

**MONTANA DEPARTMENT OF ENVIRONMENTAL QUALITY  
OPERATING PERMIT TECHNICAL REVIEW DOCUMENT**

**Air, Energy & Mining Division  
1520 E. Sixth Avenue  
P.O. Box 200901  
Helena, Montana 59620-0901**

Calumet Montana Refining, LLC  
NE¼, Section 1, Township 20 North, Range 3 East, Cascade County  
1900 10<sup>th</sup> Street Northeast  
Great Falls, MT 59404

The following table summarizes the air quality programs testing, monitoring, and reporting requirements applicable to this facility.

<b>Facility Compliance Requirements</b>	<b>Yes</b>	<b>No</b>	<b>Comments</b>
Source Tests Required	X		
Ambient Monitoring Required	X		
Continuous Opacity Monitoring System (COMS) Required	X		FCCU
Continuous Emission Monitoring System (CEMS) Required	X		Flare Gas and RFG for NSPS J, Ja, and CD, NO <sub>x</sub> for NSPS Ja units, SO <sub>2</sub> on Boilers and FCCU, CO on FCCU
Continuous Parameter Monitoring System (CPMS)	X		Truck and Railcar Loading Rack
Schedule of Compliance Required		X	
Annual Compliance Certification and Semiannual Reporting Required	X		
Monthly Reporting Required		X	
Quarterly Reporting Required	X		Consent Decree Required Reporting, Umbrella Limit Reporting
<b>Applicable Air Quality Programs</b>			
ARM Subchapter 7 Montana Air Quality Permitting	X		MAQP # 2161
New Source Performance Standards (NSPS)	X		40 CFR 60, Subparts J, Ja, Kb, UU, VV, GGG, VVa, GGGa, and QQQ
National Emission Standards for Hazardous Air Pollutants (NESHAPS)	X		40 CFR 61, Subpart M, FF, J, and V
Maximum Achievable Control Technology (MACT)	X		40 CFR 63, Subparts R, CC, UUU, EEEE, ZZZZ, DDDDD
Major New Source Review (NSR/Prevention of Significant Deterioration (PSD))	X		Calumet is a Major Stationary Source subject to Prevention of Significant Deterioration requirements when triggered under New Source Review
Risk Management Plan Required (RMP)	X		
Acid Rain Title IV		X	
Compliance Assurance Monitoring (CAM)		X	
State Implementation Plan (SIP)	X		General Montana SIP

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## SECTION I GENERAL INFORMATION

### A. Purpose

This document establishes the basis for the decisions made regarding the applicable requirements, monitoring plan, and compliance status of emission units affected by the operating permit proposed for this facility. The document is intended for reference during review of the proposed permit by the U.S. Environmental Protection Agency (EPA) and the public. It is also intended to provide background information not included in the operating permit and to document issues that may become important during modifications or renewals of the permit.

### B. Facility Location

Calumet operates the Great Falls refinery, which is located along the Missouri River in Great Falls, Montana. This facility is located in the NE<sup>1</sup>/<sub>4</sub> of Section 1, Township 20 North, Range 3 East, in Cascade County, Montana. The air quality of Cascade County is considered attainment/unclassified for all pollutants. A narrow area along 10th Avenue South (bounded by 9th Avenue South on the north, 11th Avenue South on the south, 54th Street South on the east and 2nd Street South on the west) in Great Falls was previously classified as a non-attainment area for Carbon Monoxide (CO) but has since been re-designated to attainment area status under a limited maintenance plan. This re-designation became effective on July 8, 2002. The area lies in a region that is transitional between mountains to the west and plains to the east. Potential sensitive areas include schools, residential areas, parks, dams, and recreational areas.

### C. Facility Background Information

On December 2, 1985, the Montana Department of Health and Environmental Sciences and Montana Refining Company (MRC) signed a stipulation requiring MRC to obtain an air quality permit, and stipulated that a permit emission limitation of 4,700 tons per year (TPY) CO would constitute compliance with ambient CO standards. MRC submitted this permit with the intentions of permitting its existing refining operations, including all equipment not already permitted.

On October 20, 1985, MRC was granted a general permit for their petroleum refinery and major refinery equipment located in Great Falls, Cascade County, Montana. The application was assigned **Montana Air Quality Permit (MAQP) #2161**.

The first alteration to the original permit was given **MAQP #2161-A** and was issued on May 31, 1989. This alteration involved the addition of a deisobutanizer reboiler.

The second alteration was given **MAQP #2161-A1** and was issued on March 12, 1990. This project involved the installation of one (1) 30,000-barrel gasoline storage tank and one (1) 40,000-barrel crude oil storage tank at the present facility. Both tanks were to be installed with external floating roof control.

The third alteration was given **MAQP #2161-A3** and was issued on December 18, 1990. This alteration consisted of the installation of a Hydrofluoric Acid Alkylation Unit, internal floating roofs at existing storage tanks, which had fixed roofs, and a safety flare.

The fourth alteration was given **MAQP #2161-04** and was issued on June 16, 1992. This alteration consisted of the installation of a sodium hydrosulfide (NaHS) unit at the existing Great Falls Refinery.

The NaHS unit receives refinery fuel gas (540,000 standard cubic feet per day (scf/day) maximum rated capacity) containing hydrogen sulfide (H<sub>2</sub>S) and reacts this fuel with a sodium hydroxide caustic solution to remove virtually 100% of the H<sub>2</sub>S by converting it to NaHS, a saleable product.

The resultant sweet fuel gas is burned, as before, in other process heaters; however, since the fuel gas contains virtually no H<sub>2</sub>S, SO<sub>2</sub> emissions from the process heaters, assuming no other changes, decrease by nearly 60 percent. There was no decrease in permitted SO<sub>2</sub> emissions from this permit because the refinery wanted to retain the existing permitted SO<sub>2</sub> emission limitations so it could charge less expensive, higher sulfur crude oil.

In the basic process, off-gases from product desulfurizing processes (fuel gases) are contacted with a caustic solution in a gas contractor. The resultant reaction solution is continually circulated until the caustic solution is essentially used up; NaHS product is then sent to storage. Make-up caustic is added to the process as required. The process requires a gas contractor, process heat exchanger, circulation pump, storage tanks for fresh caustic and NaHS product, 12 pipeline valves, 4 open ended valves, 21 flanges, and other process control equipment.

The only process emissions will be fugitive Volatile Organic Compounds (VOCs) from equipment (valves and flanges) in fuel gas stream service. To estimate unit VOC emissions, emission factors developed by EPA for equipment in gas vapor service with measured emissions from 0 to 1,000 parts per million (ppm) are used. With an aggressive monitoring and maintenance program, fugitive VOC emissions from valves and flanges will be within this 0 to 1,000-ppm range. Total annual fugitive VOC emissions from the sodium hydrosulfide unit are estimated to be 20 pounds per year.

The tank that is to be used to store NaHS product was in jet fuel service. When taken out of jet fuel service, this tank (#35) will no longer be a source of VOC emissions; the reduction in VOC emissions will be 2,270 pounds per year. Considering the 2,270-pound-per-year decrease due to tank #35 service change, the refinery will realize a net decrease in annual VOC emissions of 2,250 pounds or 1.1 TPY.

The fifth alteration was given **MAQP #2161-05** and was issued on October 15, 1992. This permit alteration was for the construction and operation of two (2) 20,000-barrel capacity aboveground storage tanks at its Great Falls Refinery. The new tanks contain heavy naphtha (#127) and raw diesel (#128).

Each tank is constructed of metal sections welded together and rests on a concrete ring wall foundation. External floating roofs with dual seals are installed on each tank for VOC control.

On April 6, 1993, MRC was granted **MAQP # 2161-06** to construct and operate a hydrodesulfurization (HDS) unit and hydrogen plant. This sixth alteration was required to go through PSD review for NO<sub>x</sub> and was deemed complete on February 22, 1993. The HDS project is designed to process 5,000 barrels per day of diesel/gas oil and to reduce the sulfur content to 0.05 weight percent. The reduction of sulfur in diesel fuel and gasoline are mandated by the 1990 Clean Air Act Amendments and must be accomplished by October 1993 and 1995, respectively. The current desulfurizer unit operated by MRC was limited in size and the throughput capacity to approximately 1,400 barrels per day.

This new HDS project consisted of an HDS process unit and heater, hydrogen plant with reformer heater, and the removal of storage Tanks #40 through #43. Tanks #40 and #41, which currently process gas oil, would be discontinued. Tanks #42 and #43, which process raw diesel, would be discontinued. Tanks #44 and #111, which currently service naphtha, are now be used for gas oil. Tank #45, which services JP-4, is used for gas oil.

On July 28, 1993, **MAQP #2161-07**, a modification to MRC's air quality permit, was issued to change the emission control requirements of Section II.A.4.d.i., titled "Pressure Vessels."

In a system where the valves relieve to atmosphere, rupture discs can prevent emissions in the event of relief valve leakage. In hydrogen fluoride (HF) systems, they can provide some protection from acid corrosion on the relief valve and acid salt formation. Except where HF acid is present, rupture discs do not provide any additional protection; nor do they prevent any release of air contaminants in a closed relief system.

In heavy liquid service, rupture discs can be safety hazards by partial failure or leaking and changing, over time, the differential pressure required to provide vessel protection. Therefore, only pressure vessels in HF Acid service shall be equipped with rupture discs upstream of the relief valves and all except storage tanks shall be vented to the flare system.

Also, the allowable particulate emission limitation for MRC's FCC unit was corrected to reflect the maximum allowable emissions based on the process weight rule (Administrative Rules of Montana (ARM) 17.8.310). The maximum allowable emissions were calculated to be 234.53 TPY using a catalyst circulation rate of 125 tons per hour (TPH).

MRC requested **MAQP Modification #2161-08** to remove the alkylation unit and Tanks #127 and #128 from new source performance standards (NSPS) status because they were erroneously classified as affected facilities under NSPS when originally permitted. This request for modification was submitted on August 11, 1993, and issued on January 6, 1994.

When MRC applied for the preconstruction permit to build the HF Alkylation Unit in 1990, it was presumed, since this unit was new to MRC, it automatically fell under NSPS as new construction. Subsequently, it has been determined that if a source is moved as a unit from a location where operation occurred (Garden City, Kansas) to another location, it must meet the definition of reconstruction or modification in order to trigger NSPS applicability.

The alkylation plant was originally constructed in Garden City, Kansas during 1959 - 1960 and moved, in its entirety, to Great Falls and installed. Since the unit was originally constructed before the NSPS-affected date of January 5, 1981, it does not meet the criteria for construction date of a new source under 40 CFR, Subpart GGG or Subpart QQQ.

The project does not meet the criteria under reconstruction because no capital equipment was replaced when the unit was relocated. The replacement work performed as the unit was moved amounted to pump seals, valve packing, bearings, small amounts of corroded piping, and some heat exchanger tubes and bundles, all of which are done routinely as maintenance. The VOC emitters, such as valve packing and pump seals, were upgraded to meet Best Available Control Technology (BACT).

Along the same line, tanks #127 and #128 were originally constructed at Cody, Wyoming in 1960 and relocated to Great Falls in 1993. The only change was the modification of the roof seals to double seals to meet BACT. This cost a total of \$15,000 for both tanks as compared to more than \$500,000 if two new tanks were to be built.

Also, on October 28, 1993, MRC submitted a permit application to alter the existing permit. This modification and alteration of the existing permit was assigned MAQP #2161-08. MRC proposed to construct and operate a 3,500 barrel-per-day asphalt polymerization unit. The unit would enable MRC to produce a polymerized asphalt product that meets future federal specifications for road asphalt, as well as supply polymerized asphalt to customers that currently wish to use the product.

The proposed unit consists of two circuits: the asphalt circuit and the hot oil circuit. In the asphalt circuit, polymerization occurs in a 1,000-barrel steel, vented mix tank. Product blending and storage occurs in three steel, vented 1,000-barrel tanks identified as A, B, and C on the attached flow diagram. Existing Tanks #55 and #56 (3,000 barrels each) will remain in asphalt service and will be used for storage. In addition to the above equipment, the asphalt circuit also consists of four (4) pumps and approximately 47 standard valves. All the above equipment is in asphalt service and, except for Tanks #55 and #56, are new.

