gases include settling chambers, inertial separators, impingement separators, wet scrubbers, fabric filters, and electrostatic precipitators. Fabric filters (baghouses) and electrostatic precipitator (ESPs) are often considered equivalent for particulate control. Both types of devices can achieve removal efficiencies of over 99 percent. ESPs and baghouses are used extensively as control devices at cement plants. ESPs are generally specified for kiln and clinker cooler exhaust gases because of their ability to operate effectively at varying temperatures. Baghouses are also used at many facilities for particulate control from kilns and coolers. Both types of control equipment provide for the

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

recovery/recycling of collected dust back into the process stream. Baghouses are also used to control particulate emissions from most other material processing operations at cement plants.

Common controls to limit particulate emissions from fugitive sources (such as roadways, stockpiles, and material processing and conveying equipment) include wet suppression, sweeping, application of surfactants, paving of roads and covering of stockpiles to reduce wind erosion. Wet suppression of fugitive particulate emissions is considered as BACT for most material handling operations and unpaved roads. Dust from stockpiles can be minimized by relatively high material moisture content with additional water spraying as necessary.

A review of the BACT Clearinghouse shows that baghouses and ESPs are widely used to control particulate matter from process emission units at cement plants. They are commonly accepted as BACT. At this facility, particulate matter sources are controlled by baghouses.

Southdown has proposed to increase the process rate (145 to 150 TPH) for both kilns, therefore changing the allowable emission rates for particulate matter (PM/PM₁₀) from Kilns Nos. 1 and 2 and Clinker Coolers Nos. 1 and 2 to allow for the fluctuations in emission rates during normal operating conditions. The permitted PM/PM₁₀ limits would be increased for Kiln No. 2 from 13.5 pounds per hour (lb/hr) to 27.0 lb/hr, while PM/PM₁₀ emissions for Kiln No. 1 are proposed to be decreased from 39.0 lb/hr (allowable emissions) to 27.0 lb/hr. The proposed limit for the two clinker coolers would be increased from 7.13 lb/hr (Kiln No. 1) and 5.0 lb/hr (Kiln No. 2) to 13.6 lb/hr. The proposed kiln particulate emission limits are equivalent to 0.18 pounds per ton of dry feed to each kiln preheater (lb/ton feed_{ph}). This is a standard lower than the New Source Performance Standard NSPS limit of 0.3 pounds per ton of dry feed (kiln). For the coolers the proposed limits are equivalent to 0.09 lb/ton feed_{ph} which is approximately equal to the applicable NSPS limit.

Southdown also requested to increase VE (which is largely linked to particulate emissions) from 10 percent for Kiln No. 2 to 20 percent.

PRODUCTS OF COMBUSTION AND INCOMPLETE COMBUSTION

Nitrogen Oxides

Emissions of NO_x from dry process cement plants with a preheater include the kiln, and any fuel-fired support operation. NO_x is generated during fuel combustion by oxidation of chemically bound nitrogen in the fuel (fuel NO_x) and by thermal fixation of nitrogen in the combustion air (thermal NO_x). As flame temperature increases, the amount of thermally generated NO_x increases. Fuel type affects the quantity and type of NO_x generated. Generally, natural gas is low in nitrogen. However it causes higher flame temperatures and generates more thermal NO_x than oil or coal, which have higher fuel nitrogen content, but exhibit lower flame temperatures.

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

NO_x emissions represent a significant portion of the total emissions generated by this project, and shall be minimized using BACT.

The emissions of NO_x can potentially be reduced at Portland cement plants by two methods:

1. Minimizing the quantity of NO_x generated during combustion (combustion modifications).
2. Reducing the quantity of NO_x in the flue gas stream (flue gas controls).

In establishing BACT for cement kilns, the Department reviewed the EPA BACT/LAER Clearinghouse and a paper presented at the Air and Waste Management Association (AWMA) International Specialty Conference on Waste Combustion in Boilers and Industrial Furnaces. The paper, "Reduction of NO_x Emissions from Cement Kiln/Calciner through the Use of the NO_xOUT Process," which was written by representatives of Nalco and Ash Grove Cement, suggests that SNCR is a viable control method. A level as low as 1.0 lb/ton of clinker was reached based on demonstration tests conducted at the Ash Grove cement plant in Seattle, Washington. However the process has not been demonstrated on a long term basis. Recently a proposed cement plant (Great Star Cement, Clark County, Nevada) was permitted with the urea-based SNCR/NO_xOUT process as BACT. The process relies on the reaction between ammonia and NO_x to yield molecular nitrogen. The delivery system consists of urea injectors in one of the preheater sections. The objective was to achieve 50% reduction of NO_x emissions. At that level there should be no ammonia slip while meeting a BACT limit of 3.1 lb/ton clinker.

A review of the EPA BACT/LAER Clearinghouse (BACT Clearinghouse) information indicates that NO_x emissions at most facilities are minimized by process control and good combustion practices.

