United States Department of the Interior

NATIONAL PARK SERVICE
Air Resources Division
P.O. Box 25287
Denver, CO 80225-0287

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N3615 (2350)

April 27, 2017

Gary Huitsing, P.E.
Washington Department of Ecology
Air Quality Program
300 Desmond Drive SE
Lacey, WA 98503

Dear Mr. Huitsing:

Tesoro Refining & Marketing Company LLC (Tesoro) is proposing a Clean Products Upgrade Project (CPUP) which would be a major modification at the Anacortes Refinery in Washington. The facility is located 76 km from North Cascades National Park (NP), 77 km from Olympic NP, and 176 km from Mt. Rainier NP, all Class I areas administered by the National Park Service (NPS). The proposed modification is major for particulate matter less than or equal to 10 microns in diameter (PM10) and particulate matter less than or equal to 2.5 microns in diameter (PM2.5) due to a 21.6 ton-per-year (tpy) increase in these pollutants, as well as a 347,644 tpy increase in and Greenhouse gases (GHG). The CPUP also includes several minor modifications emitting other criteria pollutants. The proposed modifications include a new steam boiler, a Marine Vapor Emission Control system, an expansion of the Naphtha Hydrotreater and an Aromatics Recovery Unit. The project expands the ability of the Anacortes refinery to deliver cleaner local transportation fuels and global feedstocks for polyester production but does not increase the refinery's capacity to process crude or change the crude slate processed.

We reviewed Tesoro's April 2016 permit application and associated draft permits from the Washington Department of Ecology and the Northwest Clean Air Agency. We recognize that the Tesoro modification is major for PM10 and GHG, and that Tesoro has employed effective controls to minimize the emissions from the modification. We commend Tesoro for the addition of Selective Catalytic Reduction (SCR) on the new boiler. Tesoro also proposes to collect and combust the displaced vapors from loading marine vessels along with natural gas introduced at the dock safety unit to keep the gas within safe ranges. This project reduces volatile organic compound (VOC) emissions from the facility by over 300 tpy. We appreciate the addition of controls for VOC on the marine loading facility and the reduction in VOC is significant.

NPS Analysis of Impacts on Air Quality Related Values

In our review of the Tesoro Anacortes refinery, our primary concerns are visibility and nitrogen deposition impacts at North Cascades NP and Olympic NP based on current emissions from the entire facility. We modeled 2014 – 2015 average annual emissions from the facility (as described below) to estimate these current impacts.

CALPUFF Model

The NPS air quality impact analysis applied the EPA CALPUFF 5.8 suite of models. (CALPUFF version 5.8 Level 070623, CALMET Level 070623, POSTUTIL Level 070623, and CALPOST Version 6.221.) The modeling was performed in the regulatory mode with the switch MREG=1. The pollutants modeled for both the existing emissions scenario (2014A-annual) and (2015-annual) were SO_2, SO_4, NO_x, elemental carbon, organic carbon, and $PM_{2.5}$ in pounds per hour units. The stack parameters and locations, the CALMET data, and the Class I discrete receptors were all from the major modification modeling analysis Tesoro submitted to the State of Washington's Department of Ecology.

The three years (2003 – 2005) of CALMET used 12 months of MM5 prognostic data, NWS upper air data, and NWS surface stations. The model domain consists of 115 four-kilometer east-west grid cells and 105 north-south four-kilometer grid cells with ten vertical layers. The hourly ozone data used in the modeling were from 38 ozone monitors. These monitors were located in the three national parks being analyzed, 14 ozone monitors sites in Washington, 9 ozone monitors from sites located in Oregon, 4 ozone monitor sites in Idaho, and 7 ozone monitor sites located in British Columbia, Canada. The monthly ammonia (NH_3) background data of 17 ppb) was from a monitoring study conducted in the Frazer Valley, British Columbia, Canada approximately 10 kilometers north of the US-Canada boundary. This historical and conservative ammonia monitoring data has been applied by Washington for many years.

The Anacortes refinery consists of 62 different stacks and sources. Many of the stacks only emit small amounts of air pollutants. Therefore, the NPS air quality impact analysis focused on only the large emitting stacks/sources. NPS grouped the emission points into 7 groups. Group 1: Crude heaters and CGS heaters; Group 2: Vacuum flash heater, Catalytic Cracker heaters, DHT heater, and CFH heater; Group 3: Main Boiler; Group 4: NHT heaters; Group 5: Catalytic Reform heaters; Group 6: CCU Boilers; and Group 7: Small engines and points without stacks. The VOC-only sources were not modeled.

The CALPUFF outputs from the 7-stack scenario were run through the post processor POSTUTIL for both visibility and acid deposition in separate runs. In the POSTUTIL visibility run, the option switch MNITRATE, which recomputes the HNO3/NO3 partition, was set = 1 so as not to overestimate the formation of particulate nitrate.

The visibility impacts were modeled with CALPOST version 6.221 following the methodology found in the Federal Land Managers' Air Quality Related Values Work Group 2010 Phase I Report—Revised (2010 FLAG)[1] using Method 8, Mode 5. This Method incorporates

[1] 2010 FLAG, p. 23. *See* http://www.nature.nps.gov/air/Pubs/pdf/flag/FLAG_2010.pdf.

background extinction coefficients which are computed from monthly concentrations representative of North Cascades, Olympic, and Mount Rainier NPs for ammonium sulfate (BKSO4), ammonium nitrate (BKNO3), coarse particulates (BKPMC), organic carbon (BKOC), soil (BKSOIL), elemental carbon (BKEC) and sea salt (BKSALT). Monthly Relative Humidity Adjustment Factors for small and large SO_4 and NO_3 and sea salt specific to North Cascades, Olympic, and Mount Rainier NPs from FLAG are also applied.

