air pollution control district
SANTA BARBARA COUNTY

NOV 12 2019

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Return Receipt Requested

Otis Dickinson
ExxonMobil Production Company
W4.2A.471
22777 Springwoods Village Parkway
Houston, TX 77389

RE: Approval of 2013 ATEIR for ExxonMobil - SYU Project
Air Toxics "Hot Spots" Information and Assessment Act (AB 2588)

Dear Mr. Dickinson:

This letter is for the approval of ExxonMobil's Air Toxics Emission Inventory Report (ATEIR) for the inventory year 2013. Due to the iterative process of the 2013 Air Toxics Emission Inventory Plan (ATEIP) approval, the Santa Barbara County Air Pollution Control District (District) would like to clarify the approved changes to the 2013 ATEIR per the approved 2013 ATEIP dated December 2013 (conditionally approved on August 8, 2014 with supplemental changes approved August 26, 2019).

The District received ExxonMobil's 2013 ATEIR in February 2015. Emission calculations were presented in an Excel spreadsheet titled *SYU AB2588 2013 – Calcs Feb2015.xls*. The corrections to the ATEIR (i.e., the emission calculations) listed in the attachment were required, per the approved 2013 ATEIP, District policy and simply correcting calculation errors. The District made all required corrections to the ATEIR spreadsheet. No further action is required from ExxonMobil for the 2013 ATEIR.

If you have any questions, please call me at (805) 961-8824 or email me at harrisd@sbcapcd.org.

Sincerely,

David Harris, Division Supervisor
Engineering Division

enc: List of Required Corrections to ExxonMobil's 2013 ATEIR

cc: Facility AB 2588 Project File
Engr Chron File
Patrice Surmeier, ExxonMobil Production Company
Bart Leininger, Ashworth Leininger Group
Toxics Group

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List of Required Corrections to ExxonMobil's 2013 ATEIR

The bolded headers below refer to the name of the tab in the spreadsheet submitted by ExxonMobil.

Acids Caustics

1. Weight Fractions: The weight percentages of acid within solution were modified to be consistent with Section 4.1.6 of the 2013 ATEIP. Additionally, the District adjusted the calculations to use the maximum weight fraction of each pollutant when a range was shown in the Material Safety Data Sheet.
2. Hydrazine: Emissions of hydrazine from the Deaerator and Steam System Chemical Injection System were calculated based on Section 4.1.7 of the 2013 ATEIP, which states that the solution contains 0.01% hydrazine.
3. Vapor Pressure: The value for the vapor pressure of water at 25 °C (p_{al}) was corrected based on the following source: https://www.engineeringtoolbox.com/water-vapor-saturation-pressure-d_599.html.
4. Temperature: A row was added for calculating the value of the temperature in Rankine in order to use a more precise value for the calculation.

ExtComb

5. Ethyl Benzene: The emission factor for ethyl benzene from Ventura County APCD's AB 2588 Combustion Emission Factors for natural gas fired external combustion equipment was added, consistent with Section 4.2.1 of the 2013 ATEIP.

Internal Combustion

6. Speciated Emission Factors: In the spreadsheet submitted by ExxonMobil, the speciated hourly diesel combustion emission factors were determined by comparing factors from Ventura County APCD and USEPA's AP-42, and then selecting the lower of the two sets of factors for each pollutant. Consistent with Section 4.2.3 of the 2013 ATEIP, the District modified the calculations to use the approved Ventura County APCD emissions factors for all pollutants.
7. Diesel Exhaust: Because there are no 8-hour or acute RELs for diesel particulate matter (diesel PM), the annual and hourly emissions from diesel engines are speciated to calculate the 8-hour and acute non-cancer risks. The speciated emissions were only calculated for Tier 2 diesel engines less than 750 bhp and Tier 1 and Tier 0 engines because the emission factors are not representative for engines of other Tier ratings. In order to avoid overestimating the risk, the speciated annual emissions are not included in the cancer or chronic non-cancer risk calculations. Furthermore, the hourly emissions of DPM were removed to clearly show that risk is not calculated from these emissions.
8. Hours of Operation: The hours of operation for the Emergency Air Generator, Emergency Generator (G-800), Firewater Pump A, Firewater Pump B, Firewater Pump (805), and Firewater Pump (806) presented in an attachment to Patrice Surmeier's September 30, 2019 email were added. The emission calculations for these engines were modified so that they were based on the hours of operation rather than the incomplete fuel usage record.
9. Light Towers: The diesel PM emission factors for the light towers were changed to 0.6 g/bhp-hr based on the model years, as requested in ExxonMobil's addendum to the 2013 ATEIP.
10. Fuel Consumption: As requested in ExxonMobil's addendum to the 2013 ATEIP, the fuel consumption calculations were revised to use the District's default brake-specific fuel consumption of 7800 Btu/bhp-hr for Tier 0 engines and 7500 Btu/bhp-hr for Tier 2 and Tier 3 engines.

