

**Bay Area Air Quality Management District**

939 Ellis Street  
San Francisco, CA 94109  
(415) 771-6000

**Proposed "Revision 5"**

**Permit Evaluation  
and  
Statement of Basis  
for a  
Minor Revision of the**

**MAJOR FACILITY REVIEW PERMIT**

for

**Tesoro Refining & Marketing Company, LLC  
Facility # B2758 & Facility #B2759**

**Facility Address:**

Facility #B2758  
Golden Eagle Refinery  
150 Solano Way  
Martinez, CA 94553

Facility #B2759  
Amorco Terminal  
1750 Marina Vista Way  
Martinez, CA 94553

**Mailing Address:**

Golden Eagle Refinery, 150 Solano Way  
Martinez, CA 94533

Application Engineer: Arthur Valla  
Site Engineer: Arthur Valla

November 5, 2015

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## **Title V Statement of Basis**

### **A. Background**

This facility is subject to the Operating Permit requirements of Title V of the federal Clean Air Act, Part 70 of Title 40 of the Code of Federal Regulations (CFR), and BAAQMD Regulation 2, Rule 6, Major Facility Review because it is a major facility as defined by BAAQMD Regulation 2-6-212. It is a major facility because it has the “potential to emit” (as defined by BAAQMD Regulation 2-6-218) more than 100 tons per year of a regulated air pollutant.

Major Facility Operating permits (Title V permits) must meet specifications contained in 40 CFR Part 70 as contained in BAAQMD Regulation 2, Rule 6. The permits must contain all “applicable requirements” (as defined in BAAQMD Regulation 2-6-202), monitoring requirements, recordkeeping requirements, and reporting requirements. The permit holders must submit reports of all monitoring at least every six months and compliance certifications at least every year.

In the Bay Area, state and District requirements are also applicable requirements and are included in the permit. These requirements can be federally enforceable or non-federally enforceable. All applicable requirements are contained in Sections I through VI of the permit.

Each facility in the Bay Area is assigned a facility identifier that consists of a letter and a 4-digit number. This identifier is also considered to be the identifier for the permit. The identifiers for these facilities are B2758 and B2759.

The District issued the initial Title V permit to these facilities on December 1, 2003. The permit has been reopened several times, as outlined below.

*Revision 1:* The District issued a reopened permit, Revision 1, that amended flare and Regulation 9-10 requirements, corrected errors, and incorporated some new sources and permit conditions on December 16, 2004. This reopening is generally referred to as “Revision 1”.

*Revision 1.5:* On October 8, 2004, EPA sent a letter formally objecting to the permit because it did not include monitoring or a design review for the destruction efficiency of thermal oxidizers. The permit was revised to address EPA’s objection in a reopening of the permit that was proposed on February 1, 2005. The revised permit was issued on April 12, 2005. This reopening is generally referred to as “Revision 1.5”. There are no revisions designated 1.1, 1.2, 1.3 or 1.4.

*Revision 2:* EPA’s October 8, 2004 letter also included comments identifying a number of issues to be resolved in the District’s refinery Title V permits. (Note that EPA commented on five refineries in this letter. Not all comments concern this facility.) To address those deficiencies, the District proposed another reopening, generally referred to as “Revision 2”, and published it for public comment on April 15, 2005. In addition, some issues raised in the refinery’s appeal to the December 16, 2004 permit and some refinery comments on that permit were addressed.

*Revision 3:* On March 15, 2005, shortly before the Revision 2 reopening was proposed, EPA issued an Order directing the District to reopen the permit to address possible deficiencies that EPA had identified based on petitions it received from the public to object to the permit. To address those possible deficiencies, the District proposed another reopening, generally referred to as Revision 3, in order to address the issues raised in the Order. The District proposed Revision 3 and published it for public comment on August 2, 2005. EPA and one other organization submitted comments. The District finalized Revision 2 and Revision 3 concurrently. The revised permit was issued on March 9, 2007.

*Revision 4:* During the time the District was addressing the issues of the Revision 2 reopening and the Revision 3 reopening, many permit applications were received from the facility. Revision 4 was a Significant Revision incorporating changes from all of these applications (listed in the statement of basis for that Revision). Revision 4 was the final permit revision prior to the 2008 permit renewal and forms the basis for the renewal submission. The revised permit was issued on March 20, 2008.

*Renewal:* The District issued the Renewed Title V permit to these facilities on June 28, 2011.

*Revision 5 Renewal:* The "Rev 5" permit is an update of the 2011 Renewed permit incorporating all of the changes due to permit applications and corrections. The proposed permit shows all changes to the permit in strikeout/underline format. Details of proposed permit changes are listed in Section C of this document

## **B. Facility Description**

The Title V permit includes the Golden Eagle Refinery and the Amorco Terminal. There are no changes to the facility description.

## **C. Permit Content**

The legal and factual basis for the permit follows. The permit sections are described in the order presented in the permit.

### Changes to permit:

1. The name of the facility owner was changed to Tesoro Refining & Marketing Company, LLC and the facility contact was changed to Matthew W. Buell (Title V Application 25191).
2. The name of the Responsible Official was changed to Thomas A. Lu (Title V Application 27121).

## **I. Standard Conditions**

This section contains administrative requirements and conditions that apply to all facilities. If the Title IV (Acid Rain) requirements for certain fossil-fuel fired electrical generating facilities or the accidental release (40 CFR § 68) programs apply, the section will contain a standard

condition pertaining to these programs. Many of these conditions derive from 40 CFR § 70.6, Permit Content, which dictates certain standard conditions that must be placed in the permit. The language that the District has developed for many of these requirements has been adopted into the BAAQMD Manual of Procedures, Volume II, Part 3, Section 4, and therefore must appear in the permit.

The standard conditions also contain references to BAAQMD Regulation 1 and Regulation 2. These are the District's General Provisions and Permitting rules.

### Changes to permit:

Amendment dates have been updated for BAAQMD Regulation 1, Regulation 2, Rules 1, 2 and 5.

## **II. Equipment**

This section of the permit lists all permitted or significant sources. Each source is identified by an S and a number (e.g., S24).

Permitted sources are those sources that require a BAAQMD operating permit pursuant to BAAQMD Rule 2-1-302.

Significant sources are those sources that have a potential to emit of more than 2 tons per year of a "regulated air pollutant" (as defined in BAAQMD Rule 2-6-222) or 400 pounds per year of a "hazardous air pollutant" (as defined in BAAQMD Rule 2-6-210).

All abatement (control) devices that control permitted or significant sources are listed. Each abatement device whose primary function is to reduce emissions is identified by an A and a number (e.g., A-24). If a source is also an abatement device, such as when an engine controls VOC emissions, it will be listed in the abatement device table but will have an "S" number. An abatement device may also be a source (such as a thermal oxidizer that burns fuel) of secondary emissions. If the primary function of a device is to control emissions, it is considered an abatement (or "A") device. If the primary function of a device is a non-control function, the device is considered to be a source (or "S").

The equipment section is considered to be part of the facility description. It contains information that is necessary for applicability determinations, such as fuel types, contents or sizes of tanks, etc. This information is part of the factual basis of the permit.

Each of the permitted sources has previously been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. These permits are issued in accordance with state law and the District's regulations. The capacities in the permitted sources table are the maximum allowable capacities for each source, pursuant to Standard Condition I.J and Regulation 2-1-403.

Changes to permit:

1. S-1024 Exempt Tank was removed from Table II-B and II-C. It was removed from service in 2012.
2. S-1549 was added to Table II-A1 (Title V Application 20969).
3. S-1552 was added to Table II-A1 (Title V Application 22153).
4. The limit on the hours of operation for S-1550 and S-1551 were removed (Title V Application 22170)
5. S-1553 was added to Table II-A (Title V Application 22170).
6. A-1553 was added to Table II-B (Title V Application 22170).
7. S-58 was added to Table II-A2 (Title V Application 21714)
8. S-1554 was added to Table II-A1 (Title V Application 22824)
9. In Table II-B a row for A-14 was added abating S-1554 (Title V Application 22824)
10. Did not change capacity of S-850 in Table II-A1 to be consistent with the permitted capacity granted in NSR Permit Application 3318. An S-850 expansion to 70,000 BPD was proposed in the Clean Fuels Project (1995 Application 10912), but this expansion was constructed without additional fugitive components. Thus no offsets were required. The 70,000 BPD capacity increase in Condition 8077 Part B6B for the Authority to Construct granted via Application 10912 is a valid limit. District records will be corrected to remove the "Expired AC" from S-850 in Application 10912.
11. In Table II-A1, corrected firing rates for S-973 and S-974 and corrected Condition 8077 basis. The firing rates for these two No 3 HDS furnaces were inadvertently reversed when permitted in NSR Permit Application 27769.
12. In Table IIB, updated the operating parameters information for A-963 Steam Injection System abating S-963 Alkylolation Plant Gas Turbine (Title V Application 23233).
13. In Table IIA, updated and corrected capacity information for S-955 through S-960 (Title V Application 23882).
14. In Table IIB, added CO abatement limits for S-952, S-953 and S-954, and updated NOx abatement limits for S-955 through S-960 (Title V Application 23882).
15. In Table IIA, updated S-690 to show the NSR review in 2005 Permit Application 11737.
16. In Table IIA, corrected S-1009 Alkylolation Unit to show that it is a NSR source permitted via 1995 Tosco Application 10912.
17. In Table IIA, updated S-613 to reflect the vapor storage service (Title V Application 23982). It is noted that even in vapor storage service, there may be organic liquid in the tank because heavier components in the vapor may condense in the tank.
18. In Table IIB, removed S-613 from A-14 8-5-306 control to reflect the Regulation 8, Rule 33 vapor storage service of S-613 (Title V Application 23982).
19. In Table II-C, removed S-369 and S-406, both removed from service in March 2012.
20. In Table II-A1, revised footnotes 1, 2, and 3, and added footnote 4 clarifying the operation of the flares (Title V Application 24066).
21. Added all flares to Table II-B to be consistent with District Policy and the other refinery Title V permits.
22. In Table II-A1, removed the Grandfathered Limit designation for flares S-854, S-992 and S-1013, all of which were constructed in 1979 or later. Added the Basis for the capacity to by referring to the appropriate permit application.
23. In Table II-A1, added capacities for flares S-1517 and S-1524 to be consistent with the other flares in Table II-A1.

24. In Table II-A1, corrected the capacities of S-971, S-972 and S-1020, consistent with the capacities approved in NSR Permit Application 23322 (Title V Application 23323).
25. In Table II-A1, corrected the capacity of S-1004 based on the 1996 maximum throughput data provided by Tesoro.
26. In Table II-A1, replaced the grandfathered limit basis for S-802 with the Firm Emissions Limit Condition 11433 established in 1994 NSR Application 12722.
27. In Table II-A1, added S-1555 Reformate Splitter. This source was formerly combined with S-1004 No 2 Catalytic Reformer. It was separated from S-1004 because when it was modified in NSR Application 10912, it was permitted to processes reformate from the S-1020 No 3 Catalytic Reformer as well and has a higher NSR capacity limit than the grandfathered S-1004.
28. In Table II-A1, revised S-908 indicating that it is a grandfathered source that has never been subject to the requirements of Regulation 2, Rule 2, New Source Review. Added Condition 25476, part 5 from Permit Application 23322.
29. In Table II-A1, revised the permitted capacities and/or capacity bases of S-915, S-916, S-919, S-920 and S-921 based on 1991 NSR Application 6468. Added Condition 8350. (Title V Application 23323)
30. In Table II-A1, revised the capacity bases of S-917 based on 1987 NSR Application 164. Added Condition 8350 (Title V Application 23323).
31. In Table II-A1, revised the permitted capacity of S-926 to 130MMBtu/hr based on 2013 Application 25523. Added "Grandfathered Source" because S-926 was initially operated in 1957 and has never been modified (Title V Application 25636).
32. In Table II-A1, revised the permitted capacities and/or capacity bases of S-928-933, S-934 and S-935 based on 1987 NSR Application 548. Added Condition 8077. (Title V Application 23323).
33. Corrected the permitted throughput for S-612 from 243K to 1,200K bbl/yr consistent with Condition 6740 Part 3 (Title V Application 23854).
34. Added S-1557 Emergency Generator to Table II-A.1 (Title V Application 25958).
35. In Table II-A.1, revised S-1412 to the New Source Review limits determined in Permit Application 25758 that evaluated the unpermitted 1980 modification (Title V Application 25759).
36. In Table II-A.1, revised the annual firing rate limit of S-950 to be consistent with Condition 25161 (Tesoro 4/30/15 Comment # 21)
37. In Table II-B, corrected A1433 showing that it does not abate S-972 and added row for A1433 showing NOx limit of Condition 25476-10 (Title V Application 23323).
38. In Table II-A.1, added Condition 25476 and/or revised capacity for S-971, S-972 and S-1020. (Title V Application 23323).
39. In Table II-A1, removed demolished tanks S-315, 318, 367, 529, 530, 587 and 588. (Tesoro Comment # 61)
40. In Table II-A1, removed S-659 and S-660 Coke Storage Tanks because they have been demolished. Also removed A-9 in Table II-B.
41. In Table II-A1, removed S-809 and S-810 because the permits were surrendered in 2012.
42. In Table II-A1, added "Grandfathered Source" to S-904 because it was initially operated in 1956 and has never been modified.
43. In Table II-A1, added "Grandfathered Source" to S-908 because it was initially operated in 1937 and has never been modified.
44. In Table II-A1, revised annual firing rate limits for S-909, S-912 and S-950, and added Condition 25161 (Title V Application 23425).



45. In Table II-A1, "New source review" was removed from Limit basis for S-1469, 1471, 1472, 1475, 1476. These engines were initially permitted as a Loss of Exemption in 2002 Application 4389 and were not subject to Regulation 2, Rule 2.
46. In Table II-A2, removed S-19, S-21, S-30, S-49 and S-50 Amorco Terminal Tanks and S-56 Firewater Pump because they are now owned by Tesoro Logistic Operations and are included in a separate Title V permit (Facility E1200).
47. In Table II-A2, added "Grandfathered Source" to S-55 because it was initially operated prior to 1972 and has never been modified.
48. In Table II-C, removed demolished tanks S-2, 269, 271, 368, 369, 377, 378, 406 and 503. (Tesoro Comment # 61)

### **III. Generally Applicable Requirements**

This section of the permit lists requirements that generally apply to all sources at a facility including insignificant sources and portable equipment that may not require a District permit. If a generally applicable requirement applies specifically to a source that is permitted or significant, the standard will also appear in Section IV and the monitoring for that requirement will appear in Sections IV and VII of the permit. Parts of this section apply to all facilities (e.g., particulate, architectural coating, odorous substance, and sandblasting standards). In addition, standards that apply to insignificant or unpermitted sources at a facility (e.g., refrigeration units that use more than 50 pounds of an ozone-depleting compound) are placed in this section.

Unpermitted sources are exempt from normal District permits pursuant to an exemption in BAAQMD Regulation 2, Rule 1. They may, however, be specifically described in a Title V permit if they are considered "significant sources" as defined in BAAQMD Rule 2-6-239.

### **IV. Source-Specific Applicable Requirements**

This section of the permit lists the applicable requirements that apply to permitted or significant sources. These applicable requirements are contained in tables that pertain to one or more sources that have the same requirements. The order of the requirements is:

- District Rules
- SIP Rules (if any) are listed following the corresponding District rules. SIP rules are District rules that have been approved by EPA for inclusion in the California State Implementation Plan. SIP rules are "federally enforceable" and a "Y" (yes) indication will appear in the "Federally Enforceable" column. If the SIP rule is the current District rule, separate citation of the SIP rule is not necessary and the "Federally Enforceable" column will have a "Y" for "yes". If the SIP rule is not the current District rule, the SIP rule or the necessary portion of the SIP rule is cited separately after the District rule. The SIP portion will be federally enforceable; the non-SIP version will not be federally enforceable, unless EPA has approved it through another program.
- Other District requirements, such as the Manual of Procedures, as appropriate.
- Federal requirements (other than SIP provisions)
- BAAQMD permit conditions. The text of BAAQMD permit conditions is found in Section VI of the permit.

- Federal permit conditions. The text of Federal permit conditions, if any, is found in Section VI of the permit.

Section IV of the permit contains citations to all of the applicable requirements. The text of the requirements is found in the regulations, which are readily available on the District or EPA websites, or in the permit conditions, which are found in Section VI of the permit. All monitoring requirements are cited in Section IV. Section VII is a cross-reference between the limits and monitoring requirements. A discussion of monitoring is included in Section C.VII of this permit evaluation/statement of basis.

District permit applications included in this proposed permit

This facility sends a large number of permit applications to the District every year. Review of the following permit applications was completed in time to include the results in this Title V permit. The Title V permit will be revised periodically to incorporate these applications as permit revisions following the procedures in Regulation 2, Rule 6, Major Facility Review.

| Application # | Revision Type  | Project Description   |
|---------------|----------------|---|
| 11737         | Minor          | S-690 Crude Oil Tank Modification                             |
| 20968/20969   | Minor          | S-1549 Tank 890 Diesel Additive Tank                          |
| 21072/21141   | Minor          | S-912 NOx Box Revision  |
| 21713/21714   | Minor          | S-58 Amorco Wharf Diesel Generator                            |
| 21744/21744   | Minor          | S-1510 Delayed Coker Emissions Revision                       |
| 21787/21790   | Minor          | S-926 NOx Box Revision  |
| 21797/21800   | Minor          | S-913 NOx Box Revision  |
| 22148/22163   | Administrative | S-1524 Flare Change of Conditions                             |
| 22149/22151   | Minor          | S-919 NOx Box Revision  |
| 22152/22153   | Minor          | S-1552 Emergency Diesel Engine                                |
| 22169/22170   | Minor          | S-1553 Backup Boiler  |
| 22580/22581   | Minor          | S-920 NOx Box Revision  |
| 22582/22583   | Minor          | S-926 NOx Box Revision  |
| 22615/22624   | Minor          | S-1020 Reformer Hot Feed Project                              |
| 22823/22824   | Minor          | S-1554 High Sulfur Vacuum Gas Oil Tank                        |
| 22971/22972   | Minor          | S-913 NOx Box Revision  |
| 23006/23007   | Administrative | NOx Box Change of Condition 18372                             |
| 23075         | N/A            | Alteration to S-802 FCCU                                      |
| 23232/23233   | Minor          | S-963 Alkylation Unit Gas Turbine CAM Plan                    |
| 23322/23323   | Minor          | S-1020 No. 2 Reformer Capacity Increase                       |
| 23339/23340   | Minor          | S-920 NOx Box Revision  |
| 23341/23425   | Minor          | S-1001 50 Crude Unit AGO Project                              |
| 23848/23882   | Minor          | Title V Renewal Appeal Items -- Engines                       |
| 23869         | Minor          | Greenhouse Gas Requirements Removal                           |
| 23870/23871   | Minor          | S-916 NOx Box Revision  |
| 23854         | Minor          | Title V Renewal Appeal # 8&9, Wastewater, & #21 Miscellaneous |
| 23981/23982   | Minor          | S-613 Bladder Tank and S-1025 Gasoline Truck Rack             |
| 24056/24057   | Administrative | Bubble Condition 8077 Corrections                             |
| 24065/24066   | Minor          | Title V Renewal Appeal Items -- Flares                        |

|             |                |   |
|-------------|----------------|---|
| 24362/24363 | Administrative | Change S-913 from 40# to 100# Fuel Gas Supply   |
| 24693       | Administrative | Responsible Official Change   |
| 24920/24921 | Minor          | S-916 NOx Box Revision  |
| 25006/25007 | Minor          | S-913 NOx Box Revision  |
| 25191       | Administrative | Facility Owner and Contact Name Change  |
| 25523/25636 | Administrative | S-926 No. 2 Reformer Splitter Reboiler  |
| 25758/25759 | Minor          | S-1412 Sulfuric Acid Plant Start-up Heater 1980 Modification and 2014 Alteration      |
| 25942/25958 | Minor          | S-1557 Emergency Generator, Diesel Engine   |
| 26159/26160 | Minor          | S-920 NOx Box Revision  |
| 26272/26273 | Minor          | No 3 HDS Performance Test S-850, S-973, S-974, and Refinery Emissions Cap Adjustments |

District permit applications not included in this proposed permit

Review of the following permit applications was not completed in time to include the results in this Title V permit. The Title V permit will be revised periodically to incorporate these applications as permit revisions following the procedures in Regulation 2, Rule 6, Major Facility Review.

| Application # | Revision Type | Project Description                             |
|---------------|---------------|---|
| 23138/23139   | Significant   | S-1005 Source Test Frequency Change             |
| 25718/25719   | Minor         | S830 S977 S980 Grandfathered Limit Exceedance   |
| 26422/26423   | Minor         | S-920 NOx Box Revision                          |
| 26552         | N/A           | Delayed Coker Steam Ejectors                    |
| 26602/26603   | Minor         | Slop Oil System Change in Operation             |
| 26715/26716   | Minor         | Consent Decree Change in Conditions             |
| 27030/27031   | Minor         | Coker Flare Change in Conditions                |
| 27054/27065   | Minor         | S-904 No 6 Boiler House Burner Replacement      |
| 27058/27068   | Minor         | S-1411 Sulfuric Acid Plant Alteration           |
| 27309/27310   | Minor         | S-973/974 No 3 HDS Furnace Change in Conditions |
| 27395/27396   | Minor         | Back-up Boilers                                 |

Changes to permit:

1. Added Permit Condition 27424 to Crude Oil Tank S-690 in Table IV-F.1 (Application 11724).
2. S-1024 Exempt Tank was removed from Table IV-F1 and IV-F2. It was removed from service in 2012.
3. S-1549 was added to Tables IV-F.1 and IV-F.2 (Title V Application 20969).
4. Removed 40 CFR 98 and CCR Title 17 Subchapter 10, Article 2, 95101-95130 from Table IV-A.1 (Title V Application 23869).
5. Removed 40 CFR 98 and CCR Title 17 Subchapter 10, Article 2, 95101-95130 from Table IV-A.2 (Title V Application 23869).
6. Added Table IV-C.3.7 for S-1552 Emergency Diesel Water Pump (Title V Application 22153).

7. Added S-1553 to Table IV-C.1.3, and deleted Condition 22491, Part 3 (Title V Application 22170).
8. Added Permit Condition 24834 and 25476 to Table IV-B.10 for S-1020 (Title V Applications 22624 and 23323).
9. Added BAAQMD Regulations 8-5-306.2 and 8-5-502.2 to Table IV-F.3.
10. Added S-1554 to Tables IV-F.1 and IV-F.2 (Title V Application 22824).
11. In Table IV-B.3, did not change capacity of S-850 in Table II-A1 to be consistent with the permitted capacity granted in NSR Permit Application 3318. An S-850 expansion to 70,000 BPD was proposed in the Clean Fuels Project (1995 Application 10912), but this expansion was constructed without additional fugitive components. Thus no offsets were required. The 70,000 BPD capacity increase in Condition 8077 Part B6B for the Authority to Construct granted via Application 10912 is a valid limit. District records will be corrected to remove the "Expired AC" from S-850 in Application 10912.
12. In Table IV-C.4.3, deleted Condition 18372 Part 21 and revised Part 22 (Title V Application 23007)
13. Deleted. The District agreed to remove Application 23139 from Rev 5 to avoid the revision from being a significant revision
14. Revised Table IV-C.5.1 to incorporate 40 CFR 64 CAM requirements for S-963 Alkylation Plant Gas Turbine (Title V Application 23233).
15. Added Permit Condition 25161 to Tables IV-C.4.2 and C.4.4 (Title V Application 23425).
16. Updated requirements for Regulation 9, Rule 8 in Table IV-C.3.2 for engines S-952, S-953 and S-954 (Title V Application 23882).
17. Updated requirements for Regulation 9, Rule 8 in Table IV-C.3.3 for engines S-955 through S-960 (Title V Application 23882).
18. Corrected Table IV-C.4.2, Condition 8077 Part B7D removing the CO source test requirement (Title V Application 24057).
19. Revised Tables IV-C.4.2 and G.3 to reflect change in Conditions 13605, 20099, 21053, 21100 and 21849 to remove S-913 (Title V Application 24363).
20. Revised Table IV-D.7 S-1025 with language expansions and to remove the requirements of S-613 Vapor Storage Tank (Title V Application 23982).
21. Added Table IV-D.10 with the requirements of S-613 Vapor Storage Tank (Title V Application 23982).
22. In Tables IV-F.1 and F.2, removed S-613 Vapor Storage Tank (Title V Application 23982).
23. In Table IV-C.2.1, deleted Condition 24323 Part 4 (Title V Application 24066).
24. In Table IV-G.4, revised the 40 CFR 61 Subpart FF requirements for S-532 and S-1484 based on the determination that these sources process aqueous waste rather than non-aqueous waste (Title V Application 23854).
25. In Table IV-A.1, deleted 61.356(b)(6), 61.357(d)(7)(i), and 61.357(d)(7)(ii) (Title V Application 23854).
26. In Table IV-C.4.4, deleted 40 CFR 61.349(a)(1)(i), 40 CFR 61.349(a)(1)(iii), 40 CFR 61.349(a)(1)(iv) and 61.357(d)(7)(i) (Title V Application 23854).
27. In Table IV-G.5, revised the 40 CFR 61 Subpart FF requirements for S-606 and S-607 based on the determination that these sources process aqueous waste rather than non-aqueous waste (Title V Application 23854).

28. In Tables IV-C.1.2, IV-C.4.1, IV-C.4.2, IV-C.4.4, IV-C.4.5, IV-C.4.6 and IV-H.2, added applicability specification for BAAQMD Regulation 10 and 40 CFR 60 Appendix F (Title V Application 23854).
29. In Table IV-C.4.7, deleted 40 CFR 60 Appendix F (Title V Application 23854).
30. In Table IV-G.8, deleted 40 CFR 60 Subpart QQQ 60.695(b) because the closed vent requirements in 40 CFR 60 Subpart QQQ do not apply to emission points vented to fuel gas systems as defined 60.691 (Title V Application 23854).
31. In Table IV-B.1, added 40 CFR 63 Subpart UUU requirements monitor requirements 63.1572(a) and (b) (Title V Application 23854).
32. Added Table IV-C.3.8 for S-1557 Emergency Diesel Generator (Title V Application 25958).
33. In Tables IV-A.1, and IV-C.4.3, added Condition 25798 (Title V Application 26273).
34. In Table IV-C.4.5, changed 9-10-111 to 9-10-112, deleted 9-10-306.1 and 306.3, added 9-10-502 and 502.2, and added Condition 25846 (Title V Application 25759).
35. Deleted. In Table IV-C.2.2, for S-943 Butane Flare, BAAQMD Regulation 8, Rule 5 and SIP Regulation 8, Rule 5 was not added to be consistent with S-943 in Table II-B.
36. In Table IV-F.1 and F.2, removed demolished tanks S-2, 269, 315, 318, 367, 368, 369, 377, 378, 406, 503, 529, 530, 587 and 588. (Tesoro Comment # 61)
37. In Table IV-C.4.6, clarified that only S-1470 is subject to NSPS J. S-1160 has natural gas only firing requirement and is not subject to NSPS J. (Tesoro Comment # 77)
38. Corrected ACTM Citations and Condition 23811 in Tables IV-C.3.1, C.3.4, C.3.5, C.3.6, C.3.7 and C.3.8.
39. In Table IV-C.2.2, added note on S-943 operation.
40. Removed S-971 and S-972 from Table IV-C.4.3 and added them to new Table IV-C.4.8 for these sources (Subject to NSPS Subpart Ja). (Title V Application 23323).

## **V. Schedule of Compliance**

Since the District has not determined that the facility is out of compliance with an applicable requirement, the schedule of compliance for this permit contains only sections 2-6-409.10.1 and 2-6-409.10.2.

## **VI. Permit Conditions**

During the Title V permit development, the District has reviewed the existing permit conditions, made corrections if errors were found, deleted the obsolete conditions, and, as appropriate, revised the conditions for clarity and enforceability. Each permit condition is identified with a unique numerical identifier, up to five digits.

All changes to existing permit conditions are clearly shown in “strike-out/underline” format in the proposed permit. When the permit is issued, all “strike-out” language will be deleted and all “underline” language will be retained, subject to consideration of comments received.

The existing permit conditions are derived from previously issued District Authorities to Construct (A/C) or Permits to Operate (P/O). Permit conditions may also be imposed or revised

as part of the annual review of the facility by the District pursuant to California Health and Safety Code (H&SC) § 42301(e), through a variance pursuant to H&SC § 42350 et seq., an order of abatement pursuant to H&SC § 42450 et seq., or as an administrative revision initiated by District staff. After issuance of the Title V permit, permit conditions will be revised using the procedures in Regulation 2, Rule 6, Major Facility Review.

The District has reviewed and, where appropriate, revised or added new annual and daily throughput limits on sources so as to help ensure compliance with District rules addressing preconstruction review. The applicability of preconstruction review depends on whether there is a “modified source” as defined in District Rule 2-1-234. Whether there is a modified source depends in part on whether there has been an “increase” in “emission level.” 2-1-234 defines what will be considered an emissions level increase, and takes a somewhat different approach depending on whether a source has previously permitted by the District.

Sources that were modified or constructed since the District began issuing new source review permits will have permits that contain throughput limits, and these limits are reflected in the Title V permit. These limits have previously undergone District review, and are considered to be the legally binding “emission level” for purposes of 2-234.1 and 2-1-234.2. By contrast, for older sources that have never been through preconstruction review (commonly referred to as “grandfathered” sources), an “increase” in “emission level” is addressed in 2-1-234.3. A grandfathered source is not subject to preconstruction review unless its emission level increases above the highest of either: 1) the design capacity of the source, 3) the capacity listed in a permit to operate, or 3) highest capacity demonstrated prior to March 2000. However, if the throughput capacity of a grandfathered source is limited by upstream or downstream equipment (i.e., is “bottlenecked”), then the relaxing of that limitation (“debottlenecking”) is considered a modification.

The District has written throughput limits into the Title V permit for grandfathered sources. As discussed above, these limits are written for the purpose of determining whether an increase in emission levels has occurred. The purpose of these limits is to facilitate implementation of preconstruction review program. If these limits are exceeded, the facility would be expected to report the exceedence, and the District would treat the reported exceedence as presumptively establishing the occurrence of a modification. The facility would then be expected to apply for a preconstruction permit addressing the modification and the District would consider whether an enforcement action was appropriate.

It is important to note the presumptive nature of throughput limits for grandfathered sources that are created in the Title V permit. These limits are generally based upon the District’s review of information provided by the facility regarding the design capacity or highest documented capacity of the grandfathered source. To verify whether these limits reflect the true design, documented, or “bottlenecked” capacity (pursuant to 2-10234.1) of each source is beyond the resource abilities of the District in this Title V process. Moreover, the District cannot be completely confident that the facility has had time or resources necessary to provide the most accurate information available in this regard. Creating throughput limits in the Title V permit for grandfathered sources is not required by either Part 70 or the District’s Major Facility Review rules. Despite the lack of such a requirement, and despite the resource and information challenges presented in the Title V process, the District believes that writing presumptive limits for grandfathered sources into the Title V permit will provide a measure of predictability

regarding the future applicability of the preconstruction review program, and that this increased predictability is universally beneficial.

It follows from the presumptive nature of these throughput limits for grandfathered sources that exceedance of these limits is not per se a violation of the permit. *Failure to report an exceedance would be a permit violation.* In this sense, the throughput limits function as monitoring levels, and are imposed pursuant to the District's authority to required monitoring that provide a reasonable assurance of compliance. If an exceedance occurs, the facility would have an opportunity to demonstrate that the throughput limit in fact did not reflect the appropriate limit for purposes of 2-1-234.3. If the facility can demonstrate this, no enforcement action would follow, and the permit would be revised at the next opportunity. It also follows that compliance with these limits is not a "safe harbor" for the facility. If evidence clearly shows that a grandfathered source has undergone a "modification" as defined in 2-1-234.3, the District would consider that a preconstruction review-triggering event, notwithstanding compliance with the throughput limit in the Title V permit. In other words, the protection afforded the facility by complying with the throughput limit in the Title V permit is only as strong as the information on which it was based. There is no Title V "permit shield" associated with throughput limits for grandfathered sources, as they are being proposed. A shield may be provided if the District determines with certainty that a particular limit is appropriate for purposes of 2-1-234.3.

Conditions that are obsolete or that have no regulatory basis have been deleted from the permit.

Conditions have also been deleted due to the following:

- Redundancy in recordkeeping requirements.
- Redundancy in other conditions, regulations and rules.
- The condition has been superseded by other regulations and rules.
- The equipment has been taken out of service or is exempt.
- The event has already occurred (i.e. initial or start-up source tests).

The regulatory basis is listed following each condition. The regulatory basis may be a rule or regulation. The District is also using the following terms for regulatory basis:

- BACT: This term is used for a condition imposed by the Air Pollution Control Officer (APCO) to ensure compliance with the Best Available Control Technology in Regulation 2-2-301.
- Cumulative Increase: This term is used for a condition imposed by the APCO that limits a source's operation to the operation described in the permit application pursuant to BAAQMD Regulation 2-1-403.
- Offsets: This term is used for a condition imposed by the APCO to ensure compliance with the use of offsets for the permitting of a source or with the banking of emissions from a source pursuant to Regulation 2, Rules 2 and 4.
- PSD: This term is used for a condition imposed by the APCO to ensure compliance with a Prevention of Significant Deterioration permit issued pursuant to Regulation 2, Rule 2.

#### Changes to permit:

1. Added Permit Condition 24649 for S-1549 (Title V Application 20969).

2. Revised Condition 18372, Part 31A, for S-912 NOx Box Revision (Title V Application 21141).
3. Revised Condition 23129, Part 19 (Application 21744).
4. Revised Condition 18372 Part 31A, for S-926 NOx Box Revision (Title V Application 21790).
5. Revised Condition 18372 Part 31A, for S-913 NOx Box Revision (Title V Application 21800).
6. Revised Condition 24323 Parts 8 and 10 S-1524 Flare Purge and Pilot Gas (Title V Application 22163).
7. Revised Condition 18372 Part 31A, for S-919 NOx Box Revision (Title V Application 22151).
8. Added Permit Condition 27424 for Crude Oil Tank S-690 (Application 11724).
9. Revised Condition 11433 to note FCCU Alteration via Application 23075.
10. Added S-1552 to Permit Condition 23811 (Title V Application 22153).
11. Added S-1553 to Permit Condition 24491 and deleted Part 3 (Title V Application 22170).
12. Added S-58 to Permit Condition 23811 (Title V Application 21714). Updated ATCM references in the bases for Part 1 and Part 2.
13. Revised Condition 18372 Part 31A, for S-920 NOx Box Revision (Title V Application 22581).
14. Revised Condition 18372 Part 31A, for S-926 NOx Box Revision (Title V Application 22583).
15. Added Permit Condition 24834 S-1020 No 3 Reformer (Title V Application 22624)
16. Added Permit Condition 25025 for S-1554 High Sulfur Vacuum Gas Oil Tank (Title V Application 22824).
17. Did not correct Permit Condition 8077 Part B6B and B6C to show the S-850 capacity consistent with the permitted capacity of NSR Permit Application 3318. An S-850 expansion to 70,000 BPD was proposed in the Clean Fuels Project (1995 Application 10912), but this expansion was constructed without additional fugitive components. Thus no offsets were required. The 70,000 BPD capacity increase in Condition 8077 Part B6B for the Authority to Construct granted via Application 10912 is a valid limit. District records will be corrected to remove the "Expired AC" from S-850 in Application 10912.
18. Deleted. The group limit for S-973/974 in Condition 8077-B7B was not changed.
19. Corrected capacity of S-973 and S-974 in Permit Condition 16685. The firing rates for these two No 3 HDS furnaces were inadvertently reversed when permitted in NSR Permit Application 27769.
20. Revised NOx Box Permit Condition 18372 introduction, Parts 20, 21, 22, 29, 31, 32 and 33 as approved in Permit Application 23006 (Title V Application 23007).
21. Revised Condition 18372 Part 31A, for S-913 NOx Box Revision (Title V Application 22972).
22. Deleted. The District agreed to remove Application 23139 from Rev 5 to avoid the revision from being a significant revision. (Title V Application 23139).
23. Added Parts 21, 22 and 23 to Condition 19528 to incorporate 40 CFR 64 CAM requirements for S-963 Alkylolation Plant Gas Turbine (Title V Application 23233).
24. Added Permit Condition 25161 for S-909, S-912, S-920, and S-950 (Title V Application 23425).
25. Revised IC Engine Conditions 13509 and 15204 (Title V Application 23882).