The applicant stated that NO_x emissions at this facility will be controlled through "proper combustion practices" such as burner design with primary combustion air control. The applicant has proposed for each kiln with a preheater design a NO_x emission rate of 285 lb/hr and 1.9 lb/ton kiln_{PH} feed (3.17 lb/ton clinker at a production rate of 90 TPH, 30-day average).

A review of the NO_x emission rate summary indicates that the applicant's proposal is among the lowest BACT determinations made to date for plants utilizing dry processes. The dry process with a preheater/precalciner is considered to be the most energy-efficient process. Dry process preheater designs, such as the one employed by Southdown, are also energy efficient. Therefore it is expected that the lower fuel use will result in relatively low NO_x, as well as documented reductions from tire burning is another reason to expect low emission rate from the both preheater design kilns.

Following is a comparison between previous BACT determinations for NO_x documented in the BACT Clearinghouse and Southdown's proposal.

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

CEMEX Construction Materials Florida, LLC
Brooksville North Cement Plant

BD-6

Permit No. 05300010-045-AV
Title V Air Operation Permit Renewal

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

Previous BACT Determinations

| BASIS | Least Stringent | Most Stringent | Proposed (Applicant) |
|----------------|-----------------|----------------|----------------------|
| | Year 1978 | Year 1981 | Year 1996 |
| lb/ton clinker | 11.13 | 0.85 | 3.17 |

It is important to note that the facility which was given the 0.85 lb/ton clinker NO_x limit has not been able to meet it since construction. A dry process plant with a preheater/precalciner received a NO_x limit of 1.11 lb/ton clinker but was never built. Another dry process plant with a preheater/precalciner received a BACT determination of 2.09 lb NO_x/ton clinker. However, it appears that since that time a less stringent standard was applied. One dry process preheater/precalciner kiln in California received a NO_x BACT determination of 2.5 lb/ton clinker. The Department made a BACT Determination of 2.8 lb/ton clinker in 1997 (Florida Crushed Stone) and in 1995 for the proposed Florida Rock Industries Cement Plant in Newberry, Florida. The main reason that the lb/ton clinker emission rate was higher than the one for the California plant was that Florida limestone is wetter and requires more heat input to dry. A claim by the kiln manufacturer that differences in volatility between Eastern and Western coal should be reflected in an even higher emission limit for the Florida kiln was rejected by the Department.

Based on the long history of past permitting actions of Kiln No. 1 since its permit was issued in 1973 (no allowable emission limit for any pollutant other than PM), and the few stack records data on file with the Department, the Department has determined that the BACT limit for dry process preheater kilns should not exceed 1.83 lb/ton kiln PH feed (275 lb/hr at 150 TPH preheater feed rate) or 3.05 lb/ton clinker at a production rate of 90 TPH, 30-days average.

Introduction of tires in the material feed end of the kiln (Kiln No. 1) will reduce the thermal load on the burner end and possibly result in lower NO_x emissions [refer to files on stack tests performed in 1993 while burning 80% coal and 20% WTDF (191 lb/hr on a two days average), 1994 (159 lb/hr), and 1995 (152 lb/hr)]. The newer Kiln No. 2 has a BACT emission limit for NO_x of 1.72 lb/ton kiln PH feed which is equivalent to 2.86 lb/ton clinker. The kiln has been able to consistently meet this value.

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

SOUTHDOWN, INC.
PORTLAND CEMENT FACILITY
PERMIT 0530010-003-AC (PSD-FL-233)
Hernando County

The applicant, Southdown Inc. (SI), owns a portland cement manufacturing facility in Brooksville. It consists of two kilns with a dry process preheater design and two clinker coolers along with raw mill, finish mill, cement and clinker handling equipment, coal handling equipment, silos, and air pollution control equipment. A process description was included in the Technical Evaluation and Preliminary Determination issued on May 6, 1997.

Each kiln/cooler is permitted to feed 165 tons per hour (TPH) of raw material to the preheater, 148 TPH to the kiln, and produce 90 TPH from the cooler on a 1-hr basis. Each is also permitted to feed 145 TPH to the preheater, 130 TPH to the kiln, and produce 84 TPH from the cooler on a 30-day basis.

A single, large, fabric filter system (baghouse) is already in use to capture particulate matter from each kiln and cooler. Baghouses are also used to limit particulate emissions from other process emission points. All the emission units controlled by baghouses are listed in a Best Available Control Technology (BACT) determination performed for Cement Plant 2 in 1980. Kiln No. 2 has three (3) additional BACT determinations on file with the Department (1980, 1988 and 1993). No previous BACT determinations have been performed on Kiln No. 1.

Southdown requested to revise the allowable emissions limits for their kilns and coolers due to an increase in the process rate to the kiln preheater from 145 to 150 TPH (30-day basis). Specifically, it was requested to increase emissions limits for particulate matter (PM/PM₁₀), carbon monoxide (CO), nitrogen oxides (NO_x), visible emissions (VE) and volatile organic compounds (VOC) from Kiln No. 2; decrease PM/PM₁₀ (allowable emissions) and increase NO_x, VOC and CO emission limits for Kiln No. 1; and increase the PM/PM₁₀ limits for Coolers Nos. 1 and 2.

