

NORTH CAROLINA DIVISION OF AIR QUALITY			Region: Washington Regional Office County: Craven NC Facility ID: 2500019 Inspector's Name: Bernie Pittman Date of Last Inspection: 07/29/2009 Compliance Code: 3 / Compliance - inspection
Air Permit Review – 112(j) Significant Modification Permit Issue Date: XXXXXX, 2010			
Facility Data			Permit Applicability (this application only)
Applicant (Facility's Name): Marine Corps Air Station Facility Address: Marine Corps Air Station Highway 70 and Highway 101 Cherry Point, NC 28533 SIC: 9711 / National Security NAICS: 92811 / National Security Facility Classification: Before: Title V After: Title V Fee Classification: Before: Title V After: Title V			SIP: N/A NSPS: N/A NESHAP: N/A PSD: N/A PSD Avoidance: N/A NC Toxics: N/A 112(r): N/A Other: 15A NCAC 2D .1109 <i>[112(j) – Part 2 Hammer for Boilers & Process Heaters]</i>
Contact Data			Application Data
Facility Contact	Authorized Contact	Technical Contact	Application Number: 2500019.09A Date Received: 09/10/2009 Application Type: 112(j) Part II Application Schedule: TV-Significant Existing Permit Data Existing Permit Number: 04069T31 Existing Permit Issue Date: 11/09/2009 Existing Permit Expiration Date: 08/31/2014
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I. Introduction:

Marine Corps Air Station (MCAS) Cherry Point comprises 13,164 acres situated along the Neuse River in Craven County. MCAS Cherry Point is home to the headquarters of the 2nd Marine Aircraft Wing (MAW), which is also the largest tenant command at the facility. The 2nd MAW group includes all of the following organizations, Marine Aircraft Group (MAG) 14, Marine Wing Support Group (MWSG) 27, and Marine Air Control Group (MACG) 28. The flying squadrons assigned to MAG-14 include three AV-8B Harrier Squadrons, four EA-6B Prowler Squadrons, and one KC-130 Hercules refueling squadron. The Air Station is also home to the Marine Corps' only AV-8B Harrier Training Squadron.

Per 40 CFR Part 70.2, MCAS Cherry Point is a major source of both criteria pollutants and hazardous air pollutants. Potential emissions of criteria pollutants exceed the 100 tons per year threshold. Additionally, the facility exceeds the hazardous air pollutant (HAP) thresholds of 10 tons per year of an individual HAP or 25 tons per year of aggregate HAP.

II. Purpose of application: Application No. 2500019.09A was received by the Division of Air Quality (DAQ), Raleigh Central Office on September 10, 2009 and was considered complete on that date. This application is a Part 2 MACT "Hammer" application and a site specific risk assessment for the affected boilers located at the Marine Corp Air Station facility. This application was prepared in accordance with DAQ's CAA §112(j) – Part II MACT "Hammer" Application Guidance.

II. Purpose of application: (Continued)

The facility proposes to demonstrate compliance through the health based compliance approach. The following conservative assumptions were used:

- Affected units were assumed to operate concurrently at maximum capacity for 8760 hours per year.
- Fuel was assumed to contain the maximum anticipated concentrations based on the facilities 2006 fuel variability study.
- Receptors were placed at equally spaced positions starting on the property boundary.

III. Permit Modifications/Changes:

The following table describes the modifications to the current permit.

Page(s)	Section	Description of Change(s)
1	Cover letter	Amend permit revision numbers and issuance/effective dates.
2	Cover letter	Amend issue and effective date
3	Cover letter	Revise “changes to permit table” per application 2500019.09A
1	Permit	Amend Permit issue and effective date, changed complete application date, revise application number, changed permit revision to T32
3	Permitted Sources Table	Add 112(j) description to boilers CP-152-BOIL-1, 2, 3, 4, 5, & 6 Add 112(j) description to boilers CP-4390-BOIL-1, 2, & 3
6-9	Permitted Sources Table	Added boilers (less than 3.0 mmBtu/hour heat input) that are subject to 112(j) to Table
All pages	Header of Permit	Changed revision No. to T32
10	Specific Conditions and Limitations	Added 15A NCAC 2D.1109 [CAA § 112(j)] conditions to regulatory requirements
13	Specific Conditions and Limitations	Added 15A NCAC 2D.1109 [CAA § 112(j)] conditions to regulatory requirements
16	Specific Conditions and Limitations	Added 15A NCAC 2D.1109 [CAA § 112(j)] conditions to regulatory requirements
19	Specific Conditions and Limitations	Added 15A NCAC 2D.1109 [CAA § 112(j)] conditions to regulatory requirements
32-33	Specific Conditions and Limitations	Added regulations for the numerous boilers (all less than 3 million Btu per hour) that were added to the permit because of 112(j) applicability
44	Multiple Emissions	Added 15A NCAC 2D.1109 [CAA § 112(j)] conditions to regulatory Specific Conditions
52-61	General Conditions	Added General Conditions (version 3.1)

IV. Regulatory Review – 15A NCAC 2D .1109 – CAA § 112(j); Case-by-Case MACT for Boilers

A. On July 20, 2007, the D.C. Circuit Court vacated the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Industrial, Commercial, and Institutional Boilers and Process Heaters, which had been promulgated under 40 CFR 63, Subpart DDDDD. The North Carolina Attorney General’s office has determined that the NESHAP vacatur equates to the failure of the U.S. EPA to promulgate a valid standard as required under Section 112(d) of the Clean Air Act (CAA). As a result, the site-specific Maximum Achievable Control Technology (MACT) standards required under CAA §112(j), commonly referred to as the MACT “hammer” provisions, have been triggered. North Carolina regulations implementing the MACT hammer are found at 15A NCAC 2D .1109.

On September 10, 2009, the NC DAQ received a Part 2 MACT “Hammer” application from this facility asking that the NC DAQ establish 112(j) emissions limitations. In addition to the solid fuel boilers at the Central Heating plant, Marine Corps Air Station – Cherry Point operates units classified as liquid fuel fired boilers at the Central Heating Plant and various small liquid and gaseous boilers at individual buildings or groups of buildings through the facility. All these units have been included in the risk assessment for this facility.

