

# Statement of Basis for the Air Operating Permit - Final

## **ConocoPhillips Ferndale Refinery**

Ferndale, Washington

**January 1, 2011**



*Serving Island, Skagit & Whatcom Counties*

**PERMIT INFORMATION**  
**ConocoPhillips Company**  
**3901 Unick Road, Ferndale, WA 98248**

**SIC: 2911**

**NAICS: 324110**

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## Table of Contents

<b>1</b>	<b>Introduction and General Facility Description .....</b>	<b>5</b>
1.1	Facility Description .....	5
1.2	Facility History .....	9
1.3	Enforcement History .....	9
1.4	Emission Reports .....	12
1.5	Emissions Inventory .....	12
1.6	Miscellaneous Refinery Non-Process Activities .....	14
1.7	Insignificant Emission Units .....	14
<b>2</b>	<b>Regulatory Programs .....</b>	<b>16</b>
2.1	New Source Performance Standards .....	16
2.2	National Emission Standards for Hazardous Air Pollutants.....	20
2.3	Prevention of Significant Deterioration .....	24
2.4	Consent Decree .....	25
2.5	Compliance Assurance Monitoring (CAM).....	25
2.6	Washington Administrative Code .....	31
2.7	Northwest Clean Air Agency Regulation.....	31
2.8	Refinery Gas Systems .....	31
2.9	Continuous Monitoring Systems (CMS).....	32
2.10	Equipment Leaks (Leak Detection and Repair) .....	33
2.11	Storage Vessel Regulations.....	36
<b>3</b>	<b>Process Descriptions, Construction History, and Regulatory Applicability .....</b>	<b>39</b>
3.1	Crude Distillation Process Area .....	39
3.2	Catalytic Cracking Process Area .....	47
3.3	Alkylolation Process Area .....	57
3.4	Reformer/DHT Distillation Process Area .....	64
3.5	Sulfur Plant/Treaters Process Area .....	71
3.6	Utilities Process Area .....	78
3.7	Effluent Treatment Process Area .....	84
3.8	Storage Vessels .....	87
3.9	Flares .....	89
3.10	Receiving Pumping Shipping .....	90
<b>4</b>	<b>Air Operating Permit Administration .....</b>	<b>93</b>
4.1	One-Time Only Requirements .....	93
4.2	Federal Enforceability .....	93
4.3	Future Requirements .....	93
4.4	Compliance Options .....	93
4.5	Permit Elements.....	93
<b>5</b>	<b>Insignificant Activities and Emission Units.....</b>	<b>97</b>
<b>6</b>	<b>Summary of Changes in Renewal 1 .....</b>	<b>103</b>
6.1	Changes throughout the AOP .....	103
6.2	Front page .....	103
6.3	Information page .....	103
6.4	Attest page .....	103
6.5	Table of Contents .....	103
6.6	SECTION 1: Emission Unit Descriptions.....	103
6.7	SECTION 2: Standard Terms and Conditions.....	103
6.8	SECTION 3: Standard Terms and Conditions for NSPS and NESHAP .....	104

6.9	SECTION 4 Generally Applicable Requirements .....	104
6.10	SECTION 5 Specifically Applicable Requirements .....	104
6.11	SECTION 6 Inapplicable Requirements .....	106
<b>7</b>	<b>Public Docket .....</b>	<b>107</b>
<b>8</b>	<b>Definitions and Abbreviations/acronyms .....</b>	<b>108</b>

## Illustrations

### Tables

Table 1-1	ConocoPhillips Ferndale Refinery Notices of Violation .....	9
Table 1-2	Criteria Pollutants in tons per year .....	12
Table 1-3	Toxic Air Pollutants in pounds per year .....	13
Table 1-4	Greenhouse gas estimates in tons per year .....	14
Table 2-1	NSPS General Provisions .....	17
Table 2-2	Equipment Subject to Subpart J.....	19
Table 2-3	NESHAP General Provisions under 40 CFR Part 61 .....	21
Table 2-4	NESHAP General Provisions under 40 CFR Part 63 .....	22
Table 2-5	Emission Units and Pollutants Subject to CAM.....	27
Table 2-6	Emission Units and Pollutants not subject to CAM.....	27
Table 2-7	Continuous Monitoring Systems .....	33
Table 2-8	ConocoPhillips Process Unit LDAR Regulation Applicability Matrix.....	35
Table 2-9	Tank Requirement Applicability Matrix .....	38
Table 6-1	Orders of Approval to Construct/Prevention of Significant Deterioration .....	106

### Figures

Figure 1-1	ConocoPhillips Ferndale Refinery Locale .....	6
Figure 1-2	ConocoPhillips Ferndale Refinery Facility View .....	7
Figure 1-3	General Refinery Flow Diagram.....	8
Figure 3-1	Crude Distillation Process Unit .....	39
Figure 3-2	S/R Gas Plant Process Unit.....	40
Figure 3-3	FCC Process Unit .....	47
Figure 3-4	FCC Process Unit Feed Prep.....	48
Figure 3-5	FCC Gas Plant .....	48
Figure 3-6	Alkylation Process Unit .....	58
Figure 3-7	Alky Sat Gas Plant Process Unit .....	59
Figure 3-8	#3 Reformer Process Unit .....	65
Figure 3-9	#3 Pretreater Process Unit .....	65
Figure 3-10	Diesel Hydrotreater Process Unit .....	66
Figure 3-11	SRU Process Unit .....	71
Figure 3-12	Boilers Process Unit.....	79
Figure 3-13	Wastewater Treatment Plant .....	85
Figure 3-14	Flare System .....	89

## **1 Introduction and General Facility Description**

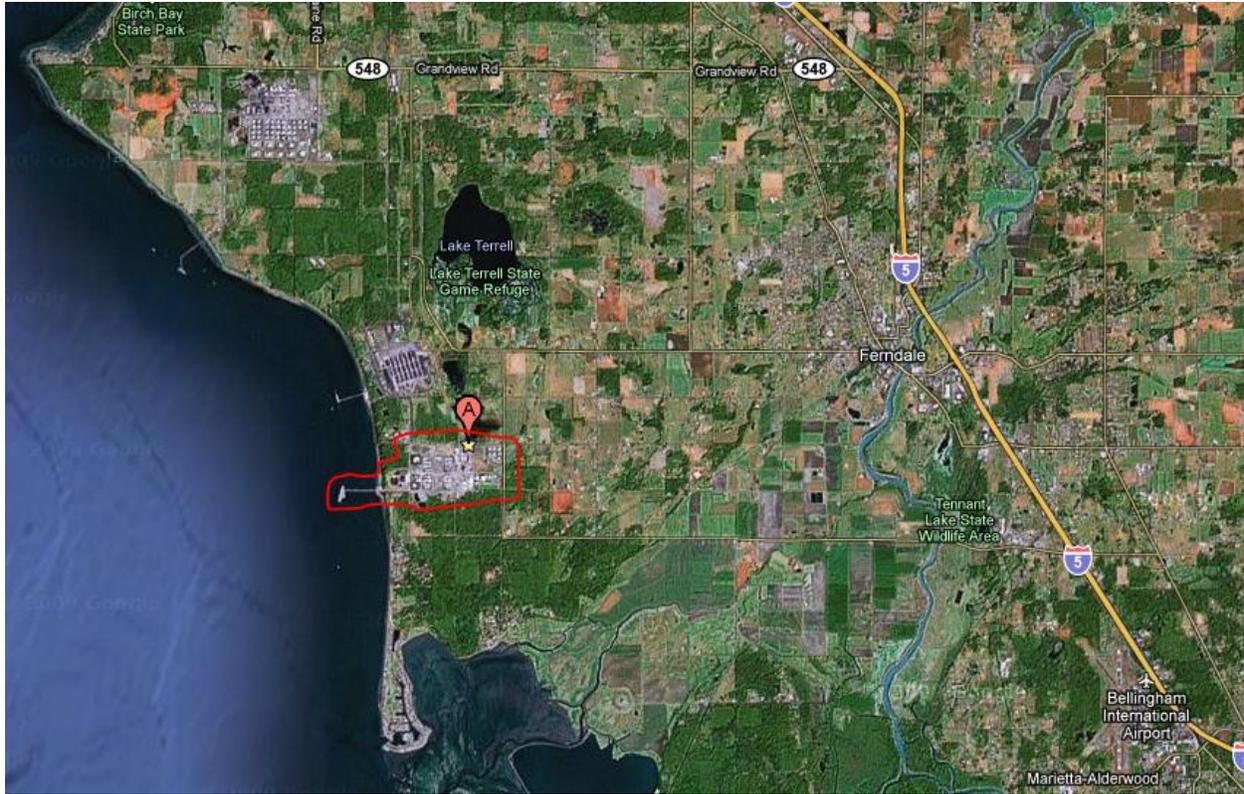
The Northwest Clean Air Agency (NWCAA) is issuing a facility air operating permit to the ConocoPhillips Ferndale Petroleum Refinery pursuant to Washington Administrative Code (WAC) 173-401 and NWCAA 322. The ConocoPhillips Ferndale Refinery, (also referred to herein as COP) is a designated major source for the air operating permit program because the facility has the potential to emit more than 100 tons of carbon monoxide (CO), nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>x</sub>), particulate matter less than ten microns in size (PM10), volatile organic compounds (VOCs), and more than 25 tons per year of combined Hazardous Air Pollutants (HAP) and more than 10 tons per year of a single HAP. These air pollutants are defined as regulated air pollutants in Chapter 173-401 of the Washington Administrative Code (WAC).

An air operating permit is a compilation of applicable air pollution regulations and enforceable procedural requirements in one facility-specific document. The purpose of this Statement of Basis is to set forth the legal and factual basis for the ConocoPhillips Ferndale Refinery Air Operating Permit conditions and to provide background information to facilitate review of the permit by interested parties. This Statement of Basis is not a legally enforceable document.

### **1.1 Facility Description**

The refinery is located at 3901 Unick Road in Ferndale, Whatcom County, Washington. The refinery is located on the coastline adjacent to the Strait of Georgia in a rural setting zoned for heavy industrial use. The surrounding area is designated in attainment with the National Ambient Air Quality Standards.

The ConocoPhillips refinery purchases crude oil on the open market for processing into a variety of petroleum products, primarily gasoline, diesel, and fuel oil. The refinery receives crude oils via tanker or pipeline and produces a wide variety of products including gasoline, diesel, sulfur, liquefied petroleum gas (LPG), butane, bunker fuel, as well as intermediates such as reformat and alkylate. Current refinery crude oil throughput is approximately 108,000 barrels per day of gross crude feed.



**Figure 1-1 ConocoPhillips Ferndale Refinery Locale**

In summary, the refining process is as follows. The crude oil is purified and fed to the crude distillation unit, which separates the material into fractions according to boiling point range. These fractions are sent to other refinery process units such as the catalytic cracking, reformer, isomerization and alkylation units for additional processing. Unrecoverable gases are burned to produce heat. A treating system is used to remove impurities, including sulfur from the products. The sulfur removed is recovered as saleable elemental sulfur. A wastewater system reduces contaminants in effluent water before discharge into the Strait of Georgia. The refinery's products are blended and stored before shipment via ship and barge, pipeline, rail car, and tanker trucks.



**Figure 1-2 ConocoPhillips Ferndale Refinery Facility View**

The ConocoPhillips refinery went through major upgrade projects in 2003 and 2007. In 2003, the existing Thermoform Catalytic Cracking Unit was replaced with a new Fluidized Catalytic Cracking Unit (FCCU). The cracking unit is a central component of the refining process, and the new FCCU provides the plant with greater efficiencies and reliability. As part of the 2003 upgrade project, additional desulfurization capacity was added so that the refinery may produce the low sulfur gasoline required by federal fuels standards. In 2007, the Crude Unit and FCCU Gas Plant were upgraded and a second Sulfur Recovery Unit (SRU#2) was installed. The operating permit incorporates the air emission standards applicable to these Upgrade/Clean Fuels Projects. A general refinery process flow diagram showing the refinery configuration is attached as Figure 1-3.

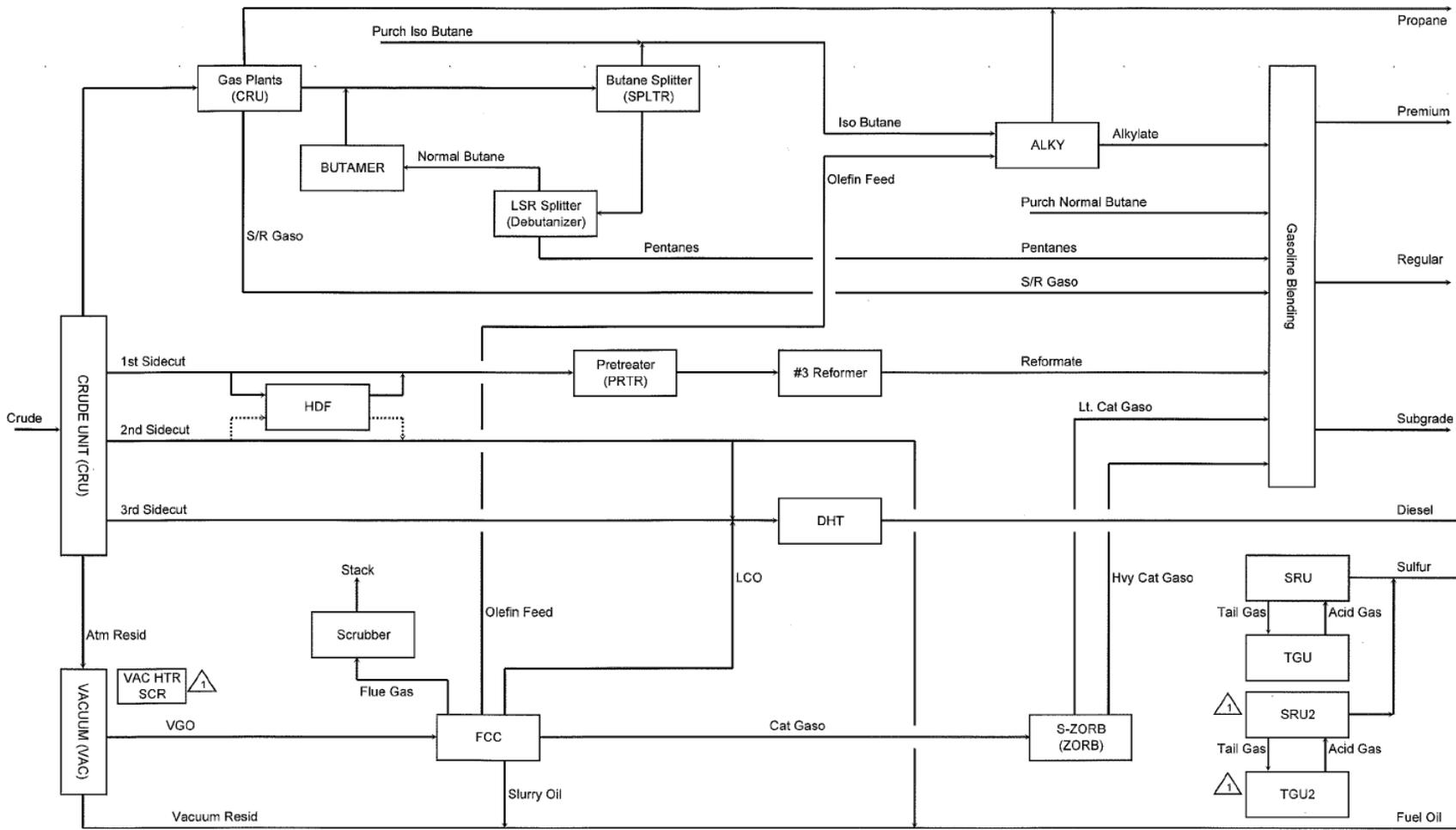


Figure 1-3 General Refinery Flow Diagram

A more detailed description of petroleum refinery processes and the resulting air emissions may be found in Chapter 5 of EPA's publication AP-42, Compilation of Air Pollutant Emission Factors. This document may be found at: <http://www.epa.gov/ttn/chief/ap42/ch05/>The principal sources of air emissions from refineries are:

- Combustion units (furnaces, boilers)
- Catalytic Cracking
- Storage tanks
- Fugitive emissions from pipe fittings, pumps, and compressors
- Sulfur plants
- Wastewater treatment facilities

## 1.2 Facility History

The refinery was built in 1953-1954 by the Mobil Oil Corporation. The BP Oil Company owned the facility from 1988 to 1993. The Tosco Corporation owned the facility from 1993 to 2001, when the Phillips 66 Company purchased the Ferndale refinery. The Phillips 66 Company merged with Conoco in 2002 to form ConocoPhillips. Therefore, documents pertaining to the subject refinery issued during these time periods are addressed to or come from each of the refining companies. The original facility was designed to process low sulfur Canadian crude oil delivered by pipeline from Alberta. The original capacity was 35,000 barrels of crude oil per day. The facility was expanded in 1967, 1972, 1990, and 2007. Current crude oil processing capacity is about 108,000 barrels per day.

The relevant construction and modification events for each process area are described below in the "Process Area Description" section of the Statement of Basis.

## 1.3 Enforcement History

Table 1-1 presents a listing of Notices of Violation (NOV) issued to the refinery since 1992. Violations are resolved through a combination of penalty assessments and corrective action taken by the source. In most cases a summary of corrective action taken by the source is submitted to the NWCAA as a written response to the violation. Additional information about each violation can be obtained upon request to the NWCAA.

**Table 1-1 ConocoPhillips Ferndale Refinery Notices of Violation**

Date Issued	NOV#	Summary	Penalty
3/8/94	2325	Ambient violation of sulfur dioxide standards	\$10,660
6/11/94	2355	Nuisance odors detected east of the facility in such concentration, duration and of such character which unreasonably interfered with enjoyment of life and property.	\$500
6/22/94	2362	Nuisance odors detected from the 5700-5900 block of N. Starr Road, on Mt. View west of N. Starr and again north of Lake Terrell and Unick in such concentration and duration as to interfere with enjoyment and use of property.	\$1,000

<b>Date Issued</b>	<b>NOV#</b>	<b>Summary</b>	<b>Penalty</b>
7/25/94	2383	Nuisance odors detected from the 5200 block of Elder, north to the Unick Road, continuing east on Unick, and south of Unick on the Lake Terrell Road in such concentration and duration as to interfere with enjoyment and use of property.	\$5,000
1/23/96	2581	Exceeded 0.250 ppm hourly ambient SO <sub>2</sub> standard more than twice in a consecutive seven day period.	\$11,000
1/23/96	2582	Exceeded 0.250 ppm ambient hourly SO <sub>2</sub> standard more than twice in a consecutive seven day period.	\$11,000
3/4/97	2712	Exceeded the 0.250 ppm ambient sulfur dioxide standard more than twice in a seven day period.	\$5,000
3/4/97	2713	Exceeded the 0.250 ppm ambient standard for sulfur dioxide more than twice in a seven day period.	\$8,300
3/4/97	2714	Exceeded the 0.250 ppm ambient sulfur dioxide standard more than twice in a seven day period.	\$11,600
5/21/97	2740	Flue gas observed to be leaking from pipe connection between the catalytic cracking unit and carbon monoxide boiler.	\$500
7/13/98	2862	1. Failure to submit complete NO <sub>x</sub> excess emissions and CEM performance summary reports for Boiler 22F-C1 for quarters 2nd, 3rd, 4th 1997 and 1st 1998. 2. Failure to submit NO <sub>x</sub> emission data reports for quarters: 2nd, 3rd, 4th 1997 and 1st 1998.	Warning
7/13/98	2863	Failure to complete NO <sub>x</sub> emissions performance test on Boiler 22F-C1 and submit results within 180 days of unit start-up.	\$600
7/14/98	2864	Butane Isomerization Unit: Failure to submit initial certification required by New Source Performance Standards subpart QQQ.	Warning
11/13/98	2902	Failure to assure that gasoline cargo tanks were leak tight in accordance with requirements under Refinery MACT Phase I.	\$500
8/23/99	2973	TCCU Surge Separator Stack opacity greater than 40% on July 27, 1999.	\$500
9/27/99	2988	Exceedance of NSPS subpart J fuel gas sulfur content limits in fuel gas routed to Liquid Feed heater 4F-1A on 7/31/99.	\$500
10/11/99	2990	Procedural error in tail gas unit startup caused shutdown of the sulfur recovery unit and resulted in routing high-sulfur sour gas and acid gas to the	\$500

<b>Date Issued</b>	<b>NOV#</b>	<b>Summary</b>	<b>Penalty</b>
		refinery flare thereby exceeding the 1000 ppm SO2 limit at the flare on 9/25/99.	
11/16/00	3091	The external floating roof on alkylate storage tank 300X43 was landed on the roof legs for four hours on 11/18/99 in violation of the Refinery MACT Phase I (40 CFR Part 63 Subpart CC) section 63.646(a) which references 40 CFR 63.119(c)3 and (c)(4).	Warning
5/2/02	3235	Operator error resulted in visible emissions in excess of 20% opacity from the refinery flare for approximately 70 minutes.	\$500
8/13/02	3241	Source test on March 7, 2002 indicated nitrogen oxides emissions from the Diesel Hydrotreater heater to be in excess of the 0.05 lbs. NO <sub>x</sub> per million Btu emission limit established by Order	Warning
5/15/02	3242	Exceeded 40% opacity limit at the TCCU Surge Separator Stack.	\$1,000
8/13/02	3259	Exceeded the NWCAA Regulation Section 462.1 emission limit of 1000 ppmv sulfur dioxide at the refinery flare for approximately ten minutes on July 3, 2002.	Warning
12/18/02	3291	Failure to install control devices on compressors 1K-1 and 1K-1A.	\$17,000
7/28/03	3324	Open hatches on effluent plant equipment.	\$1,000
7/28/03	3325	Open manhole covers on 6 <sup>th</sup> Street.	\$4,000
9/2/03	3349	Source test showed excess pressure at gasoline loading truck rack.	\$1,500
12/22/03	3381	CO Boiler carbon monoxide standard exceedances in May, June 2003	\$14,758
4/30/04	3411	Failure to calibrate monitoring equipment	\$4,800
02/02/05	3462	Failure to perform Relative Accuracy Test Audits on two CEMs.	Warning
3/10/05	3466	CO Boiler carbon monoxide standard exceedances	\$15,000
3/24/05	3468	Hydrogen sulfide in Refinery Fuel Gas exceeded 162 ppm.	\$2,000
6/7/05	3477	January 2005 Sulfur Recovery Unit acid gas flaring exceedances	\$92,000
7/21/05	3490	Failure to notify prior to storage vessel filling.	Warning
1/23/06	3524	July 2005 stack test showed excess particulate matter from the FCCU.	\$6,400
2/13/06	3526	Secondary seals on storage tanks open to	\$2,000

Date Issued	NOV#	Summary	Penalty
		atmosphere.	
7/27/06	3548	Stack test showed CO exceedances from SRU.	\$30,000
1/22/07	3573	Source test showed excess pressure at gasoline loading truck rack.	\$52,500
8/6/08	3712	Sulfur Recovery Unit (SRU) incinerator SO <sub>2</sub> emissions from both SRU #1 and SRU #2 increased above emission limits on April 17, 2008 due to poor or inadequate maintenance.	\$6,000

#### 1.4 Emission Reports

The refinery has various reporting requirements resulting from Federal, State, and NWCAA regulations as well as Prevention of Significant Deterioration (PSD) permits and Orders of Approval to Construct (OACs).

The refinery's monthly report is of particular interest, as it is a valuable tool in monitoring the refinery's compliance with emission limits. Monthly emissions reports are submitted to the NWCAA within 20 days following the end of each calendar month. Supporting data must be kept at the refinery for at least five years and made available to the NWCAA personnel upon request.

The list of reports generated by the facility and submitted to the NWCAA is large. For the most current information, contact the NWCAA. The records are available for the public's review in person, by fax, or through the U.S. Mail.

#### 1.5 Emissions Inventory

Each year the refinery is required to submit an emissions inventory for the entire facility. This report includes criteria air pollutants (carbon monoxide, nitrogen oxides, particulate matter, sulfur dioxide, and volatile organic compounds) and toxic air pollutants (TAPs). Greenhouse gas (GHG) emissions are also provided voluntarily. Inventory reports from the refinery are categorized into different source groups as well as for individual emission units. The NWCAA uses the emissions inventory data in a jurisdiction-wide emissions inventory report that includes a summary of annual emissions for large industrial facilities. This report lists air pollutants emitted from the ConocoPhillips Ferndale Refinery as follows:

**Table 1-2 Criteria Pollutants in tons per year**

Criteria Air Pollutant	2007	2008	2009
Particulate matter (PM)	51	49	43
Particulate matter 10 microns in size or less (PM <sub>10</sub> )	47	45	39
Particulate matter 2.5 microns in size or less (PM <sub>2.5</sub> )	41	39	33
Sulfur dioxide (SO <sub>2</sub> )	145	245	182
Nitrogen oxides (NO <sub>x</sub> )	785	1,010	705

Volatile Organic Compounds (VOCs)	980	1,002	962
Carbon Monoxide (CO)	231	262	240

**Table 1-3 Toxic Air Pollutants in pounds per year**

Toxic Air Pollutant	2007	2008	2009
1,3 butadiene	22	18	17
2,2,4-trimethylpentane	16,774	16,539	16,279
Acetaldehyde	268	308	290
Acrolein	168	190	180
Ammonia	555	612	2,000
Benzene	8,299	11,021	9,410
Butane	483,667	499,271	461,010
Chromium	0	0	0
Cresol (all isomers)	159	128	138
Cumene	291	295	312
Cyclohexane	5,642	6,892	7,085
Cyclopentane	10,086	10,860	10,362
Ethane	0	0	0
Ethyl benzene	3,369	3,940	4,263
Ethylene	50	153	161
Formaldehyde	812	957	914
Heptane	5167	5870	6142
Hexane (all)	64,831	68,618	66,022
Hydrochloric acid	3	3	3
Hydrogen flouride	462	462	462
Hydrogen sulfide	424	308	410
Methanol	14	15	21
Methylcyclohexane	12,022	13,435	14,033
Methylcyclopentane	N/A	145	131
Naphthalene	1,234	1,030	1,357
N-heptane	7	22	21
Nonane, n-	792	852	875
Octane	1,170	1,278	1,295

Toxic Air Pollutant	2007	2008	2009
Pentane	71,410	81,836	78,393
Perchloroethylene	21	14	12
Phenanthrene	212	175	200
Phenol	3,132	382	423
Propane	7,636	7,940	5,477
Propylene	3,983	4,439	3,991
Styrene	65	87	88
Sulfuric acid	13,885	18,844	18,685
Toluene	20,629	24,303	24,311
Trimethyl benzene	3,264	3,480	3,687
Xylene	16,412	18,385	21,257

**Table 1-4 Greenhouse gas estimates in tons per year**

Greenhouse gas	2007	2008	2009
Methane (CH <sub>4</sub> )	51	41	NA
Carbon dioxide (CO <sub>2</sub> )	809,236	934,651	NA
Nitrous oxide (N <sub>2</sub> O)	7.7	7.9	NA

### 1.6 Miscellaneous Refinery Non-Process Activities

There are several regulated refinery activities that can emit pollutants to the atmosphere that are not generated by unit processes. These activities include asbestos removal, fire training, abrasive blasting, and cutback asphalt paving. Asbestos removal occurs during the demolition or modification of buildings and units at the refinery which are likely to contain asbestos-containing materials such as insulation and tiles. The refinery is subject to federal, state, and NWCAA asbestos requirements. Fire training employs open burning during the instruction of the refinery's emergency response personnel. Open burning activities are subject to state and NWCAA requirements. Abrasive blasting occurs during maintenance and repair activities of tanks and equipment at the refinery to remove old and chipped paint and surface contaminants. This activity is subject to state and NWCAA regulations. Finally, cutback asphalt paving occurs from time to time at the refinery for the repair of roadways and unit areas as a means to reduce dust emissions and aid storm water runoff control. This activity is subject to NWCAA regulations.

### 1.7 Insignificant Emission Units

The refinery has emission units and activities determined to be insignificant by the state air operating permit rules. These emissions units normally have low emissions or generate only fugitive emissions and are considered to be insignificant for regulation with the exception of generally applicable requirements. Insignificant emission units and activities are identified in WAC Chapter 173-401-530, -532, and -533. The Generally Applicable requirements in Section 4 of the permit apply to these units, although the testing, monitoring,

recordkeeping, and reporting requirements have been determined to not apply. Note that no emission unit or activity subject to a federally enforceable requirement (other than generally applicable requirements of the state implementation plan) shall qualify as an insignificant emissions unit or activity (WAC 173-401-530(2) (a)). Insignificant emissions units and activities are listed in Section 5 of this Statement of Basis.

## 2 Regulatory Programs

### 2.1 New Source Performance Standards

The federal New Source Performance Standards (NSPS) apply to the control of criteria pollutants emitted from specific types of sources that have been constructed or modified after the applicability date of each NSPS rule. These rules are found in Title 40 Code of Federal Regulations (CFR) part 60. Criteria pollutants are those pollutants associated with national ambient air quality standards (carbon monoxide, sulfur dioxide, nitrogen oxides, particulate matter (of different particle sizes), volatile organic compounds, ozone, and lead).

The ConocoPhillips Refinery is subject to seven NSPS subparts and Subpart A, the General Provisions. Subpart A contains procedural and other requirements that apply generically to all other NSPS subparts, unless noted otherwise. One NSPS that does not apply to the facility bears mentioning here. NSPS Subpart JJJJ - Standards of Performance for Stationary Spark Ignition Internal Combustion Engines would apply to an emergency generator at the refinery if the emergency generator had been constructed after January 1, 2009. The sole generator that might have been subject at the refinery was constructed, modified, or reconstructed prior to the deadline, so it is not subject to the regulation.

The following listed NSPS regulations apply to emission units at the ConocoPhillips refinery. A more detailed description of each NSPS follows the list:

**Subpart A** – General Provisions

**Part 60 Subpart Db** – Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units.

**Part 60 Subpart GGG** - Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After January 4, 1983 and on or Before November 7, 2006. Subpart GGG references NSPS subpart VV.

**Part 60 Subpart GGGa** – Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006. Subpart GGGa references NSPS subpart VVa.

**Part 60 Subpart J** – Standards of Performance for Petroleum Refineries.

**Part 60 Subpart Ka** – Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973 and Prior to May 19, 1978.

**Part 60 Subpart Kb** – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984.

**Part 60 Subpart QQQ** – Standards of Performance for VOC Emissions from Petroleum Refinery Wastewater System.

#### 2.1.1 Subpart A – General Provisions

If any NSPS applies to a facility, the general provisions included in Subpart A also apply. Some of the requirements from Subpart A have been included in the AOP and some have not. These guidelines were used in choosing whether to include Subpart A requirements in the AOP:

If a requirement is not applicable until triggered by a facility's actions, the requirement was not included in the permit.

If the requirement is entirely administrative in nature and does not require concrete action, it was not included.

If the requirement applies to a regulatory agency and not the facility, it was not included.

If the requirement is not continuing (for example, a past requirement), it was not included.

The fact that these requirements were not included in the AOP does not exempt the facility from compliance with the requirements. Table 2-1 contains the parts of Part 60 Subpart A that were included in either Sections 3 or 5 of the AOP.

**Table 2-1 NSPS General Provisions**

Subpart	Description
40 CFR 60.4(a) and (b)	Addresses for reports, notifications, and submittals
40 CFR 60.7(a)	Notification
40 CFR 60.7(b)	Startup, Shutdown, and Malfunction (SSM) records
40 CFR 60.7(c) and (d)	Excess emission records
40 CFR 60.7(f)	Maintenance of records
40 CFR 60.11(b) and (c)	Compliance with opacity standards
40 CFR 60.11(d)	Operation and maintenance
40 CFR 60.11(g)	Credible evidence
40 CFR 60.12	Circumvention
40 CFR 60.18(c)	General control device and work practice requirements

**2.1.2 Subpart Db – Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units**

Subpart Db establishes nitrogen oxide emission standards and associated requirements for boilers that were constructed, modified, or reconstructed after June 19, 1984 with a heat input capacity greater than 100 million BTUs/hr. Two boilers at the refinery are subject to this NSPS. In operation, boiler #1 (22F-1C) combusts refinery fuel gas and boiler #4 (22F-1E) combusts natural gas. However, they are both permitted through Orders of Approval to Construct to combust refinery fuel gas as well as natural gas if they can do so while meeting the emission standards. Boiler #1 was originally permitted to burn #2 distillate fuel as a backup, but dual-fuel burners would have had to be installed to enable combustion of #2 distillate. Since the dual-fuel burners were not installed, the permit was revised to remove the ability to combust fuel oil. To comply with Subpart Db, both boilers' stacks are equipped with Continuous Emissions Monitors for NO<sub>x</sub>. The boilers do not have duct burners and are not limited by a low annual capacity factor.

### **2.1.3 Subpart GGG – Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After January 4, 1983 and on or Before November 7, 2006.**

Subpart GGG, as originally promulgated May 30, 1994, applied to affected facilities in petroleum refineries constructed or modified after January 4, 1983. With some exceptions (like compressors in hydrogen service) Subpart GGG requires the permittee to comply with the requirements of 40 CFR Part 60 Subpart VV – Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry. The regulation was amended on November 16, 2007. The amendment had the following affect:

Applicability was limited to affected facilities constructed, reconstructed, or modified after January 4, 1983 and on or before November 7, 2006. A new regulation, Subpart GGGa was promulgated to regulate affected facilities constructed, reconstructed, or modified after November 7, 2006.

The definition of “process unit” was revised. The revised definition was stayed “until further notice” in a June 2, 2008 amendment. As of the date of permit issuance, the stay continues to be in effect.

Open ended lines in asphalt service were exempted from regulation under Subpart GGG.

The amendment added an option that allows facilities to comply with 40 CFR 63, Subpart H requirements for valves in gas/vapor (G/V) or light liquid (LL) service rather than 40 CFR 60.482-7

The amendment required compliance with NSPS VV requirements, also amended on November 16, 2007.

The equipment covered by Subpart GGG is listed in Table 2-8 of this Statement of Basis.

### **2.1.4 Subpart GGGa – Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006**

Subpart GGGa was promulgated on November 16, 2007. The 40 CFR Subpart GGGa incorporates the above-mentioned amendments to NSPS GGG and requires facilities to comply with NSPS VVa (Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry) with the exception that facilities do not have to conduct periodic monitoring of connectors in gas/vapor or light liquid service. If a facility opts to not monitor these connectors, the connectors would be subject to the same requirements as connectors in heavy liquid (HL) service. Similarly to Subpart GGG, the definition of “process unit” was stayed until further notice.

As of the date of permit issuance, there is only one piece of equipment subject to Subpart GGGa, the Flare Gas Recovery (FGR) system.

### **2.1.5 Subpart J – Standards of Performance for Petroleum Refineries**

Subpart J establishes sulfur dioxide and carbon monoxide emission limits and associated requirements for fluid catalytic cracking unit catalyst regenerators constructed or modified after June 11, 1973. Subpart J also establishes sulfur dioxide emission limits and requirements for fuel gas combustion devices constructed or modified after June 11, 1973, and Claus sulfur recovery plants constructed or modified after October 4, 1976 (except Claus plants of 20 long tons per day (LTD) or less). Subpart J was amended on June 24, 2008. The amendment added several exemptions from the sulfur oxide standard for fuel

gas streams combusted in fuel combustion devices that are deemed inherently low in sulfur content.

The facility's fluid catalytic cracking unit and two sulfur recovery plants are subject to Subpart J. All of the facility's fuel gas combustion devices (including flares constructed on or before December 31, 2011) are subject to Subpart J either through construction, modification, or through COP's negotiated Consent Decree (CD) lodged January 5, 2005.

**Table 2-2 Equipment Subject to Subpart J**

Crude Oil Heater 1F-1A	Alkylation Depropanizer Reboiler 17F-1
Crude Oil Heater 1F-1	No. 3 Reformer Pretreat Heater 18F-1
Vacuum Flasher Heater 4F-2	No. 3 Reformer Regenerator Heater 18F-26
No. 2 Hydrodesulfurizer Heaters 14F-1 & 2	No. 3 Boiler 22F-1B
No. 3 Reformer Heaters 18-F21, F22, F23, F24	No. 4 Boiler 22F-1E
Diesel Hydrotreater Heater 33F-1	Cat Gas Desulfurizer (S-Zorb) Feed Heater
No. 1 Boiler 22F-1C	FCCU Combustion Air Preheater
No. 2 Boiler 22F-1A	Emergency Flare (as of Dec. 31, 2011)
Refinery ZTOF Flare (as of Dec. 31, 2011)	Space intentionally left open

**2.1.6 Subpart Ka -- Standards of Performance for Petroleum Liquid Storage Vessels for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973 and Prior to May 19, 1978 .**

Subpart Ka contains standards for storage vessels that contain petroleum liquids. There are exceptions for storage vessels of a certain capacity or containing material at specific vapor pressures. Pressure vessels are also exempted. At the time of permit issuance, the only storage tank subject to Subpart Ka is 6000X1.

