WYOMING DEPARTMENT OF ENVIRONMENTAL QUALITY
Air Quality Division

FY '91 ANNUAL INSPECTION REPORT

NAME OF FIRM:	FMC Wyoming Corporation
NAME OF PLANT:	Westvaco Soda Ash Refinery
PLANT LOCATION:	Sections 14, 15, 22 and 23 of T19N, R110W, Sweetwater County, Wyoming (located 20 miles WNW of Green River, about 5 miles north of Interstate 80)
PLANT MANAGER:	Ken Dailey
PLANT ADDRESS:	P.O. Box 872, Green River, WY, 82935
TELEPHONE NUMBER:	(307) 875-2580
INSPECTION DATE:	May 29, 1991
COMPANY REPRESENTATIVES:	Wes Nash, Environmental Manager
DIVISION INSPECTOR:	Lee Gribovicz, District Air Quality Engineer
LAST ANNUAL INSPECTION REPORT:	May 7, 1990
STAFF REVIEW:	Charles A. Collins, Air Quality Administrator Bernie Dailey, Air Quality Supervisor Dan Olson, Air Quality Environmental Officer
REPORT DATE:	June 11, 1991

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PLANT AND PROCESS DESCRIPTION:

This plant refines trona ore (sodium bicarbonate/carbonate mineral) into purified soda ash (sodium carbonate) by driving off the bicarbonate CO_2 and water of hydration in the ore, and by physically removing soluble and insoluble impurities mined with the ore. The plant produces soda ash by two slightly different chemical processes known as the monohydrate process and the sesqui-carbonate process, respectively. The plant also combines elemental phosphorus with soda ash slurry to produce a product called sodium tripolyphosphate, known as STPP. Later additions to the plant included a solution mining operation where "burned lime" (calcium oxide) is produced from calcium carbonate feed stock, and slaked to produce a calcium hydroxide solution. The calcium hydroxide is reacted with sodium carbonate solution to produce a sodium hydroxide caustic solution mining liquor. The caustic solution can also be concentrated to 50% sales solution in a caustic concentration plant. In another process, sodium carbonate liquor is recarbonated with carbon dioxide from the phosphate plant reactors to produce a sodium bicarbonate product in the bicarb plant. Finally, FMC produces 30% sodium cyanide sales solution in the cyanide plant at this site.

The plant is divided into six basic processing areas.....

Mono Plant

First is the newer mono plant, which has a production capacity of about 1.65 MM TPY of soda ash. The mono plant processing area is housed in one building containing two distinct process lines. Basic equipment in each process line includes a gas fired calciner, a dissolver section, liquor purification equipment, triple effect evaporators, centrifuges, and fluid bed dryers. The mono plant has an ore stockpile to feed the process with crushing and screening equipment in a separate adjacent building. Product is conveyed to storage silos for either bulk railcar or truck loading. The mono plant also has a second major building housing two 600,000 pph, 887 MM Btu per hour coal fired steam boilers. The powerhouse also contains a backup dual fuel (natural gas or fuel oil) fired boiler rated at 300 MM Btu per hour.

Sesqui Plant

The older sesqui plant has a capacity of approximately 1.25 MM TPY of soda ash. The sesqui plant has a separate ore stockpile with crushing and screening equipment in one building. Basic process equipment located in a second building includes four lines of ore dissolvers, liquor purification equipment, three lines of three-stage crystallizers, centrifuges, and eight calciners. There are three steam tube type calciners, three direct gas fired calciners, and two fluid bed calciners. Sesquicarbonate crystals can be redissolved, recrystallized, recentrifuged, and dried in a small plant in the sesqui area called the "Baby Sesqui Plant" to provide a more highly refined product. The capacity of the "Baby Sesqui Plant" is about 0.05 MM TPY. Sesqui area product is conveyed to

storage and shipped out of six bulk rail loadout stations. There is also a transfer operation, whereby sesqui plant soda ash can be hauled by rail car to storage silos near the bicarb plant, and fed from these silos to product bagging equipment. The mono plant coal fired boilers now supply most of the plant's power and steam requirements, but there is a powerhouse in the sesqui plant area containing one 333 MM Btu/hr and three 167 MM Btu/hr dual fuel (natural gas or fuel oil) fired boilers, used for backup and supplemental steam demand.

Phosphate Plant

The STPP plant is located on the western edge of the plant site. It consists of two process lines, the older of which is rated at 0.15 MM TPY as modified under permit MD-41. The second process line is rated at 0.10 MM TPY under construction permit CT-684. Feed materials to the process include liquid phosphorus shipped in by rail tank car, and sesquicarbonate slurry from the sesqui plant. Basic process equipment in each line includes a phosphorus furnace; a chemical reaction section; a dryer section (spray drier on the older line, rotary kiln on the newer line); screening, milling and compaction equipment for product sizing; and storage and rail loading equipment.

Lime/Caustic Plant

The fourth major process area is the solution mining preparation plant on the eastern edge of the plant site. Basic equipment used in this area are a gas fired lime kiln, a lime slaker, and a reactor for producing the sodium hydroxide solution mining liquor. The kiln is rated to produce approximately 0.2 MM TPY of lime. Also located in this vicinity is the caustic concentrator building using quadruple effect evaporators and multi-stage cooling equipment to produce the 50% caustic sales solution.

Sodium Cyanide Plant

The fifth process area is the sodium cyanide plant located adjacent to the solution mining facility on the extreme eastern edge of the operation. This facility has a design capacity of about 0.03 MM TPY of liquid sodium cyanide product. Basic equipment used here includes a methane and ammonia catalytic reactor to produce hydrogen cyanide gas, an absorber to scrub the hydrogen cyanide gas with sodium carbonate liquor, and a two stage exhaust gas incinerator to destroy any pollutants which escape the absorber.

Sodium Bicarbonate Plant

The sixth process area is the sodium bicarbonate plant located just northeast of the sesqui process, with a rated capacity of 0.08 MM TPY of bicarb product. Basic equipment used in this plant includes a carbon dioxide reactor tank, crystal dewatering centrifuges, a steam heated bicarbonate flash dryer, and product milling, screening and storage equipment.

A process description which identifies the function of individual plant point sources constructed at that time, is contained in the 1981 Annual Inspection Report. Table I of this report provides an itemized listing of all current plant point emission sources, together with their tested or estimated pollutant emission rates.

AIR QUALITY PERMITS:

MD-27 (06/01/79) // OP-145 (07/15/85)

This permit allowed FMC to make certain changes to the mono plant to increase its capacity from 1.3 MM TPY to 1.65 MM TPY. Complete details can be found in FMC's application of March 27, 1978. No new point sources were created. Permit conditions attached to this permit limit the allowables for the mono plant modified sources to those rates already set by Section 25, require that FMC test those sources to demonstrate compliance, and require that FMC dismantle point sources NA-2, 3, and 6 associated with the old natural ash plant that was once part of the operation.

FMC completed the debottlenecking work and tested the required sources in the Fall of 1981, with test results submitted in a package dated January 15, 1982. The Division reviewed these reports by memo of February 18, 1982 and found that all tests were satisfactory and met the required allowables. NA-2, 3 and 6 were reported not in use during the 1982 Annual Inspection and were reported dismantled during the EPA Overview Inspection of June 7, 1983. The operating permit was issued to FMC following review during the 1985 Annual Inspection.

CT-310 (06/20/80) // OP-117 (08/09/83)

This permit allowed FMC to construct the lime slaker and lime storage silo associated with their solution mining program. Although other point sources were initially permitted, the only sources actually constructed under this permit were RD-2, the lime storage silo bin vent; and RD-3, the slaker vent. Complete details can be found in FMC's application of February 22, 1980.

Permit conditions of this permit set the allowable particulate emission rate of RD-2 at 1.5 pph and for RD-3 at 1.0 pph; required a reduction in the allowable particulate emission rate of RA-22 from 35.0 to 32.0 pph to offset the increase; required that FMC test RA-22 to demonstrate compliance; required FMC to pave the preparation plant area and access roads; and required FMC to treat the access road to the solution mining site with dust suppressant chemicals to control fugitive dust. An August 9, 1983 details FMC's compliance with these permit conditions leading to the issuance of the operating permit. During recent inspections the Division has noted no deviations from any of the permit conditions.

CT-448 (07/01/82) // OP-118 (08/09/83)

This permit allowed FMC to construct a bulk truck loadout facility. The only point source constructed under the permit was Mono-10, the dust collection system baghouse. Complete details can be found in FMC's application of March 19, 1982. The only permit condition limited this source to a particulate emission rate of 1.7 pph. An August 9, 1983 details FMC's compliance with this permit condition leading to the issuance of the operating permit. No problems have been noted with this baghouse during recent inspections.

MD-41 (06/08/83) // OP-178 (10/20/87)

This permit allowed FMC to modify the STPP plant to increase production from 100,000 to 150,000 TPY. No new point sources were created, but allowables on several existing sources were revised downward to reflect BACT capability of new control equipment. Complete details of the project can be found in FMC's application of December 14, 1982 and supplemental information dated February 22 and March 25, 1983.

Modifications were completed and operation at the expanded production rate was accomplished during the summer of 1985. Testing was conducted during September, 1985 and reviewed in the 1986 Annual Inspection report. Test results all showed compliance with their respective allowable emission rates. The allowable for one source, PP-12 phosphorus furnace, has since been reduced under permit CT-684. The 1985 test for this source still shows compliance with this lower permitted emission rate.

Discussion in the FY '87 Annual Inspection Report describes the Division's review leading to the issuance of the operating permit for this project.

Permit conditions contained in OP-178 require FMC to provide the annual throughput of the secondary calciner (PP-25) in order to demonstrate that the modification has not affected this source and set allowables for the five other process sources in the spray drier line whose capacities were increased as a result of this project. As noted previously all sources are currently observed to be in compliance with these OP-178 allowable emission rates. The pre-permit production limit for PP-25 was 119,088 TPY, which was recognized by FMC in their May 25, 1988 letter. The latest information available as of this writing shows that the PP-25 throughput for 1990 was 73,233 tons.

CT-520 (12/19/83) // OP-198 (10/27/89)

This permit allowed FMC to construct a coal/gas fired lime kiln and associated coal handling equipment as part of their solution mining project. The permit was later revised to eliminate the coal firing option and utilize natural gas only. Point sources created were the kiln exhaust (SM-1) and two housekeeping baghouses

(SM-2 and SM-3). Details of this project can be found in the following file documents. Portions of this application are contained in the confidential file.

Date	Source	Content
04/13/83	FMC	initial application for the lime kiln project
05/03/83	AQD	request for additional control equipment information
05/19/83	FMC	specifications for the kiln venturi scrubber
06/17/83	AQD	discussion of modeling problems
08/03/83	AQD	memo analyzing permit modeling requirements
08/29/83	FMC	permit addendum modeling package
09/22/83	AQD	review of FMC's modeling package
11/02/83	FMC	proposed reduction in kiln allowable emission rate for BACT
11/15/83	AQD	publish Public Notice of permit analysis
12/19/83	AQD	CT-520 issued
12/17/85	FMC	notification of changes to permitted control equipment
02/24/86	AQD	review of control equipment changes
02/26/86	AQD	CT-520A issued to revise source allowable emission rates
04/16/86	FMC	notification of kiln start-up on natural gas only
07/30/86	AQD	annual inspection noting revisions to planned equipment
11/10/86	FMC	notification that the kiln would be fired on a 50/50 mix of coal and natural gas for the foreseeable future
07/24/87	FMC	notification of Sept. kiln testing on natural gas fuel only
09/04/87	AQD	annual inspection noting extended testing delay
09/28/87	AQD	kiln testing observation memo
11/18/87	FMC	test report submittal
12/17/87	AQD	test review showing compliance w/ 3 test averages, but exceedances of individual particulate & NO_x tests
03/23/88	AQD	annual inspection noting problems w/ test result representativeness & audit analysis problems
05/03/88	FMC	explanation of audit problems & correct sample recalculation
05/25/88	FMC	explanation of individual variation in kiln test results
03/30/89	AQD	annual inspection noting history of permit condition compliance & recommending issuance of the operating permit
10/27/89	AQD	OP-198 issued

Permit conditions of OP-198 included emission limits for particulate, NO_x and carbon monoxide for the lime kiln and particulate limits for the two baghouses. Also, the kiln exhaust venturi scrubber was required to have instrumentation to record the scrubber pressure drop and scrubber liquor supply pressure. Finally, the permit limited this kiln to natural gas firing only. The kiln has been tested in compliance with its emission limitations, while testing on the two baghouses was waived. Required scrubber monitoring instrumentation was installed on the kiln exhaust, while the kiln continues to be fired on natural gas only. The FY '89 Annual Inspection Report contains the details of FMC's compliance with these conditions leading up to the issuance of the operating permit.

Start-up of this project occurred in the Summer of 1986.

CT-534 (03/29/84) // OP-179 (10/30/87)

This permit allowed FMC to construct a new fluid bed calciner in the sesqui plant to replace existing steam tube calciners that had become obsolete. The calciner, designated RA-26, originally was to replace both RA-13 and RA-14 steam tube calciners. Because of back-up considerations, FMC subsequently requested to keep RA-14 and use it along with RA-15 and RA-16 steam tube calciners in rotation, with any two of these three in use at any one time. The scrubber on RA-26 was the only new point source created. Complete details can be found in FMC's initial correspondence of November 29, 1983, their application of December 14, 1983, their supplemental letter of January 4, 1984, and their subsequent request to keep RA-14 of September 19, 1984. Permit conditions as modified by the Division's letter of October 5, 1984, set the allowable particulate emission rate of RA-26 at 12.0 pph and limit the operation of the other three steam tube units as described above. The new RA-26 calciner was fired on March 22, 1985.

The FY '87 Annual Inspection Report (9/4/87) details FMC's compliance with applicable permit conditions leading up to the issuance of the operating permit. During all subsequent inspections, including this one, only two of the three steam tube calciners have been operated at any one time and nothing has indicated that the RA-26 emissions differ significantly from tested rates. Thus FMC is currently in compliance with applicable provisions of this permit.

CT-603 (05/01/85) // OP-180 (10/30/87)

This permit allowed FMC to construct a silo to collect coal fly ash from the mono plant boilers, and a truck loadout to facilitate sale of this fly ash to the cement industry. Point sources created were NS-10 and NS-11 baghouses on the silo bin vent and truck loadout, respectively. Complete details can be found in FMC's application of January 23, 1985 and supplemental letter of February 19, 1985. Permit conditions included setting the allowables for NS-10 and NS-11 at 0.34 pph, each, and requiring that all access roads and trafficked areas in the loadout area be paved.

By letter of November 4, 1986 FMC notified the Division that construction on this project had been completed and that the system had been started-up. The FY '87 Annual Inspection contains a description of the review leading up to the issuance of the operating permit. No visible emissions have been observed from these two baghouses during recent inspections.

CT-684 (04/28/86) // OP-197 (11/01/89)

This permit allowed FMC to construct a second sodium phosphate process line rated at 100,000 TPY of product. Point sources created include PP-11, a new phosphorus furnace; PP-20, a new rotary dryer; and PP-28, a baghouse for the dry product sizing and handling portion of the plant. Details of this project can be found in the following file documents.

Date	Source	Content
09/06/85	FMC	initial application for 0.10 MM TPY sodium phosphate line
09/16/85	AQD	letter detailing treatment under request for confidentiality
11/13/85	AQD	request for additional control equipment specifications
11/22/85	AQD	description of modeling discrepancies for phosphate project
12/16/85	FMC	control equipment specifications & modeling explanation
01/07/86	TRC	consultant supplied meteorological data for the project
01/07/86	FMC	acceptance of reduced BACT allowable for phosphate furnace
01/20/86	FMC	release from confidentiality request
01/22/86	FMC	transmittal of news release on the project
01/27/86	FMC	confirmation of acceptance of 11 pph allowable on furnaces
01/30/86	AQD	request for a non-confidential permit application
02/03/86	TRC	non-confidential permit application page substitutions
03/25/86	AQD	publish Public Notice of permit analysis
04/28/86	AQD	CT-684 issued
07/24/87	FMC	notification of start-up of the phosphorus furnace, with the rotary drier start-up scheduled for August
09/04/87	AQD	annual inspection noting testing planned for late Fall '87
02/16/87	FMC	notification of operational problems causing testing delay
03/23/88	AQD	annual inspection noting testing scheduled for Fall '88
08/22/88	FMC	sampling protocol for phosphorus furnace and rotary drier
08/26/88	FMC	revised test schedule & confirmation of test protocol
10/05/88	AQD	request for discussion of test problems on PP-11 furnace, request for justification on PP-28 baghouse test waiver, request for maintenance plan on PP-28 baghouse & request for NO_x tests on phosphorus plant fired sources
10/07/88	AQD	test observation memo describing problems encountered
10/10/88	FMC	preliminary particulate test results indicating failure of PP-11 phosphorus furnace to meet its allowable
10/26/88	FMC	justification for PP-28 baghouse test waiver, maintenance plan for PP-28 baghouse, plans for phosphate plant NO_x tests & final control equipment specifications
11/15/88	FMC	preliminary NO_x sampling results
12/20/88	FMC	final particulate test report
03/03/89	AQD	review of final particulate test results
03/13/89	FMC	back-up data on NO_x testing
03/20/89	AQD	review of phosphate plant NO_x test results
03/30/89	AQD	annual inspection noting history of permit condition compliance & recommending issuance of the operating permit
11/01/89	AQD	OP-197 issued

OP-197 permit conditions incorporate all application commitments into the final permit and set allowable particulate emission rates for the three sources constructed under this permit, as well as set reduced allowable rates for existing sources PP-12 and Mono-9 as part of the permit agreement. The permit also requires pressure drop monitoring instrumentation on PP-11 and PP-20 scrubbers, as well as flow meters on the scrubber liquor lines of these sources.

It is also specified that these liquor flows are to be checked once per 8-hour shift, and adjusted as needed to assure that the scrubber liquor is maintained at a specified specific gravity. All permit commitments have been met and the major process equipment has been tested in compliance with the permit allowables. Testing was waived on PP-28 housekeeping baghouse. Required scrubber monitoring instrumentation is in place. The FY '89 Annual Inspection Report (3/30/89) contains the details of FMC's compliance with these conditions leading up to the issuance of the operating permit.

Start-up of this sodium phosphate line took place in the Summer of 1987.

CT-827 (03/20/89)

This permit allowed FMC to construct an 80,000 TPY sodium bicarbonate manufacturing plant. Point sources created were BC-1, the baghouse on the process flash drier and BC-2, the baghouse on the product handling section of the plant. Permit conditions set allowable particulate emission limits for BC-1 and BC-2, and limited the opacity on BC-2 to 7% per NSPS Subpart OOO. Details of this project can be found in the following documents.

Date	Source	Content
10/31/88	FMC	initial application for bicarb plant permit
11/07/88	AQD	discussion of Wyoming confidentiality provisions
11/15/88	FMC	release from confidentiality request
11/28/88	FMC	supplementary impact modeling analysis
12/15/88	FMC	process rate specifications & baghouse ventilation system diagram
02/01/89	AQD	memo reviewing 1988 ambient particulate violations at the FMC facility relevant to the bicarb application
02/14/89	AQD	publish Public Notice of permit analysis
03/20/89	AQD	CT-827 issued
01/04/90	FMC	notification of changes to proposed control equipment
06/11/90	AQD	bicarb plant changes acceptable & will be included in the OP
06/25/90	FMC	notification of anticipated start up around the first of August
08/02/90	FMC	notification of actual start up on July 31st
10/24/90	FMC	notification of delayed testing due to start up problems
01/11/91	FMC	test protocol and schedule for testing in two weeks
01/30/91	AQD	test observation memo
02/28/91	FMC	submittal of BC-1 & BC-2 test report
03/07/91	FMC	request for permit to operate the bicarb plant
03/28/91	AQD	review of the test report, showing both stacks in compliance
04/03/91	AQD	confirmation of test results to FMC, but noting that NSPS Subpart OOO readings are still necessary
04/19/91	FMC	acknowledgement that OOO readings will be completed by 4/30/91
05/24/91	FMC	submittal of Subpart OOO opacity report

As described in the FY '90 Annual Inspection Report, FMC notified the Division that refined engineering on this bicarb plant had caused them to change the specifications for the two point source baghouses permitted under CT-827. FMC revised exhaust flow rates such that the emission rate of BC-1 would climb by 1 pph, up to 3.0 pph, while BC-2 emissions would fall by an equal amount, down to 1.7 pph. The total permitted particulate emission rate from the bicarb facility would remain as considered in the analysis, at 4.7 pph. Because there was an equal trade off, and because there was no potential environmental problems, the Division notified FMC that this modification was acceptable and would be incorporated into the operating permit for the facility.