The project and rule applicability are described in the previously issued Technical Evaluation and Preliminary Determination. A Best Available Control Technology (BACT) determination pursuant to Prevention of Significant Deterioration (PSD) is required for each pollutant exceeding the significant emission rates in Table 62-212.400-2, F.A.C., "Regulated Air Pollutants Significant Emissions Rates." The increase in actual emissions will subject Kilns Nos. 1 and 2 to PSD review for particulate matter, nitrogen oxides, volatile organic compounds and carbon monoxide, and Coolers Nos. 1 and 2 to PSD review for particulate matter.

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

BD-1

CEMEX Construction Materials Florida, LLC
Brooksville North Cement Plant

Permit No. 05300010-045-AV
Title V Air Operation Permit Renewal

**APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

Following is the BACT determination proposed by the applicant. These are on the basis of feed to the kiln.

BACT DETERMINATION REQUESTED BY THE APPLICANT - KILN FEED BASIS:

| POLLUTANT | EMISSION LIMIT |
|--|-------------------------------|
| Particulate Matter (PM/PM ₁₀) (kilns) | 0.2 lb./ton of dry kiln feed |
| Particulate Matter (PM/PM ₁₀)(coolers) | 0.1 lb/ton of dry kiln feed |
| Nitrogen Oxides (NO _x) | 2.11 lbs/ton of dry kiln feed |
| Carbon Monoxide (kilns) | 1.30 lb/ton dry kiln feed |
| Volatile Organic Compounds (Kiln No. 2) | 0.1 lb/ton dry kiln feed |
| Visible Emissions (Kiln No. 2) | 20 percent |

The above limits are expressed in terms of pollutant emitted per ton of material reaching the kiln. Following a review of past permits, the exact process, requirements of the applicable NSPS for cement plants, and discussions with Southdown, the Department will limit only raw material fed to the kiln preheater. This is the most accurate and reliable measure of kiln operating rate in a preheater or precalciner kiln, particularly when there are no bypass streams and when little or no cement kiln dust is wasted. All limits will be expressed in terms of pounds of pollutant per ton of material fed to the kiln preheater (kiln_{ph}). Where appropriate, equivalent factors in terms of pounds of pollutant per ton of clinker produced will also be given for reference and comparison with industry or EPA reporting conventions. The above table is therefore adjusted as follows:

BACT DETERMINATION REQUESTED BY THE APPLICANT - PREHEATER BASIS:

| POLLUTANT | EMISSION LIMIT |
|--|---|
| Particulate Matter (PM/PM ₁₀) (kilns) | 0.18 lb./ton of dry kiln _{ph} feed |
| Particulate Matter (PM/PM ₁₀)(coolers) | 0.09 lb/ton of dry kiln _{ph} feed |
| Nitrogen Oxides (NO _x) | 1.9 lb/ton of dry kiln _{ph} feed |
| Carbon Monoxide (kilns) | 1.2 lb/ton dry kiln _{ph} feed |
| Volatile Organic Compounds (Kiln No. 2) | 0.09 lb/ton dry kiln _{ph} feed |
| Visible Emissions (Kiln No. 2) | 20 percent |

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

DATE OF RECEIPT OF A BACT APPLICATION:

February 21, 1997

REVIEW GROUP MEMBERS:

Teresa Heron, and A. A. Linero of the New Source Review Section.

BACT DETERMINATION PROCEDURE:

In accordance with Chapter 62-212, F.A.C., this BACT determination is based on the maximum degree of reduction of each pollutant emitted which the Department of Environmental Protection (Department), on a case by case basis, taking into account energy, environmental and economic impacts, and other costs, determines is achievable through application of production processes and available methods, systems, and techniques. In addition, the regulations state that, in making the BACT determination, the Department shall give consideration to:

- (a) Any Environmental Protection Agency determination of BACT pursuant to Section 169, and any emission limitation contained in 40 CFR Part 60 - Standards of Performance for New Stationary Sources or 40 CFR Part 61 - National Emission Standards for Hazardous Air Pollutants.
- (b) All scientific, engineering, and technical material and other information available to the Department.
- (c) The emission limiting standards or BACT determination of any other state.
- (d) The social and economic impact of the application of such technology.

The EPA currently stresses that BACT should be determined using the "top-down" approach. The first step in this approach is to determine, for the emission unit in question, the most stringent control available for a similar or identical emission unit or emission unit category. If it is shown that this level of control is technically or economically infeasible for the emission unit in question, then the next most stringent level of control is determined and similarly evaluated. This process continues until the BACT level under consideration cannot be eliminated by any substantial or unique technical, environmental, or economic objections.

The air pollutant emissions from this facility can be grouped into categories based upon the control equipment and techniques that are available to control emissions from these emission units. Using this approach, the emissions can be classified as follows:

- o Particulate matter from kilns and coolers (PM/PM₁₀, and VE). This is controlled generally by add-on particulate collection equipment such as baghouses or electrostatic precipitators.