**2.1.7 Subpart Kb – Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984**

Subpart Kb contains standards for volatile organic compounds (VOCs) from storage vessels. There are exceptions for storage vessels of a certain size or containing material at specific vapor pressures. Pressure vessels are also exempted. The Subpart Kb equipment specifications, testing, reporting and recordkeeping requirements form a standard for other, later regulations. They are cited and/or referenced in minor new source review permits issued by NWCAA, in NWCAA regulations, and in federal regulations. At the time of permit issuance, the following storage tanks are subject to Subpart Kb: 300x40, 300x44, 100x92, 900x1, 900x2, 900x3, 100x95, 100x98 and 400x1.

### **2.1.8 Subpart QQQ – Standards of Performance for VOC Emissions from Petroleum Refinery Wastewater Sections**

Subpart QQQ applies to process wastewater drain and treatment systems at petroleum refineries constructed, modified, or reconstructed after May 4, 1987. The subpart contains standards for individual drain systems, oil-water separators, aggregate facilities (an individual drain system together with ancillary downstream sewer lines and oil-water separators, down to and including the secondary oil-water separator), and closed vent systems and control devices for VOCs. There is considerable regulatory overlap between Subpart QQQ, the Refinery MACT Phase 1, and 40 CFR Part 61 Subpart FF. Where the Refinery MACT Phase 1 overlaps with Subpart QQQ for Group 1 wastewater streams (as defined in subpart CC), the Refinery MACT Phase 1 takes precedence. Group 1 wastewater streams are defined as follows:

*Group 1 wastewater stream* means a wastewater stream at a petroleum refinery with a total annual benzene loading of 10 megagrams per year or greater as calculated according to the procedures in 40 CFR 61.342 of subpart FF of part 61 that has a flow rate of 0.02 liters per minute or greater, a benzene concentration of 10 parts per million by weight or greater, and is not exempt from control requirements under the provisions of 40 CFR part 61, subpart FF.

Other wastewater streams that do not meet the Group 1 definition may still contain benzene and volatile organic compounds and be subject to Subpart QQQ. Wastewater equipment at the refinery subject to Subpart QQQ is addressed in Section 5 of the permit.

## **2.2 National Emission Standards for Hazardous Air Pollutants**

The National Emission Standards for Hazardous Air Pollutants (NESHAP), which cover the emission of hazardous air pollutants, are found in Title 40 CFR part 61 and part 63. These rules apply to specific existing sources regardless of the construction/modification dates. The NESHAP are established to reduce emissions of pollutants that are associated with toxic impacts other than what are considered under the national ambient air quality standards. The NESHAP also include a Subpart A with procedural and other requirements that apply generically to all other NESHAP subparts. The NESHAP requirements and testing procedures are often referenced by regulatory orders, the NWCAA Regulation, and other federal rules. The following NESHAP regulations apply to emission units at the ConocoPhillips refinery:

**Part 61 Subpart A** – General Provisions

**Part 61 Subpart FF** – National Emission Standard for Benzene Waste Operations

**Part 63 Subpart A** - General Provisions

**Part 63 Subpart Q** – National Emission Standards for Hazardous Air Pollutants From Industrial Process Cooling Towers.

**Part 63 Subpart CC** – National Emission Standards for Hazardous Air Pollutants From Petroleum Refineries (aka Refinery MACT Phase I)

**Part 63 Subpart UUU** - National Emission Standards for Hazardous Air Pollutants for Petroleum Refineries: Catalytic Cracking Units, Catalytic Reforming Units, and Sulfur Recovery Units (aka Refinery MACT Phase II)

**Part 63 Subpart ZZZZ** - National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines

### 2.2.1 40 CFR Part 61 Subpart A – General Provisions

The requirements from Subpart A to 40 CFR Part 61 were chosen to be included in the AOP according to these guidelines:

With the exception of the requirement to obtain approval from the NWCAA prior to constructing or modifying a stationary source subject to a Part 61 NESHAP, if a requirement is not applicable until triggered by a facility’s actions, the requirement was not included in the permit.

If the requirement is entirely administrative in nature and does not require concrete action, it was not included.

If the requirement applies to a regulatory agency and not the facility, it was not included.

If the requirement is not continuing (for example, a past requirement), it was not included.

The fact that these requirements were not included in the AOP does not exempt the facility from compliance with the requirements. The following list contains the parts of Part 61 Subpart A that were included in Section 3 of the AOP:

**Table 2-3 NESHAP General Provisions under 40 CFR Part 61**

Subpart	Description
40 CFR 61.4	Addresses for reports, notifications, and submittals
40 CFR 61.05(b), (c), and (d)	Prohibited Activities and Circumvention
40 CFR 61.5(a), 61.07, and 61.10	Requirements for Existing, Newly Constructed, and Reconstructed Sources
40 CFR 61.09(a)	Notification of Startup
40 CFR 61.12(c)	Operation and Maintenance
40 CFR 61.12(e)	Credible Evidence
40 CFR 61.13(g)	Recordkeeping Requirements
40 CFR 61.19	Circumvention

### 2.2.2 40 CFR Part 61 Subpart FF – National Emission Standard for Benzene Waste Operations

Subpart FF applies to waste operations (primarily wastewater) at petroleum refineries with >10 Mg/yr of benzene in their waste streams. Along with general standards, the Subpart includes standards for equipment including tanks, surface impoundments, containers, individual drain systems, oil-water separators, treatment processes, and closed-vent systems and control devices and standards for monitoring, testing, repair, reporting, and recordkeeping. The refinery MACT Phase I (subpart CC) wastewater provisions have exactly the same applicability criteria (and essential requirements) as subpart FF. All units subject to subpart FF are also subject to CC. The list of wastewater streams subject to Subpart FF is substantial and varies from year to year. The refinery keeps records detailing the status of every waste stream containing benzene at the facility and submits to the NWCAA every year a report entitled the Total Annual Benzene (TAB) report with controlled and uncontrolled benzene-containing waste streams.

**2.2.3 40 CFR Part 63 Subpart A – General Provisions**

More requirements from Subpart A to 40 CFR Part 63 were chosen to be included in the AOP than for either 40 CFR Part 60 or Part 61. This is because the Part 63 rules have been promulgated more recently than the other two parts; as a consequence Subpart A to Part 63 provides more detailed instruction and requirements than were not included in the earlier NESHAP regulations. The following guidelines were used to omit Subpart A requirements:

If the requirement is entirely administrative in nature and does not require concrete action, it was not included.

If the requirement applies to a regulatory agency and not the facility, it was not included.

If the requirement is not continuing (for example, a past requirement), it was not included.

The fact that these requirements were not included in the AOP does not exempt the facility from compliance with the requirements. The following list contains the parts of Part 63 Subpart A that were included in either Section 3 or Section 5 of the AOP:

**Table 2-4 NESHAP General Provisions under 40 CFR Part 63**

Subpart	Description
40 CFR 63.4	Prohibited Activities and Circumvention
40 CFR 63.5(b)(1), (3), (4), (6)	Requirements for Existing, Newly Constructed, and Reconstructed Part 63 NESHAPS Sources
40 CFR 63.6(e)(1)	Operation and Maintenance
40 CFR 63.6(e)(3)	Startup Shutdown and Malfunction (SSM) Plans for Part 63 NESHAPS Sources
40 CFR 63.6(e)(3)	SSM Plans for Part 63 NESHAPS Refinery MACT (Subpart CC) Affected Sources
40 CFR 63.6(e)(3)	SSM Plans for Part 63 NESHAPS Refinery MACT II (Subpart UUU) Affected Sources
40 CFR 63.6(i) and 63.9(c)	Extension of Compliance for Early Reductions and Other Reductions
40 CFR 63.7(e)(1)	Conduct of Performance Tests
40 CFR 63.8(c)(1),(2),(3 and (4)	Operation and Maintenance of Continuous Monitoring Systems (CMS)
40 CFR 63.8(c)(7), and (8)	Continuous Monitoring Systems (CMS) Out of Control Periods
40 CFR Part 63.8(d)	Continuous Monitoring Systems (CMS) Quality Control Program
40 CFR 63.8(g)(1-4)	Continuous Monitoring Systems (CMS) Data Reduction
40 CFR 63.9(a) and 63.10(a)	Address for Reports, Notifications and Submittals
40 CFR Part 63.9 (b)(2) and (j)	Notification Requirements for EXISTING Part 63 NESHAPS Sources Except Refinery MACT (Subpart CC) Affected Sources

Subpart	Description
40 CFR 63.9(b)(4)	Notification Requirements for New or Reconstructed Part 63 NESHAPS Sources
40 CFR 63.9(e)	Notification of Performance Tests
40 CFR 63.10(b)(1),(2) and (d)(5)	SSM Reports for Part 63 NESHAPS Sources
40 CFR 63.10(b)(2) and (d)(5)	SSM Reports for Part 63 NESHAPS Refinery MACT (Subpart CC) Affected Sources
40 CFR 63.640(l) and (m)	Additional Refinery MACT (Subpart CC) Process Units Added or Process Changes Not Meeting Construction or Reconstruction Definition
40 CFR 63.642(e)	Recordkeeping Requirements for Refinery MACT (Subpart CC) Equipment
40 CFR 63.1575(h) and 63.1577	SSM Reports for Part 63 NESHAPS Refinery MACT Phase II (Subpart UUU) Affected Sources

#### **2.2.4 Part 63 Subpart Q - National Emission Standards for Hazardous Air Pollutants From Industrial Process Cooling Towers**

Subpart Q was published by the EPA on September 8, 1994. Industrial process cooling towers (IPCTs) that operate with chromium-based water treatment chemicals at major sources are subject to a standard in the rule that states that they can no longer use those chemicals. A slight revision to Subpart Q was made on April 7, 2006 to clarify existing source applicability. The ConocoPhillips facility has cooling towers. They have notified the NWCAA that they do not use chromium-based water treatment chemicals in the cooling towers.

#### **2.2.5 Part 63 Subpart CC – National Emission Standards for Hazardous Air Pollutants From Petroleum Refineries (aka Refinery MACT Phase I)**

Subpart CC was published by the EPA on August 18, 1995. It covers the reduction of hazardous air pollutants from both existing and new petroleum refinery equipment. Refiners must control emissions from storage tanks, equipment leaks, process vents, and wastewater collection and treatment systems. The requirements for wastewater defer to 40 CFR 61 Subpart FF. The Refinery MACT Phase 1 specifically exempted certain refinery equipment; fluidized catalytic cracking units, sulfur plants, catalytic reformers, and associated bypass lines. This equipment was regulated in 2002 under the Refinery MACT Phase 2 (40 CFR Part 63 Subpart UUU). Subpart CC was amended on October 28, 2009 and June 30, 2010. The amendments:

- add maximum achievable control technology standards for heat exchange systems.
- amend the general provisions cross-reference table and
- corrects section references, including the overlap provision between Part 63 Subpart CC and Part 60 Subpart GGGa.

The ConocoPhillips Ferndale refinery has existing heat exchangers that are subject to the amended Subpart CC. The facility is required to be in compliance with the requirements by October 28, 2012. They are currently in the process of identifying the subject heat

exchangers and engineering a plan for compliance. The regulatory requirements for heat exchangers are not included in the AOP since the project is in its early stages.

### **2.2.6 Part 63 Subpart UUU – National Emission Standards for Hazardous Air Pollutants for Petroleum Refineries: Catalytic Cracking Units, Catalytic Reforming Units, and Sulfur Recovery (aka Refinery MACT Phase II)**

Subpart UUU, published on April 11, 2002, established controls for emissions of hazardous air pollutants from fluidized catalytic cracking units, sulfur plants, catalytic reformers, and associated bypass lines at petroleum refineries. The ConocoPhillips Ferndale refinery installed a new fluidized catalytic cracking unit in 2003 and was therefore subject to the regulation upon startup of the FCCU. In addition to the FCCU, the refinery has two sulfur plants, a catalytic reforming unit, and a limited number of bypass vent lines controlled under the regulation. The regulation was amended, published February 9, 2005. The amendments changed the affected source designations, added new compliance options for catalytic reforming units that use different types of emission control systems, new monitoring alternatives for catalytic cracking units and catalytic reforming units, and a new procedure for determining the metal or total chloride concentration on catalyst particles. The amendments also defer technical requirements for most continuous parameter monitoring systems, clarify testing and monitoring requirements, and make editorial corrections.

### **2.2.7 ZZZZ – National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines**

The Environmental Protection Agency promulgated national emission standards for hazardous air pollutants for stationary reciprocating internal combustion engines (RICE) on June 15, 2004. Existing and new stationary RICE at major sources of HAP with a site rating > 500 brake horsepower (HP) were subject to this rule. New requirements were added to this standard on January 18, 2008 (*73 Federal Register 3567*). The new requirements regulate new and reconstructed RICE at area sources of HAP or with a site rating ≤ 500 brake HP.

The ConocoPhillips facility has one unit subject to the regulation. An emergency generator rated at 739 hp (Caterpillar Model 3412) was installed on December 29, 2004. Under the regulations, the facility is required to submit initial notification only. This notification was submitted on January 14, 2005.

## **2.3 Prevention of Significant Deterioration**

The Prevention of Significant Deterioration (PSD) program is a federal new source review program that applies to construction of major new sources and major modifications that occur in areas that are in attainment with the National Ambient Air Quality Standards (NAAQS). The PSD program stems from 40 CFR parts 50, 51, and 52. The area surrounding the refinery is in attainment with all of the NAAQS. The PSD permitting process ensures that air quality is maintained in attainment areas. The PSD permit establishes best available control technology (BACT) for the new and modified emission units. The U.S. EPA has partially delegated the PSD rules to the Washington State Department of Ecology (WDOE) which writes PSD permits covering emissions of criteria pollutants for which a facility or a project is major.

The ConocoPhillips refinery has received two PSD permits. As described below in the "Process Area Description" Section of the Statement of Basis, the WDOE issued PSD permit #PSD-00-02 on April 4, 2001 for the "Upgrade/Clean Fuels" projects associated with a

large-scale upgrade of the refinery and installation of equipment needed to make low sulfur gasoline. As of the date of this permit issuance, PSD-00-02 has been amended five times. The Upgrade/Clean Fuels project triggered PSD for nitrogen oxides, carbon monoxide, and particulate matter 10 microns in diameter or less (PM10). Other pollutants were addressed via NWCAA approval order #733. The second permit issued by the WDOE to the refinery, PSD-05-01, was issued on November 16, 2005 for the "Crude/Fluidized Catalytic Cracking/Sulfur Recovery Unit" project. The project was initiated primarily to increase crude oil charge and catalytic cracking unit feed, increase the primary amine system capacity to remove more sulfur from fuel gas, and add a second sulfur recovery unit to provide backup capacity and additional sulfur removal from exhaust gas. The project triggered PSD for nitrogen oxides, carbon monoxide, total particulate matter, PM10, and VOCs.

## **2.4 Consent Decree**

On December 5, 2005, a complaint and a Consent Decree were filed by the United States Justice Department, on the behalf of the Environmental Protection Agency and five co-plaintiffs, including the Northwest Clean Air Agency, against the ConocoPhillips Company (COP). The United States alleged that the ConocoPhillips Company had violated and/or continues to violate statutory and regulatory provisions at twelve refineries, including the Ferndale refinery.

The ConocoPhillips Company denied that it had violated the statutory, regulatory, and SIP provisions and the state and/or local rules and regulations incorporating and implementing federal requirements, and maintained that it had been and remains in compliance with all applicable statutes, regulations and permits and was not liable for civil penalties and injunctive relief.

As a result of the Consent Decree (a settlement), the permittee took numerous actions to reduce air pollutants at the Ferndale refinery. The Consent Decree will eventually terminate (or "sunset") when the permittee has completed the Consent Decree's requirements, but ongoing emission limits and requirements have been written in to existing PSD permits and Orders of Approval to Construct to provide permanence. These requirements have been included in the Air Operating Permit. Other requirements in the Consent Decree are considered an enhancement of existing requirements and will terminate with the Consent Decree. These requirements are not Title V applicable requirements and have not been included in the specifically applicable requirements of Section of the permit. The Consent Decree is available on the NWCAA website at the internet location [http://www.nwcleanair.org/aqPrograms/airPermits\\_pg2.htm](http://www.nwcleanair.org/aqPrograms/airPermits_pg2.htm).

## **2.5 Compliance Assurance Monitoring (CAM)**

The 40 CFR Part 64 CAM rule requires owners and operators to monitor the operation and maintenance of their control equipment so that they can evaluate the performance of their control devices and report whether or not their facilities meet established emission standards. If owners and operators of these facilities find that their control equipment is not working properly, the CAM rule requires them to take action to correct any malfunctions and to report such instances to the appropriate enforcement agency (i.e., State and local environmental agencies). Additionally, the CAM rule provides some enforcement tools that will help State and local environmental agencies require facilities to respond appropriately to the monitoring results and improve pollution control operations.

The CAM rule applies to each Pollutant Specific Emissions Unit (PSEU) when it is located at major source that is required to obtain Title V, Part 70 or 71 permit and it meets all of the following criteria:

- be subject to an emission limitation or standard, and
- use a control device to achieve compliance, and
- have **potential pre-control** emissions that exceed or are equivalent to the major source threshold.

Please note that the term "PSEU" means an emissions unit considered separately with respect to each regulated air pollutant. Also the term "control device" means equipment, other than inherent process equipment, that is used to destroy or remove air pollutants prior to discharge to the atmosphere. The term "control device" does not include passive methods such as lids or seals or inherent process equipment provided for safety or material recovery.

The following emission limitations or standards are exempted from the CAM rule:

- post – 11/15/90 NSPS or NESHAP standards, since those standards have been and will be designed with monitoring that provides a reasonable assurance of compliance;
- stratospheric ozone protection requirements under Title VI of the act;
- acid rain program requirements;
- emission limitations or standards or other requirements that apply solely under an approved emissions trading program;
- emissions cap that meets requirements of 70.4(b)(12) or 71.6(a)(13);
- emission limitations or standards for which a part 70 or 71 permit specifies a continuous compliance determination method, as defined in 40 CFR 64.1;
- certain municipally-owned utility units, as defined in 40 CFR 72.2.

Please note that the emission unit is not exempted from the CAM rule if nonexempt emission limitations or standards (e.g. a state rule or older NSPS emission limits) apply to the emissions unit.

Part 64 requires permits to specify at a minimum:

- The approved monitoring approach, including the indicators (or the means to measure the indicators) to be monitored, and performance requirements established to satisfy 40 CFR 64.3 (b) or (d), as applicable;
- The means by which the owner or operator will define exceedances or excursions;
- The duty to conduct monitoring;
- If appropriate, minimum data availability and averaging period requirements; and
- milestones for testing, installation, or final verification.

Based upon potentials to emit the CAM rule applies at the following emission units at the ConocoPhillips Ferndale Refinery:

**Table 2-5 Emission Units and Pollutants Subject to CAM**

Pollutant-Specific Emission Unit	Description	Control Device	Pollutant
FCCU Unit	FCCU Regenerator/Combustion Air Heater/CO Boiler	Flue Gas Scrubber (FGS)	PM/PM <sub>10</sub> : Gases exiting the flue gas scrubber control device are saturated with water vapor so directly measuring particulate matter is difficult and unreliable. The alternative is to measure those items that affect scrubber efficiency and correlate that data with source tests. This method was used to develop an alternative monitoring plan using liquid-to-gas ratio and weight percent solids as the continuously monitored parameters.
Transfer (Loading) Racks	Gasoline/Diesel Truck Load Rack	Thermal Oxidizer	VOC: Temperature in the thermal oxidizer is monitored continuously during loading. A minimum temperature is maintained.

**Table 2-6 Emission Units and Pollutants not subject to CAM**

PSEU Designation	Unit Description & Control Device	Pollutant & Reasons for Non Applicability
Crude Distillation Process Area	<ul style="list-style-type: none"> <li>• 1F-1A Crude Heater</li> <li>• 1F-1 Crude Heater</li> <li>• 14F-1, -2 HDF Heaters</li> </ul>	These units do not have control devices.

PSEU Designation	Unit Description & Control Device	Pollutant & Reasons for Non Applicability
	<ul style="list-style-type: none"> <li>HDF Stripper Offgas Process Vent</li> </ul>	post – 11/15/90 regulatory standard
Catalytic Cracking Process Area	<ul style="list-style-type: none"> <li>FCCU Regenerator/Combustion Air Heater/CO Boiler</li> </ul>	Metal HAP – Post 11/15/90 regulatory standard NO <sub>x</sub> – Unit equipped with CEM CO – Unit equipped with CEM SO <sub>2</sub> – Unit equipped with CEM
	<ul style="list-style-type: none"> <li>4F-2 Vacuum Flasher Heater</li> </ul>	SO <sub>2</sub> – No control device NO <sub>x</sub> - CEM
	<ul style="list-style-type: none"> <li>Process Vent 25FV-007</li> </ul>	post – 11/15/90 regulatory standard
Alkylation Process Area	<ul style="list-style-type: none"> <li>Process Vent 17HC-1717</li> </ul>	post – 11/15/90 regulatory standard
	<ul style="list-style-type: none"> <li>17F-1 Alky Depropanizer Reboiler Heater</li> <li>38F-101 Cat Gas Desulfurizer (S-Zorb Unit) Feed Heater</li> </ul>	These units do not have control devices.

PSEU Designation	Unit Description & Control Device	Pollutant & Reasons for Non Applicability
Reformer/Diesel Hydrotreater Process Area	<ul style="list-style-type: none"> <li>18F-1 #3 Reformer Pretreater Heater</li> <li>18F-26 #3 Reformer Catalyst Regeneration Heater</li> <li>33-F-1 Diesel Hydrotreater (DHT) Heater</li> <li>18F-21, -22 #3 Reformer Heater, Passes 1 and 2</li> <li>18F-23, -24 #3 Reformer Heater, Passes 3 and 4</li> </ul>	These units do not have control devices
	<ul style="list-style-type: none"> <li>Miscellaneous Process Vents</li> </ul>	post - 11/15/90 regulatory standard
	<ul style="list-style-type: none"> <li>#3 Reformer Regeneration Vents</li> </ul>	post - 11/15/90 regulatory standard
Sulfur Plant/Treaters Process Area	<ul style="list-style-type: none"> <li>Sulfur Recovery Unit #1</li> </ul>	SO <sub>2</sub> - CEM NO <sub>x</sub> - no control device CO - no control device
	<ul style="list-style-type: none"> <li>Sulfur Recovery Unit #2</li> </ul>	SO <sub>2</sub> - CEM NO <sub>x</sub> - no control device CO - no control device HAP - post-11/15/90 regulatory standard
Utilities Process Area	<ul style="list-style-type: none"> <li>22F-1C #1 Boiler with Flue Gas Recirculation</li> </ul>	NO <sub>x</sub> - CEM

PSEU Designation	Unit Description & Control Device	Pollutant & Reasons for Non Applicability
	<ul style="list-style-type: none"> <li>• 22F-1A #2 Boiler</li> <li>• 22F-1B #3 Boiler</li> <li>• 22F-1E #4 Boiler</li> <li>• Cooling Tower #1</li> <li>• Cooling Tower #2</li> </ul>	<p>These units have no control device</p>
<p>Wastewater Treatment Plant</p>	<ul style="list-style-type: none"> <li>• 12S-204 Induced Air Flotation Unit (IAF)</li> <li>• 12S-2 API Separator</li> <li>• Individual Drain Systems</li> <li>• Closed vent systems and control devices</li> <li>• Vacuum trucks</li> </ul>	<p>These units are subject to MACT Subpart CC and NESHAP Subpart FF. Subpart CC, finalized in 1995 and amended in 2009 and 2010, references Subpart FF for wastewater requirements including monitoring. Since the Subpart FF reference and wastewater monitoring requirements were not amended in the initial Subpart CC promulgation or the 2009/1010 amendments, the facility is considered to be exempted from CAM due to a post-11/15/90 regulatory standard.</p> <p>Individual drain systems subject to only NSPS QQQ are minimal at the facility and presumed to have exempt amounts of pre-control emissions.</p>
<p>Storage and Handling</p>	<ul style="list-style-type: none"> <li>• Tank Farm</li> <li>• Butane/Pentane Spheres</li> </ul>	<p>These units have no control device</p>
<p>Flares</p>	<ul style="list-style-type: none"> <li>• Flare Gas Recovery</li> <li>• ZTOF 13V-10</li> <li>• Ground Flare 13D-16</li> </ul>	<p>These units have no control device</p>

All of the ConocoPhillips pollutant specific emission units are classified as "other pollutant-specific emission units." An "other pollutant-specific emission unit" is one that has a potential to emit more than 100 tons per year of a pollutant *without* the control device, but has the potential to emit less than 100 tons per year of that same pollutant *with* the control device. The CAM rule requirements apply to "other pollutant-specific emission units" upon air operating permit renewal.

## **2.6 Washington Administrative Code**

The Washington Administrative Code (WAC) primarily contains requirements that apply generally to all air pollution sources. These generally applicable requirements, such as limits on visible emissions (opacity), SO<sub>2</sub>, and fugitive particulate matter are addressed in Section 4 of the air operating permit.

Two sections of the WAC are specifically notable for refineries and are addressed in Section 5 of the AOP: the particulate and opacity limits for catalytic cracking units (WAC 173-400-070), and the standards for gasoline loading terminals from WAC 173-491. State regulations require issuance of regulatory approval orders prior to the construction or modification of certain new emission sources. This state new source review (NSR) program entails evaluation of ambient impacts and requirements for BACT for every permitted project. The air operating permit program in Washington State is established via WAC 173-401.

## **2.7 Northwest Clean Air Agency Regulation**

The NWCAA Regulation primarily contains requirements that are generally applicable to all air pollution sources.

These generic limits are either addressed specifically in Section 5 of the AOP for a limited number of units (for example the 1000 ppm sulfur dioxide emission limit from NWCAA Section 462) or more broadly in Section 4. The requirements in NWCAA Section 580 that apply specifically to various petroleum refinery processes: storage vessels, equipment leaks, turnarounds and vacuum systems, and loading racks are addressed in Section 5 of the AOP. The NWCAA new source review regulations reflect state and federal NSR regulations. The federal system to implement the Clean Air Act (in particular programs related to the NAAQS) may be administered by the federal government or it may be delegated (in part) to states, such as Washington, that seek regulation through State Implementation Plans (SIPs). Certain state and local (NWCAA) regulations are part of the Washington State Implementation Plan and are therefore enforceable by both the EPA and the NWCAA. These SIP approved rules are in the operating permit. There can be a lag between a change to a state/local regulation and approval into the SIP. Note that there may be both a SIP-approved version of a regulation and a non-SIP approved version (identified as "state only") in the operating permit.

The NWCAA does not currently have authority to issue PSD permits. The NWCAA has authority to enforce local, state and most federal regulations and to fully enforce the air operating permit.

## **2.8 Refinery Gas Systems**

Waste gases produced during refinery processing are delivered via a fuel gas system for combustion to various heaters and boilers. If the refinery is low on fuel gas generation, fuel gas drums can also be supplemented with purchased natural gas. Refinery fuel gas typically contains sulfur, primarily in the form of hydrogen sulfide (H<sub>2</sub>S), which is converted to sulfur

oxides and other sulfur-containing compounds when combusted. New and modified combustion units have restrictions on fuel gas sulfur content through BACT limits contained in OACs. There is also a generally applicable 1000 ppm SO<sub>2</sub> limit on sulfur dioxide emissions that applies to all combustion devices.

At the present time all of the combustion units at the refinery have NSPS or BACT restrictions for H<sub>2</sub>S. The DHT heater and Reformer heaters burn fuel gas from a separate supply circuit that is scrubbed to reduce sulfur levels below the applicable limit of 50 ppmvd H<sub>2</sub>S. The entire refinery fuel gas system is scrubbed to produce combustible fuel below the NSPS subpart J H<sub>2</sub>S level of 162 ppmvd H<sub>2</sub>S. Pursuant to OAC #733a and #780, fuel gas supplied to the cat gas desulfurizer heater and the diesel hydrotreater heater (DHT/Reformer) must be scrubbed to 50 ppm H<sub>2</sub>S.

Fuel gas combustion devices subject to NSPS Subpart J must not burn fuel that contains more than 162 ppmvd H<sub>2</sub>S, based on a 3-hour rolling average. ConocoPhillips operates a fuel gas H<sub>2</sub>S content continuous monitoring system (CMS) to monitor compliance with NSPS and BACT limits. Subpart J actually references a fuel concentration limit of 230 mg H<sub>2</sub>S/dscm. Because the CMS readout is in ppm of H<sub>2</sub>S, the Subpart J standard has been converted to ppm and used in the AOP accordingly. Below is the conversion which uses standard conditions of 20 °C and 760 mm Hg conservatively rounded to the nearest integer.

**Equation 2-1**

$$\frac{230 \text{ mg H}_2\text{S}}{\text{dscm air}} \times \frac{1 \text{ g H}_2\text{S}}{1,000 \text{ mg H}_2\text{S}} \times \frac{1 \text{ mol H}_2\text{S}}{34.082 \text{ g H}_2\text{S}} \times \frac{24.056 \text{ L H}_2\text{S}}{\text{mol H}_2\text{S (ideal gas law)}} \times \frac{1 \text{ dscm H}_2\text{S}}{1,000 \text{ L H}_2\text{S}}$$

$$= \frac{162 \text{ dscm H}_2\text{S}}{1,000,000 \text{ dscm air}} = 162 \text{ ppmvd H}_2\text{S in air}$$

ConocoPhillips currently uses periodic sampling and analysis of fuel gas sulfur content to monitor compliance with the generally applicable 1,000 ppm SO<sub>2</sub> limit (per WAC 173-400-040(6) and NWCAA 462.1). This fuel gas data and fuel gas specific gravity data are then used to calculate the SO<sub>2</sub> concentrations in the flue gases for comparison with the standard. To make this calculation it is assumed that all hydrocarbons combust to form CO<sub>2</sub>, hydrogen combusts to water, and all sulfur compounds combust to form SO<sub>2</sub>. The carbon to hydrogen ratio is first calculated for the fuel gas. The total number of moles of H<sub>2</sub>S in the flue gas is then calculated based on fuel gas gravity, total sulfur concentration in the fuel gas, and the carbon to hydrogen ratio. The refinery assumes that all of the moles of H<sub>2</sub>S calculated are converted to SO<sub>2</sub> during combustion.

As part of the ConocoPhillips Consent Decree the refinery fuel gas systems are now subject to NSPS Subpart J standards for H<sub>2</sub>S content.

**2.9 Continuous Monitoring Systems (CMS)**

As required by regulation, there are various CMS within the refinery that are used to monitor compliance with air pollution standards. When the monitoring system measures emissions rather than a process variable, it is called a continuous emissions monitor (CEM). Continuous monitoring systems and CEMs are installed and operated in accordance with applicable federal requirements (40 CFR 60 appendices B and F) and the NWCAA Regulation 367 and the associated Appendix A to the agency regulations. Each CMS is quality assurance tested as required under 40 CFR Appendix F and NWCAA Regulation 367 and Appendix A. This includes conducting quarterly cylinder gas audits (CGA) and annual relative accuracy test audits (RATA). The duration and nature of CEM downtimes is reported to the NWCAA in each monthly emission report. The monthly reports also include CGA and RATA results. Under NWCAA Regulation 340 measured emission exceedances are reported

within twelve hours and explained in monthly emission reports. Below is a table of each CMS located at the ConocoPhillips Refinery.

**Table 2-7 Continuous Monitoring Systems**

Unit	Location	Pollutants Monitored
Heaters and Boilers	Refinery Fuel Gas Circuit	H <sub>2</sub> S
Heaters	Reformer Fuel Gas Circuit	H <sub>2</sub> S
SRU 1	Tail Gas Unit Incinerator Stack	SO <sub>2</sub> , O <sub>2</sub>
SRU 2	Tail Gas Unit Incinerator Stack	SO <sub>2</sub> , O <sub>2</sub>
#1 Boiler	Exhaust stack	NO <sub>x</sub> , O <sub>2</sub>
#4 Boiler	Exhaust stack	NO <sub>x</sub> , CO, O <sub>2</sub>
FCCU	Vacuum Flasher Heater stack	NO <sub>x</sub> , O <sub>2</sub>
	Wet gas scrubber outlet	NO <sub>x</sub> , SO <sub>2</sub> , CO, O <sub>2</sub>
	Wet gas scrubber inlet	SO <sub>2</sub> , O <sub>2</sub>
	FCC Absorber Offgas Fuel Gas	H <sub>2</sub> S

### 2.10 Equipment Leaks (Leak Detection and Repair)

Small leaks of volatile organic compounds throughout a refinery can add up to a large total emission quantity. Work practice standards that require leak detection and repair at equipment components such as pumps, compressors, valves, and flanges may be required pursuant to the Refinery MACT Phase I, NSPS subpart GGG, NSPS subpart GGGa, BACT requirements, and NWCAA 580.8. Many of these regulations draw on NSPS subparts VV and VVa for the LDAR regimen specification, even though these subparts apply to synthetic organic chemicals manufacturing facilities. Subparts VV and VVa do not directly apply to the subject refinery.

Large sections of the refinery are in organic hazardous air pollutant (HAP) service and are therefore subject to Refinery MACT Phase I LDAR requirements. Refinery MACT Phase I 63.640(p) allows for consolidation of LDAR programs by stating that “after the compliance dates specified in paragraph (h) of this section, equipment leaks that are also subject to the provisions of 40 CFR parts 60 and 61 standards promulgated before September 4, 2007, are required to comply only with the provisions specified in this subpart” and “equipment leaks that are also subject to the provisions of 40 CFR part 60, subpart GGGa, are required to comply only with the provisions specified in 40 CFR part 60, subpart GGGa.”

Therefore, equipment subject to 40 CFR Part 60 Subpart GGG and Refinery MACT Phase 1 are only subject to Refinery MACT Phase 1 and equipment subject to 40 CFR Part 60 Subpart GGGa and Refinery MACT Phase 1 are subject only to Subpart GGGa. Other units at the refinery such as the butane isomerization unit are not in HAP service, but are subject to NWCAA 580.8 LDAR requirements. Since both NWCAA 580.8 and the refinery MACT Phase I largely specify NSPS subpart VV, the “bottom line” LDAR program is essentially the same for all of the existing source affected process areas that have not been modified or reconstructed.

Many of the older Orders of Approval to Construct specify compliance with NSPS subpart VV or GGG for the BACT requirement. Other Orders of Approval to Construct specify the BACT

requirement as compliance with 40 CFR part 63 subpart CC provisions for new sources (called the modified HON). More recently, the NWCAA has determined that compliance with the more strict equipment leak thresholds and inspection frequencies in Subpart GGGa (similar to the enhanced monitoring requirements under refinery Consent Decrees) is more appropriately considered BACT.

The following is a summary of the subpart VV LDAR regimen. Subpart VV specifies standards, monitoring, and recordkeeping associated with leak detection and repair at various process equipment components including compressors, pumps in light liquid service, pressure relief devices in gas/vapor service, sampling connections, open-ended valves and lines, valves in gas/vapor and light liquid service, pumps and valves in heavy liquid service, pressure relief devices in heavy liquid and light liquid service, flanges, and other connections. Each of these components must be periodically monitored, and if a leak is found it must be repaired within a prescribed period.

Under Subpart VV, the monitoring frequency for process equipment is specified and, depending on the type of equipment being monitored and leak rate, the frequency can be decreased with the proviso that the frequency would be increased if leaks are detected. For pumps in light liquid service, a leak is defined at 10,000 ppm (60.482-2). For compressors, a seal system that employs a barrier fluid system is required (60.482-3). For pressure relief devices in gas/vapor service a leak is defined at 500 ppm (60.482-4). Sampling connections require a closed-purged, closed-loop, or closed-vent system. Open-ended valves and lines are required to be equipped with a cap, blind flange, or a second valve. For valves in gas/vapor and light liquid service a leak is defined as 10,000 ppm. For pumps and valves in heavy liquid service, pressure relief devices in light liquid or heavy liquid service and connectors a leak is defined at 10,000 ppm.

If a leak is measured (according to EPA Method 21), Subpart VV specifies the standards for repair as well as the delay of a repair (60.482-9). Typically, repairs are required within 15 days of detection. Delays are allowed for technically infeasible repairs and/or when repairs would cause greater emissions than the leak. Under circumstances, delays can be allowed up to 6 months but not beyond a unit shutdown.

Method 21 is specified in 40 CFR part 60 appendix A. Method 21 involves use of a calibrated organic vapor analyzer to detect leakage. Method 21 specifies how the instrument is to be used, the minimum performance criteria of the instrument and the calibration and recordkeeping protocols.

Subpart VV also allows for alternative standards for valves (60.483-1 and 60.483-2). The first standard allows for 2% of all valves to meet the definition of leaking. This standard meets the same record keeping and repair criteria as specified in 60.482. The other alternative standard allows for skip-period of leak detection and repair for valves. The skip-period is performance based and regresses to the standards of 60.482 if greater than 2% of the valves meet the definition of leaking. ConocoPhillips is not on a skip-period LDAR regimen.

While 40 CFR Part 60 Subpart VV is the basis for most of the refinery's emission units subject to leak detection and repair requirements, some units are covered by other regulations as well.