To maintain the asphalt at the optimum temperature in the storage and blending tanks, a hot circuit is utilized. Hot oil (heavy fuel oil) is heated in an existing permitted process heater (Tank 56 heater) and circulated through coils in the process tankage. No change in the method of operation of the heater was anticipated. A steel, vented hot-oil storage/supply tank is used to maintain the required amount of hot oil in the unit. In addition to the process heater and storage/supply tank, the hot-oil circuit consists of one (1) pump and approximately 56 standard valves. The above equipment is in hot-oil service and, except for the heater, is new.

An annual emissions increase of 7.3 TPY of VOC is expected due to operation of the unit. The unit is only anticipated to be operated 6 months of the year. These emissions will occur from the vented hot-oil tank and the valves and pump in hot-oil service.

**MAQP #2161-09** was issued on September 6, 1994, and included a change in the method of heating three previously permitted polymer modified asphalt tanks. As previously permitted, these tanks were to have been heated utilizing circulating hot oil. The tanks are now heated individually using natural gas fired fire-tube heaters. This eliminated the hot-oil circuit, including the hot-oil storage tank, entirely.

Since the initial permit application for the modified asphalt unit, several small design changes have occurred involving the addition of a new 800-gallon wetting tank, which are in asphalt service. Also added was an output line from existing Tank #69 (Tall Oil). This output line added approximately 12 new valves and one new pump, all in Tall Oil service, to the unit. All other valves and pumps were designated to be in asphalt service. All VOC emissions from equipment and tanks in asphalt service were assumed to be negligible, since asphalt has negligible vapor pressure at the working temperatures seen in the unit.

**MAQP #2161-10**, for the installation of an additional boiler (Boiler #3) to provide steam for the facility, was never issued as a final permit. On May 28, 1997, the Department of Environmental Quality (Department) received a letter requesting the withdrawal of the permit and the withdrawal was granted to MRC.

**MAQP #2161-11** was issued on January 23, 1998, for the installation of a vapor collection system and enclosed flare for the reduction of Hazardous Air Pollutants (HAPs) resulting from the loading of gasoline. This was done in order to comply with the gasoline loading rack provisions of 40 CFR 63, Subpart CC – National Emission Standards for Petroleum Refineries. A vapor combustion unit (VCU) was added to the truck loading rack. The gasoline vapors is collected from the trucks during loading then routed to an enclosed flare where combustion occurs. The result of this project was an overall reduction in the amount of VOCs and HAPs emitted, and a slight increase in CO and NO<sub>x</sub> emissions.

Because the Bulk gasoline and distillate truck loading tack VCU is defined as an incinerator under MCA 75-2-215, a determination that the emissions from the VCU will constitute a negligible risk to public health was required prior to the issuance of a permit to the facility. The facility and the Department identified the following hazardous air pollutants from the flare, which were used in the health risk assessment. These constituents are typical components of MRC's gasoline.

1. Benzene
2. Toluene
3. Ethyl Benzene
4. Xylenes
5. Hexane
6. 2,2,4 Trimethylpentane
7. Cumene
8. Napthalene
9. 1,3 Butadiene

MRC demonstrated compliance with the negligible risk requirement.

MRC requested, via a letter dated August 13, 1997, permitted changes to administratively and technically correct MAQP #2161-09. These changes were necessary as a result of the withdrawal of MAQP #2161-10. The changes included correctly stating opacity limits relating to asphalt storage tanks, removing references to procedural rules, changing monitoring requirements for the Diesel/Gas Hydrotreater (HTU) sour water stripper (SWS) and changing performance specifications for the continuous H<sub>2</sub>S monitoring system. Because MRC had applied for a permit alteration on October 21, 1997, for the loading rack VCU the draft modification was addressed in the permit alteration request.

**MAQP #2161-12** was not issued. MRC applied for a modification on February 18, 1998, and this action was given MAQP #2161-12. On February 27, 1998, the Department notified MRC that the permitting actions requested would require an alteration and that a complete preconstruction permit application would be required.

**MAQP #2161-13** placed enforceable emissions limits on the facility, both plant-wide and on the #1 and #2 boilers. The emission limits have been shown, through the use of EPA approved models, to protect the NAAQS for sulfur dioxide.

The continuous gas flow meters being installed in the vacuum heater and the crude heater were placed in the permit as a requirement. Also, the #1 and #2 boilers limits were updated to allow MRC more flexibility in their operations. The limits were originally placed on the boilers to keep MRC below the PSD permitting threshold. The new limits maintain the status below the PSD permitting threshold.

The monitoring location was identified in the permit's Attachment 1, Ambient Air Monitoring Plan. The current location was determined to be inappropriate after reviewing the modeling analysis, and the new location is approximately 1.2 km from its present location. The monitoring location was chosen based on the modeling analysis that was submitted and is required to provide confirmation of compliance with the State SO<sub>2</sub> standards. The Department will work with MRC for the final exact siting of the monitor. The method numbers for examination of water and wastewater were updated in Section II.C and Attachment 2. MAQP #2161-13 replaced MAQP #2161-11.

On August 4, 2001, the Department issued **MAQP #2161-14** for the installation and operation of five 1600-kW diesel-powered, temporary generators. These generators were necessary because of the current high cost of electricity. The generators would only operate for the length of time necessary for MRC to acquire a permanent, more economical, supply of power. Further, the generators are limited to a maximum operating period of 2 years.

Because these generators would only be used when commercial power is cost prohibitive, the amount of emissions expected during actual operation is minor. In addition, because the permit limits the operation of these generators to a time period of less than 2 years, the installation and operation qualifies as a "temporary source" under the PSD permitting program. Therefore, the proposed project does not require compliance with ARM 17.8.804, 17.8.820, 17.8.822, and 17.8.824. Even though the portable generators are considered temporary, the Department requires compliance with BACT and public notice requirements; therefore, compliance with ARM 17.8.819 and 17.8.826 will be ensured. Finally, the facility is responsible for complying with all applicable ambient air quality standards.

On August 17, 2002, the Department issued **MAQP #2161-15** to eliminate the summer boiler SO<sub>2</sub> emission limits (both the plant-wide and 24-hour average) and redefine the winter limits as year-round limits. The seasonal limits were originally placed in the permit to allow more flexibility when operating the boilers. Both the winter and summer scenarios were supported by ambient air quality modeling performed prior to MAQP #2161-13 being issued. The winter limit being redefined as a year-round limit does not represent an increase in SO<sub>2</sub> emissions from the boilers or any other emitting point. In addition, the Department removed requirements to determine and report NO<sub>x</sub> emissions both from the crude heater (due to the old SWS) and refinery wide, as these sources are not subject to NO<sub>x</sub> emissions limitations. The requirements appeared to have been inadvertently applied through an administrative error. MRC already provides refinery-wide NO<sub>x</sub> emissions as part of its annual emission inventory submission to the Department.

On March 19, 2003, the Department issued **MAQP #2161-16** to include certain limits and standards associated with the Consent Decree lodged on December 20, 2001. In addition, the permit was updated with new rule references under ARM 17.8, Subchapter 7.

The Department received a request to modify air quality MAQP #2161-16 on July 10, 2003, to change the emission testing schedule for the gasoline truck loading vapor combustion unit to be consistent with the current operating permit. MRC requested to remove all references to a 7,000-barrel per day (bbl/day) limit of crude charge referenced in MRC's Title V Operating Permit. By removing the 7,000 bbl/day reference, MRC is now subject to the conditions in ARM 17.8.324. In a letter received by the Department on September 30, 2003, MRC also requested to add three new asphalt tanks with associated natural gas heaters. Since the emissions from the three tanks were less than 15 TPY, the Department added the tanks under de minimis, ARM 17.8.745. The current permit action updated the permit to reflect the changes. **MAQP #2161-17** replaced MAQP #2161-16.

The above changes were also incorporated into **Operating Permit #OP2161-01**. In addition, in a letter dated May 3, 2004, MRC named Dana Leach as an alternate responsible official. Lastly, the permitting action also changed the dates when MRC shall submit to the Department the compliance monitoring reports required by Section V.D and the compliance certification report required by Section V.B.

On May 14, 2004, the Department received a letter from MRC requesting changes to MAQP #2161-17. The proposed change includes adding the ability to burn sweet gas in heaters at the HF Alkylation Unit, and at Tanks #102, #135, #137, #138, and #139. The sweet gas will have a H<sub>2</sub>S limit equivalent to the 40 CFR Part 60, Standards of Performance for NSPS, Subpart J limit of 0.10 grains per dry standard cubic foot (gr/dscf) H<sub>2</sub>S. The continuous refinery fuel gas monitoring system for H<sub>2</sub>S installed on the fuel gas system that supplies the heaters would be used to determine compliance with the limit. Since the emissions from switching the fuel to sweet gas are less than 15 TPY, the Department added the fuel switch under de minimis, ARM 17.8.745. The current permit action updates the permit to reflect the changes. **MAQP #2161-18** replaced MAQP #2161-17.

On October 20, 2005, the Department received a de minimis notification and Title V permit modification request from MRC for a new floating roof wastewater surge tank, which is subject to 40 CFR 60, Subparts Kb and QQQ.

On May 17, 2007, the Department received an application from MRC for the installation of a railcar product loading rack controlled by a John Zink VCU for gasoline and naphtha. The gasoline railcar loading rack is subject to 40 CFR 63, Subpart CC. Because MRC has found that naphtha may have a vapor pressure above the regulatory threshold of 27.6 kilopascals, MRC has decided to include it as regulated product. In addition to permitting this new process, the permit was updated to improve the organization; new applicable regulations were added, including 40 CFR 63, Subpart UUU, Subpart EEEE, and Subpart DDDDD; obsolete equipment and references were removed, including the five diesel generators which were permitted in 2001 and never installed, and the old SWS unit and its monitoring requirements; Consent Decree #CIV-01-1422LH, entered March 5, 2002 (Consent Decree) requirements were integrated, including the new requirements to comply with 40 CFR 60, Subpart J limits for refinery fuel gas and SWSOH; and refinery fuel gas (RFG) and SWSOH sampling was eliminated, and revised to reflect the operation of a continuous H<sub>2</sub>S fuel gas meter and requirement to comply with 40 CFR 60, Subpart J. **MAQP #2161-19** replaced MAQP #2161-18.

On October 15, 2007, the Department received letter from MRC requesting a correction to MAQP #2161-19, to remove the restrictions on the type of fuel used in specific asphalt tank heaters, which was added erroneously during the previous permitting action. In addition, the MAQP was updated to reflect the fact that requirements under 40 CFR 63, Subpart DDDDD are now "state-only" since the federal rule was vacated in Federal Court on July 30, 2007. **MAQP #2161-20** replaced MAQP #2161-19.

On June 9, 2008, the Department received a letter from MRC requesting an amendment to MAQP #2161-20, to modify the restrictions on Storage Tank #8. This request was a follow-up to a de minimis request received by the Department on April 21, 2008, where MRC proposed to change the operation of Storage Tank #8 from NaHS to naphtha. The Department reviewed this de minimis request and determined that MAQP #2161-20 must first be amended as described in the ARM 17.8.745(2) and ARM 17.8.764 before this change would be allowed. Although the potential emissions increase for this project is less than the de minimis threshold, the proposal would have violated a condition of MRC's current 2161-33 11 Final: 2/26/2020 permit. Specifically, the MAQP states, "Storage tanks #8, #9, #50, #55, #56, #69 #102, #110, #112, #130, #132, #133, and #135 shall be used for asphalt, modified asphalt, or tall oil service (ARM 17.8.749)." This permit has been

amended to allow the proposed change in operation of Storage Tank #8.

On July 2, 2008, the Department received another letter from MRC requesting an administrative amendment to MAQP #2161-20 to include certain conditions specified in the Administrative Order on Consent (AOC) that MRC entered into with the Department on May 13, 2008. The AOC requires MRC to install and operate a SO<sub>2</sub> and Oxygen (O<sub>2</sub>) continuous emission monitor system (CEMS) on the stack for the #1 and #2 Boilers. This SO<sub>2</sub>/O<sub>2</sub> CEMS is to be used as the primary analytical instrument to determine compliance with state and federal SO<sub>2</sub> requirements. The AOC requires MRC to request that these conditions be included in the MAQP as enforceable permit conditions.