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

- o Products of combustion and incomplete combustion (e.g., SO₂, NO_x, CO, VOC). Control is largely achieved by good combustion practices and reactions with clinker and raw materials.
- o Emissions from materials handling, conveyance, and storage (primarily PM). Controlled generally by fabric filters and reasonable precautions.

Grouping the pollutants in this manner facilitates the BACT analysis because it enables the equipment available to control the type or group of pollutants emitted and the corresponding energy, economic, and environmental impacts to be examined on a common basis. Although all of the pollutants addressed in the BACT analysis may be subject to a specific emission limiting standard as a result of PSD review, the control of "non-regulated" air pollutants is considered in imposing a more stringent BACT limit on a "regulated" pollutant (i.e., PM, SO₂, H₂SO₄, fluorides, etc.), if a reduction in "non-regulated" air pollutants can be directly attributed to the control device selected as BACT for the abatement of the "regulated" pollutants.

BACT ANALYSIS

Particulate Matter (PM/PM₁₀)

Particulate Matter is generated by the various physical and chemical processes at a cement manufacturing plant. Sources of particulate matter at cement plants include (1) quarrying and crushing, (2) raw material storage, (3) grinding and blending, 4) clinker production, 5) finish grinding, and 6) packaging and loading. Additional sources of PM are raw material storage piles, conveyers, storage silos, and unloading facilities.

The largest emission source of PM within cement plants is the pyroprocessing system that includes the kiln and clinker cooler exhaust stacks (in this case, common kiln/cooler stack). Emissions from kilns are affected by several factors, including differences in convective patterns, material movement patterns, burner locations and orientations, heat transfer mechanisms, and the type of clinker cooler that supplies secondary air to the kiln for combustion. Typically, dust from the pollution control equipment servicing the kiln and cooler is collected and recycled into the kiln and thus incorporated into the clinker. Southdown has stated that the great majority of the cement kiln dust (CKD) captured in the baghouse is returned to the pyroprocessing system as raw material.

Common control devices for stack gases include settling chambers, inertial separators, impingement separators, wet scrubbers, fabric filters, and electrostatic precipitators. Fabric filters (baghouses) and electrostatic precipitator (ESPs) are often considered equivalent for particulate control. Both types of devices can achieve removal efficiencies of over 99 percent. ESPs and baghouses are used extensively as control devices at cement plants. ESPs are generally specified for kiln and clinker cooler exhaust gases because of their ability to operate effectively at varying temperatures. Baghouses are also used at many facilities for particulate control from kilns and coolers. Both types of control equipment provide for the

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

CEMEX Construction Materials Florida, LLC
Brooksville North Cement Plant

BD-4

Permit No. 05300010-045-AV
Title V Air Operation Permit Renewal

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

recovery/recycling of collected dust back into the process stream. Baghouses are also used to control particulate emissions from most other material processing operations at cement plants.

Common controls to limit particulate emissions from fugitive sources (such as roadways, stockpiles, and material processing and conveying equipment) include wet suppression, sweeping, application of surfactants, paving of roads and covering of stockpiles to reduce wind erosion. Wet suppression of fugitive particulate emissions is considered as BACT for most material handling operations and unpaved roads. Dust from stockpiles can be minimized by relatively high material moisture content with additional water spraying as necessary.

A review of the BACT Clearinghouse shows that baghouses and ESPs are widely used to control particulate matter from process emission units at cement plants. They are commonly accepted as BACT. At this facility, particulate matter sources are controlled by baghouses.

Southdown has proposed to increase the process rate (145 to 150 TPH) for both kilns, therefore changing the allowable emission rates for particulate matter (PM/PM₁₀) from Kilns Nos. 1 and 2 and Clinker Coolers Nos. 1 and 2 to allow for the fluctuations in emission rates during normal operating conditions. The permitted PM/PM₁₀ limits would be increased for Kiln No. 2 from 13.5 pounds per hour (lb/hr) to 27.0 lb/hr, while PM/PM₁₀ emissions for Kiln No. 1 are proposed to be decreased from 39.0 lb/hr (allowable emissions) to 27.0 lb/hr. The proposed limit for the two clinker coolers would be increased from 7.13 lb/hr (Kiln No. 1) and 5.0 lb/hr (Kiln No. 2) to 13.6 lb/hr. The proposed kiln particulate emission limits are equivalent to 0.18 pounds per ton of dry feed to each kiln preheater (lb/ton feed_{ph}). This is a standard lower than the New Source Performance Standard NSPS limit of 0.3 pounds per ton of dry feed (kiln). For the coolers the proposed limits are equivalent to 0.09 lb/ton feed_{ph} which is approximately equal to the applicable NSPS limit.

Southdown also requested to increase VE (which is largely linked to particulate emissions) from 10 percent for Kiln No. 2 to 20 percent.