B. Table 1: Marine Corps Air Station Cherry Point Affected Sources

Building No.	ID No.	Building Name	Heat Input Capacity	Fuel
152	CP-152-BOIL-1 *	Central Heating Plant (CHP)	94 million Btu per hour	Coal
152	CP-152-BOIL-1 *	Central Heating Plant (CHP)	145 million Btu per hour	No. 6 fuel oil
152	CP-152-BOIL-1 *	Central Heating Plant (CHP)	96 million Btu per hour	No. 2 fuel oil
152	CP-152-BOIL-2 *	Central Heating Plant (CHP)	94 million Btu per hour	Coal
152	CP-152-BOIL-2 *	Central Heating Plant (CHP)	145 million Btu per hour	No. 6 fuel oil
152	CP-152-BOIL-2 *	Central Heating Plant (CHP)	96 million Btu per hour	No. 2 fuel oil
152	CP-152-BOIL-3 *	Central Heating Plant (CHP)	96 million Btu per hour	No. 2 fuel oil
152	CP-152-BOIL-3 *	Central Heating Plant (CHP)	96 million Btu per hour	Off Spec JP-5
152	CP-152-BOIL-4 *	Central Heating Plant (CHP)	96 million Btu per hour	No. 2 fuel oil
152	CP-152-BOIL-4 *	Central Heating Plant (CHP)	96 million Btu per hour	Off Spec JP-5
152	CP-152-BOIL-5 *	Central Heating Plant (CHP)	72 million Btu per hour	No. 6 fuel oil
152	CP-152-BOIL-5 *	Central Heating Plant (CHP)	60 million Btu per hour	Off Spec JP-5
152	CP-152-BOIL-6 *	Central Heating Plant (CHP)	72 million Btu per hour	No. 6 fuel oil
152	CP-152-BOIL-6 *	Central Heating Plant (CHP)	60 million Btu per hour	Off Spec JP-5
4390	CP-4390-BOIL-1*	Naval Hospital	6.25 million Btu per hour	No. 2 fuel oil
4390	CP-4390-BOIL-2*	Naval Hospital	6.25 million Btu per hour	No. 2 fuel oil
4390	CP-4390-BOIL-3*	Naval Hospital	6.25 million Btu per hour	No. 2 fuel oil
486	-----	BOQ-4	0.42 million Btu per hour	No. 2 fuel oil
486	-----	BOQ-4	0.42 million Btu per hour	No. 2 fuel oil
192	-----	FIRE STATION #2	0.21 million Btu per hour	No. 2 fuel oil
248	-----	SPECIAL WEAPONS	0.76 million Btu per hour	No. 2 fuel oil
487	-----	BOQ-1	0.66 million Btu per hour	No. 2 fuel oil
487	-----	BOQ-1	0.66 million Btu per hour	No. 2 fuel oil
1229	-----	MAG 32	0.21 million Btu per hour	No. 2 fuel oil
4810	-----	ORDNANCE	0.14 million Btu per hour	No. 2 fuel oil
1777	-----	MACS-6	0.68 million Btu per hour	No. 2 fuel oil
1779	-----	3 rd LAAM	0.40 million Btu per hour	No. 2 fuel oil
1780	-----	3 rd LAAM	1.15 million Btu per hour	No. 2 fuel oil
1781	-----	3 rd LAAM	0.40 million Btu per hour	No. 2 fuel oil
1782	-----	3 rd LAAM	0.62 million Btu per hour	No. 2 fuel oil
1783	-----	3 rd LAAM	0.40 million Btu per hour	No. 2 fuel oil
1786	-----	MACS-6	0.36 million Btu per hour	No. 2 fuel oil
1787	-----	MACS-6	0.43 million Btu per hour	No. 2 fuel oil
1791	-----	FIRE/CRASH	0.53 million Btu per hour	No. 2 fuel oil
1795	-----	AWTU-2	0.35 million Btu per hour	No. 2 fuel oil
1799	-----	MASS-1	0.22 million Btu per hour	No. 2 fuel oil
3916	-----	MAINT. SHOP	0.50 million Btu per hour	No. 2 fuel oil
3919	-----	MAINT.FAC.	0.69 million Btu per hour	No. 2 fuel oil
4041	-----	ACROSS RUNWAY	0.14 million Btu per hour	No. 2 fuel oil
4049	-----	MAINT. FAC.	0.84 million Btu per hour	No. 2 fuel oil
4213	-----	TRAINER FAC.	0.54 million Btu per hour	No. 2 fuel oil
4298	-----	CHILD CARE	0.60 million Btu per hour	No. 2 fuel oil
4344	-----	27 HEADQTRS	0.39 million Btu per hour	No. 2 fuel oil
4401	-----	AIR OPS.FAC	0.63 million Btu per hour	No. 2 fuel oil
4402	-----	WAREHOUSE1	0.56 million Btu per hour	No. 2 fuel oil
4465	-----	WAREHOUSE2	0.54 million Btu per hour	No. 2 fuel oil
4563	-----	OPS BLDG	0.36 million Btu per hour	No. 2 fuel oil
4564	-----	REFUEL MAINT	0.24 million Btu per hour	No. 2 fuel oil
4571	-----	ENG/MAINT	0.36 million Btu per hour	No. 2 fuel oil