In addition, MRC requested that the permit be amended to allow certain de minimis changes related to the Diesel/Gas Oil HDS heater and three PMA tank heaters. Specifically, MRC requested that refinery fuel gas, in addition to natural gas, be allowed to be burned in these heaters. The current permit requires that the Diesel/Gas Oil HDS heater and the three PMA tank heaters be fired only with natural gas. This requirement is based on BACT. For the Diesel/Gas Oil HDS heater, the BACT analysis requires that low sulfur fuel be used. Since the refinery fuel gas is also a low sulfur fuel meeting 40 CFR 60, Subpart J requirements of 160 ppm H<sub>2</sub>S, the Department determined that the proposed change does not violate any applicable rule and therefore, can be allowed through an administrative amendment as specified in ARM 17.8.745(2) and ARM 17.8.764. For the three PMA tank heaters, however, the BACT analysis specifically requires that these heaters be fired with natural gas for control of NO<sub>x</sub> emissions. Therefore, the Department determined that the proposed three PMA tank heaters de minimis changes are prohibited under ARM 17.8.745(1)(a)(i) since an applicable rule, specifically ARM 17.8.752 requiring that BACT be utilized, would be violated. Because BACT determinations cannot be changed under the amendment process, the Department requested that MRC submit an application for a permit modification that would include a revised BACT analysis in order to make the proposed change for the three PMA tank heaters.

In addition, the Department updated Attachment 1 to reflect the most current permit language and requirements for ambient monitoring. **MAQP #2161-21** replaced MAQP #2161-20.

On December 19, 2008, the Department received a request from MRC to amend MAQP #2161-21. MRC requested to change the wording for material stored in specified storage tanks to language representative of the requirements of 40 CFR 60, Subpart Kb in order to provide operational flexibility. Instead of referring to specific products (e.g., naphtha, gasoline, diesel, tall oil, etc.), the products would instead be referred to as light oils, medium oils, and heavy oils.

Under MRC's proposed language, light oils would be defined as a volatile organic liquid with a maximum true vapor pressure greater than or equal to 27.6 kilopascal (kPa), but less than 76.6 kPa and would include, but not be limited to, gasoline and naphtha. Medium oils would be defined as volatile organic liquids with a vapor pressure less than 27.6 kPa and greater than or equal to 5.2 kPa and would include, but not be limited to, ethanol. Heavy oils would be defined as volatile organic liquid with a maximum true vapor pressure less than 5.2 kPa and would include, but not be limited to diesel, kerosene, jet fuel, slurry oil, and asphalt. In addition to making the requested change, the Department has clarified the permit language for the bulk loading rack VCU regarding the products that may be loaded in the event the VCU is inoperable and deleted all references to 40 CFR 63, Subpart DDDDD: NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters, as it was removed from the ARM in October 2008. The Department has also updated Attachment 1, Ambient Monitoring to reflect the most current permit language and requirements for ambient monitoring. **MAQP #2161-22** replaced MAQP #2161-21.

On July 9, 2009, the Department received a permit application from MRC to modify MAQP #2161-22. The application was deemed complete on July 24, 2009. MRC submitted a permit modification to allow the use of treated refinery fuel gas or natural gas in the tank heaters. Previously, the PMA tanks heaters were permitted to use natural gas only pursuant to a BACT analysis that was completed for MAQP #2161-09. This permit modification applied to three previously permitted asphalt tanks (Tanks #130, 132 and 133) and the associated PMA tank heaters. **MAQP #2161-23** replaced MAQP #2161-22.

On January 15, 2008, the Department received a request from MRC to install a second hydrogen plant that utilizes a process heater with a heat input of 80 million British thermal units per hour (MMBtu/hr). The Department approved this de minimis request on February 8, 2008. Pursuant to the Consent Decree (CD) and the approval of the de minimis request, MRC was required to conduct an initial performance test on the process heater with the results reported based upon the average of three, one-hour testing periods. The CD also required MRC to submit an application to the Department and to propose a NOx permit limit for the heater. MRC submitted a permit application on December 29, 2009 and the Department deemed this application incomplete on January 15, 2010. On July 12, 2010, MRC submitted additional information as requested by the Department. On September 2, 2010, during the comment period, MRC submitted information to support the guaranteed ultra-low NOx burner emission limit of 0.033 lb/MMBtu based on the Higher Heating Value (HHV) of the fuel. This limit was based on the process heater of the hydrogen plant operating at full capacity (80 MMBtu/hr) with fuel gas consisting of 40.5 % natural gas and 59.4% Pressure Swing Adsorption (PSA) vent gas. This permit modification applied to NOx limits on the Hydrogen Plant #2 process heater. **MAQP #2161-24** replaced MAQP #2161- 23.

On July 6, 2011, MRC submitted a permit application and subsequent modeling demonstration to add a new boiler (Boiler #3) capable of firing refinery fuel gas, SWSOH, or natural gas at the petroleum refinery. The primary purpose of Boiler #3 is to supplement the two existing boilers (#1 and #2) that provide process steam to the refinery. The design burner heat input capacity for Boiler #3 varies, depending upon fuel characteristics, from 59.7 to 60.5 MMBtu/hr. The Department deemed the application incomplete on August 4, 2011, and MRC provided additional information in response to the Department's letter on September 26, 2011.

On October 25, 2011, the Department requested additional information with respect to MRC's plantwide applicability limit (PAL) and the SWSOH combustion properties. This information was received by the Department on November 15, 2011. Additionally, because MRC experienced significant downtime with the SO<sub>2</sub>/O<sub>2</sub> CEMS required on the #1 and #2 Boiler stack, MRC submitted a request to allow the use of the H<sub>2</sub>S fuel gas analyzer located near the fuel gas drum as backup to the SO<sub>2</sub>/O<sub>2</sub> CEMS. MRC also requested this for Boiler #3.

Therefore, in addition to adding the Boiler #3 to the refinery's operation, the permit action also added compliance, reporting and recordkeeping requirements for allowing the H<sub>2</sub>S fuel analyzer to be used as a backup to the SO<sub>2</sub>/O<sub>2</sub> CEMS. When the H<sub>2</sub>S fuel analyzer is used, MRC would not be allowed to route the SWSOH to the boilers. **MAQP #2161-25** replaced MAQP #2161-24.

On October 24, 2012, the Department received a request for the transfer of ownership. According to the information submitted, the previous owner, Connacher Oil and Gas, sold its shares of MRC to Calumet Specialty Products Partners. With the transfer of ownership, Calumet Specialty Products Partners also requested a facility name change from MRC to Calumet Montana Refining, LLC. This was an administrative permit action to change the name. **MAQP #2161-26** replaced MAQP #2161-25.

On July 30, 2013, the Department received an application for modification to MAQP #2161-26. The permit action removed older storage tanks that were located close to the process unit area and in order to accommodate potential future expansion. As such, Calumet requested to remove nine (9) tanks and to add eight (8) new tanks.

All kerosene and asphalt tanks were equipped with fixed roofs, and all gasoline storage tanks are equipped with external floating roofs. In addition, tanks 50 and 102 are equipped with two burners (John Zink Burner), each rated at 2.3 MMBtu/hr to keep the asphalt from cooling down and/or hardening. **MAQP #2161-27** replaced MAQP #2161-26.

On October 3, 2013, the Department received a permit application requesting a major modification under the New Source Review-Prevention of Significant Deterioration (NSRPSD) program. This permit application was assigned MAQP #2161-28. The project was deemed significant for greenhouses (GHG) and volatile organic compounds (VOCs), and the permit application was deemed complete on February 10, 2014.

With this permit action, Calumet proposed to increase the low sulfur fuels capacity at the refinery from approximately 10,000 bpsd throughput up to 30,000 bpsd while increasing yields of distillates, kerosene, diesel, and asphalt products.

The expansion project included the construction of four new processing units: a new crude unit that will process heavy sour crudes, a MHC for gas-oil conversion to higher value distillates, a new hydrogen plant (#3) to support the MHC, and a fuel gas treatment unit to handle the increased fuel gas production from the MHC. The main emitting units included with the expansion project are as follows: Hydrogen Plant #3 (equipped with two heaters with a total combined firing rating of up to 134 million British thermal units per hour (MMBtu/hr)); Combined Feed Heater (up to 54 MMBtu/hr); Fractionation Feed Heater (up to 38 MMBtu/hr), Crude Heater (up to 71 MMBtu/hr), Vacuum Heater (up to 27 MMBtu/hr), and a new flare interconnected to the existing flare that will be equipped with a flare gas scrubber. With the expansion, Calumet also proposed to add a new rail car loading (diesel and asphalt) and unloading (crude oil and gas oil) area, and several new storage tanks in addition to re-purposing some existing storage tanks to accommodate the expansion project.

Additionally, the existing HTU that block operated in both diesel and gas-oil service was to become the kerosene HTU, and the existing kerosene HTU was to become a Naptha HTU. Lastly, Calumet requested a federally enforceable operational limit on Boiler #1 and Boiler #2.

The Department issued a preliminary determination (PD) as MAQP #2161-28 on March 18, 2014, final department decision (DD) on April 25, 2014, and final permit on May 13, 2014. However, the Department did not notify the public by advertisement in a newspaper of general circulation in the Great Falls area in accordance with ARM 17.8.826(2)(c) when it issued the PD for MAQP #2161-28. Therefore, the Department reissued its PD under MAQP #2161-29 along with a public notice in the Great Falls Tribune to satisfy the requirements of ARM 17.8.826(2)(c). All project analyses and conclusions from MAQP #2161-28 for this project remained the same. MAQP #2161-29 contained any comments received on the PD for MAQP #2161-28 and corrections made to address them.

On April 4, 2017 the Department received an application from Calumet to modify the existing MAQP. Incompleteness responses and additional information were received, with final information completing the application on September 26, 2017. Due to various operational and design issues, compliance with certain limits associated with the expansion project permitted in MAQP #2161-29 were determined to be unachievable on a continuous and ongoing basis. These limitations were

necessary to avoid the project being determined a major modification of a major stationary source and subject to the permitting requirements of ARM 17.8 Subchapter 8 for NO<sub>x</sub>. As such, Calumet proposed an alternative operating scenario and alternative limitations to maintain the project below relevant significant emissions rates.

Calumet proposed to install a new temporary low NO<sub>x</sub> boiler (Boiler #4) for additional/supplemental steam production and an ammonia combustor to remove and combust fuel bound nitrogen that otherwise would be present in refinery fuel gas. In addition, Calumet proposed an umbrella limit on emissions of NO<sub>x</sub> and CO on a rolling 12-month basis. The umbrella limit would apply to combined emissions from multiple units such that any combination of emissions from these units, provided the overall emissions limitation is adhered to, maintains the project as not a major modification for NO<sub>x</sub> or CO. Prior limitations related to PSD avoidance on Boilers #1 and #2 have been removed from the permit.

Calumet has determined a need to reduce fuel-bound nitrogen in fuel gas in order to meet NO<sub>x</sub> limitations on various units. Further, Calumet has identified mechanical issues with Boiler #3 which has resulted in the potential for excess NO<sub>x</sub> emissions. Bringing a temporary low NO<sub>x</sub> boiler on-site will allow Calumet to produce steam for operations while ongoing efforts are undertaken to reduce plant wide NO<sub>x</sub> emissions. The low NO<sub>x</sub> boiler will provide for reduced emissions of NO<sub>x</sub> per pound of steam produced compared to the NO<sub>x</sub> performance capabilities of Boilers #1 and #2.

Boiler #3, the new low NO<sub>x</sub> boiler, and the ammonia combustor were determined technically and economically related to the expansion project and were included in the expansion project as new units. The purpose of this permitting action is to establish limits which maintain the net emissions increases to less than the significant emissions rates for NO<sub>x</sub> and CO, or less than the amount of other emissions previously reviewed for the expansion project. All pollutants were reviewed, and the project was re-permitted as if the project had not been previously permitted. A request in the future to modify or replace associated units would require a reassessment of the project emissions. The allowable operating capacity of the associated refining unit heaters as a whole was reduced in the current operational scenario, and future projects to reduce emissions will be necessary to gain full use of the increased refining capacity capable of being accomplished with the associated equipment installed for avoidance of PSD.