PRODUCTS OF COMBUSTION AND INCOMPLETE COMBUSTION

Nitrogen Oxides

Emissions of NO_x from dry process cement plants with a preheater include the kiln, and any fuel-fired support operation. NO_x is generated during fuel combustion by oxidation of chemically bound nitrogen in the fuel (fuel NO_x) and by thermal fixation of nitrogen in the combustion air (thermal NO_x). As flame temperature increases, the amount of thermally generated NO_x increases. Fuel type affects the quantity and type of NO_x generated. Generally, natural gas is low in nitrogen. However it causes higher flame temperatures and generates more thermal NO_x than oil or coal, which have higher fuel nitrogen content, but exhibit lower flame temperatures.

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

NO_x emissions represent a significant portion of the total emissions generated by this project, and shall be minimized using BACT.

The emissions of NO_x can potentially be reduced at Portland cement plants by two methods:

1. Minimizing the quantity of NO_x generated during combustion (combustion modifications).
2. Reducing the quantity of NO_x in the flue gas stream (flue gas controls).

In establishing BACT for cement kilns, the Department reviewed the EPA BACT/LAER Clearinghouse and a paper presented at the Air and Waste Management Association (AWMA) International Specialty Conference on Waste Combustion in Boilers and Industrial Furnaces. The paper, "Reduction of NO_x Emissions from Cement Kiln/Calciner through the Use of the NO_xOUT Process," which was written by representatives of Nalco and Ash Grove Cement, suggests that SNCR is a viable control method. A level as low as 1.0 lb/ton of clinker was reached based on demonstration tests conducted at the Ash Grove cement plant in Seattle, Washington. However the process has not been demonstrated on a long term basis. Recently a proposed cement plant (Great Star Cement, Clark County, Nevada) was permitted with the urea-based SNCR/NO_xOUT process as BACT. The process relies on the reaction between ammonia and NO_x to yield molecular nitrogen. The delivery system consists of urea injectors in one of the preheater sections. The objective was to achieve 50% reduction of NO_x emissions. At that level there should be no ammonia slip while meeting a BACT limit of 3.1 lb/ton clinker.

A review of the EPA BACT/LAER Clearinghouse (BACT Clearinghouse) information indicates that NO_x emissions at most facilities are minimized by process control and good combustion practices.

The applicant stated that NO_x emissions at this facility will be controlled through "proper combustion practices" such as burner design with primary combustion air control. The applicant has proposed for each kiln with a preheater design a NO_x emission rate of 285 lb/hr and 1.9 lb/ton kiln_{PH} feed (3.17 lb/ton clinker at a production rate of 90 TPH, 30-day average).

A review of the NO_x emission rate summary indicates that the applicant's proposal is among the lowest BACT determinations made to date for plants utilizing dry processes. The dry process with a preheater/precalciner is considered to be the most energy-efficient process. Dry process preheater designs, such as the one employed by Southdown, are also energy efficient. Therefore it is expected that the lower fuel use will result in relatively low NO_x, as well as documented reductions from tire burning is another reason to expect low emission rate from the both preheater design kilns.

Following is a comparison between previous BACT determinations for NO_x documented in the BACT Clearinghouse and Southdown's proposal.

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

CEMEX Construction Materials Florida, LLC
Brooksville North Cement Plant

BD-6

Permit No. 05300010-045-AV
Title V Air Operation Permit Renewal

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

Previous BACT Determinations

| BASIS | Least Stringent | Most Stringent | Proposed (Applicant) |
|----------------|-----------------|----------------|----------------------|
| | Year 1978 | Year 1981 | Year 1996 |
| lb/ton clinker | 11.13 | 0.85 | 3.17 |

It is important to note that the facility which was given the 0.85 lb/ton clinker NO_x limit has not been able to meet it since construction. A dry process plant with a preheater/precalciner received a NO_x limit of 1.11 lb/ton clinker but was never built. Another dry process plant with a preheater/precalciner received a BACT determination of 2.09 lb NO_x/ton clinker. However, it appears that since that time a less stringent standard was applied. One dry process preheater/precalciner kiln in California received a NO_x BACT determination of 2.5 lb/ton clinker. The Department made a BACT Determination of 2.8 lb/ton clinker in 1997 (Florida Crushed Stone) and in 1995 for the proposed Florida Rock Industries Cement Plant in Newberry, Florida. The main reason that the lb/ton clinker emission rate was higher than the one for the California plant was that Florida limestone is wetter and requires more heat input to dry. A claim by the kiln manufacturer that differences in volatility between Eastern and Western coal should be reflected in an even higher emission limit for the Florida kiln was rejected by the Department.

Based on the long history of past permitting actions of Kiln No. 1 since its permit was issued in 1973 (no allowable emission limit for any pollutant other than PM), and the few stack records data on file with the Department, the Department has determined that the BACT limit for dry process preheater kilns should not exceed 1.83 lb/ton kiln PH feed (275 lb/hr at 150 TPH preheater feed rate) or 3.05 lb/ton clinker at a production rate of 90 TPH, 30-days average.