26. Revised Condition 18372 Part 31A, for S-916 NOx Box Revision (Title V Application 23870).
27. Revised Condition 18372 Part 31A, for S-916 NOx Box Revision (Title V Application 24920).
28. Revised Condition 18372 Part 31A, for S-913 NOx Box Revision (Title V Application 25006).
29. Corrected Condition 8077 Source List, and Parts B7A and B7D (Title V Application 24057).
30. Revised Conditions 13605, 20099, 21053, 21100 and 21849 to remove S-913 from source test requirements since this source is no longer fired with the 40# fuel gas, the system that abates the sources (Title V Application 24363).
31. Revised Condition 21849 to update application record and to reflect S-613 Vapor Storage service (Title V Application 23982).
32. Deleted Condition 24323 Part 4 (Title V Application 24066).
33. Revised Condition 23129 Part 56 to include purge gas (Title V Application 24066).
34. Added S-1557 to Condition 23811 (Title V Application 25958).
35. Added Condition 25798 for S-850, S-973 and S-974 (Title V Application 26273).
36. Revised Condition 8077, Parts B2A and B2B Refinery Emissions Cap mass emissions limits (Title V Application 26273).
37. Revised Condition 18372 Part 31A, for S-920 NOx Box Revision (Title V Application 26160).
38. Added Condition 25846 for S-1412 (Title V Application 25759).
39. Updated the firing rates in Condition 16685 based on the approved NSR firing rates as follows:

| Source | Description                        | Approved NSR Limit | Year | NSR Application |
|--------|------------------------------------|--------------------|------|-----------------|
| S-915  | Plat former Intermediate Heater    | 50 MMBtu/hr        | 1991 | 6468            |
| S-919  | No 2 HDS Depentanizer Reboiler     | 111 MMBtu/hr       | 1991 | 6468            |
| S-934  | Hydrocracker Stabilizer Reboiler   | 135 MMBtu/hr       | 1987 | 548             |
| S-935  | Hydrocracker Splitter Reboiler     | 135 MMBtu/hr       | 1987 | 548             |
| S-971  | No 3 Reformer UOP Furnace          | 300 MMBtu/hr       | 2015 | 23322           |
| S-972  | No 3 Reformer Debutanizer Reboiler | 45 MMBtu/hr        | 2015 | 23322           |

40. Revised S-971 and S-972 firing rates in Condition 16685 to the changes shown in underline/strikeout in the above table (Title V Application 23323).
41. Deleted Condition 20682 because S-659 and S-660 Coke Silos have been demolished.
42. Revised the firing rate in Condition 16685 for S-926 (Title V Application 25636).
43. In Condition 8077, added Parts C3 and C4 firing rate limits to hydrocracker furnaces in accordance with hydrocracker expansion project Application 548 (1987). (Title V Application 23323)
44. In Condition 8350, added Parts A5 and B5, B6, B7 and C5 firing rate limits for S-915, S-916, S-919, S-920 and S-921 furnaces in accordance with the diesel expansion project Application 6468 (1991). (Title V Application 23323)
45. In Condition 8350, added Part A6 firing rate limits for furnace S-917 in accordance with Application 164 (1987). (Title V Application 23323)

## VII. Applicable Limits and Compliance Monitoring Requirements

This section of the permit is a summary of numerical limits and related monitoring requirements for each source. The summary includes a citation for each monitoring requirement, frequency of monitoring, and type of monitoring. The applicable requirements for monitoring are completely contained in Sections IV, Source-Specific Applicable Requirements, and VI, Permit Conditions, of the permit.

Changes to permit:

1. Added Table VII-C.3.7 for S-1552 Emergency Diesel Water Pump (Title V Application 22153).
2. Added S-1553 to Table VII-C.1.3, and deleted Condition 22491, Part 3 (Title V Application 22170).
3. Added Permit Condition 24834 throughput limits to Table VII-B.10 for S-1020 (Title V Application 22624).
4. Added S-1554 Condition 25025 limits to Table VII-F.3 (Title V Application 22824).
5. In Table VII-D.7 for S1025, corrected 8-33-308.1 POC limit to TOC and clarified 3000 ppm limit is expressed as methane (C1).
6. In Table VII-B.3, did not change capacity of S-850 in Table II-A1 to be consistent with the permitted capacity granted in NSR Permit Application 3318. An S-850 expansion to 70,000 BPD was proposed in the Clean Fuels Project (1995 Application 10912), but this expansion was constructed without additional fugitive components. Thus no offsets were required. The 70,000 BPD capacity increase in Condition 8077 Part B6B for the Authority to Construct granted via Application 10912 is a valid limit. District records will be corrected to remove the "Expired AC" from S-850 in Application 10912.
7. In Table VII-C.4.3, corrected CO monitoring and ammonia slip limit for S-972 (Title V Application 23007).
8. In Table VII-J.1, miscellaneous changes were made to the Regulation 8, Rule 18 section to reflect that total organic compounds are monitored. Methane is included as defined in Regulation 8-18-219.
9. Deleted. The District agreed to remove Application 23139 from Rev 5 to avoid the revision from being a significant revision. (Title V Application 23139).
10. Revised Table VII-C.5.1 to incorporate 40 CFR 64 CAM requirements for S-963 Alkylation Plant Gas Turbine (Title V Application 23233).
11. Added Permit Condition 25161 to Tables VII-C.4.2 and C.4.4 (Title V Application 23425).
12. Updated requirements for Regulation 9, Rule 8 in Table VII-C.3.2 for engines S-952, S-953 and S-954 (Title V Application 23882).
13. Updated requirements for Regulation 9, Rule 8 in Table VII-C.3.3 for engines S-955 through S-960 (Title V Application 23882).
14. In Table VII-F.3, added TVP and throughput limits for S-690 consistent Condition 24724 added to Section VI (Application 11737).
15. Corrected Tables VII-C.4.2 and VII-4.3, removing Condition 8077 Part B7A CO limit (Title V Application 24057).
16. Corrected Tables VII-C.4.2 and G.3 to reflect VOC and POC source test requirements for S-908, S909 and S912 in Conditions 13605, 20099, 21053, 21100 and 21849 (Title V Application 24363).

17. Updated Table VII-D.7 for S-1025 Bulk Plant, moving S-613 Vapor Storage Tank requirements to a new table. (Title V Application 23982).
18. Added Table VII-D.10 with the requirements of S-613 Vapor Storage Tank (Title V Application 23982).
19. In Table VII-C.2.1, for S-1524, deleted Condition 24323 Part 4 and all references to NSPS 60.18 (Title V Application 24066).
20. In Table VII-C.2.1, revised existing SO<sub>2</sub> limit and added new SO<sub>2</sub> limit pertaining to Consent Decree Condition 24324, Part 2 (Title V Application 24066).
21. In Table VII-G.4, deleted the 40 CFR 61 Subpart FF requirements for 61.349(a)(1)(i) and 61.349(f), consistent with Table IV-G.4 (Title V Application 23854).
22. In Table VII-G.5, deleted the 40 CFR 61 Subpart FF requirements for 61.348(a)(1)(i) and 63.647(a), consistent with Table IV-G.5 (Title V Application 23854).
23. In Table VII-C.1.1, deleted the CO CEM monitoring for the 121.9 tpy CO limit. The CO CEM is required by the Consent Decree, through Condition 11433 Part 11, for compliance with the 500 ppmvd at 0% O<sub>2</sub> limit of Condition 11433 Part 9. But it is not required for determination compliance with the Condition 11433 Part 2 CO limit of 121.9 tpy (Title V Application 23854).
24. In Table VII-B.10, updated pH and liquid/gas ratio monitoring limits as determined by the performance test for 40 CFR 63 Subpart UUU (Title V Application 23854).
25. Added Table VII-C.3.8 for S-1557 Emergency Diesel Generator (Title V Application 25958)
26. In Tables VII-A.1 and VII-A.2, revised Condition 8077 Parts B2A and B2B Refinery Emissions Cap mass emissions limits (Title V Application 26273)
27. In Table VII-C.4.5, added S-1412 Firing Rate limit (Title V Application 25759).
28. Deleted. In Table VII-C.2.2, for S-943 Butane Flare, BAAQMD Regulation 8, Rule 5 and SIP Regulation 8, Rule 5 was not added to be consistent with S-943 in Table II-B.
29. In Tables VII-C.4.2 and VII-C.4.3, corrected the Condition 16685 firing rate limits of S-915, S-919, S-928 through S-933, S-934, S-935, S-971 and S-972, consistent with the limits approved in 1988 NSR Permit Application 548 (Hydrocracker Expansion Project), 1992 NSR Permit Application 6468 (Diesel Modification Project) and 1978 NSR Permit Application 26645 (No 3 Reformer Project).
30. In Table VII-C.4.2, revised the firing rate in Condition 16685 for S-926 (Title V Application 25636).
31. In Table VII-C.4.3, corrected the firing rates for S-973 and S-974. The firing rates for these two No 3 HDS furnaces were inadvertently reversed when permitted in NSR Permit Application 27769.
32. In Table VII-C.2.2, added note on S-943 operation.

## VIII. Test Methods

This section of the permit lists test methods that are associated with standards in District or other rules. It is included only for reference. In most cases, the test methods in the rules are source test methods that can be used to determine compliance but are not required on an ongoing basis. They are not “applicable requirements” as defined by Regulation 2-6-202.

If a rule or permit condition requires ongoing testing, the requirement will also appear in Section IV of the permit.

## **IX. Permit Shield**

The District rules allow two types of permit shields. The permit shield types are defined as follows: (1) A provision in a major facility review permit explaining that specific federally enforceable regulations and standards do not apply to a source or group of sources, or (2) A provision in a major facility review permit explaining that specific federally enforceable applicable requirements for monitoring, recordkeeping and/or reporting are subsumed because other applicable requirements for monitoring, recordkeeping, and reporting in the permit will assure compliance with all emission limits.

The second type of permit shield is allowed by EPA's "White Paper 2 for Improved Implementation of the Part 70 Operating Permits Program." The District uses the second type of permit shield for all streamlining of monitoring, recordkeeping, and reporting requirements in Title V permits. The District's program does not allow other types of streamlining in Title V permits.

This facility has no permit shields.

## **X. Revision History**

This section summarizes the permit revisions.

## **XI. Glossary**

The glossary was updated removing TRMP.

## **D. Alternate Operating Scenarios:**

No alternate operating scenario has been requested for this facility.

## **E. Compliance Status:**

As part of the permit application, the owner certified that all equipment was operating in compliance.

## **F. Differences between the Application and the Proposed Permit:**

Differences related to sources and abatement devices included in the application are explained in Section C.II of this evaluation.

Permit Evaluation and Statement of Basis: Site B2758 & B2759, Tesoro Refining & Marketing Company, LLC,  
Golden Eagle Refinery, 150 Solano Way, Martinez, CA 94553

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# Appendices

**APPENDIX A – ENGINEERING EVALUATIONS**

## **Application 11737, Crude Oil Tank 690 Modification**

### **ENGINEERING EVALUATION**

**Tesoro Refining and Marketing Company**

**PLANT NO. 14628**

**APPLICATION NO. 11737**

**Authority to Construct Extension August, 2010**

#### **BACKGROUND**

The Tesoro Refining and Marketing Company (Tesoro) applied for and was granted an Authority to Construct for to the following equipment:

**S-690 External Floating Roof Tank; Tank A-690, Capacity: 13,020K Gallons,  
Storing: Crude Oil – *alteration to install a secondary seal***

The Authority to Construct was granted March 17, 2005. The Authority to Construct was extended December 5, 2006. Prior to the AC expiration date of March 17, 2009, Tesoro applied for another extension. However, the scope of the S-690 project changed from a simple seal installation. As the project progressed, S-690 was found to be in need of a new primary seal, a new roof, and a new floor. Consequently, this application is no longer an alteration. This changes the analysis of this application and caused a delay in approving the Authority to Construct extension.

The following background is from the original engineering evaluation:

S-690 is a grandfathered source that is permitted to store crude oil. Tesoro currently stores San Joaquin Valley (SVJ) crude that has a true vapor pressure less than 0.5 psia at temperatures less than 249 F (Regulation 8-5, Table 1). Piping exists to route higher vapor pressure crude oil to S-690. These crude oils have true vapor pressures greater than 0.5 psia and Tesoro will be subject to Regulation 8-5: Organic Compounds, Storage of Organic Liquids. The external floating roof is required to have a secondary seal as per Regulation 8-5-304.3. Tesoro was originally given the Authority to Construct the secondary seal in Application #12475 in May 1994. Tesoro did not install the secondary seal at that time and the Authority to Construct expired in 1996. With the higher vapor pressure crude oils in S-690, Tesoro is subject to Regulation 8-5 and must meet the primary seal requirements in Regulation 8-5-321 and the secondary seal requirements of Regulation 8-5-322. Tesoro has been permitted to store crude oils, without permit conditions or restrictions as to the types of crude oil, in S-690. But to comply with District rules when storing all types of crude oil, Tesoro must install the secondary seal as a control measure to meet the requirements of Regulation 8-5. The secondary seal control measure will decrease emissions of POC from the storage of crude. There will be no increase in emissions.

For the 2009 AC extension request, the emissions were reviewed. The RACT adjusted emissions for the SVJ crude storage were estimated. The emissions for the higher vapor pressure crude were also estimated. The result was an emission increase making this application a modification subject to New Source Review Regulation 2, Rule 2. Since S-690 is a "Grandfathered" source.



Emissions are determined pursuant to 2-2-604 Emission Increase Calculation Procedures, New or Modified Sources, which requires a three-year baseline pursuant to Regulation 2-2-605.

**EMISSIONS SUMMARY**

**Annual Emissions:**

The three-year baseline for the period ending 3/1/05 (the date of the initial application) shows an average annual throughput of 7,500,205 bbls or 315,008,601 gallons. An EPA TANKS calculation for SJV crude with a true vapor pressure of 0.50 psia estimated POC emissions at 1936 lb/yr. This TANKS simulation included a primary and secondary seal to satisfy the RACT adjustment requirements of Regulation 2-2-605.5.

Based on the new throughput of 18,250 kbbls/yr 766.5MM gal/yr. an EPA TANKS calculation for RVP 11.5 crude with a maximum true vapor pressure of about 11 psia estimated POC emissions at 9078 lb/yr.

The emission increase for this application is:

SJV Crude emissions: 1936 lb/yr  
 11.5 RVP Crude emissions 9078 lb/yr = 4.539 ton/yr  
 Application Increase 7142 lb/yr  
 = 19.56 lb/day  
 = 3.571 ton/yr

**Plant Cumulative Increase:**

(All previous increases have been offset)

|            | <u>Current</u><br>Ton/yr | <u>New</u><br>Ton/yr | <u>New Total</u><br>tons/yr |
|------------|--------------------------|----------------------|-----------------------------|
| <b>POC</b> | 0                        | 3.571                | 3.571                       |

**Toxic Risk Screening:**

Toxic emissions will increase as a result of this application. The toxic emissions are summarized below:

| TAC          | Maximum Emissions |       | 2-5 Trigger Levels |        | Trigger Exceeded? |         |
|--------------|-------------------|-------|--------------------|--------|-------------------|---------|
|              | Lb/hr             | Lb/yr | Lb/hr              | Lb/yr  | Acute             | Chronic |
| Benzene      | 5.76E-03          | 40.35 | 2.9                | 38     | No                | Yes     |
| Ethylbenzene | 2.26E-03          | 15.84 | N/a                | 43     | No                | No      |
| N-hexane     | 4.93E-03          | 34.55 |                    | 270000 | No                | No      |
| Toluene      | 6.49E-03          | 45.44 | 82                 | 12000  | No                | No      |
| Xylene       | 7.81E-03          | 54.75 | 49                 | 27000  | No                | No      |

Based on the evaluation documented in the July 27, 2010 Toxics section memorandum, the risk screen analysis indicates the maximum cancer risk is 0.1 in a million, and the maximum chronic hazard index is 0.00006. In accordance with Regulation 2, Rule 5, this source is in compliance with the TBACT and project risk requirements.

## **STATEMENT OF COMPLIANCE**

The owner/operator of S-690 External Floating Roof Tank; Tank A-690 is subject to Regulation 8-5-301 Storage Tank Control Requirements. For tanks greater than 150 m<sup>3</sup> (39,626 gallons) with organic contents with a true vapor pressure greater than 0.5 psia and less than 11 psia, an internal floating roof, external floating roof, or approved emission control system is required. The owner/operator of S-690 is subject to Regulation 8-5-304 Requirements for External Floating Roofs. The owner/operator is also subject to the tank fitting requirements of Regulation 8-5-320, the primary seal requirements of Regulation 8-5-321, the secondary seal requirements of Regulation 8-5-322, the tank degassing requirements of Regulation 8-5-328, the tank cleaning requirements of Regulation 8-5-331 and the sludge handling requirements of Regulation 8-5-332. The owner/operator is also subject to the inspection requirements of Regulation 8-5-401 and the recordkeeping requirements of Regulation 8-5-501.

The project is considered to be ministerial under the District's CEQA regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emissions factors and therefore is not discretionary as defined by CEQA.

The project is over 1000 feet from the nearest school and therefore not subject to the public notification requirements of Reg. 2-1-412.

### **Best Available Control Technology:**

BACT is triggered for this application because POC emissions exceed 10 lb/highest day. S-690 will comply with BACT by a floating roof w/ liquid mounted primary seal and zero gap secondary seal, all meeting design criteria of Reg. 8, Rule 5. Also, there will be no ungasketed roof penetrations, no slotted pipe guide pole unless equipped with float and wiper seals, and no adjustable roof legs unless fitted w/ vapor seal boots or equivalent.

### **NESHAPS:**

Source S-690 is subject to and expected to comply with National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR Part 63, Subpart CC, Section 63.646, which refers to 40 CFR Part 63, Subpart G, National Emission Standards For Organic Hazardous Air Pollutants From The Synthetic Organic Chemical Manufacturing Industry for Process Vents, Storage Vessels, Transfer Operations, and Wastewater. S-690 is expected to comply with the provisions of 40 CFR 63.119(c) for external floating roof tanks.

### **PSD and NSPS:**

PSD and NSPS do not apply.

### **Offsets:**

Permit Evaluation and Statement of Basis: Site B2758 & B2759, Tesoro Refining & Marketing Company, LLC, Golden Eagle Refinery, 150 Solano Way, Martinez, CA 94553

Offsets are required for this project pursuant to Regulation 2, Rule 2, Section 302. Tesoro has enough contemporaneous emission reduction credits to fully offset the POC emission increases. The company will use the Certificate of Deposit # 968 to provide the needed offsets at a ratio of 1.15:1 per Regulation 2-2-302.2.

Total Increase: 3.571 tons  
Offset Ratio X 1.15  
Offsets required: 4.107 tons

Bank # 968 currently has a balance of 11.844 tons POC.

## PERMIT CONDITIONS

The following permit conditions will be imposed for S-690:

Conditions for Source S-690, External Floating Roof Tank A-690  
Application #11737 (March 2005)  
Modified by Application 11737 (August 2010)  
Plant # 14628 - Tesoro Refinery.

1. The owner/operator of S-690 shall not exceed 18,250,000 barrels of 11 RVP Crude Oil during any consecutive twelve-month period. (Basis: Cumulative Increase)
2. The owner/operator may store alternate liquid(s) other than the material specified in Part 1 and/or usages in excess of that specified in Part 1, provided that the owner/operator can demonstrate that all of the following are satisfied:
  - a. Total POC emissions from S-690 do not exceed 9,078 pounds in any consecutive twelve month period; and
  - b. The use of these materials does not increase toxic emissions above any risk screening trigger level of Table 2-5-1 in Regulation 2-5.(Basis: Cumulative Increase, Toxics, Offsets)
3. To determine compliance with the above parts, the owner/operator shall maintain the following records and provide all of the data necessary to evaluate compliance with the above parts, including the following information:
  - a. Quantities of Crude Oil stored at this source on a monthly basis.
  - b. If a material other than Crude Oil specified in Part 1 is stored, POC/NPOC and toxic component contents of each material used; and mass emission calculations to demonstrate compliance with Part 2, on a monthly basis;
  - c. Monthly throughput and/or emission calculations shall be totaled for each consecutive twelve-month period.All records shall be retained on-site for five years, from the date of entry, and made available for inspection by District staff upon request. These recordkeeping requirements shall not replace the recordkeeping requirements contained in any applicable District Regulations.  
(Basis: Cumulative Increase; Toxics)
4. The owner/operator of S-690 shall equip the source with a liquid mounted primary seal and a zero-gap secondary seal. There shall be no ungasketed roof fittings. Except for roof legs, each roof fitting shall be of the design, which yields the minimum roof fitting losses (per EPA Compilation of Air Pollution Emission Factors, AP-42, Supplement E, Section 12.3.2, Table 12.3-11). The following list indicates the type of control required for a variety of typical roof fittings. Control techniques for roof fittings not included in this list shall be subject to District approval, prior to installing the roof on the tank.

| <u>Fitting Type:</u> | <u>Control Technique</u>  |
|----------------------|---|
| Access hatch:        | Bolted cover, gasketed  |
| Guide pole/well:     | Unslotted guide pole, gasketed sliding cover; or slotted with controls per API 2517 Addendum (See Note 1) |

Permit Evaluation and Statement of Basis: Site B2758 & B2759, Tesoro Refining & Marketing Company, LLC, Golden Eagle Refinery, 150 Solano Way, Martinez, CA 94553

|                          |  |
|--------------------------|--|
| Gauge float well:        | Bolted cover, gasketed   |
| Gauge hatch/sample well: | Weighted mechanical actuation, gasketed  |
| Vacuum breaker:          | Weighted mechanical actuation, gasketed  |
| Roof drain:              | Roof drain does not drain water into product   |
| Roof leg:                | Fixed; or adjustable with vapor seal boot, or gasket between roof leg and leg sleeve |
| Rim vent:                | Weighted mechanical actuation, gasketed  |

NOTE 1: Slotted Guide Pole Control Configuration, per Addendum to API Publication 2517, May 1994, shall include the following components:

- a. Sliding cover;
- b. Well gasket;
- c. Pole sleeve with pole wiper approximately 6 inches above sliding cover, or District approved equivalent
- d. Float with float wiper approximately 1 inch above the sliding cover, or alternately a float with multiple wipers (Basis: BACT)

NOTE 2: This part 4 Authority to Construct design condition will be deleted once the tank design is confirmed to comply with BACT:

## RECOMMENDATION

Issue an Authority to Construct extension for the modification of the following equipment:

**S-690 External Floating Roof Tank; Tank A-690, Capacity: 13,020K Gallons**

## EXEMPTIONS

none

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**Arthur Valla**  
**Senior Air Quality Engineer**

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**August 16, 2010**

**Application 20968, Diesel Additive Tank S-1549**

**EVALUATION REPORT  
TESORO - GOLDEN EAGLE REFINRY  
Application #20968 - Plant #14628**

150 Solano Way  
**Martinez, CA 94553**

**I. BACKGROUND**

Tesoro has applied for an Authority to Construct/Permit to Operate for the following equipment to be located at the Tesoro Refinery:

**S-1549 Horizontal Fixed Roof Tank, 6000 gallons, Diesel Additive**

The material stored in this tank is Innospec OLI-9085.x, a hydrocarbon gelatinous liquid with a vapor pressure of 5-6.6 mm Hg.

This tank will replace S-1527 that was permitted via 2008 Application 18715 and was recently removed from service.

This application was granted a temporary PO May 4, 2010 under the Accelerated Permitting Program.

**II. EMISSION CALCULATIONS**

Tank Emissions:

An EPA TANKs simulation estimates the emissions as follows:

Basis:

Throughput: 40,000 gal/yr

TVP = 0.25 psia

Vapor MW = 106 lb/lb-mole

Storage Temperature = 61F

Tank Capacity = 6000 gallons

Turnovers: 7

Results:

Standing Loss = 36.5 lb/yr

Working Loss = 118.1 lb/yr

Total Loss = 154.6 lb/yr

= 0.42 lb/day

= 0.0773 tons/yr

Fugitive Emissions:

There are no changes to the number of fugitive components therefore there are no fugitive emissions associated with this application.

**III. TESORO PLANT CUMULATIVE INCREASE SINCE 4/5/1991**

(All previous increases have been offset)

|                    | <u>Current</u><br>Ton/yr | <u>New</u><br>Ton/yr | <u>New Total</u><br>tons/yr |
|--------------------|--------------------------|----------------------|-----------------------------|
| POC =              | 0                        | 0.077                | 0.077                       |
| NO <sub>x</sub> =  | 0                        | 0                    | 0                           |
| SO <sub>2</sub> =  | 0                        | 0                    | 0                           |
| CO =               | 0                        | 0                    | 0                           |
| NPOC =             | 0                        | 0                    | 0                           |
| TSP =              | 0                        | 0                    | 0                           |
| PM <sub>10</sub> = | 0                        | 0                    | 0                           |

**IV. TOXIC SCREENING ANALYSIS**

There are no toxic emissions that exceed the trigger levels in Regulation 2, Rule 5. Therefore, a Toxic risk screen is not required. The following TAC emissions are calculated:

| TAC            | Concentration<br>Wt fraction | Acute<br>Trigger<br>(lb/hr) | Emissions<br>(lb/hr) | Chronic<br>Trigger<br>(lb/yr) | Emissions<br>(lb/yr) |
|----------------|------------------------------|-----------------------------|----------------------|-------------------------------|----------------------|
| Ethylbenzene   | 0.0499                       | N/A                         | N/A                  | 43                            | 2.8                  |
| Naphthalene    | 0.0099                       | N/A                         | N/A                  | 3.2                           | 0.06                 |
| Xylene (mixed) | 0.149                        | 49                          | 0.002                | 27000                         | 16.4                 |

**V. BEST AVAILABLE CONTROL TECHNOLOGY**

This application does not trigger BACT since the POC emissions are less than the 10 pounds per highest day threshold limit per Regulation 2-2-301.

**VI. OFFSETS**

Offsets are required for this project pursuant to Regulation 2, Rule 2, Section 302. Credits for the out of service S-1527 will be used as follows:

Total Emissions from S-1549: 0.077 tons  
 Less Emissions from S-1527: 0.012 tons  
 Net Emissions to offset: 0.065  
 Offset Ratio: 1.15  
 Total Offsets required: 0.075

Offsets will be provided from Bank 968.

## VII. STATEMENT OF COMPLIANCE

Source S-1549 Fixed Roof Tank is subject to Regulation 8, Rule 5, but qualifies for the limited exemption 8-5-117 Low Vapor Pressure:

**8-5-117 Limited Exemption, Low Vapor Pressure:** The provisions of this rule, except for Section 8-5-307.3, shall not apply to tanks storing organic liquids with a true vapor pressure of less than or equal to 25.8 mm Hg (0.5 psia) as determined by Sections 8-5-602 or 604.

S-1549 is expected to comply with 8-5-307.3:

**8-5-307 Requirements for Fixed Roof Tanks, Pressure Tanks and Blanketed Tanks:**  
307.3 The sealing mechanism on pressure relief devices located on pressure tanks and on tanks blanketed with organic gases other than natural gas shall be maintained in a gas tight condition except when operating pressure exceeds the valve set pressure, or except when the sealing mechanism is vented to a vapor recovery or disposal system that has an overall abatement efficiency of at least 95% by weight.

Source S-1549 is not subject to Regulation 10 - Standard of Performance for New Stationary Sources, Part 17, otherwise known as 40 CFR 60, Subpart Kb - Volatile Organic Liquid Storage Vessels. The tank is less than the 75 cubic meters (19800 gallons) size threshold of 60.110b(a).

Source S-1527 is not subject to National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR Part 63, Subpart CC, because it is smaller than 40 cubic meters (10,600 gallons) limit in 40 CFR63.641.

This project is considered to be ministerial under the District's CEQA Regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Permit Handbook, Source-Specific Guidance Chapter 4.0, Organic Liquid Storage Tank.

This project is over 1,000 ft from the nearest public school and is therefore not subject to the public notification requirements of Regulation 2-1-412.

Toxics, BACT and PSD are not applicable.

## VIII. CONDITIONS

The following conditions will be imposed based on the Permit Handbook guidance:

Application # 20968  
Source S-1549 Horizontal Fixed Roof Tank  
Diesel Additive

1. The owner/operator of S-1549 shall not exceed the following throughput limits during any consecutive twelve-month period:  
Innospec OLI-9085.x : 40,000 Gallons  
(Basis: Cumulative Increase)
2. To determine compliance with the above part, the owner/operator shall maintain the following records and provide all of the data necessary to evaluate compliance with the above parts, including the following information:
  - a. Quantities of liquid stored at this source on a monthly basis.
  - b. Monthly throughput shall be totaled for each consecutive twelve-month period. All records shall be retained on-site for five years, from the date of entry, and made available for inspection by District staff upon request. These recordkeeping requirements shall not replace the recordkeeping requirements contained in any applicable District Regulations. (Basis: Cumulative Increase; Toxics)

## **IX. RECOMMENDATION**

It is recommended that an Authority to Construct be waived and a Permit to Operate be granted to Tesoro for the following equipment:

**S-1549 Horizontal Fixed Roof Tank, 6000 gallons, Diesel Additive**

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**Arthur Valla**  
**Senior Air Quality Engineer**

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**June 2, 2010**



**Application 21072, NOx Box Revision for S-912**

**EVALUATION REPORT  
TESORO REFINING AND MARKETING COMPANY  
REVISED NO<sub>x</sub> BOX FOR S-912, F-12  
#1 FEED PREP HEATER  
APPLICATION 21072, PLANT 14628**

**BACKGROUND**

The Tesoro Golden Eagle Refinery (Tesoro) operates several furnaces and boilers that are subject to Regulation 9, Rule 10, Nitrogen Oxides And Carbon Monoxide From Boilers, Steam Generators And Process Heaters In Petroleum Refineries. Regulation 9-10-301 limits the refinery wide NO<sub>x</sub> emissions to 0.033 lb/MMBtu of fired duty. Regulation 9-10-502 requires the installation of a NO<sub>x</sub>, CO and O<sub>2</sub> CEM to demonstrate compliance with Regulation 9-10-301. Regulation 9-10-502 also allows a CEM equivalent verification system to determine compliance with Regulation 9-10-301. The District and Tesoro have worked diligently to produce the CEM equivalent verification system. This system is called the “NO<sub>x</sub> Box”. The NO<sub>x</sub> Box is an operating window for the unit, expressed in terms of fired duty and oxygen content in the flue gas. The operating window is established by source tests for various operating conditions. The source tests demonstrate the NO<sub>x</sub> emissions are equal to or less than a specified emission factor. As long as the fired unit duty and oxygen content are in this NO<sub>x</sub> Box operating window, the specified emission factor is used to determine compliance with the 0.033 lb/MMBtu limit of Regulation 9-10-301. The Permit Condition that contains the details of the NO<sub>x</sub> Box is #18372.

Condition 18372, Part 30 required Tesoro to submit the initial NO<sub>x</sub> Box for the affected sources by January 1, 2005. Tesoro met this requirement via Application 15682. The NO<sub>x</sub> Box’s in the application were supported by properly conducted source tests and the NO<sub>x</sub> Box operating windows for all the affected sources have been included in Revision 4 of the Title V permit (reference: Section VI, Condition 18372, Part 31A, NO<sub>x</sub> Box Ranges).

This application requests a change in the NO<sub>x</sub> Box operating window for:

**S-912 F12 Furnace-#1 Feed Prep Heater**

The change is as follows:

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
| 912        | 0.027                      | 2.1, 60.50   | <del>3.4, 70.104.1,</del><br><u>49.80</u>                      | 1.9, 101.51   | 4.0, 104.13   | 5.4, 100.24   |

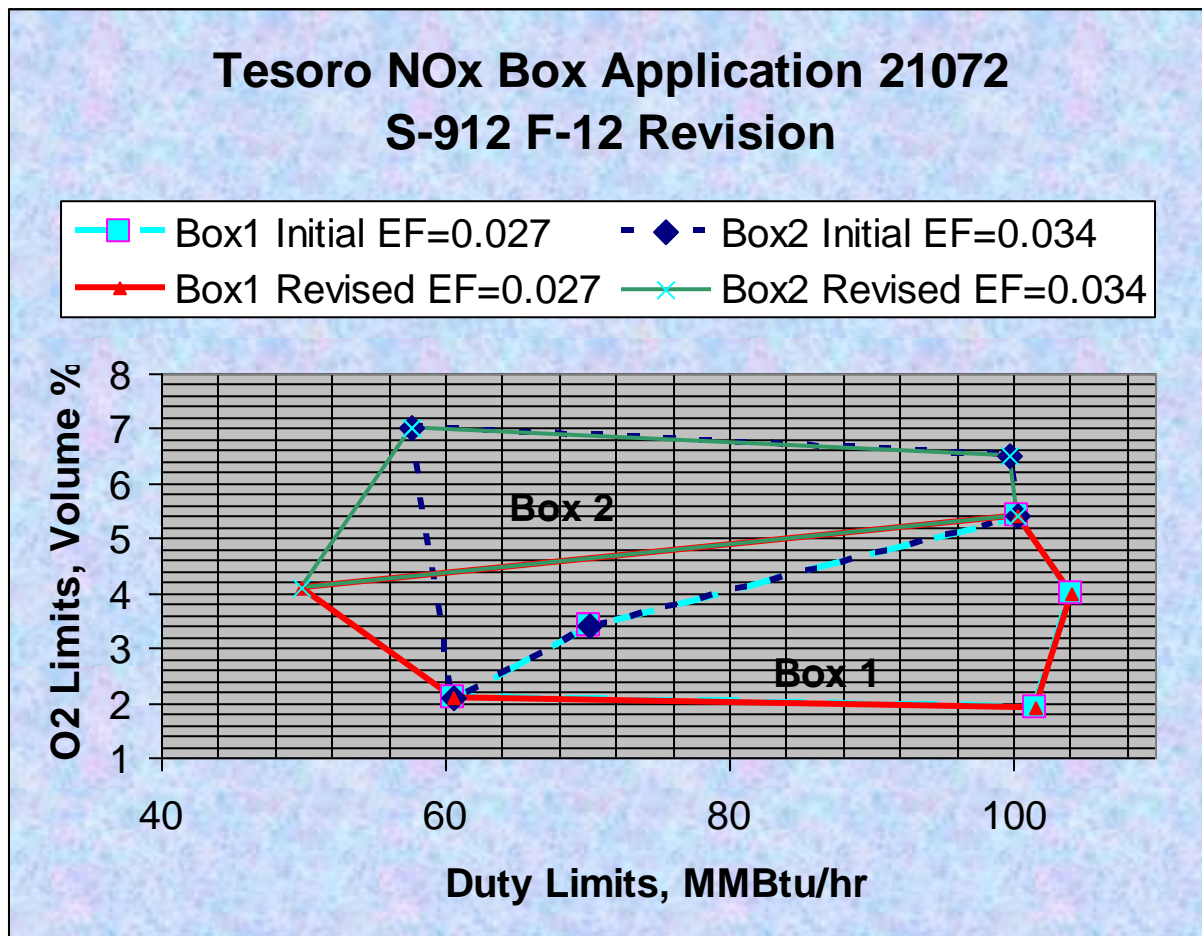
|  |       |                                 |            |             |                       |            |
|--|-------|---------------------------------|------------|-------------|-----------------------|------------|
|  | 0.034 | <del>4.1, 49.802-1, 60.50</del> | 7.0, 57.57 | 5.4, 100.24 | <del>3.4, 70.10</del> | 6.5, 99.68 |
|--|-------|---------------------------------|------------|-------------|-----------------------|------------|

Tesoro is using two operating ranges as allowed by Condition 18372, Part 30.