Start-up of this facility occurred in July, 1990, with testing being delayed until January, 1991. Test results showed BC-1 emissions at 0.28 pph, while BC-2 showed particulate emissions of 0.20 pph.

NSPS Subpart OOO opacity readings were taken May 24, 1991, but the report only show one 6-minute reading in each of three hours. Subpart OOO requires a 3 hour average opacity reading. Telephone conversations with Wes Nash after the inspection have confirmed that because FMC did not observe the BC-2 stack for a full 3 hours, their May 24th opacity report is deficient and will have to be revised. The Division is preparing a Subpart OOO guideline which will provide necessary elements for compliance with NSPS requirements. The operating permit for this project cannot be issued until the NSPS question is resolved for this project.

CT-845 (08/15/89)

This permit allowed FMC to construct a 50 million pound per year capacity sodium cyanide (NaCN) manufacturing plant. This process produces a 30% concentrated liquid sodium cyanide product by first passing oxygen, methane and ammonia through a catalytic reactor to produce hydrogen cyanide gas. The hydrogen cyanide gas is then absorbed in a 50% sodium hydroxide caustic solution to produce the final product. The main point source created is a two stage incinerator (NaCN-1) for destruction of off gasses escaping the absorber vessel. Also constructed was a 5.68 MM Btu/hr natural gas fired air preheater (NaCN-3) and an emergency flare stack (NaCN-2) with a 0.576 MM Btu/hr pilot. A more complete description of this project can be obtained from the following file documents:

Date	Source	Content
03/28/89	FMC	initial application for a 0.03 MM TPY sodium cyanide plant
04/04/89	AQD	acknowledgement of receipt & request for additional copy
04/07/89	FMC	supplies additional copy & requests meetings to expedite review
05/15/89	AQD	request for modeling revisions, grid maps and BACT questions
05/26/89	TRC	consultants response with modeling revisions, grid maps and commitment to incinerate cyanide storage & loadout vents
06/09/89	FMC	preventive safety & emergency procedures

06/12/89	TRC	modeling source list
07/14/89	AQD	publish Public Notice of permit analysis
08/15/89	AQD	CT-845 issued
06/11/90	AQD	note incinerator test requirements & request test protocol
06/12/90	EPA	confirms that RCRA incinerator requirements are not applicable
07/02/90	FMC	still investigating protocol methods; proposal prior to 9/1/90
08/22/90	FMC	test protocol for HCN, NH_3, CO & NO_x on incinerator stack
11/07/90	AQD	comment on protocol, requesting standard-addition methodology
11/20/90	FMC	notification of start up on November 13, 1990
01/31/91	FMC	initial cyanide plant flare report
02/15/91	AQD	review of initial flare report, noting high emissions
02/21/91	FMC	discussion of delays in reaching full production for testing
03/21/91	AQD	requires 4/30/91 testing, explanation of flare HCN emissions, quarterly flare reporting, & confidentiality discussions
04/01/91	FMC	schedule testing w/ revised protocol proposal on HCN gas
04/02/91	FMC	revised copy of initial flare report
04/03/91	FMC	response to 3/21 concerns; explanation of HCN flare emissions
04/05/91	FMC	review & acceptance of revised HCN test protocol
04/15/91	AQD	test observation memo
05/13/91	FMC	test report showing HCN, NH_3, CO compliance; NO_x non-compliance
06/07/91	AQD	waiver for test requirements on NaCN-3, the preheater stack

The first condition of this permit incorporates all application commitments into the final permit. The permit also sets allowable mass emission limits on the incinerator stack for hydrogen cyanide, ammonia, carbon monoxide, and nitrogen oxides. The gas fired air preheater and flare pilots have carbon monoxide and nitrogen oxide mass emission limits, while the air preheater must also meet its BACT limit of 0.1 lb NO_x per MM Btu fired. The emergency flare also has mass emission limits for ammonia, carbon monoxide, and nitrogen oxides. Under CT-845, FMC is required to test the incinerator stack for compliance with its emission limits. Emissions from the flare are to be obtained by logging and reporting flare use incidents annually, with emissions calculated from flare hours and volumes. Finally, the Division set standards for the construction of the ammonia storage tanks to minimize vent emissions per the application.

Start-up on this plant occurred in November, 1990, with testing conducted on the incinerator stack in April, 1991. Results showed that HCN, NH_3, CO were all in compliance with allowable emission limits, but NO_x was over 50% higher than its permitted rate. During this inspection, I was told that FMC felt the cause of the failed NO_x test was an improperly calibrated combustibles meter in the incinerator. They have ordered new calibration gas for this instrument and intend to retest the stack after they return the unit to proper operation. The Division should require that FMC confirm the explanation for the NO_x test failure, and provide a corrective plan and schedule for retesting this source.

The air preheater has not been tested, but because of its small total emissions (2.6 TPY NO_x), testing was waived (6/7/91 letter).

The flare emission reports began with data from 1990, and although flare use was up during that first quarter of operation, subsequent flare reports have shown reduced emissions. Also, FMC hopes to refine their emissions estimates for flare use, because initial methods of calculating emissions are suspected to be conservatively high.

The Division's April, 1991 inspection showed that the ammonia tanks were reflective silver coated, effectively meeting the condition of the permit requiring light colors to minimize solar heating of the tanks. The permit also requires water cooling and high pressure (300 psi) emergency relief valves on the tanks, but the Division has not confirmed that these items are in place. FMC should be requested to report on whether these emission control measures were installed.

MD-112 (11/21/89)

This permit allowed FMC to construct a new sesqui soda ash product bagging facility. Under this permit sesqui manufactured soda ash is shuttled from the sesqui plant to the new bagging facility by bottom dump railcars and unloaded into three 180 ton capacity storage tanks for feeding four bagging stations. The only point source created was the area housekeeping baghouse, RA-28. As partial tradeoff for the new emissions, FMC proposed to remove the old sesqui bagging facility from service, along with its baghouse, RA-27. Permit conditions limit particulate emissions from RA-28 to 0.05 grams/dscm, not to exceed 1.29 pph mass rate cap, and limit the opacity to 7% per NSPS Subpart OOO requirements. Also, FMC was required to completely remove, or permanently disable the existing sesqui bagging facility equipment and RA-27 baghouse. A more complete description of this project can be found in the following file documents:

Date	Source	Content
04/24/89	FMC	confirmation that the sesqui bagger project requires a permit
05/17/89	AQD	letter noting that a permit application will be forthcoming
07/18/89	FMC	permit application for sesqui bagger
10/04/89	FMC	dust collection system diagram w/ commitment to control rail car unloading point
10/17/89	AQD	publish Public Notice of permit analysis
11/21/89	AQD	MD-112 issued
12/17/90	FMC	notification of plant start-up on December 3, 1990
03/08/91	FMC	notification of bagging equipment start up problems & delays

During this inspection, I looked at this facility and found that potential emissions from RA-28 baghouse are unlikely to be significant. From my experience looking at similar installations, it is my opinion that the soda ash handling and bagging equipment will probably generate very little in the way of particulate emissions. I told Mr. Nash that the Division would require an NSPS Subpart OOO opacity reading on the source, and if that reading confirmed expected low

emissions, I told him that I would recommend waiving testing requirements for this baghouse.

Regarding the existing sesqui product loadout, Mr. Nash told me that FMC now was talking about retaining this old facility, rather than dismantling it as required in MD-112. I told Mr. Nash that any deviations from the commitments and descriptions considered in this permit analysis would require review by the Division, and possibly, re-permitting of additional emissions.

MD-120 (03/13/90)

This permit allowed FMC to modify their mono ore stockpile reclaim operation by adding a second ore reclaim conveyor and crushing/screening operation. The only new point source created was Mono-11, a dust collection system and wet venturi scrubber for controlling dust in this new ore handling operation. Permit conditions limit particulate emissions from Mono-11 to 0.05 grams/dscm, not to exceed 3.0 pph mass rate cap, and require pressure drop and scrubber liquor recirculation instrumentation per NSPS Subpart OOO requirements for the scrubber. Also, FMC is required to submit a semi-annual report on deviations from tested parameters during compliance testing on the scrubber. A more complete description of this project can be found in the following file documents:

Date	Source	Content
09/15/89	TRC	consultant's submittal of mono dual ore reclaim application
10/05/89	FMC	initial attempt at PM-10 modeling for the FMC plant
10/06/89	FMC	Mono-11 scrubber exhaust parameters
11/11/89	TRC	revised PM-10 modeling for the FMC plant
11/20/89	AQD	analysis of downwash in trona plant modeling
12/15/89	FMC	Mono-11 dust collection system diagram
12/19/89	TRC	list of FMC sources and emission rates used in the modeling
02/10/90	AQD	publish Public Notice of permit analysis
03/13/90	AQD	MD-120 issued
06/28/90	FMC	notice of anticipated start up in August, 1990
10/10/90	FMC	notice of actual start up on October 5, 1990
10/19/90	AQD	on site inspection discussing crusher equipment problems
12/04/90	FMC	test protocol and schedule for testing
01/21/91	FMC	Mono-11 test report
03/06/91	AQD	test review, pounds per hour only
03/07/91	FMC	request for operating permit for the mono dual ore crusher
03/21/91	AQD	letter confirming test results to FMC

Start up of this crusher occurred in October, 1990, with testing being conducted in January, 1991. Results showed total particulate emissions of 0.55 pph, 18% of the 3.0 pph allowable. The average front half exhaust loading was 0.0095 grams per dry standard cubic meter, 19% of the NSPS Subpart OOO standard for this source of 0.05 grams/dscm. The average scrubber pressure drop during testing was 18.5" W.G., and the scrubber liquor recirculation rate was 100 gpm. Before the

operating permit can be issued for this project, FMC must begin semi-annual reporting of pressure drop and liquor flow rates excursions which deviate from these test period averages by ± 30%, per requirements of Subpart OOO.

Caustic Plant Project

FMC has constructed a caustic soda (NaOH) plant to produce 65,000 TPY of 50% caustic solution. The plant takes 10% caustic solution from FMC's solution mining lime slaker and drives the excess water off in a quadruple effect evaporator system. Details of the project can be found in the following file documents:

Date	Source	Content
04/24/89	FMC	confirmation of telephone conversation indicating the construction was proceeding on a new caustic soda processing plant, with no emission sources associated with it
05/17/89	AQD	request for a written description of the project
06/09/89	FMC	process description, equipment list & plot plan for the project

FMC completed construction of this caustic soda processing plant in the Spring of 1990.

During this inspection I went to the plant control room in this caustic building, but did not enter the process room itself due to FMC safety rules (rubber outer clothing required). One can see most of the process room from the glass enclosed control room, however, and there were no deviations from the design information in the file. From FMC's written description of the operation and observations during the past two inspections, I have confirmed that there are no emissions from this operation and a waiver of permitting is warranted. The Division has never responded to FMC's proposal in writing and should now confirm that the waiver is granted.

INSPECTION OBSERVATIONS:

I arrived at the plant around 8:30 in the morning and met first with Mr. Nash to discuss issues of concern at this plant. Items discussed included the status of several permits that FMC has recently received and completed start up testing on during the past year. We also discussed NO_x and opacity compliance problems experienced on the plant coal fired boilers in 1990. Problems of CEM reliability were solved during the past year. FMC did record multiple ambient exceedances of the 24 hour TSP standard in 1990, and we discussed these high particulate concentrations. More detailed descriptions of these discussions appear in specific sections dealing with each issue throughout this report.

After our meeting we went out into the plant to observe current operations. We first headed west towards the phosphate plant and I found the RA-1 "baby" sesqui plant stack showing near zero opacity. The calciner kiln was running this date.

The sesqui ore stockpile stacker was delivering ore to the pile this date, but no excessive dust was being generated. The variable height ore stacker was minimizing the ore drop and the ore appeared damp, straight out of the mine. The entire area was damp, with the area having experience heavy rains for the past few weeks.

We then passed the sesqui dissolver section and found the dissolver vents (PA-5 through 9) operating with short attached steam plumes. This date there were no visible emissions from these stacks after the steam plumes dissipated. PA-4, the sesqui plant crusher scrubber was operating and showing no opacity after the steam plume dissipated. At the sesqui plant boiler house, none of the units were on line this date, although these units are used regularly (+50% of the year according to the 1990 Emission Inventory). Mr. Nash mentioned that these duel fuel boilers (natural gas/fuel oil) occasionally burn the waste motor oil that FMC generates on plant.

At the phosphate plant on the far west edge of the plant grounds, only PP-20, the rotary drier, was on line. This stack had been brought on line earlier in the morning, with the rest of the phosphate plant still down due to maintenance problems. Table A summarizes the operations of the major phosphate plant process this date.

Table A: 5/29/91 Phosphate Plant Operations

Source Number	Equipment Number	Type*	Process Rate ppm phosphorus (or gpm slurry)	Design Capacity ppm phosphorus (or gpm slurry)	Observed Opacity (%)	Allowable Opacity (%)
PP-11	RF-1204	PF	down	170	down	20
PP-12	RF-1203	PF	down	170	down	20
PP-20	RF-1901	RD	(55)	(70) (28.9 TPH @ 1.62 sg)	> 5%	20
PP-21	RF-1501	SD	down	(60) (24.0 TPH @ 1.62 sg)	down	20

* PF = phosphorus furnace
RD = rotary drier
SD = spray drier

n.a. = not available

As can be seen, the rotary drier was operating just under 80% of capacity this date. The secondary calciner (PP-25) was not on line this date. No throughput figure is available in the control room for this source, even when PP-25 is running. I observed the STPP product handling section of this plant and noted no visible emissions from the three baghouses (PP-24, 26 and 27).

From the phosphorus plant we headed back east towards the sesqui calciner area of the plant. Of the three steam tube calciners, two were operating, in compliance with the OP-179 permit condition limiting FMC to only two of these

units on line at any one time. All three of the gas fired calciners were on line this date, while both of the two fluid bed calciners was operating. Table B summarizes the sesqui plant operations this date.

Table B: 5/29/91 Sesqui Plant Calciner Operations

Source Number	Kiln Number	Calciner Type*	Process Rate pph steam (or cfh gas)	Design Capacity pph steam (or cfh gas)	Observed Opacity (%)	Allowable Opacity (%)
RA-14	R-2	ST	down	50,000	down	40
RA-15	R-1	ST	28,000	50,000	± 20	40
RA-16	R-7	ST	62,000	50,000	± 20	40
RA-22	R-9	GF	(20,000)	(60,000)	± 60	40
RA-23	R-13	GF	(32,000)	(60,000)	± 60	40
RA-24	R-15	GF	(47,000)	(60,000)	± 60	40
RA-25	R-5	FB	74,000	80,000	± 5	40
RA-26	R-6	FB	79,000	80,000	0	20

* ST = steam tube
GF = direct gas fired
FB = fluid bed

As can be seen, the three gas fired calciners were showing marginal opacity performance, a condition that is common at these older plant process units. No official opacity reading was taken because the sources are located so close together, that the steam plumes normally merge before the steam dissipates. The opacity listed in the table is the approximate density of the combined plumes from these stacks.

We broke for lunch, and went to the new bicarb plant the first thing in the afternoon. This date the plant was running with a tower draw slurry rate of 120 gpm feeding the centrifuges prior to the flash drier, as indicated on instrument number FIC-U841. This flow meter is the only measure of throughput in the entire bicarbonate plant process. There is no weigh belt on the product stream, and there is no measure of the input raw materials. A flow rate of 300 gpm on this tower draw slurry flow meter represents the approximate theoretical production of the bicarbonate plant, which is 9 TPH according to design. No visible emissions were noted from either BC-1, the bicarbonate flash drier, or from BC-2, the baghouse controlling the product sizing and handling section of the plant. There was heavy cloud cover this date, which would have made any emissions difficult to see.

We then drove to the mono plant, stopping on the way to observe the operations from the hill to the southwest of the facility. We parked at the mono plant coal fired boiler house and passed through the boiler control room on the way to the refinery. There I found both boilers on line, with Boiler #6 operating slightly

over design at 103% of capacity and Boiler #7 operating at 77% of design. Boiler operations are summarized in Table C, below.

Table C: 5/29/91 Boiler Operations

	Boiler #6 (NS-1A)	Boiler #7 (NS-1B)
Design Steam Rate (pph)	600,000	600,000
Actual Steam Rate (pph)	615,000	464,000
Allowable Opacity (%)	20	20
Actual Opacity (%)	1	11
Allowable SO_2 (lb/MM Btu)	1.20	1.20
Actual SO_2 (lb/MM Btu)	0.73	0.55
Allowable NOx (lb/MM Btu)	0.70	0.70
Actual NOx (lb/MM Btu)	0.57	0.57
Actual CO_2 (%)	14.8	11.1

As can be noted, both boilers were showing compliance on all monitored emission parameters when my readings were taken.

After we left the boiler house we proceeded to the mono plant refinery, where I found both Mono I and Mono II process lines operating as summarized in Table D.

Table D: 5/29/91 Mono Plant Operations

Source Number	Equipment Designation	Observed Operation	Design Capacity	Observed Opacity	Allowable Opacity
Mono 5	R-2201 calciner kiln	63% belt speed	100% belt speed	0%	20%
NS-3	R-3201 calciner kiln	80% belt speed	100% belt speed	±20%	20%
Mono 6	#1 line fluid bed dryer	58,000 pph steam	70,000 pph steam	0%	20%
NS-6	#2 line fluid bed dryer	130,000 pph steam	130,000 pph steam	0%	20%

As can be seen, #1 dryer was operating at 83% capacity while #2 was at its design maximum. The calciners were operating somewhat under full load. We had stopped to observe the mono plant operations on the way to the plant, stopping on a small hill at the edge of the tailings pond to the southwest of the stacks. As can be seen in the attached pictures, the sky was completely overcast at this time. No residual opacity showed up against this background, after obvious steam plumes from the two dryers and the #1 line calciner scrubber dissipated. No obvious steam plume was visible from NS-3, but rather a bluish white plume stood out against the dark background. With sky conditions the way they were, I estimated the plume around the allowable of ± 20% opacity. As described elsewhere in this

report, the opacity from this stack is currently a source of controversy which FMC is attempting to resolve.

After we left the mono plant, we traveled to the far eastern edge of the plant to the solution mining operation. There I found SM-1 lime kiln operating at 10.9 TPH of feed to the kiln (instrument #WIC-R5501), as compared with a permitted design maximum of 26 TPH. Opacity was 0% from this kiln, as it was also from RD-1, the lime slaker scrubber. Other baghouses in the solution mining area of the plant showed no visible emissions.

At the NaOH caustic concentration plant, I went into the control room and found no operator with knowledge of the process instrumentation in the area. FMC safety rules require that anyone entering the main process area of this caustic plant must wear rubber outerware and safety goggles. The control room was glass enclosed, with a view of most of the process plant visible from this spot. This plant has no atmospheric emission points, so I did not think it productive to take the time to obtain the safety equipment for entry. Mr. Nash and I did stop at the caustic plant supervisor's office and found that the design throughput for the plant was 350 gpm of 50% concentrated product.