Introduction of tires in the material feed end of the kiln (Kiln No. 1) will reduce the thermal load on the burner end and possibly result in lower NO_x emissions [refer to files on stack tests performed in 1993 while burning 80% coal and 20% WTDF (191 lb/hr on a two days average), 1994 (159 lb/hr), and 1995 (152 lb/hr)]. The newer Kiln No. 2 has a BACT emission limit for NO_x of 1.72 lb/ton kiln PH feed which is equivalent to 2.86 lb/ton clinker. The kiln has been able to consistently meet this value.

**APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

BACT/LAER/RACT CLEARINGHOUSE DATABASE COMPARISON

The following table is to be used for reference and comparison with portland cement facilities listed in the BACT/LAER/RACT Clearinghouse database:

| POLLUTANT | lb/ton clinker | lb/ton kiln _{ph} feed * | lb/ton kiln feed** | lb/MM BTU |
|------------------------------|----------------|----------------------------------|--------------------|-----------|
| PM/PM ₁₀ (kiln) | 0.31 | 0.18 | 0.2 | 0.08 |
| SO ₂ (kiln) | 0.16 | 0.10 | 0.12 | 0.05 |
| NO _x (Kiln No. 1) | 3.05 | 1.83 | 2.03 | 0.91 |
| NO _x (Kiln No. 2) | 2.87 | 1.72 | 1.91 | 0.86 |
| CO (kiln) | 2.00 | 1.2 | 1.33 | 0.57 |
| VOC (kiln) | 0.15 | 0.09 | 0.1 | 0.04 |
| PM/PM ₁₀ (Cooler) | 0.15 | 0.09 | 0.1 | 0.04 |

Based on the following process rates:
 Preheater feed rate (kiln_{ph} feed rate) : 165 TPH (one-hour maximum)
 Preheater feed rate (kiln_{ph} feed rate) *: 150 TPH (30-day average)
 Kiln feed rate **: 135 TPH (30-day average)
 Clinker production : 90 TPH (30-day average)
 Heat Input : 300 MMBTU/hr

DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING:

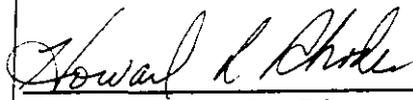
Teresa Heron, Review Engineer
 A. A. Linero, Administrator, New Source Review Section
 Department of Environmental Protection
 Bureau of Air Regulation
 2600 Blair Stone Road
 Tallahassee, Florida 32399-2400

Recommended By:


 C. H. Fancy, P.E., Chief
 Bureau of Air Regulation

6/23/97
 Date:

Approved By:


 Howard L. Rhodes, Director
 Division of Air Resources Management

6/25/97
 Date:

Southdown, Inc.
 Portland Cement Facility

Air Permit No. 0530010-003-AC
 PSD-FL-233 Kilns & Coolers No. 1 & No. 2

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

Carbon Monoxide

Carbon monoxide (CO) is a pollutant formed by the incomplete combustion (oxidation) of carbon containing compounds in the cement kiln fuel and during the transformation of cement raw materials to cement clinker. When insufficient oxygen is provided, more CO and less CO₂ are formed than under excess air conditions. Substantial quantities of CO and CO₂ are also generated through calcining of limestone and other calcareous material. This calcining process thermally decomposes CaCO₃ to CaO and CO₂. The calcining of limestone in the cement manufacturing process liberates large amounts of CO₂, which is available for dissociation into CO.

Flyash, a constituent of the raw feed mix, contains unburnt carbon which can vary in concentration depending on the source of the flyash. As the raw feeds travels down the preheater tower, most of the carbon present in the flyash is burned off. However, some of it is emitted as carbon monoxide. This contributes to fluctuations in carbon monoxide emissions.

The generation of CO and NO_x is inversely related to that of NO_x and is linked to the oxygen level that is present in the kiln system. As the oxygen level increases, the formation of NO_x increases and the formation of CO decreases. Conversely, when the oxygen level decreases, the formation of NO_x decreases and the formation of CO increases. Southdown will meet CO and NO_x emission levels by controlling excess oxygen in the kiln to a level between one and one-half to three percent excess oxygen. A continuous CO process monitor will assist in the control of the CO content in the kiln.

Emissions of CO can potentially be reduced at portland cement plants through utilization of proper combustion practices to maximize the oxidation of CO to CO₂ and reducing the quantity of CO in the flue gas stream (flue gas control). The high temperatures and control of excess air and fuel, typically results in simultaneous optimization for CO and NO_x. The applicant proposes proper combustion practices as BACT to control emissions of CO from this plant. A review of the BACT Clearinghouse reveals that for cement plants, BACT for CO is proper combustion practices.

The applicant proposes a CO limit of 1.2 lb/ton of feed_{ph} and good combustion practice as BACT for CO for each Kiln. This represents an emission increases for Kiln No. 1 from 57.7 lb/hr to 180 lb/hr and for Kiln No. 2 from 64.0 to 180 lb/hr respectively. This increase is proposed in order to allow for more representativeness on a year-round basis compared with what is achievable during an annual test. It also accounts for fluctuations due to normal process oscillations and varying characteristics of raw materials and fuels.