During PSD review, Calumet identified that Tank #50 and #102 will not be equipped with tank heaters and the emissions were removed from considerations in contemporaneous emissions increases. MAQP #2161-30 replaced MAQP #2161-29.

On July 12, 2019, the Department received from Calumet an application to modify the MAQP. Calumet sought to relax the control requirements on Tanks #125 and #128, due to a finding that the tanks are out-of-round, making seals associated with floating roof design to be infeasible to maintain. These tanks are in heavy liquid service, and as such, the Department approved request to maintain these tanks as fixed roof tanks with submerged fill. In doing so, the emissions increases associated with the expansion project is updated, and Best Available Control Technology (BACT) review is presented in demonstration that the requirements of BACT are maintained (see the permit analysis). Condition III.B.7.h was established to require the fixed roof tanks be maintained in heavy liquids service with submerged fill practices maintained. Prior requirements that these tanks be maintained with floating roof design was removed. **MAQP #2161-32** replaced MAQP #2161-31.

On December 31, 2019, the Department received from Calumet a concurrent MAQP and Title V application to revise nitrogen oxides (NO<sub>x</sub>) limitations on the #2 Crude Vacuum Heater H-2102 and the Mild Hydrocracker Reactor Fractionation Heater H-4102. These heaters were assigned NO<sub>x</sub>

limitations as part of Best Available Control Technology (BACT) review associated with the refinery expansion project. The limits were originally set at 0.035 pounds per million British thermal units, on a higher heating value basis, on a 30-day rolling average. The permit application requested that these limits be revised to 0.040 lb/MMBtu on a 3-hr basis, as would be monitored via an annual source test. The current permit action would provide for an achievable limitation which would be practically enforceable without a requirement for CEMS. The mass-based umbrella limitations for NO<sub>x</sub> and CO remained unchanged. MAQP #2161-33 replaced MAQP #2161-32.

On June 5, 2006, the Department received an application for the renewal of Title V Operating Permit #OP2161-01. The application was deemed administratively complete on July 5, 2006, and technically complete on August 4, 2006. This permit incorporates all applicable source changes since the issuance of Operating Permit #OP2161-01, including:

- Addition of new emitting unit: EU15 – Gasoline Railcar Loading Rack and VCU;
- Incorporation of Consent Decree #CIV-01-1422LH, entered March 5, 2002 requirements. This included updating the Title V Operating Permit with a number of specific new emission limits and monitoring requirements which had been included in the most recent MAQP #2161-19, as well as adding a general requirement for MRC to comply with the relevant applicable terms and conditions of the Consent Decree (excluding the stipulated penalty components); and
- Inclusion of new regulations impacting MRC, including three MACT standards: 40 CFR 63, Subpart UUU, Subpart ZZZZ, and Subpart DDDDD.

**Operating Permit #OP2161-02** replaced Operating Permit #OP2161-01.

On October 15, 2007, the Department received a letter from MRC requesting a correction to MAQP #2161-19, to remove the restrictions on the type of fuel used in specific asphalt tank heaters, which was added erroneously during the previous permitting action. In addition, the MAQP was updated to reflect the fact that requirements under 40 CFR 63, Subpart DDDDDD are now “state-only” since the federal rule was vacated in Federal Court on July 30, 2007. **MAQP #2161-20** replaced MAQP #2161-19.

On June 9, 2008, the Department received a letter from MRC requesting an amendment to MAQP #2161-20, to modify the restrictions on Storage Tank #8. This request was a follow-up to a de minimis request received by the Department on April 21, 2008, where MRC proposed to change the operation of Storage Tank #8 from sodium hydrosulfide to naphtha. The Department reviewed this de minimis request and determined that MAQP #2161-20 must first be amended as described in the ARM 17.8.745(2) and ARM 17.8.764 before this change would be allowed. Although the potential emissions increase for this project is less than 15 tons per year, the proposal would have violated a condition of MRC’s current permit.

On July 2, 2008, the Department received another letter from MRC requesting an administrative amendment to MAQP #2161-20 to include certain conditions specified in the Administrative Order on Consent (AOC) that MRC entered into with the Department on May 13, 2008. The AOC requires MRC to install and operate a SO<sub>2</sub> and Oxygen (O<sub>2</sub>) continuous emission monitor system (CEMS) on the stack for the #1 and #2 Boilers. This SO<sub>2</sub>/O<sub>2</sub> CEMS is to be used as the primary analytical instrument to determine compliance with state and federal SO<sub>2</sub> requirements. The AOC requires MRC to request that these conditions be included in the MAQP as enforceable permit conditions.

In addition, MRC requested that the permit be amended to allow certain de minimis changes related to the Diesel/Gas Oil HDS heater and three PMA tank heaters. Specifically, MRC requested that refinery fuel gas, in addition to natural gas, be allowed to be burned in these heaters. The current permit requires that the Diesel/Gas Oil HDS heater and the three PMA tank heaters be fired only with natural gas. This requirement is based on BACT. For the Diesel/Gas Oil HDS heater, the BACT analysis requires that low sulfur fuel be used. Since the refinery fuel gas is also a low sulfur fuel meeting 40 CFR 60, Subpart J requirements of 160 ppm H<sub>2</sub>S, the Department determined that the proposed change does not violate any applicable rule and therefore, can be allowed through an administrative amendment as specified in ARM 17.8.745(2) and ARM 17.8.764. For the three PMA tank heaters, however, the BACT analysis specifically requires that these heaters be fired with natural gas for control of NO<sub>x</sub> emissions. Therefore, the Department determined that the proposed three PMA tank heaters de minimis changes are prohibited under ARM 17.8.745(1)(a)(i) since an applicable rule, specifically ARM 17.8.752 requiring that BACT be utilized, would be violated. Because BACT determinations cannot be changed under the amendment process, the Department requested that MRC submit an application for a permit modification that would include a revised BACT analysis in order to make the proposed change for the three PMA tank heaters. **MAQP #2161-21** replaced MAQP #2161-20.

On December 19, 2008, the Department received a request from MRC to amend MAQP #2161-21. MRC requested to change the wording for material stored in specified storage tanks to language representative of the requirements of 40 CFR 60, Subpart Kb in order to provide operational flexibility. Instead of referring to specific products (e.g., naphtha, gasoline, diesel, tall oil, etc.), the products would instead be referred to as light oils, medium oils, and heavy oils.

Under MRC's proposed language, light oils would be defined as a volatile organic liquid with a maximum true vapor pressure greater than or equal to 27.6 kilopascal (kPa), but less than 76.6 kPa and would include, but not be limited to, gasoline and naphtha. Medium oils would be defined as volatile organic liquids with a vapor pressure less than 27.6 kPa and greater than or equal to 5.2 kPa and would include, but not be limited to, ethanol. Heavy oils would be defined as volatile organic liquid with a maximum true vapor pressure less than 5.2 kPa and would include, but not be limited to diesel, kerosene, jet fuel, slurry oil, and asphalt.

In addition to making the requested change, the Department clarified the permit language for the bulk loading rack VCU regarding the products that may be loaded in the event the VCU is inoperable and deleted all references to 40 CFR 63, Subpart DDDDD – NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters, as it was removed from the ARM in October 2008. The Department has also updated Attachment 1, Ambient Monitoring to reflect the most current permit language and requirements for ambient monitoring. **MAQP #2161-22** replaced MAQP #2161-21.

On July 9, 2009, the Department received a permit application from MRC to modify MAQP #2161-22. The application was deemed complete on July 24, 2009. MRC submitted a permit modification to allow the use of treated refinery fuel gas or natural gas in the tank heaters. Previously, the PMA tanks heaters were permitted to use natural gas only pursuant to a BACT analysis that was completed for MAQP #2161-09. This permit modification applied to three previously permitted asphalt tanks (Tanks #130, #132, and #133) and the associated PMA tank heaters. **MAQP #2161-23** replaced MAQP #2161-22.

On January 15, 2008, the Department received a request from MRC to allow the installation of a second hydrogen plant (Hydrogen Plant #2) that utilizes a process heater with a heat input of 80

MMBtu/hr. The Department approved this de minimis request on February 8, 2008. Pursuant to the Consent Decree and the approval of the de minimis request, MRC was required to conduct an initial performance test on the process heater with the results reported based upon the average of three, one hour testing periods. The Consent Decree also required MRC to submit an application to the Department and to propose a NO<sub>x</sub> permit limit for the heater. MRC submitted a permit application on December 29, 2009 and the Department deemed this application incomplete on January 15, 2010. On July 12, 2010, MRC submitted additional information as requested by the Department. On September 2, 2010, during the comment period, MRC submitted information to support the guaranteed ultra-low NO<sub>x</sub> burner emission limit of 0.033 lb/MMBtu based on the Higher Heating Value (HHV) of the fuel. This limit was based on the process heater of the hydrogen plant operating at full capacity (80 MMBtu/hr) with fuel gas consisting of 40.5 % natural gas and 59.4% PSA vent gas. This permit modification only applied to the NO<sub>x</sub> limit on Hydrogen Plant #2 process heater and was assigned **MAQP #2161-24** and replaced MAQP #2161-23.

On December 19, 2008, the Department received an application for a significant modification to Title V Operating Permit #OP2161-02. This permit incorporates all applicable source changes since the issuance of Operating Permit #OP2161-02, including:

- A change in the type of material allowed to be stored in Storage Tank #8;
- A wording change for the type of material to be stored in specified storage tanks that is representative of the requirements of 40 CFR 60, Subpart Kb in order to provide operational flexibility;
- Incorporation of SO<sub>2</sub>/O<sub>2</sub> CEMS requirements on boilers #1 and #2;
- A change to the type of fuel that may be fired in the HTU unit;
- Clarification of permit language for the bulk loading rack VCU regarding products that may be loaded in the event the VCU is inoperable;
- Removal of 40 CFR 63, Subpart DDDDD “state-only” requirements, as this MACT was removed from the ARM in October 2008; and
- Revisions to Appendix E, Ambient Air Monitoring Plan to reflect the most current permit language and requirements for ambient monitoring.

**Operating Permit #OP2161-03** replaced Operating Permit #OP2161-02.

On July 9, 2009, the Department received a request from MRC to modify MAQP #2161-22. MRC submitted a permit modification to allow the use of treated refinery fuel gas or natural gas in the tank heaters. This modification applies to three modified asphalt tanks (Tanks #130, #132, and #133) and the associated PMA tank heaters. MAQP #2161-23 replaced MAQP #2161-22. This action also required a significant modification to Operating Permit #OP2161-03. **Operating Permit #OP2161-04** replaced Operating Permit #OP2161-03.

Pursuant to the Consent Decree and the approval of the de minimis request dated February 8, 2008, MRC was required to submit an application to the Department and to propose a NO<sub>x</sub> permit limit for the reformer heater at Hydrogen Plant #2. MRC submitted a permit application on December 29, 2009, and the Department deemed this application incomplete on January 15, 2010. On July 12,

2010, MRC submitted additional information as requested by the Department and the application was deemed complete. On September 2, 2010, during the comment period, MRC disagreed with the Department's proposed limits and submitted information to support the guaranteed ultra-low NO<sub>x</sub> burner emission limit of 0.033 lb/MMBtu based on the HHV of the fuel. This limit was based on the process heater of the hydrogen plant operating at full capacity (80 MMBtu/hr) with fuel gas consisting of 40.5% natural gas and 59.4% PSA vent gas. This permit modification only applied to the NO<sub>x</sub> limit on Hydrogen Plant #2 process heater and was assigned Operating Permit #OP2161-05. Additionally this permit updates the NO<sub>x</sub> emission limits for the FCCU unit established by the Environmental Protection Agency (EPA). Pursuant to a letter dated September 23, 2010 from the EPA and received by the Department on October 1, 2010, and paragraph 11.E of the MRC Consent Decree, the final FCCU NO<sub>x</sub> emission limits were established at 68.0 parts per million, volumetric dry (ppmvd) (at 0% O<sub>2</sub>) based on a 365-day rolling average and 87.0 ppmvd (at 0% O<sub>2</sub>) based on a 7-day rolling average. **Operating Permit #OP2161-05** replaced Operating Permit #OP2161-04.