**Table 2-8 ConocoPhillips Process Unit LDAR Regulation Applicability Matrix**

Control Area/Unit	NWCAA 580	40 CFR 60 GGG	40 CFR 63 CC (MACT)	BACT (Mod. Subpart H)	BACT(40 CFR 60 GGGa)	Bottom Line LDAR
Crude Distillation			X			MACT (VV)
Crude Control Area						
Straight Run Gas Plant			X			MACT (VV)
#2 Hydrofiner (HDF)		X	X	X		BACT (Modified HON)
<b>FCC Control Area</b>						
Catalytic Cracking		X	X	X		BACT (Modified HON)
Vacuum Distillation		X	X			MACT (VV)
FCC Gas Plant		X	X			MACT (VV)
<b>Alkylation Control Area</b>						
LSR Splitter	X		X			VOC- NWCAA (VV) HAP- MACT (VV)
Cat Gas Splitter	X		X			VOC- NWCAA (VV) HAP- MACT (VV)
Saturated Gas Plant	X		X			VOC- NWCAA (VV) HAP- MACT (VV)
Alkylation Non-Acid	X		X	X		BACT (Modified HON)
Alky Debutanizer	X	X	X	X		BACT (Modified HON)
Alky Acid	X	X	X	X		BACT (Modified HON)
S-Zorb		X	X	X		BACT (Modified HON)
Butamer	X	X				NSPS (GGG)
Butamer Perc			X			MACT (VV)
<b>Reformer Control Area</b>						
Reformer Pretreater			X			MACT (VV)
#3 Reformer			X			MACT (VV)
DHT		X	X			VOC- NSPS (GGG) HAP- MACT (VV)
<b>Sulfur Plant/ Treaters Control Area</b>						
Merox Extraction Unit		X	X	X		BACT (Modified HON)
Amine Treating Unit			X			MACT (VV)
Sour Water Stripper			X			MACT (VV)
#1 Sulfur Recovery Unit			X			MACT (VV)
#2 Sulfur Recovery Unit						
#1 Tail Gas Unit			X			MACT (VV)
#2 Tail Gas Unit						
Minalk Treaters			X			MACT (VV)
<b>Utilities</b>						
Boilers			X			MACT (VV)
<b>Offplot Control</b>						
LPG Storage Area	X					NWCAA (VV)
Truck Rack	X		X			VOC- NWCAA (VV) HAP- MACT (VV)
Storage Tanks	X		X			VOC- NWCAA (VV) HAP- MACT (VV)
ZTOF and Ground Flares	X		X			VOC- NWCAA (VV) HAP- MACT (VV)
<b>Flare Gas Recovery Unit</b>					X	<b>NSPS Subpart GGGa</b>
<b>WWTP Control</b>						
WWTP Unit			X			MACT (VV)
<b>Dock Control</b>						
Dock			X			MACT (VV)

MACT (VV) – Light liquid (LL) Valves 10,000 ppm, LL Pumps 10,000 ppm, heavy liquid (HL) & all connectors 10,000 ppm  
 NSPS (GGG) – LL Valves 10,000 ppm, LL Pumps 10,000 ppm, HL & all connectors 10,000 ppm  
 NSPS (GGGa) – LL Valves 500 ppm, LL Pumps 2,000 ppm, HL & all connectors 10,000 ppm  
 NWCAA (VV) – LL Valves 10,000 ppm, LL Pumps 10,000 ppm, HL & all connectors 10,000 ppm  
 BACT (Modified HON) – LL Valves 1,000 ppm, LL & HL Pumps 2,000 ppm, HL Valves & all connectors 1,000 ppm

**Note: Consent Decree enhancements require lower leak thresholds (Valves= 500 ppm & Pumps= 2,000 ppm)**

## **2.11 Storage Vessel Regulations**

Storage vessel (or "tank") emissions result from evaporation of stored volatile organic compounds ("breathing" losses), and from displaced vapors as tanks are filled ("working" losses). Liquid residue left on the tank wall as the contents drain are also easily volatilized and emitted. Tank control requirements stem from NSPS, NESHAPS, NWCAA 580 and 560, and state/local new source review regulations. The control requirements and applicability vary depending on the contents of the tank, vapor pressure, the date of installation/modification, tank size, and the type of emission control technology employed. Tank applicability can be complex. The Storage Vessels "Process Descriptions" section of the Statement of Basis provides an applicability matrix for the tanks at the subject refinery. As indicated, tanks at the ConocoPhillips refinery fall into one of ten different combinations of applicability.

For the most part, the control requirements are much the same among the different applicable regulations. The refinery MACT Phase I applies to certain tanks in organic HAP service and draws heavily on NSPS subpart Kb for control specifications. Similarly, NWCAA 580 references NSPS subpart Kb. Tanks that are subject to NSPS subpart Kb and the refinery MACT Phase I, must comply with NSPS subpart Kb. Tanks that are subject to NSPS subpart Ka and the refinery MACT Phase 1 must comply with the refinery MACT Phase 1.

The following is a summary of storage vessel control requirements established in the ConocoPhillips refinery air operating permit. There are three basic tank designs relevant to the air regulations: 1) internal floating roof (IFR), external floating roof (EFR), and 3) fixed roof. All three types are present at the Ferndale Refinery. All EFR tanks must use a double seal system between the tank wall and floating roof cover. The normal double seal configuration at the COP refinery is a metallic shoe primary seal and a rim mounted secondary seal. IFR tanks use a fixed cone roof covering over the top of the tank along with an internal floating roof having at least a single seal system between the tank wall and floating roof cover. A second seal is not required by the underlying regulations because the fixed roof cover serves to reduce exposure of the floating roof thereby limiting fugitive VOC and HAP emissions. In some cases, two internal seals are used for added emission control. IFR Tanks equipped with a double seal system are allowed a more flexible inspection schedule under NSPS and Refinery MACT Phase I requirements. The storage vessel standards have requirements for fixed roof tanks, but the fixed roof tanks at the COP refinery are all exempt from control requirements because of the low volatility of their contents and because they do not store HAPs. Fixed roof tank requirements will not be addressed here.

For EFR tanks, secondary seals must be inspected and gap tested annually and the primary seal is inspected and gap tested following tank refilling. There are quarterly and semiannual inspections to inspect the integrity of the seal system and hatch seals. For IFR tanks, the annual inspection is visual through the fixed roof hatch with a comprehensive internal inspection being required once every ten years for tanks. IFR tank roof hatches must be observed quarterly.

Internal and external floating roof tanks may not store volatile organic products that exceed a maximum True Vapor Pressure (TVP) of 11.1 psia. Because the vapor pressure characteristics of crude oils and other non-finished products can vary considerably, their vapor pressures are sampled and tested to assure that they are maintained below 11.1 psia on an on-going basis. In addition some tanks have internal heaters that can increase storage temperatures above ambient. Temperature and vapor pressure records are kept by the facility and are available for inspection. Maximum true vapor pressures are calculated in

using the methods in API Chapter 19.2 Evaporative Loss From Floating Roof Tanks (previously API Bulletin 2517).

The NWCAA is notified of all annual inspections and gap tests on a schedule developed by the refinery at the beginning of each calendar year. Adjustments to the schedule are made at other times during the year as long as notices meet the 30/7 day advance notice requirements of the underlying rule. Advanced notices allow regulatory staff an opportunity to attend seal gap testing and internal inspections of tanks when they are degassed. Inspection and gap testing requirements are common to both 40 CFR 60 Subpart Kb and 40 CFR 63 Subpart CC. Any seal gap measurements or other defects found during inspections which exceed the compliance thresholds are required to be corrected within 45 days (unless an extension is used) and reported to the NWCAA on semiannual reports.

The table below indicates how each tank regulatory program applies to each tank at the ConocoPhillips Refinery.

**Table 2-9 Tank Requirement Applicability Matrix**

AOP Tank Category #	Configuration	Applicability:								ConocoPhillips Tank ID #
		560	580 (SIP)	580	MACT	Ka	Kb	Kb via OAC	BWON	
1	EFR	X	X		X					1340X110 1340X111 1340 X112 1340X113 1340X114 1340X115 1340X116 1340X117 300X43 300X45 550X101 600X1 800X141 800X142 800X143 800X144, 800X145 800X151 3000X1 300X41 300X42 550X102 550X106
3	EFR	X	X				X			300X44
4	EFR	X	X		X			X		100X92
5	EFR	X	X				X		X	900X1 900X2 900X3
6	EFR	X	X		X			X	X	100X95
7	IFR	X	X		X				X	100x96 50x304
8	IFR	X	X				X			400X1
9	IFR	X	X		X			X	X	300X40 100X98
10	IFR	X	X		X				X	100X99 100X94
11 MACT Group II Tanks	FR/EFR									6X10, 6X11, 50X300, 50X301, 50X302, 50X303, 100X91, 300X36, 300X37, 300X38, 300X39, 550X100, 550X103, 550X104, 550X105, 800X140, 800X146, 800X147, 800X148, 800X149, 800X150, 960X1
12	EFR	X	X		X				X	300X35 300X46

**EFR = external floating roof**

**IFR = internal floating roof**

**FR = floating roof**

OAC = Order of Approval to Construct

Kb = NSPS standards for storage tanks (40 CFR Part 60 subpart Kb)

Ka = NSPS standards for storage tanks (40 CFR Part 60 subpart Ka)

BWON = benzene waste NESHAP (40 CFR part 61 subpart FF)

### 3 Process Descriptions, Construction History, and Regulatory Applicability

The following section provides a description of each refinery process area along with a construction history and regulatory applicability discussion for each process unit or product handling system in that area. The refinery areas are presented in the same order found in the AOP for ease in cross-referencing.

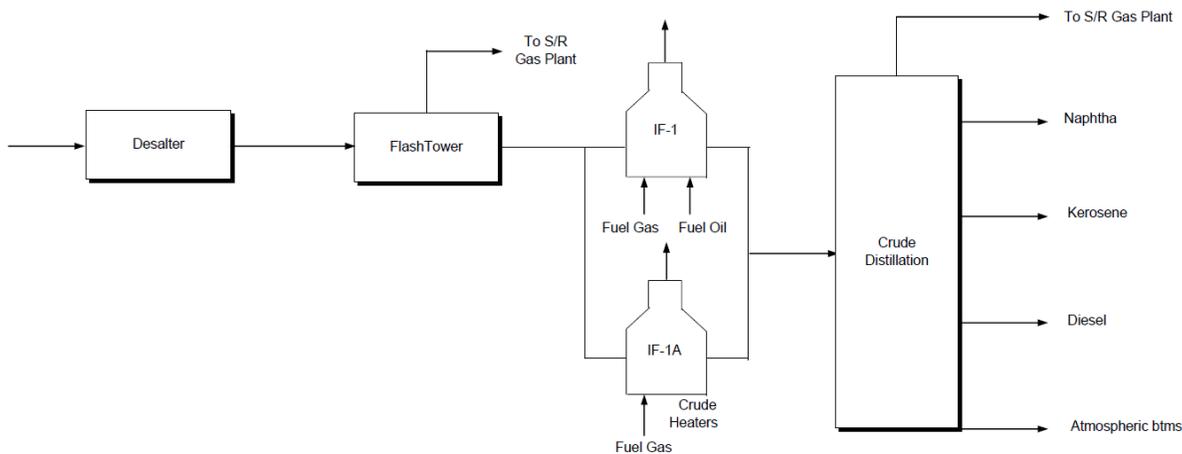
#### 3.1 Crude Distillation Process Area

##### 3.1.1 General Operation and Background

The Crude Distillation process area incorporates the Crude Distillation process unit, the Straight Run Gasoline Plant (S/R Gas Plant) process unit, and the Hydrodesulfurization Finisher (HDF), otherwise known as the #2 Hydrofiner, process unit.

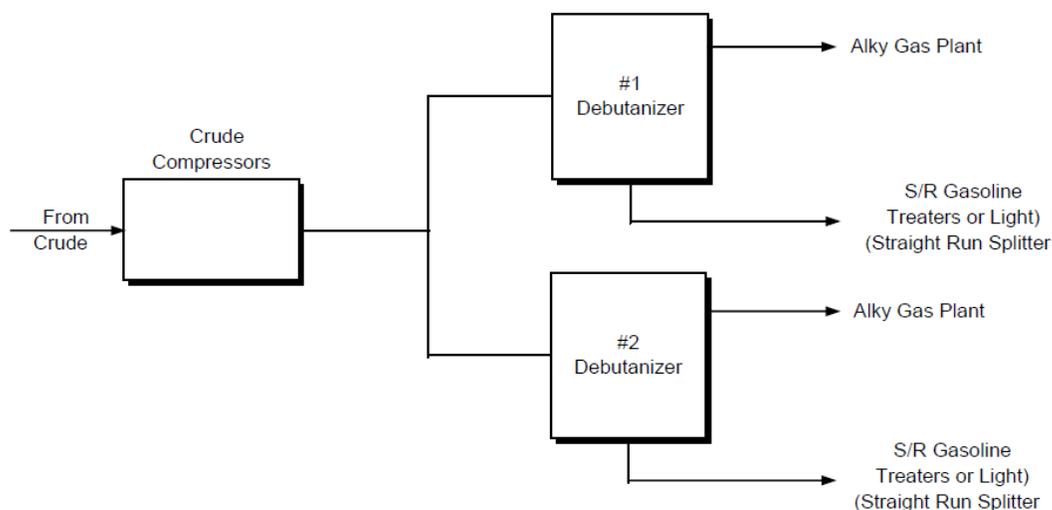
The Crude Distillation process unit separates the crude oil feedstock into its various components by boiling point temperature ranges or "cuts." Heat is supplied to the bottom of the tower while cooled product is recycled or "refluxed" back into the top of the tower. This heating and cooling creates a temperature gradient across the tower. The crude oil is continuously vaporized and condensed throughout the tower. Collection trays are positioned at various levels in the tower to collect and remove liquid product of a particular boiling point temperature range, i.e., a "cut." These cuts then exchange heat with the fresh feed, are further cooled, and then sent to storage.

Depending on the characteristics of a specific crude oil, the throughput of the crude unit may vary. Different crude oils require different heat loads for processing. Different crude oils also produce different quantities of the various cuts. Various additives are used to control such things as pH and to inhibit corrosion.



**Figure 3-1 Crude Distillation Process Unit**

The gasoline range cut is further processed in other towers in the S/R Gas Plant process unit to control vapor pressure prior to becoming a gasoline blending component. The naphtha range cut is sent to the Reformer process unit for further processing into a gasoline blending component. The kerosene cut can be sent to storage or be further processed in the HDF process unit to remove excess sulfur compounds or in the Treaters process unit to remove water. The diesel cut can be sent to storage or be further processed in the Diesel Hydrotreater (DHT) process unit to remove excess sulfur compounds. The atmospheric bottoms cut is sent to the Catalytic Cracking process unit for further processing into fuel oil and other gasoline blending components.



**Figure 3-2 S/R Gas Plant Process Unit**

Volatile organic compound and hazardous air pollutant emissions from this process area result primarily from leaks from valves, pumps, flanges, and compressors. Combustion emissions result from two heaters associated with the crude distillation tower (1F-1 and 1F-1A) and two heaters associated with the HDF unit (14F-1 and 14F-2). Emissions may also originate from process waste sewers and from the miscellaneous process vent venting HDF stripper accumulator offgas to the refinery flare gas recovery system and flare.

### 3.1.2 Construction and Permitting History

The basic configuration of the units in the Crude Distillation Process Area was established during original refinery construction in 1953. The NWCAA issued approval on 1/24/72 for installation of crude heater 1F-1A. A combustion air preheater was installed on crude oil heater 1F-1 in 1979 (NWCAA OAC #235). Two projects permitted by the NWCAA and the WDOE included changes to refinery units including the Crude Distillation Process Area. The Ferndale Upgrade/Clean Fuels project, permitted by OAC #733 (with three revisions) and PSD-00-02 (with five revisions) covered modifications to the #2 Hydrofiner to remove sulfur from gasoline instead of jet fuel. The Crude/Fluidized Catalytic Cracking/Sulfur Recovery Unit project, permitted by NWCAA OAC #908 (revised once) and PSD-05-01, included modifications to increase the crude oil charge from 98 thousand barrels per day to 105 thousand barrels per day. The crude unit equipment was modified to install piping, a new heat exchanger, new nozzles to the crude column, and new trays to the crude and preflash columns. There are no other formal permitting actions pertaining to the Crude Distillation Process in the NWCAA files.

Two heaters in the HDF process area are out of service (3F-1 and 14F-4). The NWCAA considers these heaters to be permanently out of service and are therefore not addressed in the operating permit.

The following is a summary of the NWCAA Orders of Approval to Construct for Crude Distillation Process Area equipment:

#### **NWCAA Order of Approval to Construct for the 1F-1A Crude Heater and 1C-50 Depropanizer Tower (the depropanizer tower is part of the alkylation unit) Original Date January 24, 1972.**

Approval Condition: The crude heater shall be equipped with an oxygen analyzer and combustion control instrumentation and these instruments must be equipped with a chart recorder. No other conditions were specified.

Compliance: The required instruments are installed. Electronic data collection through the data acquisition system replaced strip charts for the 1F-1A crude heater, as per the requirements of the

NWCAA Regulations Appendix A. These requirements are considered obsolete and have not been included in section 5 of the operating permit.

Approval Condition: The crude heater is to be operated on fuel gas and/or fuel oil.

Compliance: The heater is equipped to burn only fuel gas and/or fuel oil. This requirement is included in section 5 of the operating permit.

Approval Condition: The fuel gas will not contain more than 0.5 mole percent sulfur, primarily H<sub>2</sub>S.

Compliance: ConocoPhillips monitors fuel gas sulfur content via a chromatograph to ensure that this condition is met and to ensure that heater and boiler exhausts do not exceed 1000 ppmv sulfur dioxide. The generic fuel gas sulfur monitoring requirement is in Section 4 of the operating permit and this requirement for the crude heater is included in section 5 of the operating permit. Compliance with this requirement is assured since the fuel gas system serving the entire refinery is scrubbed to meet or exceed NSPS subpart J sulfur content levels (162 ppm).

Approval Condition: The fuel oil shall not exceed more than 2% sulfur by weight.

Compliance: ConocoPhillips measures the fuel oil sulfur content. This requirement is included in section 5 of the operating permit and a generic fuel oil sulfur monitoring requirement is included in Section 4 of the operating permit.

Approval Condition: Provision must be made whereby suitable smoke opacity instruments and recorders may be added to the stack at some future time if the visual emissions from this crude heater, when in operation, closely approaches or exceeds the visual emission standards.

Compliance: The stack is constructed such that these instruments may be installed if requested by the NWCAA. This requirement is completed and is not included in the air operating permit.

Approval Condition: Notify the Control Officer so the units may be inspected prior to or during start-up.

Compliance: The notification was made on April 17, 1972. This requirement is not included as an ongoing applicable requirement in the operating permit.

**NWCAA Order of Approval to Construct No. 235 (Install Combustion Air Preheater on Crude Oil Heater 1-F-1) Original Date April 12, 1979.**

Approval Condition: Notify the NWCAA before operation begins of the date operation will commence.

Compliance: Records of this notification are not in the source file, but records of an inspection by the NWCAA are in the file. This requirement is not included as an ongoing applicable requirement in the operating permit.

**NWCAA Order of Approval to Construct #733c (Ferndale Upgrade and Clean Fuels Projects)**

OAC #733 was issued on 4/6/01. It has been revised three times; once on 8/13/02; again on 6/8/05 and finally on 7/29/05. With each revision, ongoing permit requirements from the previous permit were incorporated into the new permit. Orders of Approval to Construct #733, 733a, and 733b have been superseded by OAC #733c.

OAC #733c applies to many emission units within different refinery process areas. To effectively address the OAC's regulatory requirements without constant duplication, the requirements of the permit that apply to multiple units will be described in this first process area, the Crude Distillation Process Area. Compliance with those requirements will also be addressed in this process area's section. Specifically-applicable requirements will be addressed in each individual process area's section of the Statement of Basis. The widely-applicable approval conditions from OAC 733c are as follows:

Approval Condition 1: All equipment associated with the FCCU, Alkylation, Cat Gasoline Desulfurizer and #2 Hydrofiner Units and subject to 40 CFR Part 63 Subpart CC or 40 CFR Part 60 Subpart GGG shall be in compliance with 40 CFR Part 63 Subpart H except as provided in paragraphs (c) through (i) of §63.648. Compliance shall be attained upon initial startup of each unit.

Compliance: The entire refinery was shutdown to tie in the equipment from this project. Records show that the FCCU, Alkylation, Cat Gasoline Desulfurizer and #2 Hydrofiner units were started up during the period of 2/21/03 to 3/12/03. The first Semiannual Report for Refinery MACT 1 was submitted on 9/8/03. This report included leak detection results from required inspections performed after startup on the crude unit (including the cat gasoline desulfurizer and #2 hydrofiner units), the alkylation unit, and the FCCU. Repairs were performed within 15 days or leaking pumps were put on delay of repair, as required. Inspections and repairs have continued since initial startup. The continuing requirements are included in Section 5 of the AOP.

Approval Condition 2: With respect to the equipment referenced in Condition 1, the owner or operator shall comply with the following:

Recordkeeping and reporting provisions of 40 CFR 63.654(d), 40 CFR 63.181 and 40 CFR 63.182 except for §§ 63.182(b), (c)(2) and (c)(4);

The applicable requirements of 40 CFR Part 63 Subparts A & CC; and,

The applicable requirements of 40 CFR Part 60 Subparts A & GGG. Compliance with Condition 1 is an adequate demonstration of compliance with the leak detection and repair standard of §60.592. Compliance with Condition 2(a) is an adequate demonstration of compliance with the recordkeeping and reporting requirements of §§ 60.486 and 60.487.

A single or multiple point calibration drift assessment shall be conducted after each monitoring shift, and prior to all calibrations performed after the initial daily calibration, on all organic vapor analyzers (OVA) used to perform required EPA Method 21 monitoring. The calibration drift test shall follow the procedures of EPA Method 21 (40 CFR Part 60 Appendix A) §3.2 and §4.4.2 and 40 CFR §60.485(b)(1). If any calibration drift assessment after the initial calibration shows a negative drift of more than 10%, then all components monitored since the last calibration shall be remonitored.

Concentrations measured during performance of required OVA calibrations and EPA Method 21 monitoring shall be recorded. The date of each measurement and a unique identifier linking the item measured to each concentration datum shall be part of the record.

Compliance: The facility has submitted semiannual reports detailing compliance with inspections, repairs, recordkeeping and reporting requirements. Any deviations with these requirements have been submitted with monthly reports. One such deviation was reported for failing to comply with the requirement to perform a calibration drift assessment after each monitoring shift, prior to all subsequent calibrations. The facility did not implement these calibrations upon startup of the new equipment. An NOV was issued for the violation. A letter submitted in response to the NOV stated that the facility had begun post-monitoring calibration drift assessments as of December, 2003. The continuing requirements of this condition are included in Section 5 of the AOP.

Approval Condition 3: For the purposes of implementation of this Order of Approval to Construct the term "in organic hazardous air pollutant service" shall be replaced with "in VOC service" as that term is defined in 40 CFR Part 60 Subpart VV.

Compliance: This condition clarifies that for the FCCU, Alkylation, Cat Gasoline Desulfurizer and #2 Hydrofiner Units, the OAC's leak detection and repair requirements apply to equipment in either organic hazardous air pollutant service or in VOC service.

Approval Condition 18: The heaters and boilers listed in the table below are affected facilities, as that term is used in the NSPS, 40 CFR Part 60, and are subject to and will comply with the requirements of NSPS Subparts A and J for fuel gas combustion devices. Fuel combusted in the following units shall be limited to refinery fuel gas containing less than 162 ppm hydrogen sulfide (3-hour average) or purchased natural gas:

Crude Heater 1F-1	Supplemental Crude Heater 1F-1A
Tar Separator Heater 4F-2	Alky Depropanizer Reboiler 17F-1
No. 2 HDF Heaters 14F-1 & 2	No. 3 Reformer Pretreat Heater 18F-1

No. 3 Reformer Heaters 18-F21, 22, 23 & 24	No. 3 Reformer Regen. Heater 18F-26
DHT Heater 33F-1	No. 3 Boiler 22F-1B
No. 1 Boiler 22F-1C	No. 4 Boiler 22F-1E
No. 2 Boiler 22F-1A	

The hydrogen sulfide content of refinery fuel gas combusted in the devices specified in this condition shall be monitored by a CMS that is compliant with 40 CFR Part 60 subpart J, subpart A and appendix F. Concentration measurements provided by the CMS shall be used to directly determine compliance on a continuous basis.

Compliance: The hydrogen sulfide content of the fuel gas combusted in the tabled heaters and boilers is continuously monitored. Hydrogen sulfide levels are consistently below the 162 ppm limits of subpart J. This requirement has been included in Section 5 of the permit.

Approval Condition 19: Fuel oil (defined as any liquid fossil fuel with sulfur content greater than 0.05% by weight) shall not be burned in any of the combustion devices subject to this permit except during periods of natural gas curtailment, test runs, or operator training. This does not limit the owner or operator's ability to burn Torch Oil in an FCCU regenerator to assist in starting restarting, maintaining hot standby, or maintaining regenerator heat balance.

Compliance: The operator's emissions inventory records show compliance with this condition. Torch oil is combusted in the FCCU regenerator in accordance with the conditions of this permit. This requirement has been included in Section 5 of the permit.

Approval Condition 20: The owner or operator shall keep all raw data, calculation results, test results, and monitoring data required by this order on-site and available to NWCAA representatives for not less than five years.

Compliance: Periodic inspections have shown compliance with this condition. Inspection reports are available for review in the docket maintained at the NWCAA. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 21: For each test required by this order, the owner or operator shall submit a test plan to the NWCAA not less than 30 days before the scheduled test date and notify the NWCAA at least two weeks in advance of the exact test date. Test results shall be provided to the NWCAA not more than 45 days after completion of the sampling. All performance tests shall be conducted at or near maximum representative operating capacity for the process. All tests shall be conducted while operating the control device at conditions that represent normal operation.

Compliance: The test requirements of this condition are satisfied or the permittee notifies the NWCAA prior to a performance test to discuss the circumstances and request guidance, then the permittee follows the NWCAA's instructions. Deviations from the strict deadlines of this condition are included in the facility's monthly report. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 22: The owner or operator shall provide to the NWCAA the following information in a monthly report. The report shall be submitted within 20 days after the end of each month.

For all monitoring systems required to be operated by this order, including control device performance monitoring systems: the dates, times, and causes of all periods that the monitoring system(s) did not function or operating parameters were outside of established ranges in the reporting month.

Compliance: The permittee submits a monthly report with this information to the NWCAA. This continuing requirement has been included in Section 5 of the permit.

**Washington State Department of Ecology Prevention of Significant Deterioration (PSD) Permit #PSD-00-02 Amendment 5**

Originally issued as #PSD 00-02 on 4/4/01; revised on 6/5/02, 5/13/03, 6/15/05, 3/16/07, and 10/23/08.

As was done for OAC #733, the permit requirements that apply to multiple units are included in this, the first process area section of the Statement of Basis.

Approval Condition 17: Within 90 days of startup, ConocoPhillips shall conduct performance test for NO<sub>x</sub> emissions from the cat gasoline desulfurizer feed heater, combined emissions from the FCCU and CO boiler and the sulfur recovery unit, conducted by an independent testing firm. A test plan shall be submitted to the department for approval at least 30-days prior to testing. The term startup is defined by 40 C.F.R. 60.2.

Compliance: ConocoPhillips performed an initial source test for NO<sub>x</sub> from the FCCU FGS outlet and the SRU #1 on 6/4/03. An initial source test for NO<sub>x</sub> from the Cat Gas Desulfurizer Stack was performed on 3/3/04. The concentration and mass of NO<sub>x</sub> emissions from these units were well within the limits. This condition is considered obsolete and has not been included in the permit.

Approval Condition 19: The maximum firing rate of the cat gasoline desulfurizer feed heater, FCC combustion air heater, FCC unit, CO boiler, and sulfur recovery unit shall be limited to the values listed in Appendix A of the PSD permit, and repeated below.

Unit	WEDS ID #	Maximum firing Rate (MMBtu/hr)
Sulfur Recovery Unit	17	23
Cat Gasoline Desulfurizer Feed Heater	A	40
FCC Combustion Air Heater	C	70
CO Boiler	E	109*

\* Applies when auxiliary firing fuel gas.

Compliance: ConocoPhillips reports the maximum firing rate for each of the combustion units in the monthly report. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 21: ConocoPhillips shall report the following monitoring data to the Northwest Clean Air Agency and the department. It will no longer be necessary to report to the department when PSD compliance and enforcement delegated Northwest Clean Air Agency or once the Northwest Clean Air Agency has issued a Title V permit.

Submit the performance test data from the initial performance test and the performance evaluation of the continuous emission monitor's using the applicable performance specifications in 40 C.F.R. Appendix B.

Submit a report within 20 days of the end of the each calendar month, or on another approved reporting schedule, and in the format approved by the department, including the following:

- Calendar date,
- Average NO<sub>x</sub>, CO, and PM/PM<sub>10</sub> emission rates from the FCC/CO Boiler wet gas scrubber,
- Identification of any steam generating days for which NO<sub>x</sub> data were not obtained, including reasons for not obtaining sufficient data and description of corrective actions taken,
- Identification of times emission data are excluded from the calculated average emission rate and the reasons for excluding the data, and
- Wet scrubber pump operation and maintenance records pursuant to Approval Condition 9 until ConocoPhillips demonstrates compliance with the limits in Approval Condition 7.

Submittal of monthly reports satisfies the quarterly reporting requirements of 40 CFR 60.49b, except that ConocoPhillips shall submit a quarterly report, within 30 days after the end of each calendar quarter, including the following continuous emission monitor test data:

- Days for which data was not collected,
- Reasons for which data was not collected,
- Identification of times when the pollutant concentration exceeds span of the continuous emission monitor,
- Description of any modifications to the continuous emission monitor system that could affect the ability of the system to comply with performance specifications 2 or 3, and
- Results of any continuous emission monitor drift tests.

In addition, ConocoPhillips shall maintain monitoring records on site for at least five years, and shall submit:

- Excess emission reports to the department and the Northwest Clean Air Agency, as appropriate, and
- Results of any compliance source tests.

Compliance: The Northwest Clean Air Agency issued the first Title V permit to ConocoPhillips on May 20, 2003 and the unit startups for emission units subject to the PSD permit were completed March 13, 2003. The permittee included the reporting requirements in their ongoing monthly report to the NWCAA. Excess emission reports are included in the monthly report and the results of compliance source tests are submitted to the NWCAA. Initial tests were performed on the FCC FGS outlet and the SRU on May 4, 2003, within the 90-day deadline. Initial source testing for the cat gasoline desulfurizer (S-Zorb) feed heater was on 3/3/04, also within the 90-day deadline.

Approval Condition 22: Any activity, which is undertaken by the company or others, in a manner, which is inconsistent with the application and this determination, shall be subject to enforcement under the applicable regulations.

Compliance: This is a general, continuing requirement that applies only to the units permitted under PSD-00-02. As such, it has been included in Section 5 of the permit for those units.

Approval Condition 23: Access to the source by the EPA, state, and local regulatory personnel shall be permitted upon request for the purposes of compliance assurance inspections. Failure to allow such access is grounds for an enforcement action.

Compliance: This is a general, continuing requirement that applies only to the units permitted under PSD-00-02. As such, it has been included in Section 5 of the permit for those units.

Approval Condition 24: This approval shall become invalid if construction of the project is not commenced within eighteen (18) months after receipt of the final approval, or if construction of the facility is discontinued for a period of eighteen (18) months, unless the department extends the 18 month period upon satisfactorily showing that an extension is justified, pursuant to 40 CFR 52.21(r)(2) and applicable EPA guidance.

Compliance: The facility received final approval under PSD-00-02 on 4/4/01. Construction commenced within eighteen months of that date. This condition is considered obsolete and is not included in the permit.

Approval Condition 25: Final approval of this permit shall not be earlier than the date upon which the EPA notified Ecology that the EPA has satisfied its obligations, if any, under Section 7 of the Endangered Species Act 16 U.S.C. paragraph 1531 et seq., 50 CFR part 402, Subpart B (Consultation Procedures) and Section 305(b)(2) of the Magnuson-Stevens Fishery and Conservation Act 16 U.S.C. paragraph 1801 et seq., 50 CFR Part 600 Subpart K (EFH Coordination, Consultation, and Recommendations).

Compliance: Final approval of the permit was received on 4/4/01. This condition is considered obsolete and is not included in the permit.

### **NWCAA Order of Approval to Construct #908a**

This OAC was originally issued as OAC #908 on 11/17/05. OAC #908 was revised to include a project change, correct typographical errors, and provide clarification. OAC #908a covers the Crude Distillation Process Unit, but the project included no physical modifications to the unit that would increase air emissions other than adding a limited number of equipment components subject to leak detection and repair. New equipment components added by the project were incorporated into the existing leak detection and repair program for the unit. Therefore, there are no OAC requirements for the crude distillation process unit.

Washington Department of Ecology Prevention of Significant Deterioration #PSD-05-01

PSD-05-01 was issued on 11/16/05. It has not been revised. The permit was issued for the Crude/Fluidized Catalytic Cracking/Sulfur Recovery Unit project. Physical modifications were made to increase crude charge and FCC charge rates and to remove the increased sulfur that resulted from the higher charge rates. While the permit covers the Crude Distillation Process Unit, the project included no physical modifications to the unit that would increase air emissions other than adding a limited number of equipment components subject to leak detection and repair. New equipment components added by the project were incorporated into the existing leak detection and repair program for the unit. Therefore, there are no specific approval conditions for the crude distillation process unit.

### **3.1.3 Regulatory Applicability**

At the Crude Distillation Process Area, leak detection and repair (LDAR) activities are required pursuant to the refinery MACT Phase I regulation. Except for the #2 Hydrofiner, none of the process units in the Crude Distillation Process Area have been constructed or modified subsequent to 1/4/83 so NSPS subpart GGG applies only to the #2 Hydrofiner. The #2 Hydrofiner is also subject to the refinery MACT Phase I and BACT LDAR requirements under OAC #733c. Where there is an overlap between NSPS subpart GGG and the refinery MACT Phase I, the MACT takes precedence. LDAR requirements under NWCAA 580 do not apply because feed to the units are not "butane or lighter" (an applicability criterion for NWCAA 580.8). The refinery MACT Phase I LDAR requirements are cited in Section 5 of the permit. The BACT LDAR requirements applicable to the #2 Hydrofiner are in Section 5 also.

There are two reciprocating compressors (1K-1 and 1K-1A) in the Crude Unit that are subject to control requirements under the refinery MACT Phase I. The refinery MACT Phase I requires control of compressors in accordance with NSPS subpart VV or the NESHAPS HON rule. ConocoPhillips has chosen to comply with subpart VV. Subpart VV requires compressors to be equipped with a barrier fluid system to prevent emissions or a closed vent system to control emissions. Compressors that normally leak with no detectable emissions (§60.482-3(i)) or that must be recast (§63.482-3(j)) are exempt. In December 2002 NWCAA concluded that the subject compressors were not in compliance with the control requirements of the refinery MACT Phase I and did not qualify for an exemption. Notice of Violation #3291 was written on 12/18/02. COP equipped the compressors with a barrier fluid system to prevent emissions.

There are various process waste drains in the Crude Distillation Process Area that are subject to control requirements under the Benzene Waste Standard (40 CFR part 61 subpart FF). These requirements are in Section 5 of the AOP.

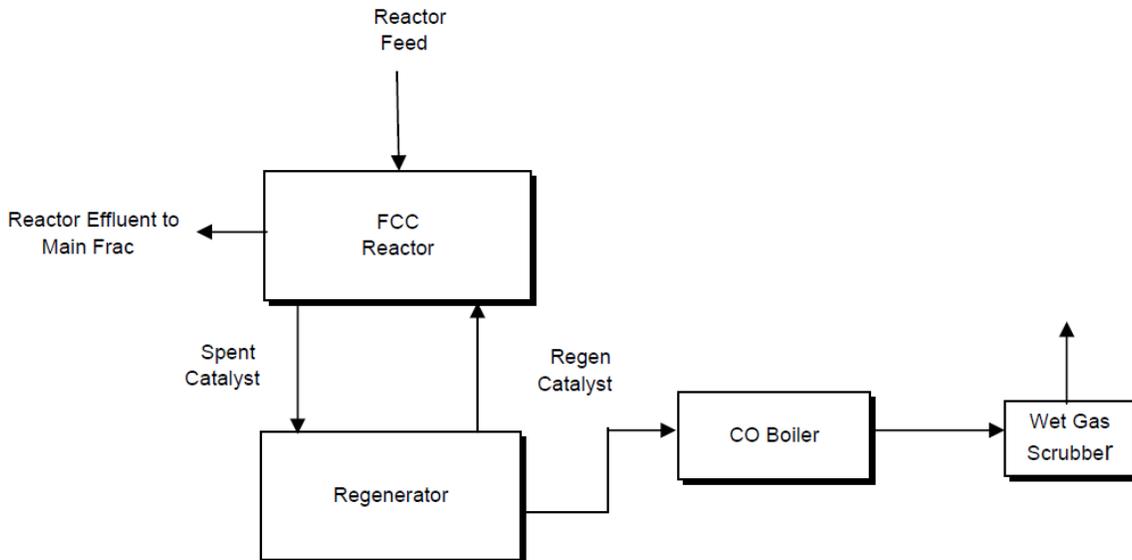
ConocoPhillips identified one miscellaneous process vent in the Crude Distillation Process Area that is subject to control requirements under the Refinery MACT Phase I. This process vent is routed to the flare gas recovery system or the main refinery flare. ConocoPhillips has submitted documentation that the refinery flare meets the control device standards of 40 CFR Part 63. The monitoring requirements for flares are included in Section 5 of the air operating permit. There are no outstanding or known chronic issues at any of the emission units in the Crude Distillation Process Area.