* Currently on existing Air Permit

-Table continued on the next page-

B. Table 1: Marine Corps Air Station Cherry Point Affected Sources (Continued)

Building No.	ID No.	Building Name	Heat Input Capacity	Fuel
4571	-----	ENG/MAINT	0.36 million Btu per hour	No. 2 fuel oil
4576	-----	MOTOR"TT"	0.24 million Btu per hour	No. 2 fuel oil
4639	-----	SEWAGE PLANT	0.60 million Btu per hour	No. 2 fuel oil
4639	-----	SEWAGE PLANT	0.60 million Btu per hour	No. 2 fuel oil
4639	-----	SEWAGE PLANT	0.63 million Btu per hour	No. 2 fuel oil
199	-----	TOWER	2.65 million Btu per hour	LP GAS
287	-----	STATION GYM	0.68 million Btu per hour	LP GAS
1281	-----	BOWLING CENTER	0.50 million Btu per hour	LP GAS
1665	-----	VMA-231	0.48 million Btu per hour	LP GAS
1667	-----	VMAT-202	0.48 million Btu per hour	LP GAS
3383	-----	COMBAT POOL	0.50 million Btu per hour	LP GAS
3452	-----	ANDY'S	0.76 million Btu per hour	LP GAS
3542	-----	DAIRY QUEEN	0.48 million Btu per hour	LP GAS
3673	-----	BEQ-1	0.86 million Btu per hour	LP GAS
3742	-----	BEQ-2	0.86 million Btu per hour	LP GAS
3957	-----	TRAINING POOL	0.48 million Btu per hour	LP GAS
4066	-----	FLIGHT SIMULATOR	1.00 million Btu per hour	LP GAS
4166	-----	BEQ	0.60 million Btu per hour	LP GAS
4167	-----	BEQ	0.60 million Btu per hour	LP GAS
4168	-----	BEQ	0.60 million Btu per hour	LP GAS
4169	-----	BEQ	0.60 million Btu per hour	LP GAS
4197	-----	BEQ	0.60 million Btu per hour	LP GAS
4198	-----	BEQ	0.60 million Btu per hour	LP GAS
4199	-----	BEQ	0.60 million Btu per hour	LP GAS
4200	-----	BEQ	0.60 million Btu per hour	LP GAS
4201	-----	BEQ	0.60 million Btu per hour	LP GAS
4210	-----	DEBARAKATION	1.01 million Btu per hour	LP GAS
4280	-----	DDS TACT	0.72 million Btu per hour	LP GAS
4294	-----	BEQ	0.60 million Btu per hour	LP GAS
4295	-----	BEQ	0.60 million Btu per hour	LP GAS
4296	-----	BEQ	0.60 million Btu per hour	LP GAS
4310	-----	BEQ	0.60 million Btu per hour	LP GAS
4311	-----	BEQ	0.60 million Btu per hour	LP GAS
4312	-----	BEQ	0.60 million Btu per hour	LP GAS
4313	-----	BEQ	0.60 million Btu per hour	LP GAS
4335	-----	INSTR. BLDG.	0.65 million Btu per hour	LP GAS
4397	-----	COMMUNICATIONS	0.50 million Btu per hour	LP GAS
4464	-----	WAREHOUSE3	1.28 million Btu per hour	LP GAS
4629	-----	CHILD DEVELOPMENT	0.45 million Btu per hour	LP GAS
4629	-----	CHILD DEVELOPMENT	0.45 million Btu per hour	LP GAS
4629	-----	CHILD DEVELOPMENT	0.30 million Btu per hour	LP GAS

The following table provides a summary of limits and standards for the small boilers described above that are not listed in the current permit.

Regulated Pollutant	Limits/Standards	Applicable Regulation
Particulate matter	0.20 pounds per million Btu	15A NCAC 2D .0503
Sulfur dioxide	2.3 pounds per million Btu	15A NCAC 2D .0516
Opacity	Shall not be more than 20% opacity when averaged over a six-minute period. However, six-minute averaging periods may exceed 20% opacity not more than once in any hour and not more than four times in any 24-hour period. In no event shall the six-minute average exceed 87% opacity.	15A NCAC 2D .0521
HAPs	Best Combustion Practices	15A NCAC 2D .1109 [CAA § 112(j)]

1. 15A NCAC 2D .0503: PARTICULATES FROM FUEL BURNING INDIRECT HEAT EXCHANGERS

- a. Emissions of particulate matter from the combustion of liquid petroleum gas and No. 2 fuel oil that are discharged from the affected combustion sources (process heaters) listed in Table 1 above into the atmosphere shall not exceed 0.20 pounds per million Btu heat input.

The total heat input for all of the boilers (excluding the boilers in the Central Heating Plant and the Naval Hospital) listed in the Table 1 above is 45.53 million Btu per hour heat input:

Using AP-42 emission factors, PM emissions from liquid petroleum gas are estimated to be less than 0.20 lb/MMBtu, as follows:

AP-42 emissions factor for liquid petroleum gas = 0.40 lbs total PM/1000 gallons LP gas
 AP-42 heat value for liquid petroleum gas = 90,500 Btu/gallon

$$\frac{0.4 \text{ lbs } PM_{total}}{1000 \text{ gallons}} \times \frac{1 \text{ gallon}}{90,500 \text{ Btu}} \times \frac{1 \times 10^6}{mmBtu} = \frac{0.0044 \text{ lbs } PM_{total}}{mmBtu}$$

Using AP-42 emission factors, PM emissions from No. 2 fuel oil are estimated to be less than 0.20 lb/MMBtu, as follows:

AP-42 emission factor for No. 2 fuel oil = 3.3 lbs total PM/1000 gallons
 AP-42 heat value for No. 2 fuel oil = 140,000 Btu/gallon

$$\frac{3.3 \text{ lbs } PM_{total}}{1000 \text{ gallons}} \times \frac{1 \text{ gallon}}{140,000 \text{ Btu}} \times \frac{1 \times 10^6}{mmBtu} = \frac{0.024 \text{ lbs } PM_{total}}{mmBtu}$$

Because worst-case PM emission rates are estimated to be less than the allowable PM emission rate (0.2 lbs total PM/mmBtu), no monitoring, recordkeeping, or reporting shall be required to demonstrate compliance with this limitation.

Testing [15A NCAC 2D .2601]

- b. If emissions testing is required, the testing shall be performed in accordance General Condition JJ of the Permit. If the results of this test are above the limits given in Section IV. B. 1. a. above, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0503.

Monitoring/Recordkeeping/Reporting [15A NCAC 2Q .0508(f)]

- c. No monitoring, recordkeeping, or reporting is required for particulate emissions from the firing of No. 2 fuel oil or LP gas in these sources.

2. 15A NCAC 2D .0516: SULFUR DIOXIDE EMISSIONS FROM COMBUSTION SOURCES

- a. Emissions of sulfur dioxide from the burning of No. 2 fuel oil and LP gas from the affected combustion sources (except for the boilers in the Central Heat Plant and the Naval Hospital) listed in Table 1 above shall not exceed 2.3 pounds per million Btu heat input. Sulfur dioxide formed by the combustion of sulfur in fuels, wastes, ores, and other substances shall be included when determining compliance with this standard.