The changes are supported by source tests reviewed by the Source Test Section.

This application is being processed as an administrative change in conditions since there is no change to the specified NOx emission factor for this unit.

The following diagram summarizes the changes to the S-912 NOx Box:



### EMISSIONS SUMMARY

There are no changes in emissions due to this application. The emission factors are unchanged by this application and there will be no impact on the overall facility limit of 0.033 lb/MMBtu required by Regulation 9-10-301.

### PLANT CUMULATIVE INCREASE

There are no net changes to the plant cumulative emissions.

### **TOXIC RISK SCREEN**

This proposed NOx Box change would not emit toxic compounds in amounts different than previously emitted. Therefore, a toxic risk screen is not required.

### **BEST AVAILABLE CONTROL TECHNOLOGY**

BACT is triggered for new or modified sources that emit criteria pollutants in excess of 10 lbs/day. However, Regulation 2-1-234 defines a modified source as one that results in an increase in daily or annual emissions of a regulated air pollutant. For this application, there is no change in emissions. Therefore, BACT does not apply.

### **PLANT LOCATION**

According to the SCHOOL program, the closest school is Las Juntas Elementary, which is almost two miles from the facility.

### **COMPLIANCE**

The change to the NOx Box will not change the compliance for Furnace S-912. Emissions from S-912 will continue to comply with all applicable regulations, including Regulation 6, Rule 1 and Regulation 9, Rule 10.

The closest school is over a mile from the facility, so the Public Notice requirements of Regulation 2-1-214 do not apply.

Toxics, CEQA, NESHAPS, BACT, Offsets and NSPS do not apply.

### **CONDITIONS**

The NOx Box Condition 18372, will be modified as shown below. Only the substantive changes for the S-912 NOx Box points detailed in Part 31A are shown. For clarity, the change is tracked from the version in Revision 4 of the Title V permit. All of the other parts of Condition 18372 remain unchanged by this application.

Condition 18372

31. Except as provided in part 31B & C, the owner/operator shall operate each source within the NOx Box ranges listed below at all times of operation. This part shall not apply to any source that has a properly operated and properly installed NOx CEM. (Regulation 9-10-502)
  - A. NOx Box ranges

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr) | Max O2 at Low Firing (O2% , MMBtu/hr) | Min O2 at High Firing (O2% , MMBtu/hr) | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr) |
|------------|----------------------------|---------------------------------------|---------------------------------------|--|--|--|
| 909        | 0.146                      | 5.6, 53.71                            | 9.6, 41.41                            | 2.1, 83.60                             | 3.1, 67.35   | 5.7, 76.49                             |
|            | 0.148                      | 9.6, 41.41                            | 11.2, 61.81                           | 2.1, 83.60                             | 5.7, 76.49   | 7.3, 79.58                             |
| 912        | 0.027                      | 2.1, 60.50                            | 4.1, 49.803-4, 70.10                  | 1.9, 101.51                            | 4.0, 104.13  | 5.4, 100.24                            |
|            | 0.034                      | 4.1, 49.802-1, 60.50                  | 7.0, 57.57                            | 5.4, 100.24                            | 3.4, 70.10N/A  | 6.5, 99.68                             |
| 913        | 0.027                      | 1.2, 19.89                            | 3.0, 14.80                            | 1.3, 30.33                             | 2.1, 15.53   | 4.1, 25.71                             |
| 915        | 0.143                      | 0, 3.85                               | 8.0, 3.85                             | 0, 20.00                               | N/A  | 8.0, 20.00                             |
|            | 0.098                      | 8.0, 3.85                             | >8.0, 3.85                            | 8.0, 20.00                             | N/A  | >8.0, 20.00                            |
| 916        | 0.088                      | 5.7, 9.53                             | 9.3, 9.17                             | 5.4, 30.00                             | N/A  | 9.1, 34.05                             |
|            | 0.099                      | 9.3, 9.17                             | 10.6, 24.64                           | 9.1, 34.05                             | N/A  | 10.4, 33.11                            |
| 917        | 0.061                      | 0, 3.60                               | -, 3.6                                | 0, 18.00                               | N/A  | -, 18.00                               |
| 919        | 0.047                      | 3.9, 23.30                            | 8.3, 22.06                            | 5.8, 48.20                             | 9.2, 39.12   | 10.1, 47.20                            |
|            | 0.056                      | 8.3, 22.06                            | 9.5, 21.10                            | 9.2, 39.12                             | N/A  | 10.1, 47.20                            |
| 920        | 0.046                      | 5.0, 24.84                            | 7.7, 17.86                            | 5.8, 40.77                             | 7.1, 15.34   | 7.3, 42.64                             |
|            | 0.055                      | 7.7, 17.86                            | 10.8, 27.53                           | 7.3, 42.64                             | N/A  | 10.0, 45.15                            |
| 924        | 0.106                      | 0.0, 3.20                             | -, 3.20                               | 0.0, 16.00                             | N/A  | -, 16.00                               |
| 926        | 0.032                      | 1.8, 32.81                            | 6.0, 40.89                            | 2.9, 126.72                            | 4.4, 32.81   | 3.9, 131.59                            |
|            | 0.037                      | 6.0, 40.89                            | 7.0, 77.89                            | 3.9, 131.59                            | N/A  | 4.2, 122.33                            |
| 928        | 0.044                      | 0.0, 4.00                             | < 6.0, 4.00                           | 0.0, 20.00                             | N/A  | < 6.0, 20.00                           |
|            | 0.073                      | 6.0, 4.00                             | > 6.0, 4.00                           | 6.0, 20.00                             | N/A  | > 6.0, 20.00                           |
| 929        | 0.024                      | 0.0, 4.00                             | < 6.0, 4.00                           | 0.0, 20.00                             | N/A  | < 6.0, 20.00                           |
|            | 0.087                      | 6.0, 4.00                             | > 6.0, 4.00                           | 6.0, 20.00                             | N/A  | > 6.0, 20.00                           |
| 930        | 0.033                      | 0.0, 4.00                             | < 6.0, 4.00                           | 0.0, 20.00                             | N/A  | < 6.0, 20.00                           |
|            | 0.077                      | 6.0, 4.00                             | > 6.0, 4.00                           | 6.0, 20.00                             | N/A  | > 6.0, 20.00                           |
| 931        | 0.034                      | 0.0, 4.00                             | < 9.0, 4.00                           | 0.0, 20.00                             | N/A  | < 9.0, 20.00                           |

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr) | Max O2 at Low Firing (O2% , MMBtu/hr) | Min O2 at High Firing (O2% , MMBtu/hr) | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr) |
|------------|----------------------------|---------------------------------------|---------------------------------------|--|--|--|
|            | 0.073                      | 9.0, 4.00                             | > 9.0, 4.00                           | 9.0, 20.00                             | N/A  | > 9.0, 20.00                           |
| 932        | 0.037                      | 0.0, 4.00                             | < 4.0, 4.00                           | 0.0, 20.00                             | N/A  | < 4.0, 20.00                           |
|            | 0.053                      | 4.0, 4.00                             | > 4.0, 4.00                           | 4.0, 20.00                             | N/A  | > 4.0, 20.00                           |
| 933        | 0.035                      | 0.0, 4.00                             | < 5.0, 4.00                           | 0.0, 20.00                             | N/A  | < 5.0, 20.00                           |
|            | 0.050                      | 5.0, 4.00                             | >5.0, 4.00                            | 5.0, 20.00                             | N/A  | > 5.0, 20.00                           |
| 951        | 0.111                      | 5.2, 2.68                             | 12.1, 0.78                            | 5.0, 10.42                             | 4.2, 7.78  | 10.4, 10.19                            |
|            | 0.175                      | 12.1, 0.78                            | 13.6, 1.73                            | 10.4, 10.19                            | N/A  | 13.5, 2.61                             |

The limits listed above are based on a calendar day averaging period for both firing rate and O2%.

## **RECOMMENDATION**

It is recommended that a Change of Conditions to the Permit to Operate be granted to Tesoro for:

### **S-912 F12 Furnace-#1 Feed Prep Heater**

\_\_\_\_\_  
Arthur P. Valla  
Senior Air Quality Engineer

\_\_\_\_\_  
Date  
October 2, 2009

**Application 21713, Amorco Terminal Backup Generator S-58**

**ENGINEERING EVALUATION  
Tesoro Refining and Marketing Company – Amorco Terminal  
PLANT NO. 14629  
APPLICATION NO. 21713**

**BACKGROUND**

Tesoro has applied to obtain an Authority to Construct (AC) and/or a Permit to Operate (PO) for the following equipment:

**S-58 Standby Diesel Generator, Caterpillar Model C9 ATAAC, 312 BHP**

on the dock on the Amorco Terminal. It will provide emergency power (in the event of a blackout) for all essential electrically powered equipment on the dock. These emergency engines must be periodically tested to ensure that they will generate power when needed.

The Emergency Diesel Engine Generator Set (S-58) is CARB certified and is equipped with the best available control technology (BACT) for minimizing the release of air borne criteria pollutants and harmful air toxins due to fuel combustion.

S-58 meets the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 3 Off-road standard. The engine will burn commercially available California ultra low sulfur diesel fuel. The sulfur content of the diesel fuel will not exceed 0.0015% by weight. The operation of the engine should not pose any health threat to the surrounding community or the public at large.

**EMISSIONS**

**Annual Average Emissions:**

The diesel engine (S-58) is CARB Certified and the emission factors are listed below. These factors are based on the CARB emissions factors as well as 5-mode testing, submitted to CARB. For this report, it is assumed that the emission value of NMHC+NO<sub>x</sub> is made up of 5% POC and 95% NO<sub>x</sub>, per Engineering Division policy. Tesoro has asked to run S-58 for 50 hours per year for testing and maintenance which is the maximum allowed by the ATCM.

| Pollutant            | Engine Emissions<br>g/kw-hr | Engine Emissions<br>g/bhp-hr |
|----------------------|-----------------------------|------------------------------|
| NMHC (POC)           | 0.185                       | 0.138                        |
| NO <sub>x</sub>      | 3.515                       | 2.621                        |
| NMHC+NO <sub>x</sub> | 3.7                         | 2.759                        |
| CO                   | 3.3                         | 2.461                        |
| PM                   | 0.18                        | 0.134                        |

| Pollutant | hours/yr | x | BHP | x | emission factor g/bhp-hr |   | lb=454 |   | lb/year | TPY |        |
|-----------|----------|---|-----|---|--------------------------|---|--------|---|---------|-----|--------|
|           |          |   |     |   |                          |   | grams  |   |         |     |        |
| NOx       | 50       | x | 312 | x | 2.621                    | / | 454    | = | 90.06   | =   | 0.045  |
| CO        | 50       | x | 312 | x | 2.461                    | / | 454    | = | 84.56   | =   | 0.042  |
| POC       | 50       | x | 312 | x | 0.138                    | / | 454    | = | 4.74    | =   | 0.0024 |
| PM10      | 50       | x | 312 | x | 0.134                    | / | 454    | = | 4.60    | =   | 0.0023 |

|     | Sulfur content | x | fuel density (lb/gal) | x | Max fuel use | x | (lb SO2/lb S) | x | hr/yr | = | lb/yr | = | TPY     |
|-----|----------------|---|-----------------------|---|--------------|---|---------------|---|-------|---|-------|---|---------|
| SO2 | 0.000015       | x | 7.206                 | x | 15.4         | x | 2             | x | 50    | = | 0.166 | = | 8.3E-05 |

**Maximum Daily Emissions:**

Maximum Daily emissions are calculated to establish whether a source triggers the requirement for BACT (10 lb/highest day total source emissions for any class of pollutants). 24-hr/day of operation will be assumed since no daily limits are imposed on emergency operations.

| Pollutant | hours/day | x | BHP | x | emission factor g/bhp-hr |   | lb=454 |   | lb/day |
|-----------|-----------|---|-----|---|--------------------------|---|--------|---|--------|
|           |           |   |     |   |                          |   | grams  |   |        |
| NOx       | 24        | x | 312 | x | 2.621                    | / | 454    | = | 43.2   |
| CO        | 24        | x | 312 | x | 2.461                    | / | 454    | = | 40.6   |
| POC       | 24        | x | 312 | x | 0.138                    | / | 454    | = | 2.3    |
| PM10      | 24        | x | 312 | x | 0.134                    | / | 454    | = | 2.2    |

|     | Sulfur content | x | fuel density (lb/gal) | x | Max fuel use | x | (lb SO2/lb S) | x | hr/day | = | lb/day |
|-----|----------------|---|-----------------------|---|--------------|---|---------------|---|--------|---|--------|
| SO2 | 0.000015       | x | 7.206                 | x | 15.4         | x | 2             | x | 24     | = | 0.0799 |

**PLANT CUMULATIVE INCREASE**

Table 1 summarizes the cumulative increase in criteria pollutant emissions. Current emissions are zero because all previous emissions have been offset.

**Table 1**

| Pollutant | Current plant emissions (TPY) | Increase in plant emissions associated with this application (TPY) | Cumulative emissions (Current + Increase) |
|-----------|-------------------------------|--|---|
| NOx       | 0                             | 0.045  | 0.045                                     |
| CO        | 0                             | 0.042  | 0.042                                     |
| POC       | 0                             | 0.0024   | 0.0024                                    |
| PM10      | 0                             | 0.0023   | 0.0023                                    |
| SO2       | 0                             | 0.00008  | 0.00008                                   |

**TOXIC RISK SCREENING ANALYSIS**

The cancer risk is calculated based on the emission rate of diesel exhaust particulate matter. Diesel exhaust particulate matter is used as a surrogate for all toxic contaminants found in diesel exhaust. Because the proposed emissions exceed the risk screening trigger level for diesel exhaust particulate matter in Table 2-5-1, a risk screening was performed.

Results from the health risk screening analysis indicate that the maximum cancer risk is estimated at 0.6 in a million if the engine were to run for 50 hours/year.

Based on 50 hours per year of operation, the emergency generator passed the Health Risk Screening Analysis (HRA) conducted on April 19, 2010 by the District's Toxic Evaluation Section. This source poses no significant toxic risk, since the increased cancer risk to the maximally exposed receptor (Resident) is 0.01 in a million. The hazard index for a resident is 0.000004. The increased cancer risk to workers is 0.6 in a million and the hazard index is 0.0004. In accordance with Regulation 2-5, the above risk level is considered acceptable for this engine.

**BACT**

BACT is triggered for NOx and CO since the maximum daily emissions exceeds 10 lb/day. BACT for this source is presented in the current BAAQMD BACT/TBACT Workbook for this source category as shown below:

|                  |  |   |                   |
|------------------|--|---|-------------------|
| <b>Source:</b>   | <b>IC Engine – Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump</b>  | <b>Revision:</b>  | <b>6</b>          |
|                  |  | <b>Document #:</b>  | <b>96.1.3</b>     |
| <b>Class:</b>    | <b>&gt; 50 BHP Output</b>  | <b>Date:</b>  | <b>04/13/2009</b> |
| <b>Pollutant</b> | <b>BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice</b>  | <b>TYPICAL TECHNOLOGY</b>   |                   |
| <b>NOx</b>       | 1. n/s <sup>d</sup><br>2. Current tier <sup>a,b</sup> standard for NOx at applicable horsepower rating.  | 1. n/s <sup>d</sup><br>2. Any engine certified or verified to achieve the applicable standard. <sup>a,b</sup> |                   |
| <b>CO</b>        | 1. n/s <sup>d</sup><br>2. The more stringent of either 2.75 g/bhp-hr [319 ppmvd @ 15% O <sub>2</sub> ] <sup>c</sup> or the current Tier <sup>a,b</sup> standard. | 1. n/s <sup>d</sup><br>2. Any engine certified or verified to achieve the applicable standard.                |                   |



The more restrictive BACT 1 standards levels do not apply for engines used exclusively for emergency use during involuntary loss of power. Hence, the owner/operator has to meet the BACT 2 limits. The Tier 3 standards are 4.0 g/kw-hr NO<sub>x</sub>+NMHC and 3.5 g/kw-hr CO. Therefore, this engine meets the requirements of BACT2.

**OFFSETS**

Offsets are required since the facility's POC and NO<sub>x</sub> emissions are each more than 35 ton/yr per Regulation 2-2-302.

| Pollutant       | Increase in plant emissions associated with this application (TPY) | Offset Ratio | Offsets Required (TPY) |
|-----------------|--|--------------|------------------------|
| NO <sub>x</sub> | 0.045  | 1.15         | 0.052                  |
| POC             | 0.0024   | 1.15         | 0.0028                 |

**CARB STATIONARY DIESEL ENGINE ATCM**

The State Office of Administrative Law approved the amended Airborne Toxic Control Measure (ATCM) on October 18, 2007. State law requires the local Air Districts to implement and enforce the requirements of the ATCM. Since this engine was installed after January 1, 2005, it is a new standby engine. Therefore, the engine is required to comply with subsection 93115.6(a)(3) of the ATCM.

“Stationary Diesel Engine ATCM” section 93115, title 17, CA Code of Regulations.

**Diesel PM – General Requirements**

- 93115.6(a)(3)(A)1.a Meet 0.15 g/bhp-hr PM standard
- 93115.6(a)(3)(A)1.c Operate 50 hours per year, or less, for maintenance and testing (except emergency use and emissions testing)

**HC,NO<sub>x</sub>, NMHC+NO<sub>x</sub>, CO**

93115.6(a)(3)(B) Meet standards for off-road engines of the same model year and horsepower rating as specified in the OFF-Road Compression Ignition Engine Standards; Or if no standards have been established, meet the Tier 1 standards in Title 13, CCR, Section 2423 for off-road engines of the same horsepower rating, irrespective of the new engine’s model year

This emergency standby diesel engine (S-58) is in compliance with the above ATCM requirements. The diesel engine will operate for no more than 50 hours per year for maintenance and reliability testing. This engine is subject to the EPA Tier 3 requirements for HC, NO<sub>x</sub>, NMHC+NO<sub>x</sub> and CO. As shown in the Table 2, the engines meet these requirements.

**Table 2. ATCM Tier 3 Compliance**

|  | Engine Emissions | ATCM Tier 3 | ATCM Tier 3 |
|--|------------------|-------------|-------------|
|  |                  |             |             |

|            | g/bhp-hr | Requirements<br>g/kw-hr | Requirements<br>g/bhp-hr |
|------------|----------|-------------------------|--------------------------|
| NMHC (POC) | 0.138    | N/A                     | N/A                      |
| NOx        | 2.621    | N/A                     | N/A                      |
| NMHC+NOx   | 2.759    | 4.0                     | 2.983                    |
| CO         | 2.461    | 3.5                     | 2.610                    |
| PM         | 0.134    | 0.20                    | 0.149                    |

### **STATEMENT OF COMPLIANCE**

Source S-58 is subject to and expected to be in compliance with the requirements of District Regulation 1-301 (Public Nuisance), Regulation 6-1 (Particulate Matter General Requirements), Regulation 9-1 (Sulfur Dioxide) and Regulation 9-8 (NOx and CO from Stationary Internal Combustion Engines).

From Regulation 1-301, no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property. For purposes of this section, three or more violation notices validly issued in a 30 day period to a facility for public nuisance shall give rise to a rebuttable presumption that the violations resulted from negligent conduct.

S-58 is subject to the limitations of Regulation 6-1-303 (Ringelmann No. 2 Limitation), Regulation 6-1-305 (Visible Particles) and Regulation 6-1-310 (Particulate Weight Limitation). Regulation 6-1-303 states that a person shall not emit for a period or periods aggregating more than three minutes in any hour, a visible emission that is as dark or darker than No. 2 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to an equivalent or greater degree, nor shall said emission, as perceived by an opacity sensing device in good working order, where such device is required by District Regulations, be equal to or greater than 40% opacity. Regulation 6-1-305 prohibits visible particles from causing an annoyance if such particles fall on real property other than that of the person responsible for the emission. Regulation 6-1-310 limits particulate matter to less than 0.15 gr. per dscf. This low PM10 emitting engine is not expected to produce visible emissions or fallout in violation of this regulation, and it will be assumed to be in compliance with Regulation 6 pending a regular inspection.

S-58 is also subject to the SO2 limitations of Regulation 9-1-301 (Limitations on Ground Level Concentrations), Regulation 9-1-302 (General Emission Limitation) and 9-1-304 (Fuel Burning (Liquid and Solid Fuels)). From Regulation 9-1-301, the ground level concentrations of SO2 will not exceed 0.5 ppm continuously for 3 consecutive minutes or 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours. Per Regulation 9, Rule 1, Section 302, a person shall not emit from any source a gas stream containing sulfur dioxide in excess of 300 ppm (dry). And Regulation 9, Rule 1, Section 304, states that a person shall not burn any liquid fuel having sulfur content in excess of 0.5% by weight. Compliance with both Regulations 9-1-

302 and 9-1-304 is likely since California law mandates using diesel fuel with a 0.0015% by weight sulfur.

S-58 is also subject to Regulation 9-8 "NO<sub>x</sub> and CO from Stationary Internal Combustion Engines." From Regulation 9-8-110.5, the source is not subject to the requirements of Regulations 9-8-304 (Emission Limits – Compression-Ignited Engines), 9-8-305 (Emission Limits – Delayed Compliance, Existing Compression-Ignited Engines, Model Year 1996 or Later), 9-8-501 (Initial Demonstration of Compliance) and 9-8-503 (Quarterly Demonstration of Compliance). S-58 is subject to the monitoring and record keeping procedures described in Regulation 9-8-530 (Emergency Standby and Low Usage Engines, Monitoring and Recordkeeping).

This project is considered to be ministerial under the District's CEQA Regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Permit Handbook Chapter 2.3.

The project is not within 1000 feet of the nearest school and therefore the application is not subject to the public notification requirements of Reg. 2-1-412.

### **NSPS**

The engine is subject to 40 CFR 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines because it was manufactured after April 1, 2006, as required by Section 60.4200(a)(2)(i).

The engine has a total displacement of 8.8 liters and has 6 cylinders, so each cylinder has a volume of about 1.5 liters. The engine is a 2010 model year engine and is not a fire pump. Section 60.4205(b) requires these engines to comply with the emission standards in Section 60.4202, and 60.4202(a)(2) for engines greater than 50 HP and displacement less than 10 liters/cylinder refers to 40CFR89.112 and 40CFR89.113 for all pollutants. For a 312 HP engine, these standards are:

NMHC+NO<sub>x</sub>: 4.0 g/kw-hr

CO: 3.5 g/kw-hr

PM: 0.20 g/kw-hr

20% opacity during acceleration mode

15% opacity during lugging mode

50% opacity during peaks in acceleration or lugging mode

According to CARB Executive Order U-R-001-0399, the engine will comply with the standards.

Sections 60.4206 and 60.4211(a) require that the owner/operator operate and maintain the engine according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer, over the entire life of the engine.

Section 60.4207(a) requires that by October 1, 2007, the owner/operator must use fuel that complies with 40 CFR 80.510(a). This means that the fuel must have a maximum sulfur content of 500 parts per million (ppm), a cetane index of 40 or a maximum aromatic content of 35 percent by volume. Section 60.4207(b) requires that by October 1, 2010, the owner/operator

must use fuel that complies with 40 CFR 80.510(b). This means that the fuel must have a maximum sulfur content of 15 parts per million (ppm), and the same cetane index or aromatic content as previously stated. California Air Resources Board (CARB) diesel fuel, which has a maximum sulfur content of 15 ppm and a maximum aromatic content of 10 to 20 percent by volume, is the only available Diesel Fuel in California. Staff in the Stationary Source Division of CARB indicate that some verified diesel fuel in California may have a maximum aromatic content greater than 10 percent if the fuel has been demonstrated to have an equal or greater emissions benefit as diesel fuel with maximum aromatic content of 10 percent, but no verified fuel has had an aromatic content greater than 25 percent.

Section 60.4209(a) requires a non-resettable hour meter.

The engine will comply with the requirements of Section 60.4211(c) because it has been certified in accordance with 40 CFR Part 89.

The engine will comply with the requirement in Section 60.4211(e) to run for less than 100 hours per year for maintenance checks and readiness testing.

The owner/operator is not required to perform tests in accordance with Section 60.4212 or 60.4213.

The owner/operator is not required to submit an initial notification to EPA for emergency engines in accordance with Section 60.4214(b).

Because the engine does not have a diesel particulate filter, it is not subject to Section 60.4209(b) (installation of a backpressure monitor) or 60.4214(c) (records of corrective action taken after high backpressure).

The owner/operator is required to comply with certain sections of 40 CFR 60, Subpart A, General Provisions, as listed in Subpart III, Table 8. These general provisions are 60.1, 60.2, 60.3, 60.4, 60.5, 60.6, 60.7 (as specified in 60.4214(a)), 60.9, 60.10, 60.12, 60.14, 60.15, 60.16, 60.17 and 60.19.

Offsets, PSD, and NESHAPS are not triggered.

## **PERMIT CONDITIONS**

The following permit condition will be revised as shown.

COND# 23811 -----

Application 14917, September 2006  
Modified by Application 16495, November 2007  
Modified by Application 19330, February 2009  
Plant 14628 (B2758) Emergency Diesel Engines S-1518 and S-1519  
Plant 14629 (B2759) Emergency Diesel Engines S-56 and S-57

Plant 14629 (B2759) Emergency Diesel Engine S-58

1. Operating for reliability-related activities is limited to 50 hours per year per engine.

[Basis: "Stationary Diesel Engine ATCM", CA Code of Regulations, Title 17, Sections 93115.6(b)(3)(A)2b and 93115.6(a)(3)(A)1c.

2. The owner or operator shall operate each emergency standby engine only for the following purposes: to mitigate emergency conditions, for emission testing to demonstrate compliance with a District, state or Federal emission limit, or for reliability-related activities (maintenance and other testing, but excluding emission testing). Operating hours while mitigating emergency conditions or while emission testing to show compliance with District, state or Federal emission limits is not limited.

[Basis: Regulation 9-8-330, "Stationary Diesel Engine ATCM", CA Code of Regulations, Title 17, Section 93115.4(29)

3. The owner/operator shall operate each emergency standby engine only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures the hours of operation for the engine is installed, operated and properly maintained.

[Basis: Regulation 9-8-530, "Stationary Diesel Engine ATCM", CA Code of Regulations, Title 17, Section 93115.10(e)(1)

4. Records: The owner/operator shall maintain the following monthly records in a District-approved log for at least 60 months from the date of entry. Log entries shall be retained on-site, either at a central location or at the engine's location, and made immediately available to the District staff upon request.
  - a. Hours of operation for reliability-related activities (maintenance and testing).
  - b. Hours of operation for emission testing to show compliance with emission limits.
  - c. Hours of operation (emergency).
  - d. For each emergency, the nature of the emergency condition.
  - e. Fuel usage for each engine(s).

[Basis: Regulation 9-8-530, Regulation 2-6-501, and "Stationary Diesel Engine ATCM", CA Code of Regulations, Title 17, Section 93115.10(g) ]

RECOMMENDATION

Grant an Authority to Construct to Tesoro Amorco Terminal for the following equipment:

**S-58 Standby Diesel Generator, Caterpillar Model C9 ATAAC, 312 BHP**

By:

Arthur Valla  
Senior Air Quality Engineer

May 19, 2010

**Application 21744, S-1510 Delayed Coker Emissions Revision**

**EVALUATION REPORT  
TESORO - GOLDEN EAGLE REFINRY  
Application #21744 - Plant #14628**

**150 Solano Way  
Martinez, CA 94553**

**I. BACKGROUND**

In 2006, via Application 14141, Tesoro applied for and was granted a conditional Authority to Construct for the following equipment:

**S-1510 Delayed Coker**

**S-1511 Delayed Coker Heater #1, 230 MMBtu/hr abated by A-1511 Selective Catalytic Reduction System (SCR)**

**S-1512 Delayed Coker Heater #2, 230 MMBtu/hr abated by A-1512 Selective Catalytic Reduction System (SCR)**

The unit was built and started up in 2008. A Permit to Operate was granted 6/2/2009.

The Delayed Coking process produces coke that is deposited in coke drums. The heat needed to produce coke is provided by the heaters. There are two heaters in the delayed coker process and there are two coke drums per heater. When the coke drum is full, the production is switched to the other coke drum and the full drum is switched to coke removal mode. During this removal mode the coke drum is purged, cooled, and depressured. After these steps the drum contains residual pressure that is vented to atmosphere through the Delayed Coker Steam Vents. At the time of the initial permit application, information on possible emissions from the Delayed Coker Steam Vents was not available. An engineering assessment of the coker drum vent stream was performed and it was determined that these emissions were insignificant, and no emissions were attributed to this vent.

Since then a detailed source testing evaluation was conducted on the coker vents at the Hovensa refinery in St. Croix. Tesoro has performed a review of this source test data and has developed an engineering estimate of POC, PM10 and Toxic emissions from the Delayed Coker Steam Vents. Tesoro has submitted this application to correct the Delayed Coker emissions.

Tesoro also reviewed the original emission calculations and found some errors associated with the delayed coker heater emission estimates. This application also corrects these emission estimates.

Lastly, Tesoro requested a change in conditions to require a TRS monitor on the fuel gas to the S-1511 and S-1512 furnaces only when refinery fuel gas is used for combustion.

Currently Tesoro only uses natural gas fuel, and there are no plans to change this fuel. Tesoro wants to use the TRS meter in another location.

## II. EMISSION CALCULATIONS

The following changes are proposed by this application:

- A. **S-1511 and S-1512 Coker Furnaces:**
1. *Organic emissions were originally understated by 48.5% due to a computational error that used a 1516 btu/scf heating value for fuel gas. The revised emissions use a natural gas heat content of 1020 btu/scf. Total POC emissions were estimated in Application 14141 at 7.31 t/y for both furnaces. Corrected POC emission are 10.86 t/y for both furnaces.*
  2. *NOx emissions were originally overstated slightly by using an F-factor of 8831 scf/MMBtu. The revised emissions use a F-factor of 8710 scf/MMBtu. Total NOx emissions were estimated in Application 14141 at 19.13 t/y for both furnaces. Corrected NOx emission are 18.87 t/y for both furnaces.*
  3. *CO emissions were originally understated by 119% due to both a.) the F-factor computational error that used a 8831 scf/MMBtu F-factor and b.) a computational error that left out the CO emissions that occur during normal operation (only the higher CO concentrations of abnormal operation were included). Total CO emissions were estimated in Application 14141 at 30.63 t/y for both furnaces. Corrected POC emission are 67.22 t/y for both furnaces.*
  4. *SO<sub>2</sub> emissions were originally understated by 45% due to a computational error that used a 1516 btu/scf heating value for fuel gas. The revised emissions use a refinery fuel gas heat content of 1042 btu/scf. Total SO<sub>2</sub> emissions were estimated in Application 14141 at 7.74 t/y for both furnaces. Corrected SO<sub>2</sub> emissions are 11.26 t/y for both furnaces.*
  5. *PM<sub>10</sub> emissions were originally overstated by 169% due to both a.) the use of a 1516 btu/scf heating value for fuel gas and b.) a computational error that included condensable particulate matter. Only filterable particulate matter was included in the ERCs granted to Tesoro via Application 16389. Total PM<sub>10</sub> emissions were estimated in Application 14141 at 10.10 t/y for both furnaces. Corrected PM<sub>10</sub> emissions are 3.75 t/y for both furnaces.*
- B. **S-1510 Delayed Coker:** *In addition to the S-1510 fugitive emissions included in the original application, Tesoro has estimated the coker vent emissions based on the 2008 Coker Steam Vent Source Test Report conducted at the Hovensa refinery in St. Croix. Based on the data in this report, for a drum depressurizing from 5 psi, 1065 coker cycles per year and 16.6 hrs per cycle, the following emissions are calculated:*

| <b>Drum Depressurizing (psig)</b> | <b>POC (lb/cycle)</b> | <b>POC (lb/hr)</b> | <b>POC (tpy)</b> | <b>PM<sub>10</sub> filt. (lb/cycle)</b> | <b>PM<sub>10</sub> filt. (lb/hr)</b> | <b>PM<sub>10</sub> filt. (tpy)</b> |
|-----------------------------------|-----------------------|--------------------|------------------|---|--------------------------------------|------------------------------------|
| 5 to 0                            | 38.0                  | 2.29               | 20.235           | 1.3                                     | 0.078                                | 0.692                              |

The overall project emissions are summarized below with the changes tracked from the original Application 14141 and modified by Application 16389.