Volatile Organic Compounds

VOC is also a pollutant formed due to incomplete combustion of fuel and organic material in the feed material to the kiln system. Limestone contains very low levels of VOCs. An additional source of VOC is oil from mill scale that is sometimes used as a raw material for its iron.

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

CEMEX Construction Materials Florida, LLC
Brooksville North Cement Plant

BD-8

Permit No. 05300010-045-AV
Title V Air Operation Permit Renewal

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

Southdown will reduce the VOC emissions by controlling the temperatures in the kiln system. In the kiln, the feed material will reach about 2700 degrees Fahrenheit. The temperature of the gases in the kiln will reach between 3700 to 3800 degrees Fahrenheit. At these high temperatures, virtually all VOCs will be consumed or destroyed regardless of their source (limestone, mill scale, coal, fuel oil, etc.). Clinker production requires certain temperatures, residence time, and turbulence within the kiln. These factors are sufficient to ensure the destruction of almost all VOCs at cement plants.

Emissions of VOC can also be controlled by add-on control devices, by the mechanisms of adsorption, absorption, or incineration (afterburning). Incineration processes include flame incineration, thermal incineration, and catalytic incineration. No add-on controls for VOC have been demonstrated for cement plants.

A review of the BACT Clearinghouse reveals that for cement plants, BACT for VOCs is proper combustion practices.

For VOC, the applicant has estimated 13.6 lb/hr (an increase of approximately 9.1 lb/hr) for both kilns. The applicant is utilizing good combustion practices for both kilns to reduce VOCs emissions.

BACT DETERMINATION RATIONALE:

The existing BACT VE limit of 10 percent for Kiln No. 2 is more stringent than the NSPS for Portland Cement Plant, 40 CFR 60, Subpart F for Kiln No. 2. It is also consistent with various recent BACT determinations made throughout Florida. There is no good basis for considering the higher VE limit proposed by Southdown than the one already established. Although Kiln No. 1 has a VE limit of 20 percent, the kilns are operated similarly and will have identical PM limits. The efforts to maintain the lower Opacity limit at Kiln No. 2 will probably result in fairly low opacity from Kiln No. 1.

BACT for PM (0.2 lb/ton kiln feed) from Kilns No. 1 and No. 2 proposed by Southdown is more stringent than the NSPS for Portland Cement Plants, 40 CFR 60, Subpart F. The basis is the BACT determinations made by the Department for Florida Rock Industries and Florida Crushed Stone and the original BACT determination for Southdown (then FM&M). The Department accepts the applicant's proposed limit (as corrected to 0.18 lb/ton kiln_{ph} feed) for both Kiln Nos. 1 and 2.

BACT for PM (0.1 lb/ton kiln_{ph}) feed from Coolers Nos. 1 and 2 proposed by Southdown is equal to that given in the NSPS for Portland Cement Plants. Southdown was unable to achieve lower limits set in the past as a result of permit conditions they agreed to comply with in order to avoid PSD/BACT. The basis is also the BACT determinations made by the Department for Florida Rock Industries and Florida Crushed Stone. The Department accepts the applicant's proposed limit (corrected to 0.09 lb/ton kiln_{ph} feed) for both Coolers Nos. 1 and 2 with the understanding that it is being met at all times rather than just during annual emission tests.

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

BACT for CO was proposed by Southdown to be 1.2 lb/ton kiln_{ph} feed (2.0 lb/ton clinker at a clinker production rate of 90 TPH) for both Kilns. This value will provide sufficient flexibility to minimize NO_x and SO₂ emissions. The value is within the Department's recent BACT determination to Florida Crushed Stone (FCS) with a CO limit of 2.0 lb/ton clinker. However the Department encourages Southdown to continue to be judicious in selecting sources of coal ash. Some of the local power companies are trying to recover the unburned carbon in the coal ash by reburning it, taking advantage of the heat content, and producing a more salable coal ash for customers such as the cement industry. If Southdown revises its specifications and accepts poor quality flyash, it can be counter-productive for this pollution prevention effort affecting both industries.

A BACT determination was required for VOC for both Kilns. The Department accepts the limit requested by Southdown which will result in annual emissions above the PSD threshold. It will allow Southdown sufficient flexibility in control for all combustion products.

No BACT determination was requested or required for metals such as mercury, beryllium, lead arsenic, fluorides and sulfuric acid mist (PSD pollutants). Original emission estimates submitted for previous applications provided assurance that emissions of these pollutants are less than the PSD significant threshold values.

No new BACT determination was requested for SO₂. The actual BACT emission level of 15 lb SO₂/hr is being met. This is equal to 0.10 lb SO₂/ton kiln_{ph} feed. For comparison with industry conventions, this value is equal to 0.16 lb SO₂/ton clinker at a production rate of 90 TPH. Kiln No. 1 also meets the same SO₂ limit as Kiln No. 2.