Using AP-42 emission factors, SO₂ emissions from LP gas are estimated to be less than 2.3 lb/MMBtu, as follows:

AP-42 emission factor = 0.01 lbs SO₂/1000 gallons
AP-42 heat value for liquid petroleum gas = 90,500 Btu/gallon

$$\frac{0.01 \text{ lbs } SO_2}{1000 \text{ gallons}} \times \frac{1 \text{ gallon}}{90,500 \text{ Btu}} \times \frac{1 \times 10^6}{\text{mmBtu}} = \frac{1.1 \times 10^{-4} \text{ lbs } SO_2}{\text{mmBtu}}$$

Using AP-42 emission factors, SO₂ emissions from No. 2 fuel oil are estimated to be less than 2.3 lb/MMBtu, as follows:

AP-42 emission factor = 71.0 lbs SO₂/1000 gallons
AP-42 heat value for No. 2 fuel oil = 140,000 Btu/gallon

$$\frac{71.0 \text{ lbs } SO_2}{1000 \text{ gallons}} \times \frac{1 \text{ gallon}}{140,000 \text{ Btu}} \times \frac{1 \times 10^6}{\text{mmBtu}} = \frac{0.51 \text{ lbs } SO_2}{\text{mmBtu}}$$

Because worst-case SO₂ emission rates are estimated to be less than the allowable SO₂ emission rate (2.3 lbs SO₂/mmBtu), no monitoring, recordkeeping, or reporting shall be required to demonstrate compliance with this limitation.

Testing [15A NCAC 2D .2601]

- b. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 2D .2601 and General Condition JJ found in Section 3 of the Permit. If the results of this test are above the limit given in Section IV. B. 2. A above, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0516.

Monitoring/Recordkeeping/Reporting [15A NCAC 2Q .0508(f)]

- c. No monitoring, recordkeeping, or reporting is required for the combustion sources listed above from the firing of LP gas and No. 2 fuel oil in these sources.

3. 15A NCAC 2D .0521: CONTROL OF VISIBLE EMISSIONS

- a. Visible emissions from the affected combustion sources listed above shall not be more than 20 percent opacity when averaged over a six-minute period. However, six-minute averaging periods may exceed 20 percent not more than once in any hour and not more than four times in any 24-hour period. In no event shall the six-minute average exceed 87 percent opacity.

Testing [15A NCAC 2D .2601]

- b. If emissions testing is required, the testing shall be performed in accordance with 15A NCAC 2D .2601 and General Condition JJ of the Permit. If the results of this test are above the limit given in Section IV B. 3. a. above, the Permittee shall be deemed in noncompliance with 15A NCAC 2D .0521.

Monitoring/Recordkeeping/Reporting [15A NCAC 2Q .0508(f)]

- c. No monitoring, recordkeeping, or reporting is required for visible emissions from the firing of natural gas in these sources.

4. 15A NCAC 2D .1109: CAA § 112(j); Case-by-Case MACT

- a. The Permittee shall use best combustion practices when operating the affected boilers listed above. The initial compliance date for this work practice standard and the associated monitoring, recordkeeping, and reporting requirements is **<ENTER DATE THREE YEARS AFTER PERMIT ISSUANCE>**. These conditions need not be included on the annual compliance certification until after the initial compliance date.

Monitoring/Recordkeeping

- b. To assure compliance, the Permittee shall perform an annual boiler inspection and maintenance as recommended by the manufacturer, or as a minimum, the inspection and maintenance requirement shall include the following:
- i. Inspect the burner, and clean or replace any components of the burner as necessary;
 - ii. Inspect the flame pattern and make any adjustments to the burner necessary to optimize the flame pattern; and,
 - iii. Inspect the system controlling the air-to-fuel ratio, and ensure that it is correctly calibrated and functioning properly.

The Permittee shall conduct at least one tune-up per calendar year to demonstrate compliance with this requirement. The Permittee shall be deemed in noncompliance with 15A NCAC 2D .1109 if the affected boilers are not inspected and maintained as required above.

- c. The results of inspection and maintenance shall be maintained in a logbook (written or electronic format) on-site and made available to an authorized representative upon request. The logbook shall record the following:
- i. The date of each recorded action;
 - ii. The results of each inspection; and,
 - iii. The results of any maintenance performed on the boilers.

The Permittee shall be deemed in noncompliance with 15A NCAC 2D .1109 if these records are not maintained.

Reporting [15A NCAC 2Q .0508(f)]

- d. No reporting is required for hazardous air pollutants from the firing of natural gas in these sources.

C. Boilers located at the Central Heating Plant and Naval Hospital that are currently listed on the Air Permit That burn Coal (these boilers burn fuels but those emissions will be addressed in another section of this review):

- One coal-fired boiler {94 million Btu per hour heat input capacity when firing coal, ID Nos. CP-152-BOIL-1) with one associated electrostatic precipitator (17,136 square feet of collection plate area) in series with one multi-cyclone (36 twelve inch diameter tubes per collector), ID No. CD-CP-152-BOIL-01E} located at the Central Heating Plant
- One coal-fired boiler {94 million Btu per hour heat input capacity when firing coal, ID Nos. CP-152-BOIL-2) with one associated electrostatic precipitator (17,136 square feet of collection plate area) in series with one multi-cyclone (36 twelve inch diameter tubes per collector), ID No. CD-CP-152-BOIL-02E} located at the Central Heating Plant

The facility proposed total filterable particulate matter (PM), Hg, and CO emission limitations that are consistent with the NC DAQ application guidance (<http://daq.state.nc.us/permits/112j/>). NC DAQ has developed this guidance to provide standards and compliance procedures that it has determined meet the requirements of § 112(j).

The facility has chosen to comply with a Health-Based Compliance Alternative (HBCA) for HCl. The HBCA eligibility demonstration is consistent with the procedures provided by the EPA in the vacated § 112(d) standard for boilers and process heaters.

Both of the coal-fired/No. 6 fuel oil/No. 2 fuel oil-fired boilers (CP-152-BOIL-1 and 2) are controlled by one electrostatic precipitator each in series with one multi-cyclone each to meet the total PM standard of 0.24 lbs/million Btu heat input. Marine Corps Air Station chose to use the HBCA for PM and the emission of manganese is excluded from the list of metals.