11. Load Factors: Load factors were removed from the maximum hourly emission calculations.

12. Maximum Hourly Operating Scenario: Engine operating logs for 2013 were included as an attachment to Patrice Surmeier's September 30, 2019 email. These logs show that only the following engines operated during the 1-hour period with the highest emissions: the Emergency Air Generator, Firewater Pump (805) and Firewater Pump (806) at POPCO. Hourly emissions for all engines are presented in the spreadsheet for informational purposes. Because variable emissions were not used in the HRA, only the worst-case hourly operating scenario was required to modeled. For this reason, only emissions from the Emergency Air Generator, Firewater Pump (805) and Firewater Pump (806) at POPCO were included in the HRA for the acute non-cancer risk analysis.

ThermalOx

13. Fuel Quantities: The annual fuel quantities for the POPCO Thermal Oxidizer – Planned Other and Purge & Pilot operations were revised to match the 2013 Compliance Verification Reports, consistent with Section 4.2.4 of the 2013 ATEIP.

14. Tail Gas: The amount of tail gas sent to the Waste Gas Incinerator during normal operations was revised to match the 2013 Compliance Verification Reports, consistent with Section 4.2.4 of the 2013 ATEIP.

15. Emission Factors: In the spreadsheet submitted by ExxonMobil, Venoco's 2004 source test emission factors were used to calculate emissions from the thermal oxidizers. Consistent with Section 4.2.4 of the 2013 ATEIP, the District modified the calculations to use the approved Ventura County APCD emission factors.

Turbine

16. PAH Factor: The emission factor for polycyclic aromatic hydrocarbons (PAHs) from USEPA's AP-42 Table 3.1-3 was added, consistent with Section 4.1.1 of the 2013 ATEIP.

17. Naphthalene Factor: To avoid double counting any risk from naphthalene already captured in the PAH emission factor, ExxonMobil requested that the District subtract the naphthalene emission factor from the PAH emission factor for the natural gas-fired turbine. The District reviewed the background documentation for the PAH and naphthalene factors from USEPA's AP-42 Table 3.1-3. The naphthalene factor is based on the average of four source tests, one of which did not detect naphthalene in all three runs. The naphthalene value from the test[1] with non-detect results was set equal to half the detection limit, and then averaged with the other three source tests to determine naphthalene factor presented in Table 3.1-3 of AP-42. Due to the naphthalene test with non-detect results, the District determined that it was not appropriate to subtract the naphthalene factor from the PAH factor. Instead, the emission factor for naphthalene was set to zero. Naphthalene has a chronic REL while PAHs (treated as benzo(a)pyrene for the HRA) do not, and PAHs have a higher cancer risk factor than naphthalene. Because the chronic non-cancer risk in this HRA is much lower than the District's significance threshold, the naphthalene emission factor was excluded, accounting for all naphthalene emissions in the PAHs emission factor, as a health conservative assumption.

18. Maximum Rating: The maximum hourly rating in MMBtu/hr for the CPP Planned Bypass turbine was revised to match the District PTO 5651-R5, consistent with Section 4.1.1 of the 2013 ATEIP.