The sodium cyanide plant is also located in this area, but it was not operating this date. It had been down for several days, a condition that has been normal during its first year of operation due to lack of customers for the product.

On our way to the solution mining end of the plant, we passed the fly ash silos at the edge of the powerhouse. No fly ash trucks were being loaded and the two baghouses (NS-10 and NS-11) showed no visible emissions.

On our return, we stopped by the new sesqui bagging operation, located at the east end of the bicarb plant warehouse. The facility receives railcar transfers of soda ash shuttled from the sesqui plant, and this date a car was delivering a load to the underground receiving hopper, through the elevator to the three storage silos constructed as part of the project at this site. There was no bagging in progress this date. The baghouse stack was showing no visible emissions. Based on this observation and on experience with this type of soda ash bagging operation, I expect emissions to be negligible from this source and I told Mr. Nash that I would recommend waiving testing on the plant baghouse.

During the inspection I observed both the mono and sesqui stockpiles and noted no excessive emission from either pile. As noted, it had been a very wet Spring prior to this inspection.

At the conclusion of this tour we returned to the office and had a closing meeting. I told FMC that the only problem that I had detected during the plant tour concerned the high opacity from the sesqui plant gas fired calciners. These calciners have always shown marginal compliance with opacity standards, with a Notice of Violation issued in 1988. Maintenance was conducted on these gas fired

calciners and they were tested late in that year with relatively low emissions compared with their allowable emission rates. I told Mr. Nash that I would be requesting FMC to report on current maintenance practices for these sources to enable the Division to establish a baseline from which to evaluate the company's efforts in this area.

I left the plant around 4:30 pm.

CONTINUOUS EMISSION MONITORING REVIEW:

System Description

The coal fired boilers in the mono plant, NS-1A and NS-1B, are subject to NSPS, and the continuous monitoring provisions of this regulation apply. FMC replaced an existing monitoring system in 1982 with a Measurex CEM system that was tied in with a new boiler control system that was designed to optimize boiler efficiency while minimizing emissions, especially NOx emissions. This Measurex system consists of a Model 2242 opacity monitor, a Model 2243 infrared sensor for measuring CO and CO_2 concentrations, and a Model 2244-01 ultraviolet sensor for measuring SO_2 and NO_x concentrations. A full description of this system is contained in FMC's latest revision to their quality assurance plan submitted under cover of the company's September 6, 1989 letter.

Quality Assurance

Past inspection reports have discussed the history surrounding the development of FMC's Quality Assurance plan for their CEM systems. Under cover of their September 6, 1989 letter FMC submitted an updated QA plan which incorporates proper Appendix F audit procedures. The plan also contains a description of the monitor system, of the company's CEM organization and responsibility, of monitor calibration and drift procedures, of preventative maintenance programs, of precision determination and "out-of-control" criteria, and of reporting procedures. The Division has not yet confirmed to FMC that this plan satisfies their QA requirements. The Division's QA coordinator should complete a review of this submittal and notify FMC of his determination.

Audits

FMC implemented their audit program for the first time in 1990. In 1990 FMC conducted CGA's on the boiler SO_2 monitors during the first, second, and third quarters of the year, with a RATA performed during the fourth quarter of the year. Audit results for these audits are presented in Table E, below.

Table E: 1990 Monitor Audit Results

Audit Quarter	Report Date	Audit Date	Audit Type	Tested Relative Accuracy (%) Boiler #6 SO_2	Boiler #6 NO_x	Boiler #7 SO_2	Boiler #7 NO_x	Allowable Relative Accuracy (%)
1	04/23/90	02/14,15	CGA	+ 2.9	+ 12.9	+ 7.0	- 4.5	15
2	07/19/90	06/07,26	CGA	+ 10.5	- 8.1	- 4.3	- 12.7	15
3	10/29/90	09/06,10	CGA	+ 0.0	- 4.0	- 3.2	- 2.9	15
4	01/29/91	11/12-16	RATA	+ 7.2	+ 4.9	+ 13.8	+ 3.6	20

This year, the Division also reviewed the November RATA report for compliance with emission limits (12/20/90 memo). SO_2 emissions averaged 0.96 lb/MM Btu on Boiler #6 and 0.91 lb/MM Btu on Boiler #7, in compliance with the 1.2 lb/MM Btu standard for these boilers. NO_x emissions averaged 0.59 lb/MM Btu on Boiler #6 and 0.61 lb/MM Btu on Boiler #7, in compliance with the 0.7 lb/MM Btu standard for these boilers.

Certification

Past inspection reports have described the history of FMC's certification attempts, beginning in 1983. Problems with the system's zero tube delayed certification until March, 1985 (3/26/85 memo). The certification report was submitted under May 3, 1985 cover. Eric Highberger's letter of October 29, 1985 found that the certification was substantially acceptable, with a discrepancy in the method of calculating diluent (CO_2) drift test results. By letter of November 14, 1985 FMC supplied the recalculated drift results, satisfying Mr. Highberger's concerns in this area.

Compliance Rates

FMC began submitting analyzable EER's with data for the third quarter of 1985. Prior to that the company had several years during which no data was available due to the company's inability to operate the Measurex system initially, and several years when the data from the original monitoring system was not in proper format to allow ready analysis. Data from 1985 through the last complete calendar year is summarized in Tables II-1 through II-6 of this report.

-Boiler Opacity-

In 1990, Boiler #6 (NS-1A) had an opacity compliance rate of 96%, up from 92% in 1989. Boiler #7 (NS-1B) had an opacity compliance rate of 91%, the same as recorded in 1989.

-Boiler SO_2-

For SO_2, Boiler #6 showed 98% compliance in 1990, the same as in 1989. Boiler #7 also showed 98% compliance in 1990, up slightly from 95% in 1989.

-Boiler NO_x-

For NO_x, Boiler #6 showed 93% compliance for 1990 up significantly from 84% last year. Boiler #7 NO_x compliance also rose in 1990 up to 95% as compared to 91% in 1989.

-Discussion of Results-

As can be seen from the above data, opacity compliance on Boiler #7 remained marginally above 90% this past year, not improving from 1989. FMC's 1st quarter 1991 EER (4/29/91) addressed this problem, stating that since attempted methods of improving performance had not helped (plate alignment - 9/11/89 memo), the company had gone outside for suggestions for alternatives. They had been washing the internal parts of the electrostatic precipitators with water during annual maintenance shut downs, but they found that the electric power generation industry was turning to a dry sand blasting technique for cleaning their precipitators. They tried this technique on Boiler #7 on March 10, 1991 and were pleased with the results. They found that from an operational standpoint, the dry technique allowed them to bring the unit back on line much faster, without waiting days for the internal components to evaporate dry. They also felt that the sand blasting was more efficient at removing buildup from the wires, plates, and remote corners of the precipitator housing. Although the average opacity compliance for the first quarter on Boiler #7 was only 84%, they reported that the compliance rate since the sand blasting was 98%. They also stated that Boiler #7 had been experiencing an exceptional number of steam tube leaks, causing non-compliance from start-ups, shut-downs, and more frequent cleaning requirements. They stated that a project to replace these steam tubes had been approved for August, 1991.

Boiler #6 opacity compliance improved to 96% in 1990, removing it as a source of concern for the time being and SO_2 compliance rates are all comfortably above 95% for the past year.

As described in detail in last year's Annual Inspection Report, NO_x compliance showed dramatic improvement in 1989, after FMC completed retrofit installation of "low NO_x" burners on both boilers in the Spring of the year. The burner replacement project was initiated in response to the Air Quality Division's Compliance Order #2077-89 (first issued in 1988 an revised in August, 1989) and EPA's Compliance Order issued in June, 1989. Compliance testing was conducted in November, 1989, showing compliance with NO_x emission limits.

As can be seen NO_x compliance rates are up once again in 1990, but data for the 4th quarter of the year showed compliance rates dropping below 90% for both boilers. In an attempt to assure that this slip in performance was reversed, the Division requested a report of FMC's "analysis of the situation and corrective actions required to maintain compliance" (2/22/91 letter). FMC's response (3/6/91) stated that they were "diligently working to improve the compliance performance" of these boilers during short term downturns in 1990. They attributed the poor NO_x compliance to receipt of poor coal, causing boiler slagging problems. These slagging problems were controlled by boiler adjustments that resulted in the poor emissions compliance. According to their letter, the problems were solved by first determining that the cause stemmed from coal quality, then taking steps to maintain a higher quality coal. NO_x compliance for the 1st quarter of 1991 is 98% on Boiler #6 and 97% on Boiler #7.

Monitor Availability

In looking at the monitor availability in the summary tables, one can see that all figures are now above 95%. For 1990, FMC monitor availability is shown in Table F.

Table F: 1990 Boiler CEM Availability

	Opacity	SO2	NOx
Boiler #6	96%	95%	95%
Boiler #7	97%	98%	98%

Monitor availability is a measure of how much data was obtained over the calendar year. FMC occasionally turns the monitors off when the boilers are down, which reduces their monitor availability. They also run the monitors during shorter boiler outages, however, which inflates this availability figure. I have separately calculated the "monitor reliability" figures for these monitors, which is a measure of how the monitor performed when the unit was on line and emissions were being emitted. These reliability values, which did not differ significantly from availability in 1990, are shown in Table G.

Table G: 1990 Boiler CEM Reliability

	Opacity	SO2	NOx
Boiler #6	96%	95%	95%
Boiler #7	97%	98%	98%

AMBIENT AIR MONITORING:

TSP Results

Tables III-1 through III-11 of this report summarize the ambient TSP monitoring that FMC has collected since initiating monitoring in 1974. Sites 002, 840, and

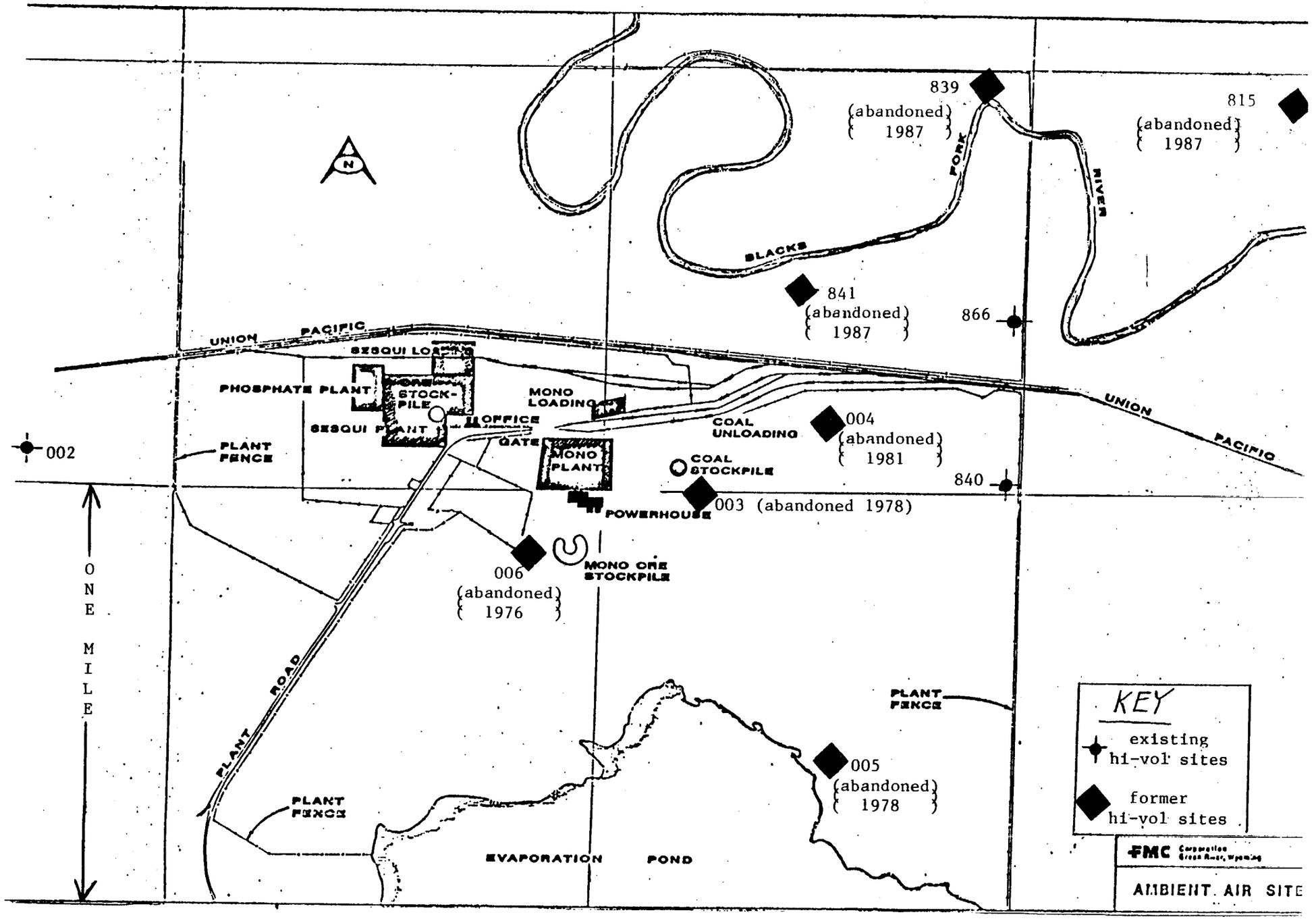
839
(abandoned
1987)
815
(abandoned
1987)
BLACKS FORK RIVER
841
(abandoned
1987)
866
UNION PACIFIC
SESQUI LOADING
PHOSPHATE PLANT
ORE STOCK-PILE
OFFICE
SESQUI PLANT
MONO LOADING
COAL UNLOADING
004
(abandoned
1981)
UNION PACIFIC
002
PLANT FENCE
GATE
MONO PLANT
COAL STOCKPILE
840
POWERHOUSE
003 (abandoned 1978)
006
(abandoned
1976)
MONO ORE STOCKPILE
ONE MILE
PLANT ROAD
PLANT FENCE
PLANT FENCE
005
(abandoned
1978)
EVAPORATION POND
KEY
existing hi-vol sites
former hi-vol sites
FMC
AMBIENT AIR SITE

Figure 1

866 are currently active. Data from former sites 003, 004, 005, 006, 815, 816, 839, and 841 is also presented in the tables. Figure 1 shows the location of these sites, except for 816 which was located one mile east of 815, off the map.

Site 002 is the "upwind site" located about 3/4 mile west of the plant. It has been in operation since 1974, and since the adoption of new PM-10 standards focuses attention on size specific particulate, FMC felt that they should be monitoring PM-10 at their upwind site. Because of the long TSP history of 002, they requested permission to abandon the 002 TSP monitor, and implement PM-10 monitoring only at the site. The request was reviewed (3/20/90 memo) and approved by letter of April 2, 1990. In their 2nd quarter ambient report (7/19/90), FMC informed the Division that the last TSP sample was April 2nd, and that they began PM-10 monitoring at the site on April 9, 1990. For the three month period that it operated in 1990, the 002 TSP monitor showed an annual geometric mean of 15 ug/m^3, with no exceedances of the 24 hour standard.

Site 840 is the "primary" downwind site located about 1 mile east of the plant. This site showed a geometric mean of 64 ug/m^3 in 1990, over the old Wyoming annual standard of 60 ug/m^3, but down slightly from the previous year's 69 ug/m^3 average. The Air Quality Division has revised particulate standards and no longer recognizes an annual TSP standard. The 24 hour TSP standard of 150 ug/m^3 was retained and site 840 exceeded this 24-hour standard 8 times in 1990.

Established in 1988, site 866 is located about 1 mile northeast of the plant in a "secondary" downwind location. For 1990 this site recorded an annual geometric mean of 33 ug/m^3, down from 42 ug/m^3 recorded the previous year. Site 866 had no exceedances of the 24 hour standard in 1990.

From Table III-2, one can see that the 1990 64 ug/m^3 annual geometric mean at site 840 represented a drop of 7% from the 1989 average and a drop of 15% from the year before that. Thus it can be seen that there has been improvement over the past two years. Contrary to 1990 annual TSP trends however (both 002 and 866 were down in 1990), the 8 exceedances of the 24-hour standard at 840 were up from the previous year.

Table H shows the summary of dust control activities conducted by FMC over the last few years. As can be seen, FMC's 1990 dust control effort was improved over the previous year, with increased use of dust suppressant and vacuum truck use, and with especially large increases in water truck hours and water use.

Table H: FMC Dust Control Activities

Year	Gallons of Dust Suppressant Sprayed	Acres Treated w/Dust Suppressant	Hours of Water Truck Use	Gallons of Water Sprayed	Hours of Street Sweeper Use	Hours of Vacuum Truck Use
1987	152,500 (Mg Cl)	100	783	3.384 MM	356	530
1988	120,800 (Ca Cl)	N/A	762	2.981 MM	38	684
1989	101,937 (Mg Cl)	41	758	3.437 MM	165	670
1990	139,900 (Mg Cl)	43	1031	6.176 MM	28	787

The Division already has a PM-10 monitor located at site 840, and as discussed below, this size fractionating monitor did not show any problems with PM-10 standards at this site. To address the TSP exceedances the Division will require FMC to analyze plant operating conditions and meteorological data for the 8 days in 1990, for which TSP concentrations at 840 exceeded the Division's 150 ug/m^3 standard, and report their findings, together with plans for measures they intend to take to assure that TSP standards are maintained in the future.

PM-10 Results

Wyoming adopted PM-10 standards in February, 1989, including a 50 ug/m^3 annual standard to be exceeded no more than once per year as determined by statistical analysis according to specified rules. FMC had been collecting PM-10 data at site 840 since 1984 and in 1987 the Division asked FMC to submit that data. Also, beginning in January, 1988, FMC started collecting PM-10 data at site 866. Beginning in April, 1990, added a PM-10 monitor at site 002.

Tables III-1A, III-2A and III-3A summarize available PM-10 data from these sites. As can be seen, the initial 9 months at site 002 showed an annual arithmetic mean of 15 ug/m^3, and no exceedances of the 24 hour standard.

Site 840 had an arithmetic mean of 27 ug/m^3 in 1990, down 7% from 1988, with no exceedances of the 24-hour standard.

Site 866 had an arithmetic mean of 19 ug/m^3, down 17% from the previous year, also with no exceedances of the 24-hour standard.

For the years that FMC has collected PM-10 data, the Division has determined a PM-10 to TSP ratio for those dates when concurrent samples were available at a given sampling station. Table J shows the PM-10 ratio for FMC's data, averaged for each available year.

Table J: FMC PM-10 Ratios
(% PM-10)

Year	Site 840	Site 866
1984	42.1	--
1985	39.4	--
1986	41.9	--
1987	45.2	--
1988	40.1	49.1
1989	37.2	51.5
1990	40.1	54.1

Quality Assurance Program

Last year's annual inspection describes procedures followed to incorporate FMC's ambient monitoring program into the State of Wyoming's network for quality assurance purposes. In September, 1989, an on-site review of the FMC network was made by the Division (9/28/89 memo), with QA deficiencies noted. FMC corrected these deficiencies and the Division the sent a description of the revised network to the EPA for review. EPA responded that each company would have to prepare and submit a QA plan and Standard Operating Procedures manual.

The company was notified of this requirement and given an April 15th deadline for submittal of the package. FMC submitted their QA/SOP manual on March 13, 1990. The document contained a description of the network, of the company's ambient monitoring organization and responsibility, and of the standard operating procedures, including sampling procedures, sampler calibration procedures, resistance plate calibration procedures, and data analysis and reporting procedures. The quality assurance section contains a description of accuracy and precision calculations, preventative maintenance procedures and schedules, performance and system audits, data validation, documentation control, and management QA reports.