All of the boilers located at the Central Heat Plant are less than 100 million Btu per when firing coal

Coal	$30 \leq C < 100$	Particulate Matter (filterable)	0.41 lb/MMBtu
		Total Selected Metals*	0.0004 lb/MMBtu
		Mercury	0.000003 lb/MMBtu
		Hydrogen Chloride	0.31 lb/MMBtu
		Carbon Monoxide	133 ppmvd, 7% O ₂

* Facilities may choose to comply with the Total Selected Metals (TSM) standard *in lieu* of the particulate matter (PM) standard. Facilities are not required to comply with both the PM and TSM standards.

1. Filter able Particulate Matter (PM)

In accordance with the 112(j) application guidance provided by NC DAQ, affected facilities may propose either a total selected metal (TSM) limit or a filterable PM limit. The filterable PM is a surrogate for the regulated TSM, including arsenic, beryllium, cadmium, chromium, lead, manganese, nickel, and selenium. This facility proposed a filterable PM limit that is consistent with the NC DAQ application guidance.

a. Source Testing:

Marine Corp Air Station at Cherry Point performed a stack test on one of the two solid fuel fired units at the Central Heating Plant to measure the emissions of HCl, CL₂, Hg, and Mn. In addition to this data, representative testing of a fuel oil fired unit from the Marine Corps Base at Camp Lejeune was used in estimating the hydrogen chloride and chlorine emission from the small fuel oil fired boilers. Also, the facility performed testing in 2006 to determine the compliance approach to be used with the original regulation. This testing event quantified emissions of mercury fro the solid fuel-fired boilers.

Prior to any stack testing, fuel analyses were conducted using the methods outlined in the fuel sampling plan to document that the worse-case fuel mix was fired in each boiler during eh HCl, CL₂, and Mn testing. Based on historical data and the fuel sampling results, coal has the highest chloride and manganese content of the fuels fired in the CHP boiler . Therefore, testing was conducted while firing 100% coal.

Summary of the Central Plant Testing Program

Emission Source	Fuel Mix	Test Location	Parameter/Pollutants	US EPA Test Methods
CP-152-BOIL-2	100% coal	Selected using US EPA Method 1. The sampling points for collecting gas samples and measuring gas flow were identical at the two stacks. The stack is 63 inches in diameter, with 3 inch flanged pipe stub ports approximately 100 feet above the ground level.	Oxygen and carbon dioxide	3A or 3B
			Moisture	4
			Conversion of concentration data to units of pounds per million Btu will be calculated using the F-factor methodology	19
			HCl and CL ₂	26
			Hg and Mn	29

b. Worse-Case Potential emissions of from Central Heating Plant Boilers

Equation 1 in Section 15 of the application Guidance Document was used.

$$MaximumHourlyEmissions = \sum_{j=1}^I (R_{i,j} \times I_j)$$

Where:

- $E_{i,s}$ = Maximum hourly emission rate for HAP (HCl, Cl₂, Hg, Mn) in pounds per hour
- s = Individual emission point
- j = Each affected source associated with an emission point, s
- t = Total number of affected sources associated with an emission point s
- $R_{i,j}$ = Emission rate for HAP (HCl, Cl₂, Hg, Mn) in lbs/mmBtu.
- I_j = Maximum rated heat input capacity of the appropriate emission point, in mmBtu/hr.

i. Mercury (Hg)

This facility has proposed a mercury limit of 3.0E-06 lbs/mmBtu when firing coal, which is consistent with the NC DAQ application guidance.

Test results are summarized in the following table:

Unit	Maximum Rated Heat input (mmBtu/hr)	Mercury – Coal Firing		
		Emission Rate lbs/mmBtu	Fuel variability factor	Max. hourly emission lbs/hr
CP-152-BOIL-1	94	9.50E-07	7.57E+00	6.76E-04
CP-152-BOIL-2	94	9.50E-07	7.57E+00	6.76E-04

To demonstrate compliance with the standard, Marine Corps Air Station at Cherry Point will conduct an initial performance test and establish the minimum coal-to-sorbent emission rate required to demonstrate compliance with the Hg limit. If the facility believes that prior testing is sufficient to demonstrate compliance with the applicable limit and establish the operating parameter, it may submit the report to the NC DAQ – SSCB for review.

In addition, the facility must monitor proper operation of the ESP and multicyclones, which will be demonstrated by limiting the opacity of the exhaust streams to no greater than 20% opacity (6-minute average), except for one 6-minute period per hour of not more than 27% opacity.

ii. Carbon Monoxide (CO)

Marine Corp Air Station Cherry Point proposed a CO limit of 133 ppmvd, corrected to 7% oxygen, which is consistent with the NC DAQ application guidance.

D. Boilers located at the Central Heating Plant and Naval Hospital that are currently listed on the Air Permit that burn No. 6 fuel oil, or No. 2 fuel oil, or off specification JP-5, or used oil:

- One No. 6/No. 2 fuel oil-fired boiler {145 million Btu per hour heat input capacity when firing No. 6 fuel oil, and 96 million Btu per hour heat input capacity each when firing No. 2 fuel oil, ID Nos. CP-152-BOIL-1) with one associated electrostatic precipitator (17,136 square feet of collection plate area) in series with one multi-cyclone (36 twelve inch diameter tubes per collector), ID No. CD-CP-152-BOIL-01E} located at the Central Heating Plant
- One No. 6/No. 2 fuel oil-fired boiler {145 million Btu per hour heat input capacity when firing No. 6 fuel oil, and 96 million Btu per hour heat input capacity each when firing No. 2 fuel oil, ID Nos. CP-152-BOIL-2) with one associated electrostatic precipitator (17,136 square feet of collection plate area) in series with one multi-cyclone (36 twelve inch diameter tubes per collector), ID No. CD-CP-152-BOIL-02E} located at the Central Heating Plant
- One No. 2 fuel oil/off-specification JP-5 fuel/used oil-fired boiler, (96.0 million Btu per hour heat input capacity, ID Nos. CP-152-BOIL-3, NSPS) located at the Central Heating Plant
- One No. 2 fuel oil/off-specification JP-5 fuel/used oil-fired boiler, (96.0 million Btu per hour heat input capacity, ID Nos. CP-152-BOIL-4, NSPS) located at the Central Heating Plant
- One No. 6 fuel oil/off specification JP-5 fuel/used oil-fired boiler (72.0 million Btu per hour heat input capacity when firing No. 6 and 60 million Btu heat input capacity when firing JP-5 fuel, ID Nos. CP-152-BOIL-5) located at the Central Heating Plant
- One No. 6 fuel oil/off specification JP-5 fuel/used oil-fired boiler (72.0 million Btu per hour heat input capacity when firing No. 6 and 60 million Btu heat input capacity when firing JP-5 fuel, ID Nos. CP-152-BOIL-6) located at the Central Heating Plant