## 3.2 Catalytic Cracking Process Area

### 3.2.1 General Operation and Background

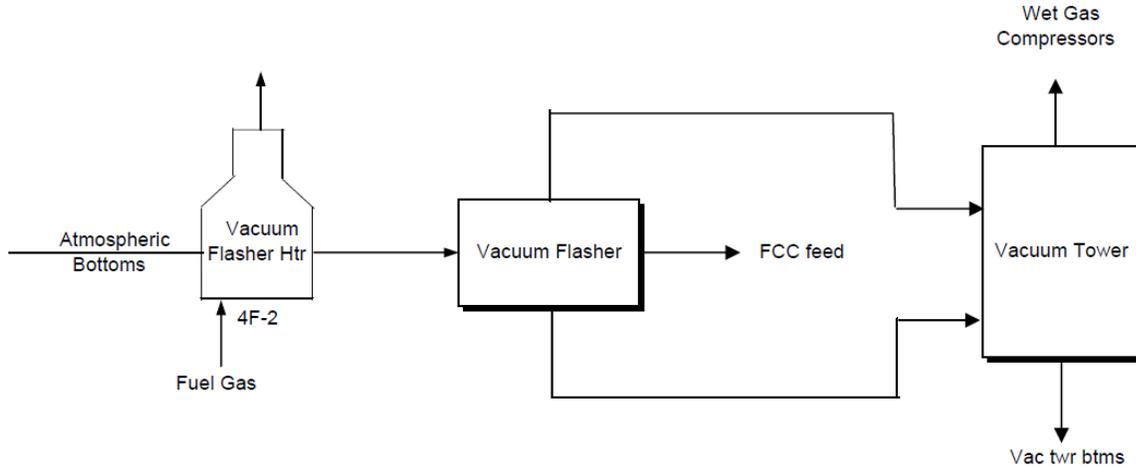
The Catalytic Cracking process area includes the Fluidized Catalytic Cracking Unit (FCCU), the Vacuum Distillation Tower, the Vacuum Flasher Heater (4F-2), the Unsaturated Gas Plant (Unsat Gas Plant) process unit, the Carbon Monoxide (CO) Boiler and the Flue Gas Scrubber (FGS).

The catalytic cracking unit takes heavier cuts of the crude oil (such as gas oil and residual oil) from the Crude Distillation process unit and converts them into lighter cuts of higher value products (such as olefins and gasoline) by using a catalyzed high temperature reaction to break apart the hydrocarbon bonds. Coke formed as a reaction product on the FCCU catalyst is removed from the catalyst by combustion in the Regenerator. The Regenerator Flue Gas is combusted in the CO Boiler, where it is used to generate steam. Sulfur dioxide and particulate matter pollutants in the CO Boiler exhaust gas are removed by the Wet Gas Scrubber.



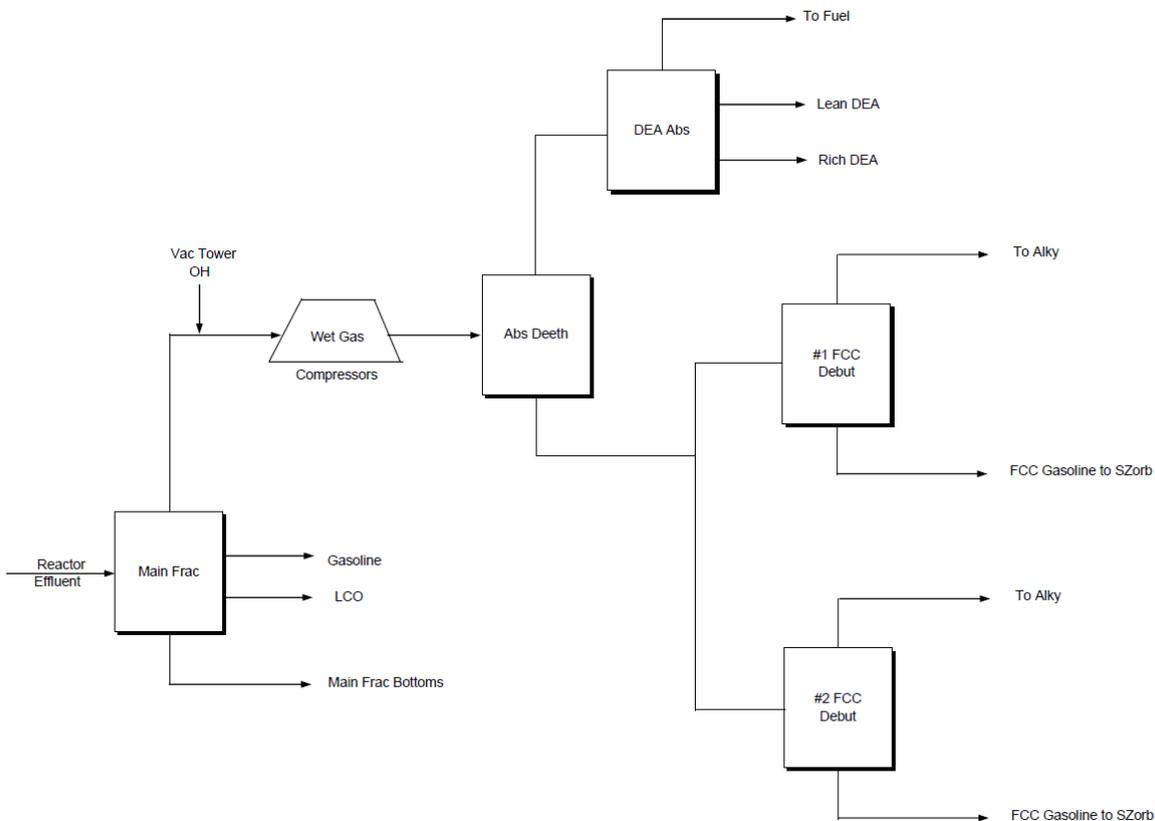
**Figure 3-3 FCC Process Unit**

The Vacuum distillation tower takes crude distillation bottoms and further distills the material to produce a fuel oil blending component and feed for the FCC process unit.



**Figure 3-4 FCC Process Unit Feed Prep**

Lighter hydrocarbons from the cracking unit are further processed in the Unsaturated Gas Plant process unit. Absorber columns at Unsat Gas Plant remove sulfur compounds (such as H<sub>2</sub>S) from the light gases. The sulfur compounds are then sent to the Sulfur Plant (SRU) process units for sulfur recovery.



**Figure 3-5 FCC Gas Plant**

Stack emissions from this process area result primarily from the FGS exhaust and the Vacuum Flasher Heater stack. Gases from catalytic cracker catalyst regeneration and auxiliary fuel fired in the CO Boiler flow through the FGS. Fugitive emissions come from leaks from valves, flanges, and compressors and

from process waste sewers. A miscellaneous process vent (#25-FV-007) is vented to the flare gas recovery system and/or refinery flare. Two other miscellaneous process vents that vent the cases for wet gas compressors 5K-1 and 5K-1A go to atmosphere. These are identified as Group 2 vents under the Refinery MACT Phase 1.

### **3.2.2 Construction and Permitting History**

The original Catalytic Cracking Process Area was installed during refinery construction in 1953. The ConocoPhillips Refinery historically operated a Thermoform Catalytic Cracking Unit (TCCU). The high operating costs of the TCCU and availability of more effective cracking technology spurred ConocoPhillips to install a Fluidized Catalytic Cracking Unit (FCCU) and remove the TCCU (including the original CO Boiler). The FCCU and associated equipment began operation in March 2003.

There are six relevant projects that received formal construction approval orders from the NWCAA. Two projects were permitted by both the NWCAA and the WDOE. The Ferndale Upgrade/Clean Fuels Project, permitted by OAC #733 and PSD-00-02 included replacing the TCCU with the FCCU of the same nominal capacity (30,000 bbl. feed/day). The new FCCU had a new 70 MMBtu/hr combustion air heater needed for operation during startups. A new carbon monoxide boiler with auxiliary fuel burners was installed to generate steam from combustion of carbon monoxide discharged from the FCCU. Discharge from the FCCU combustion air heater, the FCCU regenerator, and the CO boiler were routed through a Belco Technologies Corporation EDV<sup>®</sup> wet gas scrubber before exhausting to the atmosphere.

The Crude/Fluidized Catalytic Cracking/Sulfur Recovery Unit project, permitted by NWCAA by OAC #908 and PSD-05-01, included modifications to increase the FCCU charge to 36.5 thousand barrels per day. The third project involved installation of a combustion air preheater on Tar Separator Heater 4F-2 in 1981. The fourth project involved the TCCU and is now obsolete for that unit. The approval order conditions are summarized below. The fifth project was installation of a selective catalytic reduction control system for removing nitrogen oxide emissions from the Vacuum Flasher Heater 4F-2 (formerly the Tar Separator Heater). The sixth and most recent project was installation of an enhanced selective non-catalytic reduction (ESNCR) system to reduce nitrogen oxide emissions from the FCC Unit. The ESNCR system includes injection of vaporized ammonia enhanced with hydrogen into the combustion chamber of the CO boiler. As of the date of permit issuance, this system has not yet been constructed. All regulatory requirements under the ESNCR system's Order of Approval to Construct #1047 are considered future-effective and have been included in Section 5 of the AOP. Under the Consent Decree, the project is required to be completed by the end of 2010.

**NWCAA Order of Approval to Construct #288** (Refinery Optimization Project: increase capacity or function of the Crude, TCC and Alky Units) Original Date June 18, 1990. This project involved changes to the TCC, Crude, and Alkylation units. The TCCU was modified to allow increased production of gasoline (higher cracking severity). Since the TCC unit (including the original CO boiler) has been removed from the refinery, any permit conditions for the unit are considered obsolete.

NWCAA Order of Approval to Construct #340 (Install Combustion Air Preheater on Tar Separator Heater 4F-2) Original Date June 15, 1981.

This permit was superseded by OAC #1012.

**NWCAA Order of Approval to Construct #733c** (Ferndale Upgrade and Clean Fuels Projects) OAC #733 was issued on 4/6/01. It has been revised three times; once on 8/13/02; again on 6/8/05 and finally on 7/29/05. With each revision, ongoing permit requirements from the previous permit were incorporated into the new permit. Orders of Approval to Construct #733, 733a, and 733b have been superseded by OAC #733c.

OAC #733c applies to many emission units within different refinery process areas. To effectively address the OAC's regulatory requirements without constant duplication, the OAC requirements that apply to multiple units (fugitive leaks of VOC and HAP, fuel oil combustion, refinery fuel gas combustion, and recordkeeping, monitoring, and test requirements) were described in the Crude

Distillation Process Area in Section 3.1.2 of this Statement of Basis. Only the permit requirements that apply to the Catalytic Cracking Process Area are described in detail here.

Additional enforceable restrictions are provided in OAC #733c. ConocoPhillips requested limitations on annual capacity factors for supplemental fuel firing in the CO boiler. These limits effect dismissal of NO<sub>x</sub> emission limits and monitoring requirements of 40 CFR Part 60 Subpart Db that otherwise would have applied to the CO boiler. ConocoPhillips requested limitations on operating hours for the FCC combustion air heater because the heater is employed only during unit start-up. ConocoPhillips requested limitations on the sulfur content in refinery fuel gas combusted by a variety of heaters and boilers. The tar separator heater (now called the vacuum flasher heater) at the catalytic cracking process area is subject to this fuel gas sulfur limit.

Approval Condition 9: Discharge from the FCCU Combustion Air Heater, FCCU Regenerator, and the CO Boiler shall be continuously routed through a wet gas scrubber that reduces sulfur dioxide emissions to the atmosphere by at least 90% averaged over each rolling twenty-four hours of FCCU operation and at least 95% over each rolling seven days of FCCU operation.

The owner or operator shall conduct monitoring, testing, recordkeeping and reporting in compliance with the appropriate sections of 40 CFR §60.105, §60.106 & §60.107. The emission limits specified in this condition shall be included in the basis for recordkeeping and reporting.

Compliance: Exhaust gases from the Combustion Air Heater, the Regenerator, and the CO Boiler pass through the FGS. Monitored sulfur dioxide emissions data shows that the FGS consistently meets the 90% and 95% reduction requirements. Monitoring, testing, recordkeeping, and reporting requirements are also met consistently. These continuing requirements are included in Section 5 of the Air Operating Permit.

Approval Condition 10: Sulfur dioxide discharged from the FCCU Combustion Air Heater, FCCU Regenerator, and the CO Boiler in combination shall not exceed 548.4 tons per rolling 12-month period. Each calendar month the owner or operator shall use procedures approved by the NWCAA and data from the SO<sub>2</sub> continuous monitoring system (CMS) to calculate the mass of sulfur dioxide emitted over the preceding 12-month period. The results of this calculation shall be reported to the NWCAA each month. All data and supporting documentation used to make each calculation shall be kept on-site for at least five years.

Compliance: ConocoPhillips calculates the mass of sulfur dioxide emitted monthly from the three combustion units. The monthly emissions are aggregated to provide a rolling 12-month period, which is reported to the NWCAA. The amount of sulfur dioxide emitted is consistently less than the 548.4 ton emission limit. These continuing requirements are included in Section 5 of the Air Operating Permit.

Approval Condition 11: Sulfur dioxide discharged from the FCCU Combustion Air Heater, FCCU Regenerator, and the CO Boiler in combination shall not exceed 25 ppmdv on a 365-day rolling average basis and 50 ppmdv on a 7-day rolling average basis, at 0 percent oxygen. Compliance with these emission limits shall be demonstrated through the use of a CEMS.

SO<sub>2</sub> emissions during periods of malfunction of the FCCU (defined as the fluidized catalytic cracking unit and its regenerator and associated boiler) and during periods of malfunction of the wet gas scrubber will not be used in determining compliance with the 50 ppmdv emission limit, provided that during such periods the owner or operator implements good air pollution control practices to minimize SO<sub>2</sub> emissions. "Malfunction" shall mean, as specified in 40 CFR Part 60.2, "any sudden infrequent and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions."

Each calendar month the owner or operator shall use data from the SO<sub>2</sub> CEMS to calculate each of the 365-day and 7-day rolling average SO<sub>2</sub> concentrations for each day in the month. The results of this calculation shall be reported to the NWCAA each month. All data and supporting documentation used to make each calculation shall be kept on-site for at least five years.

Compliance: ConocoPhillips monitors the concentration of SO<sub>2</sub> emitted from the combustion units through the FGS with a CEMS. The data is reduced to a 365-day rolling average and a 7-day rolling average. As of the data of permit issuance, the permittee has met the permit limits. Daily SO<sub>2</sub> emissions are reported to the NWCAA on a monthly basis. The NWCAA has access to the calculated rolling averages if the daily emission results justify an investigation. These continuing requirements are included in Section 5 of the Air Operating Permit.

Approval Condition 12: Visible emissions discharged from the FCCU Combustion Air Heater, FCCU Regenerator, and the CO Boiler shall not exceed 20% opacity for more than six minutes in any hour as measured by EPA Method 9. The owner or operator shall monitor compliance with term D-3 via monitoring performed pursuant to the facility's EPA-approved alternative monitoring plan dated April 4, 2003.

Compliance: Visible emissions from the FGS are not reliably able to be measured due to the stack's steam plume. The refinery managers requested an alternative monitoring plan to monitor particulate emissions as a surrogate for visibility. The alternative monitoring plan was approved by the EPA. The Plan's continuing requirements are included in Section 5 of the permit.

Approval Condition 13: Within 90 days of initial start-up of the CO boiler, the owner or operator shall identify boiler operational parameters and practices that have been described as "good combustion practice." These operational parameters and practices shall be included in an operation and maintenance (O&M) manual for the boiler. The O&M manual shall also include a description of records that will be maintained to insure the continuous application of "good combustion practice." The O&M manual shall be available at the facility for review by state, federal, and local agencies.

Compliance: ConocoPhillips has developed an O&M manual for the CO boiler. It is available at the facility for review. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 14: The FCCU Combustion Air Heater shall not be operated more than 240 hours in any 12-month period. The owner or operator shall notify the NWCAA within 12 hours after each heater startup. This requirement becomes applicable 30 days after the initial startup date.

Compliance: The FCCU Combustion Air Heater is only used during FCCU startup after a planned or unplanned unit shutdown. The FCCU is the gasoline producer for the refinery and is infrequently shut down. The permittee is consistently in compliance with this requirement and notifies the NWCAA appropriately. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 15: The annual capacity factor for natural gas burned in the CO boiler shall not exceed ten percent of the total potential heat input to the CO boiler in each calendar year. Total potential heat input shall not include heat recovered from the FCCU regenerator, but shall include heat generated from the combustion of CO in the boiler. The owner or operator shall continuously monitor the amount of purchased natural gas combusted in the CO boiler in accordance with a monitoring plan approved by the NWCAA.

Compliance: ConocoPhillips' monthly report provides the quantity of natural gas combusted and the beginning and ending times and dates for all periods during which natural gas is combusted in the CO boiler for the month. While the annual capacity factor is not calculated, the quantity of natural gas combusted in the CO boiler is minimal. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 17: Combined total emissions from the FCCU and CGD units and emissions increases resulting from modifications to the SRU and Alkylation units shall not cause exceedance of acceptable source impact levels specified in WAC 173-460-150 and -160 as determined by methods specified in WAC 173-460-080.

Compliance: ConocoPhillips performed source tests on 12/29-12/30/03 using approved source test methods for toxic air pollutants regulation under WAC 173-460-080. The facility demonstrated that emissions were not in exceedance of acceptable source impact levels for the tested pollutants. The NWCAA is satisfied that the conditions of this requirement have been fulfilled and this requirement has

not been included in the permit. Furthermore, the NWCAA has authority to require retesting at any time under NWCAA Regulation 367.

Approval Condition 22: The owner or operator shall provide to the NWCAA the following information in a monthly report. The report shall be submitted within 20 days after the end of each month. Report the following:

- For all monitoring systems required to be operated by this order, including control device performance monitoring systems: the dates, times, and causes of all periods that the monitoring system(s) did not function or operating parameters were outside of established ranges in the reporting month.
- The beginning and ending times and dates of all periods that the FCCU Combustion Air Heater was operated in the reporting month.
- The total number of hours the FCCU regenerator was operated in partial combustion mode in the reporting month. The total number of hours the FCCU regenerator was operated in full combustion mode in the reporting month.
- A summary providing the range and average of the rolling 12-hour average and 720-hour average SRU mass and concentration emission calculations made in each reporting month.
- The quantity of natural gas combusted and the beginning and ending times and dates for all periods during which natural gas is combusted in the CO boiler in each reporting month.
- At the FCCU wet gas scrubber: the maximum and average operating parameter readings recorded in each reporting month from monitoring as per Condition 12. This condition was designated as Condition E-10(f) of OAC #733a.

Compliance: ConocoPhillips consistently submits a monthly report containing the required information from this condition. This continuing requirement is included in Section 5 of the permit.

**Washington State Department of Ecology Prevention of Significant Deterioration (PSD) Permit #PSD-00-02 Amendment 5 Originally issued as #PSD-00-02 on 4/4/01; revised on 6/5/02, 5/13/03, 6/15/05, 3/16/07, and 10/23/08.**

The PSD-00-02 Amendment 5 permit requirements that apply to multiple units were included in the first process area section, the Crude Distillation Process Area. The permit requirements applicable to the Catalytic Cracking Process Area are included here.

Approval Condition 2: Combined NO<sub>x</sub> emissions from the FCCU and CO boiler shall not exceed 127 ppm<sub>dv</sub> at 7% O<sub>2</sub> over a 1-hour averaging period and 308.10 tons per year over a 12-month rolling total. If ConocoPhillips is unable to meet the emission limits for NO<sub>x</sub> listed above within 90 days of startup, they must install a selective non-catalytic reduction unit and retest within 150 days of startup.

Compliance: ConocoPhillips performed an initial source test for NO<sub>x</sub> from the FCCU FGS outlet on 6/4/03. The concentration and mass of NO<sub>x</sub> emissions were well within the limits. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 5: Combined carbon monoxide emissions from the Fluidized Catalytic Cracking Unit and Carbon Monoxide Boiler shall not exceed 500 ppm<sub>dv</sub> @ 7% O<sub>2</sub> over a 1-hour averaging period and 100 ppm<sub>dv</sub> @ 0% O<sub>2</sub> over a 365 day rolling average. Initial compliance shall be determined in accordance with EPA Reference Method 10, 10A or 10B.

Compliance: The initial test performed on 6/4/03 showed the 1-hour concentration of CO to be well within the limits of the permit. Records show that the CO has not exceeded 100 ppm<sub>dv</sub> during normal operations. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 7: By no later than June 30, 2007, combined PM/PM<sub>10</sub> emissions from the FCCU and CO boiler shall not exceed 0.50 lb/1000 lbs coke burn-off over a rolling three-hour average and 0.020

grains per dry standard cubic foot corrected to 7% O<sub>2</sub> over a rolling 3-hour average. Initial compliance shall be determined in accordance with EPA Reference Method 5B.

Compliance: ConocoPhillips performed an initial source test on June 1, 2007 that demonstrated that PM/PM<sub>10</sub> emissions were in compliance with the standard. The continuing requirement to comply with the emission limits has been included in Section 5 of the permit.

Approval Condition 8: For the period between the time this permit becomes final and the date that ConocoPhillips demonstrated compliance with the emission limits in Approval Condition 7, combined PM/PM<sub>10</sub> emissions from the FCCU and CO boiler shall not exceed 0.80 lb/1000 lb coke burn-off over a rolling three-hour average when operating three scrubber water recirculation pumps and 0.020 grains per dry standard cubic foot corrected to 7% O<sub>2</sub> over a 3-hour rolling average. Initial compliance shall be determined in accordance with EPA Reference Method 5B.

Compliance: The facility did not submit any source tests for PM/PM<sub>10</sub> between the time the PSD permit became final (2/16/07) and the date that they demonstrated compliance with Approval Condition 7 (6/1/07). There were no requirements to source test within this period. This is an obsolete requirement and has not been included in the permit.

Approval Condition 9: For the period between the time this permit becomes final and the date that ConocoPhillips demonstrates compliance with the emission limits in Approval Condition 7, ConocoPhillips will operate all three scrubber water recirculation pumps to the maximum extent practicable, except during pump malfunction or periods of scheduled maintenance of a pump. ConocoPhillips will optimize the operation of the pumps in order to minimize the periods of scheduled maintenance. ConocoPhillips will not schedule maintenance on more than one pump at any given time and scheduled maintenance will not exceed one week. During pump malfunction ConocoPhillips will use best efforts to take all steps necessary (including pump replacement) to minimize the amount of time the FCCU wet gas scrubber operates with fewer than three pumps.

Compliance: This requirement is considered to be obsolete and has not been included in the permit.

Approval Condition 11: Compliance with Approval Condition 2 will be monitored by a continuous emission monitor for NO<sub>x</sub> meeting the performance specifications of 40 CFR Part 60, Appendix B and quality control/quality assurance requirements of 40 CFR Part 60, Appendix F. The continuous emission monitor must be installed and certified within 180 days after startup.

Compliance: The facility monitors compliance with the NO<sub>x</sub> emission standard in Condition 2 with a CEM meeting the requirements of Appendices B and F. This continuing requirement has been included in Section 5 of the permit. The CEM was installed and certified with 180 days of startup.

Approval Condition 12: Compliance with Approval Condition 5 will be demonstrated by a continuous emission monitor for carbon monoxide meeting the performance specifications of 40 CFR Part 60, Appendix B and quality control/quality assurance requirements of 40 CFR Part 60, Appendix F.

Compliance: The facility monitors compliance with the CO emission standard in Condition 5 with a CEM meeting the requirements of Appendices B and F. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 14: Compliance with Approval Condition 7 will be demonstrated by annual source testing in accordance with EPA Reference Method 5B, as found in 40 CFR Part 60, Appendix A or an alternative approved method. Source testing shall be performed no sooner than 4 months after the previous test and no later than 8 months after the previous test. Source testing shall be performed at maximum normal FCCU feed rates.

Compliance: ConocoPhillips performed a source test for PM/PM<sub>10</sub> on June 1, 2007. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 15: Compliance with Approval Condition 8 will be determined by semi-annual source testing in accordance with EPA Reference Method 5B. Source testing shall be performed no

sooner than 4 months after the previous test and no later than 8 months after the previous test. Source testing shall be performed at maximum normal FCCU feed rates.

Compliance: This condition is obsolete and has not been included in the permit.

Approval Condition 16: Compliance with Approval Condition 9 will be met by recordkeeping.

Compliance: The facility complied with this condition during the time period that the condition covered. This condition is obsolete and has not been included in the permit.

Approval Condition 18: Use of natural gas shall be limited to 10% of fuel combusted in the CO boiler or 111,252 MMBtu/yr over a calendar year averaging period.

Compliance: The natural gas use in the CO boiler is submitted in each monthly report and annual emissions inventory. Natural gas is usually used only for the boiler's pilots and amounts to less than the limits. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 20: Within 90 days of initial start-up of the boiler, ConocoPhillips shall identify boiler operational parameters and practices that have been described as "good combustion practice." These operational parameters and practices shall be included in an operation and maintenance (O&M) manual for the boiler. The O&M manual shall also include a description of records that will be maintained to insure the continuous application of "good combustion practice." The O&M manual shall be maintained by ConocoPhillips and be available for review by state, federal, and local agencies. Emissions that result from a failure to follow the requirements of the O&M manual may be considered credible evidence that emission violations have occurred.

Compliance: ConocoPhillips has developed an O&M manual for the CO boiler. It is available at the facility for review. This continuing requirement has been included in Section 5 of the permit.

#### **NWCAA Order of Approval to Construct #908a**

This OAC was originally issued as OAC #908 on 11/17/05. OAC #908 was revised to include a project change, correct typographical errors, and provide clarification. OAC #908a covers the Catalytic Cracking Process Unit, but the project included no physical modifications to the unit that would increase air emissions other than adding a limited number of equipment components subject to leak detection and repair. New equipment components added by the project were incorporated into the existing leak detection and repair program for the unit. Therefore, there are no OAC requirements for the catalytic cracking unit process area.

#### **Washington Department of Ecology Prevention of Significant Deterioration #PSD-05-01**

PSD-0501 was issued on 11/16/05 for the Crude/Fluidized Catalytic Cracking/Sulfur Recovery Unit project. Physical modifications were made to increase crude charge and FCC charge rates, and to remove the increased sulfur that resulted from the higher charge rates. While the permit covers the Catalytic Cracking Process Unit, there were no physical modifications to the unit that would increase air emissions other than adding a limited number of equipment components subject to leak detection and repair. New equipment components added by the project were incorporated into the existing leak detection and repair program for the unit.

**NWCAA Order of Approval to Construct #1012b** was originally issued on 2/7/08 and revised on 9/11/08 and 4/27/09. OAC #1012b supersedes #1012a and #1012, which in turn supersedes OAC #340. The OAC approves installation and operation of a selective catalytic reduction (SCR) system on the vacuum flasher heater 4F-2, previously named the tar separator heater. The permit provides federally enforceable limits on nitrogen oxides and ammonia. The reduction in nitrogen oxide emissions were required by the facility's Consent Decree. The first amendment changed the NO<sub>x</sub> emission limit averaging period from 12 months to a 365-day average (required by the CD) and removal of an oxygen correction factor. The second amendment removed a reference to 40 CFR Part 60 Subpart Ja and relaxed the NO<sub>x</sub> limit from 12 ppm to 80 ppm and from 0.011 lb/MMBtu to 0.07 lb/MMBtu. The emission limit was made at the request of ConocoPhillips because the SCR system did not operate as efficiently as planned despite post-construction modification. The key factor in this

decision was the fact that the regulatory driver for the NO<sub>x</sub> emission limits in OAC #1012b is the facility's Consent Decree and the current emission limits meet the CD. Ammonia emission limits stayed the same. After much investigation by the permittee and their vendors, the catalyst bed was found to have significant blockage and resultant channeling from material deposited upon the bed following startup. The catalyst bed was redesigned and modified and an extension to initial testing was ammonia plan submission was granted by the NWCAA.

Approval Condition 1: Fuel combusted in Vacuum Flasher Heater 4F-2 shall be limited to refinery fuel gas.

Compliance: This continuing requirement is included in the AOP in Section 5.

Approval Condition 2: Visual emissions from the heater shall not exceed five percent (5%) opacity for more than three minutes in any one hour period as determined by Department of Ecology Method 9A.

Compliance: This continuing requirement is included in the AOP in Section 5.

Approval Condition 3: NO<sub>x</sub> emissions shall not exceed 80 ppm NO<sub>x</sub> by volume, dry basis at 3% oxygen, 24-hour rolling average. NO<sub>x</sub> emissions shall not exceed 0.07 lb/NO<sub>x</sub>/MMBtu (HHV) on a 365-day rolling average basis.

Compliance: This continuing requirement is included in the AOP in Section 5.

Approval Condition 4: Compliance with Condition 3 shall be determined by installing NO<sub>x</sub> and oxygen CEMs in the heater stack. The CEMS shall be calibrated, maintained and operated in accordance with NWCAA Appendix A and 40 CFR Part 60 Appendices B and F.

Compliance: This continuing requirement is included in the AOP in Section 5.

Approval Condition 5: Emissions of ammonia from the heater shall not exceed 10 ppm<sub>dv</sub> corrected to 3% O<sub>2</sub> as a 24-hour average.

Compliance: This continuing requirement is included in the AOP in Section 5.

Approval Condition 6: Compliance with Condition 5 shall be determined by Bay Area Air Quality Management District ST-1B or EPA Method 320 by the average of three 60-minute test runs at a 90% or greater heater load or other alternative method approved by NWCAA. During any testing, the permittee shall record ammonia feed rate, NO<sub>x</sub> emissions, fuel consumption, excess oxygen and exhaust temperature.

Compliance: This continuing requirement is included in the AOP in Section 5.

Approval Condition 7: The permittee shall conduct an initial compliance test for ammonia and opacity through an independent contractor prior to September 30, 2009.

Compliance: The compliance test for ammonia and opacity was conducted on September 4, 2009. Test result show compliance with the ammonia and opacity emission limits. This requirement is considered completed and has not been included in the AOP.

Approval Condition 8: The permittee shall conduct annual compliance tests for ammonia through an independent contractor within one month of the anniversary of the previous test.

Compliance: This continuing requirement is included in the AOP in Section 5.

Approval Condition 9: The permittee shall develop and implement an Ammonia Emissions Monitoring Plan to establish a predictive relationship between the heater and SCR parameters and emissions of ammonia. The plan shall be submitted as follows:

An initial plan shall be submitted to NWCAA at least 30 days prior to SCR startup and shall include specific operating parameters.

A final plan shall be submitted to NWCAA within 120 days after conducting the initial ammonia compliance test. The acceptability of the plan will be assessed based on the initial and annual source test results and may be amended and improved accordingly.

Compliance: an initial ammonia emission monitoring plan was submitted to the agency on November 13, 200. After modification of the SCR system and unit restart, the final plan was submitted to the NWCAA on December 16, 2009, within 120 days after conducting the initial test. The continuing requirement to amend and improve the plan based upon annual test results has been included in the AOP in Section 5.

Approval Condition 10: Report information on the SCR system and emissions on a monthly basis.

Compliance: This continuing requirement is included in the AOP in Section 5.

Condition 11: Notify the NWCAA in writing of the completion of installation of the SCR. This notification shall be postmarked no later than 15 days after the heater's startup date.

Compliance: The modified SCR system was started up on December 22, 2008 after an extensive shutdown. Written notification was provided to the NWCAA on January 27, 2009. However, multiple meetings, periodic updates, and at least one site inspection was performed following completion of installation and the NWCAA considers that this regulatory requirement has been fulfilled.

### 3.2.3 Regulatory Applicability

Regarding equipment leak standards, the Catalytic Cracking Unit is monitored pursuant to the requirements of the BACT determination in OAC #733c, BACT as per the modified HON. The Vacuum Distillation Tower at the Catalytic Cracking Process Area was replaced in 1995 and thereby triggered NSPS subpart GGG equipment leaks standard applicability. These units are also subject to the refinery MACT Phase 1 and where there is overlap between NSPS subpart GGG and the refinery MACT Phase I, the refinery MACT Phase I equipment leak monitoring requirements take precedence over subpart GGG.

A number of individual drains at the process area are subject to 40 CFR 61 subpart FF, the benzene waste NESHAP, and are therefore subject to the refinery MACT Phase I (40 CFR 63 subpart CC). These drains are identified in the permit by the names that ConocoPhillips uses to designate the waste streams that enter the subject drains.

ConocoPhillips identified in the Catalytic Cracking Process Area one miscellaneous process vent that is subject to control requirements under the Refinery MACT Phase I. This process vent is routed to the flare gas recovery system or the main refinery flare. ConocoPhillips has submitted documentation that the refinery flare meets the control device standards of 40 CFR Part 63.

The liquid feed heater (4F-1A) was disconnected prior to startup of the FCC. NWCAA OAC#523 requirements are therefore no longer applicable.

The FCCU is subject to emission limitations and monitoring, recordkeeping and reporting requirements under a variety of standards. Federal and state standards applicable to emission units in the catalytic cracking process area are described below. These applicable requirements are specified in Sections 3 and 5 of the air operating permit.

Emissions Unit	Pollutant	Rule Applicability
FCCU regenerator	CO & PM	NSPS J (<500 ppm CO) WAC 173-400-070 (5)(a) (< 40% opacity & <0.2 grains particulate matter/dscf)
	opacity	WAC 173-400-075 (40%) NSPS J (30%)
	SO <sub>2</sub>	NSPS J (90% reduction 60.104(b)(1))
	HAPs	Refinery MACT phase II (NESHAP UUU) (applicable now)

FCCU CO boiler	SO <sub>2</sub>	NSPS J (<162 ppm H <sub>2</sub> S in fuel gas)
	PM and NO <sub>x</sub>	NSPS Db (exempt from standards due to fuel selection and limited capacity factor)
FCCU combustion air heater	SO <sub>2</sub>	NSPS J (<162 ppm H <sub>2</sub> S in fuel gas)
FCCU	Fugitive leaks of HAP & VOC	NSPS GGG or NESHAP CC (leak detection and repair) (superseded by BACT requirement to follow LDAR for new sources)

The following discussion addresses notable regulatory issues related to the FCCU/CO Boiler. Operation of a flue gas scrubber on the FCCU/CO Boiler exhaust will produce an attached condensed plume (ca. exhaust temperature = 140°F) that disallows use of a continuous opacity monitor putatively required by 40 CFR §60.105(a)(1). In a letter dated 4/4/03 the USEPA granted an exemption from the NSPS subpart J (§60.105(a)(1)) requirement to operate a continuous opacity monitor (COM) on the FCCU regenerator discharge. The Alternative Monitoring Plan was updated and reissued on 12/7/09. Instead of an opacity monitor, scrubber operating parameters will be continuously monitored. The FCCU regenerator is also subject to the refinery MACT Phase II emission standards (Title 40 part 63 subpart UUU). Subpart UUU requires compliance with the NSPS subpart J particulate and carbon monoxide emission limits and it requires installation of a continuous opacity monitor. The 2009 alternative monitoring plan approved by EPA for the NSPS COM requirement explicitly addresses the subpart UUU COM requirement.

The CO boiler is only approved to burn refinery fuel gas or natural gas auxiliary fuel in addition to the waste gas produced by the FCCU regenerator. Because of this there is no requirement to monitor liquid/solid fuel combustion per §60.105(d) and the boiler is not subject to particulate or sulfur dioxide limits under subpart Db. The amount of natural gas allowed to be burned in the boiler is limited thereby allowing the boiler to be exempt from the subpart Db requirement to install a CEM for NO<sub>x</sub> (0.44b (e) and 0.44b (l)).

The CO Boiler will be subject to sulfur dioxide limits under NSPS subpart J as specified in the operating permit. Compliance with the subpart J refinery fuel gas combustion device sulfur dioxide limits will be demonstrated via an H<sub>2</sub>S continuous monitoring system installed on the fuel gas supply line. The CO boiler does not burn any supplemental liquid or solid fuels.

There are no outstanding or known chronic compliance issues at any of the emission units in the Catalytic Cracking Process Area.