Since the last inspection, FMC's QA/SOP manual was reviewed by the EPA and additional deficiencies were noted. Another on-site inspection was conducted in September, 1990 (9/12/90 memo), this time with EPA participating. On October 29, 1990, FMC submitted a revised QA/SOP manual, with some final minor changes documented under FMC's February 12, 1991 letter. By letter of April 16, 1991, the Division notified EPA that their Standard Operating Procedures and Quality Assurance/Quality Control Plan was approved by the EPA.

SODIUM CYANIDE PLANT FLARING:

Permit CT-845 requires FMC to submit an annual flare use report for the sodium cyanide plant. Initial operation of this plant occurred in November, 1990, with the first annual flaring data submitted for the 1990 calendar year.

FMC's first flare report was submitted under January 31, 1991 cover and was reviewed for acceptability (2/15/91 memo). The review showed that 1990 emissions were greater than allowed, as shown in Table K, below.

Table K: NaCN Plant Flaring Emissions (TPY)

	NO_x	NH_3	HCN
CT-845 Allowables	12.06	0.94	0.00
1990 Actual Reported	17.95	1.84	0.09

In 1990, the plant had 68 flare use incidents, totalling to 185.9 total hours of flaring. As estimated in the permit, the plant was expected to have two start-up periods per month (24 incidents/year), each lasting approximately two hours during which flaring would be required, for a total of 48 hours of flare use per year. As can be seen, the initial operation of this plant has resulted in abnormally high flare use.

The review of the initial plant flare report also pointed out that the permit had not considered any hydrogen cyanide gas from the flare operation, while FMC showed one operating condition, ("Position 6") where HCN is emitted from the flare. FMC was asked to address this inconsistency (3/21/91 letter) and they responded that the failure to include HCN emissions from the flare was an oversite (4/3/91 response). They did point out that they had modeled a maximum 3.2 ug/m^3 ambient HCN concentration in their permit compliance demonstration, which included emissions from the incinerator, and three ground level vents. A review of the application shows that these sources were predicted to emit 0.123 pph total HCN emissions. The three ambient tank vents were eventually dropped from the project, in favor of ducting these sources to the flare. The maximum emission rate that FMC now predicts from the flare is 3.9 pph of HCN, more than 30 times the previously considered emissions rate, however results from a screening model that FMC cited in their response, show that the maximum ground level concentration resulting from this higher HCN emission rate is only 1.6 ug/m^3. It is suspected that the lower ground level concentration shown in the latest model, which is shown despite the higher emission rate, results from the fact that the plume rise from the hotter elevated and hot flare stack is much greater than for the cool tank vents used in the initial ambient model. The Division's modeling expert reviewed this screening model to determine if it acceptably simulates the ambient impact from this flare (6/4/91 memo) and his conclusions are that the model provides adequate demonstration that maximum ambient HCN concentrations are below the most stringent Acceptable Ambient Level. The Division should now determine whether any revisions to the plant permit are necessary, due to this modified emission scenario.

FMC has also requested that the Division hold parts of their flare reports as proprietary information. The Division must still determine whether the

confidentiality can be maintained under Wyoming regulations. In my review of the flare reports, I have found that it is not possible to duplicate FMC's calculated emissions in certain cases. FMC should be requested to clarify how these calculations are made. Once it is clear what information is needed to calculate emissions, then a decision can be made on whether the material in the confidential section of the report is necessary for public knowledge of this plant's emissions.

ANNUAL EMISSIONS:

Tables IV, V, VI, VII, and VIII summarize FMC's point source 1990 annual emissions, for particulate, sulfur dioxide, nitrogen oxides, hydrogen cyanide and ammonia, respectively. With few exceptions, the calculations were made based on the latest tested or estimated hourly emission rate for a particular source, using the annual hours of operation for that source as presented in FMC's March 21, 1991 Annual Emission Inventory. One exception is that nitrogen oxide emissions for all untested gas fired sources were calculated using actual fuel usage data for those years from the Emissions Inventories, along with AP-42 emission factors for natural gas combustion. Hourly emission rates were then back calculated using annual hours of operation. The other exception is that flaring emissions from the sodium cyanide flare (source NaCN-2) were taken from the 1990 annual flare use report of April 2, 1991. From the tables then, FMC's Annual Emissions are:

	1989	1990
Particulate :	1136 tons	1146 tons
Sulfur Dioxide :	4619 tons	4626 tons
Nitrogen Oxides :	3503 tons	3219 tons
Hydrogen Cyanide :	n/a	0.09 tons (181 pounds)
Ammonia :	n/a	1.85 tons (3688 pounds)

As can be seen, particulate and sulfur dioxide emissions were approximately the same for the past two years. NO_x emissions dropped 8% from the previous year, mostly because the Division obtained tested data on the Mono plant calciners which showed much lower NO_x emission rates than had been estimated in the past. This calciner NO_x reduction was partially offset by increased use of the sesqui plant boilers in 1990. Both hydrogen cyanide and ammonia come from the new sodium cyanide plant, which first began operations in November, 1990.

ANNUAL PRODUCTION:

From the Wyoming State Inspector of Mines report, FMC produced 4.661 MM tons of trona ore in 1990. In the trona industry it takes about 1.8 tons of ore to make a ton of soda ash, therefore for 1990, this plant ran at about 89% of its current 2.9 MM TPY rated soda ash capacity. This is down about 1% from the year before as taken from the report.

NSPS SUBPART OOO REQUIREMENTS:

The Division has occasionally allowed FMC to postpone or eliminate stack testing on some new equipment which are suspected to be relatively small emission sources. When these sources are also subject to NSPS Subpart OOO requirements, the company has been instructed that it would be necessary for them to conduct the three hour opacity observation cited in the regulation for dry baghouses, even if formal stack testing was eventually waived.

The BC-2 baghouse in the bicarb plant is subject to Subpart OOO and FMC has submitted a 5/24/91 report. The report contained a picture of the stack taken from the opacity vantage point. It was not made clear to FMC, however, that the picture should be taken some time during the opacity reading in order to aid the Division in evaluating and verifying the resultant reading. The picture that accompanied FMC's Subpart OOO opacity reading was taken a day after their reading.

Also, NSPS Subpart OOO opacity readings were taken May 24, 1991, but the report only shows one 6-minute reading in each of three hours. Subpart OOO requires a 3 hour average opacity reading. Telephone conversations with Wes Nash after the inspection have confirmed that because FMC did not observe the BC-2 stack for a full 3 hours, their May 24th opacity report is deficient and will have to be revised.

In order to utilize these Subpart OOO readings to any benefit, there are certain elements of the report that will be necessary. First, the company must include a description of how the process was operating during the reading, including process rates for all affected equipment. Secondly, to enable the Division to visualize the conditions under which the readings were taken, the company must include a photograph of the stack from the opacity vantage point taken during the opacity reading. Original photographs must be sent to both of the Division's offices (no xerox copies). The opacity form itself must list all of the 15 second opacity readings that were taken, the time and date they were taken, a sketch of the location from which they were taken, a description of the emission plume and the background, and the name of the person who took the readings. The previously mentioned guideline that is being developed by the Division will address just how many 15 second readings are necessary on stacks which exhibit no visible emissions. FMC should be directed to incorporate these elements into all future Subpart OOO opacity reports.

WASTE MOTOR OIL RCRA COMPLIANCE: As noted in the "Inspection Observations" section of this report, Mr. Nash told me that the Sesqui Plant dual fuel boilers occasionally burn waste motor oil, an activity that is sometimes restricted under the Resource Conservation and Recovery Act. In talking with Ken Schreuder of the Department's Solid Waste Management Division, I am told that if FMC burns only waste motor oil generated by company vehicles on the site, then they do not need to meet the notification requirements of the law, but only must keep records of

the halogen and heavy metal content of any oil they burn to assure that they are meeting the maximum concentrations specified in the act.

SESQUI CALCINER COMPLIANCE:

Past Annual Inspection Reports have described a history of marginal opacity levels from the sesqui plant calciners leading up to a 1988 NOV issued for high opacity readings on RA-24. FMC conducted maintenance work on the scrubber and retested this unit, showing a significant particulate emission rate reduction. The opacity portion of the NOV was satisfied in 1989 (9/8/89 memo).

As noted in the "Inspection Observations" section of this report, during this inspection the three gas fired calciners (RA-22, 23 & 24) were once again showing marginal opacity performance, but no official opacity reading was possible. These sources are located so close together that on cool days, their exhaust plumes merge before the steam dissipates, a condition that existed this date. The combined opacity from these plumes was 60%, or more this date, however. To address this marginal performance, FMC should be requested to provide a detailed report on what maintenance program is carried on for these three sources, including a list of maintenance activities and the schedule that is followed to execute these tasks.

MONO CALCINER COMPLIANCE:

During last year's Annual Inspection, I read the opacity of the Mono Plant #1 and #2 process line calciners (sources Mono-5; 36% and NS-3; 37%) over the 20% allowable opacity limit for the two stacks. The inspection transmittal letter requested FMC to test both of these stacks for particulate, and since the Division had no NO_x information on these gas fired calciners, to include testing for this latter pollutant as well. FMC responded that they would conduct the requested testing, but that they felt the opacity readings were invalid. They felt that the observations were invalid because of the position of the observer relative to the sun, and in the case of NS-3, that the observed opacity was a condensed water vapor plume. The Division defended the readings as valid, but suggested that they would be repeated just to eliminate the questions of position and water vapor.

Testing for NO_x and TSP was conducted in October, 1990, with Mono-5 showing compliance with its allowable (53 pph tested/41 pph allowable). NS-3, however showed 28% over its particulate limit (52 pph tested/41 pph allowable), with another opacity reading over the standard (40%). NOV #2198-90 was issued on December 19, 1990 based on the high NS-3 test results and opacity readings. FMC responded that they had made corrections to the precipitator such that particulate readings were back in compliance, and they once again challenged the validity of the latest opacity reading based on their contention that the detached plume forming above the stack exit is water vapor. It was, and is the

Division's belief based on color and atmospheric persistence, that the plume is condensable organic particulate forming in the atmosphere.

FMC retested NS-3 late in January, 1991, but, although some improvement was shown (51 pph tested), it was still 24% over standard. The January test results had to be requested by the Division, and by the time they were received, FMC had made some adjustments to the precipitator and had internal testing demonstrating that they were back in compliance. A final compliance attempt was made in March, 1991; this time with results at 71% of allowable (29 pph tested).

The Division confirmed that the results met the particulate standard, but noted that the ambient opacity question was still unresolved. To help settle the matter, the Division directed FMC to install an opacity meter on the NS-3 exhaust stack and provide a schedule for accomplishing this task. FMC responded that they would pursue a schedule leading to installation and certification of the CEM system by the end of the 1991 calendar year. They are still not convinced that the plume which is formed outside the stack, is particulate matter, so they have taken steps to hire a consultant to prepare a thermodynamic model to predict whether water vapor should be forming in the atmosphere at various ambient temperatures. FMC is trying very hard to get the Air Quality Division to accept the ambient plume; probably because they do not see any practical way of doing anything about it if it does turn out to be formed organic particulate. The Division should request a date by which we can expect to see the consultant's water vapor modeling, and should request a progress report on FMC's efforts to obtain and operate a CEM opacity system on the NS-3 stack.

Details of negotiations on this issue can be found in the following pieces of file correspondence:

Date	Source	Content
05/07/90	AQD	FY '90 Inspection Report noting initial high opacity readings
06/11/90	AQD	letter requesting NO_x & TSP testing on the Mono plant calciners
07/02/90	FMC	acceptance of testing, but disagreement with opacity validity
08/08/90	AQD	opacity readings defense, but agreement for additional readings
10/02/90	FMC	test protocol and schedule for Mono-5 & NS-3 TSP & NO_x testing
10/18/90	AQD	test observation memo, w/ new NS-3 opacity reading of 40%
12/03/90	AQD	memo confirming telephoned results, w/ NS-3 failing TSP limits
12/05/90	FMC	submittal of Mono-5 & NS-3 test results for TSP & NO_x
12/10/90	AQD	review of Mono-5 test results, showing compliance w/ TSP
12/10/90	AQD	review of NS-3 test results, showing non-compliance w/ TSP
12/19/90	AQD	NOV #2198-90 issued for high opacity and TSP emissions on NS-3
12/19/90	AQD	NOV transmittal letter confirming retesting requirement
01/04/91	FMC	acknowledgement of NOV & validity challenge for opacity reading
01/11/91	FMC	test protocol and schedule for NS-3 retesting
02/07/91	AQD	test observation memo, w/ discussion of FMC corrective measures; notification NS-3 once again failed the TSP test
02/21/91	AQD	request immediate submittal of January test results

02/26/91	FMC	notification of schedule for NS-3 retest attempt
02/28/91	FMC	submittal of 1/31 report, w/ subsequent internal test results
03/06/91	AQD	test observation memo, w/ discussion of addnl corrective action
03/14/91	AQD	review of January NS-3 testing, once again showing non-compliance, along w/ subsequent internal compliance testing
03/05/91	FMC	submittal of March test report, showing mass rate compliance
03/28/91	AQD	review of March NS-3 testing, w/ TSP compliance demonstrated
04/03/91	AQD	confirmation of compliance; request for opacity monitor instltn
05/06/91	FMC	acceptance of CEM requirement; notification of plume study
05/28/91	FMC	schedule for certified opacity monitor operation by Dec. 1991

DEAD VEGETATION COMPLAINT:

As described by my memo of April 12, 1991, the Division received notification from archaeologists working just east of the FMC facility, that there was an area of several acres where most all of the vegetation was either dead or suffering from obvious reduced vitality. My investigation corroborated the observations and the matter was directed to the Land Quality Division to confirm whether there was really biological damage at the site. Alan Guile's April 22, 1991 report confirms that there appears to be damage, but suggests that a better observation can be made in the height of the growing season in late June. As of this writing, the Air Quality Division has received no further report from the Land Quality Division. FMC should be requested to comment on their observations in the area, and report on whether they have attributed this phenomena to any particular cause.

AIR QUALITY CONCERNS:

1. As described in this report, FMC's NSPS Subpart OOO opacity readings taken on BC-2 baghouse in the bicarb plant, are unacceptable for demonstrating compliance because the stack was not observed for a full three hour period. FMC must now repeat the readings to satisfy Subpart OOO requirements.

2. As described in this report, testing on the sodium cyanide plant incinerator stack was conducted in April, 1991, with results showing NO_x emissions over 50% higher than permitted. The Division should require that FMC provide an explanation for the NO_x test failure, and provide a plan of corrective action and schedule for retesting this source.

3. As described in this report, Division inspections have confirmed that the ammonia tanks at the sodium cyanide plant are reflective silver coated, effectively meeting the condition of CT-845 requiring light colors to minimize solar heating of the tanks. The permit also requires water cooling and high pressure (300 psi) emergency relief valves on the tanks, to minimize ammonia emissions, but it has not been confirmed that this permit condition has been completely fulfilled. Please confirm that these emission control measures were installed on the ammonia tanks.

4. As described in this report, potential emissions from RA-28 baghouse, constructed under MD-112 for the sesqui bagging project, are unlikely to be significant. The Division will require an NSPS Subpart 000 opacity reading on the source, and if that reading confirms expected low emissions, the Division should waive testing requirements for this baghouse.

5. As described in this report, FMC is considering whether to retain the old sesqui bagging facility, rather than dismantling it as required in MD-112. FMC should be informed that any deviations from the commitments and descriptions considered in the MD-112 permit analysis will require review by the Division, and possibly, re-permitting of additional emissions.

6. As described in this report, FMC has completed construction and testing of the mono dual ore crushing facility. Before the operating permit can be issued for this project, however, FMC must begin semi-annual reporting of pressure drop and liquor flow rates excursions which deviate from test period averages by $\pm$ 30%, per requirements of Subpart 000.

7. The Division has confirmed that there are no emissions from the caustic plant operation and a waiver of permitting is warranted. The Division has never responded in writing to FMC's request for a permit determination on this project and should now confirm that a waiver is granted.

8. As described in this report, FMC submitted an updated QA plan on September 6, 1989. The Division's QA coordinator should now complete a review of this submittal and notify FMC whether this plan satisfies the company's QA requirements.

9. As described in this report, opacity compliance on Boiler #7 remained only marginally above 90% during 1990. FMC has addressed this problem in their 1st quarter 1990 Excess Emission Report, stating that a dry sand blasting technique for cleaning their precipitators was tried on Boiler #7 in March, 1991 and results showed improved compliance rate since the sand blasting was completed. They also stated that they would replace the steam tubes on Boiler #7 in August, 1991, to alleviate leaks which had contributed to opacity exceedances. The Division should verify that the steam tube project is completed during the next inspection, and should monitor 1991 EER's to assure that opacity compliance remains high on plant boilers.

10. As described in the report, hi-vol monitoring site #840 recorded 8 separate exceedances of the 24 hour 150 ug/m^3 TSP standard during 1990. To address these TSP exceedances, the Division will require FMC to analyze plant operating conditions and meteorological data on these 8 dates and report their findings, together with plans for measures they intend to take to assure that TSP standards are maintained in the future.

11. As described in this report, CT-845 did not considered any hydrogen cyanide gas from the flare operation, while the initial annual flare report did show HCN emissions from the flare. FMC has responded that the failure to include HCN emissions from the flare was an oversite in their permit application, but they point out that the modeled maximum ambient HCN concentration in their permit compliance package provide a conservative demonstration that ambient concentrations will be well within the most stringent Applicable Ambient Levels. The Division's modeling expert reviewed FMC's model and his conclusions are that an adequate demonstration of maximum ambient HCN concentrations has been made. The Division should now determine whether any revisions to the plant permit are necessary, due to this modified emission scenario.

12. As described in this report, FMC has requested that the Division hold parts of their sodium cyanide flare reports as proprietary information. The Division must still determine whether the confidentiality can be maintained under Wyoming regulations. The review of the flare reports has revealed that it is not possible to duplicate FMC's calculated emissions in certain cases. FMC should be requested to clarify how these calculations are made. Once it is clear what information is needed to calculate emissions, then a decision can be made on whether the material in the confidential section of the report is necessary for public knowledge of this plant's emissions.

13. As described in this report, in order to utilize NSPS Subpart OOO opacity readings to any benefit, there are certain elements of a report that are necessary. First, the company must include a description of how the process was operating during the reading, including process rates for all affected equipment. Secondly, to enable the Division to visualize the conditions under which the readings were taken, the company must include a photograph of the stack from the opacity vantage point taken during the opacity reading. Original photographs must be sent to both of the Division's offices (no xerox copies). The opacity form itself must list all of the 15 second opacity readings that were taken, the time and date they were taken, a sketch of the location from which they were taken, a description of the emission plume and the background, and the name of the person who took the readings. The Division is developing a guideline that will address just how many 15 second readings are necessary on stacks which exhibit no visible emissions. FMC should be directed to incorporate these elements into all future Subpart OOO opacity reports.

14. As described in this report, FMC test results show that the NS-3 particulate mass emission rate is back within its allowable limit, but the ambient opacity question on this stack is still unresolved. FMC has been directed to install an opacity monitor on the NS-3 exhaust stack, and has responded with a proposed schedule leading to installation, certification and operation of the CEM system by January, 1992. The Division should

request a progress report on the installation of this new NS-3 opacity CEM system.

15. As described in this report, FMC is not convinced that the NS-3 plume which forms outside the stack, is particulate matter. They have hired a consultant to prepare a thermodynamic model to predict whether water vapor should be forming in the atmosphere at various ambient temperatures. The Division should request a date by which the consultant's water vapor modeling will be reported to the Division.

16. As described in this report, there is an area of several acres located just east of the FMC complex, where most all of the vegetation is suffering from obvious reduced vitality. FMC should be requested to comment on their observations in the area, and report on whether they have attributed this phenomena to any particular cause.