- One No. 2 fuel oil-fired boiler (6.25 million Btu per hour heat input capacity, ID Nos. CP-4390-BOIL-1) located in Building 4390 [Naval Hospital]
- One No. 2 fuel oil-fired boiler (6.25 million Btu per hour heat input capacity, ID Nos. CP-4390-BOIL-2) located in Building 4390 [Naval Hospital]
- One No. 2 fuel oil-fired boiler (6.25 million Btu per hour heat input capacity, ID Nos. CP-4390-BOIL-3) located in Building 4390 [Naval Hospital]

The facility proposed total filterable particulate matter (PM), Hg, and CO emission limitations that are consistent with the NC DAQ application guidance (<http://daq.state.nc.us/permits/112j/>). NC DAQ has developed this guidance to provide standards and compliance procedures that it has determined meet the requirements of § 112(j).

The facility has chosen to comply with a Health-Based Compliance Alternative (HBCA) for HCl. The HBCA eligibility demonstration is consistent with the procedures provided by the EPA in the vacated § 112(d) standard for boilers and process heaters.

Both of the No. 6 fuel oil/No. 2 fuel oil-fired boilers (CP-152-BOIL-1 and 2) are controlled by one electrostatic precipitator each in series with one multi-cyclone each to meet the total PM standard of 0.24 lbs/million Btu heat input. Marine Corps Air Station chose to use the HBCA for PM and the emission of manganese is excluded from the list of metals.

Both of the No. 2 fuel oil/off specification JP-5 fuel/used oil-fired boilers (CP-152-BOIL-3 and 4) are uncontrolled. These units are limited to 0.21 lbs PM/mmBtu heat input per 15A NCAC 2D .0503. These units are also subject to NSPS Subpart Dc which limit sulfur content in fuel to 0.5% by weight. Marine Corps Air Station chose to use the HBCA for PM and the emission of manganese is excluded from the list of metals.

Both of the No. 6 fuel oil/off specification JP-5 fuel/used oil-fired boilers (CP-152-BOIL-5 and 6) are uncontrolled. These units are limited to 0.23 lbs PM/mmBtu heat input per 15A NCAC 2D .0503. Marine Corps Air Station chose to use the HBCA for PM and the emission of manganese is excluded from the list of metals.

All three of the No. 2 fuel oil-fired boilers (CP-4390-BOIL-1, 2, and 3) are uncontrolled. These units are limited to 0.20 lbs PM/mmBtu heat input per 15A NCAC 2D .0503. Marine Corps Air Station chose to use the HBCA for PM and the emission of manganese is excluded from the list of metals.

Residual Fuel Oil (Nos. 4, 5, and 6)	All Capacities	Particulate Matter (filterable)	0.45 lbs/mmBtu
		Total Selected Metals*	0.002 lbs/mmBtu
		Mercury	0.00002 lbs/mmBtu
		Carbon Monoxide	28 ppmvd, 7% O ₂
Distillate Fuel Oil	All Capacities	Particulate Matter (filterable)	0.014 lbs/mmBtu
		Total Selected Metals*	0.000051 lbs/mmBtu
		Mercury	0.000003 lbs/mmBtu
		Carbon Monoxide	30 ppmvd, 7% O ₂
Gaseous Fuel	All Capacities	Carbon Monoxide	66 ppmvd, 7% O ₂

* Facilities may choose to comply with the Total Selected Metals (TSM) standard *in lieu* of the particulate matter (PM) standard. Facilities are not required to comply with both the PM and TSM standards.

1. Liquid and Gaseous Fuel Fired Boilers:

In accordance with the application guidance published by the NCDAQ, Marine Corp Air Station Cherry Point shall comply with the monitoring, recordkeeping, and reporting as outlined in Section 6, 9, 12, 13, and 14 of the guidance document.

- No performance testing is required for those boilers firing only gaseous fuel and/or virgin distillate fuel oil. These units will comply with the required initial compliance demonstration, monitoring, recordkeeping, and notification requirements. [Section 6. a. ii. of guidance document]
- For those units firing only gaseous fuel and/or distillate fuel oil retain records demonstrating that the source only fires these fuels. An acceptable record may include a fuel oil certification from the vendor or receipts for fuel oil, natural gas, propane, and/or liquefied petroleum gas purchased by the facility. [Section 9. a. iii. of guidance document]

- The Permittee shall maintain records of the type and amount of all fuels burned in each affected source during the reporting period to demonstrate that:
 - The fuel types and mixtures of fuels fired at the sources were limited to only gaseous fuel and/or distillate fuel oil. [Section 12. a. iii. of guidance document]
- Maintain records of monthly fuel use by each affected source, including the types of fuel and amounts used. [Section 13. e. i. of the guidance document]
- Submit Notification of Compliance Status that meets the requirements of §63.9(h)(2)(ii) before the close of business on the 60th day following the completion of the final required initial compliance demonstration. The Notification of Compliance Status report must contain a certification signed by the Responsible Official that the sources fired only gaseous fuel and/or distillate fuel oil. [Section 14. b. viii. of guidance document]

E. Health Based Compliance Analysis for Hydrogen Chloride (HCl)

Marine Corp Air Station Cherry Point submitted an HBCA eligibility compliance demonstration in September 2009 in accordance with procedures promulgated by the EPA using a modeling.