19. Maximum Hourly Operating Scenario: The turbine can only operate in one mode at a time (i.e., normal operations, HRSG only, or planned bypass). Normal operations of the turbine result in higher emissions than the other two modes. Hourly emissions for all modes are presented in the spreadsheet

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[1] ID 27 from USEPA's Access database, available at: https://www3.epa.gov/ttn/chief/ap42/ch03/index.html. Testing occurred on May 5, 1993 at Sargent Canyon Cogen in Bakersfield, California.

for informational purposes. Because variable emissions were not used in the HRA, only the worst-case hourly operating scenario was required to modeled. For this reason, only emissions from normal operation of the turbine were included in the HRA for the acute non-cancer risk analysis.

Stretford System

20. Annual Emissions: Equation 4-35 of Section 4.2.5 of the 2013 ATEIP contains an error: the inclusion of the operation fraction, which is unitless, causes the annual emissions to be incorrectly calculated in units of lb/hr. The District rectified this error by removing the division by 8760 from the formulas for all annual emissions calculations, resulting in emissions correctly calculated in units of lb/yr.
21. Hourly Emissions: The hourly emissions from the Stretford system were revised to reflect Equation 4-34 of Section 4.2.5 of the 2013 ATEIP. The ATEIR submitted by ExxonMobil bases the hourly emissions on the annual emissions divided by 8760. Due to the error in the annual emissions calculation described above, the hourly emissions were calculated incorrectly in ExxonMobil's ATEIR and were corrected by the District.
22. Sodium Hydroxide: Emission calculations for sodium hydroxide were added based on the 1990 sampling results for the Stretford Outlet stream (SP-10), as reported in Appendix A of ExxonMobil's *Las Flores Canyon Facility: AB 2588 Air Toxics Emission Inventory Report for 1993/1994.*
23. Aerators: Emissions were not calculated for the aerators, consistent with ExxonMobil's addendum to the 2013 ATEIP.
24. Drift Fraction: As requested in ExxonMobil's addendum to the 2013 ATEIP, the drift fraction was changed from 0.02 to 0.0002, the default value for evaporative coolers with low-efficiency drift eliminators from CARB's *Technical Support Document to Proposed Hexavalent Chromium Control Plan*. The Ralph M Parsons Company specifications for the evaporative cooler, submitted by Patrice Surmeier via email to David Harris on July 8, 2019, show that it is equipped with drift eliminators.

FHC – VOC Categories

25. Component Leak Paths: Component leak path (CLP) counts were revised to match values from Appendices H and I from the 2013 ATEIP. This also adjusted the total CLP counts and daily ROC emissions in the table at the bottom of this tab.

FHC – Gas Toxics, FHC – Oil Toxics, and FHC – Pump Seal Toxics

26. Vapor Recovery: In the spreadsheet submitted by ExxonMobil, the LFC-3 stream sampling results were applied to the Vapor Recovery components. The District applied the LFC-2 stream sampling results to the Vapor Recovery components, consistent with Table 1 of the sampling plan in the 2013 ATEIP.
27. Annual and Hourly Emissions: The daily emissions were incorrectly labeled as the annual emissions. The District corrected the annual emissions by multiplying the daily emissions by 365 days/year. This correction also changed the hourly emissions because they are equal to the annual emissions divided by 8760. This is consistent with the methodology approved in Sections 4.1.11 and 4.2.9 of the 2013 ATEIP, which state that the fugitive TOC emissions will be calculated using the emission factors defined in District PTO 5651 and PTO 8092 for the LFC and POPCO facilities, respectively.

Paints

28. Volume Units: In an attachment to Patrice Surmeier's September 30, 2019 email, ExxonMobil states that the usage of Carbothane 134 and Carbomastic 15 paints at POPCO were incorrectly reported in units of ounces. Because of this, ExxonMobil erroneously divided the usage by 128 to calculate the

volume in units of gallons in their ATEIR spreadsheet submitted in February 2015. The District corrected the calculation by removing the division by 128 in cells O28 and AB28.

29. VOC Emissions: The formulas for calculating the VOC emissions from the paints were inserted into the corresponding cells, which had previously contained a value rather than a calculation formula. This made only small adjustments to the calculated VOC emissions, with one exception: the hourly emissions from Carboguard 893 at POPCO were reduced by about two orders of magnitude.