### Project Emission Summary

| <b>Source</b> | <b>NOx (tons/yr)</b> | <b>SO<sub>2</sub> (tons/yr)</b> | <b>PM<sub>10</sub> (tons/yr)</b> | <b>POC (tons/yr)</b> | <b>CO (tons/yr)</b> |
|---------------|----------------------|---------------------------------|----------------------------------|----------------------|---------------------|
|               |                      |                                 |                                  |                      |                     |



|                       |                                |                               |                               |                                   |                                |
|-----------------------|--------------------------------|-------------------------------|-------------------------------|-----------------------------------|--------------------------------|
| S-1510                | 0                              | 0                             | <u>0.692</u>                  | <u>21.534</u><br><del>1.299</del> | 0                              |
| S-1511                | <u>9.4359.565</u>              | <u>5.633.870</u>              | <u>5.0501.875</u>             | <u>3.6555.430</u>                 | <u>33.610</u><br><u>15.316</u> |
| S-1512                | <u>9.4359.565</u>              | <u>5.633.870</u>              | <u>5.0501.875</u>             | <u>3.6555.430</u>                 | <u>33.610</u><br><u>15.316</u> |
| S-1513                | 0                              | 0                             | 1.752                         | 0                                 | 0                              |
| S-1514                | 0                              | 0                             | 0.451                         | 0                                 | 0                              |
| S-1515                | 0                              | 0                             | 0.451                         | 0                                 | 0                              |
| S-1516                | 0                              | 0                             | 0.938                         | 0                                 | 0                              |
| S-1517<br>Pilot/Purge | 0.465                          | 0.003                         | 0.037                         | 0.027                             | 0.198                          |
| Total                 | <u>19.335</u><br><u>19.595</u> | <u>11.263</u><br><u>7.743</u> | <u>8.071</u><br><u>13.729</u> | <u>32.421</u><br><u>8.636</u>     | <u>67.418</u><br><u>30.830</u> |

The net project emissions, reflecting the Onsite Project Contemporaneous Emission Reductions, is summarized in the original CMP evaluation in Table IV, modified by Application 16389, which is shown below with the new emissions tracked:

**Table IV  
Coker Modification Project Emission Summary, tons per year (TPY)**

|                                   | POC                           | NOx                   | SO2                                    | CO                                | PM/PM <sub>10</sub>                |
|-----------------------------------|-------------------------------|-----------------------|--|-----------------------------------|------------------------------------|
| Current                           | 2.22                          | 301.96                | 3,146.93                               | 79.78                             | 68.65                              |
| Future                            | <u>8.636</u><br><u>32.241</u> | <u>19.335595</u>      | <u>11.263</u><br><u>7.743</u>          | <u>67.418</u><br><u>30.830</u>    | <u>13.729</u><br><u>8.071</u>      |
| Net emissions                     | <u>30.021</u><br><u>6.416</u> | (282. <u>625365</u> ) | <u>(3,139.19)</u><br><u>(3135.667)</u> | <u>(48.95)</u><br><u>(12.462)</u> | <u>(54.921)</u><br><u>(60.579)</u> |
| Difference from initial estimates | 23.605                        | 0.260                 | (3.523)                                | (36.588)                          | 5.658                              |

### III. TOXIC EMISSIONS

According to the engineering evaluation for Application 14141, the following sources were subject to a risk screen:

**Table VI  
Sources Required Toxic Risk Analysis**

| Source | Toxic Pollutant Emitted | Hour Rate Emission (lb/hr) | Acute Trigger Level (lb/hr) | Annual Emission (lb/yr) | Chronic Trigger Level (lb/yr) |
|--------|-------------------------|----------------------------|-----------------------------|-------------------------|-------------------------------|
| S-1510 | Benzene                 | 0.0069                     | 2.9                         | 60.61                   | 6.4                           |
| S-1511 | PAH                     | Appendix C                 |                             | Appendix C              | 1.1 E-2                       |

**Table VI  
Sources Required Toxic Risk Analysis**

| Source | Toxic Pollutant Emitted | Hour Rate Emission (lb/hr) | Acute Trigger Level (lb/hr) | Annual Emission (lb/yr) | Chronic Trigger Level (lb/yr) |
|--------|-------------------------|----------------------------|-----------------------------|-------------------------|-------------------------------|
|        | Arsenic                 | 1.95 E-4                   | 4.2 E-4                     | 1.71                    | 1.2 E-2                       |
|        | Cadium                  |                            |                             | 1.99                    | 4.5 E-2                       |
|        | Chromium                |                            |                             | 2.16                    | 1.3 E-3                       |
|        | Formaldehyde            | 2.6 E-1                    | 2.1 E-1                     | 224                     | 30                            |
|        | Lead                    |                            |                             | 9.85                    | 5.4                           |
|        | Nickel                  | 0.002                      | 1.3 E-2                     | 19.0                    | 7.3 E-1                       |
| S-1512 | PAH                     | Appendix C                 |                             | Appendix C              | 1.1 E-2                       |
|        | Arsenic                 | 1.95 E-4                   | 4.2 E-4                     | 1.71                    | 1.2 E-2                       |
|        | Cadium                  |                            |                             | 1.99                    | 4.5 E-2                       |
|        | Chromium                |                            |                             | 2.16                    | 1.3 E-3                       |
|        | Formaldehyde            | 2.6 E-1                    | 2.1 E-1                     | 224                     | 30                            |
|        | Lead                    |                            |                             | 9.85                    | 5.4                           |
|        | Nickel                  | 0.002                      | 1.3 E-2                     | 19.0                    | 7.3 E-1                       |
| S-1517 | Chromium                |                            |                             | 1.8 E-3                 | 1.3 E-3                       |

*Appendix C refers to an attachment to the Engineering Evaluation for Application 14141.*

*In this application, Tesoro has revised the emissions for this project as follows:*

- A. *S-1511 and S-1512 Coker Furnaces: Organic emissions were understated by 48.5%. Total POC emissions were estimated in Application 14141 at 7.31 t/y for both furnaces. Corrected POC emission are 10.86 t/y for both furnaces. All organic emissions from S-1511 and S-1512 in Application 14141 need to be increased by  $(10.86-7.31)/7.31 = 48.56\%$ . The table below shows the revised speciated emissions.*

**Tesoro Refining & Marketing**

Golden Eagle Refinery Delayed Coker Project  
 Delayed Coker Combustion Emissions  
 Speciated HAPs and TACs  
 S-1511 and S-1512 Heaters Toxics from Refinery Gas Fuel

Original from Application 14141

Corrected by Application 21744

| Substance                            | TAC Threshold<br>lb/year |     | S-1511                 |                         |                 |                 | S-1512   |                 |                 |          | TOTAL HAP<br>lb/hr | TOTAL HAP<br>TON/YR | TOTAL HAP<br>lb/hr | TOTAL HAP<br>TON/YR |
|--------------------------------------|--------------------------|-----|------------------------|-------------------------|-----------------|-----------------|----------|-----------------|-----------------|----------|--------------------|---------------------|--------------------|---------------------|
|                                      |                          |     | Heat Input, MMBtu/hr=> |                         | Coker Furnace 1 | Coker Furnace 2 | Total    | Coker Furnace 1 | Coker Furnace 2 | Total    |                    |                     |                    |                     |
|                                      |                          |     | HAP                    | lb/MMBTU <sup>(1)</sup> | 230             | 230             |          | 230             | 230             |          |                    |                     |                    |                     |
|                                      |                          |     | Lb/yr                  | Lb/yr                   | Lb/yr           | Lb/yr           | Lb/yr    | Lb/yr           |                 |          |                    |                     |                    |                     |
| Acenaphthene                         | PAH                      | Yes | 2.36E-09               | 4.75E-03                | 4.75E-03        | 9.51E-03        | 1.09E-06 | 4.76E-06        | 7.06E-03        | 7.06E-03 | 1.41E-02           | 1.61E-06            | 7.06E-06           |                     |
| Acenaphthylene                       | PAH                      | Yes | 1.55E-09               | 3.12E-03                | 3.12E-03        | 6.25E-03        | 7.13E-07 | 3.12E-06        | 4.64E-03        | 4.64E-03 | 9.27E-03           | 1.06E-06            | 4.64E-06           |                     |
| Acetaldehyde                         | 6.40E+01                 | Yes | 1.53E-05               | 3.08E+01                | 3.08E+01        | 6.17E+01        | 7.04E-03 | 3.08E-02        | 4.58E+01        | 4.58E+01 | 9.15E+01           | 1.04E-02            | 4.58E-02           |                     |
| Antimony                             | 7.7                      | Yes | 5.17E-07               | 1.04E+00                | 1.04E+00        | 2.08E+00        | 2.38E-04 | 1.04E-03        | 1.55E+00        | 1.55E+00 | 3.09E+00           | 3.53E-04            | 1.55E-03           |                     |
| Arsenic                              | 1.20E-02                 | Yes | 8.50E-07               | 1.71E+00                | 1.71E+00        | 3.43E+00        | 3.91E-04 | 1.71E-03        | 2.54E+00        | 2.54E+00 | 5.08E+00           | 5.80E-04            | 2.54E-03           |                     |
| Barium <sup>(2)</sup>                | NA                       | No  | 0                      | 0                       | 0               | 0               |          |                 |                 |          |                    |                     |                    |                     |
| Benzene                              | 6.4                      | Yes | 6.47E-05               | 1.30E+02                | 1.30E+02        | 2.61E+02        | 2.98E-02 | 1.30E-01        | 1.93E+02        | 1.93E+02 | 3.86E+02           | 4.41E-02            | 1.93E-01           |                     |
| Benzo(a)anthracene                   | PAH                      | Yes | 3.21E-08               | 6.47E-02                | 6.47E-02        | 1.29E-01        | 1.48E-05 | 6.47E-05        | 9.61E-02        | 9.61E-02 | 1.92E-01           | 2.19E-05            | 9.61E-05           |                     |
| Benzo(a)pyrene                       | PAH                      | Yes | 8.96E-08               | 1.81E-01                | 1.81E-01        | 3.61E-01        | 4.12E-05 | 1.81E-04        | 2.69E-01        | 2.69E-01 | 5.38E-01           | 6.14E-05            | 2.69E-04           |                     |
| Benzo(b)fluoranthene                 | PAH                      | Yes | 4.04E-08               | 8.14E-02                | 8.14E-02        | 1.63E-01        | 1.86E-05 | 8.14E-05        | 1.21E-01        | 1.21E-01 | 2.42E-01           | 2.76E-05            | 1.21E-04           |                     |
| Benzo(g,h,i)perylene <sup>(2)</sup>  | PAH                      | Yes | 0                      | 0                       | 0               | 0               |          |                 |                 |          |                    |                     |                    |                     |
| Benzo(k)fluoranthene                 | PAH                      | Yes | 2.41E-08               | 4.86E-02                | 4.86E-02        | 9.71E-02        | 1.11E-05 | 4.86E-05        | 7.22E-02        | 7.22E-02 | 1.44E-01           | 1.65E-05            | 7.22E-05           |                     |
| Beryllium <sup>(2)</sup>             | 8.00E-02                 | Yes | 0                      | 0                       | 0               | 0               |          |                 |                 |          |                    |                     |                    |                     |
| Cadmium                              | 4.50E-02                 | Yes | 9.88E-07               | 1.99E+00                | 1.99E+00        | 3.98E+00        | 4.55E-04 | 1.99E-03        | 2.96E+00        | 2.96E+00 | 5.91E+00           | 6.75E-04            | 2.96E-03           |                     |
| Chromium (Hex) <sup>(2)</sup>        | 1.30E-03                 | Yes | 0                      | 0                       | 0               | 0               |          |                 |                 |          |                    |                     |                    |                     |
| Chromium (Total)                     | 1.30E-03                 | Yes | 1.07E-06               | 2.16E+00                | 2.16E+00        | 4.31E+00        | 4.92E-04 | 2.16E-03        | 3.21E+00        | 3.21E+00 | 6.42E+00           | 7.33E-04            | 3.21E-03           |                     |
| Chrysene                             | PAH                      | Yes | 1.63E-09               | 3.28E-03                | 3.28E-03        | 6.57E-03        | 7.50E-07 | 3.28E-06        | 4.87E-03        | 4.87E-03 | 9.75E-03           | 1.11E-06            | 4.87E-06           |                     |
| Copper                               | 9.30E+01                 | No  | 4.21E-06               | 8.48E+00                | 8.48E+00        | 1.70E+01        |          |                 | 1.26E+01        | 1.26E+01 | 2.52E+01           | 2.88E-03            | 1.26E-02           |                     |
| Dibenz(a,h)anthracene <sup>(2)</sup> | PAH                      | Yes | 0                      | 0                       | 0               | 0               |          |                 |                 |          |                    |                     |                    |                     |
| Ethylbenzene                         | 7.70E+04                 | Yes | 3.02E-05               | 6.08E+01                | 6.08E+01        | 1.22E+02        | 1.39E-02 | 6.09E-02        | 9.03E+01        | 9.03E+01 | 1.81E+02           | 2.06E-02            | 9.03E-02           |                     |
| Fluoranthene                         | PAH                      | Yes | 3.06E-09               | 6.17E-03                | 6.17E-03        | 1.23E-02        | 1.41E-06 | 6.17E-06        | 9.17E-03        | 9.17E-03 | 1.83E-02           | 2.09E-06            | 9.17E-06           |                     |
| Fluorene                             | PAH                      | Yes | 1.08E-08               | 2.18E-02                | 2.18E-02        | 4.35E-02        | 4.97E-06 | 2.18E-05        | 3.24E-02        | 3.24E-02 | 6.48E-02           | 7.39E-06            | 3.24E-05           |                     |
| Formaldehyde                         | 3.00E+01                 | Yes | 1.11E-04               | 2.24E+02                | 2.24E+02        | 4.47E+02        | 5.11E-02 | 2.24E-01        | 3.33E+02        | 3.33E+02 | 6.66E+02           | 7.60E-02            | 3.33E-01           |                     |
| Hydrogen Sulfide <sup>(2)</sup>      | 3.90E+02                 | Yes | 0                      | 0                       | 0               | 0               |          |                 |                 |          |                    |                     |                    |                     |

**Tesoro Refining & Marketing**

Golden Eagle Refinery Delayed Coker Project

Delayed Coker Combustion Emissions

Speciated HAPs and TACs

S-1511 and S-1512 Heaters Toxics from Refinery Gas Fuel

Original from Application 14141

Corrected by Application 21744

| Substance                      | TAC Threshold<br>lb/year | S-1511 |  | S-1512   |                       | Total<br>Lb/yr | TOTAL HAP<br>lb/hr | TOTAL HAP<br>TON/YR | S-1511                |                       | S-1512                |                | TOTAL HAP<br>lb/hr | TOTAL HAP<br>TON/YR |                    |                     |
|--------------------------------|--------------------------|--------|--|----------|-----------------------|----------------|--------------------|---------------------|-----------------------|-----------------------|-----------------------|----------------|--------------------|---------------------|--------------------|---------------------|
|                                |                          | HAP    | Heat Input,<br>MMBTU/hr=><br>lb/MMBTU <sup>(1)</sup> |          | Coker<br>Furnace<br>1 |                |                    |                     | Coker<br>Furnace<br>2 | Coker<br>Furnace<br>1 | Coker<br>Furnace<br>2 | Total<br>Lb/yr |                    |                     | TOTAL HAP<br>lb/hr | TOTAL HAP<br>TON/YR |
|                                |                          |        | 230  | 230      | 230                   |                |                    |                     | 230                   |                       |                       |                |                    |                     |                    |                     |
|                                |                          |        | Lb/yr  | Lb/yr    | Lb/yr                 |                |                    |                     | Lb/yr                 |                       |                       |                |                    |                     |                    |                     |
| Indeno(1,2,3-cd)pyrene         | PAH                      | Yes    | 1.03E-07   | 2.08E-01 | 2.08E-01              | 4.15E-01       | 4.74E-05           | 2.08E-04            | 3.09E-01              | 3.09E-01              | 6.18E-01              | 7.05E-05       | 3.09E-04           |                     |                    |                     |
| Lead                           | 5.4                      | Yes    | 4.89E-06   | 9.85E+00 | 9.85E+00              | 1.97E+01       | 2.25E-03           | 9.85E-03            | 1.46E+01              | 1.46E+01              | 2.93E+01              | 3.34E-03       | 1.46E-02           |                     |                    |                     |
| Manganese                      | 7.7                      | Yes    | 6.81E-06   | 1.37E+01 | 1.37E+01              | 2.74E+01       | 3.13E-03           | 1.37E-02            | 2.04E+01              | 2.04E+01              | 4.07E+01              | 4.65E-03       | 2.04E-02           |                     |                    |                     |
| Mercury                        | 5.60E-01                 | Yes    | 1.80E-07   | 3.63E-01 | 3.63E-01              | 7.25E-01       | 8.28E-05           | 3.63E-04            | 5.39E-01              | 5.39E-01              | 1.08E+00              | 1.23E-04       | 5.39E-04           |                     |                    |                     |
| Naphthalene                    | 5.3                      | Yes    | 3.13E-07   | 6.31E-01 | 6.31E-01              | 1.26E+00       | 1.44E-04           | 6.31E-04            | 9.37E-01              | 9.37E-01              | 1.87E+00              | 2.14E-04       | 9.37E-04           |                     |                    |                     |
| Nickel                         | 7.30E-01                 | Yes    | 9.42E-06   | 1.90E+01 | 1.90E+01              | 3.80E+01       | 4.33E-03           | 1.90E-02            | 2.82E+01              | 2.82E+01              | 5.65E+01              | 6.44E-03       | 2.82E-02           |                     |                    |                     |
| Phenanthrene                   | PAH                      | Yes    | 1.46E-08   | 2.94E-02 | 2.94E-02              | 5.88E-02       | 6.72E-06           | 2.94E-05            | 4.37E-02              | 4.37E-02              | 8.74E-02              | 9.97E-06       | 4.37E-05           |                     |                    |                     |
| Phenol                         | 7.70E+03                 | Yes    | 5.63E-06   | 1.13E+01 | 1.13E+01              | 2.27E+01       | 2.59E-03           | 1.13E-02            | 1.68E+01              | 1.68E+01              | 3.36E+01              | 3.83E-03       | 1.68E-02           |                     |                    |                     |
| Phosphorus <sup>(2)</sup>      | 2.7                      | Yes    | 0  | 0        | 0                     | 0              |                    |                     |                       |                       |                       |                |                    |                     |                    |                     |
| Propylene                      | 1.20E+05                 | No     | 2.17E-06   | 4.37E+00 | 4.37E+00              | 8.74E+00       |                    |                     | 6.49E+00              | 6.49E+00              | 1.30E+01              | 1.48E-03       | 6.49E-03           |                     |                    |                     |
| Pyrene                         | PAH                      | Yes    | 2.48E-09   | 5.00E-03 | 5.00E-03              | 9.99E-03       | 1.14E-06           | 5.00E-06            | 7.43E-03              | 7.43E-03              | 1.49E-02              | 1.70E-06       | 7.43E-06           |                     |                    |                     |
| Selenium                       | 7.70E+02                 | Yes    | 1.96E-08   | 3.95E-02 | 3.95E-02              | 7.90E-02       | 9.02E-06           | 3.95E-05            | 5.87E-02              | 5.87E-02              | 1.17E-01              | 1.34E-05       | 5.87E-05           |                     |                    |                     |
| Silver                         | NA                       | No     | 1.61E-06   | 3.24E+00 | 3.24E+00              | 6.49E+00       |                    |                     | 4.81E+00              | 4.81E+00              | 9.63E+00              | 1.10E-03       | 4.81E-03           |                     |                    |                     |
| Sulfur trioxide <sup>(3)</sup> | Note 4                   | No     | 3.99E-04   | 8.03E+02 | 8.03E+02              | 1.61E+03       |                    |                     | 1.19E+03              | 1.19E+03              | 2.39E+03              | 2.72E-01       | 1.19E+00           |                     |                    |                     |
| Sulfuric acid <sup>(3)</sup>   | 3.90E+01                 | No     | 4.88E-04   | 9.84E+02 | 9.84E+02              | 1.97E+03       |                    |                     | 1.46E+03              | 1.46E+03              | 2.92E+03              | 3.34E-01       | 1.46E+00           |                     |                    |                     |
| Thallium <sup>(2)</sup>        | NA                       | No     | 0  | 0        | 0                     | 0              |                    |                     |                       |                       |                       |                |                    |                     |                    |                     |
| Toluene                        | 1.20E+04                 | Yes    | 1.07E-04   | 2.16E+02 | 2.16E+02              | 4.31E+02       | 4.92E-02           | 2.16E-01            | 3.21E+02              | 3.21E+02              | 6.42E+02              | 7.33E-02       | 3.21E-01           |                     |                    |                     |
| Xylene (Total)                 | 2.70E+04                 | Yes    | 3.73E-05   | 7.52E+01 | 7.52E+01              | 1.50E+02       | 1.72E-02           | 7.52E-02            | 1.12E+02              | 1.12E+02              | 2.23E+02              | 2.55E-02       | 1.12E-01           |                     |                    |                     |
| Zinc                           | 1.40E+03                 | No     | 2.08E-05   | 4.19E+01 | 4.19E+01              | 8.38E+01       |                    |                     | 6.22E+01              | 6.22E+01              | 1.24E+02              | 1.42E-02       | 6.22E-02           |                     |                    |                     |
| Total                          |                          |        |  |          |                       | 2.64E+00       | 0.182              | 0.799               |                       |                       |                       |                |                    |                     |                    |                     |

(1) values are from Appendix B, page B-9 of EERC August 14, 1998 document "Air Toxic Emission Factors for Combustion Sources Using Petroleum Based Fuels, Final Report, Vol. II"

(2) emission factors presented in the EERC document for these compounds were all based entirely on non-detect analytical values, therefore an emission factor of zero has been substituted based on CAPCOA health risk assessment guidelines.

(3) Based on ratio of SO3/SO2 factors for fuel oil emissions, AP-42 Section 1.3, and 100 ppmv TRS in the refinery fuel gas.

Sulfur trioxide readily converts to sulfuric acid.

(4) Sulfur trioxide is a TAC but no chronic trigger level is

**Tesoro Refining & Marketing**

Golden Eagle Refinery Delayed Coker Project  
 Delayed Coker Combustion Emissions  
 Speciated HAPs and TACs  
 S-1511 and S-1512 Heaters Toxics from Refinery Gas Fuel

Original from Application 14141

Corrected by Application 21744

| Substance | TAC<br>Threshold<br><br>lb/year | Heat Input, MMBtu/hr=> |                      | S-1511          | S-1512          | Total<br><br>Lb/yr | TOTAL<br>HAP<br><br>lb/hr | TOTAL<br>HAP<br><br>TON/YR | S-1511          | S-1512 | Total<br><br>Lb/yr | TOTAL<br>HAP<br><br>lb/hr | TOTAL<br>HAP<br><br>TON/YR |
|-----------|---------------------------------|------------------------|----------------------|-----------------|-----------------|--------------------|---------------------------|----------------------------|-----------------|--------|--------------------|---------------------------|----------------------------|
|           |                                 | Coker Furnace 1        |                      | Coker Furnace 2 | Coker Furnace 1 |                    |                           |                            | Coker Furnace 2 |        |                    |                           |                            |
|           |                                 | 230                    |                      | 230             | 230             |                    |                           |                            | 230             |        |                    |                           |                            |
|           |                                 | HAP                    | MMBTU <sup>(c)</sup> | Lb/yr           | Lb/yr           |                    |                           |                            | Lb/yr           | Lb/yr  |                    |                           |                            |
|           |                                 |                        |                      |                 |                 |                    |                           |                            |                 |        |                    |                           |                            |

provided.

**B. S-1510 Delayed Coker: In addition to the S-1510 benzene fugitive emissions calculated in the original application, Tesoro has estimated the coker vent emissions based on the 2008 Coker Steam Vent Source Test Report conducted at the Hovensa refinery in St. Croix. These additional emissions need to be added to the Risk Screen conducted for Application 14141 and 16389.**

| TAC                         | Lb/cycle | Tons/yr  | Average lb/hr | Lb/hr (one vent) | Lb/hr (two vents) |
|-----------------------------|----------|----------|---------------|------------------|-------------------|
| Benzene                     | 0.333    | 1.77E-01 | 2.01E-02      | 0.333            | 0.666             |
| n-Hexane                    | 0.303    | 1.61E-01 | 1.83E-02      | 0.303            | 0.606             |
| Toluene                     | 0.861    | 4.59E-01 | 5.19E-02      | 0.861            | 1.722             |
| m- and p-Xylene             | 0.650    | 3.46E-01 | 3.92E-02      | 0.650            | 1.300             |
| o-Xylene                    | 0.121    | 6.42E-02 | 7.26E-03      | 0.121            | 0.242             |
| Aniline                     | 0.010    | 5.29E-03 | 5.98E-04      | 0.010            | 0.020             |
| Indeno(1,2,3-cd) pyrene     | 0.001    | 5.92E-04 | 6.70E-05      | 0.001            | 0.002             |
| Naphthelene                 | 0.333    | 1.77E-01 | 2.00E-02      | 0.333            | 0.666             |
| Benzo(a)anthracene          | 0.006    | 3.26E-03 | 3.69E-04      | 0.006            | 0.012             |
| Benzo(b)fluoranthere        | 0.001    | 6.04E-04 | 6.83E-05      | 0.001            | 0.002             |
| Benzo(k) fluoranthere       | 0.001    | 5.22E-04 | 5.90E-05      | 0.001            | 0.002             |
| Benzo(a)pyrene              | 0.005    | 2.50E-03 | 2.83E-04      | 0.005            | 0.010             |
| Phenol                      | 0.018    | 9.83E-03 | 1.11E-03      | 0.018            | 0.036             |
| Bis(2-Ethylhexyl) phthalate | 2.75E-05 | 1.46E-05 | 1.66E-06      | 2.75E-05         | 5.5E-05           |
| Chrysene                    | 0.006    | 3.34E-03 | 3.78E-04      | 0.006            | 0.012             |
| Dibenz(a,h)anthracene       | 0.001    | 7.86E-04 | 8.89E-05      | 0.001            | 0.002             |

*The tons/yr emissions are based on 1065 coker cycles per year. The average lb/hr are based on annual emissions divided by 1065 cycles/yr and 16.6 hr/cycle. The venting occurs in about 15 minutes, so the maximum hourly emissions during a single drum venting are the same as the lb/cycle (not shown is the emission rate, which would be 4 times the cycle amount since venting occurs in 1/4 hour). The last column is the peak emissions during a situation where two drums vent within the same hour. Tesoro indicates this is an unlikely scenario.*

These increases in toxic emissions required a revision to the toxic risk screen conducted in Application 16389.

Results from the health risk screening analysis indicate that the maximum cancer risk at the Point of Maximum Impact is estimated at 1.9 chances in a million.

The Coker Modification Project (CMP) revised emissions passed the Health Risk Screening Analysis (HRA) conducted on June 21, 2010 by the District's Toxic Evaluation Section. This source poses no significant toxic risk, since the increased cancer risk to the maximally exposed receptor (Resident) is less than 0.40 in a million. The hazard index for a resident is less than 0.005. The increased cancer risk to workers is less than 0.4 in a million and the hazard index is less than 0.005. In accordance with Regulation 2-5, the above risk level is considered acceptable for this project.

#### IV. PLANT CUMULATIVE INCREASE SINCE 4/5/1991

There is no Cumulative Increase associated with this application. All emissions in the original application were offset with Onsite Project Contemporaneous Emission Reductions except POC emissions, which will be offset.

#### V. OFFSETS

|                                 | POC     | NOx       | SO2        | CO       | PM/PM <sub>10</sub> | Ammonia  |
|---------------------------------|---------|-----------|------------|----------|---------------------|----------|
| Current                         | 2.22    | 301.96    | 3,146.93   | 79.78    | 68.65               | 678.31   |
| Future                          | 32.421  | 19.335    | 11.263     | 67.418   | 8.071               | 9.173    |
| Net CMP emissions               | 30.201  | (282.625) | (3135.667) | (12.362) | (60.579)            | (669.14) |
| Offsets Required (1.15:1)       | 34.731  |           |            |          |                     |          |
| Offsets Provided with App 14141 | (7.360) |           |            |          |                     |          |
| Offsets Provided with App 16389 | (0.018) |           |            |          |                     |          |
| Net                             | 27.353  |           |            |          |                     |          |

|             |  |  |  |  |  |  |
|-------------|--|--|--|--|--|--|
| Offsets Due |  |  |  |  |  |  |
|-------------|--|--|--|--|--|--|

Tesoro will provide 27.353 tons of POC offsets via the following certificates:

|        |             |
|--------|-------------|
| # 1181 | 20.160      |
| # 1082 | 4.704       |
| # 1058 | 0.120       |
| # 1131 | 2.369       |
| Total  | 27.353 tons |

## VI. EMISSION REDUCTION CREDITS

The original CMP permitting included the issuance of ERCs to Tesoro for NO<sub>x</sub>, CO, SO<sub>2</sub>, and PM<sub>10</sub> through Banking Application #17798. Banking Certificate 1144 was granted.

Banking Certificate: 1144

Application no: 17798

Final Disposition: Certificate Issued 02/24/09

Reduction Location: Tesoro Refining and Marketing Company [Martinez]

Certificate owner: Tesoro Refining and Marketing Company [plant 14628]

| <u>tons per year</u><br><u>PM10</u> | PM   | POC  | NOX     | SO2      | CO     | NPOC |
|-------------------------------------|------|------|---------|----------|--------|------|
| Requested<br>53.730                 | .000 | .000 | 282.370 | 3139.190 | 48.950 | .000 |
| Approved<br>12.600                  | .000 | .000 | 272.000 | 2900.500 | 56.500 | .000 |
| <b>Balance</b><br>12.600            | .000 | .000 | 272.000 | 2900.500 | 56.500 | .000 |

The following table shows the changes to the ERC balances as the result of the emission corrections.

| Pollutants | CMP ERCs Received <sup>a</sup> | Difference | Updated ERC Balance |
|------------|--------------------------------|------------|---------------------|
|            | tpy                            | tpy        | tpy                 |
| NOx        | 272.000                        | 0.260      | 272.260             |
| CO         | 56.500                         | -36.588    | 19.912              |



|                 |           |        |           |
|-----------------|-----------|--------|-----------|
| SO <sub>2</sub> | 2,900.500 | -3.523 | 2,896.977 |
| PM10            | 12.600    | 5.658  | 18.258    |

<sup>a</sup> ERC amounts from BAAQMD "Engineering Evaluation" for Banking Application No. 17798. See this application for details on how the ERCs were estimated.

## VII. STATEMENT OF COMPLIANCE

There are no changes in compliance for S-1510 Delayed Coker or the furnaces. The sources comply and are expected to continue complying with all applicable rules and regulations.

This application for an administrative change in conditions and a correction in emissions, not an increase in emissions, and therefore is exempt from CEQA per Regulation 2-1-312.1, and therefore is not subject to CEQA review.

2-1-312.1 Applications to modify permit conditions for existing or permitted sources or facilities that do not involve any increases in emissions or physical modifications.

This application just corrects the emissions based on better information and calculations.

This project is over 1,000 ft from the nearest public school and is therefore not subject to the public notification requirements of Regulation 2-1-412.

PSD, NSPS, NESHAPS and BACT are not applicable.

## VIII. CONDITIONS

There are no changes in conditions associated with the emissions corrections. Tesoro has requested a change in conditions for the fuel gas TRS monitor on furnaces S-1511 and S-1512. Condition # 23129 will be revised as indicated below (only part 19 is shown).

19. When burning refinery fuel gas in S-1511 or S1512, the owner/operator of S-1511, S-1512, A-1511 and A-1512 shall install a total reduced sulfur (TRS) or SO<sub>2</sub> continuous monitoring and recording system to verify compliance with the requirement of Part 18. The owner/operator shall maintain the equipment in accordance with manufacturer's recommendations. (basis: NSPS (40 CFR 60, Subpart J))

## IX. RECOMMENDATION

It is recommended that the emissions corrections be accepted and that a change in conditions be granted to Tesoro Refining & Marketing Company for the following equipment:

**S-1510 Delayed Coker**

**S-1511 Delayed Coker Heater #1, 230 MMBtu/hr abated by A-1511 Selective Catalytic Reduction System (SCR)**

**S-1512 Delayed Coker Heater #2, 230 MMBtu/hr abated by A-1512 Selective Catalytic Reduction System (SCR)**

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**Arthur Valla**  
**Senior Air Quality Engineer**

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**October 5, 2010**

**Application 21787, S-926 NOx Box Revision**

**EVALUATION REPORT  
TESORO REFINING AND MARKETING COMPANY  
REVISED NOx BOX FOR S-926,  
F-26 No 2 REFORMER SPLITTER  
APPLICATION 21787, PLANT 14628**

**BACKGROUND**

The Tesoro Golden Eagle Refinery (Tesoro) operates several furnaces and boilers that are subject to Regulation 9, Rule 10, Nitrogen Oxides And Carbon Monoxide From Boilers, Steam Generators And Process Heaters In Petroleum Refineries. Regulation 9-10-301 limits the refinery wide NOx emissions to 0.033 lb/MMBtu of fired duty. Regulation 9-10-502 requires the installation of a NOx, CO and O2 CEM to demonstrate compliance with Regulation 9-10-301. Regulation 9-10-502 also allows a CEM equivalent verification system to determine compliance with Regulation 9-10-301. The District and Tesoro have developed the CEM equivalent verification system. This system is called the “NOx Box”. The NOx Box is an operating window for the unit, expressed in terms of fired duty and oxygen content in the flue gas. The operating window is established by source tests for various operating conditions. The source tests demonstrate the NOx emissions are equal to or less than a specified emission factor. As long as the fired unit duty and oxygen content are in this NOx Box operating window, the specified emission factor is used to determine compliance with the 0.033 lb/MMBtu limit of Regulation 9-10-301. The Permit Condition that contains the details of the NOx Box is #18372.

Condition 18372, Part 30 required Tesoro to submit the initial NOx Box for the affected sources by January 1, 2005. Tesoro met this requirement via Application 15682. The NOx Box’s in the application were supported by properly conducted source tests.