17. As described in this report, during this inspection I found high opacity emissions coming from the combined plumes of the sesqui plant gas fired calciners. These calciners have always shown marginal compliance with opacity standards, with a Notice of Violation issued in 1988. Maintenance was conducted on these gas fired calciners and they were tested late in that year with relatively low emissions compared with their allowable emission rates. To assure that current maintenance practices on these sources are adequate, and to establish a baseline from which to evaluate the company's future efforts in this area, FMC should be requested to provide a detailed report on what maintenance program is carried on for these three sources (RA-22, 23 & 24), including a list of maintenance activities and the schedule that is followed to execute these tasks.

COMPLIANCE STATUS

As noted in the "Air Quality Concerns" section of this report, current testing shows FMC's sodium cyanide plant incinerator out of compliance with applicable NO_x emission standards. Also, boiler CEM reports show marginal opacity and NO_x emission compliance rates. Site #840 in the ambient monitoring network recorded 8 exceedances of Wyoming's 24 hour TSP standard in 1990. Also as noted in the report, the opacity compliance of NS-3 calciner stack is still unresolved and the company is under an order to install an opacity monitor on the stack. During the inspection, it was found that the sesqui plant gas fired calciners were showing marginal opacity performance. These are the substantive compliance problems detected by this year's Annual Inspection and file review, however, there are a number of administrative issues also listed in the "Air Quality Concerns" section of the report. Therefore FMC <u>is not</u> currently in compliance with all permit conditions and applicable sections of the Wyoming Air Quality Standards & Regulations.

TABLE I

FMC Green River Trona Plant Point Source Emissions

Emission Point	Source (Date) (Installed)	Size (acfm) design (tested)	Control Equipment (Date) (Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable W.A.Q.S.&R. Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimated Emission (lb/hr)
PA-4	Sesqui Plant Hammermill Crusher Vent (1964)	16,500 (20,248)	FMC TI Dual Throat Model 20K Venturi Scrubber (1978)	360 TPH (?)	Particulate	1.25 (opacity) (40%)	25 b(3)	1.09 (front) (half) (only)	8/78	9/4/87	n/a
PA-5 (new)	Sesqui Plant Ore Screening Vent (1964)	40,000 (32,810)	FMC Dual Throat Model 40K Venturi Scrubber (1981)	360 TPH (?)	Particulate	1.25 (opacity) (40%)	25 b(3)	1.22[2]	1982	n/a	n/a
PA-6	Sesqui Plant Dissolver Vent (1966)	1,400 (1,347)	None	90 TPH (?)	Particulate	1.0 (opacity) (40%)	25 b(3)	0.02 (front) (half) (only)	3/78	9/4/87	n/a
PA-7	Sesqui Plant Dissolver Vent (1963)	1,400	None	90 TPH	Particulate	1.0 (opacity) (40%)	25 b(3)	None	n/a	n/a	0.02[3]

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PA-8	Sesqui Plant Dissolver Vent (1958)	1,400	None	90 TPH	Particulate	1.0 (opacity) (40%)	25 b(3)	None	n/a	n/a	0.02[3]
PA-9	Sesqui Plant Dissolver Vent (1953)	1,400	None	90 TPH (?)	Particulate	1.0 (opacity) (40%)	25 b(3)	None	n/a	n/a	0.02[3]
RA-1	"Baby" Sesqui Plant Calciner and Bagging Operation Combined Vents (modified) (1983)	8,000	Ducon Multivane Type L Model II Wet Scrubber (1983)	11.2 TPH	Particulate	10.0 (opacity) (20%)	25 b(3)	None	n/a	n/a	1.37[4]
					Nitrogen Oxides	n/a	10	None	n/a	n/a	0.47[7]
RA-14	R-2 Sesqui Plant Steam Tube Calciner (1953)	16,500 (22,550)	Ducon Multivane Type L Model II Wet Scrubber (1972)	35.5 TPH (?)	Particulate	4.0 (opacity) (40%)	25 b(3)	1.76	2/84	9/4/87	n/a

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RA-15	R-1 Sesqui Plant Steam Tube Calciner (1953)	20,500 (21.448)	Ducon Multivane Type L Model II Wet Scrubber (1972)	35.5 TPH (?)	Particulate	4.0 (opacity) (40%)	25.b(3)	0.67	2/81	9/4/87	n/a
RA-16	R-7 Sesqui Plant Steam Tube Calciner (1953)	18,500 (18,893)	Ducon Multivane Type L Model II Wet Scrubber (1972)	35.5 TPH (?)	Particulate	4.0 (opacity) (40%)	25 b(3)	1.26	3/77	1977 W.R.	n/a
RA-22 A & B	R-9 Sesqui Plant Gas Fired Calciner (1958)	57,000 Total (46,094)	Twin Peabody Wet Scrubbers (1981)	35 TPH (26.6)	Particulate	32.0 (opacity) (40%)	CT-310 Permit Condition	20.32	5/88	11/1/88	n/a
					Nitrogen Oxides	n/a	10	None	n/a	n/a	2.12[7]
RA-23 A & B	R-13 Sesqui Plant Gas Fired Calciner (1964)	77,000 Total (67,215)	Twin FMC Dual Throat Model 50K Venturi Scrubbers (1979)	50 TPH (30.5)	Particulate	35.0 (opacity) (40%)	25 b(3)	29.89	6/88	11/1/88	n/a
					Nitrogen Oxides	n/a	10	None	n/a		8.65[7]

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RA-24 A & B	R-15 Sesqui Plant Gas Fired Calciner (1966)	57,500 Total (59,270)	Twin Ducon Multivane Type L Model II Wet (1966)	70 TPH (52.8)	Particulate	45.0 (opacity) (40%)	25 b(3)	24.21	5/88	6/6/88	n/a
					Nitrogen Oxides	n/a	10	none	n/a	n/a	6.72[7]
RA-25	R-5 Sesqui Plant Fluid Bed Calciner (1969)	83,000 (71,240)	Ducon Multivane Type I Model II Wet Scrubbers (1970)	72 TPH (?)	Particulate	26.5 (opacity) (40%)	25 b(3)	10.33	4/77	1977 W.R.	n/a
RA-26	R-6 Sesqui Plant Fluid Bed Calciner (1984)	107,000 (83,965)	FMC Model 120K Venturi Scrubber (1984)	85.5 TPH (89.6) (TPH)	Particulate	12.0 (opacity) (20%)	CT-534 Permit Condition	3.84	6/85	10/2/85	n/a
RA-27	Sesqui Plant Bagging Operation (1974)	2,628	Micropulsaire Model 1F1-24 Baghouse (1974)	77 TPH	Particulate	3.0 (opacity) (40%)	25 b(3)	None	n/a	n/a	0.45[4]

TABLE I

FMC Green River Trona Plant Point Source Emissions

Emission Point	Source (Date) (Installed)	Size (acfm) design (tested)	Control Equipment (Date) (Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable W.A.Q.S.&R. Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimate Emissio (lb/hr)
RA-28	Sesqui Plant Bagging Operation (1990	7,500	Mikropulsaire Model 168S-8-TRH Baghouse (1990)	60 TPH	Particulate	1.29 (0.05 grams) (per dacm)	MD-112 Permit Condition (NSPS) (Subpart 000)	None	n/a	n/a	1.29[10]
RA-33	Sesqui Plant Storage Silo Vents and Belt Galleries (1972)	40,000 (40,905)	Ducon Multivane Type L Model II Wet Scrubber (1972)	650 TPH (300) (TPH)	Particulate	3.0 (opacity) (40%)	25 b(3)	2.98	7/77	1977 W.R.	n/a

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FMC Green River Trona Plant Point Source Emissions

Emission Point	Source (Date) (Installed)	Size (acfm) design (tested)	Control Equipment (Date) (Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable W.A.Q.S.&R. Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimated Emission (lb/hr)
PP-11	RF-1204 STPP Plant #2 Phosphorus Furnace (1986)	85,000 (91,077)	York Type P Acid Mist Wet Scrubber (1986)	5.15 TPH Phosphorus (4.71) (TPH)	Particulate	11.0 (opacity) (20%)	CT-684 Permit Conditon	10.47	10/88	3/3/89	n/a
					Nitrogen Oxides	not regulated	10	0.18	10/88	3/20/89	n/a
PP-12	RF-1203 STPP Plant #1 Phosphorus Furnace (Modified) (1984)	85,000 (97,066)	York Type P Acid Mist Wet Scrubber (1965)	26 TPH P205 (20.7) (TPH)	Particulate	11.0 (opacity) (20%)	CT-684 Permit Conditon	3.65	9/85	7/30/86	n/a
					Nitrogen Oxides	not regulated	10	None	n/a	n/a	0.19[3]
PP-20	RF-1901 STPP Plant Rotary Drier (1986)	68,000 (42,620)	Fisher Klosterman Model WL-900 Spray Scrubber (1986)	28.9 TPH Wet Slurry (23.1) (TPH)	Particulate	5.0 (opacity) (20%)	CT-684 Permit Conditon	2.37	9/88	3/3/89	n/a
					Nitrogen Oxides	not regulated	10	6.28	11/88	3/20/89	n/a
PP-21	RF-1501 STPP Plant Spray Drier (Modified) (1984)	50,000 (60,807)	FMC Dual Throat Model 60K Venturi Scrubber (1984)	24 TPH (19.7) (TPH)	Particulate	15.0 (opacity) (20%)	MD-41 Permit Condition	9.24	9/85	7/30/86	n/a
					Nitrogen Oxides	n/a	10	None	n/a	n/a	6.56[3]

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FMC Green River Trona Plant Point Source Emissions

Emission Point	Source (Date) (Installed)	Size (acfm) design (tested)	Control Equipment (Date) (Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable W.A.Q.S.&R. Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimate Emissio (lb/hr
PP-22	STPP Plant Railcar Unloading Operation (Modified) (1984)	?	Flex-Kleen Model 5632 HL Baghouse (1985)	7.5 TPH	Particulate	15.8 (opacity) (20%)	14 g. Table II	None	n/a	n/a	Complian
PP-24	STPP Plant Housekeeping for High Density Screening & Loading Area (Modified) (1984)	7,238	Micropulsaire Model 1F2-24 Baghouse (Modified) (1984)	15.5 TPH	Particulate	1.6 (opacity) (20%)	MD-41 Permit	None	n/a	n/a	2.0[5]
PP-25	RF-1504 STPP Plant Secondary Calciner (Modified) (1984)	17,000 (16,670)	Ducon Multivane Type L Model II Wet Scrubber (1964)	19 TPH (8.7) (TPH)	Particulate	15.0 (opacity) (20%)	25 b(3)	9.97	9/85	6/30/86	n/a
					Nitrogen Oxides	n/a	10	None	n/a	n/a	0.37[7]
PP-26	STPP Plant Housekeeping for Medium Density Screening, Milling & Loading Area (Modified) (1984)	12,064	Fuller Draco Plenum Pulse 48-4 Zone Baghouse (Modified) (1984)	15.0 TPH	Particulate	2.0 (opacity) (20%)	MD-41 Permit	None	n/a	n/a	2.0[5]

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FMC Green River Trona Plant Point Source Emissions

Emission Point	Source (Date) (Installed)	Size (acfm) design (tested)	Control Equipment (Date) (Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable W.A.Q.S.&R. Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimate Emission (lb/hr)
PP-27	STPP Plant Housekeeping for Light Density Screening, Milling & Loading Area (Modified) (1984)	12,064	Fuller Draco Plenum Pulse 48-4 Zone Baghouse (Modified) (1984)	15.5 TPH	Particulate	2.0 (opacity) (20%)	MD-41 Permit Condition	None	n/a	n/a	2.0[5]
PP-28	STPP Plant Product Sizing & Material Handling Housekeeping (1986)	24,000	Mikropul Model 624K-8 Baghouse (1986)	11.4 TPH	Particulate	4.0 (opacity) (20%)	CT-684 Permit	None	n/a	n/a	4.0[8]
Mono-2	Mono Plant Primary Crusher (1972)	15,000 (15,980)	FMC TI Dual Throat Model 20K Venturi Scrubber (1972)	700 TPH (509) (TPH)	Particulate	2.6 (opacity) (20%)	25 b(3)	0.21	11/81	2/18/82	n/a
Mono-3	Mono Plant Housekeeping Ore Distribution Building (1972)	10,000 (11,506)	FMC TI Dual Throat Model 20K Venturi Scrubber (1972)	700 TPH (503) (TPH)	Particulate	1.3 (opacity) (20%)	25 b(3)	0.16	11/81	2/18/82	n/a

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FMC Green River Trona Plant Point Source Emissions

Emission Point	Source (Date) (Installed)	Size (acfm) design (tested)	Control Equipment (Date) (Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable W.A.Q.S.&R. Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimated Emission (lb/hr)
Mono-4	Mono Plant Line #1 Secondary Crusher (1972)	25,000 (24,651)	FMC Dual Throat Model Venturi Scrubber (1972)	140 TPH (127) (TPH)	Particulate	2.0 (opacity) (20%)	25 b(3)	0.39	11/81	2/18/82	n/a
Mono-5	R-2201 Mono Plant Line #1 Gas Fired Calciner (1972)	99,000 (91,197) (91,197)	Ducon Type VVO Vertical Venturi Oriclone Scrubber (1972)	137.5 TPH (89) (TPH) (89) (TPH)	Particulate	53.0 (opacity) (20%)	25 b(3)	31.01 w/BH	10/90	12/10/90	n/a
					Nitrogen Oxides	n/a	10	12.42	10/90	12/10/90	n/a
Mono-6	Mono Plant Line #1 Fluid Bed Dryer (1972)	84,000 (108,650)	Ducon Type VVO Vertical Venturi Oriclone Scrubber (1972)	82.5 TPH (?)	Particulate	20.0 (opacity) (20%)	25 b(3)	9.11	10/81	2/18/82	n/a
Mono-7	Mono Plant Housekeeping Shipping Area (1972)	13,000 (20,404)	Ducon Type VVO Vertical Venturi Oriclone Scrubber (1972)	330 TPH (300) (TPH)	Particulate	2.0 (opacity) (20%)	25 b(3)	1.15	12/81	2/18/82	n/a

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FMC Green River Trona Plant Point Source Emissions

Emission Point	Source (Date) (Installed)	Size (acfm) design (tested)	Control Equipment (Date) (Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable W.A.Q.S.&R. Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimated Emission (lb/hr)
Mono-8	Mono Plant Housekeeping Stockpile Reclaim Area (1978)	12,000 (16,119)	FMC Dual Throat Model 20K Venturi Scrubber (1978)	750 TPH (515) (TPH)	Particulate	1.9 (opacity) (20%)	25 b(3)	0.26	11/81	2/18/82	n/a
Mono-9	Mono Plant Railcar Product Loadout (1978)	9,000	Fuller Model 48-4-200 Baghouse (1978)	330 TPH	Particulate	2.0 (opacity) (20%)	CT-684 Permit Condition	None	n/a	n/a	1.54[4]
Mono-10	Mono Plant Bulk Truck Product Loadout (1982)	9,700	Micropulsaire Model 320 S-8-TRH Baghouse (1982)	100 TPH	Particulate	1.7 (opacity) (20%)	CT-448 Permit Condition	None	n/a	n/a	1.66[4]
Mono-11	Dual Ore Reclaim System (1990)	20,000 (16,889)	Ducon VVO Wet Scrubber (1990)	700 TPH (432) (TPH)	Particulate	3.0 (0.05 grams) (per dscm)	MD-120 Permit Condition (NSPS) (Subpart 000)	0.55 w/BH (0.01 grams) (per dscm) (FH only)	12/90	3/6/91	n/a
NS-2A	Mono Plant Powerhouse Housekeeping Coal Receiving Area(1975)	3,200	Flexkleen Model 100-RA-48KD Baghouse (1975)	250 TPH	Particulate	0.5 (Total A&B) (opacity) (20%)	25 b(3)	None	n/a	n/a	0.55[4]

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FMC Green River Trona Plant Point Source Emissions

Emission Point	Source (Date) (Installed)	Size (acfm) design (tested)	Control Equipment (Date) (Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable W.A.Q.S.&R. Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimated Emission (lb/hr)
NS-2B	Mono Plant Powerhouse Housekeeping Coal Receiving Area (1975)	3,200	Flexkleen Model 100-RA-48KD Baghouse (1975)	250 TPH	Particulate	0.5 (Total A&B) (opacity) (20%)	25 b(3)	None	n/a	n/a	0.55[4]
NS-3	R-3201 Mono Plant Line #2 Gas Fired Calciner	218,000 (227,612) (253,874)	Research Cottrell Electro-static Precipitator (1975)	275 TPH (262) (TPH) (256) (TPH)	Particulate Nitrogen Oxides	41.0 (opacity) (20%) n/a	25 b(3) 10	29.10 28.25	3/91 10/90	3/28/91 12/10/90	n/a n/a
NS-4	Mono Plant Line #2 Secondary Crusher (1975)	21,000 (14,199)	FMC Dual Throat Model 30K Venturi Scrubber (1975)	275 TPH (?)	Particulate	1.0 (opacity) (20%)	25 b(3)	0.26	10/81	2/18/82	n/a
NS-5	Mono Plant Line #2 Dissolver Vent (1975)	4,000 (4,741)	FMC Venturi Scrubber (1975)	225 TPH (197) (TPH)	Particulate	2.7 (opacity) (20%)	25 b(3)	1.49	11/81	2/18/82	n/a

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FMC Green River Trona Plant Point Source Emissions

Emission Point	Source (Date) (Installed)	Size (acfm) design (tested)	Control Equipment (Date) (Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable W.A.Q.S.&R. Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimate Emissio (lb/hr
NS-6	Mono Plant Line #2 Fluid Bed Dryer (1975)	122,00 (- 123,090)	FMC Dual Throat Model 50K Venturi Scrubber (1975)	146.5 TPH (?)	Particulate	20.0 (opacity) (20%)	25 b(3)	11.50	10/81	2/18/82	n/a
NS-7	Mono Plant Coal Unloading Building (1975)	11,000	Micropulsaire Model 216 Baghouse (1975)	2,800 TPH	Particulate	0.5 (opacity) (20%)	25 b(3)	None	n/a	n/a	1.89[4]
NS-8	Mono Plant Coal Housekeeping (1975)	11,000	Micropulsaire Model 216 Baghouse (1975)	250 TPH	Particulate	0.5 (opacity) (20%)	25 b(3)	None	n/a	n/a	1.89[4]
NS-9	Mono Plant & Solution Mining Coal Transfer Housekeeping (1975)	11,000	Mikro Modulaire Model 216 Baghouse (Modified) (1985)	259 TPH	Particulate	0.5 (opacity) (20%)	25 b(3)	None	n/a	n/a	1.89[4]
NS-10	Mono Plant Powerhouse Fly Ash Storage Silo Bin Vent (1985)	2,000	Micropulsaire Model 69-8-TRH Baghouse (1985)	2.5 TPH	Particulate	0.34 (opacity) (20%)	CT-603 Permit Condition	None	n/a	n/a	0.34[4]

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FMC Green River Trona Plant Point Source Emissions

Emission Point	Source (Date Installed)	Size (acfm) design (tested)	Control Equipment (Date Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable W.A.Q.S.&R. Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimated Emission (lb/hr)
NS-11	Mono Plant Powerhouse Fly Ash Truck Loading (1985)	2,000	Micropulsaire Model 255-8 Baghouse (1985)	2.5 TPH	Particulate	0.34 (opacity) (20%)	CT-603 Permit Condition	None	n/a	n/a	0.34[4]
RD-2	Solution Mining Lime Storage Bin Vent (1981)	8,364	Neptune Air-Pol Venturi Scrubber (1981)	25 TPH	Particulate	1.5 (opacity) (20%)	CT-310 Permit	None	n/a	n/a	1.43[4]
RD-3	Solution Mining Lime Slaker (1981)	5,208	Venturi Scrubber (1981)	16.3 TPH	Particulate	1.0 (opacity) (20%)	CT-310 Permit	None	n/a	n/a	0.89[4]