Pigging

30. Hexane: CARB's Oil and Gas Production Fugitives – Gas Service speciation profile No. 757 lists "Isomers of hexane," but does not specify a weight fraction for n-hexane. Because the weight fraction of n-hexane could be equal to the weight fraction of the isomers of hexane, the District updated the calculations assuming that all isomers of hexane are n-hexane.

Produced Water System

31. Vapor Pressure: The value for the vapor pressure of water at 25 °C (p_{a1}) was corrected based on the following source: https://www.engineeringtoolbox.com/water-vapor-saturation-pressure-d_599.html.

32. Temperature: A row was added for calculating the value of the temperature in Rankine in order to use a more precise value for the calculation.

33. Control Efficiency: The control efficiencies were corrected to match the District PTO 5651-R5, and calculations were modified to include a reduction in emissions due to the equipment's control efficiency.

Steam System

34. Hydrazine: Emissions of hydrazine from the Deaerator and Steam System Chemical Injection System were calculated based on Section 4.1.7 of the 2013 ATEIP, which states that the solution contains 0.01% hydrazine.

Sumps Separators

35. VOC Emission Factor: The VOC emission factors for the Open Drain Sumps at the OTP and SGTP were corrected to match District PTO 5651-R5, which uses the CARB/KVB method to calculate VOC emissions. This is consistent with Section 4.1.8 of the 2013 ATEIP, which states that the emissions would be calculated using the CARB/KVB method.

36. VOC Emissions: The District corrected the annual VOC emission calculations using the formula shown below. As the control efficiency is already included in the emission factors, taken from District PTO 5651-R5, this formula is consistent with Equation 4-17 in Section 4.1.8 of the 2013 ATEIP.

$$Annual\ VOC\ Emissions = \frac{EF_{VOC}\ (lb/(ft^2 * day)) * SA\ (ft^2)}{24\ hours/day} * 8760\ hours/year$$

37. Backwash Sump: Sodium hydroxide emissions from the backwash sump were added, using a 20% sodium hydroxide solution, consistent with Section 4.1.8 of the 2013 ATEIP, and the methodology outlined in Section 4.1.6 of the 2013 ATEIP. Because the methodology for calculating the sodium hydroxide emissions from this sump was not explicitly stated in Section 4.1.8, it was inferred that the same methodology should be used for these emissions as the sodium hydroxide emissions from the caustic tanks, as presented in Section 4.1.6.

Tanks

38. Tank Throughput: The throughputs for Rerun Tanks A and B were revised to match the 2013 Compliance Verification Reports, consistent with Section 4.1.4 of the 2013 ATEIP.

39. Demulsifier Tote Tanks: In the spreadsheet submitted by ExxonMobil, VOC emissions from the Demulsifier Tote Tanks were divided by four because the 2013 ATEIP states that four tanks would be modeled. However, because only two Demulsifier Tote Tanks were modeled in the HRA, these emission calculations were revised to divide the total emissions by two tanks, rather than four.

Tanks – VOC

40. Tank Throughput: The annual throughput for Rerun Tanks A and B were revised to match the 2013 Compliance Verification Reports, consistent with Section 4.1.4 of the 2013 ATEIP.

41. API Gravity: The API gravity was revised to match the OEC analytical results provided in the 2013 Compliance Verification Reports. The API gravity value was not specified in the 2013 ATEIP.

Truck Loading

42. Sulfur Loading: The hydrogen sulfide emissions from truck loading at LFC were erroneously omitted from the 2013 ATEIP. The District added hydrogen sulfide emissions from sulfur loading at the LFC facility in 2013 based on the information provided by ExxonMobil in their response to the District's request for information, dated September 18, 2017.

43. Maximum Hourly Operating Scenario: Sulfur loading logs for 2013 were included as an attachment to Patrice Surmeier's September 30, 2019 email. These logs show that the maximum amount of sulfur loaded during a single hour in 2013 was 50,540 lb. The District revised the hourly emission calculation to be based on this maximum hourly loading operating scenario rather than assuming the maximum sulfur emission rate of 0.0015 lb/min for an entire hour.