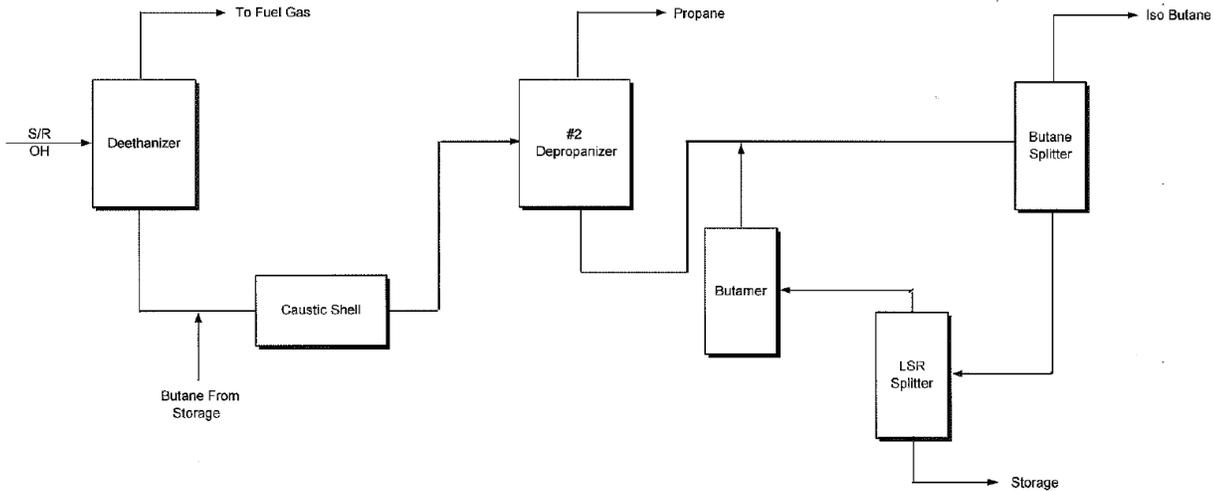
### 3.3 Alkylation Process Area

#### 3.3.1 General Operation and Background

The Alkylation (Alky) process area incorporates the Alkylation process unit, the Saturated Gas Plant (Sat Gas Plant) process unit, the Light Straight Run (LSR) Splitter Tower process unit (formerly part of the #2 Reformer), the cat gasoline desulfurization unit (CGD) (including a 40 MMBtu/hr heater), the Cat Gasoline Splitter tower, Alky Debutanizer Tower and the Butane Isomerization unit.

The Alky process unit combines the lighter ends of crude and the catalytic cracking unit with a hydrogen fluoride catalyst in the reaction section to form alkylate. Alkylates are sent to storage as a gasoline blending component. Other saturated products, such as propane and butane, are also produced in this process and are sent to storage.





**Figure 3-7 Alky Sat Gas Plant Process Unit**

Overhead gases from the LSR Splitter Tower provide the feed to the Butane Isomerization unit. The LSR Splitter was part of the #2 Reformer process unit, which has been decommissioned.

The Butane Isomerization process unit takes the LSR Splitter Overhead mixed butanes and hydrogen from the pretreater compressors and combines them in a reactor with perchloroethylene to convert normal butane to isobutane. Noncondensable VOCs go through a scrubber system and then supplement the refinery fuel gas system.

The Alky Debutanizer Tower recovers butane from the alkylation unit.

Emissions from this process area result primarily from leaks from valves, flanges, and compressors. Combustion emissions result from a heater associated with the Alkylation unit (Alky Reboiler Heater 17F-1) and the CGD heater. Emissions may also come from process waste sewers and from a miscellaneous process vent.

Equipment components in the Alkylation Process Area are subject to a variety of equipment leak requirements, depending largely upon the date of construction and the process stream compositions. To provide clarity throughout the regulatory discussion of this process area, the following table lists regulatory applicability for components within the Alkylation Process Area:

Component Location	Part 60 Subpart GGG	NWCAA 580	Part 63 Subpart CC	BACT Via 733c	BACT Via OAC 795	BACT Via OAC 564a
Butane isomerization	X	X				
Perchloroethylene components in Butane Isomerization service						X

Alkylation unit (acid section)	X	X	X	X	X	
Alkylation unit (nonacid section) and Alky Debutanizer		X	X	X	X	
LSR Splitter and Saturated Gas Plant		X	X			
Cat Gas Desulfurizer	X		X	X		

### 3.3.2 Construction and Permitting History

The basic configuration of the units in the Alkylation Process Area was established in 1965. The Butane Isomerization unit (Butamer) was added in 1997. The Butamer involved addition of equipment (valves, pumps, flanges) with fugitive leak potential and additional process waste sewers. The Cat Gas Desulfurizer was added in 2001. Initial approval of the Butamer was issued on August 30, 1996 (OAC #564). The original conditions largely reflected the underlying applicable regulations (e.g. 40 CFR part 60 subparts GGG and QQQ). The approval order was revised on October 2, 2002 to delete overlapping and obsolete requirements, leaving only one requirement pertaining to preventing fugitive leaks of perchloroethylene, which is used as a catalyst in the isomerization reaction. This requirement was left in the approval order because perchloroethylene is a toxic air pollutant listed under WAC 173-460, but was delisted as a volatile organic compound in 1996 and is not a listed organic HAP under the Refinery MACT Phase I. Despite the revision of OAC #564, the equipment components in the Butamer that are not in perchloroethylene service are subject to 40 CFR Part 60 Subpart GGG.

The following is a summary of the construction projects at the Alkylation Process area that have received formal approval from the NWCAA:

**NWCAA Order of Approval to Construct #288** (Refinery Optimization Project: increase capacity or function of the Crude, TCC and Alkylation Units) Original Date June 18, 1990. This project involved modification of the TCCU to allow increased production of gasoline (higher cracking severity), an increase in crude unit capacity of 5,000 barrels/day and an increase of 900 barrels/day of product from the alkylation unit.

**Approval Condition:** The project shall be constructed and operated in accordance with the information submitted in the Notice of Construction.

**Compliance:** The NWCAA has determined that there are no substantive requirements associated with this condition that are additional to requirements addressed in other permit conditions.

**Approval Condition:** The permittee is required to notify the NWCAA prior to start-up after the modifications are completed.

**Compliance:** A notification letter could not be found within the NWCAA files. It is probable that notification was made orally, but the NWCAA database records do not go back to 1990. The NWCAA presumes that notification was made and that this condition is obsolete.

**Approval Condition:** A plan and examination fee is due and payable prior to startup. The total amount was \$800.

**Compliance:** There are no records in the file documenting whether payment was made, but the NWCAA assumes that the condition has been satisfied.

**NWCAA Order of Approval to Construct No. 564a** (Construction of Butane Isomerization Unit for conversion of normal butane to isobutane) Original Date: August 30, 1996, Revised on October 2, 2002.

Approval Condition 1: Equipment in perchloroethylene service shall be subject to the equipment leak standards, monitoring, recordkeeping and reporting requirements in 40 CFR Part 63 Subpart CC National Emission Standards for Hazardous Air Pollutants from Petroleum Refineries. Note: the Butane Isomerization Unit is not a tacitly affected process unit with respect to Subpart CC because the equipment is not in "organic hazardous air pollutant service" as defined by this subpart.

Compliance: Notification of initial leak testing was submitted to the NWCAA on 11/21/97. The continuing requirements of OAC #564a condition 1 are addressed under Section 5 of the permit.

**NWCAA Order of Approval to Construct #715a** (Install Gasoline Splitter Tower) Original Date June 15, 1981 issued as OAC #715, revision issued on 10/2/02 as OAC #715a. The original approval order was revised to remove obsolete conditions and conditions that wholly overlap with applicable federal regulations. Applicable federal regulations constitute BACT requirements and no additional ongoing requirements are established by OAC #715a.

**NWCAA Order of Approval to Construct #733c** (Ferndale Upgrade and Clean Fuels Projects) OAC #733 was issued on 4/6/01. It has been revised three times; once on 8/13/02; again on 6/8/05 and finally on 7/29/05. With each revision, ongoing permit requirements from the previous permit were incorporated into the new permit. Orders of Approval to Construct #733, 733a, and 733b have been superseded by OAC #733c.

OAC #733c applies to many emission units within different refinery process areas. To effectively address the OAC's regulatory requirements without constant duplication, the OAC requirements that apply to multiple units (fugitive leaks of VOC and HAP, fuel oil combustion, refinery fuel gas combustion, and recordkeeping, monitoring, and test requirements) were described in the Crude Distillation Process Area in Section. Specific regulatory requirements were included in OAC #733c for the cat gasoline desulfurization unit. They are described below:

Approval Condition 8: Fuel combusted in the CGD Heater, rated at 40 MMBtu/hr, shall be limited to refinery fuel gas containing less than 50 ppm hydrogen sulfide (rolling 24-hour average) or purchased natural gas. The hydrogen sulfide content of refinery fuel gas combusted in the CGD Heater shall be continuously monitored in compliance with 40 CFR Part 60 Subpart J, Subpart A and Appendix F during periods of heater operation. Concentration measurements provided by the continuous emissions monitoring system (CEMS) required by 40 CFR Part 60 Subpart J shall be used to directly determine compliance with term C-1 and Subpart J on a continuous basis. The owner or operator shall conduct testing, recordkeeping, and reporting in accordance with the relevant sections of 40 CFR Part 60 Subpart J. The emission limits specified in Condition 8 shall be included in the basis for recordkeeping and reporting. Written operating procedures to assure compliance with Condition 8 shall be provided to the NWCAA on request and shall be available to the heater operators at all times.

Compliance: The CGD Heater currently combusts purchased natural gas. However, ConocoPhillips monitors the concentration of hydrogen sulfide in the fuel gas streams combusted by the facility heaters and boilers. Testing, recordkeeping and reporting are performed in accordance with Subpart J. Written operating procedures are available to the NWCAA and to heater operators. These continuing requirements are included in Section 5 of the permit.

**NWCAA Order of Approval to Construct #795** (Alky Debutanizer Tower) Originally issued on 2/4/02.

This approval order covered installation of a debutanizer tower at the Alkylation unit. The new distillation tower will assist in the recovery of butane from alkylate. BACT for the control of Toxic Air Pollutants (TAPs) and VOC was determined to be a leak detection and repair work practice standard equivalent to the requirements of Title 40 Code of Federal Regulations (40 CFR) Part 63 Subpart CC for new sources, with some additional monitoring and recordkeeping as specified below. With respect to

the Alkylation Unit, compliance with the Subpart CC standard for new sources provides demonstration of compliance with the applicable requirements of NWCAA Regulation Section 580.8, Title 40 Code of Federal Regulations (CFR) Part 63 subpart CC, and Part 60 Subpart GGG. Installation of the new tower triggers subpart GGG applicability to the whole alkylation unit, however, for the components in HAP service, subpart CC (refinery MACT Phase I) takes precedence over NSPS subpart GGG. As specified by the approval order, new or modified sewers installed as part of this project will be subject to NSPS subpart QQQ. Similar to the LDAR requirements, the refinery MACT Phase I takes precedence over subpart QQQ when there is an overlap.

Approval Condition 1: All equipment that is part of the Alkylation Unit, including the new debutanizer column, that is subject to NWCAA Regulation Section 580.8, 40 CFR Part 63 Subpart CC and/or 40 CFR Part 60 Subpart GGG shall be in compliance with 40 CFR Part 63 Subpart H except as provided in paragraphs (c) through (i) of 40 CFR §63.648.

Compliance: The Debutanizer was started up on March 15, 2003. The first Semiannual Report for Refinery MACT 1 was submitted on September 8, 2003. This report included leak detection results from inspections performed after startup on the alkylation unit, which would have included the Debutanizer. Repairs were performed within 15 days or leaking pumps were put on delay of repair, as required. Inspections and repairs have continued since initial startup. The continuing requirements are included in Section 5 of the AOP.

Approval Condition 2: With respect to the equipment referenced in condition 1, the owner or operator shall comply with all of the following:

- Recordkeeping and reporting provisions of 40 CFR 63.654(d), 40 CFR 63.181 and 40 CFR 63.182 except for §§ 63.182(b), (c)(2) and (c)(4);
- The applicable requirements of 40 CFR Part 63 Subpart A;
- A single or multiple point calibration drift assessment shall be conducted after each monitoring shift, and prior to all calibrations performed after the initial daily calibration, on all organic vapor analyzers (OVA) used to perform required EPA Method 21 monitoring. The calibration drift test shall follow the procedures of EPA Method 21 (40 CFR Part 60 Appendix A) §3.2 and §4.4.2 and 40 CFR §60.485(b)(1). If any calibration drift assessment after the initial calibration shows a negative drift of more than 10%, then all components monitored since the last calibration shall be remonitored; and,
- Concentrations measured during performance of required OVA calibrations and EPA Method 21 monitoring shall be recorded. The date of each measurement and a unique identifier linking the item measured to each concentration datum shall be part of the record.

Compliance: The facility has submitted semiannual reports detailing compliance with inspections, repairs, recordkeeping and reporting requirements. Any deviations from these requirements have been submitted with monthly reports. The calibration drift assessment requirement has been satisfied since December 2003. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 3: Compliance with condition 1 provides an adequate demonstration of compliance with the leak detection and repair standard of §60.592. Compliance with condition 2(a) provides an adequate demonstration of compliance with the recordkeeping and reporting requirements of §§ 60.486 and 60.487.

Compliance: This clarification has been included in Section 5 of the permit.

Approval Condition 4: For the purposes of implementation of this Order of Approval to Construct the term "in organic hazardous air pollutant service" shall be replaced with "in VOC service" as that term is defined in 40 CFR Part 60 Subpart VV.

Compliance: This term provides clarification and is cited in Section 5 of the operating permit.

Approval Condition 5: Wastewater systems constructed or modified as part of the debutanizer project and subject to 40 CFR Part 60 Subpart QQQ shall be in compliance with the applicable requirements of Subpart QQQ upon initial startup of the debutanizer tower.

Compliance: This continuing requirement has been included in Section 5 of the permit.

Approval Condition 6: ConocoPhillips Company shall notify the NWCAA in writing within 30 days of startup when the project is complete.

Compliance: Written notification of initial startup was submitted on March 28, 2003.

**Washington State Department of Ecology Prevention of Significant Deterioration (PSD) Permit #PSD-00-02 Amendment 5 Originally issued as #PSD-00-02 on 4/4/01; revised on 6/5/02, 5/13/03, 6/15/05, 3/16/07, and 10/23/09.**

The PSD-00-02 Amendment 5 permit requirements that apply to multiple units were included in the first process area section, the Crude Distillation Process Area. The permit requirements applicable to the Alkylation Process Area are included here.

Approval Condition 1: Emissions of NO<sub>x</sub> from the cat gasoline desulfurizer feed heater shall not exceed 17 ppm<sub>dv</sub> at 7% O<sub>2</sub> over a 1-hour averaging period and 5.1 tons per year. Initial compliance shall be determined in accordance with EPA Reference Method 7E.

Compliance: The cat gasoline desulfurizer feed heater has been tested for NO<sub>x</sub> emissions annually since the initial test on 3/3/04. Test results show NO<sub>x</sub> emissions below the standard in each source test report. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 4: Emissions of carbon monoxide from the cat gasoline desulfurizer feed heater shall not exceed 0.0824 lb/MMBtu over a 1-hour averaging period and 14.4 tons per year over a 12-month rolling total. Initial compliance shall be determined in accordance with EPA Reference Method 10, 10A or 10B.

Compliance: The cat gasoline desulfurizer feed heater has been tested for CO emissions annually since the initial test on 3/3/04. Test results show CO emissions below the standard in each source test report. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 10: Compliance with Approval Conditions 1 and 3 will be monitored by yearly source testing in accordance with EPA Reference Method 7E as found in 40 C.F.R. Part 60, Appendix A or an alternative approved method.

Compliance: The cat gasoline desulfurizer feed heater has been tested for NO<sub>x</sub> emissions annually in accordance with EPA Reference Method 7E. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 13: Compliance with Approval Conditions 4 and 6 will be demonstrated by yearly source testing in accordance with EPA Reference Method 10, as found in 40 CFR Part 60, Appendix A or an alternative approved method. ConocoPhillips will identify a surrogate parameter (such as fuel usage) and multiply it by the emission factor derived during the previous source test. Source testing shall be performed no sooner than 4-months after the previous test and no later than 8-months after the previous test.

Compliance: The cat gasoline desulfurizer feed heater has been tested for CO emissions annually in accordance with EPA Reference Method 10. Annual emissions are derived from fuel usage and source test results. This continuing requirement has been included in Section 5 of the permit.

### **3.3.3 Regulatory Applicability**

At the Alkylation Process Area, leak detection and repair (LDAR) activities are required pursuant to four different regulatory programs. Note that the alkylation unit itself is divided into the "acid section" and the non-acid section which is known simply as "alkylation-section" (the alkylation section is subject to MACT LDAR). Equipment in the "acid-section" is not in organic HAP service and is subject only to the

NWCAA Regulation Section 580 LDAR requirements and NSPS subpart GGG. It is extremely hazardous to work on or near the acid-section equipment because of the presence of hydrofluoric acid. The Butamer unit is not subject to the MACT standard because none of the process streams are in organic HAP service (as defined by the Refinery MACT Phase I). The perchloroethylene service sections of the Butamer are subject to the MACT LDAR standards vis a vis OAC 564a, but is not directly subject to Refinery MACT Phase I (because it is not a HAP defined under the MACT) and it is not subject to NWCAA 580 or 40 CFR part 60 subpart GGG because perchloroethylene is not a volatile organic compound. All of these various requirements are in place in Section 5 of the permit.

There are various process waste drains in the Alkylation Unit Process Area that are subject to control requirements under the Benzene Waste Standard (40 CFR part 61 subpart FF). And there are drains at the Butamer and Alkylation unit that are subject to the emission standards of 40 CFR part 60 subpart QQQ. These requirements are in Section 5 of the AOP.

ConocoPhillips identified in the Alkylation Process Area one miscellaneous process vent that is subject to control requirements under the Refinery MACT Phase I. This process vent is routed to the flare gas recovery system and main refinery flare. ConocoPhillips has submitted documentation that the refinery flare meets the control device standards of 40 CFR Part 63.

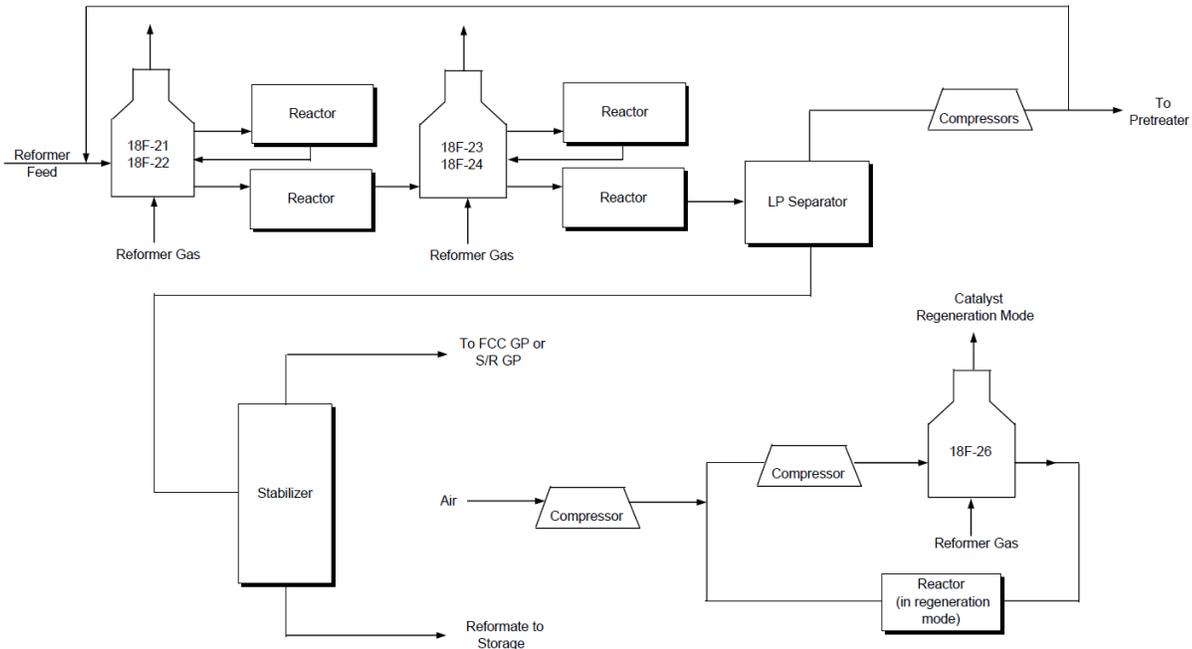
There are no outstanding or known chronic compliance issues at any of the emission units in the Alkylation Process Area.

### **3.4 Reformer/DHT Distillation Process Area**

#### **3.4.1 General Operation and Background**

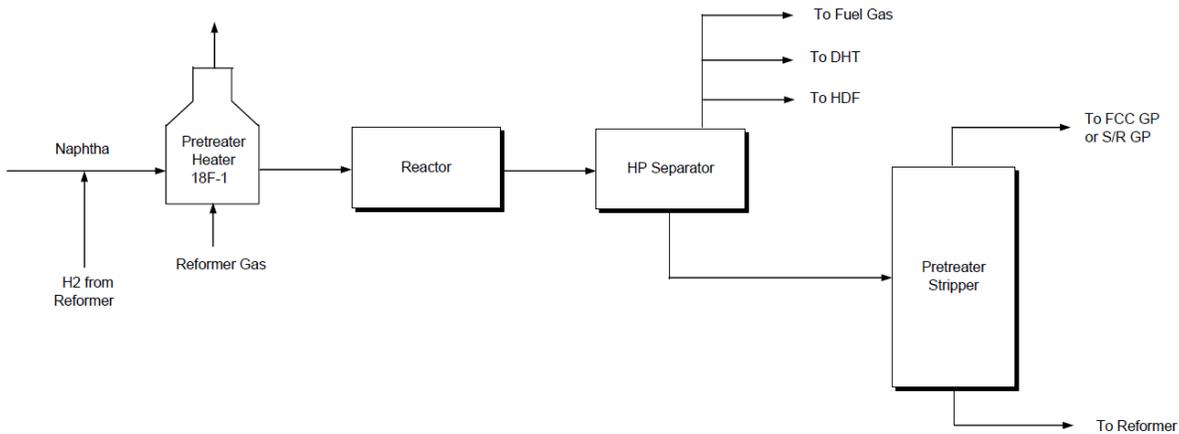
The Catalytic Reformer/Diesel Hydrotreater (Reformer/DHT) Process Area incorporates the #3 Reformer process unit, the #3 Pretreater process unit, and the DHT process unit.

The catalytic reforming process converts the "naphtha cut" from a low-octane material to a high-octane gasoline blending component and generates hydrogen required by other processing units in the Ferndale Refinery. The process involves four reactors in series with a heater pass before each reactor. A fifth reactor of catalyst can be regenerated concurrent to the onstream operation of the other four reactors. Once the reactor is regenerated, it is placed back on-stream, and one of the other four reactors is regenerated.



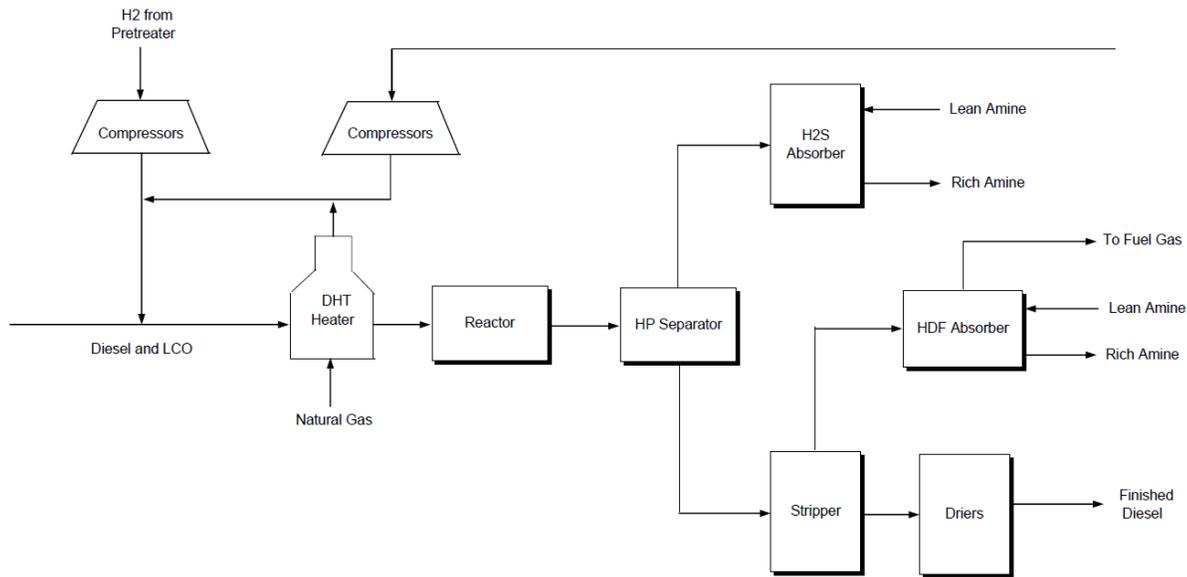
**Figure 3-8 #3 Reformer Process Unit**

The Pretreater process unit uses catalyst and heat to remove impurities, including sulfur, from the product stream before it enters the Reformer process unit. Note that the Pretreater and Reformer process units use and produce their own fuel gas.



**Figure 3-9 #3 Pretreater Process Unit**

The diesel hydrotreater (DHT) process unit reduces the amount of sulfur in diesel (both virgin and cracked) by hydrotreating with a catalyst and hydrogen from the Reformer process unit. The sulfur compounds that are removed are sent to the SRU process units for sulfur recovery. This low-sulfur diesel is then sent to storage.



**Figure 3-10 Diesel Hydrotreater Process Unit**

Emissions from this process area result primarily from leaks from valves, pumps, flanges, and compressors. Combustion emissions result from several heaters associated with the reformer (18F-21, 22, 23, 24, 26), the Pretreater (18F-1), and the DHT (33F-1). Emissions also originate from reformer regeneration exhaust, process waste sewers and from miscellaneous process vents.

### 3.4.2 Construction History

The catalytic reformer currently in operation was built in 1972. Known as the #3 Reformer, it replaced the function of earlier reformer units. A chloride scrubber was added to the unit in 2005 for compliance with Refinery MACT Phase II (Subpart UUU) requirements. The diesel hydrotreater unit was built in 1992 and modified in 1995. The DHT heater 33F-1 firing rate was increased in 2002 (refinery fuel gas was routed to the DHT heater 33F-1) and again in 2005 to add additional reactors to allow continuous production of Ultralow Sulfur Diesel (ULSD). The #3 Pretreater was also built in 1972 (initially known as the "Hydrofiner").

The following is a summary of the construction projects at the Reformer/DHT Process area that received formal approval from the NWCAA:

**NWCAA Order of Approval to Construct for the #3 Catalytic Reformer** (composed of Hydrofiner, Powerfiner, and Regeneration Facilities (Octane Improvement Project)) Original Date January 14, 1972.

Approval Condition: No approval conditions specified.

Compliance: Not applicable.

**NWCAA Order of Approval to Construct No. 343** (Diesel Hydrotreater Unit) Original Date: October 3, 1991.

The NWCAA issued two approval orders pertaining to the Diesel Hydrotreater after issuance of the original Order of Approval to Construct (#343). The latest approval order (#780) completely supersedes the two earlier orders (#343 & #552). The following is a summary of the Order of Approval to Construct No. 343.

Approval Condition 1: The project shall be constructed and operated in accordance with the information submitted in the Notice of Construction.

Compliance: The NWCAA has determined that there are no substantive requirements associated with this condition that are additional to requirements addressed in other permit conditions.

Approval Condition 2: The DHTU 30.2 MMBtu/hr heater shall burn only pipeline grade natural gas.

Compliance: Post construction inspection of the unit indicated that only purchased natural gas was piped to the DHTU heater fuel system. Order of Approval to Construct #780 later authorized combustion of refinery fuel gas in the DHTU heater.

Approval Condition 3: The DHTU shall be subject to federal New Source Performance Standards 40 CFR 60.590-593 Subpart GGG Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries.

Compliance: After construction of the DHTU the unit was added to the refinery leak detection and repair program and required reports were submitted. The DHTU is subject to NSPS Subpart GGG regardless of this requirement in the order of approval to construct. This overlapping requirement was deleted when OAC #780 was issued.

Approval Condition 4: Nitrogen Oxide emissions from the DHTU heater shall not exceed 0.07 lb NO<sub>x</sub> per MMBtu. The heater firing rate shall not exceed 30.2 MMBtu/hr heat input.

Compliance: The initial source test conducted on 8/19/93 indicated compliance with this emission limit. Source inspections have consistently indicated firing rates below 30.2 MMBtu/hr.

Approval Condition 5: A source emission test for NO<sub>x</sub> shall be conducted within 180 days of startup of the DHT Unit heater to demonstrate compliance with condition 5. The test shall conform to EPA Method 7, 40 CFR 60 Appendix A.

Compliance: Refinery staff notified the NWCAA by a letter received on June 10, 1993 that the DHTU would be starting up the following week. The initial test conducted on 8/19/93 was performed within 180 days of startup and followed EPA method 7E. Following method 7E rather than method 7 is not a significant departure from the requirements of the order of approval to construct.

Approval Condition 6: Opacity from the DHTU heater stack shall not exceed five (5) percent for more than six minutes in any one hour (EPA Method 9).

Compliance: Evidence available to the NWCAA from inspections and information from facility staff indicates that opacity from the heater stack has been, in all likelihood, compliant.

**NWCAA Order of Approval to Construct No. 552** (Installation of Diesel Hydrotreater Unit (DHTU) to increase firing rate) Original Date: June 5, 1995.

The NWCAA issued two approval orders pertaining to the Diesel Hydrotreater after issuance of the original Order of Approval to Construct #343. OAC #552 was issued to approve an increase in firing rate from 30.2 MMBtu/hr to 48 MMBtu/hr. The latest approval order (#780), which completely supersedes the two earlier orders (#343 & #552), was issued to approve combustion of refinery fuel gas in the heater. The following is a summary of the Order of Approval to Construct No. 552.

Approval Condition 1: The project shall be constructed and operated in accordance with the information submitted in the Notice of Construction.

Compliance: The NWCAA has determined that there are no substantive requirements associated with this condition that are additional to requirements addressed in other permit conditions.

Approval Condition 2: The project shall be constructed and operated subject to the same conditions specified in the original Approval to Construct issued October 31, 1991 with the following revisions:

Approval Condition 4: Nitrogen Oxide emissions from the DHTU Heater shall not exceed 0.07 Lbs. per MMBtu. The heater firing rate shall not exceed 48.0 MMBtu/hr heat input.

Approval Condition 5: A source emission test for NO<sub>x</sub> shall be conducted within 180 days of modification to the firing rate on the DHTU Heater to demonstrate compliance with condition 4. The

test shall conform with EPA Method 7E as specified at 40 CFR Part 60 Appendix A. The initial source emission test shall be conducted at the maximum operational firing rate achievable at the time of the test. Additional tests for NO<sub>x</sub> shall be conducted when 36 MMBtu/hr and 45 MMBtu/hr are achieved. The test plan shall be submitted to the NWCAA at least thirty days before testing. The operator shall notify the NWCAA at least fifteen days before testing of the exact scheduled test date.

Compliance: The initial source test conducted on 8/19/93 indicated compliance with this emission limit. The firing rate of the DHTU heater did not reach 36 MMBtu/hr in the period between issuance of the approval orders so no additional testing was necessary. Source inspections indicate that firing rates have remained below 48.0 MMBtu/hr.

**NWCAA Order of Approval to Construct No. 780** (Refinery Fuel Gas to Diesel Hydrotreater (DHT) Heater 33F-1) Original Date: July 26, 2001.

Requirements pertaining to the subject heater were established in Order of Approval to Construct #552 issued on June 5, 1995 and in the original construction order for the DHT unit issued on October 3, 1991. Requirements in these orders applicable to the DHT are rescinded and superseded by this order on the date the subject modification is completed.

Approval Condition 1: Fuel combusted in the DHT Heater 33F-1 shall be limited to refinery fuel gas containing less than 50 ppm hydrogen sulfide (rolling 24-hour average) or purchased pipeline-grade natural gas.

The hydrogen sulfide content of refinery fuel gas combusted in DHT Heater 33F-1 shall be continuously monitored in compliance with 40 CFR Part 60 Subpart J, Subpart A and Appendix F during periods of heater operation. Concentration measurements provided by the continuous emissions monitoring system (CEMS) required by 40 CFR Part 60 Subpart J shall be used to directly determine compliance with this term and Subpart J on a continuous basis.

The owner or operator shall conduct testing, recordkeeping, and reporting in accordance with the relevant sections of 40 CFR Part 60 Subpart J. The emission limits specified in this term shall be included in the basis for recordkeeping and reporting.

Written operating procedures to assure compliance with this term shall be provided to the NWCAA on request and shall be available to the heater operators at all times.

Compliance: Heater 33F-1 is subject to NSPS subpart J fuel gas sulfur limits. The monitoring, recordkeeping and reporting requirements of OAC #780 term #1 directly overlap the requirements of NSPS subpart J. OAC #780 term #1 establishes a more stringent fuel gas sulfur limit (50 ppm vs. 162 ppm). ConocoPhillips monitors the concentration of hydrogen sulfide in the fuel gas combusted by the heater. Testing, recordkeeping and reporting are performed in accordance with Subpart J. More discussion regarding these requirements is provided below in the Regulatory Applicability section. Both the subpart J and OAC #780 term #1 requirements are in Section 5 of the permit.

Approval Condition 2: Emissions of nitrogen oxides from the DHT Heater 33F-1 shall not exceed 0.05 lb. NO<sub>x</sub> per MMBtu heat input (higher heating value) over any three hour period.

Initial compliance with term 2 shall be determined in accordance with EPA Reference Method 7, 7A, 7E or other method approved by the Director within 180 days after restart following the modification. NO<sub>x</sub> emissions shall also be tested within 180 days after the heater firing rate exceeds 42 MMBtu/hr. The tests shall be conducted at the maximum firing rate achievable at the time of the test.

Compliance: A source test to address this requirement was performed on March 7, 2002. NO<sub>x</sub> emissions from the heater were in excess of the 0.05 lb/MMBtu standard and the NWCAA issued Notice of Violation 3241. ConocoPhillips retuned the heater burners and retested NO<sub>x</sub> emissions on June 27, 2002. The second test indicated compliance with the emission standard. NOV 3241 was issued as a warning because subsequent testing indicated compliance and because the problem was evidently related to commissioning issues. The ongoing requirements to meet the NO<sub>x</sub> limit and to perform further testing as the heater firing rate is increased are in Section 5 of the air operating permit.

Approval Condition 3: The heater firing rate shall not exceed 48 MMBtu/hr.

Compliance: Data available to the NWCAA indicate that the heater firing rate has not exceeded 48 MMBtu/hr. This ongoing requirement is in Section 5 of the air operating permit.

Approval Condition 4: Visible emissions from the heater stack shall not exceed five (5) percent opacity for more than six minutes in any one hour as determined by EPA Method 9.

Compliance: Data available to the NWCAA indicate that the opacity of the emissions from the heater firing rate does not normally exceed 5%. This ongoing requirement is in Section 5 of the air operating permit.

Approval Condition 5: Combined total emissions from the DHT Heater and the DHT unit shall not cause exceedance of acceptable source impact levels specified in WAC 173-460-150 and -160 as determined by methods specified in WAC 173-460-080. The owner or operator shall assess compliance with this term on request by the NWCAA.

Compliance: Compliance: Information submitted with the application indicates that the unit is in compliance with the acceptable source impact levels. NWCAA has not requested additional information in this regard. This ongoing requirement is in section 5 of the permit.

Approval Condition 6: The owner or operator shall notify the NWCAA in writing when construction of each affected process unit is complete and provide the expected date that each affected process unit will begin operating.

Compliance: ConocoPhillips provided notice of refinery fuel gas tie in by letter received 1/15/02. This requirement has been satisfied and is not included in Section 5 of the air operating permit.

**NWCAA Order of Approval to Construct #864 (Dry Chloride Scrubber) Issued October 27, 2004.**

This OAC allowed ConocoPhillips to install a dry chloride scrubber on the existing cyclic catalytic reforming unit. The project complies with the Refinery MACT Phase 2 (40 CFR 63 Subpart UUU). The dry chloride scrubber removes hydrogen chloride (HCl) from the vent stream. The exhaust from the absorber is sent to the CO Boiler where organic pollutants are combusted. There are no other emission units affected either upstream or downstream. Since there was no increase in emissions, the Order of Approval to Construct was issued under WAC 173-400-114.

Approval Condition 1: The facility shall meet the emission limitation and work practice standard requirements of 40 CFR Part 63 Subpart UUU for an existing affected source no later than April 11, 2005.

Compliance: ConocoPhillips Chloride installed the scrubber prior to the April 11, 2005 deadline. The initial performance test (June 16 & 17, 2005) for the scrubber showed compliance with the emission limitation requirements. A maximum operating temperature of 75.3 was established as an operating parameter and an operating limit of 9 ppm HCl was established. Work practice standards were initiated upon startup.

Approval Condition 2: If a hydrogen chloride (HCl) alternative monitoring plan is requested and approved under 40 CFR Part 63.1573, monitoring will begin upon startup of the dry chloride scrubber.

Compliance: An alternative monitoring plan has not been requested under 40 CFR Part 63.1573. This is an obsolete requirement.

Approval Condition 3: Provide written notification to the Northwest Clean Air Agency (NWCAA) when construction has been completed. The notification shall include the anticipated date of initial startup.

Compliance: Notification of initial startup was submitted to the NWCAA on March 16, 2005.

NWCAA Order of Approval to Construct #868 (Two DHT Reactors) Issued March 3, 2005.

The OAC allowed installation of two new reactors on the diesel hydrotreater (DHT) to improve catalyst run life and aid in production of ultra-low sulfur diesel fuel. The two new reactors replaced the previous single reactor, thereby increasing the total reactor volume from 2,700 to 13,000 cubic feet. According to the application, the DHT Revamp Project did not “debottleneck” the DHT unit. The nominal capacity of the DHT of 32,000 barrels per day of diesel was not changed by this project.