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SM-1	Solution Mining Coal Fired Lime Kiln (1985)	66,575	Neptune Air-Pol Venturi Scrubber (1985)	26 TPH Process Feed	Particulate	14.0 (opacity) (20%)	CT-520 Permit Condition	11.23	9/87	12/17/87	n/a
				(18.7) 4.8 TPH Coal	Sulfur Dioxide	9.6	Same	None	n/a	n/a	9.6[6]
				(tested) (on gas)	Nitrogen Oxides	32.4	Same	20.31	9/87	12/17/87	n/a
					Carbon Monoxide	26.1	Same	None	n/a	n/a	21.6[6]
SM-2	Solution Mining Coal Storage Bin Vent (1985)	1,400	Torit Model M1C-460-OB Baghouse (1985)	(?)	Particulate	0.24 (opacity) (20%)	CT-520A Permit Condition	None	n/a	n/a	0.24[6]
SM-3	Solution Mining Kiln Product Bin Vent (1985)	1,400	Torit Model M1C-460-OB Baghouse (1985)	(?)	particulate	0.24 (opacity) (20%)	CT-520A Permit Contition	None	n/a	n/a	0.24[6]

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BC-1	Sodium Bicarbonate Flash Drier (1990)	18,000 (21,218)	Mikropul 340-S-RH8 Baghouse (1990)	13 TPH Centrifuge Feed Cake (179 gpm) (Centrifuge) (Feed Rate)	Particulate	3.0	CT-827 (as modified)	0.29 w/BH	1/91	3/28/91	n/a
BC-2	Sodium Bicarbonate Product Handling (1990)	10,000 (8,291)	Mikropul 289-S-TRH8 Bahouse (1990)	9 TPH Bicarb Product (6.44 TPH) (Bicarb) (Product)	Particulate	1.7 (0.05 grams) (per dscm)	CT-827 (as modified) (NSPS) (Subpart 000)	0.20 w/BH (0.01 grams) (per dscm) (FH only)	1/91	3/28/91	n/a

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NaCN-1	Sodium Cyanide Absorber Exhaust (1990)	65,000 (41,962)	2-stage Incinerator (1990)	2.85 TPH 50% Sodium Cyanide Product	Hydrogen Cyanide	0.11	CT-845 Permit Condition	0.00063	4/91	6/5/91	n/a
				4000 pph design methane	Ammonia	1.80	CT-845 Permit Condition	0.027	4/91	6/5/91	n/a
				(2500pph) (tested) (methane)	Nitrogen Oxides	28.44	CT-485 Permit Condition	42.30	4/91	6/5/91	n/a
					Carbon Monoxide	17.30	CT-845 Permit Condition	0.55	4/91	6/5/91	n/a
NaCN-2	Sodium Cyanide Emergency Flare (1990)				Hydrogen Cyanide	0.00	CT-845 Permit Condition	None	n/a	n/a	0.00[2]
					Ammonia	39.21	CT-845 Permit Condition	None	n/a	n/a	39.21[2]
					Nitrogen Oxides	502.28	CT-845 Permit Condition	None	n/a	n/a	502.28[2]
					Carbon Monoxide	1.61	CT-845 Permit Condition	None	n/a	n/a	1.61[2]

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NaCN-3	Sodium Cyanide Air Preheater (1990)	850	Low NOx Burners	5.66 MM Btu/hr	Nitrogen Oxides	0.59 (0.1 lb) (MM Btu)	CT-845 Permit Condiiton	None	n/a	n/a	0.59[9]

Table 1
FMC Green River Trona Plant Point Source Emissions

Emission Point	Source (Date) (Installed)	Size (acfm) design (tested)	Control Equipment (Date) (Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable WAQS&R Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimated Emissions (lb/hr)
PH-1A	Babcock & Willcox Type FL Gas/Oil Fired Boiler (1952)	109,000	None	166.8MM Btu/Hr	Particulate (gas)	8.4	25 b.(3)	n/a	n/a	n/a	0.79[7]
					Sulfur Dioxide (gas)	n/a	4 e.	n/a	n/a	n/a	0.09[7]
					Nitrogen Oxides (gas)	76.73	10 b.(2)	n/a	n/a	n/a	86.71
					Particulate (0.8% S oil)	8.4	25 b.(3)	n/a	n/a	n/a	12.23[7]
					Sulfur Dioxide (0.8% S oil)	n/a	4 e.	n/a	n/a	n/a	139.67
					Nitrogen Oxides (0.8% S oil)	200.16	10 b.(4)	n/a	n/a	n/a	66.72[7]

Table 1
FMC Green River Trona Plant Point Source Emissions

Emission Point	Source (Date) (Installed)	Size (acfm) design (tested)	Control Equipment (Date) (Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable WAQS&R Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimated Emissions (lb/hr)
PH-1B	Babcock & Willcox Type FL Gas/Oil Fired Boiler (1952)	109,000	None	166.8MM Btu/Hr	Particulate (gas)	8.4	25 b.(3)	n/a	n/a	n/a	0.79[7]
					Sulfur Dioxide (gas)	n/a	4 e.	n/a	n/a	n/a	0.09[7]
					Nitrogen Oxides (gas)	76.73	10 b.(2)	n/a	n/a	n/a	86.71[7]
					Particulate (0.8% S oil)	8.4	25 b.(3)	n/a	n/a	n/a	12.23[7]
					Sulfur Dioxide (0.8% S oil)	n/a	4 e.	n/a	n/a	n/a	139.67
					Nitrogen Oxides (0.8% S oil)	200.16	10 b.(4)	n/a	n/a	n/a	66.72[7]

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FMC Green River Trona Plant Point Source Emissions

Emission Point	Source (Date) (Installed)	Size (acfm) design (tested)	Control Equipment (Date) (Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable WAQS&R Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimated Emissions (lb/hr)
PH-2	Babcock & Willcox Type PFI Gas/Oil Fired Boiler (1964)	45,000	None	166.8MM Btu/Hr	Particulate (gas)	4.2	25 b.(3)	n/a	n/a	n/a	0.79[7]
					Sulfur Dioxide (gas)	n/a	4 e.	n/a	n/a	n/a	0.09[7]
					Nitrogen Oxides (gas)	38.35	10 b.(2)	n/a	n/a	n/a	86.71[7]
					Particulate (0.8% S oil)	4.2	25 b.(3)	n/a	n/a	n/a	12.23[7]
					Sulfur Dioxide (0.8% S oil)	n/a	4 e.	n/a	n/a	n/a	139.67
					Nitrogen Oxides (0.8% S oil)	100.08	10 b.(4)	n/a	n/a	n/a	66.72[7]

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Emission Point	Source (Date) (Installed)	Size (acfm) design (tested)	Control Equipment (Date) (Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable WAQS&R Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimated Emissions (lb/hr)
PH-3	Babcock & Willcox Type PFI Gas/Oil Fired Boiler (1967)	72,500	None	333.6MM Btu/Hr	Particulate (gas)	8.4	25 b.(3)	n/a	n/a	n/a	1.58[7]
					Sulfur Dioxide (gas)	n/a	4 e.	n/a	n/a	n/a	0.19[7]
					Nitrogen Oxides (gas)	76.73	10 b.(2)	n/a	n/a	n/a	173.42[7]
					Particulate (0.8% S oil)	8.4	25 b.(3)	n/a	n/a	n/a	24.46[7]
					Sulfur Dioxide (0.8% S oil)	n/a	4 e.	n/a	n/a	n/a	270.33[7]
					Nitrogen Oxides (0.8% S oil)	200.16	10 b.(4)	n/a	n/a	n/a	133.44[7]

Table 1
FMC Green River Trona Plant Point Source Emissions

Emission Point	Source (Date) (Installed)	Size (acfm) design (tested)	Control Equipment (Date) (Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable WAQS&R Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimated Emissions (lb/hr)
Mono-1	Keystone No. 700 Gas/Oil Fired Boiler (1972)	40,700	None	300.2MM Btu/Hr	Particulate (gas)	7.5	25 b.(3)	n/a	n/a	n/a	1.42[7]
					Sulfur Dioxide (gas)	n/a	4 e.	n/a	n/a	n/a	0.28[7]
					Nitrogen Oxides (gas)	69.05	10 b.(2)	n/a	n/a	n/a	156.06[7]
					Particulate (0.8% S oil)	7.5	25 b.(3)	n/a	n/a	n/a	22.01[7]
					Sulfur Dioxide (0.8% S oil)	n/a	4 e.	n/a	n/a	n/a	251.37
					Nitrogen Oxides (0.8% S oil)	180.12	10 b.(4)	n/a	n/a	n/a	120.08[7]

Table I
FMC Green River Trona Plant Point Source Emissions

Emission Point	Source (Date) (Installed)	Size (acfm) design (tested)	Control Equipment (Date) (Installed)	Process[1] Rate design (tested)	Pollutant	Allowable Emissions (lb/hr)	Applicable WAQS&R Section	Tested Actual Emission (lb/hr)	Latest Date Tested	Test Review Date	Estimated Emissions (lb/hr)
NS-1A	Stirling S-10247, 600,000 pph Steam Rated, Coal Fired Boiler (1975)	359,000 (303,269)	Research Cottrell 16 Section Electrostatic Precipitator & FMC SO2 Scrubber (1975)	887 MM Btu/Hr	Particulate	45.0	25 b.(3)	19.92	11/81	2/18/82	n/a
				(?)	Sulfur Dioxide	1064.4 (1.2 lb) (per MMBtu)	4 e. & NSPS	583.87	3/85	9/4/87	n/a
				(550 MM) (Btu/Hr)	Nitrogen Oxides	620.9 (0.7 lb) (per MMBtu)	10 b.(7) & NSPS	305.37 (0.497 lb) (per MM Btu)	11/89	12/15/89	n/a
NS-1B	Stirling S-10247, 600,000 pph Steam Rated Coal Fired Boiler (1975)	359,000 (305,923)	Research Cottrell 16 Section Electrostatic Precipitator & FMC SO2 Scrubber (1975)	887 MM Btu/Hr	Particulate	45.0	25 b.(3)	42.28	10/81	2/18/82	n/a
				(?)	Sulfur Dioxide	1064.4 (1.2 lb) (per MMBtu)	4 e. & NSPS	582.95	3/85	9/4/87	n/a
				(500 MM) (Btu/Hr)	Nitrogen Oxides	620.9 (0.7 lb) (per MMBtu)	10 b.(7) & NSPS	313.93 (0.422 lb) (per MM Btu)	11/89	12/15/89	n/a

Table I
FMC Green River Trona Plant Point Source Emissions
"Footnotes"

1. Design process rate taken from 1986 Emission Inventory dated April 10, 1987.
2. Test results taken from 1985 Emission Inventory - not verified by the Air Quality Division.
3. Estimated emissions obtained from tests of a similar source.
4. Estimated emissions obtained using 0.02 gr/acf outlet grain loading and design exhaust rate.
5. Estimated emissions obtained from MD-41 permit analysis.
6. Estimated emissions obtained from CT-520 permit analysis.
7. Estimated emissions obtained using AP-42 emission factors for oil and gas combustion.
8. Estimated emissions obtained from CT-845 permit analysis.
9. Estimated emissions obtained from MD-112 permit analysis.

Table II-1

FMC Continuous Emission Monitoring Data
Boiler #6 Opacity
(Allowable = 20%)

A = <20% Opacity
B = 21 - 25%
C = 26 - 30%
D = 31 - 35%
E = 36 - 40 %
F = 41 - 45%
G = >45% Opacity

Reporting Year	Number of Hours Unit Operated	Number of Hours Monitor Operated	Number of Hours Monitor Unavailable	% Monitor Availability	% Monitored Time In Compliance A	% Monitored Time In Violation Categories B	C	D	E	F	G
1985	3731	3526	890	79.8	83.8	8.8	3.9	1.7	0.8	0.4	0.5
(3rd & 4th quarter)											
1986	7754	7278	1482	83.1	88.8	5.6	2.6	1.3	0.6	0.3	0.6
1987	6360	5759	3001	65.7	95.4	2.0	1.2	0.6	0.3	0.1	0.4
1988	7869	7759	1025	88.3	91.8	3.0	1.9	1.4	0.7	0.4	0.8
1989	7693	8181	579	93.4	91.5	2.4	2.0	1.5	0.9	0.6	1.1
1990	7751	8444	316	96.4	96.1	1.1	0.9	0.6	0.4	0.3	0.6

Table II-2

FMC Continuous Emission Monitoring Data
Boiler #6; Sulfur Dioxide
(Allowable = 1.2 lb/MM Btu)

A = <1.2 lb/MM Btu
B = 1.2 - 1.5
C = 1.5 - 1.8
D = 1.8 - 2.1
E = 2.1 - 2.4
F = 2.4 - 2.7
G = >2.7 lb/MM Btu

Reporting Year	Number of Hours Unit Operated	Number of Hours Monitor Operated	Number of Hours Monitor Unavailable	% Monitor Availability	% Monitored Time In Compliance A	% Monitored Time In Violation Categories					
						B	C	D	E	F	G
1985	3730	3583	833	81.1	96.3	1.9	0.9	0.8	0.0	0.0	0.0
(3rd & 4th quarter)											
1986	7754	7417	1343	84.7	93.5	3.9	2.3	0.7	0.2	0.1	0.0
1987	6360	5449	3311	62.2	97.5	2.1	0.3	0.1	0.0	0.0	0.0
1988	7869	7783	1001	88.6	98.6	1.0	0.4	0.0	0.0	0.0	0.0
1989	7693	8457	303	96.5	98.0	1.6	0.4	0.0	0.0	0.0	0.0
1990	7751	8407	353	96.0	98.1	1.0	0.7	0.2	0.0	0.0	0.0

Table II-3

FMC Continuous Emission Monitoring Data
Boiler #6 Nitrogen Oxides
(Allowable = 0.7 lb/MM Btu)

A = <0.70 lb/MM Btu
B = 0.70 - 0.87
C = 0.88 - 1.05
D = 1.05 - 1.23
E = 1.23 - 1.40
F = 1.40 - 1.58
G = >1.58 lb/MM Btu

Reporting Year	Number of Hours Unit Operated	Number of Hours Monitor Operated	Number of Hours Monitor Unavailable	% Monitor Availability	% Monitored Time In Compliance	% Monitored Time In Violation Categories					
					A	B	C	D	E	F	G
1985	3731	3549	867	80.4	72.1	25.0	2.7	0.1	0.0	0.0	0.1
(3rd & 4th Quarter)											
1986	7754	7362	1398	84.0	83.1	15.5	1.3	0.0	0.0	0.0	0.0
1987	6360	5557	3203	63.4	66.2	24.8	5.5	2.0	1.3	0.1	0.0
1988	7869	7535	1249	85.8	78.7	17.9	2.6	0.6	0.2	0.1	0.0
1989	7693	8462	298	96.6	84.3	13.3	2.0	0.4	0.0	0.0	0.0
1990	7751	8399	361	95.9	92.8	6.8	0.3	0.0	0.0	0.0	0.0

Table II-4

FMC Continuous Emission Monitoring Data
Boiler #7; Opacity
(Allowable = 20%)

A = <20% Opacity
B = 21 - 25%
C = 26 - 30%
D = 31 - 35%
E = 36 - 40%
F = 41 - 45%
G = >45% Opacity

Reporting Year	Number of Hours Unit Operated	Number of Hours Monitor Operated	Number of Hours Monitor Unavailable	% Monitor Availability	% Monitored Time In Compliance A	% Monitored Time In Violation Categories B	C	D	E	F	G
1985	3805	3558	858	80.6	94.6	2.5	1.2	0.6	0.4	0.2	0.5
(3rd & 4th Quarter)											
1986	8162	6732	2028	76.8	90.6	5.0	2.2	1.2	0.5	0.3	0.4
1987	8040	6116	2744	68.7	88.5	4.9	2.8	1.8	0.9	0.4	0.4
1988	8061	6988	1796	79.6	88.2	5.0	3.1	1.6	0.9	0.4	0.8
1989	8145	8046	714	91.8	91.1	3.9	2.2	1.2	0.6	0.4	0.7
1990	7977	8485	275	96.9	90.8	3.9	2.3	1.2	0.6	0.4	0.8

Table II-5

FMC Continuous Emission Monitoring Data
Boiler #7; Sulfur Dioxide
(Allowable = 1.2 lb/MM Btu)

A = <1.2 lb/MM Btu
B = 1.2 - 1.5
C = 1.5 - 1.8
D = 1.8 - 2.1
E = 2.1 - 2.4
F = 2.4 - 2.7
G = >2.7 lb/MM Btu

Reporting Year	Number of Hours Unit Operated	Number of Hours Monitor Operated	Number of Hours Monitor Unavailable	% Monitor Availability	% Monitored Time In Compliance A	% Monitored Time In Violation Categories B	C	D	E	F	G
1985	3805	3587	829	81.2	96.1	2.2	0.7	0.6	0.3	0.1	0.1
(3rd & 4th Quarter)											
1986	8162	5837	2923	66.6	96.4	1.8	0.9	0.3	0.3	0.2	0.1
1987	8040	6483	1777	79.7	98.1	1.5	0.3	0.0	0.1	0.0	0.0
1988	8061	6903	1881	78.6	97.7	1.9	0.3	0.0	0.1	0.0	0.0
1989	8145	8621	139	98.4	95.3	3.2	1.1	0.3	0.1	0.0	0.0
1990	7977	8635	125	98.6	97.8	0.9	0.9	0.3	0.1	0.0	0.0

Table II-6

FMC Continuous Emission Monitoring Data
Boiler #7, Nitrogen Oxides
(Allowable = 0.7 lb/MM Btu)

A = <0.70 lb/MM Btu
B = 0.70 - 0.88
C = 0.88 - 1.05
D = 1.05 - 1.23
E = 1.23 - 1.40
F = 1.40 - 1.58
G = >1.58 lb/MM Btu

Reporting Year	Number of Hours Unit Operated	Number of Hours Monitor Operated	Number of Hours Monitor Unavailable	% Monitor Availability	% Monitored Time In Compliance A	% Monitored Time In Violation Categories B	C	D	E	F	G
1985	3805	3539	877	80.1	43.9	39.0	14.3	2.4	0.2	0.1	0.2
(3rd & 4th Quarter)											
1986	8162	5869	2891	67.0	67.7	26.1	5.5	0.5	0.1	0.1	0.0
1987	8040	6994	1766	79.8	73.8	23.1	2.9	0.2	0.0	0.0	0.0
1988	8061	6769	2015	77.1	55.8	27.5	9.7	5.1	1.3	0.4	0.2
1989	8145	8600	160	98.2	90.8	8.3	0.8	0.1	0.0	0.0	0.0
1990	7977	8635	125	98.6	94.8	5.0	0.2	0.0	0.0	0.0	0.0

Table III-1
FMC Green River Hi-Vol Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Geometric Mean (ug/m^3)	1st High (2nd High) Readings (ug/m^3)	Dates of Exceedance of 24-HR Standard
002**	SW/4, SE/4, Sec. 16 T19N, R110W	Sept. 1974	1974	94%	34*	35	126 (91)	None
			1975	76%	92*	28	143 (98)	None
			1976	90%	55	28	116 (73)	None
			1977	93%	113*	19	101 (97)	None
			1978	87%	71	22	91 (70)	None
			1979	87%	53	24	69 (54)	None
			1980	70%	43	18	71 (51)	None
			1981**	93%	57	21	128 (73)	None
			1982	90%	55	20	62 (59)	None
			1983	88%	53	17	124 (74)	None

* Three day sampling schedule.