This application requests a change in the NOx Box operating window for:

**S-926 F-26 No 2 Reformer Splitter, 145 MMBTU/hr**

The change is as follows:

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
| 926 Old    | 0.032                      | 1.8, 32.81   | 6.0, 40.89   | 2.9, 126.72   | 4.4, 32.81  | 3.9, 131.59   |
|            | 0.037                      | 6.0, 40.89   | 7.0, 77.89   | 3.9, 131.59   | N/A   | 4.2, 122.33   |
| 926 New    | 0.032                      | 1.8, 32.81   | <del>6.0, 40.89</del><br><u>4.4, 32.81</u>                     | 2.9, 126.72   | <del>4.4, 32.81</del><br><u>N/A</u>   | 3.9, 131.59   |
|            | 0.037                      | <del>4.4, 32.81</del><br><u>6.0, 40.89</u>                     | <del>8.3, 29.60</del><br><u>7.0, 77.89</u>                     | 3.9, 131.59   | N/A   | <del>7.0, 77.89</del><br><u>4.2, 122.33</u>                     |

Permit Evaluation and Statement of Basis: Site B2758 & B2759, Tesoro Refining & Marketing Company, LLC, Golden Eagle Refinery, 150 Solano Way, Martinez, CA 94553

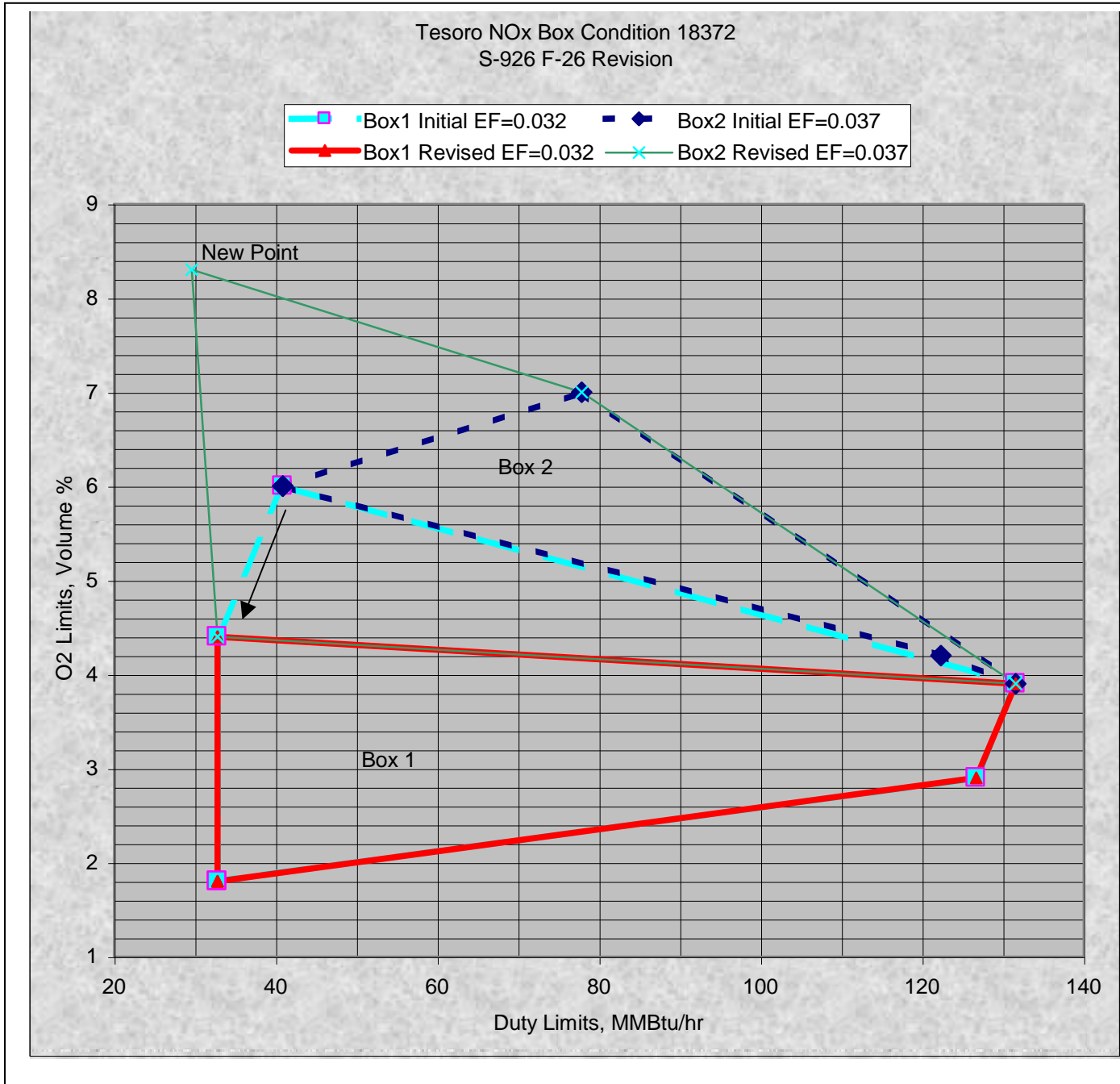
This is the first revision to the S-926 NO<sub>x</sub> Box, and the emission factor was not increased, so a CEM is not required. According to Engineering Policy approved 4/11/03 and included in Appendix B of the December 2003 Title V Statement of Basis, a CEM is only required if two source tests in a 5-year period exceed the NO<sub>x</sub> emission factor.

Tesoro is using two operating ranges as allowed by Condition 18372, Part 30.

The changes are supported by source tests reviewed by the Source Test Section.

This application is being processed as an administrative change in conditions since there is no change to the specified NO<sub>x</sub> emission factor for this unit.

The following diagram summarizes the changes to the S-913 NO<sub>x</sub> Box:



**EMISSIONS SUMMARY**

There are no changes in emissions due to this application.

**PLANT CUMULATIVE INCREASE**

There are no net changes to the plant cumulative emissions.

### **TOXIC RISK SCREEN**

This proposed NOx Box change would not emit toxic compounds in amounts different than previously emitted. Therefore, a toxic risk screen is not required.

### **BEST AVAILABLE CONTROL TECHNOLOGY**

BACT is triggered for new or modified sources that emit criteria pollutants in excess of 10 lbs/day. However, Regulation 2-1-234 defines a modified source as one that results in an increase in daily or annual emissions of a regulated air pollutant. For this application, there is no change in emissions. Therefore, BACT does not apply.

### **PLANT LOCATION**

According to the SCHOOL program, the closest school is Las Juntas Elementary, which is almost two miles from the facility.

### **COMPLIANCE**

The change to the NOx Box will not change the compliance for Furnace S-926. Emissions from S-926 will comply with Regulation 6 and Regulation 9, Rule 10 as before the change.

The closest school is over a mile from the facility, so the Public Notice requirements of Regulation 2-1-214 do not apply.

Toxics, CEQA, NESHAPS, BACT, Offsets and NSPS do not apply.

### **CONDITIONS**

The NOx Box Condition 18372, will be modified as shown below. Only the substantive changes for the S-926 NOx Box points detailed in Part 31A are shown. All of the other parts of Condition 18372 remain unchanged by this application.

Condition 18372

- \*31. Except as provided in part 31B & C, the owner/operator shall operate each source within the NOx Box ranges listed below at all times of operation. This part shall not apply to any source that has a properly operated and properly installed NOx CEM. (Regulation 9-10-502)

- A. NOx Box ranges

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr)      | Max O2 at Low Firing (O2% , MMBtu/hr)      | Min O2 at High Firing (O2% , MMBtu/hr) | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr)                    |
|------------|----------------------------|--|--|--|--|---|
| 913        | 0.032                      | 1.8, 32.81                                 | <u>4.4, 32.81</u><br><del>6.0, 40.89</del> | 2.9,<br>126.72                         | <u>N/A</u><br><del>4.4, 32.81</del>                  | 3.9,<br>131.59  |
|            | 0.037                      | <u>4.4, 32.81</u><br><del>6.0, 40.89</del> | <u>8.3, 29.60</u><br><del>7.0, 77.89</del> | 3.9,<br>131.59                         | N/A  | <u>7.0, 77.89</u><br><del>4.2,</del><br><del>122.33</del> |

The limits listed above are based on a calendar day averaging period for both firing rate and O2%.

## **RECOMMENDATION**

It is recommended that a Change of Conditions to the Permit to Operate be granted to Tesoro for:

**S-926 F-26 No 2 Reformer Splitter, 145 MMBTU/hr**

\_\_\_\_\_  
Arthur P. Valla  
Senior Air Quality Engineer

\_\_\_\_\_  
Date  
July 7, 2010

**Application 21797, S-913 NOx Box Revision**

**EVALUATION REPORT  
TESORO REFINING AND MARKETING COMPANY  
REVISED NOx BOX FOR S-913, F-13 No 2 FEED PREP HEATER  
APPLICATION 21797, PLANT 14628**

**BACKGROUND**

The Tesoro Golden Eagle Refinery (Tesoro) operates several furnaces and boilers that are subject to Regulation 9, Rule 10, Nitrogen Oxides And Carbon Monoxide From Boilers, Steam Generators And Process Heaters In Petroleum Refineries. Regulation 9-10-301 limits the refinery wide NOx emissions to 0.033 lb/MMBtu of fired duty. Regulation 9-10-502 requires the installation of a NOx, CO and O2 CEM to demonstrate compliance with Regulation 9-10-301. Regulation 9-10-502 also allows a CEM equivalent verification system to determine compliance with Regulation 9-10-301. The District and Tesoro have developed the CEM equivalent verification system. This system is called the “NOx Box”. The NOx Box is an operating window for the unit, expressed in terms of fired duty and oxygen content in the flue gas. The operating window is established by source tests for various operating conditions. The source tests demonstrate the NOx emissions are equal to or less than a specified emission factor. As long as the fired unit duty and oxygen content are in this NOx Box operating window, the specified emission factor is used to determine compliance with the 0.033 lb/MMBtu limit of Regulation 9-10-301. The Permit Condition that contains the details of the NOx Box is #18372.

Condition 18372, Part 30 required Tesoro to submit the initial NOx Box for the affected sources by January 1, 2005. Tesoro met this requirement via Application 15682. The NOx Box’s in the application were supported by properly conducted source tests and the NOx Box operating windows for all the affected sources have been included in Revision 4 of the Title V permit (reference: Section VI, Condition 18372, Part 31A, NOx Box Ranges).

This application requests a change in the NOx Box operating window for:

**S-913 F-13 No 2 Feed Prep Heater, 59 MMBTU/hr**

The change is as follows:

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
| 913 old    | 0.033                      | 1.2, 19.89   | 3.0, 14.80   | 1.5, 39.10  | 2.1, 15.53  | 3.6, 39.45  |
|            | 0.033                      | 3.0, 14.80   | 4.5, 15.86   | 3.6, 39.45  | N/A   | 4.2, 39.50  |
| 913 new    | 0.033                      | 1.2, 19.89   | 3.0, 14.80   | 1.5, 39.10  | 2.1, 15.53  | <del>3.6, 39.45</del><br><u>4.2, 39.50</u>                      |
|            | 0.033                      | 3.0, 14.80   | 4.5, 15.86   | <del>3.6, 39.45</del><br><u>4.2, 39.50</u>                      | <del>N/A</del> <u>5.1, 24.59</u>  | <del>4.2, 39.50</del><br><u>5.0, 30.30</u>                      |



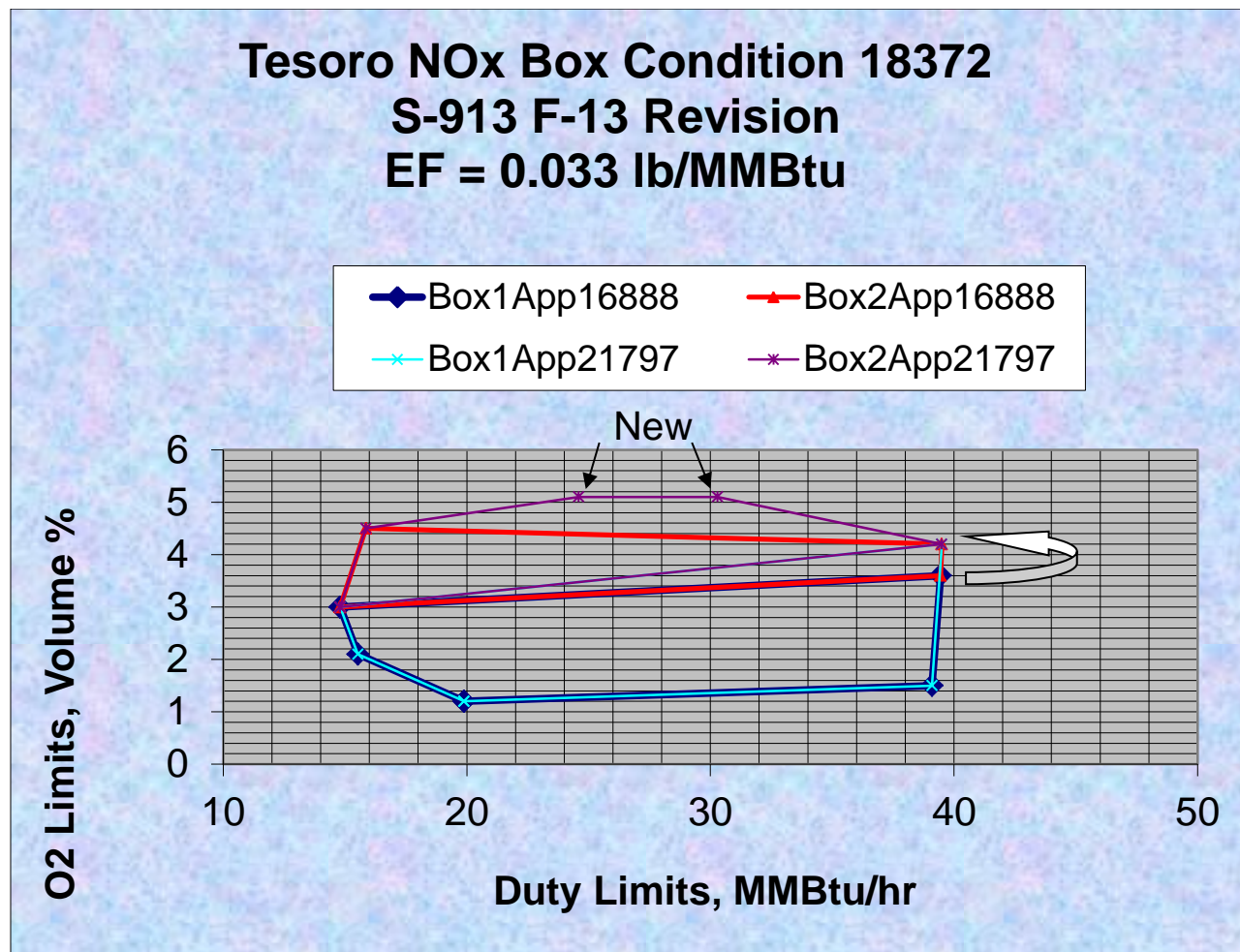
Even though this is the second revision to the S-913 NOx Box, a CEM is not required. The first revision was via Application 16888 and the change was granted April 4, 2008. However, neither the Application 16888 nor the Application 21797 revision changed the S-913 NOx emission factor. According to Engineering Policy approved 4/11/03 and included in Appendix B of the December 2003 Title V Statement of Basis, a CEM is only required if two source tests in a 5-year period exceed the NOx emission factor.

Tesoro is using two operating ranges as allowed by Condition 18372, Part 30, even though both operating ranges have the same emission factor. This is because Condition 22621, Part 10, requires the emission factor of 0.033 lb/MMBtu in order to generate IERC's.

The changes are supported by source tests reviewed by the Source Test Section.

This application is being processed as an administrative change in conditions since there is no change to the specified NOx emission factor for this unit, based on the limit of Condition 22621-10.

The following diagram summarizes the changes to the S-913 NOx Box:



## **EMISSIONS SUMMARY**

There are no changes in emissions due to this application.

## **PLANT CUMULATIVE INCREASE**

There are no net changes to the plant cumulative emissions.

## **TOXIC RISK SCREEN**

This proposed NO<sub>x</sub> Box change would not emit toxic compounds in amounts different that previously emitted. Therefore, a toxic risk screen is not required.

## **BEST AVAILABLE CONTROL TECHNOLOGY**

BACT is triggered for new or modified sources that emit criteria pollutants in excess of 10 lbs/day. However, Regulation 2-1-234 defines a modified source as one that results in an increase in daily or annual emissions of a regulated air pollutant. For this application, there is no change in emissions. Therefore, BACT does not apply.

## **PLANT LOCATION**

According to the SCHOOL program, the closest school is Las Juntas Elementary, which is almost two miles from the facility.

## **COMPLIANCE**

The change to the NO<sub>x</sub> Box will not change the compliance for Furnace S-913. Emissions from S-913 will comply with Regulation 6 and Regulation 9, Rule 10 as before the change.

The closest school is over a mile from the facility, so the Public Notice requirements of Regulation 2-1-214 do not apply.

Toxics, CEQA, NESHAPS, BACT, Offsets and NSPS do not apply.

## **CONDITIONS**

The NO<sub>x</sub> Box Condition 18372, will be modified as shown below. Only the substantive changes for the S-913 NO<sub>x</sub> Box points detailed in Part 31A are shown. All of the other parts of Condition 18372 remain unchanged by this application.

Condition 18372

\*31. Except as provided in part 31B & C, the owner/operator shall operate each source within the NOx Box ranges listed below at all times of operation. This part shall not apply to any source that has a properly operated and properly installed NOx CEM. (Regulation 9-10-502)

A. NOx Box ranges

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr) | Max O2 at Low Firing (O2% , MMBtu/hr) | Min O2 at High Firing (O2% , MMBtu/hr)         | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr)         |
|------------|----------------------------|---------------------------------------|---------------------------------------|--|--|--|
| 913        | 0.033                      | 1.2, 19.89                            | 3.0, 14.80                            | 1.5, 39.10                                     | 2.1, 15.53   | <del>4.2, 39.50</del><br><del>3.6, 39.45</del> |
|            | 0.033                      | 3.0, 14.80                            | 4.5, 15.86                            | <del>4.2, 39.50</del><br><del>3.6, 39.45</del> | 5.1, 24.59N/A  | <del>5.0, 30.30</del><br><del>4.2, 39.50</del> |

The limits listed above are based on a calendar day averaging period for both firing rate and O2%.

**RECOMMENDATION**

It is recommended that a Change of Conditions to the Permit to Operate be granted to Tesoro for:

**S-913 F-13 No 2 Feed Prep Heater, 59 MMBTU/hr**

\_\_\_\_\_  
Arthur P. Valla  
Senior Air Quality Engineer

\_\_\_\_\_  
Date  
June 7, 2010

**Application 22148, S-1524 Flare Change of Conditions**

**ENGINEERING EVALUATION  
Tesoro Refining and Marketing Company  
PLANT NO. 14628  
APPLICATION NO. 22148**

**BACKGROUND**

In March 2010, Tesoro Refining and Marketing Company was granted a Permit to Operate via Application 18752 for the following equipment:

**S-1524 No 50 Crude Unit Flare**

This source is subject to Permit Condition 24323. During the initial operation, two parts of this condition were found to need an administrative change. These are parts 8 and 10 regarding the flare purge and pilot gas:

8. The owner/operator of S-1524 shall not exceed 3,942,000 standard cubic feet of natural gas for flare pilots in any consecutive 12-month period. The owner/operator shall fire only natural gas at all flare pilots. (Basis: cumulative increase)
10. The owner/operator of S-1524 shall not exceed 3,767,000 standard cubic feet of natural gas for the flare purge in any consecutive 12-month period. The Owner/operator shall use only natural gas for the flare purge gas, except during periods of natural gas curtailment, when refinery fuel gas or nitrogen may be used. (Basis: cumulative increase)

Firstly, the purge gas limit in Part 10 was found to be insufficient. In preparation for this application, the question of nitrogen purge gas was discussed by Tesoro Engineering staff. Nitrogen purge gas is used in other flare systems, and it reduces emissions because there is less combustion. Therefore, Tesoro proposes to administratively change Part 10 as follows:

10. The owner/operator of S-1524 shall not exceed 3,767,000 standard cubic feet of natural gas for the flare purge in any consecutive 12-month period. The Owner/operator shall use only natural gas or nitrogen for the flare purge gas, except during periods of natural gas curtailment, when refinery fuel gas ~~or nitrogen~~ may be used. (Basis: cumulative increase)

Secondly, when Tesoro was reviewing the operation of the S-1524 Flare, it noted that the pilot gas does not have the allowance for natural gas curtailment as the purge gas does. Therefore, Tesoro proposes to administratively change Part 8 as follows:

8. The owner/operator of S-1524 shall not exceed 3,942,000 standard cubic feet of natural gas for flare pilots in any consecutive 12-month period. The owner/operator shall fire only natural gas at all flare pilots, except during periods of natural gas curtailment, when refinery fuel gas may be used. (Basis: cumulative increase)

## EMISSIONS SUMMARY

There are no increases in emissions associated with this application. Directionally, emissions could decrease with the use of nitrogen fuel gas, and there would be a slight change in emissions when fuel gas is used in place of natural gas. However, the change would be insignificant or negligible.

## STATEMENT OF COMPLIANCE

There will be no change in the compliance of the associated equipment. S-1524 will remain in compliance with applicable regulations.

This application is exempt from CEQA per 2-1-312.1: Permit applications to modify permit conditions for existing or permitted sources or facilities that do not involve any increases in emissions or physical modifications.

This application does not trigger BACT, NSPS, Toxics, Offsets NESHAPS and PSD.

## PERMIT CONDITIONS

Permit Condition 24323 will be administratively changed as shown above:

COND# 24323 -----

Application 18752 (May 2009)  
No. 50 Crude Unit Blowdown Tower S-834 Replacement Project  
S-1001 No. 50 Crude Unit  
A-1524 No. 50 Crude Unit Vapor Recovery System  
S-1524 No. 50 Crude Unit Flare

1. Notwithstanding any provision of District regulations allowing for the malfunction of A-1524 due to a valid breakdown, the Owner/Operator shall operate S-1001 50 Crude Unit only when A-1524 Vapor Recovery System is in

- operation. (Basis: Cumulative Increase, Consent Decree §235(a))
2. The Owner/Operator shall only operate S-1524 50 Crude Unit Flare during upsets, malfunctions or emergencies. (Basis: BACT, Cumulative Increase)
  3. The Owner/Operator of S-1524 50 Crude Unit Flare shall comply with all applicable requirements of NSPS Subpart J. (Basis: NSPS)
  4. The Owner/Operator of S-1524 50 Crude Unit Flare shall comply with NSPS Subpart A, 40 CFR 60.18. (Basis: NSPS)
  5. Deleted. (FMP Update submitted July 31, 2009.)
  6. The owner/operator of S-1524 shall use steam assisted, staged combustion in the flare to minimize smoking. (Basis: BACT)
  7. The owner/operator of S-1524 shall have a hydrocarbon destruction efficiency of at least 98% POC on a mass basis. (basis: BACT)
  8. The owner/operator of S-1524 shall not exceed 3,942,000 standard cubic feet of natural gas for flare pilots in any consecutive 12-month period. The owner/operator shall fire only natural gas at all flare pilots, except during periods of natural gas curtailment, when refinery fuel gas may be used. (Basis: cumulative increase)
  9. The owner/operator of S-1524 shall install H<sub>2</sub>S continuous vent gas monitoring and recording system to verify compliance with the requirement of Regulation 12-11. The monitoring system shall be designed and operated such that gas samples are taken at a location that ensures accurate vent gas composition. The owner/operator shall maintain the equipment in accordance with manufacturer's recommendations. (Basis: Regulation 12-11-501 and 12-11-506)
  10. The owner/operator of S-1524 shall not exceed 3,767,000 standard cubic feet of natural gas for the flare purge in any consecutive 12-month period. The Owner/operator shall use only natural gas or nitrogen for the flare purge gas, except during periods of natural gas curtailment, when refinery fuel gas ~~or nitrogen~~ may be used. (Basis: cumulative increase)
  11. The owner/operator shall maintain all records and reports required by this permit in a District-approved log. The following records shall be kept on site and made available for District inspection for a period of at least 5 years from the date on which a record is made. (basis: Regulation 2-6-501)

- a. The continuous vent gas H<sub>2</sub>S concentration at source S-1524.
- b. Total daily flow rate of the gas through the flare, summarized in a consecutive 12-month period.
- c. Total daily flow rate of the pilot gas to the flare, summarized in a consecutive 12-month period
- d. Total daily flow rate of the purge gas through the flare, including the type of gas and the reason natural gas was not used, when applicable, summarized in a consecutive 12-month period

## RECOMMENDATION

It is recommended that an Administrative Change in Conditions be granted to Tesoro for:

**S-1524**

**No 50 Crude Unit Flare**

By: \_\_\_\_\_  
Arthur Valla  
Senior Air Quality Engineer

\_\_\_\_\_  
August 30, 2010

**Application 22149, S-919 NOx Box Revision**

**EVALUATION REPORT  
TESORO REFINING AND MARKETING COMPANY  
REVISED NOx BOX FOR S-919, F-19  
No. 2 HDS DEPENTANIZER REBOILER  
APPLICATION 22149, PLANT 14628**

**BACKGROUND**

The Tesoro Golden Eagle Refinery (Tesoro) operates several furnaces and boilers that are subject to Regulation 9, Rule 10, Nitrogen Oxides And Carbon Monoxide From Boilers, Steam Generators And Process Heaters In Petroleum Refineries. Regulation 9-10-301 limits the refinery wide NOx emissions to 0.033 lb/MMBtu of fired duty. Regulation 9-10-502 requires the installation of a NOx, CO and O2 CEM to demonstrate compliance with Regulation 9-10-301. Regulation 9-10-502 also allows a CEM equivalent verification system to determine compliance with Regulation 9-10-301. The District and Tesoro have agreed to produce the CEM equivalent verification system. This system is called the “NOx Box”. The NOx Box is an operating window for the unit, expressed in terms of fired duty and oxygen content in the flue gas. The operating window is established by source tests for various operating conditions. The source tests demonstrate the NOx emissions are equal to or less than a specified emission factor. As long as the fired unit duty and oxygen content are in this NOx Box operating window, the specified emission factor is used to determine compliance with the 0.033 lb/MMBtu limit of Regulation 9-10-301. The Permit Condition that contains the details of the NOx Box is #18372.

Condition 18372, Part 30 required Tesoro to submit the initial NOx Box for the affected sources by January 1, 2005. Tesoro met this requirement via Application 15682. The NOx Box’s in the application were supported by properly conducted source tests and the NOx Box operating windows for all the affected sources have been included in Revision 4 of the Title V permit (reference: Section VI, Condition 18372, Part 31A, NOx Box Ranges).

This application requests a change in the NOx Box operating window for:

**S-919 F-19 No. 2 HDS Depentanizer Reboiler, 65 MMBTU/hr**

The change is as follows:

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
| 919        | 0.047                      | 3.9,<br><del>10.3523-</del><br>30                              | 8.3, 22.06   | 5.8, 48.20  | 9.2, 39.12  | 10.1, 47.20   |
|            | 0.056                      | 8.3,<br>22.06  | 9.5, 21.10   | 9.2, 39.12  | N/A   | 10.1, 47.20   |



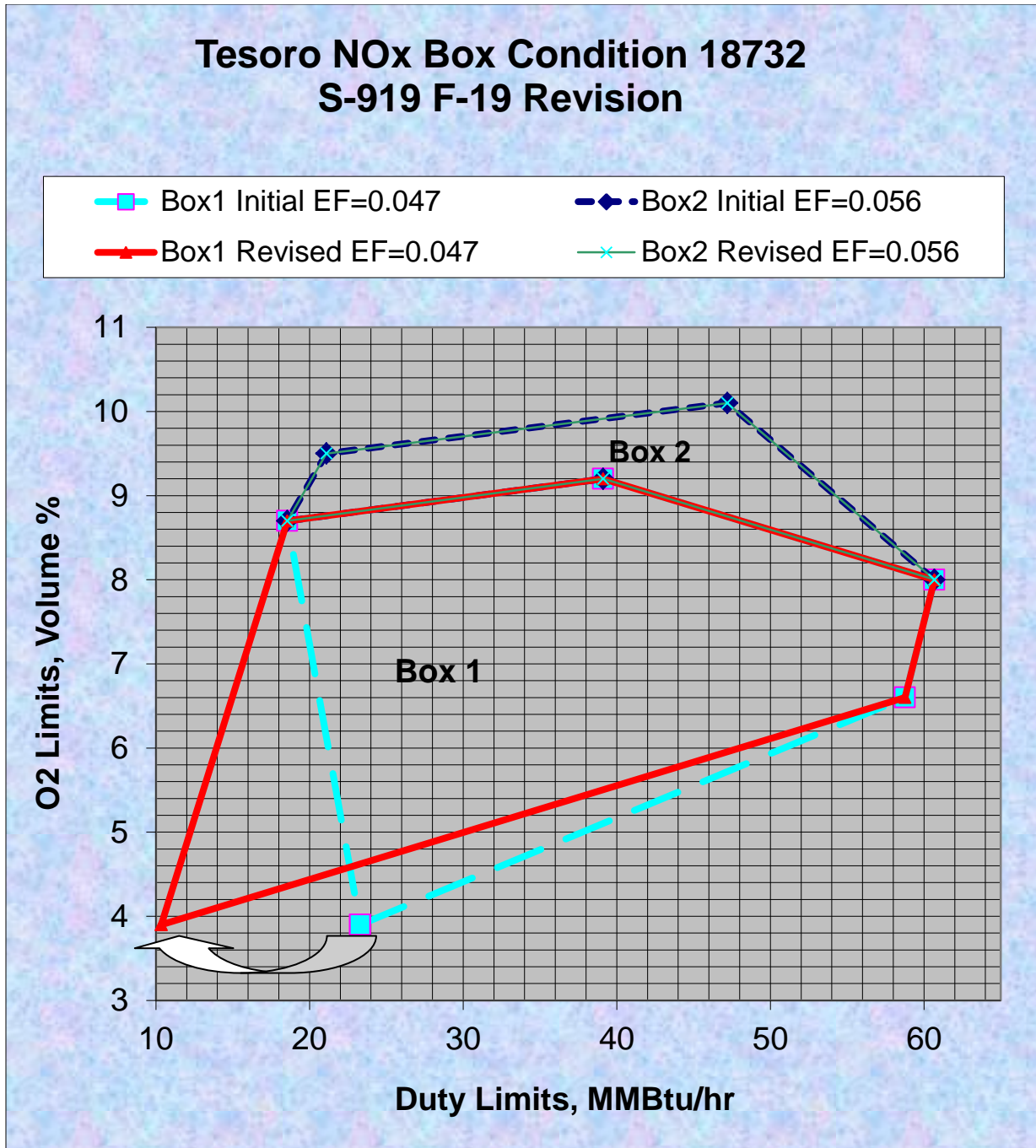
|            |       |   |            |            |   |             |
|------------|-------|---|------------|------------|---|-------------|
| 919<br>new | 0.047 | 3.9,<br>23.30   | 8.7, 18.56 | 6.6, 58.76 | 9.2, 39.12  | 8.0, 60.68  |
|            | 0.056 | <del>8.7,</del><br><del>18.56</del> <del>9.2,</del><br><del>39.12</del> | 9.5, 21.10 | 8.0, 60.68 | <del>9.2, 39.12</del> <del>8.7,</del><br><del>18.56</del> | 10.1, 47.20 |

Tesoro is using two operating ranges as allowed by Condition 18372, Part 30.

The changes are supported by source tests reviewed by the Source Test Section.

This application is being processed as an administrative change in conditions since there is no change to the specified NOx emission factor for this unit.

The following diagram summarizes the changes to the S-919 NOx Box:



Even though this is the third revision to the S-919 NOx Box, a CEM is not required. The first revision was via Application 18748 and the change was granted December 31, 2008. The second revision was via Application 21732 and the change was granted May 27, 2010. However, neither application changed the S-919 NOx emission factor. According to Engineering Policy approved 4/11/03 and included in Appendix B of the December 2003 Title V Statement of Basis, a CEM is only required if two source tests in a 5-year period exceed the NOx emission factor.

### EMISSIONS SUMMARY

There are no changes in emissions due to this application. The emission factors are unchanged by this application and there will be no impact on the overall facility limit of 0.033 lb/MMBtu required by Regulation 9-10-301.

### **PLANT CUMULATIVE INCREASE**

There are no net changes to the plant cumulative emissions.

### **TOXIC RISK SCREEN**

This proposed NO<sub>x</sub> Box change would not emit toxic compounds in amounts different than previously emitted. Therefore, a toxic risk screen is not required.

### **BEST AVAILABLE CONTROL TECHNOLOGY**

BACT is triggered for new or modified sources that emit criteria pollutants in excess of 10 lbs/day. However, Regulation 2-1-234 defines a modified source as one that results in an increase in daily or annual emissions of a regulated air pollutant. For this application, there is no change in emissions. Therefore, BACT does not apply.

### **PLANT LOCATION**

According to the SCHOOL program, the closest school is Las Juntas Elementary, which is almost two miles from the facility.

### **COMPLIANCE**

The change to the NO<sub>x</sub> Box will not change the compliance for Furnace S-919. Emissions from S-919 will comply with Regulation 6 and Regulation 9, Rule 10 as before the change.

The closest school is over a mile from the facility, so the Public Notice requirements of Regulation 2-1-214 do not apply.

Toxics, CEQA, NESHAPS, BACT, Offsets and NSPS do not apply.

### **CONDITIONS**

The NO<sub>x</sub> Box Condition 18372, will be modified as shown below. Only the substantive changes for the S-919 NO<sub>x</sub> Box points detailed in Part 31A are shown.

Condition 18372

- \*31. Except as provided in part 31B & C, the owner/operator shall operate each source within the NO<sub>x</sub> Box ranges listed below at all times of operation. This part shall

not apply to any source that has a properly operated and properly installed NOx CEM. (Regulation 9-10-502)

A. NOx Box ranges

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr)                           | Max O2 at Low Firing (O2% , MMBtu/hr) | Min O2 at High Firing (O2% , MMBtu/hr) | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr) |
|------------|----------------------------|---|---------------------------------------|--|--|--|
| 919        | 0.047                      | 3.9,<br><del>10.35</del><br>23.3<br>0                           | 8.7, 18.56                            | 6.6, 58.76                             | 9.2, 39.12   | 8.0, 60.68                             |
|            | 0.056                      | <del>8.7,</del><br><del>18.56</del><br>9.2,<br><del>39.12</del> | 9.5, 21.10                            | 8.0, 60.68                             | <del>8.7, 18.56</del><br>9.2,<br><del>39.12</del>    | 10.1, 47.20                            |

The limits listed above are based on a calendar day averaging period for both firing rate and O2%.

**RECOMMENDATION**

It is recommended that a Change of Conditions to the Permit to Operate be granted to Tesoro for:

**S-919 F-19 No. 2 HDS Depentanizer Reboiler, 65 MMBTU/hr**

\_\_\_\_\_  
Arthur P. Valla  
Senior Air Quality Engineer

\_\_\_\_\_  
Date  
August 30, 2010

**Application 22152, S-1552 Diesel Engine**

**ENGINEERING EVALUATION  
Tesoro Refining and Marketing Company  
PLANT NO. 14628  
APPLICATION NO. 22152**

**BACKGROUND**

Tesoro has applied to obtain an Authority to Construct (AC) and/or a Permit to Operate (PO) for the following equipment:

**S-1552 Emergency Diesel Pump, Caterpillar C-7, 205 HP**

The pump is used in an emergency to remove storm water. This engine was granted an exemption from permitting on 9/21/09 via application 20997, based on the pump being portable registered equipment (Regulation 2-1-105.3.3). The portable engine was initially installed as a temporary replacement for S-1499. This temporary plan has proven to be a good permanent solution, thus this application. This engine will provide emergency pumping capacity (in the event of a blackout) at the No 1 Pump Station. This emergency engine must be periodically tested to ensure that they will generate power when needed.

The Emergency Pump Diesel Engine (S-1552) is CARB certified and is equipped with the best available control technology (BACT) for minimizing the release of air borne criteria pollutants and harmful air toxins due to fuel combustion.

S-1552 meets the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 3 Off-road standard. The engine will burn commercially available California ultra low sulfur diesel fuel. The sulfur content of the diesel fuel will not exceed 0.0015% by weight. The operation of the engine should not pose any health threat to the surrounding community or the public at large.