Approval Condition 1: The DHT Unit shall be subject to federal New Source Performance Standards 40 CFR 60.590-593 Subpart GGG Standards of Performance for Equipment Leaks of VOC in Petroleum Refineries.

Compliance: After construction of the reactors the unit was added to the refinery leak detection and repair program and required reports were submitted. This continuing requirement was included in Section 5 of the permit.

Approval Condition 2: The relocated individual drain systems and aggregate facilities at the DHT unit shall be designed and maintained in compliance with the requirements of 40 CFR Subpart QQQ.

Compliance: After construction of the reactors the unit’s drains were added to the refinery’s process wastewater management system. This continuing requirement was included in Section 5 of the permit.

Approval Condition 3: ConocoPhillips shall notify the NWCAA in writing within 30 days of initial startup.

Compliance: While a specific notification letter is not in the NWCAA files, the NWCAA database records indication that startup notification was provided by ConocoPhillips on 2/10/06.

### **3.4.3 Regulatory Applicability**

At the Reformer/DHT Process Area, leak detection and repair (LDAR) activities are required pursuant to the refinery MACT Phase 1 regulation. In addition to the MACT LDAR requirements, the DHT was constructed subsequent to 1/4/83 so NSPS subpart GGG applies to the equipment components in VOC (non-HAP) service. NWCAA 580 LDAR requirements do not apply because feed to the units are not “butane or lighter” (an applicability criterion for NWCAA 580.8). There are several compressors in the DHT unit, but all of them are in hydrogen service and are therefore exempt from the MACT and subpart GGG control requirements. The refinery MACT Phase 1 and NSPS subpart GGG LDAR requirements are in Section 5 of the permit.

There are various process waste drains in the Reformer/DHT Process Area that are subject to control requirements under the Benzene Waste Standard (40 CFR part 61 subpart FF) and the refinery MACT Phase I. These ongoing requirements are in Section 5 of the AOP.

ConocoPhillips identified four miscellaneous process vents in the Reformer/DHT Process Area that are subject to control requirements under the Refinery MACT Phase 1. These process vents are routed to the flare gas recovery system and main refinery flare. ConocoPhillips has submitted documentation that the refinery flare meets the control device standards of 40 CFR Part 63.

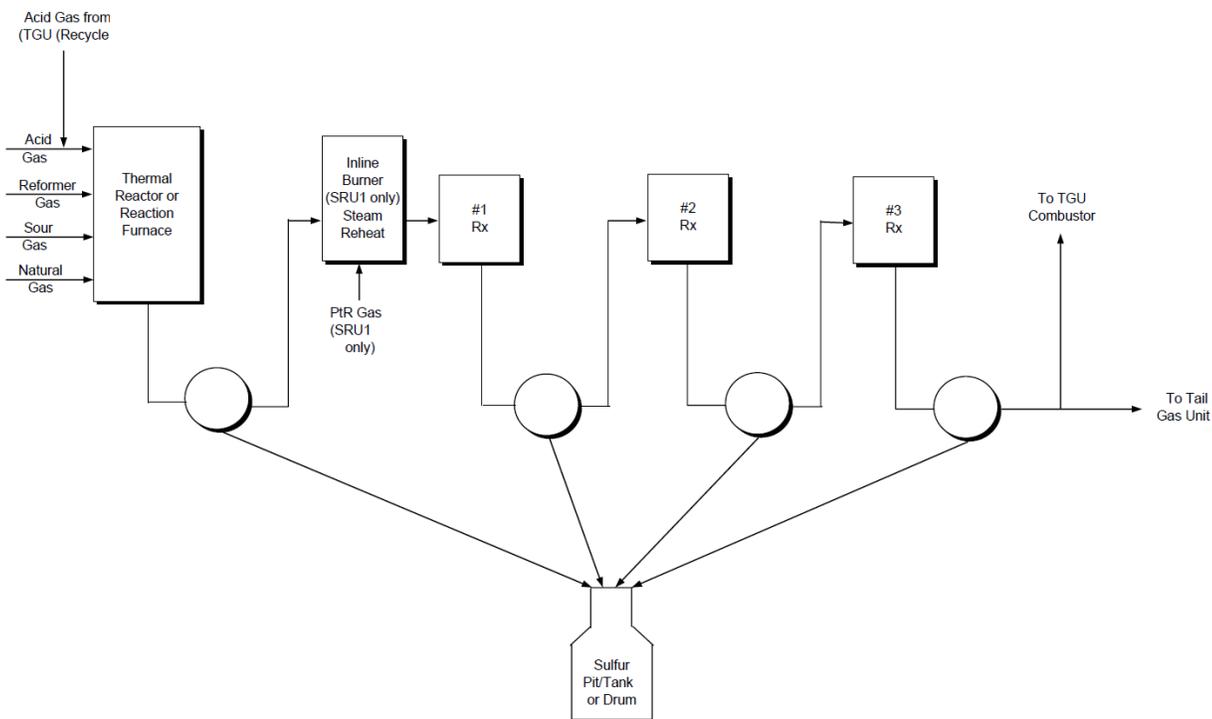
The reformer is subject to control requirements under the refinery MACT phase 2 (40 CFR part 63 subpart UUU). A Chloride scrubber was installed prior to the April 11, 2005 deadline to meet these requirements.

When the DHT heater was modified in 2001 to make it capable of burning refinery fuel gas it became subject to the NSPS subpart J sulfur emission standard. These ongoing requirements are in Section 5 of the AOP. ConocoPhillips provided prior notification to the NWCAA of this change via a Notice of Construction application received on 6/26/01. Written notification of initial startup on refinery fuel gas was received by the NWCAA on 1/15/02. Subpart J (and OAC #780, as discussed above) require continuous monitoring of fuel gas sulfur content. The DHT heater has a continuous H<sub>2</sub>S monitor to meet the compliance monitoring requirements under subpart J. The performance test plan for the H<sub>2</sub>S monitor was submitted on 3/10/99. The initial performance test for subpart J compliance was performed on 4/21/99. This test indicated compliance. ConocoPhillips is conducting quarterly accuracy audits and submitting semiannual monitoring reports pursuant to NSPS.

There are no outstanding or known chronic compliance issues at any of the emission units in the Reformer/DHT Process Area.

### 3.5 Sulfur Plant/Treaters Process Area

In 2001, ConocoPhillips started plans to increase the ability of the plant to scrub (remove) sulfur from gasoline so they could more efficiently produce low sulfur gasoline required by future federal standards. A new sulfur scrubbing unit, the Cat Gas Desulfurization Unit (CGD), (also know as the S-Zorb Unit) was built within the Alkylation Process Area and the discussion of the CGD is included in the discussion of the Alkylation Process Area. However, by providing additional sulfur removal capacity, the CGD along with other modifications increased the load on the Sulfur Plant area. The NWCAA issued approval to ConocoPhillips in 2001 to install the CGD unit and to increase the maximum capacity of the first Sulfur Recovery Unit (SRU1) by installing 100% oxygen injection technology. In 2007, a second Sulfur Recovery Unit was commissioned to provide more sulfur removal capacity and redundant operation if SRU1 were offline. The second plant, SRU2, operates in parallel with the original sulfur plant.



**Figure 3-11 SRU Process Unit**

#### 3.5.1 General Operation and Background

The Sulfur Plant/Treaters (SP/Treaters) Process Area incorporates the sulfur plants, each of which is composed of a single train, three-stage Claus sulfur recovery unit (SRU), a SCOT tail gas treating unit (TGU) and a TGU incinerator. The process area also includes various amine treating devices including a MEROX treating unit that was constructed in 2000. These process units are involved primarily in removing sulfur and, to a lesser extent, other contaminants from process streams. Individual amine absorber units at different locations within the refinery use a circulating amine to strip hydrogen sulfide (H<sub>2</sub>S) from the hydrocarbon process streams. This "acid gas" stream is fed to the sulfur plants. The overhead gas off the sour water stripper, or "sour gas," is also fed to the SRU process units to convert the H<sub>2</sub>S to sulfur and destroy the ammonia (NH<sub>3</sub>). The majority of the removed sulfur is converted to elemental sulfur in the SRUs. Sulfur that is not recovered is emitted as sulfur dioxide via combustion in the TGU incinerators.

The majority of the air emissions associated with the Sulfur Plant/Treaters section comes from combustion processes within the sulfur plant. Leaks from equipment components, such as valves, pumps, and flanges at the SP/Treaters Process Area result in fugitive emissions to the atmosphere. As described below there are regulatory requirements to monitor and repair leaking equipment. Emissions associated with this process area also come from miscellaneous process vents, and process drains.

### **3.5.2 Construction and Permitting History**

The first SRU was installed in 1978. The TGU associated with SRU1 was added in 1991. The permit for SRU1, OAC #185 issued on July 15, 1976, contained no applicable requirements. A Permit to Operate at an increased utilization rate (up to 19.5 LTD) was issued by the Agency on June 1, 1982. The sole requirement was to perform a source emission test. There are notes in the files that a source emission test on the unit was performed prior to application for installation of the TGU. The permit for the TGU, OAC #294 issued on 9/5/90, was superseded by OAC #733. Oxygen enrichment was added to the SRU in 1999 to increase capacity to 55 long tons per day. The OAC for this project, OAC#681, was also superseded by OAC #733.

**NWCAA Order of Approval to Construct #185** (installation of sulfur recovery unit) July 15, 1976: No approval conditions.

**NWCAA Order of Approval to Construct #727** (Mercox Extraction Unit) May 31, 2000: A catalytic mercaptan oxidation system to remove sulfur from olefins routed to the alkylation unit.

Approval Condition 1: All equipment associated with the Mercox Unit and subject to 40 CFR Part 63 Subpart CC or 40 CFR Part 60 Subpart GGG shall be in compliance with 40 CFR Part 63 Subpart H except as provided in paragraphs (c) through (i) of § 63.648. Compliance shall be attained upon initial startup of the Unit.

Compliance: ConocoPhillips's initial leak monitoring activities indicated that the unit is in compliance. This requirement is in section 5 of the permit.

Approval Condition 2: With respect to the equipment referenced in term #1, ConocoPhillips shall comply with the following:

Recordkeeping and reporting provisions of 40 CFR 63.654(d), 40 CFR 63.181 and 40 CFR 63.182 except for:

§§ 63.182(b), (c)(2) and (c)(4);

The applicable requirements of 40 CFR Part 63 Subparts A & CC; and

The applicable requirements of 40 CFR Part 60 Subparts A & GGG.

Compliance with term #1 is an adequate demonstration of compliance with the leak detection and repair standard of §60.592. Compliance with term #2(a) is an adequate demonstration of compliance with the recordkeeping and reporting requirements of §§ 60.486 and 60.487.

Compliance: ConocoPhillips submits periodic reports and notifications of leak detection monitoring to the NWCAA. Evidence indicates that the unit is in compliance. These ongoing requirements are in section 5 of the permit.

Approval Condition 3: For the purposes of implementation of this Order of Approval to Construct the term "in organic hazardous air pollutant service" shall be replaced with "in VOC service" as that term is defined in 40 CFR Part 60 Subpart VV.

Compliance: This term provides clarification and is cited in section 5 of the operating permit.

Approval Condition 4: Emissions from the Mercox Unit shall not cause exceedance of acceptable source impact levels specified in WAC 173-460-150 and -160 as determined by methods specified in WAC 173-460-080. ConocoPhillips shall demonstrate compliance with this term upon request by the NWCAA.

Compliance: Information submitted with the application indicates that the new unit is in compliance with the acceptable source impact levels. NWCAA has not requested additional information in this regard. This requirement is in section 5 of the permit.

Approval Condition 5: ConocoPhillips shall submit to the NWCAA screening value results from performance testing within 180 days of initial startup. The performance testing shall be conducted according to the procedures in 40 CFR §63.180.

Compliance: ConocoPhillips submitted initial leak monitoring data to the NWCAA on September 9, 2002. The NWCAA has determined that there are no substantive requirements associated with this condition that are additional to requirements addressed in other permit conditions.

**NWCAA Order of Approval to Construct #733c** (Ferndale Upgrade and Clean Fuels Projects)

Only excerpts from the OAC that are specifically relevant to the Sulfur Plant/Treating Process Area are listed here.

Approval Condition 4: Sulfur dioxide emissions from the SRU shall not exceed 250 ppm by volume, dry basis, corrected to zero percent excess air, based on a 12-hour rolling total. Sulfur dioxide emissions from the sulfur recovery unit shall not exceed 150 ppm by volume, dry basis, corrected to zero percent excess air, averaged over each rolling 720-hour period of operation.

Sulfur dioxide and oxygen concentration in the discharge from the SRU shall be monitored in compliance with 40 CFR Part 60 subpart J, subpart A and Appendix F. Concentration measurements provided by the continuous emissions monitoring system (CEMS) shall be used to directly determine compliance with Condition 4 and 40 CFR §60.104(a)(2)(i) on a continuous basis. The CEMS shall comply with the appropriate quality assurance requirements of 40 CFR part 60 appendix F.

The owner or operator shall conduct testing, recordkeeping, and reporting in accordance with the relevant sections of 40 CFR Part 60 Subpart J. The emission limits specified in term B-1 shall be included in the basis for recordkeeping and reporting.

Emissions from the sulfur pit will either be eliminated, controlled, and/or included and monitored as part of the SRU emissions under 40 CFR 60.104(a)(2).

Compliance: ConocoPhillips monitors the discharge from the SRU with a continuous emissions monitor for SO<sub>2</sub> and an oxygen monitor. The monitors meet the requirements of Appendix F. Generally, emissions do not exceed the emission limits. If there is a deviation from the requirement to meet the limits, the facility reports the deviations to the NWCAA for investigation. Testing, recordkeeping, and reporting are performed in accordance with 40 CFR Part 60 Subpart J. Sulfur pit emissions are routed to the TGU incinerator, which is included in the sulfur dioxide monitoring. These continuing requirements are included in Section 5 of the permit.

Approval Condition 5: Visible emissions from the tail gas incinerator stack shall not exceed 10 percent opacity for more than three minutes in any one-hour period as measured by Ecology Method 9A.

Compliance: There are typically no visible emissions from the TGU incinerator stack. Deviations are reported to the NWCAA for investigation. This continuing requirement is included in Section 5 of the permit.

Approval Condition 6: Supplemental fuel combusted in the SRU incinerator (19F-21) shall be limited to purchased natural gas.

Compliance: This continuing requirement is included in Section 5 of the permit.

Approval Condition 7: The owner or operator shall prepare, maintain on-site, and make available to NWCAA personnel upon request an operation and maintenance manual that identifies good air pollution control practices for minimizing emissions pursuant to 40 CFR §60.11(d) for the SRU including air pollution compliance monitoring and plantwide sulfur dioxide emissions abatement during upset conditions.

Compliance: ConocoPhillips has developed an O&M manual for SRU1. It is available at the facility for review. This continuing requirement has been included in Section 5 of the permit.

**Washington State Department of Ecology Prevention of Significant Deterioration (PSD)  
Permit #PSD-00-02 Amendment 5**

Originally issued as #PSD-00-02 on 4/4/01; revised on 6/5/02, 5/13/03, 6/15/05, 3/16/07, and 10/23/09.

The PSD-00-02 Amendment 5 permit requirements that apply to multiple units were included in the first process area section, the Crude Distillation Process Area. The permit requirements applicable to the Sulfur Plant/Treaters Process Area are included here.

Approval Condition 3: Emissions of NO<sub>x</sub> from the sulfur recovery unit shall not exceed 42.2 ppm<sub>dv</sub> at 7% O<sub>2</sub> over a 1-hour averaging period and 9.9 tons per year. Initial compliance shall be determined by EPA Reference Method 7E.

Compliance: SRU1 has been tested for NO<sub>x</sub> emissions annually since the initial test on 6/4/03. Test results show NO<sub>x</sub> emissions below the standard in each source test report. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 6: Emissions of CO from the Sulfur Recovery Unit shall not exceed 57.1 ppm<sub>dv</sub> @7% O<sub>2</sub> over a 1-hour averaging period and 8.30 tons per year over a 12-month rolling total. Initial compliance shall be determined in accordance with EPA Reference Method 10.

Compliance: SRU1 has been tested for CO emissions annually since the initial test on 6/4/03. Test results show CO emissions below the standard in all but one source test report. The source test performed on 5/31/06 showed CO emissions at 77.7 ppm<sub>dv</sub> @7% O<sub>2</sub>. Notice of Violation #3548 was issued for this exceedence. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 10: Compliance with Approval Conditions 1 and 3 will be monitored by yearly source testing in accordance with EPA Reference Method 7E as found in 40 C.F.R. Part 60, Appendix A or an alternative approved method.

Compliance: The SRU1 has been tested for NO<sub>x</sub> emissions annually in accordance with EPA Reference Method 7E. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 13: Compliance with Approval Conditions 4 and 6 will be demonstrated by yearly source testing in accordance with EPA Reference Method 10, as found in 40 CFR Part 60, Appendix A or an alternative approved method. ConocoPhillips will identify a surrogate parameter (such as fuel usage) and multiply it by the emission factor derived during the previous source test. Source testing shall be performed no sooner than 4-months after the previous test and no later than 8-months after the previous test.

Compliance: The SRU1 has been tested for CO emissions annually in accordance with EPA Reference Method 10. Annual emissions are derived from fuel usage and source test results. This continuing requirement has been included in Section 5 of the permit.

**NWCAA Order of Approval to Construct #908a**

This OAC was originally issued as OAC #908 on 11/17/05. OAC #908 was revised to include a project change, correct typographical errors, and provide clarification. OAC #908a covers the Catalytic Cracking and the Crude Distillation Process Areas, but most of the permit requirements relate to the second sulfur recovery unit to be added to the Ferndale Refinery, SRU2. The applicable requirements specific to SRU2 are as follows:

Approval Condition 1: Supplemental fuel combusted in the SRU2 incinerator shall be limited to purchased natural gas.

Compliance: This continuing requirement is included in Section 5 of the permit.

Approval Condition 2: Visual emissions from the TGU2 stack shall not exceed ten percent opacity for more than three minutes in any one hour period as measured by Washington Department of Ecology Method 9A.

Compliance: There are typically no visible emissions from the TGU incinerator stack. Since startup in October 2007, no deviations have been reported to the NWCAA for investigation. This continuing requirement is included in Section 5 of the permit.

Approval Condition 3: Sulfur dioxide emissions from the TGU2 stack shall not exceed any of the following emission limits:

250 (2.5 x 10<sup>2</sup>) ppm by volume, dry basis, corrected to zero percent oxygen, based on a 12-hour rolling average.

150 (1.50x10<sup>2</sup>) ppm by volume, dry basis, corrected to zero percent oxygen, based on a 720-hour rolling average.

22.3 tons annually, based on a consecutive 12-month rolling period.

Compliance with this condition shall be determined by a continuous emission monitor (CEM) installed, calibrated, maintained, and operated to measure sulfur dioxide and oxygen. The monitor shall meet the monitoring requirements of 40 CFR Part 60 Subpart J, the appropriate specifications of 40 CFR Part 60 Appendices B and F, NWCAA Regulation Section 367 and Appendix A.

Compliance: The TGU2 stack's CEM data shows that the facility has been in compliance with the emission standards since startup. The CEM was installed and has been operated in compliance with the requirements. These continuing requirements have been included in Section 5 of the permit.

Approval Condition 4: During normal SRU2 operation, sweep gas from the sulfur collection header shall be controlled by routing through a closed vent system directly to the new incinerator. During SRU2 operation, vented gases from the sulfur storage tank vent shall be routed to the front end of the SRU2. When SRU2 is not operating, the sulfur storage tank vent shall be diverted to the SRU1 incinerator.

Compliance: During normal SRU2 operation, sweep gas from the sulfur collection header is controlled by routing through a closed vent system directly to the new incinerator. During SRU2 operation, vented gases from the sulfur storage tank vent are routed to the SRU2 Thermal Reactor.

Approval Condition 5: The permittee shall prepare, maintain on-site, and make available to NWCAA personnel upon request an operation and maintenance manual that identifies good air pollution control practices for minimizing emissions pursuant to 40 CFR 60.11(d) for SRU2 including air pollution compliance monitoring and plantwide sulfur dioxide emissions abatement during upset conditions.

Compliance: ConocoPhillips has developed an O&M manual for SRU #2. It is available at the facility for review.

Approval Condition 6: Any lines that allow a bypass of sulfur bearing compounds normally emitted from the TGU2 shall be continuously monitored for the presence of flow. The permittee shall report to the NWCAA any time that flow is detected in a bypass line. This reportable event shall be considered a startup, shutdown or upset condition and reported in accordance with NWCAA Section 340 or 341.

Compliance: The valve on the bypass line identified as: (1) "Bypass entire TGU to the incinerator" uses a limit switch, monitored continuously via the refinery Data Collection System to indicate valve position (open or closed) and (2) "Bypass the TGU amine absorber to the incinerator" is car sealed closed and inspected once per month.

Approval Condition 7: The permittee shall provide to the NWCAA the following information in a monthly report. The report shall be submitted within 20 days after the end of each month. Report the following:

- For the CEM, the dates, times, and causes of all periods that the monitoring system did not function or operating parameters were outside of established ranges in the reporting month.

- A summary providing the range and maximum average of the rolling 12-hour average and 720-hour averages, and the 12-month rolling total.

Compliance: NWCAA checks the monthly report.

**Washington Department of Ecology Prevention of Significant Deterioration Permit PSD 05-01 Issued 11/16/05**

Approval Condition 1: NO<sub>x</sub> emissions from the SRU shall not exceed:

42.2 ppm<sub>dv</sub> @7% O<sub>2</sub>, 1-hr average, measured as provided in Approval Condition 4.

2.3 pounds per hour, measured as provided in Approval Condition 4.

Compliance: ConocoPhillips performed an initial source test for NO<sub>x</sub> from the SRU #2 on 1/6/08. The concentration and mass of NO<sub>x</sub> emissions were well within the limits. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 2: CO emissions from the SRU shall not exceed:

57.1 ppm<sub>dv</sub> @7% O<sub>2</sub>, 1-hr average, measured as provided in Approval Condition 5.

1.9 pounds per hour, measured as provided in Approval Condition 5.

Compliance: ConocoPhillips performed an initial source test for NO<sub>x</sub> from the SRU #2 on 1/6/08. The concentration and mass of NO<sub>x</sub> emissions were well within the limits. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 5: Compliance with Condition 1 shall be determined by 40 CFR 60 Appendix A, Method 7E or an equivalent method approved in advance by Ecology.

Compliance: The first source test for NO<sub>x</sub> was performed using Method 7E. This continuing requirement will be included in Section 5 of the permit.

Approval Condition 6: Compliance with Approval Condition 2 shall be determined by 40 CFR 60 Appendix A, Method 10 or an equivalent method approved in advance by Ecology.

Compliance: The first source test for CO was performed using Method 10. This continuing requirement will be included in Section 5 of the permit.

Approval Condition 7: After incorporation of the approval conditions of this PSD permit into ConocoPhillips' Title V permit (40 CFR Part 70), each occurrence of emissions measured in excess of the limit specified in Approval Conditions 1 and 2 shall be reported in writing to NWCAA as required by the Title V permit in accordance with WAC 173-401-615(3)(b).

Compliance: This continuing requirement will be included in Section 5 of the permit.

Approval Condition 8: Within 90 days of startup, ConocoPhillips shall identify operational parameters and practices that will constitute "proper operational practices" of the operation of the new SRU relative to compliance with the conditions of this permit. These operational parameters and practices shall be included in an O&M manual for the facility. The O&M manual shall be maintained and followed by ConocoPhillips and shall be available for review by Ecology, NWCAA, or EPA. Emissions that result from failure to follow the requirements of the O&M manual relative to compliance with the conditions of this permit may be considered credible evidence that emission violations have occurred.

Compliance: ConocoPhillips has developed an O&M manual for SRU #2. It is available at the facility for review.

Approval Condition 9: Access to the source by Ecology, NWCAA, or the EPA, shall be permitted upon request. Failure to allow such access is grounds for an enforcement action under the federal Clean Air Act or the Washington State Clean Air Act.

Compliance: This continuing requirement has been included in Section 5 of the permit.

Approval Condition 10: This approval shall become invalid if construction of the project is not commenced within eighteen (18) months after receipt of the final approval, or if construction of the facility is discontinued for a period of eighteen (18) months, unless Ecology extends the 18 month period, pursuant to 40 CFR 52.21®(2) and applicable EPA guidance.

Compliance: Construction of the SRU was commenced within eighteen months and not discontinued. This requirement is obsolete.

Approval Condition 11: The effective date of this permit shall not be earlier than the date upon which the US EPA notifies Ecology that the US EPA has satisfied its obligations, if any, under Section 7 of the Endangered Species Act 16 U.S.C. 1531 et seq., 50 CFR Part 402, subpart G (Consultation Procedures) and Section 305(b)(2) of the Magnuson-Stevens Fishery and Conservation Act 16 U.S.C. 1801 et Seq., 50 CFR Part 600, subpart K (EFH Coordination, Consultation, and Recommendations).

Compliance: Final approval of the permit was received on 11/16/05. This condition is considered obsolete and is not included in the permit.

Approval Condition 12: For federal regulatory purposes and in accordance with 40 CFR 124.15 and 124.19: If there was a public comment requesting a change in the preliminary determination or a proposed permit condition during the public review and comment period, the effective date of this permit shall not be earlier than 30 days after service of notice to the commenters and applicant on the preliminary determination.

If a review of the final determination is requested under 40 CFR 124.19 within the 30 day period following the date of the final determination, the effective date of the permit is suspended until such time as the review and any subsequent appeal against the permit are resolved.

If there was no public comment requesting a change in the preliminary determination or a proposed permit condition during the public review and comment period, this permit is effective upon the date of finalization subject to consideration of Condition 11 (EPA's ESA requirement) above.

Compliance: Compliance: Final approval of the permit was received on 11/16/05. This condition is considered obsolete and is not included in the permit.

### **3.5.3 Regulatory Applicability**

Sulfur Recovery unit #1 is subject to a 250 ppmv 12-hour average sulfur dioxide emission limit under 40 CFR part 60 subpart J. OAC#733c has a more stringent emission limit for SO<sub>2</sub>. Subpart J and OAC#733c require continuous monitoring of sulfur dioxide (and oxygen (O<sub>2</sub>) for correction data). The permit requirements for SRU2 are similar, although the sulfur dioxide emission limit is more stringent. The accuracy of the CEMS on both units must be determined every calendar quarter and the results submitted to the NWCAA.

Equipment components within the Sulfur Plant/Treaters Process Area are subject to leak detection and repair (LDAR) requirements as follows. As new units, the equipment in VOC service in the Merox unit is subject to NSPS subpart GGG LDAR requirements. Most of the equipment in the Merox unit is also in HAP service so it is therefore subject to the LDAR requirements under the refinery MACT Phase I. NWCAA order of approval to construct (OAC) #727 for the Merox unit established best available control technology (BACT) for equipment leaks that is equivalent to the standards under the refinery MACT Phase I established for new sources. These LDAR requirements are also known as "modified HON" LDAR or "new source MACT." The operating permit specifies these modified HON LDAR requirements for the entire Merox unit, even for equipment that is in VOC service, not in HAP service. Where there is an overlap, the requirements of the refinery MACT Phase I supersede the requirements of NSPS subpart GGG. There are equipment components within the Merox unit that are not in HAP service and so are formally subject only to NSPS subpart GGG (not MACT). Note that from a practical level the "bottom line" requirements are the same: BACT LDAR from OAC #727.

The rest of the units at the Sulfur Plant/Treaters process area are variously subject to MACT LDAR according to whether the individual equipment components are in HAP service. ConocoPhillips routinely

monitors SP/Treaters equipment for leaks and reports results pursuant to refinery MACT Phase I requirements.

The two SRUs are subject to control requirements under the refinery MACT phase 2 (40 CFR part 63 subpart UUU). These requirements are in Section 5 of the air operating permit.

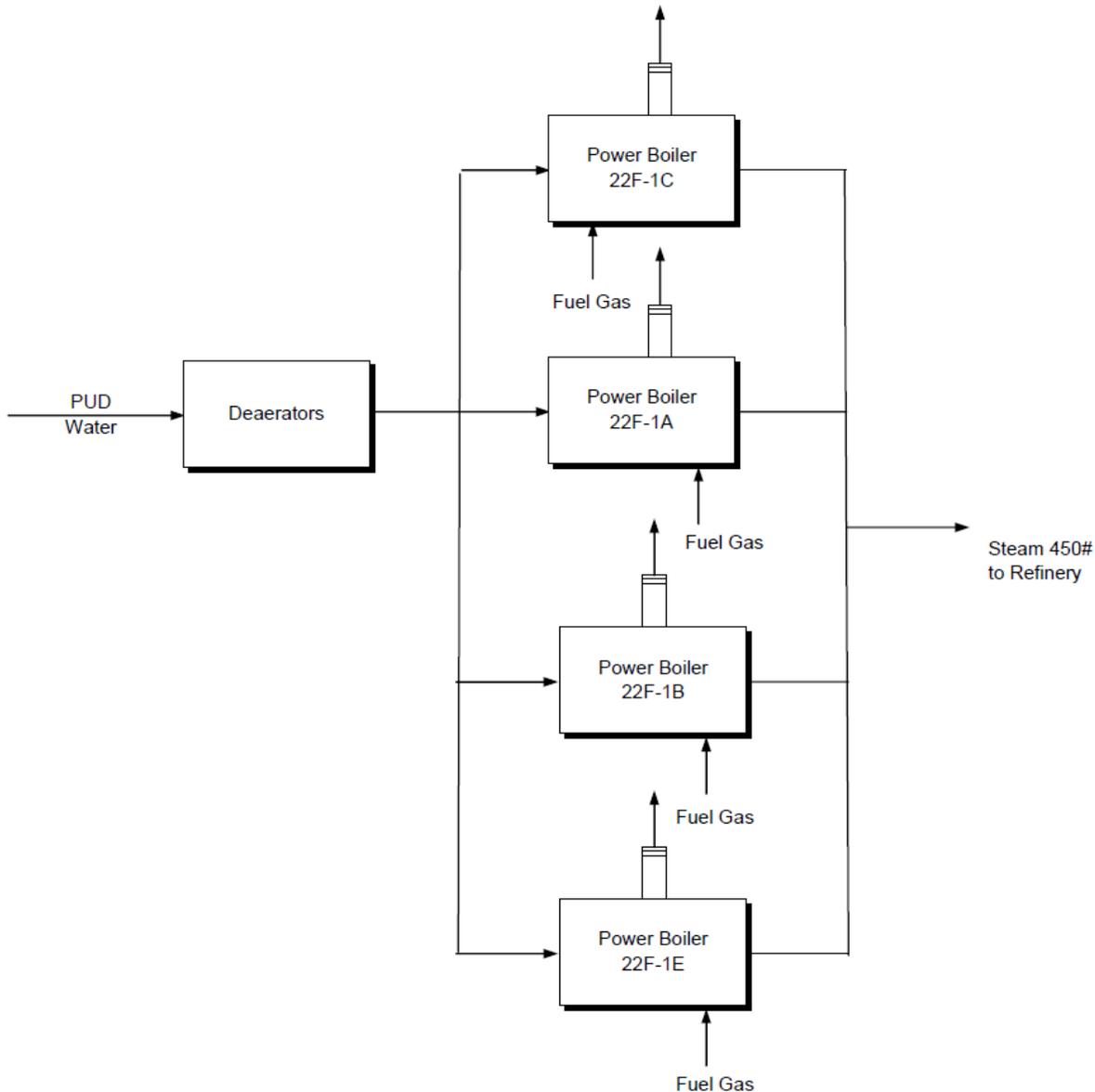
There are no outstanding or known chronic compliance issues at any of the emission units in the Sulfur Plant/Treaters Process Area.

### **3.6 Utilities Process Area**

#### **3.6.1 General Operation and Background**

The Utilities Process Area includes four combustion boilers to generate steam used to provide heat and motive force at numerous units in the plant, and two cooling towers that are operated in association with the boilers. Some steam for the Ferndale Refinery is provided by the Tenaska cogeneration power plant adjacent to the refinery. The cogeneration plant is not owned or operated by ConocoPhillips and is not part of this operating permit.

Two of the refinery's boilers were constructed during initial refinery construction. The other two boilers, Boiler #1 and Boiler #4, were added in 1996 and 2006, respectively.



**Figure 3-12 Boilers Process Unit**

The cooling tower (CT) process unit includes a circulating, non-contact cooling water system. There are two segregated systems, one for the Alkylation process area and one for the rest of the refinery.

### 3.6.2 Construction and Permitting History

Boiler #1, a 162 MMBtu/hour boiler, was added in November 1996. It was constructed under NWCAA Order of Approval to Construct No. 578. Boiler #1 replaced a temporary 99 MMBtu/hour boiler installed in January 1996 under NWCAA Order of Approval to Construct No. 581. The temporary boiler permitted under OAC #581 was removed and the OAC is obsolete. Another temporary boiler rated at 88 MMBtu/hr was constructed in 2003 under OAC #849. This boiler was replaced in 2006 by Boiler #4 rated at 164 MMBtu/hr. The temporary boiler permitted under OAC #849 was removed from the facility and OAC #849 is obsolete. Boiler #4 was constructed under NWCAA Order of Approval to Construct #877.

No other relevant construction or modification projects involving the Utilities Process Area are included in the Air Operating Permit. The following is a discussion of the requirements pertaining to the #1 and #4 boilers. Note that several OAC terms are not included in the operating permit because they do not have any substantive requirements.

**NWCAA Order of Approval to Construct No. 578a** (162 MMBtu/hr Boiler #1) Order of Approval to Construct No. 578 was originally issued on April 9, 1996. The OAC was revised on August 13, 2008 to incorporate a lower NO<sub>x</sub> limit (from 0.05 lb/MMBtu to 0.04 lb/MMBtu) as required by the refinery's Consent Decree and to remove the approval to combust fuel oil. OAC #578a superseded the original permit. Low-NO<sub>x</sub> burners and flue gas recirculation is installed to minimize NO<sub>x</sub> emissions. Refinery fuel gas burned in the boiler must be scrubbed to meet new source performance standards subpart J.

Approval Condition 1: Nitrogen oxide emissions from the #1 Boiler stack shall not exceed 0.040 lb/MMBtu (HHV) on a 365-day rolling average when burning natural gas or refinery fuel gas.

Compliance: Initial test data and ongoing monitoring data indicate that the boiler is in compliance with this requirement. This continuing requirement for natural gas and refinery fuel gas is included in the AOP in Section 5.

Approval Condition 2: The boiler shall burn only pipeline grade natural gas or refinery fuel gas.

Compliance: Dual fuel burners were not installed before January 1, 1999. The refinery is not presently authorized to burn oil in the subject boiler. Only gaseous fuels are allowed to be burned. This continuing requirement is included in the AOP in Section 5.

The boiler shall be subject to the applicable sections of 40 CFR 60, Subpart Db, Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units when burning natural gas, fuel oil or refinery fuel gas, except that sulfur dioxide emission standards under 40 CFR 60, Subpart J, Standards of Performance for Petroleum Refineries apply when burning refinery fuel gas.

Compliance: The emission standards of subparts Db and J are in Section 5 of the operating permit. Initial documentation of compliance with the NO<sub>x</sub> standard of subpart Db was provided to the NWCAA on May 27, 1998. Initial documentation of compliance with the subpart J sulfur dioxide standard was submitted with the first Semiannual Monitoring Systems Performance Report on 7/23/03, covering the period in which the #1 Boiler began using refinery fuel gas. The NWCAA has determined that there are no substantive requirements associated with this condition that are additional to requirements addressed in other AOP conditions.

Approval Condition 3: Visual opacity from the #1 Boiler stack shall not exceed 5% for more than 6 minutes in any hour as determined by EPA Method 9 of 40 CFR Part 60 Appendix A, except that soot blowing/grate cleaning is allowed pursuant to WAC 173-400-040(1)(a).

Compliance: Evidence available to the NWCAA from inspections and information from facility staff indicate that opacity from the boiler stack has been compliant. This continuing requirement is included in the AOP in Section 5.

Approval Condition 4: Emissions testing shall conform to 40 CFR 60, Appendix A. Plans for all emission testing shall be submitted to the NWCAA at least 30 days prior to the test date. The NWCAA shall be notified at least 15 days in advance of the actual test date.

Compliance: The initial NO<sub>x</sub> emissions test performed in accordance with appendix A was completed on May 20, 1997. Prior notification of the test and a test plan was provided on January 15, 1997. The continuing requirements of this condition have been included in Section 5 of the permit.

Approval Condition 5: Continuous compliance shall be monitored by a Continuous Emission Monitor (CEM) for NO<sub>x</sub> and O<sub>2</sub>. The CEMs shall be calibrated, maintained and operated in accordance with NWCAA Regulation Section 367; NWCAA Regulation Appendix A: Ambient Monitoring, Emission Testing, and Continuous Emission and Opacity Monitoring; and 40 CFR Part 60 Appendices B and F.

Compliance: The initial NO<sub>x</sub> performance test results were submitted on May 27, 1998. Continuous emission monitors for NO<sub>x</sub> and O<sub>2</sub> were installed and are operated continuously. ConocoPhillips submits quarterly NO<sub>x</sub> monitor quality assurance results and semiannual NO<sub>x</sub> monitoring reports. These continuing requirements are included in Section 5 of the permit.