** NOTE: Prior to 1981, data is at actual condidtions. Data for 1981 on is at standard conditions.

Table III-1
FMC Green River Hi-Vol Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Geometric Mean (ug/m^3)	1st High (2nd High) Readings (ug/m^3)	Dates of Exceedance of 24-HR Standard
002 (continued)			1984	97%	59	18	99 (50)	None
			1985	95%	58	21	72 (67)	None
			1986	98%	60	19	105 (101)	None
			1987	95%	58	20	84 (68)	None
			1988	97%	59	20	78 (58)	None
			1989	95%	58	20	75 (73)	None
			1990	100%	15	15	45 (40)	None
			(Sampling Terminated in March)					

Table III-1A
FMC Green River PM-10 Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Annual Arithmetic Mean (ug/m^3)	1st High (2nd High) Readings (ug/m^3)	Dates of Exceedance of 24-HR Standard
002	SW/4, SE/4, Sec. 16 T19N, R110W	April 1990	1990	70%-year 93%-actual	43	12	54 (25)	None

Table III-2
FMC Green River Hi-Vol Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Geometric Mean (ug/m^3)	1st High (2nd High) Readings (ug/m^3)	Dates of Exceedance of 24-HR Standard
840**	SE1/4, SE1/4 Sec. 14 T19N, R110W	Jan. 1980	1980	30%	18	60	222 (182)	(3) 4/15,6/14, 6/26
			1981**	66%	40	68	189 (182)	5 Total
			1982	84%	51	60	379 (191)	(3) 1/23,7/4, 10/20
			1983	97%	58	46	123 (121)	None
			1984	98%	60	57	233 (223)	(2) 5/30, 9/9
			1985	95%	58	60	428 (252)	(6) 4/1,6/6,8/11, 9/16,10/28,12/15
			1986	98%	60	49	203 (161)	(2) 3/9,7/13
			1987	85%	52	55	258 (216)	(6) 1/21/4/15,8/31, 9/30,10/6,10/18
			1988	93%	57	75	368 (241)	(10) 1/22,2/15,2/21, 4/3,9/6,10/18, 10/24,10/30, 12/11, 12/29
			1989	79%	48	69	199 (170)	(3) 3/11, 11/12, 11/18

** NOTE: Prior to 1981, data is at actual conditions. Data for 1981 on is at standard conditions.

Table III-2
FMC Green River Hi-Vol Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Geometric Mean (ug/m^3)	1st High (2nd High) Readings (ug/m^3)	Dates of Exceedance of 24-HR Standard
840**	SE1/4, SE1/4 Sec. 14 T19N, R110W	Jan. 1980	1980	30%	18	60	222 (182)	(3) 4/15,6/14, 6/26
			1981**	66%	40	68	189 (182)	5 Total
			1982	84%	51	60	379 (191)	(3) 1/23,7/4, 10/20
			1983	97%	58	46	123 (121)	None
			1984	98%	60	57	233 (223)	(2) 5/30, 9/9
			1985	95%	58	60	428 (252)	(6) 4/1,6/6,8/11, 9/16,10/28,12/15
			1986	98%	60	49	203 (161)	(2) 3/9,7/13
			1987	85%	52	55	258 (216)	(6) 1/21/4/15,8/31, 9/30,10/6,10/18
			1988	93%	57	75	368 (241)	(10) 1/22,2/15,2/21, 4/3,9/6,10/18, 10/24,10/30, 12/11, 12/29
			1989	79%	48	69	199 (170)	(3) 3/11, 11/12, 11/18

** NOTE: Prior to 1981, data is at actual conditions. Data for 1981 on is at standard conditions.

Table III-2A
FMC Green River PM-10 Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Annual Arithmetic Mean (ug/m^3)	1st High (2nd High) Readings (ug/m^3)	Dates of Exceedance of 24-HR Standard
840 PM10	SE/4,SE/4 Sec. 14 T19N, R110W	April 1984	1984	49%-year 97%-actual	30	27	71 (53)	None
			1985	89%	54	28	92 (81)	None
			1986	95%	58	24	57 (54)	None
			1987	87%	53	33	107 (99)	None
			1988	95%	58	34	148 (86)	None
			1989	90%	55	29	55 (54)	None
			1990	97%	59	27	83 (67)	None

Table III-3
FMC Green River Hi-Vol Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Geometric Mean (ug/m^3)	1st High (2nd High) Readings (ug/m^3)	Dates of Exceedance of 24-HR Standard
866	NE/4, SE/4 Sec. 14 T19N, R110W	Jan. 1988	1988	100%	61	42	220 (118)	4/3
			1989	93%	57	42	120 (101)	None
			1990	79%	48	33	99 (95)	None

Table III-3A
FMC Green River PM-10 Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Annual Arithmetic Mean (ug/m^3)	1st High (2nd High) Readings (ug/m^3)	Dates of Exceedance of 24-HR Standard
866 PM10	NE/4, SE/4 Sec. 14 T19N, R110W	Jan. 1988	1988	95%	58	25	151 (57)	None
			1989	95%	58	23	49 (42)	None
			1990	82%	50	19	46 (44)	None

Table III-4
FMC Green River Hi-Vol Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Geometric Mean (ug/m^3)	1st High (2nd High) Reading (ug/m^3)	Dates of Exceedance of 24-Hr Standard
003**	NW¼, NW¼ Sec. 23 T19N, R110W	Sept. 1974	1974	92%	33*	206	618 (617)	23 Total
			1975	63%	76*	232	1230 (624)	62 Total
			1976	39%	24	250	560 (461)	20 Total
			1977	92%	56	229	751 (561)	42 Total
			1978	93%	40	216	520 (435)	31 Total
			(Sampling terminated in September)					

* Three day sampling schedule.
** NOTE: Data is at actual contions.

Table III-5
FMC Green River Hi-Vol Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Geometric Mean (ug/m^3)	1st High (2nd High) Reading (ug/m^3)	Dates of Exceedance of 24-Hr Standard
004**	SW¼, SE¼ Sec. 14. T19N, R110W	Sept. 1974	1974	92%	33*	133	456 (431)	15 Total
			1975	69%	83*	130	756 (509)	37 Total
			1976	49%	30	154	442 (348)	16 Total
			(Most data missing from 1st quarter)					
			1977	95%	116*	150	598 (489)	60 Total
			1978	88%	72	125	598 (296)	26 Total
			1979	92%	56	83	281 (204)	11 Total
			1980	92%	56	72	291 (236)	7 Total
			1981**	95%	58	100.3	387 (310)	17 Total
			(Sampling terminated end of 1981)					

* Three day sampling schedule.
** NOTE: Prior to 1981, data is at actual conditions 1981 G.M. @ actual is 81 ug/m3.

Table III-6
FMC Green River Hi-Vol Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Geometric Mean (ug/m³)	1st High (2nd High) Reading (ug/m³)	Dates of Exceedance of 24-Hr Standard
005**	NW¼, SE¼ Sec. 23, T19N, R110W	Sept. 1974	1974	95%	35*	59	219 (215)	5 Total
			1975	80%	97*	56	260 (223)	13 Total
			1976	825	50	62	200 (187)	7 Total
			1977	89%	54	51	259 (168)	3 Total
			1978	88%	38	53	230 (204)	3 Total
			(Sampling terminated in September)					

* Three day sampling schedule.
** NOTE: Data is at actual conditions.

Table III-7
FMC Green River Hi-Vol Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Geometric Mean (ug/m^3)	1st High (2nd High) Reading (ug/m^3)	Dates of Exceedance of 24-Hr Standard
006**	$NW\frac{1}{4}, NW\frac{1}{4}$ Sec. 22 T19N, R110W	Sept. 1974	1974	72%	26*	260	1357 (1068)	19 Total
			1975	69%	84*	160	1173 (841)	48 Total
			1976	86%	6	58	109 (134)	1 Total
			(One month sampling only)					

* Three day sampling schedule.
** NOTE: Data is at actual conditions.

Table III-8
FMC Green River Hi-Vol Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Geometric Mean (ug/m^3)	1st High (2nd High) Reading (ug/m^3)	Dates of Exceedance of 24-Hr Standard
815**	NE¼, NE¼ Sec. 13, T19N, R110W	Jan. 1977	1977	83%	101*	34	118 (98)	None
			1978	82%	67	28	108 (73)	None
			1979	54%	33	26	76 (64)	None
			1980	75%	46	29	75 (65)	None
			1981**	49%	30	26	80 (47)	None
			1982	64%	39	24	80 (56)	None
			1983	90%	51	20	57 (51)	None
			1984	87%	53	22	61 (57)	None
			1985	74%	45	20	55 (48)	None
			1986	87%	53	19	46 (42)	None
			1987	77%	47	22	76 (72)	None

(Sampling terminated end of 1987)

* Three day sampling schedule.

** NOTE: Prior to 1981, data is at actual conditions. Data for 1981 on is at standard conditions.

Table III-9
FMC Green River Hi-Vol Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Geometric Mean (ug/m^3)	1st High (2nd High) Reading (ug/m^3)	Dates of Exceedance of 24-Hr Standard
816**	Center Sec. 7, T19N, R109WH	Jan. 1977	1977	85%	102*	24	105 (82)	None
			1978	83%	49	20	54 (47)	None
			(Sampling terminated in August)					

* Three day sampling schedule.
** NOTE: Data is at actual conditions.

Table III-10
FMC Green River Hi-Vol Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Geometric Mean (ug/m^3)	1st High (2nd High) Reading (ug/m^3)	Dates of Exceedance of 24-Hr Standard
839**	NE¼, NE¼ Sec. 14 T19N, R110W	Jan. 1980	1980	89%	54	19	49 (47)	None
			1981**	89%	54	21	72 (53)	None
			1982	87%	53	20	61 (61)	None
			1983	95%	57	17	50 (49)	None
			1984	92%	56	18	108 (61)	None
			1985	97%	59	20	66 (63)	None
			1986	98%	60	17	46 (40)	None
			1987	87%	53	20	77 (73)	None

(Sampling terminated in November)

Table III-11
FMC Green River Hi-Vol Data

Sampler	Location	Date Sampling Began	Collection Year	Collection Efficiency	Number of Samples Taken	Geometric Mean (ug/m^3)	1st High (2nd High) Reading (ug/m^3)	Dates of Exceedance of 24-Hr Standard
841**	SW¼, NE¼ Sec. 14 T19N, R110W	Jan. 1980	1980	72%	44	36	95 (93)	None
			1981**	85%	52	47	214 (112)	9/15
			1982	95%	58	38	165 (108)	10/20
			1983	90%	54	33	111 (95)	None
			1984	90%	55	37	212 (104)	5/30
			1985	97%	59	37	131 (100)	None
			1986	95%	58	32	106 (68)	None
			1987	87%	53	42	161 (116)	5/15
			(Sampling terminated in November.)					

** NOTE: Prior to 1981, data is at actual conditions.
Data for 1981 on is at standard condtiions.

Table IV
FMC Soda Ash 1990 Particulate Emissions
(Operating Data from the March 21, 1991 Emission Inventory)

Source	Latest Test (or Estimate) Date	1990 Emission Rate (pph)	1990 Annual Operation (hours)	1990 Annual Emissions (tons)
PA-4	8/78	1.09	8640	4.71
PA-5	1982	1.22	8640	5.27
PA-6	3/78	0.02	8174	0.08
PA-7	(6/91)	0.02	8195	0.08
PA-8	(6/91)	0.02	8145	0.08
PA-9	(6/91)	0.02	8140	0.08
RA-1	(6/91)	1.37	7259	4.97
RA-14	2/84	1.76	1086	0.96
RA-15	2/81	0.67	5144	1.72
RA-16	3/77	1.26	7438	4.69
RA-22A&B	5/88	20.32	6159	62.58
RA-23A&B	6/88	29.89	6484	96.90
RA-24A&B	5/88	24.21	7676	92.92
RA-25	4/77	10.33	6896	35.62
RA-26	6/85	3.84	7946	15.26
RA-27	(6/91)	0.45	4100	0.92
RA-28	(6/91)	1.29	-0-	0.00
RA-33	7/77	2.98	8400	12.52
PP-11	10/88	10.47	7238	37.89
PP-12	9/85	3.65	7250	13.23
PP-20	9/88	2.37	6725	7.97
PP-21	9/85	9.24	7494	34.62
PP-22	(6/91)	1.00	530	0.27
PP-24	(6/91)	1.60	7494	6.00
PP-25	9/85	9.97	5677	28.30
PP-26	(6/91)	2.00	5677	5.68
PP-27	(6/91)	2.00	7381	7.38
PP-28	(6/91)	4.00	6725	13.45
Mono-2	11/81	0.21	7371	0.77
Mono-3	11/81	0.16	7371	0.59
Mono-4	11/81	0.39	7371	1.44
Mono-5	10/90	31.01	7490	116.13
Mono-6	10/81	9.11	8255	37.60
Mono-7	12/81	1.15	7800	4.49
Mono-8	11/81	0.26	2720	0.35
Mono-9	(6/91)	1.54	4800	3.70
Mono-10	(6/91)	1.66	7800	6.47
Mono-11	12/90	0.55	120	0.03
NS-2A	(6/91)	0.55	7892	2.17
NS-2B	(6/91)	0.55	8562	2.35
NS-3	3/91	29.10	7603	110.62
NS-4	10/81	0.26	7203	0.94
NS-5	11/81	1.49	7607	5.67

(continued)

Table IV
Page 2

Source	Latest Test (or Estimate) Date	1990 Emission Rate (pph)	1990 Annual Operation (hours)	1990 Annual Emissions (tons)
NS-6	10/81	11.50	8130	46.75
NS-7	(6/91)	1.89	631	0.60
NS-8	(6/91)	1.89	6044	5.71
NS-9	(6/91)	1.89	6456	6.10
NS-10	(6/91)	0.34	1200	0.20
NS-11	(6/91)	0.34	1200	0.20
RD-2	(6/91)	1.43	-0-	0.00
RD-3	(6/91)	0.89	6962	3.10
SM-1	9/87	11.23	6977	39.18
SM-2	(6/91)	0.24	-0-	0.00
SM-3	(6/91)	0.24	6977	0.84
BC-1	1/91	0.29	1980	0.29
BC-2	1/91	0.20	1980	0.20
PH-1A	(6/91)	0.79	4190	1.65
PH-1B	(6/91)	0.79	4270	1.69
PH-2	(6/91)	0.79	4270	1.69
PH-3	(6/91)	1.58	6304	4.98
Mono-1	(6/91)	1.42	-0-	0.00
NS-1A	11/81	19.92	7751	77.20
NS-1B	10/81	42.28	7976	168.61
Total				1146.46

Table V
FMC Soda Ash 1990 Sulfur Dioxide Emissions
(Operating Data from the March 21, 1991 Emission Inventory)

Source	Latest Test (or Estimate) Date	1990 Emission Rate (pph)	1990 Annual Operation (hours)	1990 Annual Emissions (tons)
PH-1A	(6/91)	0.00	-0- (on oil)	0.00
PH-1B	(6/91)	0.00	-0- (on oil)	0.00
PH-2	(6/91)	0.00	-0- (on oil)	0.00
PH-3	(6/91)	0.00	-0- (on oil)	0.00
Mono-1	(6/91)	0.00	-0-	0.00
NS-1A	3/85	583.87	7751	2301.54
NS-1B	3/85	582.54	7976	2323.17
Total				4624.71

Table VI
FMC Soda Ash 1990 Nitrogen Oxide Emissions
(Operating Data from the March 21, 1990 Emission Inventory)

Source	Latest Test (or Estimate) Date	1990 Emission Rate (pph)	1990 Annual Operation (hours)	1990 Annual Emissions (tons)	
RA-1	(6/91)	0.87	7259	3.14*	a
RA-22A&B	(6/91)	2.92	6159	8.99*	b
RA-23A&B	(6/91)	6.45	6484	20.90*	b
RA-24A&B	(6/91)	6.33	7676	24.29*	b
PP-11	10/88	0.18	7238	0.65	
PP-12	(6/91)	0.18	7250	0.65	
PP-20	11/88	6.28	6725	21.12	
PP-21	(6/91)	6.28	7494	23.53	
PP-25	(6/91)	0.65	5677	1.95*	a
Mono-5	10/90	12.42	7490	46.51	
NS-3	10/90	28.25	7603	107.39	
SM-1	9/87	20.31	6977	70.85	
NACN-1	4/91	42.30	430	9.09	
NACN-2	(6/91)	193.01	186	17.95**	
NACN-3	(6/91)	0.57	1021	0.29*	a
PH-1A	(6/91)	57.13	4190	119.68*	c
PH-1B	(6/91)	62.41	4270	133.44*	c
PH-2	(6/91)	29.63	4270	63.25*	c
PH-3	(6/91)	34.96	6304	110.19*	c
Mono-1	(6/91)	0.00	-0-	0.00*	c
NS-1A	11/89	305.37	7751	1183.46	
NS-1B	11/89	313.93	7976	1251.95	
Total				3219.27	

* Annual emissions were calculated from actual fuel usage data contained in the 1990 Emission Inventory, using AP-42 Emission Factors. Hourly emissions were back calculated from annual hours of operation.

a. commercial sized - 100 lb NOx/MMCF
b. industrial sized - 140 lb NOx/MMCF
c. utility sized - 550 lb NOx/MMCF

** Annual emissions were taken from the annual sodium cyanide plant flare report. Hourly emissions were backcalculated from annual hours of operation.

Table VII
FMC Soda Ash 1990 Hydrogen Cyanide Emissions
(Operating Data from the March 21, 1991 Emission Inventory)

Source	Latest Test (or Estimate) Date	1990 Emission Rate (pph)	1990 Annual Operation (hours)	1990 Annual Emissions (pounds)
NACN-1	4/91	0.00063	430	0.3
NACN-2	(6/91)	0.97	186	180.3 *
Total				180.6

* Annual emissions were taken from the annual sodium cyanide plant flare report. Hourl emissions were backcalculated from annual hours of operation.

Table VIII
FMC Soda Ash 1990 Ammonia Emissions
(Operating Data from the March 21, 1991 Emission Inventory)

Source	Latest Test (or Estimate) Date	1990 Emission Rate (pph)	1990 Annual Operation (hours)	1990 Annual Emissions (pounds)
NACN-1	4/91	0.027	430	12.
NACN-2	(6/91)	19.76	186	3676. *
Total				3688

* Annual emissions were taken from the annual sodium cyanide plant flare report. Hourly emissions were backcalculated from annual hours of operation.