**EMISSIONS**

**Annual Average Emissions:**

The diesel engine (S-1552) is CARB Certified (CARB Executive Order U-R-001-0294) and the emission factors are listed below. These factors are based on the CARB emissions factors as well as 5-mode testing, submitted to CARB. For this report, it is assumed that the emission value of NMHC+NO<sub>x</sub> is made up of 5% POC and 95% NO<sub>x</sub>, per Engineering Division policy. Tesoro has asked to run S-1552 for 50 hours per year for testing and maintenance which is the maximum allowed by the ATCM.

| Pollutant            | Engine Emissions<br>g/kw-hr | Engine Emissions<br>g/bhp-hr |
|----------------------|-----------------------------|------------------------------|
| NMHC (POC)           | 0.195                       | 0.145                        |
| NO <sub>x</sub>      | 3.705                       | 2.763                        |
| NMHC+NO <sub>x</sub> | 3.9                         | 2.908                        |
| CO                   | 2.4                         | 1.790                        |
| PM                   | 0.20                        | 0.149                        |

| Pollutant | hours/yr | x | BHP | x | emission factor g/bhp-hr |   | lb=454 grams | lb/year | TPY      |
|-----------|----------|---|-----|---|--------------------------|---|--------------|---------|----------|
|           |          |   |     |   |                          |   |              |         |          |
| NOx       | 50       | x | 205 | x | 2.763                    | / | 454          | = 62.38 | = 0.0312 |
| CO        | 50       | x | 205 | x | 1.790                    | / | 454          | = 40.41 | = 0.0202 |
| POC       | 50       | x | 205 | x | 0.145                    | / | 454          | = 1.87  | = 0.0009 |
| PM10      | 50       | x | 205 | x | 0.149                    | / | 454          | = 3.36  | = 0.0017 |

|     | Sulfur content | x | fuel density (lb/gal) | x | Max fuel use | (lb SO2/lb S) | x | hr/yr | =  | lb/yr | =     | TPY |         |
|-----|----------------|---|-----------------------|---|--------------|---------------|---|-------|----|-------|-------|-----|---------|
| SO2 | 0.000015       | x | 7.206                 | x | 12.34        | x             | 2 | x     | 50 | =     | 0.133 | =   | 6.7E-05 |

### Maximum Daily Emissions:

Maximum Daily emissions are calculated to establish whether a source triggers the requirement for BACT (10 lb/highest day total source emissions for any class of pollutants). 24-hr/day of operation will be assumed since no daily limits are imposed on emergency operations.

| Pollutant | hours/day | x | BHP | x | emission factor g/bhp-hr |   | lb=454 grams | lb/day |
|-----------|-----------|---|-----|---|--------------------------|---|--------------|--------|
|           |           |   |     |   |                          |   |              |        |
| NOx       | 24        | x | 205 | x | 2.763                    | / | 454          | = 29.9 |
| CO        | 24        | x | 205 | x | 1.790                    | / | 454          | = 19.4 |
| POC       | 24        | x | 205 | x | 0.145                    | / | 454          | = 0.9  |
| PM10      | 24        | x | 205 | x | 0.149                    | / | 454          | = 1.6  |

|     | Sulfur content | x | fuel density (lb/gal) | x | Max fuel use | (lb SO2/lb S) | x | hr/day | =  | lb/day |       |
|-----|----------------|---|-----------------------|---|--------------|---------------|---|--------|----|--------|-------|
| SO2 | 0.000015       | x | 7.206                 | x | 15.4         | x             | 2 | x      | 24 | =      | 0.064 |

### PLANT CUMULATIVE INCREASE

Table 1 summarizes the cumulative increase in criteria pollutant emissions. Current emissions are zero because all previous emissions have been offset.

**Table 1**

| Pollutant | Current plant emissions (TPY) | Increase in plant emissions associated with this application (TPY) | Cumulative emissions (Current + Increase) |
|-----------|-------------------------------|--|---|
| NOx       | 0                             | 0.0312   | 0.0312                                    |
| CO        | 0                             | 0.0202   | 0.0202                                    |
| POC       | 0                             | 0.0009   | 0.0009                                    |
| PM10      | 0                             | 0.0017   | 0.0017                                    |
| SO2       | 0                             | 0.00008  | 0.000067                                  |

### TOXIC RISK SCREENING ANALYSIS

The cancer risk is calculated based on the emission rate of diesel exhaust particulate matter. Diesel exhaust particulate matter is used as a surrogate for all toxic contaminants found in diesel exhaust.

Because the proposed emissions exceed the risk screening trigger level for diesel exhaust particulate matter in Table 2-5-1, a risk screening was performed.

Results from the health risk screening analysis indicate that the maximum cancer risk is estimated at 0.09 in a million if the engine were to run for 50 hours/year.

Based on 50 hours per year of operation, the emergency pump passed the Health Risk Screening Analysis (HRA) conducted on October 7, 2010 by the District's Toxic Evaluation Section. This source poses no significant toxic risk, since the increased cancer risk to the maximally exposed receptor (Resident) is 0.09 in a million. The hazard index for a resident is 0.00003. The increased cancer risk to workers is 0.05 in a million and the hazard index is 0.00003. In accordance with Regulation 2-5, the above risk level is considered acceptable for this engine.

**BACT**

BACT is triggered for NOx and CO since the maximum daily emissions exceeds 10 lb/day. BACT for this source is presented in the current BAAQMD BACT/TBACT Workbook for this source category as shown below:

|                  |  |   |                   |
|------------------|--|---|-------------------|
| <b>Source:</b>   | <b>IC Engine – Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump</b>  | <b>Revision:</b>  | <b>6</b>          |
|                  |  | <b>Document #:</b>  | <b>96.1.3</b>     |
| <b>Class:</b>    | <b>&gt; 50 BHP Output</b>  | <b>Date:</b>  | <b>04/13/2009</b> |
| <b>Pollutant</b> | <b>BACT 1. Technologically Feasible/ Cost Effective 2. Achieved in Practice</b>  | <b>TYPICAL TECHNOLOGY</b>   |                   |
| <b>NOx</b>       | 1. n/s <sup>d</sup><br>2. Current tier <sup>a,b</sup> standard for NOx at applicable horsepower rating.  | 1. n/s <sup>d</sup><br>2. Any engine certified or verified to achieve the applicable <sup>a,b</sup> standard. |                   |
| <b>CO</b>        | 1. n/s <sup>d</sup><br>2. The more stringent of either 2.75 g/bhp-hr [319 ppmvd @ 15% O <sub>2</sub> ] <sup>c</sup> or the current Tier <sup>a,b</sup> standard. | 1. n/s <sup>d</sup><br>2. Any engine certified or verified to achieve the applicable standard.                |                   |

The more restrictive BACT 1 standards levels do not apply for engines used exclusively for emergency use during involuntary loss of power. Hence, the owner/operator has to meet the BACT 2 limits. The Tier 3 standards are 4.0 g/kw-hr NOx+NMHC and 3.5 g/kw-hr CO. Therefore, based on the CARB certified limits of 3.705 g/kw-hr (2.763 g/bhp-hr) NOx+NMHC and 2.4 g/kw-hr (1.79 g/bhp-hr) CO, this engine meets the requirements of BACT2.

**OFFSETS**

Offsets are required since the facility's POC and NOx emissions are each more than 35 ton/yr per Regulation 2-2-302.

| Pollutant | Increase in plant emissions associated with this application (TPY) | Offset Ratio | Offsets Required (TPY) |
|-----------|--|--------------|------------------------|
| NOx       | 0.0312   | 1.15         | 0.036                  |
| POC       | 0.0009   | 1.15         | 0.001                  |

**CARB Stationary Diesel Engine ATCM**

The State Office of Administrative Law approved the amended Airborne Toxic Control Measure (ATCM) on October 18, 2007. State law requires the local Air Districts to implement and enforce the requirements of the ATCM. Since this engine was installed after January 1, 2005, it is a new standby engine. Therefore, the engine is required to comply with subsection 93115.6(a)(3) of the ATCM.

“Stationary Diesel Engine ATCM” section 93115, title 17, CA Code of Regulations.

Diesel PM – General Requirements

93115.6(a)(3)(A)1.a                      Meet 0.15 g/bhp-hr PM standard

93115.6(a)(3)(A)1.c                      Operate 50 hours per year, or less, for maintenance and testing (except emergency use and emissions testing)

HC,NOx, NMHC+NOx, CO

93115.6(a)(3)(B)                      Meet standards for off-road engines of the same model year and horsepower rating as specified in the OFF-Road Compression Ignition Engine Standards; Or if no standards have been established, meet the Tier 1 standards in Title 13, CCR, Section 2423 for off-road engines of the same horsepower rating, irrespective of the new engine’s model year



This emergency standby diesel engine (S-1552) is in compliance with the above ATCM requirements. The diesel engine will operate for no more than 50 hours per year for maintenance and reliability testing. This engine is subject to the EPA Tier 3 requirements for HC, NO<sub>x</sub>, NMHC+NO<sub>x</sub> and CO. As shown in the Table 2, the engines meet these requirements.

**Table 2. ATCM Tier 3 Compliance**

|                      | Engine Emissions<br>g/bhp-hr | ATCM Tier 3<br>Requirements<br>g/kw-hr | ATCM Tier 3<br>Requirements<br>g/bhp-hr |
|----------------------|------------------------------|--|---|
| NMHC (POC)           | 0.145                        | N/A                                    | N/A                                     |
| NO <sub>x</sub>      | 2.763                        | N/A                                    | N/A                                     |
| NMHC+NO <sub>x</sub> | 2.908                        | 4.0                                    | 3.0                                     |
| CO                   | 1.790                        | 3.5                                    | 2.6                                     |
| PM                   | 0.149                        | 0.20                                   | 0.15                                    |

**STATEMENT OF COMPLIANCE**

Source S-1552 is subject to and expected to be in compliance with the requirements of District Regulation 1-301 (Public Nuisance), Regulation 6-1 (Particulate Matter General Requirements), Regulation 9-1 (Sulfur Dioxide) and Regulation 9-8 (NO<sub>x</sub> and CO from Stationary Internal Combustion Engines).

From Regulation 1-301, no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property. For purposes of this section, three or more violation notices validly issued in a 30 day period to a facility for public nuisance shall give rise to a rebuttable presumption that the violations resulted from negligent conduct.

S-1552 is subject to the limitations of Regulation 6-1-303 (Ringelmann No. 2 Limitation), Regulation 6-1-305 (Visible Particles) and Regulation 6-1-310 (Particulate Weight Limitation). Regulation 6-1-303 states that a person shall not emit for a period or periods aggregating more than three minutes in any hour, a visible emission that is as dark or darker than No. 2 on the Ringelmann Chart, or of such opacity as to obscure an observer's view to an equivalent or greater degree, nor shall said emission, as perceived by an opacity sensing device in good working order, where such device is required by District Regulations, be equal to or greater than 40% opacity. Regulation 6-1-305 prohibits visible particles from causing an annoyance if such particles fall on real property other than that of the person responsible for the emission. Regulation 6-1-310 limits particulate matter to less than 0.15 gr. per dscf. This low PM10 emitting engine is not expected to produce visible emissions or fallout in violation of this regulation, and it will be assumed to be in compliance with Regulation 6 pending a regular inspection.

S-1552 is also subject to the SO<sub>2</sub> limitations of Regulation 9-1-301 (*Limitations on Ground Level Concentrations*), Regulation 9-1-302 (*General Emission Limitation*) and 9-1-304 (*Fuel Burning (Liquid and Solid Fuels)*). From Regulation 9-1-301, the ground level concentrations of SO<sub>2</sub> will not exceed 0.5

ppm continuously for 3 consecutive minutes or 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours. Per Regulation 9, Rule 1, Section 302, a person shall not emit from any source a gas stream containing sulfur dioxide in excess of 300 ppm (dry). And Regulation 9, Rule 1, Section 304, states that a person shall not burn any liquid fuel having sulfur content in excess of 0.5% by weight. Compliance with both Regulations 9-1-302 and 9-1-304 is likely since California law mandates using diesel fuel with a 0.0015% by weight sulfur.

S-1552 is also subject to Regulation 9-8 "NO<sub>x</sub> and CO from Stationary Internal Combustion Engines." From Regulation 9-8-110.5, the source is not subject to the requirements of Regulations 9-8-304 (Emission Limits – Compression-Ignited Engines), 9-8-305 (Emission Limits – Delayed Compliance, Existing Compression-Ignited Engines, Model Year 1996 or Later), 9-8-501 (Initial Demonstration of Compliance) and 9-8-503 (Quarterly Demonstration of Compliance). S-58 is subject to the monitoring and record keeping procedures described in Regulation 9-8-530(Emergency Standby and Low Usage Engines, Monitoring and Recordkeeping).

This project is considered to be ministerial under the District's CEQA Regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Permit Handbook Chapter 2.3.1, Stationary Diesel Engines.

The project is not within 1000 feet of the nearest school and therefore the application is not subject to the public notification requirements of Reg. 2-1-412.

#### NSPS

The engine is subject to 40 CFR 60, Subpart IIII, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines because it was manufactured after April 1, 2006, as required by Section 60.4200(a)(2)(i).

The engine has a total displacement of 7.2 liters and has 6 cylinders, so each cylinder has a volume of about 1.2 liters. The engine is a 2006 model year engine and is not a fire pump. Section 60.4205(a) requires these engines to comply with the emission standards in Table 1 of Subpart IIII. For a 205 HP engine, these standards are:

HC: 1.3 g/kw-hr (1.0 g/HP-hr)  
NO<sub>x</sub>: 9.2 g/kw-hr (6.9 g/HP-hr)  
CO: 11.4 g/kw-hr (8.5 g/HP-hr)  
PM: 0.54 g/kw-hr (0.4 g/HP-hr)

According to CARB Executive Order U-R-001-0294, the engine will comply with the standards.

| Pollutant            | Engine Emissions<br>g/kw-hr | Engine Emissions<br>g/bhp-hr |
|----------------------|-----------------------------|------------------------------|
| NMHC (POC)           | 0.195                       | 0.145                        |
| NO <sub>x</sub>      | 3.705                       | 2.763                        |
| NMHC+NO <sub>x</sub> | 3.9                         | 2.908                        |
| CO                   | 2.4                         | 1.790                        |
| PM                   | 0.20                        | 0.149                        |

Sections 60.4206 and 60.4211(a) require that the owner/operator operate and maintain the engine according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer, over the entire life of the engine.

Section 60.4207(b) requires that by October 1, 2010, the owner/operator must use fuel that complies with 40 CFR 80.510(b). This means that the fuel must have a maximum sulfur content of 15 parts per million (ppm), and the same cetane index or aromatic content as previously stated. California Air Resources Board (CARB) diesel fuel, which has a maximum sulfur content of 15 ppm and a maximum aromatic content of 10 to 20 percent by volume, is the only available Diesel Fuel in California. Staff in the Stationary Source Division of CARB indicate that some verified diesel fuel in California may have a maximum aromatic content greater than 10 percent if the fuel has been demonstrated to have an equal or greater emissions benefit as diesel fuel with maximum aromatic content of 10 percent, but no verified fuel has had an aromatic content greater than 25 percent.

Section 60.4209(a) requires a non-resettable hour meter.

The engine will comply with the requirements of Section 60.4211(b) because it has been certified in accordance with 40 CFR Part 89.

The engine will comply with the requirement in Section 60.4211(e) to run for less than 100 hours per year for maintenance checks and readiness testing.

The owner/operator is not required to submit an initial notification to EPA for emergency engines in accordance with Section 60.4214(b).

Because the engine does not have a diesel particulate filter, it is not subject to Section 60.4209(b) (installation of a backpressure monitor) or 60.4214(c) (records of corrective action taken after high backpressure).

The owner/operator is required to comply with certain sections of 40 CFR 60, Subpart A, General Provisions, as listed in Subpart IIII, Table 8. There general provisions are 60.1, 60.2, 60.3, 60.4, 60.5, 60.6, 60.7 (as specified in 60.4214(a)), 60.9, 60.10, 60.12, 60.14, 60.15, 60.16, 60.17 and 60.19.

PSD, and NESHAPS are not triggered.

(i)

**PERMIT CONDITIONS**

The following permit condition will be revised as shown.

COND# 23811 -----

-

Application 14917, September 2006  
Modified by Application 16495, November 2007  
Modified by Application 19330, February 2009  
Modified by Application 21713, May 2010  
Modified by Application 22152, October 2010  
Plant 14628 (B2758) Emergency Diesel Engines S-1518 and S-1519

Plant 14628 (B2758) Emergency Diesel Engine S-1522

Plant 14629 (B2759) Emergency Diesel Engines S-56 and S-57

Plant 14629 (B2759) Emergency Diesel Engine S-58

1. Operating for reliability-related activities is limited to 50 hours per year per engine. [Basis: "Stationary Diesel

Engine ATCM", CA Code of Regulations, Title 17, Section 93115.6(b)(3)(A)2b and 93115.6(a)(3)(A)1c]

2. The owner or operator shall operate each emergency standby engine only for the following purposes: to mitigate emergency conditions, for emission testing to demonstrate compliance with a District, state or Federal emission

limit,

or for reliability-related activities (maintenance and other

testing, but excluding emission testing). Operating hours while mitigating emergency conditions or while emission testing to show compliance with District, state or Federal emission limits is not limited. [Basis: Regulation 9-8-330, "Stationary Diesel Engine ATCM", CA Code of Regulations, Title 17, Section 93115.4(29)]

3. The owner/operator shall operate each emergency standby engine only when a non-resettable totalizing meter (with a minimum display capability of 9,999 hours) that measures

the

hours of operation for the engine is installed, operated and

properly maintained. [Basis: Regulation 9-8-530, "Stationary Diesel Engine ATCM", CA Code of Regulations, Title 17, Section 93115.10(e)(1)]

4. Records: The owner/operator shall maintain the following

monthly records in a District-approved log for at least 60 months from the date of entry. Log entries shall be retained

on-site, either at a central location or at the engine's location, and made immediately available to the District staff upon request.

a. Hours of operation for reliability-related activities (maintenance and testing).

b. Hours of operation for emission testing to show compliance with emission limits.

- c. Hours of operation (emergency).
- d. For each emergency, the nature of the emergency condition.
- e. Fuel usage for each engine(s)  
[Basis: Regulation 9-8-530, Regulation 2-6-501, and "Stationary Diesel Engine ATCM", CA Code of Regulations, Title 17, Section 93115.10(g) ]

**RECOMMENDATION**

Waive an Authority to Construct and grant a Permit to Operate to Tesoro Refining and Marketing Company for the following equipment:

**S-1552          Emergency Diesel Pump, Caterpillar C-7, 205 HP**

By: \_\_\_\_\_  
Arthur Valla  
Senior Air Quality Engineer

\_\_\_\_\_  
October 12, 2010

**Application 22169, S-1553 Backup Boiler**

**ENGINEERING EVALUATION**  
**Tesoro Refining and Marketing Company**  
**PLANT NO. 14628**  
**APPLICATION NO. 22169**

**BACKGROUND**

The Tesoro Refining and Marketing Company (Tesoro) is applying for an Authority to Construct and/or Permit to Operate the following equipment:

**S-1553 Backup Steam Boiler #3, 99 MM Btu/hr, Natural Gas Fired, Abated by A-1553 SCR**

This is a third backup boiler. The other two boilers were permitted via Application 20977:

**S-1550 Backup Steam Boiler #1, 99 MM Btu/hr, Natural Gas Fired, Abated by A-1550 SCR**

**S-1551 Backup Steam Boiler #2, 99 MM Btu/hr, Natural Gas Fired, Abated by A-1551 SCR**

These Backup Boilers are needed to ensure adequate steam supply for the refinery when existing boilers S-901 and S-904 are removed from service for turnaround/maintenance. The third boiler S-1553 will be a new source, but emissions will not change for all three boilers by keeping the current firing limits and time allowed for unabated operation in Condition 24491-4 and 24491-6:

4. Except for a time period not to exceed 24 hours per boiler startup or shutdown, the owner/operator shall ensure that S-1550, ~~and~~ S-1551 ~~and~~ S-1553 are only operated when abated by SCRs A-1550, ~~and~~ A-1551 ~~and~~ A-1553, respectively. The total cumulative hours that ~~S-1550 or S-1551~~ all three boilers can be is operated without SCR abatement shall not exceed 192 hours per consecutive 12-month period. (Basis: Cumulative Increase, Offsets, Toxics)
6. The owner/operator shall ensure that the total fuel fired in S-1550, ~~and~~ S-1551 ~~and~~ S-1553 shall not exceed 4,277,000 therms in any 12 consecutive month period. (Basis: Cumulative Increase, Offsets, Toxics)

By using this permitting rationale, the application qualifies for the Accelerated Permitting Program and the Temporary Permit to Operate was granted August 3, 2010.

In addition, Tesoro has requested that Condition 24491-3 be deleted. The time limit can be an operating problem and emissions are effectively capped by conditions 24491-4 and 24491-6.

3. The owner/operator shall ensure each boiler S-1550 and S-1551 is not operated for more than 2160 hours in any consecutive 12-month period. (Basis: Cumulative Increase, Offsets, Toxics)

## EMISSION CALCULATIONS

### Emission Factors

The following emissions factors are used to calculate emissions from Backup Boiler S-1553, which are the same as Boilers S-1550 and S-1551.

NOx: 7 ppm @ 3% O<sub>2</sub> when abated by SCR (BACT)  
 30 ppm @ 3% O<sub>2</sub> without SCR operation (192 hrs/yr per boiler)  
 CO: 50 ppm @ 3% O<sub>2</sub> (BACT)  
 PM10 7.45E-3 lb/MMBtu  
 VOC 5.39E-3 lb/MMBtu (assume to be all POC)  
 SO<sub>2</sub> 5.88E-4 lb/MMBtu

Emission factors for PM10, POC, and SO<sub>2</sub> are from Chapter 1, Table 1.4-2 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors (lb/10<sup>6</sup>scf / 1020).

Exhaust flow: (8710 dscf/MMBtu)\*(20.95/(20.95-3))=10165.7 dscf/MMBtu at 3% O<sub>2</sub>

At atmospheric pressure and low temperatures, the ideal gas law will provide the necessary calculation accuracy:  
 $n = PV/RT = (1 \text{ atm} * 10165.7 \text{ dscf/MMBtu}) / ((0.7302 \text{ atm-cf/lb-mol R}) * (68 + 460 \text{ R}))$   
 = 26.367 lb-mol/MMBtu

NOx w/ SCR: 26.367 lb-mol/MMBtu(7 lb-mol NOx/1E6 lb-mol)(46 lb NOx/lb-mol NOx)  
 = 0.00849 lb/MMBtu  
 NOx w/o SCR: 26.367 lb-mol/MMBtu(30 lb-mol NOx/1E6 lb-mol)(46 lb NOx/lb-mol NOx)  
 = 0.0364 lb/MMBtu  
 CO: 26.367 lb-mol/MMBtu(50 lb-mol NOx/1E6 lb-mol)(28 lb CO/lb-mol CO)  
 = 0.0369 lb/MMBtu

### Annual Emissions:

Emissions from S-1553 Backup Boiler:

NOx (SCR) = (99 MMBtu/hr)(0.00849 lb NOx/MMBtu)(2160-192 hrs) = 1654 lb = 0.827 tons  
 NOx (w/o SCR) = (99 MMBtu/hr)(0.0364 lb NOx/MMBtu)(192 hrs) = 692 lb = 0.346 tons  
 NOx (total) = 1654 + 692 = 2346 lbs = 1.173 tons  
 CO = (99 MMBtu/hr)(0.0369 lb CO/MMBtu)(2160 hrs) = 7891 lb = 3.945 tons  
 PM10 = (99 MMBtu/hr)(7.45E-3 lb PM10/MMBtu)(2160 hrs) = 1593 lb = 0.797 tons  
 POC = (99 MMBtu/hr)(5.39E-3 lb POC/MMBtu)(2160 hrs) = 1153 lb = 0.576 tons  
 SO<sub>2</sub> = (99 MMBtu/hr)(5.88E-4 lb SO<sub>2</sub>/MMBtu)(2160 hrs) = 126 lb = 0.063 tons

However, as explained above, the total annual fuel throughput for all three boilers will not change, so there will not be any emissions increase (any emissions from S-1553 will cause a reduction in emissions from the other boilers S-1550 and S-1551).

### Cumulative Increase:

There is no cumulative increase in emissions.

**Maximum Daily Emissions:**

|               |   |
|---------------|---|
| NOx (SCR)     | =(99 MMBtu/hr)(0.00849 lb NOx/MMBtu)(24 hrs) = 20.1 lb  |
| NOx (w/o SCR) | =(99 MMBtu/hr)(0.0364 lb NOx/MMBtu)(24 hrs) = 86 lb     |
| CO            | =(99 MMBtu/hr)(0.0369 lb CO/MMBtu)(24 hrs) = 88 lb      |
| PM10          | =(99 MMBtu/hr)(7.45E-3 lb PM10/MMBtu)(24 hrs) = 17.7 lb |
| POC           | =(99 MMBtu/hr)(5.39E-3 lb POC/MMBtu)(24 hrs) = 12.8 lb  |
| SO2           | =(99 MMBtu/hr)(5.88E-4 lb SO2/MMBtu)(24 hrs) = 1.4 lb   |

**Toxic Risk Screening**

The following toxic emissions were calculated for each boiler.

| TAC             | Emission Factor<br>(lb/mmscf) | Emission Factor<br>(lb/MMBtu) | Emissions<br>(lb/hr) | Emissions<br>(lb/yr) |
|-----------------|-------------------------------|-------------------------------|----------------------|----------------------|
| Benzene         | 2.10E-03                      | 2.1E-06                       | 2.1E-04              | 4.5E-01              |
| Dichlorobenzene | 6.00E-07                      | 6.0E-10                       | 5.9E-08              | 1.3E-04              |
| Formaldehyde    | 7.50E-02                      | 7.5E-05                       | 7.4E-03              | 1.6E+01              |
| Hexane          | 1.80E00                       | 1.8E-03                       | 1.8E-01              | 3.8E+02              |
| Naphthalene     | 6.10E-04                      | 6.10E-07                      | 6.0E-05              | 1.3E-01              |
| Toluene         | 3.40E-03                      | 3.4E-06                       | 3.4E-04              | 7.3E-01              |
| PAH             | 2.45E-05                      | 2.45E-08                      | 7.0E-06              | 1.5E-02              |

However, since the toxic emissions are based on boiler firing duty, and the overall annual duty of the three boilers will not change, the overall toxic emissions will not change, and a risk screen is not required. The risk screen conducted for the first two boilers showed the project risk is considered acceptable with a Maximum Cancer Risk of 0.004 in a million, the chronic hazard index of 0.00008 and the acute hazard index of 0.003.

**BEST AVAILABLE CONTROL TECHNOLOGY**

In accordance with Regulation 2, Rule 2, Section 301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NOx, CO, SO<sub>2</sub> or PM<sub>10</sub>. Emissions from S-1553 trigger BACT for the following pollutants: NOx, CO, PM10, and POC.

A BACT Determination for these backup boilers was made in Application 20977. The Achieved in Practice BACT for these Backup Boilers was determined as follows:

- NOx: 7 ppm @ 3% O<sub>2</sub>
- CO: 50 ppm @ 3% O<sub>2</sub>
- POC emissions comply with BACT when Good Combustion Practices are followed.



PM10 emissions comply with BACT by the use of Natural Gas Fuel.

**OFFSETS**

There are no increase in annual emissions due to this application, so Offsets are not required. A summary of the offsets for Application 20977 follows:

| Description  | NOx (tons) | POC (tons) |
|--|------------|------------|
| S-1550 Emissions   | 1.173      | 0.576      |
| S-1551 Emissions   | 1.173      | 0.576      |
| Total Emissions  | 2.346      | 1.152      |
| Adjusted for Offset Ratio of 1.15  | 2.698      | 1.325      |
| Return of S-1494 & S-1495 credits when taken out of service via Application 7642 | -1.208     | -0.101     |
| Offset Requirements  | 1.490      | 1.224      |
| Offset via Bank 968  | -1.490     | -1.224     |

The total POC offsets from Bank 968 are 2.714 tons.

**NSPS**

S-1553 is not Subject to NSPS Subpart Ja because it is not a Fuel Gas Combustion Devices (natural gas is excluded from the definition of Fuel Gas in 40 CFR 60.101a unless it is commingled with refinery fuel gas).

S-1553 is not Subject to NSPS Subpart Db (Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units) because the firing rate is less than 100 MMBtu/hr. The Backup Boilers is subject to NSPS Subpart Dc because the boiler firing rate is greater than 10 MMBtu/hr and less than 100 MMBtu/hr. Emission Standards in Subpart Dc do not apply to S-1553 because the boiler is only fired on Natural Gas. S-1553 is only subject to the notification and recordkeeping requirements of 40 CFR 60.48c.

**NESHAPs and MACT**

S-1553 is not subject to NESHAPs and MACT because they are fired exclusively on Natural Gas and are not used as a control device of any HAPs emissions.

**PREVENTION OF SIGNIFICANT DETERIORATION (PSD)**

The Tesoro facility is an existing major stationary source. To determine the applicability of PSD, 40 CFR 52.21(b)(2)(i) requires a two-step evaluation. The first step is to determine if the project will result in a significant emissions increase. The second step it to determine if the project will result in a significant net emissions increase. Both steps need to result in emissions that exceed significance levels for PSD to apply.

The emissions increases need to be determined and compared to the following significance levels [40CFR52.21(b)(23)(i)]:

- Carbon monoxide: 100 tons per year (tpy)
- Nitrogen oxides: 40 tpy
- Sulfur dioxide: 40 tpy
- Particulate matter: 25 tpy of particulate matter emissions
- PM10: 15 tpy
- PM2.5: 10 tpy of direct PM2.5emissions; 40 tpy of sulfur dioxide emissions; 40 tpy of nitrogen oxide emissions unless demonstrated not to be a PM2.5precursor under paragraph (b)(50) of this section
- Ozone: 40 tpy of volatile organic compounds or nitrogen oxides
- Sulfuric acid mist: 7 tpy
- Hydrogen sulfide (H2S): 10 tpy

Total reduced sulfur (including H<sub>2</sub>S): 10 tpy  
Reduced sulfur compounds (including H<sub>2</sub>S): 10 tpy

The 'project' for this application is to install backup boilers to provide process steam while the Main Boilers are shutdown. The baseline actual emissions for steam production would decrease since the backup boilers, rated at 99 MMBtu/hr each, are operating while one of the main boilers are shutdown (S-901 @ 668MM Btu/hr and S-904 @ 775 MM Btu/hr). Even if all three backup boilers are fired a full rate, the  $3 \times 99 = 297$  MMBtu/hr duty would be less than half the duty on the shutdown boiler. Consequently, the net emissions change would be a reduction. Therefore, PSD does not apply.

## STATEMENT OF COMPLIANCE

The owner/operator of S-1553 Backup Boiler shall comply with Regulation 6, Rule 1 (Particulate Matter General Requirements). The owner/operator is expected to comply with Regulation 6 since the unit is only fueled with natural gas. Thus for any period aggregating more than three minutes in any hour, there should be no visible emission as dark or darker than No. 1 on the Ringlemann Chart (Regulation 6-1-301) and no visible emission to exceed 20% opacity (Regulation 6-1-302).

The owner/operator of S-1553 Backup Boiler shall comply with Reg. 9-1-301 (Inorganic Gaseous Pollutants: Sulfur Dioxide for Limitations on Ground Level Concentrations).

The owner/operator is not subject to Regulation 9 Rule 7: Nitrogen Oxides and Carbon Monoxide from Industrial, Institutional, and Commercial Boilers, Steam Generators, and Process Heaters as per Regulation 9-7-110.3 since S-1553 will be operated at the Tesoro Refinery.

The owner/operator is not subject to Regulation 9 Rule 10: Nitrogen Oxides and Carbon Monoxide from Boilers, Steam Generators, and Process Heaters in Petroleum Refineries because S-1553 is not a "Unit" as defined by Regulation 9-10-220. S-1553 did not have an Authority to Construct or Permit to Operate prior to January 5, 2004.

The owner/operator is subject to Regulation 8, Rule 18. The natural gas fuel lines and components will be constructed in accordance with the requirements of the 8-18 standards and added to the facility fugitive emissions monitoring program.

The project is considered to be ministerial under the District's CEQA regulation 2-1-311 and therefore is not subject to CEQA review.

The project is over 1000 feet from the nearest school and therefore not subject to the public notification requirements of Reg. 2-1-412.

The owner/operator of S-1553 Backup Boiler shall comply with BACT and NSPS.

Offsets, Toxics, PSD and NESHAPS do not apply.

## PERMIT CONDITIONS

**Condition 24491 will be revised as follows:**

Application 20977 (November 2009)

Modified by Application 22169 (September 2010). Added S-1553 and deleted Part 3.