On July 6, 2011, MRC submitted a permit application and subsequent modeling demonstration to add a new boiler (boiler #3) capable of firing refinery fuel gas or natural gas. The primary purpose of boiler #3 is to supplement the two existing boilers (#1 and #2) that provide process steam to the refinery. The design burner heat input capacity for boiler #3 varies depending upon fuel characteristics ranging from 59.7 to 60.3 million British thermal units per hour (MMBtu/hr). The Department deemed the application incomplete on August 4, 2011, and MRC provided additional information in response to the Department's letter on September 26, 2011.

On October 25, 2011, the Department requested additional information with respect to MRC's plant wide applicability limit (PAL) and the fuel combustion properties of the caustic scrubbed sour water stripper overhead gas (SWSOH). This information, and a request to allow a backup method of monitoring compliance with sulfur dioxide (SO<sub>2</sub>) emissions from the #1 and #2 boiler stack and the #3 boiler stack were received by the Department on November 15, 2011. **MAQP #2161-25** replaced MAQP #2161-24. This permit action also required a significant modification to Operating Permit #OP2161-05. **Operating Permit #OP2161-06** replaced Operating Permit #OP2161-05.

On June 5, 2012, Calumet submitted an application for renewal and this application was assigned as **Operating Permit #OP2161-07**. With this request, Calumet requested that the Department add several applicable requirements to the Operating Permit including but not limited to: 40 CFR 60, Subpart Ja and some additional requirements of 40 CFR 63, Subpart CC were clarified in this action.

Several *de minimis* actions were incorporated with this permit action:

- Calumet requested to add two new process heaters, the naphtha splitter reboiler heater equipment number is H-405, and the other heater H-402 is a replacement for the naphtha heater previously listed as EU05b.
- Calumet requested that the Department note that Asphalt tank #138 was put into service in 2008 and is subject to 40 CFR 60, Subpart UU. This was submitted as a *de minimis* request on January 15, 2008.
- On October 7, 2010, Calumet submitted a *de minimis* request to add ethanol tank #176.
- On January 15, 2008, Calumet was submitted a *de minimis* request to add diesel tanks #170 and #171 (associated with IEU11), and heavy gas oil Tank #150 (associated with IEU25).

- On April 2, 2013, (with additional information received on May 21, 2013) Calumet submitted a *de minimis* request to replace two existing 10,000 bbl tanks (Tank 29 and Tank 51) with two, 21,000 bbl fixed-roof tanks.

In the renewal application (application number #OP2161-07) Calumet noted that Tanks #44, #45, and #11 were dismantled in 2008; Tank #62 was changed to non-hydrocarbon service (spent hydroxide solution); Tank #124 was changed to gasoline service; and Tank #125 was changed from gasoline blend to crude oil.

Calumet submitted several administrative changes and information to show that a Compliance Assurance Monitoring Plan (CAM plan) is not required. In addition to those items previously mentioned, on October 24, 2012, Calumet submitted an administrative request (assigned permit action #OP2161-08) for a name change from Montana Refining Company to Calumet Montana Refining, LLC. These two permit actions were combined into one and were issued as **Operating Permit #OP2161-08** to replace Operating Permit #OP2161-06.

On July 30, 2013, the Department received an application to modify MAQP #2161-26 and Operating Permit #OP2161-08. The Department received additional information to support the application on August 16, 2013. The permit action removed older storage tanks and replaced and/or re-located tanks in order to accommodate potential future expansion. As such, Calumet requested to remove nine (9) tanks and replace eight (8) tanks with new ones as shown in more detail below:

Current Tank ID	Current Service	Current Capacity (bbl)	New Tank ID	Service	New Capacity (in bbl)
Tank #122	Unleaded Gasoline	11300	Tank #122	Unleaded Gasoline	20000
Tank #123	Unleaded Gasoline	11300	Tank #123	Unleaded Gasoline	20000
Tank #52	Premium Gasoline	3000	Tank #52	Premium Gasoline	11300
Tank #53	Premium Gasoline	3000	Removed from service		
Tank #46	Kero/Jet A	5140	Tank #49	Kero/Jet A	20000
Tank #47	Kero/Jet A	10500	Tank #47	Kero/Jet A	20000
Tank #48	Kero/Jet A	10500	Tank #48	Kero/Jet A	20000
Tank #50	Asphalt	55700	Tank #50	Asphalt	20000
Tank #102	Asphalt	10300	Tank #102	Asphalt	20000

With this permit action, **MAQP #2161-27** replaced MAQP #2161-26 and **Operating Permit #OP2161-09** replaced Operating Permit #OP2161-08.

On October 3, 2013, the Department received a permit application requesting a major modification under the New Source Review-Prevention of Significant Deterioration (NSR-PSD) program. This permit application was assigned **MAQP #2161-28**. The project was deemed significant for greenhouse gasses (GHG) and volatile organic compounds (VOCs), and the permit application was deemed complete on February 10, 2014.

With this permit action, Calumet proposed to increase the low sulfur fuels capacity at the refinery from approximately 10,000 barrels per stream day (bpsd) throughput up to 30,000 bpsd while increasing yields of distillates, kerosene, diesel, and asphalt products.

The expansion project included the construction of four new processing units: a new crude unit that will process heavy sour crudes, a MHC for gas-oil conversion to higher value distillates, a new hydrogen plant (#3) to support the MHC, and a fuel gas treatment unit to handle the increased fuel gas production from the MHC.

The main emitting units included with the expansion project are as follows: Hydrogen Plant #3 (equipped with two heaters with a total combined firing rating of up to 134 million British thermal units per hour (MMBtu/hr)); Combined Feed Heater (up to 54 MMBtu/hr); Fractionation Feed Heater (up to 38 MMBtu/hr), Crude Heater (up to 71 MMBtu/hr), Vacuum Heater (up to 27 MMBtu/hr), and a new flare interconnected to the existing flare that will be equipped with a flare gas scrubber. With the expansion, Calumet also proposed to add a new rail car loading (diesel and asphalt) and unloading (crude oil and gas oil) area, and several new storage tanks in addition to repurposing some existing storage tanks to accommodate the expansion project.

Additionally, the existing HTU that block operated in both diesel and gas-oil service was to become the kerosene HTU, and the existing kerosene HTU was to become a Naptha HTU. Lastly, Calumet requested a federally enforceable operational limit on Boiler #1 and Boiler #2.

The Department issued a preliminary determination (PD) as MAQP #2161-28 on March 18, 2014, final department decision (DD) on April 25, 2014, and final permit on May 13, 2014. However, the Department did not notify the public by advertisement in a newspaper of general circulation in the Great Falls area in accordance with ARM 17.8.826(2)(c) when it issued the PD for MAQP #2161-28. Therefore, the Department reissued its PD under MAQP #2161-29 along with a public notice in the Great Falls Tribune to satisfy the requirements of ARM 17.8.826(2)(c). All project analyses and conclusions from MAQP #2161-28 for this project remained the same. **MAQP #2161-29** contained any comments received on the PD for MAQP #2161-28 and corrections made to address them.

On April 25, 2016, the Department received a letter from Calumet requesting an Administrative Amendment to Operating Permit #OP2161-09 for the purpose of updating the Responsible Official and the Alternate Responsible Official to Wayne Leiker and Hadley Bedbury, respectively. **Operating Permit #OP2161-10** replaced Operating Permit #OP2161-09.

On March 29, 2017, the Department received a significant modification application for the Title V operating permit to incorporate applicable conditions for the expansion project authorized in MAQP #2161-28 and #2161-29. The application was assigned number #OP2161-11. Due to various operational and design issues, compliance with certain limits associated with the expansion project permitted in MAQP #2161-29 were determined to be unachievable on a continuous and ongoing basis. Because subsequent MAQP actions to address this would change the applicable requirements; the content from application #OP2161-11 would be inaccurate. Therefore, Calumet requested that the Department rescind the application in a March 15, 2018 correspondence. Title V Operating Permit **#OP2161-11** was never issued.

On April 4, 2017 the Department received an application from Calumet to modify the existing MAQP. Incompleteness responses and additional information were received, with final information completing the application on September 26, 2017. Due to various operational and design issues, compliance with certain limits associated with the expansion project permitted in MAQP #2161-29 were determined to be unachievable on a continuous and ongoing basis. These limitations were necessary to avoid the project being determined a major modification of a major stationary source and subject to the permitting requirements of ARM 17.8 Subchapter 8 for NO<sub>x</sub>. As such, Calumet

proposed an alternative operating scenario and alternative limitations to maintain the project below relevant significant emissions rates.

Calumet proposed to install a new temporary low NO<sub>x</sub> boiler (Boiler #4) for additional/supplemental steam production and an ammonia combustor to remove and combust fuel bound nitrogen that otherwise would be present in refinery fuel gas. In addition, Calumet proposed an umbrella limit on emissions of NO<sub>x</sub> and CO on a rolling 12-month basis. The umbrella limit would apply to combined emissions from multiple units such that any combination of emissions from these units, provided the overall emissions limitation is adhered to, maintains the project as not a major modification for NO<sub>x</sub> or CO. Prior limitations related to PSD avoidance on Boilers #1 and #2 have been removed from the permit.

Calumet has determined a need to reduce fuel-bound nitrogen in fuel gas in order to meet NO<sub>x</sub> limitations on various units. Further, Calumet has identified mechanical issues with Boiler #3 which has resulted in the potential for excess NO<sub>x</sub> emissions. Bringing a temporary low NO<sub>x</sub> boiler on-site will allow Calumet to produce steam for operations while ongoing efforts are undertaken to reduce plant wide NO<sub>x</sub> emissions. The low NO<sub>x</sub> boiler will provide for reduced emissions of NO<sub>x</sub> per pound of steam produced compared to the NO<sub>x</sub> performance capabilities of Boilers #1 and #2.

Boiler #3, the new low NO<sub>x</sub> boiler, and the ammonia combustor were determined technically and economically related to the expansion project and were included in the expansion project as new units. The purpose of this permitting action is to establish limits which maintain the net emissions increases to less than the significant emissions rates for NO<sub>x</sub> and CO, or less than the amount of other emissions previously reviewed for the expansion project. All pollutants were reviewed, and the project was re-permitted as if the project had not been previously permitted. A request in the future to modify or replace associated units would require a reassessment of the project emissions. The allowable operating capacity of the associated refining unit heaters as a whole was reduced in the current operational scenario, and future projects to reduce emissions will be necessary to gain full use of the increased refining capacity capable of being accomplished with the associated equipment installed for avoidance of PSD.

During PSD review, Calumet identified that Tank #50 and #102 will not be equipped with tank heaters and the emissions were removed from considerations in contemporaneous emissions increases. **MAQP #2161-30** replaced MAQP #2161-29.

On March 20, 2019, the Department received from Calumet an application to include expansion of cooling tower capacity at the refinery. The Department determined, and Calumet has concurred, that the expansion of cooling tower capacity was part of the refinery expansion project. Emissions increases therefore were required to be reviewed and permitted as part of the refinery expansion project. **MAQP #2161-31** updated the refinery expansion project net emissions increase calculations, assigned Best Available Control Technology conditions to the cooling towers to minimize volatile organic compound and particulate matter emissions, and assigned associated compliance monitoring. Additionally, Calumet requested to remove the Temporary Boiler (Boiler #4) from the project, as the boiler was not expected to be used in the future. In addition, with Calumet's concurrence, the Department removed the averaging periods associated with particulate matter, carbon monoxide, and carbon dioxide emission limits on the Crude #2 Heaters.