1. Risk Assessment Methodology:

One of the required elements to be included in the compliance demonstration is an evaluation of the peer-reviewed risk methodology used. As described in EPA guidance documents, risk assessments are divided into four steps:

a. Hazard Identification:

Human and Ecological Risk Assessment Theory and Practice edited by Dennis J. Paustenbach, PhD characterizes this step in the risk assessment process as the most easily recognized of the action of regulatory agencies and defines hazard identification as the process of determining whether human exposure to an agent could cause an increase in the incidence of a health condition (cancer, birth defect, etc.) or whether exposure by a non-human receptor, for example, fish, birds, or other wildlife, might adversely be affected. It involves characterizing the nature and strength of the evidence of causation. (Paustenbach, 2001, p.7; John Wiley and Sons, New York).

b. Dose-Response Assessment:

Human Ecological Risk Assessment Theory and Practice defines this step in the risk assessment as the process of characterizing the relation between the dose of an agent administered or received and the incidence of an adverse health effect in exposed populations and estimating the incidence of the effect as a function of exposure to the agent. (Paustenbach, 2001, p7)

The dose-response assessment for MCAS Cherry Point was derived from the Reference Concentrations (R_fC's) published by EPA in the Integrated Risk Information System (IRIS) database (HCl, Hg, and Mn) and the California Environmental Protection Agency (CAIEPA) (chlorine).

Dose –Response Data Identified Hazards

Identified Hazard	Dose-Response Data (Reference Concentration, R _f C)	Dose-Response Data (Reference Concentration, R _f C) (µg/m ³)
Hydrogen Chloride	0.02 (mg/m ³)	20 (µg/m ³)
Chlorine	0.0002 (mg/m ³)	0.2 (µg/m ³)
Manganese	0.00005 (mg/m ³)	0.05 (µg/m ³)
Mercury	0.0003 (mg/m ³)	0.3 (µg/m ³)

c. Exposure Assessment:

Paustenbach defines exposure assessment as the process of measuring or estimating the intensity, frequency, and duration of human or animal exposure to an agent currently present in the environment or of estimating the hypothetical exposures that might arise from the release of new chemicals into the environment. (Paustenbach, 2001, page 9)

The risk assessment prepared for MCAS Cherry Point utilized the emissions estimates from stack testing and fuel analysis as required by Section 15 of the NCDAQ application guidance in conjunction with the AERMOD air dispersion model. Maximum actual emission rates were utilized to derive ambient impacts.

d. Risk Characterization:

Paustenbach defines risk characterization as the process of estimating the incidence of a health effect under the various conditions of human or animal exposure described in the exposure assessment. It is performed by combining the exposure and dose-response assessments. (From Paustenbach, 2001, p.9)

The AEMOD dispersion model calculates ratios that represent a direct correlation between a source's emission rate of a substance in (grams/second) and the concentration of that substance in air (in $\mu\text{g}/\text{m}^3$) at a particular location; dose-response data provide a direct correlation between the concentration of a substance in air (in $\mu\text{g}/\text{m}^3$) and the quantity of increased deleterious effects. These two tools together make it possible to predict the increase in deleterious effect attributable to a source of HAP emissions at a downwind location.

2. Risk Assessment Results:

The Risk assessment was performed according to NCDAQ application guidelines. The assumptions utilized were intended to simulate exposure over a 70-year lifetime in order to make a reasonable comparison with the thresholds presented in the guidance document. The application guidance utilizes a concept that describes the inhalation risk associated with a particular HAP.

a. Threshold Comparison Values:

Application guidance states that the calculated Hazard Index (HI) or Hazard Quotient (HQ) must be less than or equal to 1.0 at a location where people live in order for a facility to demonstrate compliance with eh health-based compliance approach.

The hazard quotient is compound-specific and is the result of the modeled concentration divided by the reference concentration (R_fC)

R_fC = An estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime.

These R_fC values are meant to protect the general population, including susceptible or sensitive individuals. Since the values are intended to protect sensitive populations, the values are conservative. They assume continuous or daily exposure over a lifetime, typically 70 years, and incorporate several uncertainty and/or safety factors.

The hazard index is simply the sum of HQ values when multiple compounds must be evaluated concurrently. For example, the HI will be determined as the sum of the HQ for chlorine and the HQ for hydrogen chloride. The resulting HQ ratio or the calculated HI value must be less than 1.0 to utilize the health-based compliance approach.

The Risk characterization for long-term inhalation effects of hydrogen chloride and chlorine are provided in the following table. The long-term risk characterization included a conservative exposure assessment that estimated the 5-year average ambient concentrations by simulating MCAS Cherry Point operations at 100% of rated capacity. The exposures predicted to occur at the receptors with the highest 5-year average ambient concentrations by for each target compound were superimposed on a hypothetical receptor so that the cumulative risk for exposures to both of the target compounds could be aggregated. Subsequently the maximum exposure for each required compound was combined with long-term inhalation dose-response values.

The maximum hazard index (HI) for long-term inhalation effects of hydrogen chloride and chlorine at a location where people live was estimate to be 0.349, which is below the 1.0 threshold set for the health-based compliance option.

Risk Characterization for Long-Term Inhalation Effects of Hydrogen Chloride and Chlorine

Identified Hazard	Modeled Maximum 5-year concentration ($\mu\text{g}/\text{m}^3$)	Dose-Response Data {Reference Concentration, R_fC }	Hazard Quotient
Hydrogen Chloride	0.16403	0.02 mg/m^3 or 20 $\mu\text{g}/\text{m}^3$	0.0082
Chlorine	0.06818	0.0002 mg/m^3 or 0.2 $\mu\text{g}/\text{m}^3$	0.341
Hazard Index (HI)			0.349
Risk Threshold			1.00

Calculation of Hazard Index in the table above units $\mu\text{g}/\text{m}^3$:

$$\text{Hazard Index} = \frac{\text{modeled maximum concentration}_{\text{HCl}}}{\text{reference concentration}_{\text{HCl}}} + \frac{\text{modeled maximum concentration}_{\text{Cl}_2}}{\text{reference concentration}_{\text{Cl}_2}} < 1$$

The risk characterization for long-term inhalation effects of manganese and mercury is provided in the table below. The long-term risk characterization included a conservative exposure assessment that estimated the 5-year average ambient impacts by simulating MCAS Cherry Point operations at 100% of rated capacity. The exposure predicted to occur at the receptor with the highest 5-year ambient concentration was combined with the long-term inhalation dose response value.

The maximum hazard quotient (HQ) for long-term inhalation effects of manganese and mercury at a location where people live was estimated to be 0.0205, which is below the 1.0 threshold set for the health-based compliance option.