Approval Condition 6: Submit a monthly report, within 30 days of the end of the calendar month, or on another schedule agreed to by the NWCAA, with the following information:

- a. The maximum NO<sub>x</sub> emissions in the units of the standard for the month.
- b. Days, duration, and reasons for periods during which data were not collected.
- c. Excess emissions, including the time of occurrence, the magnitude of the missions excess, the duration, the probable cause, and corrective actions taken or planned.

The monthly report may be combined with any other monthly reports submitted to the NWCAA.

Compliance: These continuing requirements are included in Section 5 of the permit.

**NWCAA Order of Approval to Construct #733c** (Ferndale Upgrade and Clean Fuels Projects) In response to a Consent Decree requirement, a condition was included in OAC #733c stating that the bulk of refinery heaters and boilers are subject to 40 CFR Part 60 Subparts A and J for fuel combustion. The Utilities process area's No. 1 Boiler 22F-1C, No. 2 Boiler 22F-1A, No. 3 Boiler 22F-1B, and No. 4 Boiler 22F-1E are included in the list, which is discussed elsewhere in the Statement of Basis.

**NWCAA Order of Approval to Construct #877a** Order of Approval to Construct No. 877 was originally issued on August 12, 2004. The OAC was revised on September 15, 2008 to remove biennial particulate matter source testing requirements after several tests showed minimal particulate emissions. This allowance was included in the original permit. The OAC was also updated to reflect the new agency name and monitoring guidelines. OAC #877a superseded the original permit. This OAC approves the installation of the 164 MMBtu/hr rated #4 Boiler with flue gas recirculation and ultra low NO<sub>x</sub> burners.

Approval Condition 1: The #4 Boiler shall combust only one or a combination of the following two fuels: pipe-line quality natural gas, and/or refinery fuel gas.

Compliance: The #4 Boiler is not physically equipped to combust fuels other than natural gas and/or refinery fuel gas. This continuing requirement is included in Section 5 of the permit.

Approval Condition 2: Visible emissions from the #4 Boiler shall not exceed 5 percent (5%) opacity for more than six minutes in any hour as determined by EPA Reference Method 9 of 40 CFR Part 60 Appendix A.

Compliance: Evidence available to the NWCAA from inspections and information from facility staff indicate that opacity from the boiler stack has been compliant. This continuing requirement is included in the AOP in Section 5.

Approval Condition 3: Nitrogen oxide (NO<sub>x</sub>) emissions from the boiler stack shall not exceed 15 ppmvd @3% O<sub>2</sub> and 0.018 lb/MMBtu, both on a 24-hour average basis.

Compliance: Initial test data and ongoing monitoring data from a CEM indicate that the boiler is in compliance with this requirement. This continuing requirement is included in the AOP in Section 5.

Approval Condition 4: Initial compliance with Condition 3 shall be determined by performance test in accordance with 40 CFR Part 60.8 and 40 CFR Part 60 Appendix A, Method 7E within 60 days of achieving maximum production rate, but no later than 180 days from initial startup. During this test, the unit shall be operated at a minimum of 90 percent of maximum load.

Compliance: The date of initial startup was June 9, 2005. An initial compliance test demonstrating compliance with this condition was performed on November 10 and 11, 2005. This requirement is obsolete.

Approval Condition 5: Continuous compliance shall be monitored by a Continuous Emission Monitor (CEM) for NO<sub>x</sub> and O<sub>2</sub>. The CEMs shall be calibrated, maintained and operated in accordance with NWCAA Appendix A: Ambient Monitoring, Emission Testing, and Continuous Emission and Opacity Monitoring and 40 CFR Part 60 Appendices B and F.

Compliance: The facility monitors compliance with the NO<sub>x</sub> emission standard with a CEM meeting the requirements of Appendices B and F, and with the requirements of NWCAA Regulation 367 and Appendix A, which has replaced the Guidelines for Industrial Monitoring Equipment and Data Handling. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 6: Fuel combusted in the #4 Boiler shall not contain hydrogen sulfide (H<sub>2</sub>S) in excess of 50 ppm based on a 24-hour rolling average and 162 ppm on a 3-hour rolling average basis. During periods of operation, the H<sub>2</sub>S content of refinery fuel gas combusted shall be continuously monitored in accordance with 40 CFR Part 60 Subpart J, Subpart A and Appendix F.

Compliance: ConocoPhillips currently combusts purchased natural gas and has yet to use refinery fuel gas in the #4 Boiler. However, refinery fuel gas is continuously monitored for H<sub>2</sub>S content for other sources subject to 40 CFR Part 60 Subpart J, Subpart A and Appendix F and the #4 Boiler could use refinery fuel gas if conditions warranted it.

Approval Condition 7: Carbon monoxide (CO) from the #4 Boiler shall not exceed 70 ppmdv at 7% O<sub>2</sub> or 18.1 pounds per hour, both averaged over 24 hours.

Compliance: Initial test data and ongoing monitoring data from a CEM indicate that the boiler is in compliance with this requirement. This continuing requirement is included in the AOP in Section 5.

Approval Condition 8: Initial compliance with Condition 7 shall be determined by performance test in accordance with 40 CFR Part 60.8 and 40 CFR Part 60 Appendix A, Method 10, 10A, 10B, or an equivalent method approved by the NWAPA within 60 days of achieving maximum production rate, but no later than 180 days from initial startup. During this test the unit shall be operated at the load rate expected to produce maximum CO emissions within the normal operating load range of the boiler.

Compliance: The date of initial startup was June 9, 2005. An initial compliance test demonstrating compliance with this condition was performed on November 10 and 11, 2005. This requirement is obsolete.

Approval Condition 9: Continuous compliance shall be monitored by a Continuous Emission Monitor (CEM) for CO and O<sub>2</sub>. The CEMs shall be calibrated, maintained and operated in accordance with NWCAA Appendix A: Ambient Monitoring, Emission Testing, and Continuous Emission and Opacity Monitoring and 40 CFR Part 60 Appendices B and F.

Compliance: The facility monitors compliance with the CO emission standard with a CEM meeting the requirements of Appendices B and F, and with the requirements of NWCAA Regulation 367 and Appendix A, which has replaced the Guidelines for Industrial Monitoring Equipment and Data Handling. This continuing requirement has been included in Section 5 of the permit.

Approval Condition 10: Initial source tests to quantify opacity of emissions, emissions of PM<sub>10</sub>, and emissions of VOCs from #4 Boiler shall be conducted within 60 days after achieving the maximum production rate at which the boiler will be operated, but no later than 180 days after initial startup of the boiler. Testing shall be conducted using the methods specified below. Subsequent testing shall be completed by ConocoPhillips based on the schedule below. Unless otherwise allowed by the NWAPA, subsequent annual source tests shall occur no sooner than 10 months after the previous tests and no later than 13 months after the previous tests. Subsequent tests with a frequency of every two years (biennial) shall occur no sooner than 22 months after the previous tests and no later than 25 months after the previous tests. Testing shall be conducted at greater than or equal to 80% of peak load while firing the unit with refinery fuel gas.

Constituent	Test Method or Equivalent	Schedule
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Opacity of emissions	40 CFR 60 Appendix A Method 9	Annual
Volatile organic compounds	40 CFR 60 Appendix A Method 25A	No ongoing testing
Filterable particulate matter	40 CFR 60 Appendix A Method 5	No ongoing testing
Condensable particulate matter	40 CFR 51 Appendix M Method 202	No ongoing testing

Approval Condition 11: ConocoPhillips shall submit a test plan to the NWCAA for approval at least thirty days in advance of any test date required under this Order. The facility shall notify the NWCAA at least two weeks in advance of the exact test date. A complete test report shall be submitted to the NWCAA no later than 45 days after completion of the tests.

Compliance: This continuing requirement has been included in Section 5.

Approval Condition 12: Sampling ports and platform shall be provided on the stack. The ports shall meet the requirements of 40 CFR 60 Appendix A, Method 1.

Compliance: Sampling ports and a platform were installed during construction.

Approval Condition 13: Submit a monthly report, within 20 days of the end of the calendar month, or on another schedule agreed to by the NWCAA, with the following information:

- The maximum NO<sub>x</sub> and CO emissions in the units of the standards for the month.
- Days, duration, and reasons for periods during which data was not collected.
- Excess emissions, including the time of occurrence, the magnitude of the emissions excess, the duration, the probable cause, and corrective actions taken or planned.

The monthly report may be combined with any other monthly reports submitted to the NWCAA.

Compliance: This continuing requirement has been included in Section 5.

Approval Condition 14: ConocoPhillips shall notify the NWCAA in writing upon initial startup.

Compliance: ConocoPhillips notified the NWCAA of initial startup in an email sent on June 20, 2005. This requirement is obsolete.

**NWCAA Order of Approval to Construct #733c** (Ferndale Upgrade and Clean Fuels Projects) In response to a Consent Decree requirement, a condition was included in OAC #733c stating that the bulk of refinery heaters and boilers are subject to 40 CFR Part 60 Subparts A and J for fuel combustion. The Utilities process area's No. 1 Boiler 22F-1C, No. 2 Boiler 22F-1A, No. 3 Boiler 22F-1B, and No. 4 Boiler 22F-1E are included in the list, which is discussed elsewhere in the Statement of Basis.

### 3.6.3 Regulatory Applicability

The #1 boiler ((22F-1C) is subject to NO<sub>x</sub> emission limitations under 40 CFR part 60 subpart Db and OAC #578a. Since the boiler burns only gaseous fuels it is not subject to any other emission limitation under subpart Db. Subpart Db also requires continuous monitoring of NO<sub>x</sub> emissions. The boiler is equipped with a NO<sub>x</sub> continuous emissions monitor, and ConocoPhillips conducts quarterly accuracy audits in accordance with subpart Db and NSPS Appendix F. Subpart Db and the NSPS General Provisions require extensive recordkeeping and reporting. The boiler is subject to the sulfur emission limitations on refinery fuel gas combustion devices required under 40 CFR part 60 subpart J (162 ppm<sub>dv</sub>). The continuing requirements have been included in Section 5 of the AOP.

The #4 Boiler (22F-1E) is subject to NO<sub>x</sub> and CO emissions limitations under 40 CFR part 60 subpart Db and OAC #877a. Since the boiler burns only gaseous fuels it is not subject to any other emission limitation under subpart Db. Subpart Db also requires continuous monitoring of NO<sub>x</sub> emissions. The boiler is equipped with NO<sub>x</sub> and CO continuous emissions monitors, and ConocoPhillips conducts quarterly accuracy audits in accordance with subpart Db and NSPS Appendix F. Subpart Db and the NSPS General Provisions require extensive recordkeeping and reporting. The boiler is subject to the sulfur emission limitations on refinery fuel gas combustion devices required under 40 CFR part 60 subpart J because of Consent Decree requirements. The hydrogen sulfide standard (50 ppm<sub>dv</sub>) is stricter under OAC #877a than under Subpart J (162 ppm<sub>dv</sub>).

The other two existing boilers (#2 and #3 Boilers) are subject to 40 CFR Part 60 Subpart J under OAC #733c. They have no other specifically applicable requirements.

The cooling towers are subject to the Industrial Process Cooling Towers MACT standard (40 CFR part 63 subpart Q). This standard simply prohibits usage of chromium-based treatment chemicals in cooling water systems. ConocoPhillips provided the required initial notification by letter received 8/1/95 and the required notification of compliance status by letter received 5/1/96. There are no continuing requirements for monitoring, recordkeeping, and reporting requirements for the cooling towers.

There are no outstanding or known chronic compliance issues at any of the emission units in the Utilities Process Area.

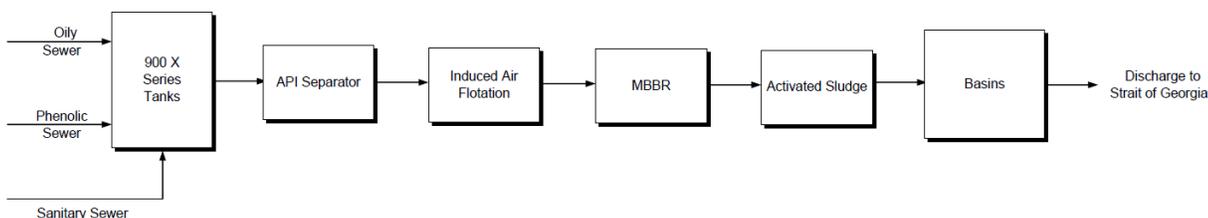
### 3.7 Effluent Treatment Process Area

#### 3.7.1 General Operation and Background

The Effluent Treatment Process Area incorporates the individual process drains, main sewer trunk lines (Oily Water and Phenolic Sewers), waste management units at the wastewater treatment plant, wastewater storage tanks, and other activities related to handling of wastes such as sludge, and wastes from turnaround activities.

Process area wastewater (including water drawn from oil storage tanks) is collected by individual drain systems that empty to sewer trunk lines, which flow to lift (pump) stations for conveyance of the wastewater to storage tanks. The stored wastewater is then treated via a series of devices that provide physical, chemical, and biological treatment. The accumulated wastewater is first routed to an oil/water (API) separator system and then to an Induced Gas Flotation Unit via closed sewers. The water leaving the Induced Gas Flotation Unit is then biologically treated in a moving bed biological reactor (MBBR) and activated sludge units to further remove organic compounds. The treated effluent water is then clarified and combined with non-process surface runoff (storm water) and is discharged via an NPDES-permitted outfall located at the margin of Georgia Strait. Oil recovered at the Effluent Treatment Plant is recycled to refinery process units; recovered solids are removed, concentrated, and shipped off-site.

Light hydrocarbons dissolved in or floating on the wastewater and other wastes evaporate and produce emissions to the atmosphere. The Effluent Plant section of the operating permit addresses the elements of the effluent treatment process area that are subject to air regulations except wastewater storage tanks, which are addressed in the Storage Vessels section of the permit.



## Figure 3-13 Wastewater Treatment Plant

### 3.7.2 Construction and Permitting History

The basic configuration of the effluent system was established during original refinery construction in 1953. Since initial construction, sewers have been extended to new process units, several tanks were added to replace open storage basins, and emission controls were installed on waste management units. In 2007, the WWTP infrastructure (including installation of the MBBR and the activated sludge units) was upgraded as per the requirements of the Consent Decree and to ensure more stable operation. The facility was not initially subject to 40 CFR part 61 subpart FF (benzene waste emission standard) when it was promulgated in 1990, but two projects were undertaken to prepare for eventual applicability (OAC #314 and #559). The facility then triggered subpart FF applicability in 1996. The following is a summary of the effluent system projects that have received formal construction approval orders from the NWCAA.

**NWCAA Order of Approval to Construct No. 314a** (Wastewater Tank Project) Original Date: August 21, 1991, Revised on October 2, 2002. This project involved installation of three 90,000 barrel storage tanks (900x1, 900x2, 900x3) to store wastewater before feed to the treatment plant. This allowed closure of several open storage basins. The original approval order was revised to remove out-of-date requirements and requirements that wholly overlap with applicable federal requirements. Note that these tanks are addressed in the Storage Vessels section of the permit.

Approval Condition 1: Tanks 100x92 and 100x95 shall be retrofitted with rim mounted continuous secondary seals on existing external floating roofs conforming to the design requirements of 40 CFR 60 Subpart Kb (60.112b (a)(2)).

Compliance: The required devices have been installed on these tanks and they are monitored in accordance with subpart Kb. This condition is in section 5 of the AOP.

Approval Condition 2: Tanks 300x40 and 100x98 shall be retrofitted with the design requirements of internal floating roofs conforming 40 CFR 60 Subpart Kb (60.112b (a)(1)).

Compliance: The required devices have been installed on these tanks and they are monitored in accordance with subpart Kb. This condition is in section 5 of the AOP.

Approval Condition 3: Tanks 300x40, 100x98, 100x92 and 100x95 shall be subject to testing and procedures requirements 40 CFR 60 subpart Kb (60.113b) reporting and recordkeeping requirements (60.115b) and monitoring (60.116b).

Compliance: Reports required under subpart Kb have been submitted for these affected tanks. This condition is in section 5 of the AOP.

**NWCAA Order of Approval to Construct No. 559** (Installation of Vapor Controls on Select Benzene-Containing Waste Management Units) Original Date: August 2, 1995. This order approved modifications being made in preparation for possible future emission control requirements imposed by the Benzene Waste Operations NESHAP (40 CFR 61 part FF). At the time of the approval order the refinery was not subject to subpart FF. The refinery became subject to subpart FF control requirements in 1996. The subject project involved installation of seals on hatches, carbon adsorption units on vents, and covers on the API Separator.

Approval Condition 1: Project shall be constructed and operated in accordance with the information submitted with the application dated July 13, 1995.

Compliance: The NWCAA has determined that there are no substantive requirements associated with this condition that are additional to requirements addressed in other permit conditions.

Approval Condition 2: Emission abatement modifications installed at individual drain system vent points (manholes, diversion boxes, storage tank water draw boxes, and pump stations) specified in the Notice of Construction and Application for Approval shall be designed, operated, and maintained in accordance with 40 CFR 61.346.

Compliance: ConocoPhillips certified via letter dated 7/3/97 that the equipment installed to comply with subpart FF were installed and that the required inspections took place. All continuing requirements, including OAC #559 condition 2 and 40 CFR §61.346, are addressed in Section 5 of the permit.

Approval Condition 3: Emission abatement modifications installed at the wastewater treatment plant API separator shall be designed, operated, and maintained in accordance with 40 CFR 61.347 for the fixed roof and 40 CFR 61.352 for the floating roof.

Compliance: ConocoPhillips certified via letter dated 7/3/97 that the equipment installed to comply with subpart FF were installed and that the required inspections took place. All continuing requirements, including OAC #559 condition 3 and 40 CFR §61.347 and §61.352, are addressed in Section 5 of the permit.

Approval Condition 4: Closed vent systems and control devices utilized at emission points specified in the Notice of Construction and Application for Approval shall be designed, operated, and maintained in accordance with 40 CFR 61.349.

Compliance: ConocoPhillips certified via letter dated 7/3/97 that the equipment installed to comply with subpart FF were installed and that the required inspections took place. All continuing requirements, including OAC #559 condition 4 and 40 CFR §61.347 and §61.352, are addressed in Section 5 of the permit.

Approval Condition 5: Upon becoming subject to the Benzene Waste Operation NESHAP, notify the NWCAA in writing of the applicability date. At that time modifications shall be operated in accordance with all provisions of 40 CFR 61 subpart FF National Emission Standard for Benzene Waste Operations.

Compliance: ConocoPhillips certified via letter dated 7/3/97 that the equipment installed to comply with subpart FF were installed and that the required inspections took place. All continuing requirements, including OAC #559 condition 5, and 40 CFR §61.347 and §61.352, are addressed in Section 5 of the permit.

NWCAA Order of Approval to Construct No. 752 (Installation of Dome Roof on Roughing Filter) Original Date: December 28, 2000. No approval conditions specified. The Roughing Filter was decommissioned by December 31, 2005 as required by the Consent Decree.

**NWCAA Order of Approval to Construct No. 756** (Installation of Oily Sludge/Emulsion Treatment System) Original Date: February 6, 2001. Portable reactor tanks utilizing recirculating air to biologically decompose sludge. Vent controlled with activated carbon canisters.

Approval Condition: The subject waste management units shall be constructed and operated in compliance with the applicable requirements of 40 CFR Part 61 Subpart FF and 40 CFR 63 Subpart CC.

Compliance: Initial inspection in July 2001 indicated that the facility was installed. However, ConocoPhillips representatives state that the system was never put into service and has been permanently removed from the facility. The refinery managers have been informed that the facility will need to initiate the new source review process again if the system is to be returned to the refinery. Regulatory requirements for this system are considered obsolete and have not been included in Section 5 of the permit.

### **3.7.3 Regulatory Applicability**

There are primarily three air regulations affecting wastewater systems at oil refineries. There is considerable overlap between them. The regulations are: 40 CFR part 60 subpart QQQ affecting new and modified (after 5/4/87) wastewater VOC emission sources, 40 CFR part 61 subpart FF affecting certain waste streams with more than threshold amounts of benzene, and 40 CFR part 63 subpart CC (refinery MACT Phase I) wastewater provisions affecting the same waste streams subject to subpart FF. Requirements established under new source review (NSR) may also apply at some emission units, but the NSR requirements typically echo the standards established by these regulations. No state or local regulations specifically target wastewater systems.

The refinery MACT Phase I (subpart CC) wastewater provisions have exactly the same applicability criteria (and essential requirements) as does the benzene standard (subpart FF) for petroleum refineries with greater than 10 megagrams per year benzene released in effluent. All units subject to subpart CC are also subject to FF. The refinery MACT Phase I also overlaps with subpart QQQ to a large extent, except that subpart CC only applies to waste streams containing benzene, whereas subpart QQQ applies to any new or modified unit containing any volatile organic compound including benzene. Also, Group 1 wastewater streams (defined in Subpart CC) managed in a piece of equipment that is also subject to subpart QQQ are required to comply only with subpart CC. Wastewater streams that are subject to subpart QQQ and contain benzene but are not Group 1 wastewater streams under subpart CC, are subject only to subpart QQQ. So, there are some subpart QQQ-affected drains at ConocoPhillips that are not subject to subpart CC (or FF). Those subpart QQQ-only drains are addressed in various parts of the permit, and are not addressed in this Effluent Treatment section.

The most influential regulation affecting the Effluent Treatment Process Area is the benzene waste standard (40 CFR part 61 subpart FF). The rule essentially requires technological and operational steps to prevent emissions from each component of the waste handling system. This includes requirements on final disposition of benzene-containing waste, overall waste treatment criteria, benzene waste generation tracking, and controls on miscellaneous waste handling activities, such as usage of vacuum trucks and cleanup operations. Portions of the system that do not receive or handle benzene-containing waste, and the very last stages of the treatment plant, do not have to be controlled. In summary, the great majority of the drains and sewer sections at the plant are subject to this rule and must have water seals on individual drains, sealed hatches, and activated carbon adsorption units to abate benzene emissions from vents. Subpart FF requires affected tanks and treatment units (e.g. API Separators) to be fitted with seals on hatches, and the tank roofs must feature rim seals or another abatement technology. Finally, subpart FF has overall waste treatment criteria and restrictions on the ultimate disposition of affected waste (e.g. sludge treatment).

The facility's Consent Decree has several requirements pertaining to the Effluent Treatment Process Area as a result of alleged violation of 40 CFR Part 61 Subpart FF requirements. Construction required by the CD includes the MBBR and a redesign of the Phenolic/Oily Water Lift Station. The CD requirements are referenced by this Statement of Basis. Additional information is available in the docket located at the NWCAA.

### **3.8 Storage Vessels**

#### **3.8.1 General Operation and Background**

The general operation of refinery storage systems and applicable regulations is described above in Section 2.5.

#### **3.8.2 Construction and Permitting History**

The basic configuration of the storage systems was established during original refinery construction in 1953. The following is a summary of the storage system projects that have received formal construction approval orders from the NWCAA.

**NWCAA Order of Approval to Construct No. 34** (Installation of External Floating Roof Storage Vessel 1340X117 and Butane Pressure Vessel 200X100) Original Date July 20, 1971.

Approval Condition: No approval conditions specified.

Compliance: Not applicable.

**NWCAA Order of Approval to Construct No. 161** (Installation of Internal Floating Roofs on Tanks 100X93, 100X94 & 100X96) Original Date June 16, 1975.

Approval Condition: Notify the Control Officer so the units may be inspected prior to or during start-up.

Compliance: Records of this notification are not in the source file, but records of an inspection by the NWCAA are in the file.

**NWCAA Order of Approval to Construct No. 163** (600,000 bbl. Capacity Crude Oil Storage Tank 6000x1) Original Date August 15, 1975.

Approval Condition: Notify the Control Officer so the units may be inspected prior to or during start-up.

Compliance: Records of this notification are not in the source file, but records of an inspection by the NWCAA are in the file.

**NWCAA Order of Approval to Construct No. 196** (Install internal floating roof on slop oil storage tank 100x99) Original Date August 12, 1977.

Approval Condition: Notify the Control Officer so the units may be inspected prior to or during start-up.

Compliance: Records of this notification are not in the source file, but records of an inspection by the NWCAA are in the file.

**NWCAA Order of Approval to Construct No. 314a** (Construction of Three 90,000 Barrel Storage Tanks and Retrofitting Tanks) Original Date: August 21, 1991, Revised October 2, 2002. The original approval order covered tank installation, control device retrofits, and modifications associated with the refinery's preparations to comply with the Benzene Waste NESHAP. The original approval order had approval conditions that directly overlapped with applicable federal standards. The order was revised to allow simplification, without lessening the stringency of control requirements. The revision removed approval conditions for tanks 900x1, 900x2, and 900x3 and, for these tanks, added text indicating equivalency between the deleted approval condition and compliance with 40 CFR 61 Subpart FF. The revision also deleted references to tank 13x100 which is out of service and was not retrofitted as planned. Finally, the revision deleted out of date text pertaining to procedures and fees. OAC 314a currently establishes the following conditions:

Approval Condition 1: Tanks 100x92 and 100x95 shall be retrofitted with rim mounted continuous secondary seals on existing external floating roofs conforming to the design requirements of 40 CFR 60 Subpart Kb (60.112b (a)(2)).

Compliance: These tanks have been retrofitted as required and the condition is addressed in Section 5 of the permit.

Approval Condition 2: Tanks 300x40 and 100x98 shall be retrofitted with the design requirements of internal floating roofs conforming 40 CFR 60 Subpart Kb (60.112b (a)(1)).

Compliance: These tanks have been retrofitted as required and the condition is addressed in Section 5 of the permit.

Approval Condition 3: Tanks 300x40, 100x98, 100x92 and 100x95 shall be subject to testing and procedures requirements 40 CFR 60 subpart Kb (60.113b) reporting and recordkeeping requirements (60.115b) and monitoring (60.116b).

Compliance: These tanks have been tested as required and the required data are handled as specified. This condition is addressed in Section 5 of the permit.

**NWCAA Order of Approval to Construct No. 715a** (Gasoline Splitter Project-Change in use (Modification) of Tanks 1340X115, 550X101, and 300X44) Original Date: December 3, 1999, Revised October 2, 2002. Installation of the gasoline splitter tower involved increasing emissions and changed usage of several storage tanks. This change invoked applicability of NSPS subpart Kb for tank 300X44 and tanks 550X101 and 1340X115 are subject to the refinery MACT Phase I storage vessel provisions. OAC #715 specified compliance with subpart Kb for Tank 300X44 and refinery MACT Phase I for the other subject tanks. Since this was a direct overlap, OAC #715 was revised to remove overlapping requirements. There are no conditions remaining in OAC #715 applicable to storage tanks. The subpart Kb and refinery MACT Phase I requirements are addressed in Section 5 of the AOP.

**NWCAA Order of Approval to Construct No. 736a** (Construction of Tank 400X1) Original Date: May 25, 2000, Revised October 2, 2002. The original approval order authorized construction of a 40,000 bbl internal floating roof storage vessel. The order had approval conditions that directly overlapped with applicable federal standards and was revised to allow simplification, without lessening the stringency of control requirements. Approval conditions that required compliance with refinery MACT Phase I storage vessel requirements and ambient impact requirements of WAC 173-460 were removed because these requirements apply to the subject tank regardless of their inclusion in a NWCAA regulatory order. OAC #736a authorizes construction and operation of the tank without conditions additional to those that exist pursuant to federal and state regulation.

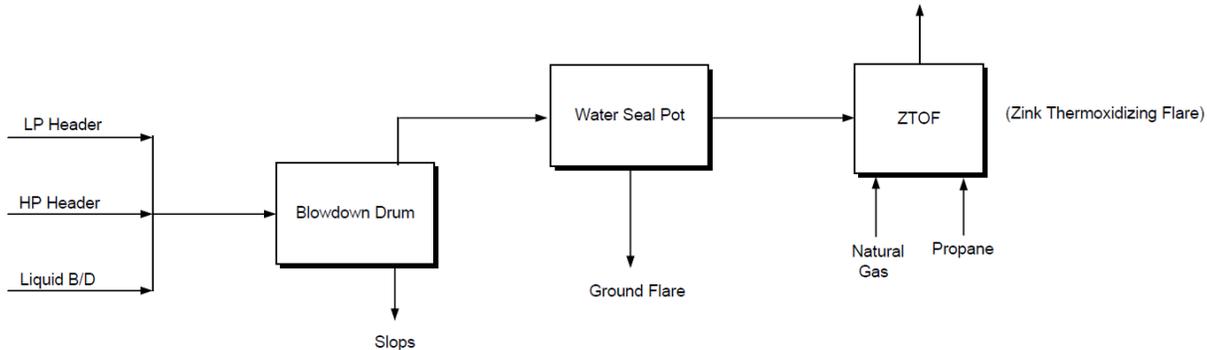
### 3.8.3 Regulatory Applicability

There are no outstanding or known chronic compliance issues at any of the emission units in the Storage Vessels Process Area.

## 3.9 Flares

### 3.9.1 General Operation and Background

ConocoPhillips' primary refinery flare is an enclosed John Zink Thermal Oxidizing Flare (ZTOF) with interconnected staged combustors and remotely operated steam injection to minimize visible plumes. An emergency flare (the ground flare) functions to safely dispose of hydrocarbons in the event that the capacity of the ZTOF is overcome. The purpose of the Refinery Flare is to safely dispose of hydrocarbons that need to be vented from process equipment. Another ZTOF flare is in operation at the facility tanker truck loading rack. The requirements applicable to the loading rack flare are addressed in that section.



**Figure 3-14 Flare System**

### 3.9.2 Construction and Permitting History

The ZTOF flare was built in 1972. The NWCAA issued approval for installation via letter dated 12/17/1971. There have been no significant changes to the flare since installation. A flare gas recovery system to recover gases and route them to the fuel gas system has been permitted for installation and operation but construction has not been completed as per the date of this permit. All regulatory requirements under the flare gas recovery system's Order of Approval to Construct #1029 are considered future-effective and have been included in Section 5 of the AOP. Under the Consent Decree, the project is required to be completed by the end of 2011.

**NWCAA Order of Approval to Construct for the John Zink Thermal Oxidizing Flare (ZTOF)**  
Original Date December 17, 1971.

The letter was issued with no specifically-applicable approval conditions. A letter from the NWCAA dated 9/18/72 authorized startup of the ZTOF and an inspection letter from the NWCAA dated 9/17/73 approved the installation and continued operation of the device.

### **3.9.3 Regulatory Applicability**

The flare system is used to destroy waste gases generated by refinery MACT Phase I affected equipment, so it must meet the control device standards of 40 CFR part 63 subpart A. ConocoPhillips submitted supporting information required by the refinery MACT Phase I Initial Notification of Compliance Status Report (submitted January 1999). Additional required information was submitted later. The information submitted provided evidence that the ZTOF meets the design and operation criteria of subpart A.

The flare is not directly subject to the NSPS general provision requirements for flares because it is not used to control emissions from any NSPS-affected closed vent system. However, the flare requirements in part 60.18 of the general provisions are referenced by other regulations. Therefore, the flare must meet the NSPS general provision requirements which are similar to the part 63 general provisions for flares.

In addition, the flares are covered under the facility's Consent Decree. The permittee has submitted formal Compliance Plans for the flares. The Compliance Plans are included in the AOP in Section 5.

### **3.10 Receiving Pumping Shipping**

#### **3.10.1 General Operation and Background**

The Receiving Pumping and Shipping Process Area covers facilities at the refinery that are used for the transfer of raw materials, intermediates, and finished products. There are five loading facilities at the Ferndale Refinery:

Marine Terminal (shipping and receiving crude, intermediate materials, jet fuel, diesel, gasoline)

Rail Car-Gaseous (shipping liquefied petroleum gas, butane, etc...)

Rail Car-Liquids (shipping and receiving intermediates, diesel, jet fuel, heating oil)

Truck-Gaseous (shipping liquefied petroleum gas)

Truck-Liquids (shipping gasoline, diesel, jet fuel, heating oil)

Emissions of volatile organic compounds and HAPs result as vapors are displaced when vessels are loaded. The truck rack at the facility is equipped with a vapor recovery/incineration system. The LPG loading system has a similar vapor recovery feature and the recovered vapors are routed to the refinery flare. When materials are off loaded to the refinery, e.g. filling storage tanks with delivered crude oil, emissions result from vapors displaced as tanks at the facility are filled. These storage vessel concerns are addressed in the storage vessels section of the air operating permit and statement of basis.

#### **3.10.2 Construction and Permitting History**

**NWCAA Order of Approval to Construct No. 265** (Modification to Existing Truck Gasoline Loading Rack: retrofit to bottom loading, install vapor recovery and incineration system) Original Date January 26, 1990.

Approval Condition 1: Construct and operate in accordance with information submitted.

Compliance: The NWCAA has determined that there are no substantive requirements associated with this condition that are additional to requirements addressed in other permit conditions.

Approval Condition 2: Emissions from the vapor recovery system shall be limited to no more than 35 milligrams per liter of gasoline transferred. Compliance shall be demonstrated by a source emissions test using EPA method 25 or another acceptable method approved by the Control Officer. Source emission testing to demonstrate compliance shall be conducted biennially. The initial test shall be made within 90 days after startup.

Compliance: The gasoline loading rack vapor collection system became subject to petroleum refinery MACT phase 1 (40 CFR Part 63 Subpart CC) in 1998. This subpart enacts a limit of 10 milligrams VOC per liter of gasoline transferred. Both limits apply. All continuing requirements are addressed under Sections 3 & 5 of the permit, which incorporates Subpart CC requirements. The NWCAA has records of truck rack vapor system emissions testing performed on the following dates: 9/10/01 (3.55 mg/l), 1/28/03 (10.29 mg/l), 2/15/05 (5.33 mg/l), 2/1/06 (6.49 mg/l) and 2/22/08 (8.7 mg/l). All of these tests indicate compliance with the 10 mg/l and 35 mg/l emission standard. However, pressure measurements during the 2003 test did not meet the Refinery MACT 1 standard. Notice of Violation #3349 was issued to the refinery for this violation. The continuing requirements of this condition have been included in Section 5 of the permit.

Approval Condition 3: Visual emissions as measured by EPA Method 9 shall not exceed ten percent opacity from the flare stack.

Compliance: Evidence available to the NWCAA from inspections and information from facility staff indicate that opacity from the truck rack flare stack has been compliant. This continuing requirement has been included in Section 5 of the permit.

**NWCAA Order of Approval to Construct #733c** (Ferndale Upgrade and Clean Fuels Projects) Originally issued as #733 on 4/6/01; revised on 8/13/02. Only excerpts from OAC #733c that are relevant to the Marine Terminal are listed here. This requirement is currently in effect.

Approval Condition 16: The quantity of gasoline loaded onto marine vessels at the refinery marine terminal shall be less than 10,000,000 barrels per rolling 12-month period. The quantity of VOC emitted from the marine terminal shall not exceed 819 tons per rolling 12-month period. The owner or operator shall record the quantity and identities of each product transferred into marine vessels and keep the records available to the NWCAA for at least five years. The owner or operator shall provide to the NWCAA semiannual or more frequent reports indicating the monthly rolling 12-month quantity of gasoline transferred onto marine vessels and VOC emissions from the marine terminal.

Compliance: Evidence available to the NWCAA indicates that the facility is in compliance with this requirement, which became effective on 8/13/02. This continuing requirement has been included in Section 5 of the permit.

### **3.10.3 Regulatory Applicability**

The bulk of the applicable air regulations relevant to this process area apply to the gasoline/diesel truck loading facility (truck rack). There are no specifically applicable requirements assigned to the LPG rail car and truck loading facilities. The marine terminal loading operation is subject only to the throughput/emissions limitations established by NWCAA OAC #733c. The annual HAP emissions and gasoline throughput of the marine terminal is below the applicability threshold of the refinery MACT Phase I. Equipment components that are in HAP service, at any location within the refinery, are subject to the leak detection and repair requirements of the refinery MACT Phase I. Certain equipment at the gasoline loading portion of the truck rack and the crude/gasoline handling portions of the marine terminal are subject to these refinery MACT Phase I LDAR requirements.

The requirements applicable to the gasoline loading truck rack are somewhat complex because there are elements that apply to vapor recovery, the vapor combustion device (truck rack ZTOF Flare), the performance of the tanker trucks themselves, and LDAR requirements for fugitive leaks from equipment components. As indicated by the operating permit, the truck rack is subject to the SIP approved version of NWCAA 580.4 and 580.10, WAC 173-491, and the refinery MACT Phase I. The refinery MACT Phase I

references 40 CFR part 63 subpart Y and part 60 subpart XX. Many of these regulations overlap. The following is a summary of the applicable regulations.

The truck loading rack must feature a vapor recovery system to capture vapors displaced as the trucks are loaded. The system must be leak tight and the overpressure valves must be set to remain closed during normal operation. The vapors must be routed to a control device. ConocoPhillips uses a thermal combustion device manufactured by the John Zink Company. The combustor must abate emissions to below 10 mg total organic compound emissions per liter gasoline transferred.