Appendix I

CEM Monitor Evaluation Worksheets

YEAR 1990
COMPANY FMC Soda Ash Plant
UNIT Boiler #6 [NS-1-A]
POLLUTANT Opacity

COMPLETED BY: Lee Driscoll
DATE: May 24, 1991

CEM MONITOR EVALUATION WORK SHEET

1	2	3	4	5	6	7	8	9	10	11	12	13	14
QUARTER	HOURS IN QUARTER	NUMBER HOURS UNIT OPERATED	NUMBER HOURS MONITOR OPERATED	NUMBER HOURS MONITORED STATISTICAL DATA SHEET	UNIT COMPLIANCE RATE (5 / 4)	NUMBER HOURS MONITORED DATA SHEET	NUMBER HOURS EXCESS EMISSION TABLE	SUM COLUMNS 7 + 8	NUMBER HOURS MONITOR OUTAGE DATA SHEET	NUMBER HOURS MONITOR OUTAGE TABLE	TOTAL MONITOR DOWNTIME (9 + 10)	MONITOR AVAILABILITY (11 / 2)	SUM COLUMNS 9+10 11+12
1	2184	1440.40	1080.90	1059.90	0.941	121.30	121.30	196.90	79.10	0.00	79.10	0.951	200.00
2	2184	1928.30	1107.10	1044.20	0.941	92.80	92.80	2137.30	57.30	0.00	57.30	0.974	215.10
3	2208	1610.30	1057.70	1023.30	0.964	92.40	92.40	2057.70	150.30	0.00	150.30	0.932	2208.00
4	2208	2058.30	2178.70	2086.40	0.958	92.30	92.30	2178.70	29.30	0.00	29.30	0.987	2208.00
YEARLY TOTAL	8760	7751.00	8444.30	8115.80	0.961	328.50	328.50	8444.30	315.70	0.00	315.70	0.964	8760.00

VIOLATION CATAGORIES		NUMBER	PERCENT	FACTOR
		B	94.80	0.011
		C	76.70	0.009
		D	48.80	0.006
		E	35.50	0.004
		F	23.50	0.003
		G	49.20	0.006

MONITOR RELIABILITY = 1.0 - (total column 10 / total column 2) = 0.959

YEAR 1990 COMPLETED BY Lee Brisovic

COMPANY FMC Soda Ash Plant DATE May 24, 1991

UNIT Boiler #6 [NS-1-A] CEM MONITOR EVALUATION WORK SHEET

POLLUTANT Sulfur Dioxide

1	2	3	4	5	6	7	8	9	10	11	12	13	14
QUARTER	HOURS IN QUARTER	NUMBER HOURS UNIT OPERATED	NUMBER HOURS MONITOR OPERATED	NUMBER HOURS MONITORED COMPLIANCE (STATISTICAL) SHEET	UNIT COMPLIANCE RATE COLUMN 5 / 4	NUMBER HOURS MONITORED VIOLATION (STATISTICAL) SHEET	NUMBER HOURS EXCESS EMISSION TABLE (SHOULD CHECK WITH 7)	SUM COLUMNS 5 + 7 (SHOULD CHECK WITH 4)	NUMBER HOURS MONITOR OUTAGE FROM OUTAGE TABLE	NUMBER HOURS MONITOR TURNED OFF FROM OUTAGE TABLE	TOTAL MONITOR DOWNTIME SUM COLUMNS 10 + 11	MONITOR AVAILABILITY MINUS COLUMN 12	SUM COLUMNS 9 + 12 SHOULD CHECK WITH 3
1	2160	2146.40	2966.00	2951.00	0.997	7.00	7.00	2958.00	193.00	0.00	193.00	0.954	3151.00
2	2184	1903.00	2112.00	2087.00	0.988	31.00	31.00	2118.00	66.00	0.00	66.00	0.970	2184.00
3	2208	1616.20	2064.00	1980.00	0.960	82.00	82.00	2062.00	144.00	0.00	144.00	0.935	2206.00
4	2208	2058.00	2165.00	2124.00	0.981	41.00	41.00	2165.00	43.00	0.00	43.00	0.981	2208.00
YEARLY TOTAL	8760	7751.00	9407.00	9246.00	0.951	161.00	161.00	9407.00	353.00	0.00	353.00	0.960	8760.00

VIOLATION CATAGORIES	B	86.00	1.010	
	C	59.00	0.007	
	D	13.00	0.002	
	E	2.00	0.000	
	F	1.00	0.000	
	G	0.00	0.000	

MONITOR RELIABILITY = 1.0 - (total column 10 / total column 3) = 0.954

YEAR 1990
COMPANY FMC Soda Ash Plant
UNIT Boiler #6 [NS-1-A]
POLLUTANT Nitrogen Oxides

CEM MONITOR EVALUATION WORK SHEET

COMPLETED BY Lee Gribovicz
DATE May 24, 1991

1	2	3	4	5	6	7	8	9	10	11	12	13	14
QUARTER	HOURS IN QUARTER	NUMBER HOURS UNIT OPERATED	NUMBER HOURS MONITOR OPERATED	NUMBER HOURS MONITORED COMPLIANCE STATISTICAL SHEET	UNIT COMPLIANCE RATE (COLUMN 5 / 4)	NUMBER HOURS MONITORED VIOLATION (STATISTICAL SHEET)	NUMBER HOURS EXCESS EMISSION TABLE (SHOULD CHECK WITH 7)	SUM COLUMNS 5 + 7 (SHOULD CHECK WITH 4)	NUMBER HOURS MONITOR OUTAGE FROM OUTAGE TABLE	NUMBER HOURS MONITOR TURNED OFF FROM OUTAGE TABLE	TOTAL MONITOR DOWNTIME SUM COLUMNS 10 + 11	MONITOR AVAILABILITY (1 MINUS (COLUMNS 12 / 2))	SUM COLUMNS 4 + 12 SHOULD CHECK WITH 2
1	2160	2148.40	2055.00	1889.00	0.919	166.00	166.00	2055.00	105.00	0.00	105.00	0.951	2161.00
2	2184	1928.00	2115.00	2033.00	0.961	82.00	82.00	2115.00	69.00	0.00	69.00	0.968	2184.00
3	2208	1614.20	2064.00	1927.00	0.934	137.00	137.00	2064.00	144.00	0.00	144.00	0.935	2209.00
4	2208	2058.30	2165.00	1943.00	0.897	222.00	222.00	2165.00	43.00	0.00	43.00	0.981	2208.00
YEARLY TOTAL	8760	7751.00	8399.00	7792.00	0.928	607.00	607.00	8399.00	361.00	0.00	361.00	0.959	8760.00

VIOLATION CATAGORIES	B	575.00	0.068
	C	27.00	0.003
	D	4.00	0.000
	E	1.00	0.000
	F	0.00	0.000
	G	0.00	0.000

MONITOR RELIABILITY = 1.0 - (total column 10 / total column 3) = 0.953

YEAR 1990 COMPLETED BY Lee Dribovich

COMPANY FMC Soda Ash Plant DATE May 24, 1991

UNIT Boiler #7 [NS-1-A] CEM MONITOR EVALUATION WORK SHEET

POLLUTANT Opacity

1	2	3	4	5	6	7	8	9	10	11	12	13	14
QUARTER	HOURS IN QUARTER	NUMBER HOURS UNIT OPERATED	NUMBER HOURS MONITOR OPERATED	NUMBER HOURS MONITORED COMPLIANCE STATISTICAL SHEET	UNIT COMPLIANCE RATE COLUMN (5 / 4)	NUMBER HOURS MONITORED VIOLATION STATISTICAL SHEET	NUMBER HOURS MONITORED VIOLATION FROM EXCESS EMISSION TABLE (CHECK)	SUM COLUMNS 5 + 7 (SHOULD EQUAL COLUMN 3) (CHECK)	NUMBER HOURS MONITOR OUTAGE FROM OUTAGE TABLE (WILL = 0)	NUMBER HOURS MONITOR TURNED OFF FROM OUTAGE TABLE	TOTAL MONITOR DOWNTIME SUM COLUMNS (10 + 11)	MONITOR AVAILABILITY (1 MINUS) COLUMNS (12 / 2)	SUM COLUMNS 4 + 12 (SHOULD EQUAL COLUMN 1)
1	2160	2041.80	2140.80	2015.70	0.942	124.90	124.90	2140.60	19.40	0.00	19.40	0.991	2160.00
2	2184	1759.00	2094.00	1983.00	0.947	111.00	111.00	2094.00	90.00	0.00	90.00	0.959	2184.00
3	2208	2025.10	2186.30	2025.20	0.926	163.10	163.10	2188.30	19.70	0.00	19.70	0.991	2208.00
4	2208	2150.30	1962.30	1580.90	0.805	381.10	381.10	1962.00	146.00	0.00	146.00	0.934	2208.00
YEARLY TOTAL	8760	7976.50	8484.70	7704.80	0.908	780.10	780.10	8484.90	275.10	0.00	275.10	0.969	8760.00

VIOLATION CATAGORIES

B	329.30	0.039
C	197.60	0.023
D	99.00	0.012
E	31.00	0.006
F	32.80	0.004
G	70.70	0.008

MONITOR RELIABILITY = 1.0 - (total column 10 / total column 3) = 0.960

YEAR 1990 COMPLETED BY Lee Gribovic

COMPANY FMC Soda Ash Plant DATE May 24, 1991

UNIT Boiler #7 [NS-1-B]

POLLUTANT Sulfur Dioxide

CEM MONITOR EVALUATION WORK SHEET

1	2	3	4	5	6	7	8	9	10	11	12	13	14
QUARTER	HOURS IN QUARTER	NUMBER HOURS UNIT OPERATED	NUMBER HOURS MONITOR OPERATED	NUMBER HOURS MONITORED COMPLIANCE (STATISTICAL) SHEET	UNIT COMPLIANCE RATE (COLUMN) (5 / 4)	NUMBER HOURS MONITORED VIOLATION (STATISTICAL) SHEET	NUMBER HOURS MONITORED VIOLATION FROM EXCESS EMISSION TABLE (SHOULD CHECK WITH 7)	SUM COLUMNS 5 + 7 (SHOULD CHECK WITH 4)	NUMBER HOURS MONITOR OUTAGE PER OUTAGE TABLE	NUMBER HOURS MONITOR DOWNTIME FROM OUTAGE TABLE	TOTAL MONITOR DOWNTIME SUM COLUMNS 10 + 11	MONITOR AVAILABILITY (1 MINUS COLUMNS 12 / 2)	SUM COLUMNS 4 + 12 (SHOULD CHECK WITH 2)
1	2160	2041.00	2158.00	2143.00	0.993	15.00	15.00	2158.00	2.00	0.00	2.00	0.999	2160.00
2	2134	1759.00	2114.00	2016.00	0.954	98.00	98.00	2114.00	70.00	0.00	70.00	0.967	2184.00
3	2208	2025.10	2190.00	2134.00	0.974	56.00	56.00	2190.00	18.00	0.00	18.00	0.992	2208.00
4	2208	2150.00	2173.00	2154.00	0.991	19.00	19.00	2173.00	35.00	0.00	35.00	0.984	2208.00
YEARLY TOTAL	8760	7976.50	8635.00	8447.00	0.978	188.00	188.00	8635.00	125.00	0.00	125.00	0.986	8760.00

VIOLATION CATAGORIES	B	74.00	0.009
	C	75.00	0.009
	D	28.00	0.003
	E	11.00	0.001
	F	0.00	0.000
	G	0.00	0.000

MONITOR RELIABILITY = 1.0 - (total column 10 / total column D) = 0.994

YEAR 1990 COMPLETED BY Lee Griscavic

COMPANY FMC Soda Ash Plant DATE May 24, 1991

UNIT Boiler #7 (NS-1-B) CEM MONITOR EVALUATION WORK SHEET

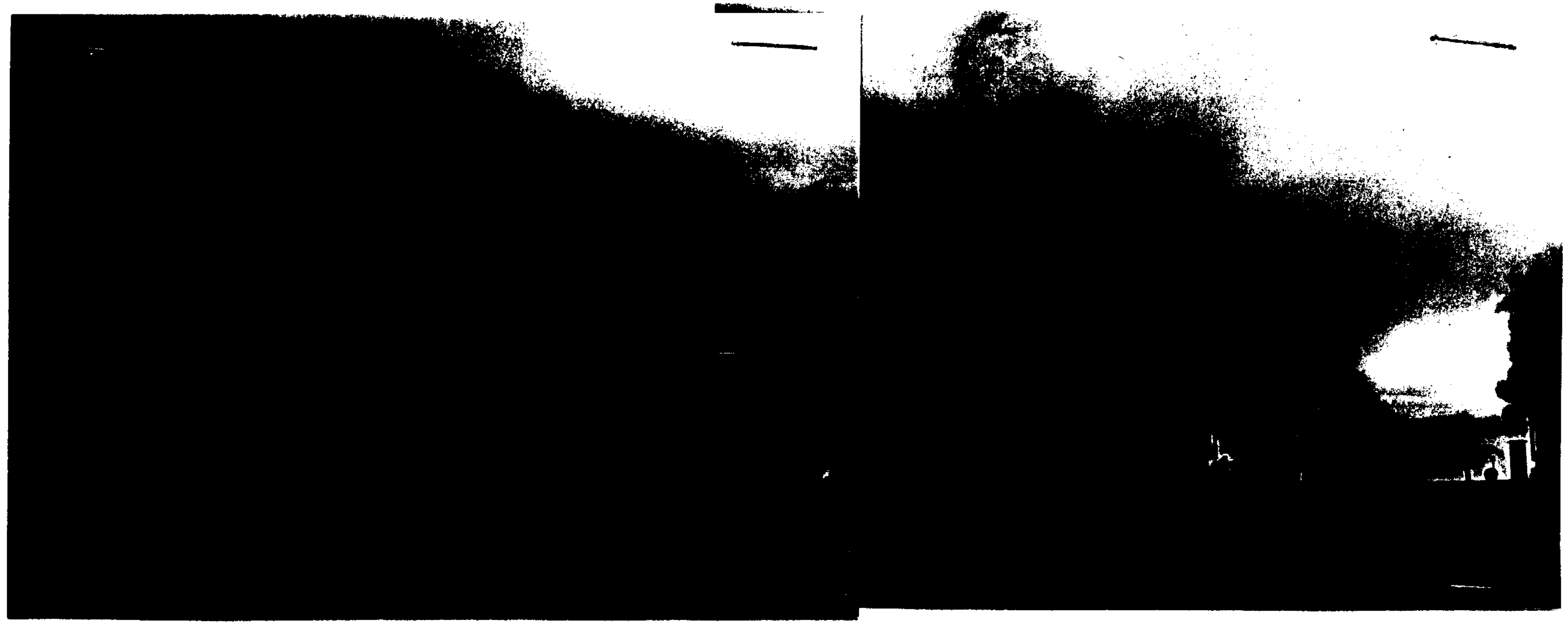
POLLUTANT Nitrogen Oxides

1	2	3	4	5	6	7	8	9	10	11	12	13	14
QUARTER	HOURS IN QUARTER	NUMBER HOURS UNIT OPERATED	NUMBER HOURS MONITOR OPERATED	NUMBER HOURS MONITORED COMPLIANCE STATISTICAL SHEET	UNIT COMPLIANCE RATE (COLUMN 5 / 3)	NUMBER HOURS MONITORED VIOLATION STATISTICAL SHEET	NUMBER HOURS MONITORED VIOLATION FROM EXCESS EMISSION TABLE (SHOULD CHECK WITH 7)	SUM COLUMNS 5 + 7 (SHOULD CHECK WITH 4)	NUMBER HOURS MONITOR OUTAGE FROM OUTAGE TABLE	NUMBER HOURS MONITOR TURNED OFF FROM OUTAGE TABLE	TOTAL MONITOR DOWNTIME SUM COLUMNS 10 + 11	MONITOR AVAILABILITY (1 MINUS COLUMN 12)	SUM COLUMNS 4 + 12 (SHOULD CHECK WITH 2)
1	2184	2041.80	2155.00	2099.00	0.973	59.00	59.00	2158.00	2.00	0.00	2.00	0.999	2157.00
2	2184	1759.00	2114.00	2086.00	0.987	28.00	28.00	2114.00	70.00	0.00	70.00	0.968	2184.00
3	2208	2025.10	2190.00	2048.00	0.935	142.00	142.00	2190.00	18.00	0.00	18.00	0.992	2208.00
4	2208	2150.60	2173.00	1951.00	0.898	222.00	222.00	2173.00	35.00	0.00	35.00	0.984	2209.00
YEARLY TOTAL	8760	7976.50	8635.00	8184.00	0.948	451.00	451.00	8635.00	125.00	0.00	125.00	0.986	8760.00

VIOLATION CATAGORIES	B	435.00	0.050
	C	15.00	0.002
	D	1.00	0.000
	E	0.00	0.000
	F	0.00	0.000
	G	0.00	0.000

MONITOR RELIABILITY = 1.0 - (total column 10 / total column 2) = 0.994

FMC Sodium Products Plant FY 91 Annual Inspection (May 29, 1991)



looking north at the sesqui plant

RA-26 fluid bed and RA-15 & 16 steam tube calciner steam plumes visible above building to the left of the picture

twin stacks from RA-22, 23 & 24 steam tube calciners are visible in the center of the picture
note the residual haze from these three sources operating at ± 60% opacity

RA-25 fluid bed calciner stack is just visible at the far right of the picture

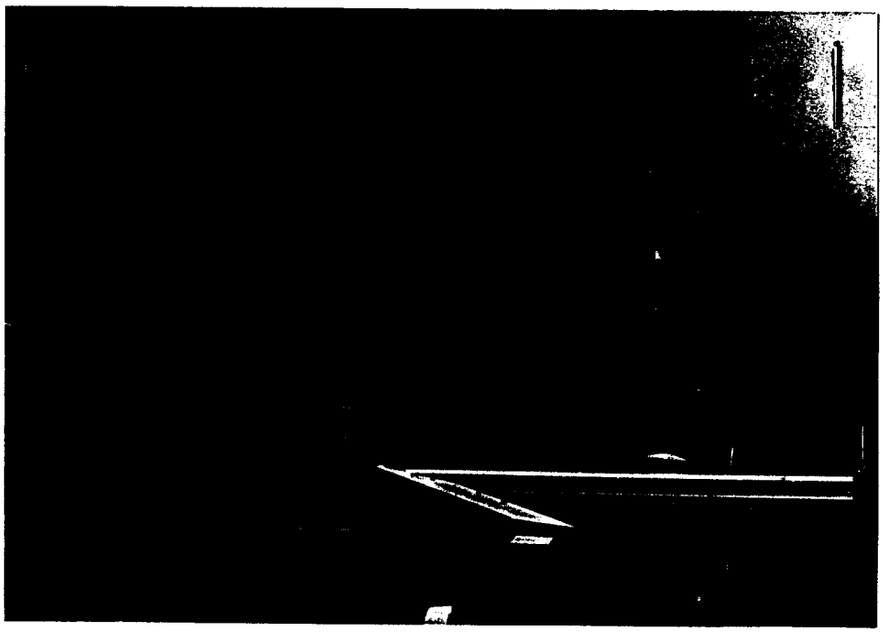
looking NE @ the mono plant

no visible emissions from Mono-6, NS-6 driers (far end), or Mono-5 calciner (near left) after ste
dissipates; note bluish haze from NS-5 calciner (near right) which is different from white stea

looking NW at the phosphate plant

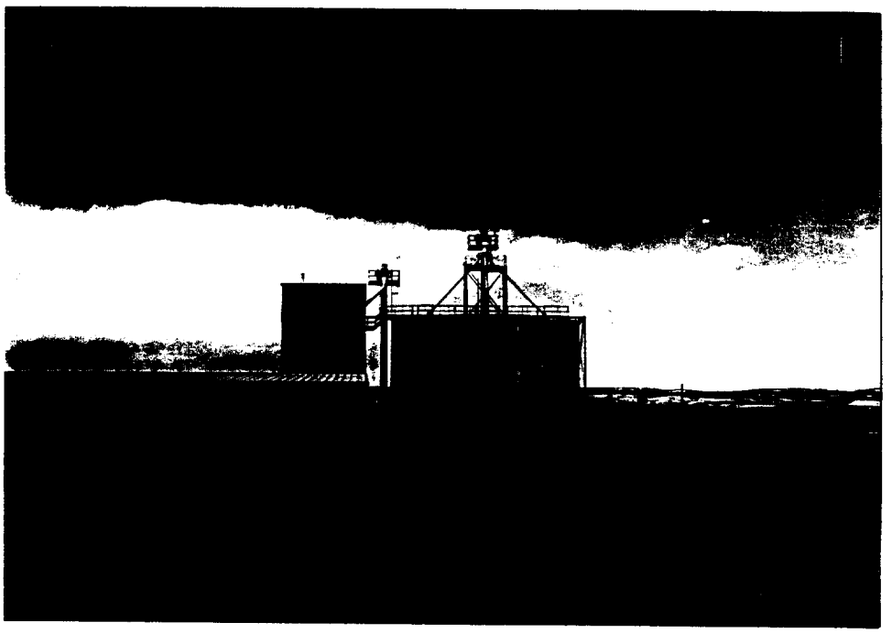
only PP-20 rotary drier is operating - no visible emissions after the steam dissipates

looking NE at the solution lime/caustic plant
no visible emissions from SM-1 lime kiln (left) after the steam dissipates
no visible emissions from RD-3 lime slaker stack (center) or from SM-2, SM-3 & RD-2 bin vents



looking east at the sodium cyanide plant
NACN-1 incinerator stack (left) & NACN-2 plant flare (right) both down this date

Looking north at the bicarb plant
w/ visible emissions from either BC-1 flash drier (right) or BC-2 product baghouse (left)



looking north at the MD-112 sesqui bagging operation, w/ no visible emissions from RH-26 baghous