Risk Characterization for Long-Term Inhalation Effects of Manganese and Mercury

Identified Hazard	Modeled Maximum 5-year concentration ($\mu\text{g}/\text{m}^3$)	Dose-Response Data (Reference Concentration, R_fC (mg/m^3))	Hazard Quotient
Manganese	0.00102	0.00005 mg/m^3 or 0.05 $\mu\text{g}/\text{m}^3$	0.0204
Mercury	0.00002	0.0003 mg/m^3 or 0.3 $\mu\text{g}/\text{m}^3$	0.000067
Hazard Index (HI)			0.0205
Risk Threshold			1.00

Calculation of Hazard Index in the table above using the units $\mu\text{g}/\text{m}^3$:

$$\text{Hazard Index} = \frac{\text{modeled maximum concentration}_{\text{Mn}}}{\text{reference concentration}_{\text{Mn}}} + \frac{\text{modeled maximum concentration}_{\text{Hg}}}{\text{reference concentration}_{\text{Hg}}} < 1$$

The risk characterization for MCAS cherry Point indicates that the risk to the public due to long-term inhalation of air emissions from the affected sources is below the low risk thresholds established by the rule for long-term inhalation effects. Therefore, MCAS Cherry Point may utilize the health-based compliance approach (HBCA) to demonstrate compliance with the case-by-case emission limits.

V. Modeling:

Mr. Tom Anderson of the DAQ Air Quality Analysis section reviewed the Air Toxics Risk Assessment analysis that was submitted with the 112(j) application. Mr. Anderson made the following comments concerning the modeling.

MCAS Cherry Point used AERMOD to model hydrogen chloride, chlorine, and manganese emissions from the facility. Emission rates and stack parameters used in the modeling are provided in the attached table. For meteorology, MCAS Cherry Point appropriately used the latest NCDAQ-processed data based on than National Weather Service’s surface data for Wilmington, NC for the five-year period form 1988-1992. Additionally, a gridded receptor field, meeting all regulatory modeling requirements, and incorporating NED-derived elevations, was used in the model as prescribed by NCDAQ.

Although the aforementioned toxics are normally modeled over either a 1-hour or 24-hr evaluation period, for this risk assessment purpose an annual period was used to gauge long-term exposure. The maximum annual concentrations from the dispersion modeling and the individual toxics' Chronic Inhalation Non-cancer Dose-Response Values were used to calculate the HQ for each pollutant. Since the HI is defined as the sum of more than one HQ from multiple substances and/or multiple exposure pathways, hydrogen chloride and chlorine (both "chlorine" compounds) were combined for comparison against the risk threshold. A facility is considered "low risk" if the HI is less than one for the Non-cancer Chronic Inhalation Risk category. The HI for each of the toxics for MCAS Cherry Point is less than 1, so this facility is considered "low risk" and qualifies for a HCBCA.

Two coal-fired boilers (94 million Btu per hour each, CP-152-BOIL-1 and 2)

Source ID	Easting (X) meters	Northing (Y) meters	Base Elev meters	Stack Height meters	Temperature Kelvin	Exit Velocity m/s	Stack Dia. meters	CL ₂ lbs/hr	HCl lbs/hr	Hg lbs/hr	Manganese lbs/hr
152_1	326920	3863580	7.82	36.58	443	12	1.6	5.817558	14.52405	0.000676	3.58E-04
152_2	326920	3863580	7.56	36.58	443	9.5	1.6	5.817558	14.52405	0.000676	3.58E-04

VI. Summary:

- Total Selected Metals (TSM) when firing Coal: 0.0004 lbs/mmBtu.
- Total Selected Metals (TSM) when firing Residual oil: 0.002 lbs/mmBtu
- Total Selected Metals (TSM) when firing Distillate fuel oil: 0.00005 lbs/mmBtu

TSM is defined as the following: arsenic, beryllium, cadmium, chromium, lead, nickel, selenium. [Manganese (Mn) shall not be included in the determination of TSM.]

- Mercury (Hg) when firing Coal: 3.0E-06 lbs/mmBtu
- Mercury (Hg) when firing Distillate: 3.0E-06 lbs/mmBtu
- Mercury (Hg) when firing Residual fuel oil: 2.0E-05 lbs/mmBtu

Hydrogen Chloride-equivalent (HCl):
HCl-equivalent is defined by the following equation:

$$E = E_{HCl} + E_{Cl_2} * (R_f C_{HCl} / R_f C_{Cl_2})$$

Where:

- E = HCl-equivalent emission rate
- E_{HCl} = HCl emission rate; (29.0481 lbs/hr for two coal-fired boilers)
- E_{Cl₂} = Cl₂ emission rate; (11.635116 lbs/hr for two coal-fired boilers)
- R_fC_{HCl} = Reference concentration for HCl (20 µg/m³); and
- R_fC_{Cl₂} = Reference concentration for Cl₂ (0.20 µg/m³).

- Carbon Monoxide (CO) when firing Coal: 133 ppmvd, corrected to 7% oxygen
- Carbon Monoxide (CO) when firing Residual fuel oil: 28 ppmvd, corrected to 7% oxygen
- Carbon Monoxide (CO) when firing Distillate coal: 30 ppmvd, corrected to 7% oxygen
- Carbon Monoxide (CO) when gaseous fuel: 66 ppmvd, corrected to 7% oxygen

$$E = E_{HCl} + E_{cl_2} \times \frac{R_f C_{hcl}}{R_f C_{cl_2}}$$

$$E = 29.0481 \text{ lbsHCl / hour} + (11.635116 \text{ lbs Cl}_2 \text{ / hour} \times \frac{20 \text{ micrograms / m}^3}{0.20 \text{ micrograms / m}^3})$$

$$E = 1192.56 \text{ lbs / hour}$$

The initial compliance date for these emission limitations and associated monitoring, recordkeeping, and reporting requirements is **???, 2013**. These conditions need not be included on the annual compliance certification until after the initial compliance date. These limits apply except for periods of startup, shutdown, and malfunction. The Permittee shall follow the procedures in 15A NCAC 2D. 0535 for any excess emissions that occur during periods of startup, shutdown, or malfunction.

Monitoring, recordkeeping, testing, reporting and operating conditions will be added to the air permit for compliance purposes.

VII. Recommendations

This permit modification application for the Marine Corp Air Station at Cherry Point, located in Cherry Point, North Carolina has been reviewed by NC DAQ to determine compliance with all procedures and requirements. NC DAQ has determined that this facility appears to be complying with all applicable requirements.

Issue Permit No. 04069T32