May 6, 2016

Mr. Stephen Posner
Manager
State of Washington
Energy Facility Site Evaluation Council
1300 South Evergreen Park Drive SE
Olympia, WA 98504-3172

Re: Response to EFSEC Review Comments on the ASC/NOC Air Permit Application for the Vancouver Energy Project

Dear Mr. Posner:

The letter contains the response of Tesoro Savage Petroleum Terminal LLC dba Vancouver Energy (Applicant) to a letter from the Energy Facility Siting Evaluation Council (EFSEC), dated March 14, 2016, that requested additional information and clarifications needed for EFSEC to continue processing the Notice of Construction air permit application for the Vancouver Energy terminal proposal. Responses are organized in the same order as the comments in the letters, with the comments or information requests repeated in italic as an introduction to each response.

1. *Maximum Crude Oil Throughput. The current ASC cites two different annual throughput values. Marine vessel loading calculations assume 131,400,000 bbl/yr. Storage tank calculations assume 124,100,000 bbl/yr. The difference in assumed maximum throughput may be a reflection of direct transfer of crude oil from rail to vessel, but this is not apparent from the calculations. The Applicant needs to confirm the throughput values are different and explain the basis for each.*

   The total annual marine vessel loading presented in the submitted permit application (i.e., 131,400,000 bbl/yr) is based on the proposed daily average 360,000 bbl/day loading rate multiplied by 365 days/yr. The crude oil storage tank emissions presented in the permit application were calculated using EPA's TANKS 4.0.9d program (hereafter, TANKS). Based on preliminary design information, each tank was assumed to have a working volume of 15,120,000 gallons (360,000 bbl multiplied by 42 gal/bbl), and to be on a 6-day turnover cycle, or approximately 60 turnovers per year. Using these assumptions, TANKS calculated an annual single-tank throughput of 868,700,000 gal/yr. When extrapolated to 6 tanks, this single-tank throughput is equivalent to a total average daily throughput of 340,000 bbl/day, which, when multiplied by 365 days/yr, is equivalent to an annual throughput of 124,100,000 bbl/yr.

EX 0122-TSS

Since the submittal of the revised NOC Application to EFSEC in August 2014, the Applicant has developed a preliminary design for the crude oil storage tanks,[1] and recalculated the number of tank turnovers using this updated tank design information. Based on the updated information, each tank will have a working volume of 341,847 bbl, and the maximum total Facility annual throughput will be 131,400,000 bbl/yr for all 6 tanks, collectively, which is equivalent to approximately 64.06 turnovers per year.

Updated emission rate calculations and, as applicable, modeling results will be provided as part of a revised ASC to be submitted later in May 2016.

2. *Process Boiler Emission Limits. The proposed process boilers are equipped with ultra-low NOX burners. The specified NOX emission rate of 0.0110 lb/MMBtu is equivalent to ~9 ppmv @ 3% O2. Emission data for ultra-low burners is generally drawn from manufacturer's literature/guarantees, and is sometimes difficult to maintain these levels beyond the first few years of operation. A NOX emission limit of 12 ppmv may be more appropriate to provide a margin of compliance for future operation. The Applicant needs to confirm that 9 ppmv @ 3% O2 is a practical, long term emission limit, or propose an alternative limit.*

   We have contacted the boiler vendor, and they have confirmed that the exhaust concentration of $NO_X$ will be 9 ppmv @ 3 percent $O_2$ or less, which can reasonably be met by the proposed boilers at all times they are operated.