Vents

44. Hexane: CARB's Oil and Gas Production Fugitives – Gas Service speciation profile No. 757 lists "Isomers of hexane," but does not specify a weight fraction for n-hexane. Because the weight fraction of n-hexane could be equal to the weight fraction of the isomers of hexane, the District updated the calculations assuming that all isomers of hexane are n-hexane.

Welding

45. Emission Factors: In the spreadsheet submitted by ExxonMobil, the welding emissions were double counting the fume correction factors and fume generation rates, because the San Diego APCD emission factors already account for these factors. The District corrected the emission calculations to match the approved method from Section 4.1.12 of the 2013 ATEIP, using the formula shown below. This correction increased the emissions by less than an order of magnitude.

$$Annual\ Emissions = U_a\ (lb\ rod/year)\ *\ EF\ (lb\ TAC/lb\ rod)$$

46. Hexavalent Chromium from SMAW: An error was found in the San Diego APCD document for the hexavalent chromium emission factor from shielded metal arc welding (SMAW). The document states that the emission factor is 3.32E-3 * Ci (the concentration of the metal within the rod). However, using the formula from the document yields an emission factor of 3.61E-3 * Ci. ExxonMobil identified this error in an attachment to Patrice Surmeier's September 30, 2019 email. The District corrected the emission factor.

47. TIG Gas Arc Welding: As requested in ExxonMobil's addendum to the 2013 ATEIP, the District removed the gas metal arc welding (GMAW) emissions and added the tungsten inert gas (TIG) arc welding emissions based on the weight and chemical composition data submitted by ExxonMobil.

Paint Speciation

48. Enviroline 405HT: In the spreadsheet submitted by ExxonMobil, the weight fractions of ethylbenzene and xylenes for the paint Enviroline 405HT were entered as 10. The District corrected the fractions for both pollutants to 0.10.

Actual Speciation Table

49. Molecular Weight: The molecular weights of cyclohexane, sodium hydroxide, and naphthalene were corrected.

50. Hexane: CARB's Oil and Gas Production Fugitives – Liquid Service speciation profile No. 756 lists "Isomers of hexane," but does not specify a weight fraction for n-hexane. Because the weight fraction of n-hexane could be equal to the weight fraction of the isomers of hexane, the District updated the calculations assuming that all isomers of hexane are n-hexane.

Stream Data

51. Molecular Weight: The molecular weights of cyclohexane and naphthalene were corrected.

52. Lab Analyses: Data were corrected to match the results from the provided lab analyses. A value equal to half the detection limit was used for results that were under the detection limit. However, if there were multiple samples and all were non-detect, then a value of zero was used.[2] More details on the changes to the data in this tab are described in items #48-51 below.

53. Carbonyl Sulfide: Carbonyl sulfide results were included for streams in which the lab analyses detected it, as carbonyl sulfide is listed in *Appendix A-I: Substances for Which Emissions Must be Quantified* of CARB's *Emission Inventory Criteria and Guidelines for the Air Toxics "Hot Spots" Program* document.

54. LFC-7 Stream: The District changed the concentration of hydrogen sulfide in the LFC-7 stream to zero, consistent with our policy of using a value of zero when there are at least three samples and the lab analysis shows the concentration of the pollutant was below the detection limit for all samples.

55. POP-6 Stream: The District changed the weight fraction of methanol in the POP-6 stream to zero, consistent with our policy of using a value of zero when there are at least three samples and the lab analysis shows the concentration of the pollutant was below the detection limit for all samples.[1]

MSDS

56. Weight Fractions: The weight percentages of acid within solution were modified to be consistent with Section 4.1.6 the 2013 ATEIP. Additionally, the District adjusted the calculations to use the maximum weight fraction of each pollutant when a range was shown in the Material Safety Data Sheet.

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[2] This policy is from the section titled "Reporting Emissions Derived from Below the Limit of Detection Source Test Results," starting on page B II - 21 of *Appendix B-II: Reporting Forms and Instructions* of CARB's *Emission Inventory Criteria and Guidelines for the Air Toxics "Hot Spots" Program* document.