The visible haze impacts for the present and future emissions scenarios for the 7-stack configuration impacts for North Cascades, Olympic and Mount Rainier NPs are found below. According to the 2010 FLAG, "[i]f this analysis indicates that the 98th percentile values for change in light extinction are equal to or greater than 5% [0.5 deciview] for any year, then the Agencies will further scrutinize the applicant's proposal."

The nitrogen and sulfur deposition impact analyses used the POSTUTIL program which combines both the wet and dry deposition concentrations of the five species modeled (SO_2, SO_4, NO_x, HNO_3, and NO_3) to produce a deposition of both total sulfur and total nitrogen. Nitrogen and sulfur deposition impacts for the present and future emissions scenarios for the 7-stack configuration impacts for North Cascades, Olympic and Mount Rainier NPs are discussed below.

Modeled Impacts from Tesoro (Please see Appendix A for additional details.)

Class I Area	Average 98th % Delta Deciview	Average Number of days with Delta-Deciview => 0.5	% of Modeled Extinction by Species							Deposition kg/ha/yr	
			% SO4	% NO3	% OC	% EC	% PMC	% PMF	% NO2	S	N
OLYM	1.691	61.7	13.1	76.9	3.7	0.0	1.1	1.9	3.3	0.003	0.014
NOCA	0.749	32.0	13.5	74.8	3.5	0.0	1.6	2.6	4.0	0.005	0.078
MORA	0.142	0.0	16.0	76.3	3.8	0.0	0.7	2.3	1.0	0.000	0.001

Olympic National Park

At Olympic National Park, our modeling of annual average emissions predicted that the highest 98th percentile 24-hour visibility impact of 1.917 dv occurred with the 2003 meteorological data[2]; the 2003 through 2005 average of the 98th percentile values was 1.691 deciview (dv), and Tesoro's emissions caused visibility impairment each year. All three years modeled showed at least 53 days with impacts greater than 0.5 dv, with an average of 61.7 days per year. Nitrate was always the dominant species impairing visibility. Nitrogen deposition exceeded our Deposition Analysis Threshold (DAT)[3] each year 2003 through 2005, peaking at 0.016 kg/ha/yr based on 2003 meteorology; the average was 0.014 kg/ha/yr.

[2] NPS modeled the 98th percentile values for 24-hour visibility impact using meteorological data from 2003 -2005
[3] 2010 FLAG p. 66. "A DAT is defined as the additional amount of nitrogen or sulfur deposition within an FLM area, below which estimated impacts from a proposed new or modified source are considered negligible."

North Cascades National Park

At North Cascades National Park, our modeling of annual average emissions predicted that the highest 98th percentile 24-hour visibility impact of 0.779 dv occurred with the 2005 meteorological data[4]; the 2003 through 2005 average of the 98th percentile values was 0.749 dv, and Tesoro's emissions caused or contributed to visibility impairment each year. All three years modeled showed at least 28 days with impacts greater than 0.5 dv, with an average of 32 days per year. Nitrate was always the dominant species impairing visibility. Nitrogen deposition exceeded our DAT each year 2003 through 2005, peaking at 0.192 kg/ha/yr based on 2003 and 2004 meteorology; the average was 0.0781 kg/ha/yr.

Mount Rainier National Park

At Mount Rainier National Park, our modeling of annual average emissions predicted that the highest 98th percentile visibility impact of 0.179 dv occurred with the 2003 meteorological data[5]; the 2003 through 2005 average of the 98th percentile values was 0.142 dv, and Tesoro's emissions did not cause or contribute to visibility impairment any year. All three years modeled showed no impacts greater than 0.5 dv. Nitrate was always the dominant species impairing visibility, but less so than at Olympic or North Cascades. Nitrogen deposition did not exceed our DAT in any year, peaking at 0.0018 kg/ha/yr based on 2005 meteorology; the average was 0.0012 kg/ha/yr.

We understand that, for this modification, the only PSD-applicable pollutants are particulate and GHG. The above modeling was done based on the current (2014 – 2015) annual emissions from the entire facility. The visibility comments provided here do not apply to the currently-proposed modification. However, given the significant visibility impacts of the entire Tesoro facility on North Cascades and Olympic National Parks, we note that the Tesoro refinery should be considered for additional controls during the next Reasonable Progress phase of the Regional Haze Rule.

We would also like to point out that the most significant contributor to the visibility impacts is NOx. For this reason we would also like to commend Tesoro and the Northwest Clean Air Agency on the addition of SCR on the new boiler and the permit limit of 9 ppmdv (corrected to 3% O2).

[4] NPS modeled the 98th percentile values for 24-hour visibility impact using meteorological data from 2003 – 2005.
[5] NPS modeled the 98th percentile values for 24-hour visibility impact using meteorological data from 2003 – 2005.

Thank you again for providing the permit for comment. We look forward to working with both Washington Department of Ecology and Tesoro on future Reasonable Progress activities. If you have questions, please contact Don Shepherd of my staff at don_shepherd@nps.gov or 303-969-2075.

Sincerely,

Susan M. Johnson
Chief, Policy, Planning, and Permit Revue Branch

cc:
NWCAA: Agata McIntyre; Lyn Tobler
EPA R10: Donald Dossett, Unit Manager
USFS: Jim Pena, Regional Forrester

bcc:
ARD-PWR: Tonnie Cummings
ARD-DEN: Johnson, McCoy, Vimont, Permit Review Group, Reading and Project File
ARD-DEN:DShepherd:2075: 4/19/2017:Tesoro CPUP Ecology