On July 12, 2019, the Department received from Calumet an application to modify the MAQP. Calumet sought to relax the control requirements on Tanks #125 and #128, due to a finding that the tanks were out-of-round, making seals associated with floating roof design to be infeasible to maintain. These tanks are in heavy liquid service, and as such, the Department approved request to

maintain these tanks as fixed roof tanks with submerged fill. In doing so, the emissions increases associated with the expansion project was updated, and Best Available Control Technology (BACT) review was presented in demonstration that the requirements of BACT were maintained (see the permit analysis). Conditions were established to require the fixed roof tanks be maintained in heavy liquids service with submerged fill practices maintained. Prior requirements that these tanks be maintained with floating roof design were removed. **MAQP #2161-32** replaced MAQP #2161-31.

On June 29, 2018, the Department received a Title V renewal application from Calumet, which was assigned application number **#OP2161-12**. This application included applicable requirements related to the expansion project authorized in MAQP #2161-30.

On March 20, 2019, the Department received a Title V significant modification application to include the expansion of cooling tower capacity at the refinery authorized in MAQP #2161-31. This was assigned application number **#OP2161-13**.

On July 12, 2019, the Department received a Title V significant modification application to relax the control requirements of Tanks #125 and #128 authorized in MAQP #2161-32. This was assigned application number **#OP2161-14**.

On February 27, 2020, the Department received a Title V administrative amendment requesting correction of several administrative errors discovered in review of the proposed version of the permit posted as #OP2161-14. The Department rolled this request into the current action to ensure a final permit with corrections made as appropriate. The current permit action addresses all four of these actions. **Operating Permit #OP2161-15** replaces Operating Permit #OP2161-10.

#### **D. Current Permit Action**

On December 31, 2019, the Department received from Calumet an application to modify NO<sub>x</sub> emissions limitations associated with the #2 Crude Vacuum Heater (H-2102), and the Mild Hydrocracker Reactor Fractionation Heater (H-4102). Both heaters received BACT limitations of 0.035 lb/MMBtu on a 30-day rolling average basis. Calumet requested that these limits be modified to 0.040 lb/MMBtu, on a 3-hour average basis. Such change aligns the averaging period to the compliance demonstration methodology Calumet would prefer for these heaters. MAQP #2161-33 was issued final on February 26, 2020, which incorporated these changes. The current permit action is the Title V follow up, incorporating the limitations into the Title V. **Operating Permit #OP2161-16 and TRD2161-16** will replace Operating Permit #OP2161-15 and TRD2161-15.

#### **E. Taking and Damaging Analysis**

House Bill (HB) 311, the Montana Private Property Assessment Act, requires analysis of every proposed state agency administrative rule, policy, permit condition or permit denial, pertaining to an environmental matter, to determine whether the state action constitutes a taking or damaging of private real property that requires compensation under the Montana or U.S. Constitution. As part of issuing an operating permit, the Department of Environmental Quality is required to complete a Taking and Damaging Checklist. As required by 2-10-101 through 2-10-105, Montana Code Annotated (MCA), the Department conducted the following private property taking and damaging assessment.

<b>YES</b>	<b>NO</b>	
X		1. Does the action pertain to land or water management or environmental regulation affecting private real property or water rights?

YES	NO	
	X	2. Does the action result in either a permanent or indefinite physical occupation of private property?
	X	3. Does the action deny a fundamental attribute of ownership? (ex.: right to exclude others, disposal of property)
	X	4. Does the action deprive the owner of all economically viable uses of the property?
	X	5. Does the action require a property owner to dedicate a portion of property or to grant an easement? [If no, go to (6)].
		5a. Is there a reasonable, specific connection between the government requirement and legitimate state interests?
		5b. Is the government requirement roughly proportional to the impact of the proposed use of the property?
	X	6. Does the action have a severe impact on the value of the property? (consider economic impact, investment-backed expectations, character of government action)
	X	7. Does the action damage the property by causing some physical disturbance with respect to the property in excess of that sustained by the public generally?
	X	7a. Is the impact of government action direct, peculiar, and significant?
	X	7b. Has government action resulted in the property becoming practically inaccessible, waterlogged or flooded?
	X	7c. Has government action lowered property values by more than 30% and necessitated the physical taking of adjacent property or property across a public way from the property in question?
	X	Takings or damaging implications? (Taking or damaging implications exist if YES is checked in response to question 1 and also to any one or more of the following questions: 2, 3, 4, 6, 7a, 7b, 7c; or if NO is checked in response to questions 5a or 5b; the shaded areas)

Based on this analysis, the Department determined there are no taking or damaging implications associated with this permit action.

## F. Compliance Designation

The following are relatively recent violations of interest:

- H<sub>2</sub>S Monitoring Downtime during the 2<sup>nd</sup> and 3<sup>rd</sup> quarters of 2018 and 1<sup>st</sup> quarter of 2019
- NO<sub>x</sub> emissions violations of the #2 Atmospheric Crude Unit Heater H-2101 from May 2018 through March 2019
- NO<sub>x</sub> emissions violations for the #3 Hydrogen Plant Heater in 2019

## SECTION II SUMMARY OF EMISSION UNITS

### A. Facility Process Description

Calumet refines petroleum hydrocarbons at a small refinery in Great Falls, Montana. The facility consists of the following major processing units:

- **Crude Distillation** - #1 and #2 Crude Units with atmospheric and vacuum distillation – separating crude oil into component parts (heavier and lighter fractions)
- **Fluidized Catalytic Cracking Unit (FCCU)** – breaking larger chains into smaller chains
- **Catalytic Reformer Unit** – convert lower octane components to high octane reformates
- **Catalytic Poly Unit** – increase lighter, smaller chains into heavier, larger chains
- **Alkylation Unit**– increase lighter, smaller chains into heavier, larger chains
- **Isomerization Unit** – convert linear molecules into higher-octane branched molecules
- **Hydrogen Plants #1, #2, and #3** – create hydrogen for use in the plant i.e. – hydrotreating and hydrocracking
- **Polymer-Modified Asphalt (PMA) Unit** – heavy asphalt handling including heated tanks
- **Mild Hydrocracker Unit** – rearranging and breaking hydrocarbons, adding hydrogen
- **Hydrotreater Unit** – reducing sulfur and nitrogen content
- **Product Loading** – loading of finished product into cargo tanks
- **Cooling Towers** – cools water used in heat exchangers throughout the process
- **Wastewater Collection and Treatment** – individual drain systems and treatment
- **Boilers** – provides heat via steam for use throughout the process
- **Storage Tanks** - crude oil, intermediates, additives, and products
- **Internal Combustion Engines** – air compression, water pumping, firewater, etc.
- **Flares and Fuel Gas Scrubber Unit** – flares are a control device for hundreds of emissions points throughout the process, and is an important safety device during maintenance, malfunctions and non-steady state conditions such as startup and shutdown. Gas from the process is treated in the fuel gas scrubber unit to reduce sulfur content to minimize SO<sub>2</sub> emissions created during combustion.

### B. Emission Units and Pollution Control Device Identification

The following table includes the significant emitting units contained in the permit. Calumet must comply with the applicable requirements for each emitting units listed below.

Title V Section	Description	Pollution Control Device/Practice
<b>#1 Crude Unit: up to 10,000 barrels per stream day</b>		
<b>Section III.C:</b>	#1 Crude Atmospheric Heater, H-0101, 30 MMBtu/hr	CD - NSPS J, MACT DDDDD, Burner Management System, NO <sub>x</sub> and CO Umbrella Limits
	#1 Crude Vacuum Heater, H-0102, 7 MMBtu/hr	CD - NSPS J, MACT DDDDD, Burner Management System, NO <sub>x</sub> and CO Umbrella Limits
	Equipment Components	CD – LDAR, NSPS GGG, MACT CC
	Individual Drain System	NSPS QQQ, MACT CC, NESHAP FF
<b>#2 Crude Unit: up to 20,000 barrels per stream day</b>		

Title V Section	Description	Pollution Control Device/Practice
<b>Section III.D:</b>	#2 Crude Atmospheric Heater, H-2101, 71 MMBtu/hr	NSPS Ja, MACT DDDDDD, Burner Management System, ULNB, NO <sub>x</sub> and CO Umbrella Limits
	#2 Crude Vacuum Heater, H-2102, 27 MMBtu/hr	NSPS Ja, MACT DDDDDD, Burner Management System, ULNB, NO <sub>x</sub> and CO Umbrella Limits
	Equipment Components	CD, NSPS GGGa, MACT CC
	Individual Drain System	NSPS QQQ, MACT CC, NESHAP FF
<b>Catalytic Polymerization Unit</b>		
<b>Section III.E</b> <b>EU04-</b> Catalytic Polymerization Unit	Equipment Components	MACT CC
	Individual Drain System	NSPS QQQ, MACT CC, NESHAP FF
<b>FCCU</b>		
<b>Section III.F:</b>	Catalyst Regenerator	MACT UUU, NSPS J via CD,
	FCCU Preheater, H-0302, 8.9 MMBtu/hr	MACT DDDDDD, CD NSPS J
	Equipment Components	CD, NSPS GGG, MACT CC
	Individual Drain System	NSPS QQQ, MACT CC, NESHAP FF
<b>Catalytic Reformer and Naphtha Units</b>		
<b>Section III.G:</b>	Reformer Heater, H-0403, 7.5 MMBtu/hr	CD, NSPS J, MACT DDDDDD
	Process Vents	MACT CC, MACT UUU
	Equipment Components	MACT CC
	Individual Drain System	NSPS QQQ, MACT CC, NESHAP FF
	Naphtha Heater, H-0402a, 6.4 MMBtu/hr	NSPS Ja, MACT DDDDDD
	Naphtha Splitter Reboiler, H-0405, 6.8 MMBtu/hr	NSPS Ja, MACT DDDDDD
	Process Vents	MACT CC
	Equipment Components	NSPS GGGa, MACT CC
<b>Alkylation Unit</b>		
<b>Section III.H:</b>	Deisobutanizer Reboiler, 28 MMBtu/hr	CD, NSPS J, MACT DDDDDD
	Equipment Components	MACT CC
	Individual Drain System	NSPS QQQ, MACT CC, NESHAP FF
	Pressure Vessels in HF Service	Flare System
<b>Isomerization Unit</b>		
<b>Section III.I:</b>	Equipment Components	MACT CC
	Individual Drain System	NSPS QQQ, MACT CC, NESHAP FF
<b>Hydrogen Plants</b>		
<b>Section III.J:</b>		
H <sub>2</sub> Plant #1		
	#1 H <sub>2</sub> Plant Furnace – H-1801, 23.8 MMBtu/hr	CD, NSPS J, MACT DDDDDD
	#1 H <sub>2</sub> Plant Components	CD, NSPS GGG
	#1 H <sub>2</sub> Plant Individual Drain System	NSPS QQQ, MACT CC, NESHAP FF
H <sub>2</sub> Plant #2		
	#2 H <sub>2</sub> Plant Furnace – H-2851, 65.2 MMBtu/hr	CD, NSPS Ja, MACT DDDDDD, ULNB
	#2 H <sub>2</sub> Plant Components	CD, NSPS GGGa