S-1550 Backup Steam Boiler #1, 99 MM Btu/hr, Natural Gas Fired, Abated by A-1550 SCR

S-1551 Backup Steam Boiler #2, 99 MM Btu/hr, Natural Gas Fired, Abated by A-1551 SCR

S-1553 Backup Steam Boiler #3, 99 MM Btu/hr, Natural Gas Fired, Abated by A-1553 SCR

1. The owner/operator shall ensure that S-1550, ~~and~~ S-1551 and S-1553 are fired exclusively on natural gas at a rate not to exceed 99 MMBtu/hr each. (Basis: Cumulative Increase, Offsets, Toxics, NSPS, BACT)
2. The owner/operator shall ensure that S-1550, ~~and~~ S-1551 and S-1553 are on site at the refinery for no more than 6 consecutive months per 12 consecutive month period. The 6-month period for each boiler begins upon the initial firing of the boiler. (Basis: BACT)
3. ~~Deleted. (Application 22169)The owner/operator shall ensure each boiler S-1550 and S-1551 is not operated for more than 2160 hours in any consecutive 12-month period. (Basis: Cumulative Increase, Offsets, Toxics)~~
4. Except for a time period not to exceed 24 hours per boiler startup or shutdown, the owner/operator shall ensure that S-1550, ~~and~~ S-1551 and S-1553 are only operated when abated by SCRs A-1550, ~~and~~ A-1551 and A-1553, respectively. The total cumulative hours that all three boilers can be ~~S-1550 or S-1551 is~~ operated without SCR abatement shall not exceed 192 hours per consecutive 12-month period. (Basis: Cumulative Increase, Offsets, Toxics)
5. The owner/operator shall ensure that S-1550, ~~and~~ S-1551 and S1553 are not operated unless they are each equipped with a District approved, fuel flow meter that measures the total volume of fuel throughput to S-1550, ~~and~~ S-1551 and S-1553 in units of standard cubic feet. (Basis: Cumulative Increase, Offsets, Toxics)
6. The owner/operator shall ensure that the total fuel fired in S-1550, ~~and~~ S-1551 and S-1553 shall not exceed 4,277,000 therms in any 12 consecutive month period. (Basis: Cumulative Increase, Offsets, Toxics)
7. Except for periods of startup and shutdown as allowed in Part 4, the owner operator shall not operate S-1550, ~~or~~ S-1551 or S-1553 unless NOx emissions are less than 7 ppmv, dry, @ 3% O2. (Basis: Cumulative Increase, Offsets, BACT)
8. During for periods of startup and shutdown as allowed in Part 4, the owner operator shall not operate S-1550, ~~or~~ S-1551 or S-1553 unless NOx emissions are less than 30 ppmv, dry, @ 3% O2. (Basis: Cumulative Increase, Offsets)

9. The owner operator shall not operate S-1550, ~~or~~ S-1551 or S-1553 unless CO emissions are less than 50 ppmv, dry, @ 3% O<sub>2</sub>. (Basis: Cumulative Increase, Offsets, BACT)
  
10. Within 10 days of the first fire date, the owner/operator shall conduct a District approved source test of each S-1550, ~~and~~ S-1551 and S-1553. The District approved source test shall measure the emission rates of NO<sub>x</sub>, POC, SO<sub>2</sub>, and PM<sub>10</sub>, from S-1550, ~~and~~ S-1551 and S-1553 while it is operated at not less than 80 MMBtu/hr. The owner/operator shall ensure that within 45 days of the date of completion of the source testing, two identical copies of the source tests results (each referencing permit application #20977, #22168, and plant #14628) are received by the District. One copy shall be sent to Source Testing and the other shall be sent to the Engineering Division. This District approved source test shall be repeated within 5 days of each subsequent boiler startup (or any operation without SCR abatement) during the 6-month period of boiler operation. (Basis: Cumulative Increase, Offsets, BACT)
  
11. In a District approved log, the owner/operator shall record the manufacturer, make, model, and maximum rated firing rate of each boiler used as S-1550, ~~and~~ S-1551 and S-1553, and the following information for each calendar day that either S-1550, ~~or~~ S-1551, or S-1553 fires fuel. The District approved log(s) shall be retained by the owner/operator on site for at least 5 years from the date of the last entry and made available to District staff upon request. (Basis: Cumulative Increase, Offsets, Toxics, BACT)
  - a. The date and hours that each S-1550, ~~and~~ S-1551 and S-1553 fire fuel.
  - b. The amount of fuel fired at each S-1550, ~~and~~ S-1551 and S-1553.
  - c. The hours that each S-1550, ~~and~~ S-1551 and S-1553 operate without abatement by a fully functioning SCR.
  - d. The amount of steam produced at each boiler S-1550, ~~and~~ S-1551 and S-1553.

### RECOMMENDATION

Waive an Authority to Construct and grant a Permit to Operate to Tesoro Refining and Marketing Company for the following source:

**S-1553 Backup Steam Boiler #3, 99 MM Btu/hr, Natural Gas Fired, Abated by A-1553 SCR**

### EXEMPTIONS

none

By: \_\_\_\_\_

Arthur P Valla  
Senior Air Quality Engineer  
September 16, 2010

**Application 22580, S-920 NOx Box Revision**

**EVALUATION REPORT  
TESORO REFINING AND MARKETING COMPANY  
REVISED NOx BOX FOR S-920, F-20  
No. 2 HDS CHARGE HEATER  
APPLICATION 22580, PLANT 14628**

**BACKGROUND**

The Tesoro Golden Eagle Refinery (Tesoro) operates several furnaces and boilers that are subject to Regulation 9, Rule 10, Nitrogen Oxides And Carbon Monoxide From Boilers, Steam Generators And Process Heaters In Petroleum Refineries. Regulation 9-10-301 limits the refinery wide NOx emissions to 0.033 lb/MMBtu of fired duty. Regulation 9-10-502 requires the installation of a NOx, CO and O2 CEM to demonstrate compliance with Regulation 9-10-301. Regulation 9-10-502 also allows a CEM equivalent verification system to determine compliance with Regulation 9-10-301. The District and Tesoro have produced the CEM equivalent verification system. This system is called the “NOx Box”. The NOx Box is an operating window for the unit, expressed in terms of fired duty and oxygen content in the flue gas. The operating window is established by source tests for various operating conditions. The source tests demonstrate the NOx emissions are equal to or less than a specified emission factor. As long as the fired unit duty and oxygen content are in this NOx Box operating window, the specified emission factor is used to determine compliance with the 0.033 lb/MMBtu limit of Regulation 9-10-301. The Permit Condition that contains the details of the NOx Box is #18372.

Condition 18372, Part 30 required Tesoro to submit the initial NOx Box for the affected sources by January 1, 2005. Tesoro met this requirement via Application 15682. The NOx Box’s in the application were supported by properly conducted source tests and the NOx Box operating windows for all the affected sources have been included in Revision 4 of the Title V permit (reference: Section VI, Condition 18372, Part 31A, NOx Box Ranges).

This application requests a change in the NOx Box operating window for:

**S-920 F-20 No. 2 HDS Charge Heater, 63 MMBTU/hr**

The change is as follows:

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
| 920        | 0.046                      | 5.0, 24.84   | 7.7, 17.86   | 6.7, 55.12  | 7.1, 15.34  | 8.0, 60.26  |
|            | 0.055                      | 7.7, 17.86   | 10.8, 27.53  | 8.0, 60.26  | N/A   | 10.0, 45.15   |

|         |              |                   |             |                   |            |             |
|---------|--------------|-------------------|-------------|-------------------|------------|-------------|
| 920 new | <u>0.042</u> | <u>2.5, 25.72</u> | 7.7, 17.86  | <u>2.7, 38.29</u> | 7.1, 15.34 | 8.0, 60.26  |
|         | 0.055        | 7.7, 17.86        | 10.8, 27.53 | 8.0, 60.26        | N/A        | 10.0, 45.15 |

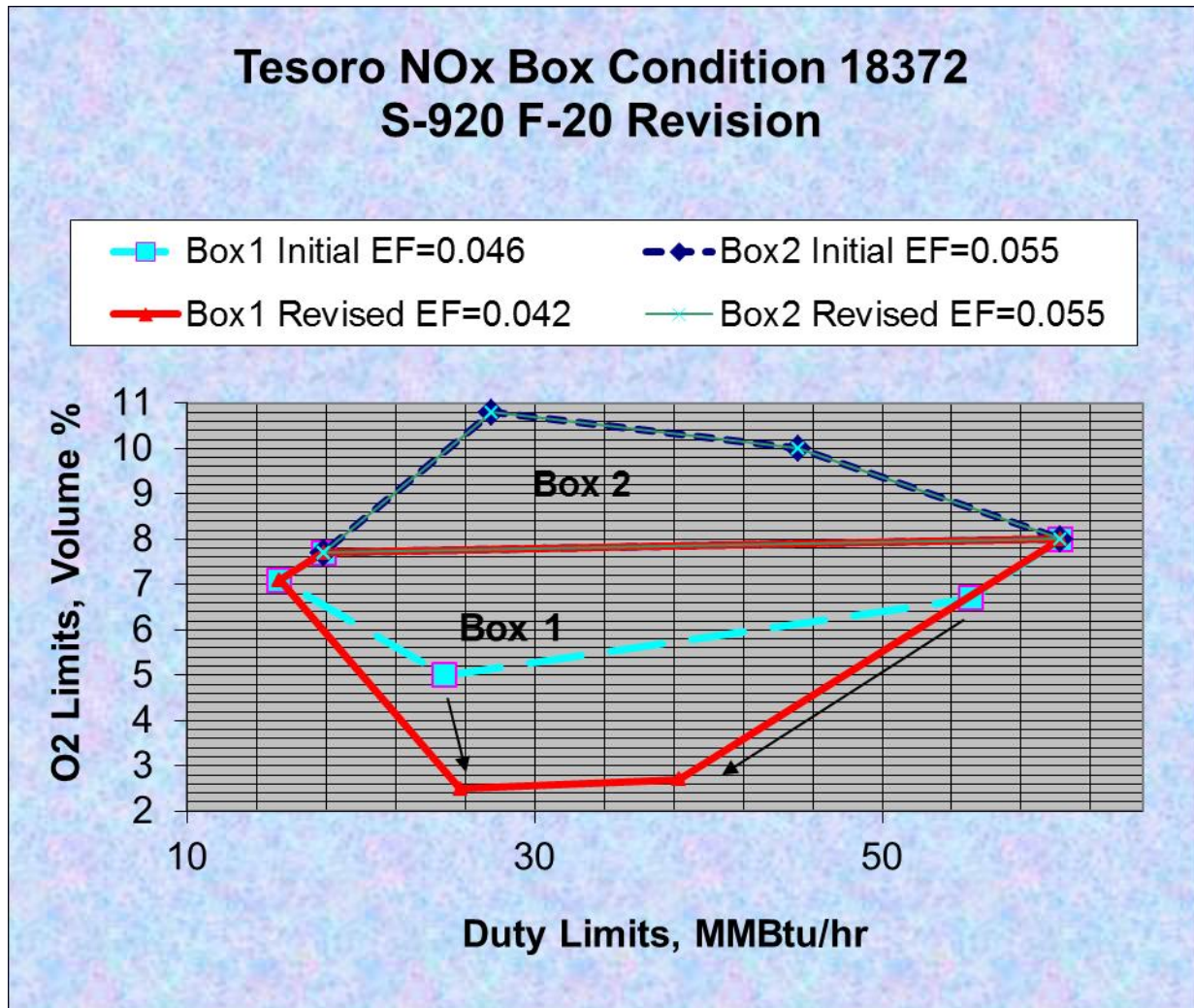
Tesoro is using two operating ranges as allowed by Condition 18372, Part 30.

The changes are supported by source tests reviewed by the Source Test Section.

This application is being processed as an administrative change in conditions since there is reduction to the specified NOx emission factor for this unit.

This is the second revision to the S-920 NOx Box, but the emission factor was not increased, so a CEM is not required. According to Engineering Policy approved 4/11/03 and included in Appendix B of the December 2003 Title V Statement of Basis, a CEM is only required if two source tests in a 5-year period exceed the NOx emission factor.

The following diagram summarizes the changes to the S-920 NOx Box:



## **EMISSIONS SUMMARY**

There are no changes in emissions due to this application. The emission factors are unchanged by this application and there will be no impact on the overall facility limit of 0.033 lb/MMBtu required by Regulation 9-10-301.

## **PLANT CUMULATIVE INCREASE**

There are no net changes to the plant cumulative emissions.

## **TOXIC RISK SCREEN**

This proposed NO<sub>x</sub> Box change would not emit toxic compounds in amounts different than previously emitted. Therefore, a toxic risk screen is not required.

## **BEST AVAILABLE CONTROL TECHNOLOGY**

BACT is triggered for new or modified sources that emit criteria pollutants in excess of 10 lbs/day. However, Regulation 2-1-234 defines a modified source as one that results in an increase in daily or annual emissions of a regulated air pollutant. For this application, there is no change in emissions. Therefore, BACT does not apply.

## **PLANT LOCATION**

According to the SCHOOL program, the closest school is Las Juntas Elementary, which is almost two miles from the facility.

## **COMPLIANCE**

The change to the NO<sub>x</sub> Box will not change the compliance for Furnace S-920. Emissions from S-920 will continue to comply with all applicable regulations, including Regulation 6, Rule 1 and Regulation 9, Rule 10.

The closest school is over a mile from the facility, so the Public Notice requirements of Regulation 2-1-214 do not apply.

Toxics, CEQA, NESHAPS, BACT, Offsets and NSPS do not apply.

## **CONDITIONS**

The NOx Box Condition 18372, will be modified as shown below. Only the substantive changes for the S-920 NOx Box points detailed in Part 31A are shown. For clarity, the change is tracked from the version in Revision 4 of the Title V permit. All of the other parts of Condition 18372 remain unchanged by this application.

Condition 18372

31. Except as provided in part 31B & C, the owner/operator shall operate each source within the NOx Box ranges listed below at all times of operation. This part shall not apply to any source that has a properly operated and properly installed NOx CEM. (Regulation 9-10-502)

A. NOx Box ranges

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr)      | Max O2 at Low Firing (O2% , MMBtu/hr) | Min O2 at High Firing (O2% , MMBtu/hr)     | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr) |
|------------|----------------------------|--|---------------------------------------|--|--|--|
| 920        | 0.0426                     | <del>5.0, 24.84</del><br><u>2.5, 25.72</u> | 7.7, 17.86                            | <del>6.7, 55.12</del><br><u>2.7, 38.29</u> | 7.1, 15.34   | 8.0, 60.26                             |
|            | 0.055                      | 7.7, 17.86                                 | 10.8, 27.53                           | 8.0, 60.26                                 | N/A  | 10.0, 45.15                            |

The limits listed above are based on a calendar day averaging period for both firing rate and O2%.

**RECOMMENDATION**

It is recommended that a Change of Conditions to the Permit to Operate be granted to Tesoro for:

**S-920 F-20 No. 2 HDS Charge Heater, 63 MMBTU/hr**

\_\_\_\_\_  
Arthur P. Valla  
Senior Air Quality Engineer

\_\_\_\_\_  
Date  
November 4, 2010



**Application 22582, S-926 NOx Box Revision**

**EVALUATION REPORT  
TESORO REFINING AND MARKETING COMPANY  
REVISED NOx BOX FOR S-926,  
F-26 No 2 REFORMER SPLITTER  
APPLICATION 22582, PLANT 14628**

**BACKGROUND**

The Tesoro Golden Eagle Refinery (Tesoro) operates several furnaces and boilers that are subject to Regulation 9, Rule 10, Nitrogen Oxides And Carbon Monoxide From Boilers, Steam Generators And Process Heaters In Petroleum Refineries. Regulation 9-10-301 limits the refinery wide NOx emissions to 0.033 lb/MMBtu of fired duty. Regulation 9-10-502 requires the installation of a NOx, CO and O2 CEM to demonstrate compliance with Regulation 9-10-301. Regulation 9-10-502 also allows a CEM equivalent verification system to determine compliance with Regulation 9-10-301. The District and Tesoro have developed the CEM equivalent verification system. This system is called the “NOx Box”. The NOx Box is an operating window for the unit, expressed in terms of fired duty and oxygen content in the flue gas. The operating window is established by source tests for various operating conditions. The source tests demonstrate the NOx emissions are equal to or less than a specified emission factor. As long as the fired unit duty and oxygen content are in this NOx Box operating window, the specified emission factor is used to determine compliance with the 0.033 lb/MMBtu limit of Regulation 9-10-301. The Permit Condition that contains the details of the NOx Box is #18372.

Condition 18372, Part 30 required Tesoro to submit the initial NOx Box for the affected sources by January 1, 2005. Tesoro met this requirement via Application 15682. The NOx Box’s in the application were supported by properly conducted source tests.

This application requests a change in the NOx Box operating window for:

**S-926 F-26 No 2 Reformer Splitter, 145 MMBTU/hr**

The change is as follows:

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
| 926<br>Old | 0.032                      | 1.8, 32.81   | 4.4, 32.81   | 2.9, 126.72   | N/A   | 3.9, 131.59   |
|            | 0.037                      | 4.4, 32.81   | 8.3,29.60  | 3.9, 131.59   | N/A   | 7.0, 77.89  |
| 926<br>New | 0.032                      | 1.8, 32.81   | <u>5.3, 29.30</u>  | 2.9, 126.72   | N/A   | 3.9, 131.59   |
|            | 0.037                      | <u>5.3, 29.30</u>  | 8.3,29.60  | 3.9, 131.59   | N/A   | 7.0, 77.89  |

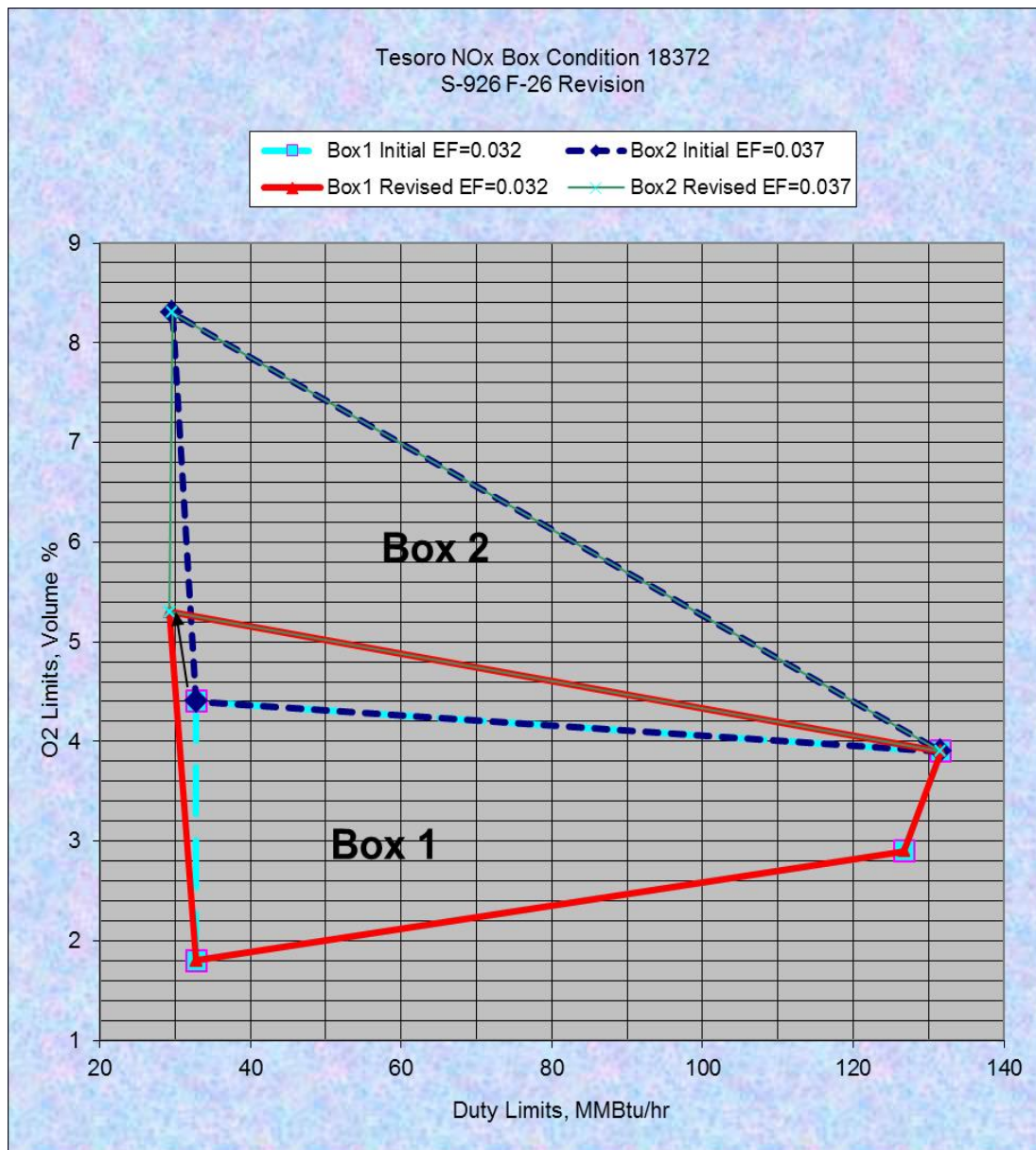
Tesoro is using two operating ranges as allowed by Condition 18372, Part 30.

The changes are supported by source tests reviewed by the Source Test Section.

This application is being processed as an administrative change in conditions since there is no change to the specified NOx emission factor for this unit.

This is the second revision to the S-926 NOx Box, but the emission factor was not increased, so a CEM is not required. According to Engineering Policy approved 4/11/03 and included in Appendix B of the December 2003 Title V Statement of Basis, a CEM is only required if two source tests in a 5-year period exceed the NOx emission factor.

The following diagram summarizes the changes to the S-913 NOx Box:



## **EMISSIONS SUMMARY**

There are no changes in emissions due to this application.

## **PLANT CUMULATIVE INCREASE**

There are no net changes to the plant cumulative emissions.

## **TOXIC RISK SCREEN**

This proposed NO<sub>x</sub> Box change would not emit toxic compounds in amounts different than previously emitted. Therefore, a toxic risk screen is not required.

## **BEST AVAILABLE CONTROL TECHNOLOGY**

BACT is triggered for new or modified sources that emit criteria pollutants in excess of 10 lbs/day. However, Regulation 2-1-234 defines a modified source as one that results in an increase in daily or annual emissions of a regulated air pollutant. For this application, there is no change in emissions. Therefore, BACT does not apply.

## **PLANT LOCATION**

According to the SCHOOL program, the closest school is Las Juntas Elementary, which is almost two miles from the facility.

## **COMPLIANCE**

The change to the NO<sub>x</sub> Box will not change the compliance for Furnace S-926. Emissions from S-926 will comply with Regulation 6 and Regulation 9, Rule 10 as before the change.

The closest school is over a mile from the facility, so the Public Notice requirements of Regulation 2-1-214 do not apply.

Toxics, CEQA, NESHAPS, BACT, Offsets and NSPS do not apply.

## **CONDITIONS**

The NO<sub>x</sub> Box Condition 18372, will be modified as shown below. Only the substantive changes for the S-926 NO<sub>x</sub> Box points detailed in Part 31A are shown. All of the other parts of Condition 18372 remain unchanged by this application.

Condition 18372

\*31. Except as provided in part 31B & C, the owner/operator shall operate each source within the NOx Box ranges listed below at all times of operation. This part shall not apply to any source that has a properly operated and properly installed NOx CEM. (Regulation 9-10-502)

A. NOx Box ranges

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr)          | Max O2 at Low Firing (O2% , MMBtu/hr)          | Min O2 at High Firing (O2% , MMBtu/hr) | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr) |
|------------|----------------------------|--|--|--|--|--|
| 926        | 0.032                      | 1.8, 32.81                                     | <del>5.3, 29.30</del><br><del>4.4, 32.81</del> | 2.9, 126.72                            | N/A  | 3.9, 131.59                            |
|            | 0.037                      | <del>5.3, 29.30</del><br><del>4.4, 32.81</del> | 8.3, 29.60                                     | 3.9, 131.59                            | N/A  | 7.0, 77.89                             |

The limits listed above are based on a calendar day averaging period for both firing rate and O2%.

**RECOMMENDATION**

It is recommended that a Change of Conditions to the Permit to Operate be granted to Tesoro for:

**S-926 F-26 No 2 Reformer Splitter, 145 MMBTU/hr**

\_\_\_\_\_  
Arthur P. Valla  
Senior Air Quality Engineer

\_\_\_\_\_  
Date  
November 4, 2010

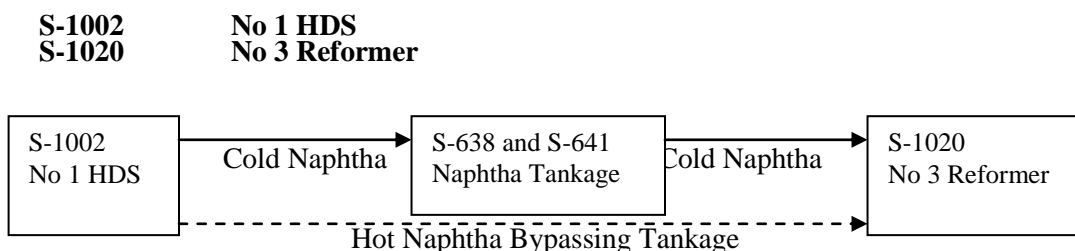
## Application 22615, S-1020 Reformer Hot Feed Project

### EVALUATION REPORT TESORO - GOLDEN EAGLE REFINRY Application #22615 - Plant #14628

150 Solano Way  
Martinez, CA 94553

#### I. BACKGROUND

Tesoro has applied for an energy conservation project that is justified as a greenhouse gas reduction project. Currently the product naphtha from the No 1 HDS unit is cooled and stored in tankage. The naphtha is then heated and fed to the No 3 Reformer. This energy conservation project proposes to add a line that bypasses the tankage. This proposed new line will allow the hot product from the No 1 HDS Unit to be directly fed to the No 3 Reformer. The energy conservation arrives from the steam savings realized by not heating a cooled process stream. From a permitting standpoint, this project causes a change in the method of operation that may increase emissions. New fugitive components are proposed to accomplish the objectives of this project. The total emissions for the project fugitive emissions are below 10 lb/day, but exemption Regulation 2-1-128.21 does not apply when there is a change in operation. Per Regulation 2-1-234, this energy conservation project is a modification for the following equipment:



Even though this project will save energy by reducing the steam required in these process units, Tesoro will retain the current operation. This allowance to operate either way causes a potential to debottleneck the process if both operations are used simultaneously. The permitting approach to address potential debottlenecking is to limit the throughputs of S-1002 and S-1020.

Tesoro is also altering the following source:

#### **S-641 Tank A641, External Floating Roof, 3,360,000 gallons**

In the original application, S-641 was modified by adding fugitive components. However, Tesoro later revised the fugitive emission components such that there is no increase in emissions.

This application also specifies that there will be emissions changes to the following two fired sources:

#### **S-904 No 6 Boiler, 775 MMBtu/hr**

#### **S-971 F53 No 3 Reformer Charge Heater, 300 MMBtu/hr**

The application states that these sources would be fired a lower rates. Both of these sources are included in the refinery bubble Condition 8077 and since there will be no change to the permitted limits in this condition, from a permitting standpoint there will be no change in emissions for these two sources.

During the completeness determination for this project, a review was conducted regarding the permitting status of these sources. The following issues surfaced causing complications to this permitting action.

S-1002 No 1 HDS Unit.

In 1991, the capacity of S-1002 was increased from 12,000 BPD to 25,000 BPD via NSR Application 6468 Diesel Upgrade Project. The District's application file folder for 6468 is missing. Thus the engineering evaluation is not available. From the available documents that could be found, it appears that this Diesel Upgrade Project increased the capacity of S-1002 and associated furnaces S-916 and S-917. New fugitive components were also part of the project scope.

It also appears that all emissions increases for Application 6468 were offset by including the emissions in the refinery bubble (originally created via No 3 HDS Plant Expansion Project Application 27769) currently residing in Condition 8077.

The limited project documents for Application 6468 show that the increase in furnace emissions for the Diesel Upgrade Project exceeded 150 lb/day for NOx and SOx triggering the (then) BACT threshold. There is no record of how the furnaces included in the Diesel Upgrade Project complied with BACT. There is also no record of an Authority to Construct being granted to Tosco for the modifications to No 1 HDS furnaces S-916 and S-917.

On September 25, 1992, an Authority to Construct was granted to then owner Tosco, for S-1002 at a capacity of 25,000 BPD. Permit Condition 8350 was imposed allowing S-1002 a throughput limit of 25,000 barrels of naphtha per day, based on a 365-day average.

As part of the initial Title V permit preparations, throughput limits had to be established for grandfathered sources. This effort was completed by Mr. Carter of the District and Ms. Lim of Ultramar (the owner of the Golden Eagle Refinery at the time). A final summary of this analysis is captured in an Excel spreadsheet titled "Ultramar- rev8". This summary includes S-1002, even though it was not a grandfathered source. The information in this summary is confusing:

| Plant # 12758  |                |  |                                    |              |                  |
|----------------|----------------|--|------------------------------------|--------------|------------------|
| Ultramar, Inc. |                |  |                                    |              |                  |
| Air District   | Air District   | Golden Eagle Historical or Design Data                           |                                    |              |                  |
| Throughput     | Throughput     |  |                                    | Maximum Rate | Max Annual units |
| Limit (units)  | Limit (units)  | Source # & Source Description                                    | Comments                           |              |                  |
| 25 kbb/day     | 9,125.0 kbb/yr | 1002 No 1 HDS Unit   | actual max data, design for annual | 28 kbb/day   | 9125.0 kbb/yr    |
|                |                | PET REF> Hydrotreating/hydrofining, Naphtha, 1042 barrels/hr max |                                    |              | 25.0 kbb/day     |

All throughput information (9,125 kbb/yr, 1042 barrels/hr max) is equivalent to the NSR limit of 25,000 BPD except one entry that has a maximum rate of 28,000 BPD. There is a comment referring to actual max data, but it is unclear how or why this should apply. S-1002 was not a grandfathered limit, and S-1002 has a permit condition limit that imposes a 25,000 BPD NSR limit. The probable explanation is that the NSR limit is a 365-day average, and the unit has reached a 28,000 BPD capacity at some duration of operation. Regardless of the explanation, the 28,000 BPD capacity was transferred to the initial version of the Title V permit:

Facility Name: Tesoro Refining and Marketing Company  
Permit for Facility #: B2758 and B2759

**Table II A - Permitted Sources**

Each of the following sources has been issued a permit to operate pursuant to the requirements of BAAQMD Regulation 2, Permits. The capacities in this table are the maximum allowable capacities for each source, pursuant to Standard Condition J 1 and Regulation 2-1-301.

| Plant #B2758 Tesoro Refining and Marketing Company |                |              |       |                              |  |
|--|----------------|--------------|-------|------------------------------|--|
| S-#  | Description    | Make or Type | Model | Capacity                     | Grandfathered Limit, or Firm Limit and Basis |
| 1002   | No. 1 HDS Unit |              |       | 28K bbl/day<br>9,125K bbl/yr | Firm Limit<br>Condition #8350,<br>part A1    |

It

should be noted that even though the 28,000 BPD was included in the Capacity column, the 9,125,000 BPY was retained (which is the 25,000 BPD x 365). This is the primary reason for the probable explanation in the paragraph above regarding the 28,000 BPD capacity.

In 2006, Tesoro submitted Application 14325 to increase the NSR limit of S-1002 to 28,000 BPD and 10,220,000 BPY. The engineering evaluation for this application indicated that this increase was to be consistent with the capacity shown in the Title V permit (even though the Title V permit showed a 9,125,000 BPY capacity limit). In this application Tesoro stated that this throughput increase would result in throughput increases for the following sources:

- S318 Feed Tank to S1002 -- 3000 BPD increase
- S638 and S641 Product Naphtha Tanks -- 3000 BPD increase
- S1004 No 2 Cat Reformer -- 1000 BPD increase
- S1038 Benzene Saturation Unit -- 200 BPD increase
- S851 Ammonia Recovery Unit -- 0.01 tons/day increase in ammonia feed
- S1401 Sulfur Recovery Plant -- 0.1 ton/day increase in H2S feed
- S904 No 6 Boiler -- unspecified increase in firing due to more steam required in S1038
- S1485 Gasoline Blending Tank A870 -- 200 BPD increase
- S1496 Reformate Tank A786 -- 700 BPD increase
- Gasoline production increased 1000 BPD, affecting storage tanks.

There was also a 2000 BPD throughput decrease specified for S637 Naphtha Tank.

Tesoro states in the application that all of "these units will not increase throughput above the currently permitted levels, therefore no permitting action is required." (Currently Tesoro characterizes the throughput changes listed above as changes in utilization of the sources.) However, according to the Title V permit at the time ('Rev 1', 12/16/04), all of these sources except S904, S1485 and S1496 (the latter two were not included in the Title V permit) were grandfathered and grandfathered limits are not considered firm permitting limits. Furthermore, according to Regulation 2-1-234.2, grandfathered source with an emissions increase due to debottlenecking is considered modified. Application 14325 does not appear to have properly addressed the debottlenecked sources, accepting instead the grandfathered limits as firm limits. Nonetheless, the District did approve Application 14325 and granted the throughput increase August 14, 2006.

### S-1020 No 3 Reformer

S-1020 is a Grandfathered source with a maximum capacity specified in the Title V permit of 25,200 BPD and 8,760,000 BPY (which is 24,000 X 365). According to the 'Ultramar- rev8' grandfathered source analysis, the District limits were 20,000 BPD and 7,300,000 BPY:

| Plant # 12758<br>Ultramar, Inc. |                | Air District  |  | Golden Eagle Historical or Design Data |               |
|---------------------------------|----------------|---|--|--|---------------|
| Throughput                      |                | Throughput  |  | Maximum Rate                           | Max Annual    |
| Limit (units)                   | Limit (units)  | Source # & Source Description   | Comments                                 | units                                  | units         |
| 20 kbb/day                      | 7,300.0 kbb/yr | 1020 #3 UOP REFORMER<br>PET REF> Catalytic reforming, Cat reformer fresh feed, refinery | Actual max data and design max in permit | 25.2 kbb/day                           | 8760.0 kbb/yr |
|                                 |                |   |  |  | 24.0 kbb/day  |

The 20,000 BPD is consistent with the Data Form G that Tosco submitted in 1981, and represents the design limits pursuant to Regulation 2-1-234.3.1.2. Although details are not provided, it appears that the 25,200 BPD shown above would qualify for Regulation 2-1-234.3.1.3 which allows the highest documented actual levels attained by the source prior to March 1, 2000. Regulation 2-1-234.3.2 also limits a source capacity by the capacity of any upstream or downstream process that acts as a bottleneck. On November 10, 2010, in a meeting with the District, Tesoro explained that the 25,200 BPD rate is the peak rate S-1020 has ever experienced and has historically been limited by a vibration problem in a heat exchange train in the reformer itself. Therefore, the rate that S-1020 is limited to before the source is modified pursuant to Regulation 2-1-234 is 25,200 BPD.

## II. EMISSION INCREASES

### Fugitive Emissions

The only potential emissions from this project are the fugitive VOC emissions from equipment leaks. The numbers of valves and connectors are shown below.