A new BACT- NO_x emission limit of 1.83 lb/ton kiln_{PH} feed or 275 lb/hr (3.05 lb/NO_x/ton clinker at a production rate of 90 TPH, 30-day average) will be set for Kiln No. 1. BACT for Kiln No. 2 will remain at 1.72 lb NO_x/ton kiln_{ph} feed or 258 lb/hr at a 150 TPH process rate (2.86 lb/ton clinker at a production rate of 90 TPH, 30-days average).

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

CEMEX Construction Materials Florida, LLC
Brooksville North Cement Plant

BD-10

Permit No. 05300010-045-AV
Title V Air Operation Permit Renewal

APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)

BACT DETERMINATION BY DEP:

Based on the information provided by the applicant and the information searches conducted by the Department, the BACT emission levels are established as follows:

| POLLUTANT | EMISSION LIMIT |
|--|--------------------------------------|
| Particulate Matter (PM/PM ₁₀) (kilns) | 0.18 lb./ton kiln _{ph} feed |
| Particulate Matter (PM/PM ₁₀)(coolers) | 0.09 lb/ton kiln _{ph} feed |
| Carbon Monoxide (kilns) | 1.2 lb/ton kiln _{ph} feed |
| Nitrogen Oxides (Kiln No. 1) | 1.83 lb/ton kiln _{ph} feed |
| Nitrogen Oxides (Kiln No. 2) | 1.72 lb/ton kiln _{ph} feed |
| Volatile Organic Compounds (kilns) | 0.09 lb/ton kiln _{ph} feed |
| Visible Emissions (Kiln No. 2) | 10 percent (no change) |

COMPLIANCE

Compliance with the particulate emission limitations shall be in accordance with the EPA Reference Method 5 as contained in Appendix A, 40 CFR 60, and set forth in Subsection 60.64 of the NSPS for Portland Cement Plants, 40 CFR 60.

Continuous opacity monitors (kilns and coolers) shall meet the requirements of the 40 CFR 60.63, NSPS Subpart F for Portland Cement Plants. Compliance with the opacity standard for the Kilns and Clinker Coolers No. 1 and No. 2 shall be demonstrated by EPA reference Method 9.

Compliance with the CO limitations shall be demonstrated initially and annually by using EPA Reference Method 10 as contained in Appendix A, 40 CFR 60.

Pursuant to Rules 62-4.070(3), 62-212.400(6), and 62-297.520, F.A.C., the kiln/cooler exhaust stack system shall also be equipped with continuous monitors process monitors to record CO and/or O₂ to indicate proper maintenance, operation, and to optimize combustion for pollution control.

Compliance with the NO_x limitation shall be demonstrated initially and annually by using EPA Reference Method 7E as contained in Appendix A, 40 CFR 60.

Compliance with the VOC limitations shall be demonstrated (on a one time basis) by three one hour stack tests using Method 25 or 25A as contained in Appendix A, 40 CFR 60.

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2

**APPENDIX BD
BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION (BACT)**

BACT/LAER/RACT CLEARINGHOUSE DATABASE COMPARISON

The following table is to be used for reference and comparison with portland cement facilities listed in the BACT/LAER/RACT Clearinghouse database:

| POLLUTANT | lb/ton clinker | lb/ton kiln _{ph} feed * | lb/ton kiln feed** | lb/MM BTU |
|------------------------------|----------------|----------------------------------|--------------------|-----------|
| PM/PM ₁₀ (kiln) | 0.31 | 0.18 | 0.2 | 0.08 |
| SO ₂ (kiln) | 0.16 | 0.10 | 0.12 | 0.05 |
| NO _x (Kiln No. 1) | 3.05 | 1.83 | 2.03 | 0.91 |
| NO _x (Kiln No. 2) | 2.87 | 1.72 | 1.91 | 0.86 |
| CO (kiln) | 2.00 | 1.2 | 1.33 | 0.57 |
| VOC (kiln) | 0.15 | 0.09 | 0.1 | 0.04 |
| PM/PM ₁₀ (Cooler) | 0.15 | 0.09 | 0.1 | 0.04 |

Based on the following process rates:

Preheater feed rate (kiln_{ph} feed rate) : 165 TPH (one-hour maximum)

Preheater feed rate (kiln_{ph} feed rate) *: 150 TPH (30-day average)

Kiln feed rate **: 135 TPH (30-day average)

Clinker production : 90 TPH (30-day average)

Heat Input : 300 MMBTU/hr

DETAILS OF THE ANALYSIS MAY BE OBTAINED BY CONTACTING:

Teresa Heron, Review Engineer
A. A. Linero, Administrator, New Source Review Section
Department of Environmental Protection
Bureau of Air Regulation
2600 Blair Stone Road
Tallahassee, Florida 32399-2400

Recommended By:


C. H. Fancy, P.E., Chief
Bureau of Air Regulation

6/23/97
Date:

Approved By:


Howard L. Rhodes, Director
Division of Air Resources Management

6/25/97
Date:

Southdown, Inc.
Portland Cement Facility

Air Permit No. 0530010-003-AC
PSD-FL-233 Kilns & Coolers No. 1 & No. 2