3. *Process Boiler Formaldehyde Emissions. The ASC cites EPA AP-42, Section 1.4 (July 1998) as the source of emission factors for HAP/TAP emissions from the natural gas fired process boilers. However, the emission factor for formaldehyde used in the application (0 .01125 lb/106 scf) is not the same as the emission factor in Table 1.4-3 (0.075 lb/106 scf). There is no citation of an alternate source for the formaldehyde emission factor. The Applicant needs to provide the source of this emission factor or recalculate formaldehyde emissions using the emission factor from AP-42, Section 1.4.*

   The AP-42 emission factor for formaldehyde was inadvertently reduced by 85 percent and has been updated to reflect the appropriate factor. As a result of the changed emission factor, facility-wide formaldehyde emissions exceed the Small Quantity Emission Rate (SQER) in WAC 173-460-150, meaning formaldehyde emissions must be modeled to compare predicted increased ambient concentrations with the Acceptable Source Impact Level (ASIL) provided for formaldehyde in WAC 173-460-150. A modeling analysis using the methodology documented in the ASC was completed for facility-wide formaldehyde emissions, and the maximum predicted annual average formaldehyde concentration was less than the applicable ASIL. The updated versions of tables from the ASC attached to this letter reflect this change.

4. *Heated Storage Tanks. The original ASC (dated Aug 2013) proposed to install heating loops in two of the crude oil storage tanks. The tanks were to be heated with two dedicated process boilers.*

[1] Letter to Stephen Posner, EFSEC, from Irina Makarow, BergerABAM, Response to EFSEC Draft EIS Data Request 6 – Seismic Ground Improvement Design. April 20, 2015.

*The tank heating boilers were removed from the revised application (dated Aug 2014), but no details were provided regarding the heated storage tanks. The Applicant needs to confirm whether any of the storage tanks will be heated, and if so, how this will be accomplished. If new combustion equipment will be used to provide process heat, technical specifications and applicable emission calculations need to be submitted.*

The Applicant confirms that two of the six crude oil storage tanks at Vancouver Energy may be electrically heated[2]. It is appropriate for the Applicant to conservatively assume that the tanks *will* be heated for purposes of air emissions permitting. No combustion units will be used to heat the tanks; the heaters will be powered by electricity.

5. *<u>HAP/TAP Emission Calculations</u>. HAP/TAP emission calculations for natural gas combustion use emission factors taken from AP-42, Section 1.4. The emission factors used have varying levels of accuracy, and many have a low reliability rating (i.e., a factor rating of 'C' through 'E'). These emission factors may not be suitable/accurate for all emission sources. Does the applicant have access to HAP/TAP emission data taken from direct testing of similar units? If so, please provide this data as a supplement to the AP-42 emission factors.*

   The Applicant queried the boiler and VCU vendors regarding speciation data that would enable calculation of emission unit-specific HAP and TAP emission factors. The boiler and VCU vendors were unable to provide any emissions data beyond criteria pollutant emission factors. The calculated HAP and TAP emission rates for the boilers and the MVCU provided in the submitted permit application are, therefore, based on emission factors from AP-42, regardless of reliability ratings.

6. *<u>HAP/TAP Weight Fractions</u>. HAP/TAP emissions from storage tank operation and fugitive component leaks are calculated by multiplying total estimated VOC calculations by an assumed weight fraction. Emission calculations presented in the application use a different set of weight fractions for storage tank emissions than are used for component leak emissions. The material being handled is the same in both cases so the speciation profile of emitted vapors would presumably be the same. The Applicant needs to explain why two different speciation profiles were used to calculate emissions or recalculate emissions using a single speciation profile.*

   The calculated fugitive tank and component HAP and TAP emissions rates are based on the same crude oil speciation information. However, because different emission calculation methodologies were used, the speciation information was applied differently for the two emission unit groups.

[2] See also Section 2.2.2.9 of the Preliminary Draft EIS submitted to EFSEC in July 2014: "Two of the tanks may be equipped with electrical heat coils so that the contents of the tanks can be heated to approximately 150°F to control viscosity during loading and unloading of crude oil that requires heating."

The storage tank emissions were estimated using TANKS. Physical properties and weight fractions of specific HAP and TAP constituents were obtained for a range of crude oils that could be received and loaded at the proposed facility. The properties and weight fractions were provided to TANKS, which calculated speciated fugitive tank emissions for each crude oil. The speciated emission rates provided by TANKS were used to calculate a composite fugitive tank emission rate for each HAP and TAP.