Title V Section	Description	Pollution Control Device/Practice
	#2 H <sub>2</sub> Plant Individual Drain System	NSPS QQQ, MACT CC, NESHAP FF
H <sub>2</sub> Plant #3		
	#3 H <sub>2</sub> Plant Furnace A and B (combined stack) – H31A&B, 67 MMBtu/hr each	CD, NSPS Ja, MACT DDDDD, ULNB, Umbrella Limits
	#3 H <sub>2</sub> Plant Components	CD, NSPS GGGa
	#3 H <sub>2</sub> Plant Individual Drain System	NSPS QQQ, MACT CC, NESHAP FF
<b>Polymer-Modified Asphalt Unit</b>		
<b>Section III.K:</b>		
	Tank 50	NSPS UU, MACT CC
	Tank 55 - Asphalt	MACT CC
	Tank 55 Heater – 6 MMBtu/hr	CD, NSPS J, MACT DDDDD
	Tank 56 – Asphalt	MACT CC
	Tank 56 Heater – 9 MMBtu/hr	CD, NSPS J, MACT DDDDD
	Tank 69 - Asphalt	MACT CC
	Tank 102 – Asphalt / NaHS	NSPS UU; MACT CC
	Tank 110 – Asphalt	MACT CC
	Tank 110 Heater – 5 MMBtu/hr	CD, NSPS J, MACT DDDDD
	Tank 112 – Asphalt	MACT CC
	Tank 112 Heater – 5 MMBtu/hr	CD, NSPS J, MACT DDDDD
	Tank 130 – PMA	MACT CC
	Tank 130 Heater – 0.8MMBtu/hr	CD, NSPS J, MACT DDDDD
	Tank 132 – PMA	MACT CC
	Tank 132 Heater – 0.8 MMBtu/hr	NSPS J, MACT DDDDD
	Tank 133 – PMA	MACT CC
	Tank 133 Heater – 0.8 MMBtu/hr	CD, NSPS J, MACT DDDDD
	Tank 135 – Asphalt	MACT CC
	Tank 135 Heater – 6 MMBtu/hr	NSPS J, MACT DDDDD
	Tank 137 – Asphalt	NSPS UU, MACT CC
	Tank 137 Heater – 1.4 MMBtu/hr	NSPS J, NSPS UU, MACT CC
	Tank 138 – Asphalt	NSPS UU; MACT CC
	Tank 138 Heater – 1.4 MMBtu/hr	NSPS Ja, MACT DDDDD
	Tank 139 – Asphalt	NSPS UU; MACT CC
	Tank 139 Heater – 4 MMBtu/hr	NSPS J, MACT DDDDD
	Tank 140 – Asphalt	NSPS UU, MACT CC
	Tank 140 Heater – 4 MMBtu/hr	NSPS J, MACT DDDDD
	Equipment Components	CD, NSPS GGG, MACT CC
	Individual Drain System	MACT CC, NESHAP FF
<b>Mild Hydrocracker Unit</b>		
	MHC Combined Feed Heater, H-4101, 54 MMBtu/hr	CD, NSPS Ja, MACT DDDDD, ULNB, Umbrella Limits
	MHC Fractionator Feed Heater, H-4102, 38 MMBtu/hr	NSPS Ja, MACT DDDDD, ULNB, Umbrella Limits
<b>Section III.L:</b>	Process Vents	MACT CC
	Equipment Components	CD, NSPS GGGa, MACT CC
	Individual Drain System	NSPS QQQ, MACT CC, NESHAP FF
<b>Hydrotreater Unit</b>		
	Kerosene Heater	NSPS J, MACT DDDDD
<b>Section III.M:</b>	HTU Heater, H-1701, 20.3 MMBtu/hr	CD, NSPS J, MACT DDDDD
	Process Vents	MACT CC
	Equipment Components	CD, NSPS GGG, MACT CC

Title V Section	Description	Pollution Control Device/Practice
	Individual Drain System	NSPS QQQ, MACT CC, NESHAP FF
<b>Flares, Flare Gas Scrubber Unit</b>		
<b>Section III.N:</b>	Primary Flare #1 – Air Assisted	NSPS Ja, MACT CC, Air Assisted, H <sub>2</sub> S Scrubbing
	Secondary Flare (Flare #2) – Air Assisted	NSPS Ja, MACT CC, Air Assisted
	NaHS Process Vents	MACT CC
	NaHS Equipment Components	CD, MACT GGGa, MACT CC
	Flare Gas Scrubber	CD, NSPS GGGa/VVa, MACT CC
<b>Product Loading</b>		
<b>Section III.O:</b>		
Truck Loading Rack		
	Truck Loading Rack – Gasoline	MACT R, MACT CC
	Truck Loading Rack VCU	MACT R, MAQP BACT
	Truck Loading Rack Equipment Components	MACT CC
	Individual Drain System	NSPS QQQ, MACT CC, NESHAP FF
Railcar Loading Rack		
	Railcar Loading Rack – Gasoline	MACT R, MACT CC
	Railcar Loading Rack – Naphtha	MACT EEEE
	Railcar Loading Rack VCU	MACT R, MAQP BACT
	Railcar Loading Rack Equipment Components	MACT CC
	Individual Drain System	NSPS QQQ, MACT CC, NESHAP FF
<b>Cooling Towers</b>		
<b>Section III.P:</b>	North Cooling Tower	Mist Eliminator, Total Dissolved Solids Control, MACT CC
	South Cooling Tower	Mist Eliminator, Total Dissolved Solids Control, MACT CC
<b>Wastewater Collection and Treatment</b>		
<b>Section III.Q:</b>	Individual Drain Systems, Junction Boxes, and Sampling Devices	NSPS QQQ, MACT CC, NESHAP FF
	API Separator, Aeration Tank, DAF Unit, etc	NSPS QQQ, MACT CC, NESHAP FF
	Closed Vent Systems and Control Devices	NSPS QQQ, MACT CC, NESHAP FF
	External Floating Roof, Wastewater Tanks	NSPS QQQ, MACT CC, NESHAP FF
<b>Boilers</b>		
<b>Section III.R:</b>	Boiler #1, B-0701, stack combined with Boiler #2	CD, NSPS J, MACT DDDDD, NO <sub>x</sub> and CO Umbrella Limits
	Boiler #2, B-0702, stack combined with Boiler #1	CD, NSPS J, MACT DDDDD, NO <sub>x</sub> and CO Umbrella Limits
	Boiler #3, B-0703, 60.5 MMBtu/hr	CD, NSPS Ja, NSPS Dc, MACT DDDDD, ULNB, Flue Gas Recirculation, NO <sub>x</sub> and CO Umbrella Limits
	Individual Drain System	NSPS QQQ
<b>Storage Tanks</b>		
<b>Section III.S:</b>	Tank 1: 152 bbl, Fixed Roof in Jet Fuel Additive service	MACT EEEE
	Tank 2: 800 bbl Pressure Vessel in Propane service	Intrinsic Design
	Tank 3: 2,000 bbl Pressure Vessel in Isobutane service	Intrinsic Design

Title V Section	Description	Pollution Control Device/Practice
	Tank 4: 600 bbl Pressure Vessel in Butane service	Intrinsic Design
	Tank 5: 600 bbl Pressure Vessel in Isobutane service	Intrinsic Design
	Tank 10: 375 bbl Fixed Roof tank in Transmix service	MACT CC
	Tank 14: 1,400 bbl Pressure Vessel in Isobutane service	Intrinsic Design
	Tank 15: 1,400 bbl Pressure Vessel in Butane service	Intrinsic Design
	Tank 29: 20,600 bbl Fixed Roof in Distillate service	MACT CC
	Tank 47: 20,500 bbl Fixed Roof in Kerosene / Jet Fuel service	MACT CC
	Tank 48: 20,500 bbl Fixed Roof in Kerosene / Jet Fuel service	MACT CC
	Tank 49: 20,500 bbl Fixed Roof in Kerosene / Jet Fuel service	MACT CC
	Tank 50: fixed roof tank in asphalt storage service	NSPS UU
	Tank 51: 21,000 bbl Fixed Roof in Treated Gas oil service	MACT CC
	Tank 52: 19,000 bbl External Floating Roof in Gasoline service	MACT CC, NSPS Kb
	Tank 54: 18,000 bbl Fixed Roof in Kerosene / Jet Fuel service	MACT CC
	Tank 57: 10,000 bbl Internal Floating Roof in Naptha service	MACT CC, NSPS Kb
	Tank 58: 9,900 bbl Fixed Roof in Kerosene / Jet Fuel service	MACT CC
	Tank 100: 1,100 bbl Fixed Roof in #5 Fuel Oil service	MACT CC
	Tank 101: 1,100 bbl Fixed Roof in #5 Fuel Oil service	MACT CC
	Tank 102: fixed roof tank in asphalt storage service	NSPS UU
	Tank 116: 44,900 bbl Fixed Roof in Distillate service	MACT CC
	Tank 118: 2,000 bbl Fixed Roof in Asphalt Emulsion service	MACT CC
	Tank 119: 2,000 bbl Fixed Roof in Asphalt Emulsion service	MACT CC
	Tank 120: 2,200 bbl Fixed Roof in Asphalt Emulsion service	MACT CC
	Tank 121: 2,200 bbl Fixed Roof in Asphalt Emulsion service	MACT CC
	Tank 122: 21,900 bbl External Floating Roof in Gasoline service	MACT CC, NSPS Kb
	Tank 123: 21,900 bbl External Floating Roof in Gasoline service	MACT CC, NSPS Kb
	Tank 124: 21,500 bbl External Floating Roof in Naptha service	MACT CC, NSPS Kb
	Tank 125: 38,500 bbl Fixed Roof in Heavy Liquids service	MACT CC
	Tank 126: 29,500 bbl External Floating Roof in Gasoline service	MACT CC, NSPS Kb
	Tank 127: 21,500 bbl External Floating Roof in Gasoline service	MACT CC
	Tank 128: 21,500 bbl Fixed Roof in Heavy Liquids service	MACT CC
	Tank 137: Fixed Roof in Asphalt Storage service	NSPS UU
	Tank 138: Fixed Roof in Asphalt Storage service	NSPS UU
	Tank 139: Fixed Roof in Asphalt Storage service	NSPS UU
	Tank 140: Fixed Roof in Asphalt Storage service	NSPS UU
	Tank 150: 30,100 bbl Fixed Roof in Raw Kerosene service	MACT CC
	Tank 170: 10,200 bbl Fixed Roof in Distillate service	MACT CC
	Tank 171: 10,200 bbl Fixed Roof in Distillate service	MACT CC
	Tank 175: 400 bbl Fixed Roof in Ethanol service	MACT CC
	Tank 176: 5,000 bbl Internal Floating Roof in Ethanol service	MACT CC, NSPS Kb
	Tank 201: 69,700 bbl External Floating Roof in Crude Oil service	MACT CC, NSPS Kb
	Tank 202: 69,700 bbl External Floating Roof in Crude Oil service	MACT CC, NSPS Kb
	Tank 203: 69,700 bbl External Floating Roof in Crude Oil service	MACT CC, NSPS Kb
	Tank Farm Equipment Components	MACT CC
	Individual Drain System	MACT CC, NSPS QQQ, NESHAP FF
<b>Stationary Internal Combustion Engines</b>		
<b>Section III.T:</b>	GEN1: 400 hp diesel fired Emergency Generator	NSPS IIII, MACT ZZZZ
	AC1: 540 hp diesel fired Emergency Air Compressor Engine	NSPS IIII, MACT ZZZZ

Title V Section	Description	Pollution Control Device/Practice
	WP1: 165 hp, diesel fired Emergency Storm Water Pump	NSPS IIII, MACT ZZZZ
	WP2: 240 hp, diesel fired Tank 54 Emergency Fire Water Pump	MACT ZZZZ
	WP3: 300 hp, diesel fired Tank 24 Emergency Fire Water Pump	NSPS IIII, MACT ZZZZ
	WP4: 300 hp, diesel fired Tank 146 Emergency Fire Water Pump	NSPS IIII, MACT ZZZZ

### C. Categorically Insignificant Sources/Activities

ARM 17.8.1201(22)(a) defines an insignificant emissions unit as one that emits less than 5 TPY of any regulated pollutant, has the potential to emit less than 500 pounds per year of lead or any hazardous air pollutant, and is not regulated by an applicable requirement other than the generally applicable requirement.

Emissions Unit ID	Description	Associated Unit(s)
IEU 1	Chemical Additive Pots	Crude Unit, Cat Poly Unit, Cat Reformer Unit, Storage Loadout Unit, Utility Unit, Asphalt Polymerization Unit
IEU 2	Chemical Additive Tanks	Hydrogen Unit
IEU 3	Tank 117 – Sodium Hydrosulfide Tank	H <sub>2</sub> S Scrubbing
IEU 4	Tank 217 – Off Spec Sodium Hydrosulfide Tank	H <sub>2</sub> S Scrubbing
IEU 5	1,042-gallon Diesel Tank	Mobil source diesel fuel tank
IEU 6	11,900-barrel Fixed Roof Ammonia Tank	Tank 160

## SECTION III. PERMIT CONDITIONS

### A. Emission Limits and Standards

Calumet shall comply with the general applicable requirements as well as some specific requirements.

Calumet shall comply with opacity limitations of 20% and 40%, depending on the year of installation for a given piece of equipment. In addition, the loading rack VCUs are limited to 10% opacity and asphalt tanks which are subject to 40 CFR 60, Subpart UU shall comply with a 0% opacity limitation.