The combustor performance must be monitored. The vapor combustion device uses propane as a supplemental fuel to assure that the temperature in the oxidizing zone is at or above 450°F at all times when vapors are being routed from the rack. The refinery MACT Phase I requires only initial testing for total organic compound emissions, whereas NWCAA Regulation Section 580.4 requires emissions testing at the truck rack flare every two years. ConocoPhillips has tested every two years as required by the rule and the results indicate that the truck rack is in compliance with the 10 mg/liter emission limit. The gasoline cargo (truck) tanks must be leak tested every year and the refinery must ensure that only tanks with valid evidence of annual leak testing are loaded. A computerized automatic interlock device is in place to prevent loading unless appropriate thermal oxidation temperatures are met and to assure that the tanks loaded all have a valid leak tighten test certification on record. NWCAA inspections of the truck rack and review of reports indicates that the truck rack is in compliance with these applicable regulations.

The truck rack is not subject to NSPS subpart XX because it was not constructed and has not been modified or reconstructed since 12/17/80, the applicability date of subpart XX. It is also not subject because it does not have a throughput above the applicability threshold of 75,700 liters per day. Note that the refinery MACT Phase I establishes emission limits on the COP truck rack that are more stringent than the limits from subpart XX.

Recent EPA applicability determinations indicate that NSPS Subpart J for SO<sub>2</sub> is applicable to the thermal oxidizer because it is combusting hydrocarbon gas generated at the refinery. On April 4, 2003 COP received EPA approval to implement an alternative monitoring strategy because it is impractical to operate a fuel gas hydrogen sulfide monitor in the truck rack vapor recovery system. This subpart J issue is common to many truck racks nationwide and the alternative monitoring strategy is similar to alternatives already approved by the EPA at other refineries. There are no applicable regulations controlling NO<sub>x</sub> emissions at the gasoline/diesel truck terminal.

## **4 Air Operating Permit Administration**

### **4.1 One-Time Only Requirements**

Applicable requirements that were satisfied by a single past action on the part of the source are not included in the AOP, but are discussed in the Statement of Basis. Regulations that require action by a regulatory agency, but not of the regulated source are not included as applicable permit conditions.

### **4.2 Federal Enforceability**

Federally enforceable requirements are terms and conditions required under the Federal Clean Air Act (FCAA) or under any of its applicable requirements. Local and state regulations may become federally enforceable by formal approval and incorporation into the State Implementation Plan (SIP) or through other delegation mechanisms. Federally enforceable requirements are enforceable by the EPA and citizens. All applicable requirements in the permit including standard terms and conditions, generally applicable requirements, and specifically applicable requirements are federally enforceable unless identified in the permit as enforceable only by the state.

Most rules and requirements are followed by a date in parentheses. Two different versions (identified by the date) of the same regulatory citation may apply to the source if federal approval/delegation lags behind changes made to the Washington Administrative Code (WAC) or the NWCAA Regulation. The date associated with a WAC regulation denotes the "State Effective Date" of the regulation. For SIP-approved WAC regulations, the date represents the "State Effective Date" of the regulation version that was SIP-approved. For NWCAA regulations, the date represents the most recent Board of Directors adoption date, which is identified as the "Passed" or "Amended" date in the NWCAA Regulation. For SIP-approved NWCAA regulations, the parenthetical date represents the "Passed" or "Amended" date of the regulation version that was SIP-approved. The date associated with an OAC or PSD permit represents the latest revision date of that order. For a federal rule, the date is the rule's most recent promulgation date.

Chapter 173-401 WAC is not federally enforceable although the requirements of this regulation are based on federal requirements for the air operating permit program. Upon issuance of the permit, the terms based on Chapter 173-401 WAC will become federally enforceable for the source.

### **4.3 Future Requirements**

Applicable requirements that have been promulgated with future effective compliance dates may be included as applicable requirements in the permit. For example, the refinery MACT Phase II is cited, even though the control requirements do not become binding until later. Some requirements that are not applicable until triggered by an action, such as the requirement to file a Notice of Construction application prior to building a new emission unit, are addressed within the standard terms and conditions section of the permit.

### **4.4 Compliance Options**

The ConocoPhillips refinery did not request emissions trading provisions or specify more than one operating scenario in the air operating permit application; therefore the permit does not address these options as allowed under WAC 173-401-650. This permit does not condense overlapping applicable requirements (streamlining) nor does it provide any alternative emission limitations. The permit does accommodate alternative monitoring options under NSPS for the FCCU (opacity, carbon monoxide) and truck rack incinerator (SO<sub>2</sub>).

### **4.5 Permit Elements**

The permit is organized in the following sequence:

- Permit Information

- Attest
- Table of Contents
- Emission Unit Descriptions
- Standard Terms and Conditions
- Standard Terms and Conditions for NSPS and NESHAP
- Generally Applicable Requirements
- Specifically Applicable Requirements
- Inapplicable Requirements

Within the Standard Terms and Conditions, Generally Applicable Requirements, and Specific Applicable Requirements sections, applicable regulations and OACs issued to the facility are listed. After each is a date in parenthesis. When the date is associated with a regulation, it represents the current version date for that regulation. Specifically, for a federal Subchapter regulation (e.g. 40 CFR 60 Subpart GGG) this date represents the date of publication in the Federal Register. For Washington Administrative Code (WAC) regulation this date represents the date filed with the State Code Reviser. For NWCAA regulation, it represents the Board of Directors adoption date. In the case of an OAC, it represents the issuance date of the order.

#### **4.5.1 Permit Information, Attest, and Emissions Unit Descriptions**

The General Information section identifies the source, the responsible corporate official, and the agency personnel responsible for permit preparation, review, and issuance. The Attest section provides authorization by the NWCAA for the source to operate under the terms and conditions contained in the permit. The Emissions Unit Identification section lists the significant emissions units, associated control equipment, fuel type, and installation dates. This section is a general overview of the facility. Detailed information about the plant can be found in the permit application and supporting files.

#### **4.5.2 Standard Terms and Conditions**

The Standard Terms and Conditions section contains administrative requirements and prohibitions that do not have ongoing compliance monitoring requirements. The citations giving legal authority to the Standard Terms and Conditions are provided in the section. At times, requirements are paraphrased. In this case the language of the cited regulation takes precedence over the paraphrased summary. For understanding and readability, the terms and conditions have been grouped by function. Similar requirements from the State and the NWCAA are grouped together where possible. There are several requirements included that are not applicable until triggered. Examples of these would be the requirement to file a "Notice of Construction" and "Application for Approval."

Three permit conditions in Section 2 are labeled "Directly Enforceable". These conditions are a clarification of the regulatory requirements, as the NWCAA interprets those requirements. They are legal requirements with which the permittee must comply and are directly enforceable through the permit.

#### **4.5.3 Standard Terms and Conditions for New Source Performance Standards and National Emission Standards for Hazardous Air Pollutant Requirements**

The Standard Terms and Conditions for New Source Performance Standards and National Emission Standards for Hazardous Air Pollutant Requirements section of the permit also specifies administrative requirements or prohibitions with no ongoing compliance monitoring requirements. The conditions in this section, Section 3, are taken from the "General Provisions" of 40 CFR Parts 60, 61, and 63. They apply specifically to the affected sources, affected facilities, or stationary sources subject to the standards of 40 CFR Parts 60, 61, and 63. These affected sources, affected facilities, or stationary

sources, identified in Section 5 of the permit, are linked to the requirements in Section 3 by a note either in the first row of the table of requirements for the unit, or within the description of the regulatory requirement itself.

#### **4.5.4 Generally Applicable Requirements**

The Generally Applicable Requirements section identifies requirements that apply broadly to the refinery. These requirements are generally not called out in OACs and instead are found as general air pollution rules in the NWCAA Regulation or the Washington Administrative Codes.

When referring to the tables in sections 4 and 5, the first column lists the permit term number and pollutant or type of requirement. The permit terms are numbered consecutively so that the reader may locate a listed requirement. Next, the citation column includes the legal citation which is a federally enforceable requirement unless listed as "state only". The "description" column is a paraphrase of the requirement and is not intended to be a legal requirement as it is for descriptive purposes only.

The MR&R column is a summary of the underlying requirement cited in the "citation" column and is not directly enforceable. If there is a statement in the MR&R column that states "directly enforceable" than that MR&R requirement is enforceable and represents gap filling done by the NWCAA during writing of the AOP. In some cases there are no MR&R or test methods listed in the AOP for a permit term. This is often due to the nature of the emission source, the lack of specifics in the underlying requirement and/or the slim likelihood that the legal requirement will be violated.

#### **4.5.5 Gap-Filling**

There are some air pollution rules and regulations and OAC conditions that do not specifically call out a monitoring, reporting, or recordkeeping method(s) to demonstrate compliance with the applicable requirement. In this case the permitting agency would develop a site-specific requirement that the source must follow. The inclusion of these customized requirements is called "gap filling". The refinery has many specific monitoring, reporting, and recordkeeping requirements in the form of continuous emission monitors and periodic reporting. In some instances however, gap filling has been used. For instance, nuisance rules and opacity requirements have site specific gap filled obligations for the source. Any areas where gap filling has taken place, the monitoring, recordkeeping and reporting for that term will state "directly enforceable".

On August 19, 2008, the U.S. Court of Appeals vacated EPA's 2006 interpretive rule that prohibited states from enhancing monitoring in Title V permits. As a result, permitting authorities again must ensure that monitoring in each permit is sufficient to assure compliance with the terms and conditions of the permit.

#### **4.5.6 Specific Requirements for Emission Units**

This section lists applicable requirements that specifically apply to the emission units. The emission units are grouped by process unit and or area. The emission limitations and monitoring, recordkeeping and reporting requirements are derived from BACT determinations and/or from applicable regulations. The format and organization of this section is the same as the table for generally applicable requirements. As with generally applicable requirements some specifically applicable requirements do not have source monitoring requirements due to the inherent nature of the source and the likelihood that the legal requirement will not be violated.

The refinery uses CEMs and COMs to continuously monitor various emission units for SO<sub>2</sub>, NO<sub>x</sub>, O<sub>2</sub> and opacity. In these cases continuous compliance for concentration and mass emission limits is a straightforward determination. Pollutants not continuously monitored are VOCs and fine particulates. Periodic opacity observations and source test data assure that the permit conditions for fine particulate are not exceeded.

#### **4.5.7 Inapplicable Requirements**

WAC 173-401-640 requires that the permitting authority to issue a determination regarding the applicability of requirements with which the source must comply. The Air Operating Permit lists requirements that are deemed inapplicable to the facility. The basis for each determination of inapplicability is included.

#### **4.5.8 Insignificant Emissions Units**

Categorically exempt emissions units listed in WAC 173-401-532 are present at the refinery. These emission units have very low, if any, emissions associated with their use and are therefore considered insignificant by regulation. The insignificant emission units are listed below:

## 5 Insignificant Activities and Emission Units

<b>Primary Crude Oil Process Area</b>	
<b>Unit</b>	<b>WAC Citation</b>
Sewer manholes, junction boxes, sumps and lift stations associated with wastewater treatment systems Note: Sewer manholes, junction boxes, sumps and lift stations regulated under 40 CFR Part 61 Subpart FF and 40 CFR Part 63 Subpart CC are not included in this exemption.	WAC 173-401-532(120)
Sampling connections used exclusively to withdraw materials for laboratory analysis and testing	WAC 173-401-532(51)
Steam vents	WAC 173-401-532(87)
Vents from continuous emissions monitors and other analyzers	WAC 173-401-532(8)
Sample gathering, preparation, management	WAC 173-401-532(73)
Lube oil storage and use	WAC 173-401-532(3) and (69)
Maintenance activities not involving installation of an emission unit and not increasing potential to emit and not otherwise subject to a federally enforceable applicable requirement.	WAC 173-401-532(74)

<b>Catalytic Cracking Process Area</b>	
<b>Unit</b>	<b>WAC Citation</b>
FCCU Catalyst: Batch loading and unloading of solid phase catalysts	WAC 173-401-532(60)
Sampling connections used exclusively to withdraw materials for laboratory analysis and testing	WAC 173-401-532(51)
Sample gathering, preparation, management	WAC 173-401-532(73)
Maintenance Activities not involving installation of an emission unit and not increasing potential to emit and not otherwise subject to a federally enforceable applicable requirement.	WAC 173-401-532(74)
Sewer manholes, junction boxes, sumps and lift stations associated with wastewater treatment systems. Note: Sewer manholes, junction boxes, sumps and lift stations regulated under 40 CFR Part 61 Subpart FF and 40 CFR Part 63 Subpart CC are not included in this exemption.	WAC 173-401-532(120)
Misc. Tanks (Seal Oil, Anti-Corrosive): Storage tanks, reservoirs and pumping and handling equipment of any size limited to soaps, lubricants, hydraulic fluid, vegetable oil, grease, animal fat, aqueous salt solutions or other materials and processes using appropriate lids and covers where there is no generation of objectionable odor or airborne particulate matter	WAC 173-401-532(4)
Vents from continuous emissions monitors and other analyzers	WAC 173-401-532(8)
Steam vents	WAC 173-401-532(87)
Lube Oil Storage and Use	WAC 173-401-532(3) and (69)

<b>Alkylation Process Area</b>	
<b>Unit</b>	<b>WAC Citation</b>

<b>Alkylation Process Area</b>	
<b>Unit</b>	<b>WAC Citation</b>
Small tanks: Operation, loading and unloading of storage tanks, not greater than one thousand one hundred gallon capacity, with lids or other appropriate closure, not for use with hazardous air pollutants (HAPs), maximum (max.) vp 550mm Hg	WAC 173-401-533(b)
Acid Storage Tanks: Tanks vessels and pumping equipment, with lids or other appropriate closure for storage or dispensing of aqueous solutions of inorganic salts, bases and acids excluding: (i) 99% or greater H <sub>2</sub> SO <sub>4</sub> or H <sub>3</sub> PO <sub>4</sub> (ii) 70% or greater HNO <sub>3</sub> (iii) 30% or greater HCl (iv) More than one liquid phase where the top phase is more than one percent VOCs	WAC 173-401-533(2)(s)
Sampling connections used exclusively to withdraw materials for laboratory analysis and testing	WAC 173-401-532(51)
Saturated Gas Plant: Steam vents	WAC 173-401-532(87)
Lube Oil Storage and Use	WAC 173-401-532(3)and(69)
Open Vessel-Equipment Neutralizer: Salt baths using nonvolatile salts and not used in operations which result in air emissions	WAC 173-401-532(80)
Open Vessel-Equipment Neutralizer: Storage tanks, reservoirs and pumping and handling equipment of any size limited to soaps, lubricants, hydraulic fluid, vegetable oil, grease, animal fat, aqueous salt solutions or other materials and processes using appropriate lids and covers where there is no generations of objectionable odor or airborne particulate matter	WAC 173-401-532(4)
Alkylation Unit and Saturated Gas Plant: Sewer manholes, junction boxes, sumps and lift stations associated with wastewater treatment systems. Note: Sewer manholes, junction boxes, sumps and lift stations regulated under 40 CFR Part 61 Subpart FF and 40 CFR Part 63 Subpart CC are not included in this exemption.	WAC 173-401-532(120)
Vents from continuous emissions monitors and other analyzers	WAC 173-401-532(8)
Maintenance activities not involving installation of an emission unit and not increasing potential to emit and not otherwise subject to a federally enforceable applicable requirement.	WAC 173-401-532(74)
Sample gathering, preparation, management	WAC 173-401-532(73)

<b>Catalytic Reformer/Diesel Hydrotreater Process Area</b>	
<b>Unit</b>	<b>WAC Citation</b>
#3 Reformer: Sampling connections used exclusively to withdraw materials for laboratory analysis and testing	WAC 173-401-532(51)
#3 Reformer: Steam vents	WAC 173-401-532(87)
#3 Reformer: Batch loading and unloading of solid phase catalysts	WAC 173-401-532(60)
Maintenance activities not involving installation of an	WAC 173-401-532(74)

<b>Catalytic Reformer/Diesel Hydrotreater Process Area</b>	
<b>Unit</b>	<b>WAC Citation</b>
emission unit and not increasing potential to emit and not otherwise subject to a federally enforceable applicable requirement.	
DHT: Lube Oil Reservoirs	WAC 173-401-532(3)
Vents from continuous emissions monitors and other analyzers	WAC 173-401-532(8)
Sewer manholes, junction boxes, sumps and lift stations associated with wastewater treatment systems. Note: Sewer manholes, junction boxes, sumps and lift stations regulated under 40 CFR Part 61 Subpart FF and 40 CFR Part 63 Subpart CC are not included in this exemption.	WAC 173-401-532(120)
Sample gathering, preparation, management	WAC 173-401-532(73)

<b>Sulfur Plant/Treaters Process Area</b>	
<b>Unit</b>	<b>WAC Citation</b>
Steam vents	WAC 173-401-532(87)
Maintenance activities not involving installation of an emission unit and not increasing potential to emit and not otherwise subject to a federally enforceable applicable requirement.	WAC 173-401-532(74)
Vents from continuous emissions monitors and other analyzers	WAC 173-401-532(8)
Sewer manholes, junction boxes, sumps and lift stations associated with wastewater treatment systems. Note: Sewer manholes, junction boxes, sumps and lift stations regulated under 40 CFR Part 61 Subpart FF and 40 CFR Part 63 Subpart CC are not included in this exemption.	WAC 173-401-532(120)
Sample gathering, preparation, management	WAC 173-401-532(73)
Lube Oil Storage and Use	WAC 173-401-532(3) and (69)
ESP Electrical System Vents: vents from rooms, buildings and enclosures that contain permitted emission units or activities from which local ventilation, controls and separate exhaust are provided	WAC 173-401-532(9)
Sampling connections used exclusively to withdraw materials for laboratory analysis and testing	WAC 173-401-532(51)
Treater Caustic, and Caustic Neutralization Tanks: Tanks vessels and pumping equipment, with lids or other appropriate closure for storage or dispensing of aqueous solutions of inorganic salts, bases and acids excluding: (i) 99% or greater H <sub>2</sub> SO <sub>4</sub> or H <sub>3</sub> PO <sub>4</sub> (ii) 70% or greater HNO <sub>3</sub> (iii) 30% or greater HCl (iv) More than one liquid phase where the top phase is more than one percent VOCs	WAC 173-401-533(2)(s)

<b>Utilities Process Area</b>	
<b>Unit</b>	<b>WAC Citation</b>
Boiler Area Steam vents	WAC 173-401-532(87)
Boiler Area Transfer – Bag Dump: Batch loading and	WAC 173-401-532(60)

<b>Utilities Process Area</b>	
<b>Unit</b>	<b>WAC Citation</b>
unloading of solid phase catalysts	
Boiler Area Slurry Basin: Demineralization and oxygen scavenging (deaeration) of water	WAC 173-401-532(61)
Sewer manholes, junction boxes, sumps and lift stations associated with wastewater treatment systems. Note: Sewer manholes, junction boxes, sumps and lift stations regulated under 40 CFR Part 61 Subpart FF and 40 CFR Part 63 Subpart CC are not included in this exemption.	WAC 173-401-532(120)
Maintenance activities not involving installation of an emission unit and not increasing potential to emit and not otherwise subject to a federally enforceable applicable requirement.	WAC 173-401-532(74)
Firefighting Fire Foam Storage	WAC 173-401-532(52)
Miscellaneous Cooling Tower Chemical Storage Tanks: Tanks vessels and pumping equipment, with lids or other appropriate closure for storage or dispensing of aqueous solutions of inorganic salts, bases and acids excluding: (i) 99% or greater H <sub>2</sub> SO <sub>4</sub> or H <sub>3</sub> PO <sub>4</sub> (ii) 70% or greater HNO <sub>3</sub> (iii) 30% or greater HCl (iv) More than one liquid phase where the top phase is more than one percent VOCs	WAC 173-401-533(2)(s), and 532(42)
Miscellaneous Cooling Tower Chemical Storage Tanks: Polymer tanks and storage devices and associated handling equipment, used for solids dewatering and flocculation	WAC 173-401-532(117)
Miscellaneous Cooling Tower Chemical Storage Tanks: Mixing, packaging, storage and handling activities of any size, limited to soaps, animal fat, aqueous salt solutions	WAC 173-401-532(69)
Lube Oil Storage and Use	WAC 173-401-532(3) and (69)
Sampling connections used exclusively to withdraw materials for laboratory analysis and testing	WAC 173-401-532(51)
Sample gathering, preparation, management	WAC 173-401-532(73)

<b>Effluent Treatment</b>	
<b>Unit</b>	<b>WAC Citation</b>
Polymer tote: Polymer tanks and storage devices and associated handling equipment, used for solids dewatering and flocculation	WAC 173-401-532(117)
Stormwater System	WAC 173-401-533(3)(d)
Spill Basin	WAC 173-401-533(3)(d)
Steam vents	WAC 173-401-532(87)

<b>Storage Vessels</b>	
<b>Unit</b>	<b>WAC Citation</b>
1X726, 100-Barrel Sulfuric Acid Storage Tank, 2X196, 200-Barrel Caustic Storage Tank, 1X722 Sodium Silicate: Tanks vessels and pumping equipment, with lids or other appropriate closure for storage or dispensing of aqueous	WAC 173-401-533(2)(s)

<b>Storage Vessels</b>	
<b>Unit</b>	<b>WAC Citation</b>
solutions of inorganic salts, bases and acids excluding: (i) 99% or greater H <sub>2</sub> SO <sub>4</sub> or H <sub>3</sub> PO <sub>4</sub> (ii) 70% or greater HNO <sub>3</sub> (iii) 30% or greater HCl (iv) More than one liquid phase where the top phase is more than one percent VOCs	
Polymer Tank: Polymer tanks and storage devices and associated handling equipment, used for solids dewatering and flocculation	WAC 173-401-532(117)
Boiler Area 50X306 Storage Tank, Boiler Area 5X1244 Storage Tank, Boiler Area 20X1300 Storage Tank, Boiler Area 250X25 Storage Tank: Storage tanks, reservoirs and pumping and handling equipment of any size limited to soaps, lubricants, hydraulic fluid, vegetable oil, grease, animal fat, aqueous salt solutions or other materials and processes using appropriate lids and covers where there is no generations of objectionable odor or airborne particulate matter	WAC 173-401-532(4)
1X723 Alum Storage Tank	WAC 173-401-532(97)
Cleaning and Painting: Maintenance activities not involving installation of an emission unit and not increasing potential to emit and not otherwise subject to a federally enforceable applicable requirement.	WAC 173-401-532(74)

<b>OTHER Insignificant Activities and Emission Units</b>	
<b>Unit</b>	<b>WAC Citation</b>
Octane test engines: Combustion source, less than five hundred thousand Btu/hr., using any commercial fuel containing less than 0.4% by weight sulfur for coal or less than 1% by weight sulfur for other fuels	WAC 173-401-533(2)(f)
Lab water heaters: Space heaters and hot water heaters using natural gas, propane or kerosene and generating less than five million Btu/hr	WAC 173-401-533(2)(r)
Vehicle exhaust from auto maintenance and repair shops	WAC 173-401-532(7)
Painting: Plant upkeep including routine housekeeping, preparation for and painting of structures or equipment, retarring roofs, applying insulation to buildings in accordance with applicable environmental and health and safety requirements and paving or stripping parking lots	WAC 173-401-532(33)
Drum storage: Portable drums and totes	WAC 173-401-532(42)
Fire and Emergency Response Training: Firefighting and similar safety equipment and equipment used to train fire fighters excluding fire drill pits	WAC 173-401-532(52)
Fuel Truck: Mobile transport tanks on vehicles, except for those containing asphalt	WAC 173-401-532(2)
Turnaround Equipment (Diesel Cranes, Air Compressors, Diesel Generators, Diesel Aggregate Blaster-Painting): Plant upkeep including routine housekeeping, preparation for and painting of structures or equipment, retarring roofs, applying insulation to buildings in accordance with	WAC 173-401-532(33)

<b>OTHER Insignificant Activities and Emission Units</b>	
<b>Unit</b>	<b>WAC Citation</b>
applicable environmental and health and safety requirements and paving or stripping parking lots	
Trucks, Forklifts, Autos, etc.: Internal combustion engines for propelling or powering a vehicle	WAC 173-401-532(10)
Infirmary	WAC 173-401-532(53)
Refinery Laboratory	WAC 173-401-533(3c)
Maintenance activities not involving installation of an emission unit and not increasing potential to emit and not otherwise subject to a federally enforceable applicable requirement.	WAC 173-401-532(74)
Carpenter Shop	WAC 173-401-532(55)
Welding Activities	WAC 173-401-532(12)
Warehouse Drum Storage	WAC 173-401-532(42)
Warehouse Forklift Propane Tanks	WAC 173-401-532(10) and (2)
Lube Oil Storage and Use	WAC 173-401-532(3) and (69)
Sample gathering, preparation, management	WAC 173-401-532(73)
Steam vents	WAC 173-401-532(87)
Sewer manholes, junction boxes, sumps and lift stations associated with wastewater treatment systems. Note: Sewer manholes, junction boxes, sumps and lift stations regulated under 40 CFR Part 61 Subpart FF and 40 CFR Part 63 Subpart CC are not included in this exemption.	WAC 173-401-532(120)

## **6 Summary of changes in Renewal 1**

### **6.1 Changes throughout the AOP**

The document was completely reformatted into the current format standard. References to the Northwest Air Pollution Authority or NWAPA were changed to the Northwest Clean Air Agency or NWCAA.

Dates for all regulatory citations have been checked, and updated as necessary to show the most recent dates for federal regulations and the most recent dates of effectiveness for state and local only regulations. New regulatory applicable requirements were added.

### **6.2 Front page**

The front page of the AOP has been changed to a newer format, a new logo, and the name of the agency changed to the Northwest Clean Air Agency.

### **6.3 Information page**

The Air Operating Permit Number has been changed from "016" to "016R1," reflecting the first renewal.

Various dates have been changed to reflect the revision's application and permit timing.

The Responsible Corporate Official was changed from the previous refinery manager, Mr. Gary Goodman, to the current refinery manager, Marjorie Hatter.

### **6.4 Attest page**

The Attest page has been changed to reflect current regulations and personnel changes.

### **6.5 Table of Contents**

The TOC provides more detail of the contents within the major sections. A listing of tables has been added.

### **6.6 SECTION 1: Emission Unit Descriptions**

Process areas have been renamed and updated to reflect current operations, in some cases with new units added to the refinery and others removed. A table was added to include miscellaneous individual drain systems and wastes. The individual drain system notes were simplified throughout each table and regulatory requirements were added whenever a distinction was necessary. The storage tanks were reorganized into different groups depending upon their current usage and regulatory requirements. The Cat Gas Desulfurizer (S-Zorb Unit) was moved to the alkylation process area from the sulfur plant/treaters process area and a second sulfur plant was added.

### **6.7 SECTION 2: Standard Terms and Conditions**

Regulatory citations and dates were checked and updated wherever necessary. A permit term (2.1.10 Ambient Air and Continuous Emission Monitoring) was revised to reflect a new State Only regulation and appendix added since original permit issuance. The following permit terms were added:

2.1.11 Credible Evidence

2.2.15 Transfer or Permanent Shutdown

2.4.5 Reporting to Verify Emissions from Potential PSD Sources

The "Excess Emissions" permit term was reorganized to clarify regulatory requirements. Finally, a "Notice of Construction and Application for Approval/New Source Review" subsection was added and new regulatory requirements were added under this topic.

## **6.8 SECTION 3: Standard Terms and Conditions for NSPS and NESHAP**

The dates and citations have been updated throughout this section. The Startup, Shutdown, and Malfunction regulatory requirements for NESHAPs in Section 3.3 were extensively rewritten and updated. Several requirements from Part 63 Subpart A, General Provisions, were added. These include:

3.3.11 Notification of Performance Tests

3.3.13 Operation and Maintenance of Continuous Monitoring Systems (CMS)

3.3.14 Continuous Monitoring Systems (CMS) Out of Control Periods

3.3.15 Continuous Monitoring Systems (CMS) Quality Control Program

3.3.16 Continuous Monitoring Systems (CMS) Data Reduction

Two permit conditions (3.3.10 Compliance With Nonopacity Emission Standards and 3.3.11 Compliance With Opacity and Visible Emission Standards) were removed because the regulations from which they were derived were vacated by the United States Court of Appeals.

## **6.9 SECTION 4 Generally Applicable Requirements**

Regulatory citations have been updated. The introductory paragraph was changed to reflect the fact that the federally approved NWCAA 365, 366 and the "Guidelines for Industrial Monitoring Equipment and Data Handling" have been replaced by NWCAA 367 and Appendix A - "Ambient Monitoring, Emission Testing and Continuous Emission and Opacity Monitoring". The "Test Method" column was removed and test methods were incorporated in the text of each condition, where appropriate. The "gap filling" requirements in the MR&R column table description has been modified to reflect that the NWCAA authority is under WAC 173-401-615(1)(b) & (c), 10/17/02. There was a slight rearrangement of the permit conditions.

## **6.10 SECTION 5 Specifically Applicable Requirements**

Section 5 has been significantly revised. The introductory paragraph was changed similarly to Section 4. Regulatory citations were updated. Conditions with citations and links to the monitoring, recordkeeping, and reporting requirements for individual drain systems (40 CFR Part 61 Subpart FF and Part 63 Subpart CC) and equipment components were added to the many tables because they have general applicability to process areas or units to which they are attached. Wherever a delegated federal rule (NSPS or NESHAP) was directly cited, a citation to the NWCAA Regulation 104.2 (6/10/10) was added to clarify that the delegation had occurred.

A schedule of compliance with 40 CFR Part 63 Subpart CC requirements for the crude unit compressors 1K-1 and 1K-1A was removed since COP completed the compliance requirements. An interim schedule for compliance with 40 CFR Part 63 Subpart UUU opacity monitoring requirements was removed and a FCCU Wet Gas Scrubber Alternative Monitoring Plan was added in its place when the interim compliance requirements were fulfilled.

CAM requirements were inserted into Section 5 for control of PM/PM10 from the FCCU/CO Boiler emission unit and for control of VOCs from the gasoline/diesel truck loading vapor combustor.

The Catalytic Gasoline Desulfurization (CGD or S-Zorb Unit) was removed from the Sulfur/Treaters process area and added to the Alkylation process area. Sulfur Plant 2 was constructed in 2007. Its regulatory requirements have been added to Section 5.

Boiler #4 (22F-1E) was constructed in 2008 and its regulatory requirements have been added.

Two control equipment units for NO<sub>x</sub> were added; an ESNCR (enhanced selective noncatalytic reduction) system was permitted for the FCCU/CO Boiler system, and SCR (selective catalytic

reduction) was permitted and added to the vacuum flash heater. The regulatory requirements were included in Section 5.

In the Effluent Plant process area, the petrozyme sludge treatment tank requirements were removed since the tanks were taken out of operation. An interim compliance schedule for 40 CFR 61.348 and 40 CFR 61.353 was removed since the compliance requirements had been completed.

Storage vessel groups and tables were updated and rearranged to reflect current tank use and regulatory requirements.

A new flare gas recovery system was permitted and installed in 2010. Regulatory requirements were added to the Flare process area. Compliance plans for the emergency ground flare and the ZTOF flare were added to meet 40 CFR Subpart J requirements. These requirements were settled in the facility's Consent Decree Civil Action No. H-05-0258.

A table, 5.12 – Miscellaneous Individual Drain Systems and Wastes, was added to include the regulatory requirements for the engine lab, spills and miscellaneous waste streams, the laboratory, and solid wasted drains.

The LDAR Equipment Leak table was significantly revised to make it more complete and to include the new regulatory requirements from NSPS Subpart GGGa.

A table, 5.15 – Common Requirements: 40 CFR 60 Subpart QQQ – Standards of Performance for VOC Emissions from Petroleum Refinery Wastewater Systems was added to streamline regulatory requirements from individual units.

Process Areas tables containing regulatory requirements from OAC 733 (including all amendments) were significantly revised because OAC 733 was amended several times since the original 2003 AOP and the newer version always superseded the older. Therefore, OAC 733a was removed from the AOP. Fourteen additional permits (both OACs and PSD permits) were added; either because they are new since the 2003 AOP or because the original did not include the older permits.

Table 6-1 is a list of the OACs and PSD permits included in the revised AOP. Several updates have been undertaken to bring the permits to current format and content expectations.

**Table 6-1 Orders of Approval to Construct/Prevention of Significant Deterioration**

<b>Permit Issuance Date</b>	<b>OAC</b>	<b>Description</b>
1/24/72	49	Crude Heater 1F-1A
1/26/90	265	Gasoline/Diesel Truck Loading Rack
8/21/91	314	External Floating Roof Tanks
8/2/95	559	API Separator (WWTP)
5/31/00	727	Merox Extraction Unit
7/26/01	780	DHT Heater
2/4/02	795	Alkylation Unit
10/02/02	564(a)	Butane Isomerization Unit
10/27/04	864	Cat Reformer Dry Chloride Scrubber
3/3/05	868	DHT Process Unit
7/29/05	733c	FCCU Process Unit
11/14/05	PSD-05-01	Sulfur Recovery Unit #2
11/06/06	908a	Sulfur Recovery Unit #2
8/13/08	578a	#1 Boiler
9/15/08	877a	#4 Boiler
10/16/08	1029	Flare Gas Recovery System
10/21/08	PSD-00-02 Amendment 5	FCC Process Unit
4/27/09	1012b	Vacuum Flasher Heater 4F-2
12/18/09	1047	ESNCR on CO Boiler

**6.11 SECTION 6 Inapplicable Requirements**

Two regulatory requirements considered to be inapplicable in the original AOP were removed from the inapplicability table. These requirements are 40 CFR Part 63 Subpart CC for the Butane Isomerization Unit equipment components and 40 CFR 60 Subpart Ka – Standards of Performance for Storage Vessels for Petroleum Liquids for Which Construction , Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984.

## **7 Public Docket**

Copies of ConocoPhillips Ferndale Refinery's Air Operating Permit permit application and technical support documents are available at the following location:

Northwest Clean Air Agency  
1600 South Second Street  
Mount Vernon, WA 98273-5202

<http://www.nwcleanair.org>

## 8 Definitions and Abbreviations/acronyms

Definitions are assumed to be those found in the underlying regulation. A short list of definitions has been included to cover those not previously defined.

An "applicable requirement" is a provision, standard, condition or requirement in any of the listed regulations or statutes as it applies to an emission unit or facility at a stationary source.

An "emission unit" is any part or activity of a stationary source that emits or has the potential to emit any regulated air pollutant.

A "permit" means for the purposes of the air operating permit program an air operating permit issued pursuant to Title 5 of the 1990 Federal Clean Air Act.

"Technology-Based Emission Standard" means a standard, the stringency of which is based on determinations of what is technologically feasible considering relevant factors.

"State" means for the purposes of the air operating permit program the NWCAA or the Washington State Department of Ecology.

The following is a list of abbreviations and acronyms possibly used in the Air Operating Permit and/or Statement of Basis:

AMP	Alternative Monitoring Plan
AOP	Air Operating Permit
ASTM	American Society for Testing and Materials
BACT	Best available control technology
Bbl	Barrel
BQ6	Benzene waste Quantity under 6 Mg/yr (wastewater)
CAA	Clean Air Act
CAM	Compliance Assurance Monitoring
CD	Consent Decree
CEM	Continuous emission monitor
COB	CO Boiler
COM	Continuous opacity monitor
COP	ConocoPhillips
CFR	Code of Federal Regulations
EFR	External Floating Roof (tank)
ESNCR	Enhanced Selective Non-catalytic Reduction
FCAA	Federal Clean Air Act
FCCU	Fluid catalytic cracking unit
HAP	Hazardous Air Pollutants
HC	Hydrocarbon
HON	Hazardous Organic NESHAP
H <sub>2</sub> S	Hydrogen sulfide
IFR	Internal Floating Roof (tank)
ISO	International Standards Organization
kPa	Kilopascals (pressure)
LDAR	Leak detection and repair
MACT	Maximum Achievable Control Technology
MDEA	Methyl-Diethyl-Amine
Mg	Megagrams (10 <sup>6</sup> grams mass)
MMBtu	Million British thermal units
MRRR	Monitoring, recordkeeping and reporting requirements
MTVP	Maximum true vapor pressure
NESHAP	National Emission Standards for Hazardous Air Pollutants
NOC	Notice of Construction

NO <sub>x</sub>	Oxides of nitrogen
NSPS	New Source Performance Standard
NSR	New Source Review
NWCAA	Northwest Clean Air Agency
O <sub>2</sub>	Oxygen
OAC	Order of Approval to Construct
PM	Particulate matter
PM <sub>10</sub>	Particulate matter less than 10 microns in diameter
ppmvd	Parts per million by volume, dry
psia	Pounds per square inch atmospheric
PTE	Potential to Emit (annual, unless otherwise noted)
PRD	Pressure Relief Device
QA/QC	Quality assurance/quality control
RCW	Revised Code of Washington
RMACT	Refinery MACT per 40 CFR 63 Subpart CC
SCR	Selective Catalytic Reduction
SOP	Standard Operating Procedure
SRU	Sulfur Recovery Unit
SIP	State Implementation Plan
SO <sub>2</sub>	Sulfur dioxide
TAB	Total Annual Benzene
TGU	Tail Gas Unit
LDAR	Leak Detection and Repair
VOC	Volatile Organic Compounds
VOL	Volatile Organic Liquid
WAC	Washington Administration Code
WDOE	Washington State Department of Ecology
FGS	Flue Gas Scrubber