Fugitive VOC emissions from components were calculated using information and methods from the "Protocol for Equipment Leak Estimates" (EPA 453-R95-017, November 1995). HAP and TAP emission rates were based on the calculated fugitive VOC emission rate for the components combined with a speciation profile based on the composite fugitive tank emission rates for each HAP and TAP.

As noted above, the fugitive tank HAP and TAP emissions are going to change as a result of the updated information discussed in Item 1. Furthermore, the fugitive component emissions will also change because they will be based on a new composite speciation profile calculated from updated fugitive tank emissions for the range of crude oils. Additional calculation details will be provided with a revised ASC to be submitted later in May 2016.

7. *Marine Vessel Fill Configuration. The ASC does not specify the type of fill configuration to be used in marine vessel loading operations. A submerged fill/bottom fill configuration is typically required for vessel loading operations, but this is not specifically addressed. The Applicant needs to specify the fill configuration to be used for loading marine vessels.*

   A submerged loading configuration will be used to fill all marine vessel tanks in accordance with U.S. Coast Guard regulations. See 46 CFR §153.282.

8. *VCU Emission Factors. VCU emission calculations in the application use emission factors of 0.023 lb/MMBtu for NOX and 0.010 lb/MMBtu for CO. These factors were taken from information provided by the manufacturer (Jordon Technologies). Previous agency experience with similar equipment suggests that actual emissions of both pollutants during ongoing operation may be significantly higher. The Applicant should consult with the vendor, and then confirm the applicability of these emission factors. If emission test data for VCUs installed at similar facilities is available, it should be submitted in support of the ASC.*

   The proposed VCU will feature a pre-mixed, metal-fiber-surface combustion technology. According to Jordan Technologies, now part of AEREON, this technology is capable of achieving the VOC destruction efficiency and emission factors used to calculate emissions presented in the ASC. Reports that document performance tests conducted on equipment similar to the proposed VCU are attached, and they confirm that the cited $NO_X$ and CO emission factors have been achieved in practice.

9. *VCU VOC Control Efficiency. The ASC and associated emission calculations cite varying degrees of VOC destruction efficiency for the marine vessel loading vapor combustion units (VCUs).*

*Available test data for VCU operation at similar facilities indicates actual destruction efficiencies ranging from 99.3% to 99.8%. The application BACT review cites destruction efficiencies of 99% or greater as being typical for similar projects, and based on performance at other facilities, this level of destruction efficiency has been demonstrated in practice. The VCU manufacturer expects to achieve a destruction efficiency of at least 99.8%, and emission calculations in the application reflect this level of control. However, this level of control may be difficult to maintain on an ongoing basis.*

*The ASC estimates uncontrolled VOC emissions from vessel loading to be 1.5654 lb/1000 gal (~187.576 mg/L) of product transferred and 4,319 tpy (Section 5.1 of the ASC, Attachment 2, p. 9). Assuming a 99.8% destruction efficiency, emissions would be 0.375 mg/Land 8.64 tpy. Assuming a 99% destruction efficiency emissions would be ~1.875 mg/L (0.015654 lb/1000 gal) and 43.19 tpy. The difference in potential emissions is significant.*

*The Applicant needs to confirm the minimum VOC destruction efficiency proposed for VCU operation at the facility.*

Please see the response to Item 8 above. The attached performance test reports confirm that the destruction efficiency cited for the proposed VCU has been achieved in practice by similar units.

The information submitted herein amends relevant sections of the previously submitted ASC. If you or your staff have any questions or need additional information, please contact our consultant, Eric Albright, of Ramboll Environ, at (425) 412-1804.

Sincerely,

Kelly J. Flint

KJF:nb

Attachments

cc: Jared Larrabee, Tesoro Savage Petroleum Terminal LLC
Jay Derr, Van Ness Feldman
Irina Makarow, BergerABAM
Eric Albright, Ramboll Environ