Calumet is no longer exempt from the sulfur in fuel limitation of 50 gr H<sub>2</sub>S /100 cubic feet in ARM 17.8.322(5), because the facility is no longer limited to less than 10,000 barrels of crude per day. However, since the facility became subject to 40 CFR 60, Subpart J and Ja fuel gas combustion device requirements, Calumet is also required to meet the more stringent refinery fuel gas limitations. In addition, although Calumet is subject to the sulfur in fuel rule for liquid or solid material of 1 lb/MMBtu, they are not allowed to burn liquid or solid fuels due to the Consent Decree.

Calumet has plant-wide SO<sub>2</sub> limitations that must be complied with both on an annual basis of 1,515 TPY and a basis of 4.15 tons per day. Calumet also has a plant-wide CO emission limitation of 4,700 TPY and 12.9 tons per day. Calumet must also comply with specific SO<sub>2</sub>, NO<sub>x</sub>, and CO emission limitations on the Boilers #1 and #2 stack, the Boiler #3 stack, and the FCCU, as well as a PM limit for the FCCU. The Diesel/Gas HTU heater and the hydrogen plant reformer heater have NO<sub>x</sub> and CO emission limitations.

Calumet has 'Umbrella' limits, which are PSD avoidance limits set up to provide flexibility regarding annualized mass emissions from those units listed. These limits were established for the refinery expansion project, where plantwide NO<sub>x</sub> performance was of potential concern.

Calumet has a gasoline truck loading rack and a gasoline railcar loading rack with specific VOC, CO, and NO<sub>x</sub> emission limitations. During permitting of the loading racks, Calumet completed risk assessments to demonstrate negligible risk to human health and the environment.

Calumet also has several sources listed in the permit that are subject to the NSPS requirements of 40 CFR, Subpart Dc, Subpart J, Subpart Ja, Subpart Kb, Subpart VV, Subpart UU, Subpart GGG, Subpart VVa, Subpart GGGa, and Subpart QQQ. Several sources are also subject to the MACT requirements of 40 CFR 63, Subpart R Subpart CC, Subpart UUU, Subpart ZZZZ, Subpart EEEE, Subpart DDDDD. Calumet is also subject to 40 CFR 61, Subpart FF, Subpart J, Subpart M, and Subpart V. If at any time from the Date of Lodging of the Consent Decree Calumet is determined to have a total annual benzene (TAB) equal to or greater than 10 Mg/yr, Calumet, as applicable, shall comply with the compliance option set forth at 40 CFR 61.342(e).

### B. Monitoring Requirements

ARM 17.8.1212(1) requires that all monitoring and analysis procedures or test methods required under applicable requirements be contained in operating permits. In addition, when the applicable requirement does not require periodic testing or monitoring, periodic monitoring must be prescribed that is sufficient to yield reliable data from the relevant time period that is representative of the source's compliance with the permit. Further, ARM 17.8.1213(2) requires that the permit contain compliance certification, testing, monitoring, reporting, and recordkeeping requirements sufficient to assure compliance with the terms and conditions of the permit.

The requirements for testing, monitoring, recordkeeping, reporting, and compliance certification sufficient to assure compliance does not require the permit to impose the same level of rigor for all emission units. Furthermore, it does not require extensive testing or monitoring to assure compliance with the applicable requirements for emission units that do not have significant potential to violate emission limitations or other requirements under normal operating conditions. When compliance with the underlying applicable requirement for an insignificant emissions unit is not threatened by lack of regular monitoring and when periodic testing or monitoring is not otherwise required by the applicable requirement, the status quo (**i.e., no monitoring**) will meet the requirements of ARM 17.8.1212(1). Therefore, the permit is not required to include monitoring for insignificant emission units.

The permit includes periodic monitoring or recordkeeping for each applicable requirement. The information obtained from the monitoring and recordkeeping will be used by Calumet to periodically certify compliance with the emission limits and standards. However, the Department may request additional testing to determine compliance with the emission limits and standards.

### **C. Test Methods and Procedures**

The operating permit may not require testing for all sources if routine monitoring is used to determine compliance, but the Department has the authority to require testing if deemed necessary to determine compliance with an emission limit or standard. In addition, Calumet may elect to voluntarily conduct compliance testing to confirm its compliance status.

A summarizing table is provided in each section to provide an overview of testing required for each processing unit. In addition to periodic testing required throughout the permit, many units are required to install, operate, calibrate, and maintain continuous emissions monitoring systems (CEMS). In cases where a unit is subject to both CEMS and periodic testing, annual RATAs may suffice in meeting the periodic testing requirement.

### **D. Recordkeeping Requirements**

Calumet is required to keep all records listed in the operating permit as a permanent business record for at least 5 years following the date of the generation of the record. The records are required to be maintained under Calumet's control and available to the Department upon request within a reasonable amount of time.

### **E. Reporting Requirements**

Reporting requirements are included in the permit for each emissions unit and Section V of the operating permit "General Conditions" explains the reporting requirements. However, Calumet is required to submit quarterly, semiannual and annual monitoring reports to the Department and to annually certify compliance with the applicable requirements contained in the permit. The reports must include a list of all emission limit and monitoring deviations, the reason for any deviation, and the corrective action taken as a result of any deviation. Quarterly reports required by the Consent Decree shall be submitted to the Department on or before January 31 and July 31 and additionally on or before April 30 and October 31.

To eliminate redundant reporting, a source may reference previously submitted reports (with at least the date and subject of the report) in the semiannual and annual reports instead of resubmitting the information in monthly, quarterly, and/or other reports. However, a source must still certify continuous or intermittent compliance with each applicable requirement annually.

## F. Public Notice

The Department published public notice regarding the issuance of Draft Permit #OP2161-16 in the *Great Falls Tribune* on August 7, 2020.

## G. Public Comments

Permit Reference	Commenter	Summarized Comment	Department Response
Section III.D.3	Michael Danielson	Reference to the H-2102 heater should be removed from this condition.	The Department agrees and the correction has been made.

## SECTION IV NON-APPLICABLE REQUIREMENT ANALYSIS

Section IV of the operating permit contains Non-Applicable Requirements. The following table summarizes the requirements that Calumet previously identified as non-applicable and contains the reasons that the Department did not include these requirements as non-applicable in the permit.

Applicable Requirement	Reason
Federal Requirements	
40 CFR 72 Permit Regulation (Acid Rain Permit) 40 CFR 73 Sulfur Dioxide Allowance System 40 CFR 74 Sulfur Dioxide OPT-Ins 40 CFR 75 CEM (Acid Rain Emission Monitoring) 40 CFR 76 Acid Rain Nitrogen Oxides Emission Reduction Program 40 CFR 77 Excess Emissions (Acid Rain) 40 CFR 78 Appeal Procedures for Acid Rain Program 40 CFR 63 Subpart Q – Cooling Towers MACT 40 CFR 63 Subpart VV – MACT for Oil-Water Separators	These regulations do or may become applicable to this facility, or the source category or equipment types related to the rule are located at this facility.
40 CFR 82 Protection of Stratospheric Ozone (except Subpart F)	These rules contain requirements for processes, equipment, or activity that is potentially used at the facility.
FCAA Title I Part D Plan Requirements for Non-Attainment Areas FCAA Section 111(d)	These rules have specific requirements that may become relevant to a major source during the permit span.

## SECTION V. FUTURE PERMIT CONSIDERATIONS

### A. MACT Standards

The Department is not aware of any proposed or pending MACT standards, in addition to those already listed, that may be applicable. Calumet could become subject to 40 CFR, Subpart GGGGG – National Emission Standards for Hazardous Air Pollutants: Site Remediation in the future.

Calumet is affected by the Refinery Sector Rule updates made to 40 CFR 63 Subpart CC and UUU.

### B. NESHAP Standards

The Department is not aware of any proposed or pending NESHAP standards, in addition to those already listed, that may be applicable.

### C. NSPS Standards

The Department is not aware of any proposed or pending NSPS standards, in addition to those already listed that may be applicable at this time.

Calumet is affected by the Refinery Sector Rule updates made to 40 CFR 60 Subpart J and Ja.

### D. Risk Management Plan

Calumet has more than a threshold quantity of a regulated substance in a process, and was required to comply with 40 CFR Part 68 requirements no later than June 21, 1999; 3 years after the date on which a regulated substance is first listed under 40 CFR Part 68.130; or the date on which a regulated substance is first present in more than a threshold quantity in a process, whichever is later.

### E. Compliance Assurance Monitoring (CAM) Plan

An emitting unit located at a Title V facility that meets the following criteria listed in ARM 17.8.1503 is subject to Subchapter 15 and must develop a CAM Plan for that unit:

- The emitting unit is subject to an emission limitation or standard for the applicable regulated air pollutant (other than emission limits or standards proposed after November 15, 1990, since these regulations contain specific monitoring requirements);
- The emitting unit uses a control device to achieve compliance with such limit; and
- The emitting unit has potential pre-control device emission of the applicable regulated air pollutant that are greater than major source thresholds.

Calumet submitted information on September 5, 2013 to show that CAM is not applicable to any of the units at the petroleum refinery. The refinery expansion project did not result in any new emitting units triggering CAM applicability.

## **F. Prevention of Significant Deterioration (PSD) and Title V Greenhouse Gas Tailoring Rule**

On May 7, 2010, EPA published the “light duty vehicle rule” (Docket # EPA-HQ-OAR- 2009-0472, 75 FR 25324) controlling greenhouse gas (GHG) emissions from mobile sources, whereby GHG became a pollutant subject to regulation under the Federal and Montana Clean Air Act(s). On June 3, 2010, EPA promulgated the GHG “Tailoring Rule” (Docket # EPA-HQ-OAR-2009-0517, 75 FR 31514) which modified 40 CFR Parts 51, 52, 70, and 71 to specify which facilities are subject to GHG permitting requirements and when such facilities become subject to regulation for GHG under the PSD and Title V programs.

Under the Tailoring Rule, any PSD action (either a new major stationary source or a major modification at a major stationary source) taken for a pollutant or pollutants other than GHG that was not final prior to January 2, 2011, would be subject to PSD permitting requirements for GHG if the GHG increases associated with that action were at or above 75,000 TPY of carbon dioxide equivalent (CO<sub>2</sub>e). Similarly, if such action were taken, any resulting requirements would be subject to inclusion in the Title V Operating Permit.

Starting on July 1, 2011, PSD permitting requirements would be triggered for modifications that were determined to be major under PSD based on GHG emissions alone, even if no other pollutant triggered a major modification. Sources that are not considered PSD major sources based on criteria pollutant emissions would become subject to PSD review if their facility-wide potential emissions equaled or exceeded 100,000 TPY of CO<sub>2</sub>e and 100 or 250 TPY of GHG on a mass basis depending on their listed status in ARM 17.8.801(22) and they undertook a permitting action with increases of 75,000 TPY or more of CO<sub>2</sub>e and greater than 0 TPY of GHG on a mass basis. With respect to Title V, sources not currently holding a Title V permit that have potential facility-wide emissions equal to or exceeding 100,000 TPY of CO<sub>2</sub>e and 100 TPY of GHG on a mass basis would be required to obtain a Title V Operating Permit.

The Supreme Court of the United States (SCOTUS), in its *Utility Air Regulatory Group v. EPA* decision on June 23, 2014, ruled that the Clean Air Act neither compels nor permits EPA to require a source to obtain a PSD or Title V permit on the sole basis of its potential emissions of GHG. SCOTUS also ruled that EPA lacked the authority to tailor the Clean Air Act’s unambiguous numerical thresholds of 100 or 250 TPY to accommodate a CO<sub>2</sub>e threshold of 100,000 TPY. SCOTUS upheld that EPA reasonably interpreted the Clean Air Act to require sources that would need PSD permits based on their emission of conventional pollutants to comply with BACT for GHG. As such, the Tailoring Rule has been rendered invalid and sources cannot become subject to PSD or Title V regulations based on GHG emissions alone. Sources that must undergo PSD permitting due to pollutant emissions other than GHG may still be required to comply with BACT for GHG emissions.