**S-641 Tank A641 Naphtha Tank**

| Component Type                | Net New Component Count | VOC Emission Factor<br>(lb/day/component) | VOC Emissions |           |
|-------------------------------|-------------------------|---|---------------|-----------|
|                               |                         |   | (lb/day)      | (lb/year) |
| Gas/Vapor Valves              | 0                       | 0.0015288                                 | 0             | 0         |
| Light Liquid Valves           | 0                       | 0.0014736                                 | 0             | 0         |
| Connectors                    | 0                       | 0.004                                     | 0             | 0         |
| Pumps                         | 0                       | 0.028872                                  | 0             | 0         |
| Compressors                   | 0                       | 0.00804                                   | 0             | 0         |
| Atmospheric Gas/Vapor PRVs    | 0                       | 0.00972                                   | 0             | 0         |
| Atmospheric Light Liquid PRVs | 0                       | 0.006312                                  | 0             | 0         |
| <b>TOTAL</b>                  |                         |   | 0             | 0         |

**S-1002 No. 1 HDS**

| Component Type                | Net New Component Count | VOC Emission Factor<br>(lb/day/component) | VOC Emissions |           |
|-------------------------------|-------------------------|---|---------------|-----------|
|                               |                         |   | (lb/day)      | (lb/year) |
| Gas/Vapor Valves              | 0                       | 0.0015288                                 | 0             | 0         |
| Light Liquid Valves           | 32                      | 0.0014736                                 | 0.047         | 17.2      |
| Connectors                    | 34                      | 0.004                                     | 0.136         | 49.6      |
| Pumps                         | 0                       | 0.028872                                  | 0             | 0         |
| Compressors                   | 0                       | 0.00804                                   | 0             | 0         |
| Atmospheric Gas/Vapor PRVs    | 0                       | 0.00972                                   | 0             | 0         |
| Atmospheric Light Liquid PRVs | 0                       | 0.006312                                  | 0             | 0         |
| <b>TOTAL</b>                  |                         |   | 0.183         | 66.9      |

**S-1020 No. 3 Reformer**



| Component Type                | Net New Component Count | VOC Emission Factor (lb/day/component) | VOC Emissions |             |
|-------------------------------|-------------------------|--|---------------|-------------|
|                               |                         |  | (lb/day)      | (lb/year)   |
| Gas/Vapor Valves              | 0                       | 0.0015288                              | 0             | 0           |
| Light Liquid Valves           | 36                      | 0.0014736                              | 0.0530        | 19.4        |
| Connectors                    | 36                      | 0.004                                  | 0.144         | 52.6        |
| Pumps                         | 0                       | 0.028872                               | 0             | 0           |
| Compressors                   | 0                       | 0.00804                                | 0             | 0           |
| Atmospheric Gas/Vapor PRVs    | 0                       | 0.00972                                | 0             | 0           |
| Atmospheric Light Liquid PRVs | 0                       | 0.006312                               | 0             | 0           |
| <b>TOTAL</b>                  |                         |  | <b>0.197</b>  | <b>71.9</b> |

Total POC emissions = 0.183 + 0.197 = 0.380 lb/day  
 = 138.7 lb/yr  
 = 0.069 ton/yr

### III. PLANT CUMULATIVE INCREASE SINCE 4/5/1991

|       | <u>Current</u><br>Ton/yr | <u>New</u><br>Ton/yr | <u>New Total</u><br>tons/yr |
|-------|--------------------------|----------------------|-----------------------------|
| POC = | 0                        | 0.069                | 0.069                       |

### IV. TOXIC SCREENING ANALYSIS

A "Risk Screening Analysis Questionnaire" form was not required with this application since none of the toxic trigger levels was exceeded per Regulation 2-5.

| Toxic Pollutant Emissions | Hourly Trigger Level (lb/hr) | Acute Emissions (lb/hr) | Annual Trigger Level (lb/yr) | Chronic (lb/yr) |
|---------------------------|------------------------------|-------------------------|------------------------------|-----------------|
| <u>Emitted</u>            |                              |                         |                              |                 |
| Benzene                   | 1.31 E-3                     | 2.9                     | 0.478                        | 6.4             |
| Ethylbenzene              | 6.90 E-4                     | N/A                     | 0.252                        | 77,000          |
| H-Hexane                  | 0                            | N/A                     | 0                            | 270,000         |
| Toluene                   | 3.52 E-3                     | 82                      | 1.29                         | 12,000          |
| Xylene, -m                | 0                            | 49                      | 0                            | 27,000          |
| Xylene, -o                | 3.56 E-3                     | 49                      | 1.30                         | 27,000          |
| Xylene, -p                | 2.91 E-6                     | 49                      | 1.06 E-3                     | 27,000          |

### V. BEST AVAILABLE CONTROL TECHNOLOGY

This application does not require BACT since all emissions are from fugitive sources are less than the 10 pounds per highest day threshold limit per Regulation 2-2-301. However, Tesoro has stated that all new fugitive components will comply with the BACT requirements, which are 100 ppm for valves and 100 ppm for connectors.

## **VI. OFFSETS**

Offsets are required for this project pursuant to Regulation 2, Rule 2, Section 302. Tesoro has enough contemporaneous emission reduction credits to fully offset the POC emission increases. The company will use the Certificate of Deposit # 968 to provide the needed offsets at a ratio of 1.15:1 per Regulation 2-2-302.2.

Available offsets = 11.807 ton/yr (Certificate of Deposit # 968)  
Emissions from this application = 0.069 TPY POC  
POC Offset provided = 0.069 tons/yr X 1.15 = 0.079 tons/yr

The total POC emissions may change based on the actual final fugitive component count consisting of valves, pumps and flanges/connectors. Since Tesoro's offset obligation for POC may increase or decrease at that time, the District will make adjustments to reflect the actual fugitive components.

## **VII. STATEMENT OF COMPLIANCE**

There will be no change in the compliance of S-1002 No 1 HDS and S-1020 No 3 Reformer. The sources will comply with Regulation 8, Rule 18- Equipment Leaks and Regulation 8, Rule 28- Episodic Releases from Pressure Release Devices at Petroleum Refinery and Chemical Plants.

S-1002 and S-1020 are subject to and are expected to comply with 40 CFR 60, Subpart GGGa-- Standards Of Performance For Equipment Leaks Of Voc In Petroleum Refineries For Which Construction, Reconstruction, Or Modification Commenced After November 7, 2006.

S-1020 will continue to comply with 40 CFR 63 Subpart UUU.

S-1002 and S-1020 are subject to 60 CFR 63, Subpart CC. The S-1020 regeneration vent is not subject to Subpart CC per 40 CFR 63.640(d)(4). S-1002 and S-1020 are subject to Subpart CC for Equipment Leaks, but overlap 40 CFR 640(p)(2) defers to NSPS Subpart GGGa.

Tesoro is not located within 1,000 feet of any school. The public notification requirements of Regulation 2-1-412 are not required.

This project is categorically exempt from CEQA per Regulation 2-1-312.11 for permit modifications for existing or permitted sources or facilities, which will satisfy the "No Net Emission Increase" provisions of District Regulation 2-2, and for which there is no possibility that the project may have any significant environmental effect in connection with any environmental media or resources other than air quality. Tesoro has completed an Appendix H form. The form indicates that there are no significant impacts due to this project.

PSD is not applicable. According to the materials presented by RTP Environmental during the Intermediate Prevention of Significant Deterioration training class conducted in July 2010, hydrocarbon emissions were dropped from the pollutants regulated by the Act in about 1980 and benzene was dropped from PSD review 11/15/90. In any case, the 0.069 tons/yr total POC emissions are well below the 40 ton/yr significance level for Volatile Organic Compounds.

VIII. CONDITIONS

Conditions for S-1002 are shown in current Condition 8350. A new permit condition will be imposed for S-1020 and the fugitive emissions.

COND# 8350 -----

S1002 No. 1 HDS Unit  
S1003 No. 2 HDS Unit  
S1006 No. 1 HDA Unit

Application #6468  
Modified by Application #14325  
Administratively Changed by Application 18861 (June 2009)  
Removed completed parts and parts redundant with District Regulations

Diesel Fuel Modification Project Permit Condition  
8350 Permit Conditions for S-1002, No. 1 HDS Unit:

A1. Permittee/Owner/Operator shall ensure that the No. 1 HDS Unit (S-1002) does not process more than 28,000 barrels of naphtha per day, based on a rolling 365-day average and that not more than 10,220,000 barrels of feed is processed at S-1002 during each 12 consecutive month period. (basis: cumulative increase)

A2. Completed. (Final fugitive count submitted 3/24/94, showing emissions less than the initial 5.04 lb/day limit.

A3. Deleted. (Completed. All new hydrocarbon vapor pressure relief valves associated with this project are vented to the refinery flare gas recovery system.)

A4. Permittee/Owner/Operator shall maintain a District-approved file containing all measurements, and other data required to demonstrate compliance with the above conditions. This file shall include, but is not limited to, the daily throughput of naphtha processed by S-1002 summarized on a monthly basis. This material shall be kept available for District inspection for a period of at least

5

years following the date on which such measurements, records or data are made or recorded. (basis:cumulative increase)

Permit Conditions for S-1003, No. 2 HDS Unit:

B1. Permittee/Owner/Operator shall ensure that the No. 2 HDS Unit (S-1003) does not process more than 40,000 barrels of diesel per day, based on a rolling 365-day average and that not more than 14,600,000 barrels of feed is processed at S-1003 during each 12 consecutive month period. (basis: cumulative increase)

B2. Deleted. (Final fugitive count submitted 3/24/94, showing emissions less than the initial estimates)

B3. Deleted. (Completed. All new hydrocarbon vapor pressure relief valves associated with this project are vented to the refinery flare gas recovery system)

B4. Permittee/Owner/Operator shall maintain a District-approved file containing all measurements and other data required to demonstrate compliance with the above conditions. This file shall include, but is not limited to, the daily throughput of diesel processed by S-1003, summarized on a monthly basis. This material shall be kept available for District inspection for a period of at least

5

years following the date on which such measurements, records or data are made or recorded. (basis: cumulative increase)

Permit Conditions for S-1006, No. 1 Reformer Unit to be converted to No. 1 HDA Unit:

C1. Permittee/Owner/Operator shall ensure that the No. 1 HDA Unit (S-1006) throughput rate does not exceed 20,000 barrels per day, based on a rolling 365-day average and that not more than 7,300,000 barrels of feed is processed at

S-1006 during each 12 consecutive month period. (basis: cumulative increase)

C2. Deleted. (Final fugitive count submitted 3/24/94, showing emissions less than the initial estimates)

C3. Deleted. (Completed. All new hydrocarbon vapor pressure relief valves associated with this project are vented to the refinery flare gas recovery system)

C4. Permittee/Owner/Operator shall maintain a District-approved file containing all measurements and other data required to demonstrate compliance with the above conditions. This file shall include, but is not limited to, the No. 1 HDA Unit (S-9006) throughput rate, summarized on a monthly basis. This material shall be kept available for District inspection for a period of at least 5 years following the date on which such measurements, records or data are made or recorded. (basis: cumulative increase)

New Condition:

Application 22615  
Hot Naphtha Feed to S-1020 No 3 Reformer Project  
January 2011

1. Permittee/Owner/Operator shall ensure that the No. 3 Reformer (S-1020) does not process more than 25,200 barrels of naphtha per day, and not more than 8,760,000 barrels of naphtha during each 12 consecutive month period. (basis: cumulative increase, Regulation 2-1-234)
2. Total fugitive POC emissions from all new and modified equipment associated with S-1002, No. 1 HDS Unit and S-1020, No 3 Reformer, shall not exceed 0.380 lb/day, based on a 365 day average emission rate, as calculated in accordance with District procedures. The owner/operator of S-1002 and S-1020 shall submit a final process flow diagram and a revised valve and flange count within 15 days of the start up of S-1002 and S-1020 in order to confirm compliance with this permit condition. If fugitive emissions from these sources exceed 0.380 lb/day, then the District may recalculate the cumulative emissions increase attributed to this permit application, and adjust accordingly the offsets before the issuance of the permit to operate. (basis: cumulative increase, offsets)
3. Permittee/Owner/Operator shall maintain a District-approved file containing all measurements, and other data required to demonstrate compliance with the above conditions. This file shall include, but is not limited to, the daily throughput of naphtha processed by S-1020 summarized on a monthly basis. This material shall be kept available for District inspection for a period of at least 5 years following the date on which such measurements, records or data are made or recorded. (basis: cumulative increase, recordkeeping)

## IX. RECOMMENDATION

Issue a conditional Authority to Construct for Tesoro for the following equipment:

|               |   |
|---------------|---|
| <b>S-641</b>  | <b>Tank A641, External Floating Roof, 3,360,000 gallons</b> |
| <b>S-1002</b> | <b>No 1 HDS</b>   |
| <b>S-1020</b> | <b>No 3 Reformer</b>  |

\_\_\_\_\_  
Arthur P. Valla

\_\_\_\_\_  
Date

Senior Air Quality Engineer

January 6, 2011

**Application 22823, S-1554 High Sulfur Vacuum Gas Oil Tank**

**EVALUATION REPORT  
TESORO - GOLDEN EAGLE REFINRY  
Application #22823 - Plant #14628**

150 Solano Way  
**Martinez, CA 94553**

**I. BACKGROUND**

Tesoro has applied for an Authority to Construct/Permit to Operate for the following equipment:

**S-1554 Fixed Roof Tank A943, High Sulfur Vacuum Gas Oil, 2,820,000 gallons, Abated by A-14 Vapor Recovery System**

S-1554 is an existing fixed roof tank without vapor recovery that was built in 2010 without an Authority to Construct. S-1554 is also not shown in the exempt table in the Title V permit. Tesoro did not disclose what material or materials were stored in S-1554, but do state the tank was exempt pursuant to Regulation 2-1-123.2, aqueous solutions with less than 1% organic content.

This application changes the service of S-1554 to store high sulfur vacuum gas oil (HSVGO). The proposed total annual throughput for S-1554 is 10,000,000 barrels or 420,000,000 gallons. There are two operating modes for S-1554. The 'normal' mode would be to store stripped HSVGO with a vapor pressure of 0.235 psia, and the alternative mode, occurring during the start-up and shutdown of S-850 No 3 HDS, which is to store unstripped HSVGO with a predicted TVP no greater than 4.65 psia. Emissions of organic and toxic material will be greater during the alternate mode. The application proposes that the alternate operating mode to be permitted for 200 hours annually. This application is also adds vapor recovery to S-1554.

This application has not been routine. The history of this application is included in the application file.

The proposed throughput of tank S-1554 is 10,000,000 barrels per year, and the maximum fill rate for S-1554 is 10,000 barrels per hour. All emissions from new tank S-1554 are recovered by A-14 Vapor Recovery System and discharged into the 40 psi fuel gas system. Since there will be new equipment and a change in service for existing equipment, the project is expected to increase the number of fugitive components.

Tesoro has specified the abatement efficiency of A-14 at 99.5%. Operational data over the past year showed A-14 to be shutdown or capacity limited for 241 minutes, including two periods of an hour or longer.

**II. EMISSION CALCULATIONS**

Normal Operation.

For all but 200 hours per year, S-1554 will be storing HSVGO with a vapor pressure of 0.235 psia. Annual emission estimates were generated by the EPA TANKS 4.0 program. The results are summarized in the following table:

| Components                      | Losses(lbs)  |                |                 |
|---------------------------------|--------------|----------------|-----------------|
|                                 | Working Loss | Breathing Loss | Total Emissions |
| UDS 391 - GENERAL REFINERY OILS | 48,114.59    | 13,462.53      | 61,577.12       |
| Hexane (-n)                     | 9.38         | 2.62           | 12.00           |
| Benzene                         | 52.02        | 14.55          | 66.57           |
| Toluene                         | 764.47       | 213.90         | 978.36          |
| Ethylbenzene                    | 133.93       | 37.47          | 171.41          |
| Xylene (-m)                     | 2,565.33     | 717.78         | 3,283.11        |
| 1,2,4-Trimethylbenzene          | 2,875.14     | 804.47         | 3,679.61        |
| Unidentified Components         | 41,714.33    | 11,671.73      | 53,386.07       |

TANKS used a vapor molecular weight of 130 lb/lb-mole.

$$61,577 \text{ lb/yr} / 130 \text{ lb/lb-mole} = 473.7 \text{ lb-mole/yr.}$$

TANKS only calculates the emissions caused by the stored material.

The remaining emissions are from the gas blanket, which are assumed to be 100% methane.

$$\text{Methane emissions are } (14.7 - 0.235 \text{ psia}) / 14.7 \text{ psia} * 473.7 \text{ lb-mole/yr} = 466.1 \text{ lb-mole/yr} * 16 \text{ lb/lb-mole} = 7458 \text{ lb/yr}$$

Based on operating data, the vapor recover system A-14 is unable to recover S-1554 vapor for 4 hrs/yr. It is assumed that this outage only occurs during normal operation. Therefore, during normal operation, the emissions are abated for  $8760 - 200 - 4 = 8556$  hrs/yr.

The following table summarizes the unabated emissions during normal operation (8556 hrs/yr):

| Material | Annual lb/yr | 8556/8760 * Annual lb/yr | 4/8760 * Annual lb/yr |
|----------|--------------|--------------------------|-----------------------|
| Methane  | 7,458        | 7,284                    | 3.4                   |
| NMHC     | 61,577       | 60,143                   | 28.1                  |

#### Alternative Operation.

For 200 hours per year, S-1554 will be storing unstripped HSVGO with a vapor pressure of 4.65 psia. Annual emission estimates were generated by the EPA TANKS 4.0 program. The results are summarized in the following table:

| Components              | Losses(lbs)  |                |                 |
|-------------------------|--------------|----------------|-----------------|
|                         | Working Loss | Breathing Loss | Total Emissions |
| HSVGO                   | 308,956.68   | 0.00           | 308,956.68      |
| Hexane (-n)             | 28.88        | 0.00           | 28.88           |
| Benzene                 | 165.17       | 0.00           | 165.17          |
| Toluene                 | 2,590.65     | 0.00           | 2,590.65        |
| Ethylbenzene            | 483.78       | 0.00           | 483.78          |
| Xylene (-m)             | 9,349.67     | 0.00           | 9,349.67        |
| 1,2,4-Trimethylbenzene  | 11,413.04    | 0.00           | 11,413.04       |
| Unidentified Components | 284,925.48   | 0.00           | 284,925.48      |



However, this estimate did not include breathing losses. When breathing losses were added, the total emissions are 321,337 lb/yr.

TANKS used a vapor molecular weight of 19.35 lb/lb-mole.

$$321,337 \text{ lb/yr} / 19.35 \text{ lb/lb-mole} = 16607 \text{ lb-mole/yr.}$$

TANKS only calculates the emissions caused by the stored material.

The remaining emissions are from the gas blanket, which are assumed to be 100% methane.

$$\text{Methane emissions are } (14.7 - 4.65 \text{ psia}) / 14.7 \text{ psia} * 16607 \text{ lb-mole/yr} = 11353 \text{ lb-mole/yr} * 16 \text{ lb/lb-mole} = 181,655 \text{ lb/yr}$$

The following table summarizes the unabated emissions during alternative operation (200 hrs/yr):

| Material | Annual lb/yr | 200/8760 * Annual lb/yr |
|----------|--------------|-------------------------|
| Methane  | 181,655      | 4,147                   |
| NMHC     | 321,337      | 7,336                   |

The following table summarizes the S-1554 tank emissions:

| Material | Normal lb/yr | Alternate lb/yr | Total Unabated lb/yr | Abatement Factor | Total Abated lb/yr | Normal Unabated lb/yr | Total Emissions lb/yr |
|----------|--------------|-----------------|----------------------|------------------|--------------------|-----------------------|-----------------------|
| Methane  | 7,284        | 4,147           | 11,431               | 0.995            | 57.2               | 3.4                   | 60.6                  |
| NMHC     | 60,143       | 7,336           | 67,479               | 0.995            | 337.4              | 28.1                  | 365.5                 |

Assuming all NMHC emissions are POC,  $\text{POC} = 365.5 / 2000 = 0.183 \text{ ton/yr}$

Fugitive Emissions:

| Component                       | Number Added | Number Removed | Net Change | Emission Factor (lb/day/component) | Fugitive Emissions (lb/day) |
|---------------------------------|--------------|----------------|------------|------------------------------------|-----------------------------|
| Valves in Gas Service           | 11           |                |            | 0.0015288                          | 0.0168                      |
| Valves in Light Liquid Service  | 41           |                |            | 0.0014736                          | 0.060                       |
| Atmospheric PRVs in Gas Service | 1            |                |            | 0.00972                            | 0.0097                      |
| Connectors                      | 64           |                |            | 0.004                              | 0.256                       |
| Pumps                           | 1            |                |            | 0.028872                           | 0.0289                      |
| Total                           |              |                |            |                                    | 0.3714                      |

$$\text{Annual emission increase} = 0.3714 \text{ lb/day} \times 365 \text{ day/yr} = 135.6 \text{ lb/yr} = 0.068 \text{ ton/yr}$$

$$\text{Total POC emissions} = 0.183 + 0.068 = 0.251 \text{ tons/yr} = 502 \text{ lb/yr}$$

### III. PLANT CUMULATIVE INCREASE SINCE 4/5/1991

(All previous increases have been offset)

|                    | <u>Current</u><br>Ton/yr | <u>New</u><br>Ton/yr | <u>New Total</u><br>tons/yr |
|--------------------|--------------------------|----------------------|-----------------------------|
| POC =              | 0                        | 0.251                | 0.251                       |
| NO <sub>x</sub> =  | 0                        | 0                    | 0                           |
| SO <sub>2</sub> =  | 0                        | 0                    | 0                           |
| CO =               | 0                        | 0                    | 0                           |
| NPOC =             | 0                        | 0                    | 0                           |
| TSP =              | 0                        | 0                    | 0                           |
| PM <sub>10</sub> = | 0                        | 0                    | 0                           |

### IV. TOXIC SCREENING ANALYSIS

The TANKS emission estimates include speciated annual toxic emissions which can be used for chronic risks. For acute risks, the peak hourly emissions will occur during the tank filling operation specified at 10,000 bbl/hr. The following table summarizes the toxic emissions that were the basis of the risk screen. There emissions were worst case assuming the A-14 vapor recovery system fails to recover S-1554 emissions during the alternate operation. It is also based on toxic component concentrations that were estimated for alternate operation by the TANKS program that did not include breathing losses. Lastly, the H2S and ammonia emissions were based on follow-up calculations provided by Tesoro (the initial application and TANKS runs did not include H2S and ammonia emissions).

*S-1554 Toxic Air Contaminant Emissions*

|              | A.<br>Filling | B.<br>Normal | C.<br>4 hr not |          |          |
|--------------|---------------|--------------|----------------|----------|----------|
|              | unabated      | abated       | abated         |          |          |
| TAC          | lb/hr         | lb/yr        | lb/yr          | TT lb/hr | TT lb/yr |
| Benzene      | 1.50          | 0.342        | 6.4            | 2.9      | 3.8      |
| Ethylbenzene | 4.41          | 0.892        | 18.5           | N/A      | 43       |
| N-Hexane     | 0.26          | 0.062        | 1.1            | N/A      | 270000   |
| Toluene      | 23.60         | 5.081        | 99.5           | 82       | 12000    |
| Xylene       | 85.18         | 17.133       | 357.8          | 49       | 27000    |
| H2S          | 656.64        | 8.420        | 2635.0         | 0.093    | 390      |
| Ammonia      | 1.41          | 0.018        | 5.6            | 7.1      | 7700     |

The normal annual emissions (column B) are based on A-14 abatement of 99.5%.

The tank can be filled at a rate of 10,000 Barrels per hour. The peak hourly emissions (column A) occur when the abatement is out of service during the tank filling.

The peak annual emissions (column C) include an allowance for 4 hours of unabated service during tank filling. This is an unlikely scenario, but serves as a high side toxic emissions estimate to determine if permit conditions are to be considered to comply with the risk management policy.

The risk screen for these toxic emission estimates failed. The acute H2S risk for the 4-hour unabated emissions during the alternate operation was the cause of the failure. These emissions would be discharged at the tank breather valve as a relatively low elevation.

After the risk screen failed, toxic emissions were recalculated based on the 4-hour unabated emissions not occurring during alternate operation that stores the unstripped, high H2S material. These adjusted emissions are as follows:

|              | Filling<br>abated | Normal<br>abated |          |          |
|--------------|-------------------|------------------|----------|----------|
| TAC          | lb/hr             | lb/yr            | TT lb/hr | TT lb/yr |
| Benzene      | 0.007523          | 0.341761         | 2.9      | 3.8      |
| Ethylbenzene | 0.022037          | 0.891998         | N/A      | 43       |
| N-Hexane     | 0.001315          | 0.062004         | N/A      | 270000   |
| toluene      | 0.118019          | 5.081043         | 82       | 12000    |
| Xylene       | 0.42589           | 17.13252         | 49       | 27000    |
| H2S          | 3.283198          | 8.420495         | 0.093    | 390      |
| Ammonia      | 0.007036          | 0.018046         | 7.1      | 7700     |

Not only were these emissions considerably lower, but the final discharge point for these emissions are at a furnace stack, the ultimate emission point of vapors recovered by A-14 Vapor Recovery System, rather than at the tank S-1554 itself.

Based on these revised toxic emissions, the risk screen passed on March 3, 2011, with the maximum cancer risk of 0.000028 in a million, the maximum chronic hazard index of 0.0000012 and a maximum acute hazard index of 0.075. In accordance with Regulation 2, Rule 5, S-1554 is in compliance with the TBACT and project risk requirements.

## V. BEST AVAILABLE CONTROL TECHNOLOGY

This application does not trigger BACT since the POC emissions are less than the 10 pounds per highest day threshold limit per Regulation 2-2-301. Nonetheless, Tesoro has specified A-14 Vapor Recovery System abatement factor to be 99.5%, well above the 98% BACT2 requirement specified in BACT/TBACT Handbook Document 167.3.1 dated 3/3/95. Furthermore, as a policy Tesoro installs all new fugitive components to be BACT compliant. Therefore, S-1554 has a BACT level of control.

## VI. OFFSETS

Offsets are required for this project pursuant to Regulation 2, Rule 2, Section 302. Tesoro has enough contemporaneous emission reduction credits to fully offset the POC emission increases. The company will use the Certificate of Deposit # 968 to provide the needed offsets at a ratio of 1.15:1 per Regulation 2-2-302.2.

Available offsets = 11.728 ton/yr (Certificate of Deposit # 968)

Emissions from this application = 0.251 TPY POC

POC Offset provided = 0.251 tons/yr X 1.15 = 0.289 tons/yr

## **IX. STATEMENT OF COMPLIANCE**

Source S-1554 Fixed Roof Storage Tank of this application is subject and expected to comply with Regulation 8, Rule 5, including

- 8-5-301 Storage Tanks Control Requirements,**
- 8-5-303 Requirements for Pressure Vacuum Valves,**
- 8-5-306 Requirements for Approved Emission Control Systems,**
- 8-5-307 Requirements for Fixed Roof Tanks, Pressure Tanks and Blanketed Tanks**
- 8-5-328 Tank Degassing Requirements,**
- 8-5-331 Tank Cleaning Requirements, and**
- 8-5-332 Sludge Handling Requirements.**

The toxic emissions from S-1554 include HAPs. Therefore, Source S-1554 is subject to and expected to comply with National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR Part 63, Subpart CC, Section 63.640(n)(1), which states that S-1554 shall comply with NSPS Subpart Kb.

Source S-1554 is subject and expected to comply with Regulation 10 - Standard of Performance for New Stationary Sources, Part 17, otherwise known as 40 CFR 60, Subpart Kb - Volatile Organic Liquid Storage Vessels. Compliance is expected with Section 60.112b(a)(3) for fixed roof tanks with a closed vent system and control device.

This project is considered to be ministerial under the District's CEQA Regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Permit Handbook, Source-Specific Guidance Chapter 4.0, Organic Liquid Storage Tank, and Chapter 3.4, Petroleum Refinery Fugitive Emissions.

This project is over 1,000 ft from the nearest public school and is therefore not subject to the public notification requirements of Regulation 2-1-412.

S-1554 is subject to and in compliance with Regulation 2, Rule 5.

S-1554 complies with BACT.

PSD is not applicable because POC emissions are not a PSD pollutant.

## X. CONDITIONS

The following conditions will be imposed based on the Permit Handbook guidance (underline/strikeout from the handbook suggested conditions):

Application # 22823  
Source S-1554 Fixed Roof Tank A-943  
Abated by A-14 Vapor Recovery System  
High Sulfur Vacuum Gas Oil  
Including operation when S-850 No 3 HDS is start-up and shutdown

### **Permit Conditions for Storage Tanks (general conditions)**

1. The owner/operator of S-1554 shall not exceed the following throughput and operation limits- during any consecutive twelve-month period:

~~{Liquid #1}~~ High Sulfur Vacuum Gas Oil, TVP not to exceed 0.235 psia: 420,000,000 Gallons

Including for periods of up to 200 hours per consecutive 12-month period:

~~{Liquid #2}~~ Unstripped High Sulfur Vacuum Gas Oil, TVP not to exceed 4.65 psia Gallons

(Basis: Cumulative Increase)

2. The owner/operator may store alternate liquid(s) other than the materials specified in Part 1 and/or usages in excess of those specified in Part 1, provided that the owner/operator can demonstrate that all of the following are satisfied:

- a. Total POC emissions from S-1554 do not exceed 386 pounds in any consecutive twelve month period;
- b. Total NPOC emissions from S-1554 do not exceed 0 pounds in any consecutive twelve month period; and
- c. The use of these materials does not increase toxic emissions above any risk screening trigger level of Table 2-5-1 in Regulation 2-5.

(Basis: Cumulative Increase; Toxics)

3. To determine compliance with the above parts, the owner/operator shall maintain the following records and provide all of the data necessary to evaluate compliance with the above parts, including the following information:

- a. Quantities and True Vapor Pressure of each type of liquid stored at this source on a monthly basis.
- b. If a material other than those specified in Part 1 is stored, POC/NPOC and toxic component contents of each material used; and mass emission calculations to demonstrate compliance with Part 2, on a monthly basis;
- c. Monthly throughput and/or emission calculations shall be totaled for each consecutive twelve-month period.

All records shall be retained on-site for ~~two~~five years, from the date of entry, and made available for inspection by District staff upon request. These recordkeeping requirements shall not replace the recordkeeping requirements contained in any applicable District Regulations.

(Basis: Cumulative Increase; Toxics)

**Permit Conditions for Vapor Recovery Systems:**

~~41. When the owner/operator stores materials with a true vapor pressure above 0.235 psia in S-1554, S-1554 shall be abated at the source at all times with A-14, Vapor Recovery System with, with an overall collection and destruction efficiency of at least 95.5%, by weight (basis: Cumulative Increase, Toxics Regulation 8-5-311.3)~~

Also included in the permit condition is the standard conditions from the Permit Handbook Section 3.4, **Petroleum Refinery Fugitive Emissions.**

**Permit Conditions for Petroleum Refinery Fugitive Emissions**

1. Not more than 30 days after the start-up of S-1554, the owner/operator shall provide the District's Engineering Division with a final count of fugitive components installed. The owner/operator has been permitted for an increase in the following fugitive components:

- ~~11~~ valves in gas service
- ~~41~~ valves in liquid service
- ~~1~~ pumps
- ~~1~~ PRV in gas service
- ~~0~~ PRVs in liquid service
- ~~64~~ connectors/flanges

(basis: Cumulative Increase, offsets, ~~toxics risk screen~~)

2. If there is an increase in the total fugitive component emissions, the plant's cumulative emissions for the project shall be adjusted to reflect the difference between emissions based on predicted versus actual component counts. The owner/operator shall provide to the District all additional required offsets at an offset ratio of 1.15:1 no later than 14 days after submittal of the final POC fugitive count. If the actual component count is less than the predicted, the total will be adjusted accordingly and all emission offsets applied by the owner/operator in excess of the actual total fugitive emissions will be credited back to the owner/operator.

(basis: offsets)

~~3. The owner/operator shall install valves, in light hydrocarbon service, that are of District approved BACT compliant technology (bellows valves, diaphragm valves, live loaded valves, or the equivalent) such that fugitive organic emissions shall not exceed 100 ppm.~~

(basis: BACT, Regulation 8-18, toxics risk screen)

~~4. The owner/operator shall install flanges and connectors, in light hydrocarbon service, that are of District approved BACT compliant technology (graphitic gaskets or the equivalent) such that fugitive organic emissions shall not exceed 100 ppm.~~

(basis: BACT, Regulation 8-18, toxics risk screen)

~~5. The owner/operator shall install pump seals, in light hydrocarbon service, that are of District approved BACT compliant technology (double mechanical seals with barrier fluid or the equivalent) such that fugitive organic emissions shall not exceed 500 ppm.~~

(basis: BACT, Regulation 8-18, toxics risk screen)

~~6. The owner/operator shall ensure that each pressure relief valve installed in hydrocarbon service is vented back to the process, to the refinery fuel gas system, or to an abatement device with a capture and destruction efficiency of at least 98% by weight.~~

(basis: BACT, Regulation 8-28, toxics risk screen)

7. In accordance with the provisions of Regulation 8-18, the owner/operator shall integrate all new fugitive equipment in organic service installed as part of the S-1554 into the facility fugitive equipment monitoring and repair program.

(basis: ~~BACT~~, Regulation 8-18)

Formating and renumbering the above conditions will product the following final permit condition for S-1554:

Application # 22823  
Source S-1554 Fixed Roof Tank A-943  
Abated by A-14 Vapor Recovery System  
High Sulfur Vacuum Gas Oil  
Including operation when S-850 No 3 HDS is start-up and shutdown

1. The owner/operator of S-1554 shall not exceed the following throughput and operation limits during any consecutive twelve-month period:

High Sulfur Vacuum Gas Oil, TVP not to exceed 0.235 psia: 420,000,000 Gallons

Including for periods of up to 200 hours per consecutive 12-month period:

Unstripped High Sulfur Vacuum Gas Oil, TVP not to exceed 4.65 psia

(Basis: Cumulative Increase)

2. The owner/operator may store alternate liquid(s) other than the materials specified in Part 1 and/or usages in excess of those specified in Part 1, provided that the owner/operator can demonstrate that all of the following are satisfied:

a. Total POC emissions from S-1554 do not exceed 386 pounds in any consecutive twelve month period;

b. Total NPOC emissions from S-1554 do not exceed 0 pounds in any consecutive twelve month period; and

c. The use of these materials does not increase toxic emissions above any risk screening trigger level of Table 2-5-1 in Regulation 2-5.

(Basis: Cumulative Increase; Toxics)

3. When the owner/operator stores materials with a true vapor pressure above 0.235 psia in S-1554, S-1554 shall be abated at all times with A-14 , Vapor Recovery System, with an overall collection and destruction efficiency of at least 99.5%, by weight (basis: Cumulative Increase, Toxics)

4. Not more than 30 days after the start-up of S-1554, the owner/operator shall provide the District's Engineering Division with a final count of fugitive components installed. The owner/operator has been permitted for an increase in the following fugitive components:

11 valves in gas service

41 valves in liquid service

1 pump

1 PRV in gas service

0 PRVs in liquid service

64 connectors/flanges

(basis: Cumulative Increase, offsets)

5. If there is an increase in the total fugitive component emissions, the plant's cumulative emissions for the project shall be adjusted to reflect the difference between emissions based on predicted versus actual component counts. The owner/operator shall provide to the District all additional required offsets at an offset ratio of 1.15:1 no later than 14 days after submittal of the final POC fugitive count. If the actual component count is less than the predicted, the total will be adjusted accordingly and all emission offsets applied by the owner/operator in excess of the actual total fugitive emissions will be credited back to the owner/operator. (basis: offsets)

6. In accordance with the provisions of Regulation 8-18, the owner/operator shall integrate all new fugitive equipment in organic service installed as part of the S-1554 into the facility fugitive equipment monitoring and repair program. (basis: Regulation 8-18)
7. To determine compliance with the above parts, the owner/operator shall maintain the following records and provide all of the data necessary to evaluate compliance with the above parts, including the following information:
  - a. Quantities and True Vapor Pressure of each type of liquid stored at this source on a monthly basis.
  - b. If a material other than those specified in Part 1 is stored, POC/NPOC and toxic component contents of each material used; and mass emission calculations to demonstrate compliance with Part 2, on a monthly basis;
  - c. Monthly throughput and/or emission calculations shall be totaled for each consecutive twelve-month period.

All records shall be retained on-site for five years, from the date of entry, and made available for inspection by District staff upon request. These recordkeeping requirements shall not replace the recordkeeping requirements contained in any applicable District Regulations.

(Basis: Cumulative Increase; Toxics)

## **IX. RECOMMENDATION**

It is recommended that a conditional Authority to Construct be granted to Tesoro for the following equipment:

**S-1554 Fixed Roof Tank A943, High Sulfur Vacuum Gas Oil, 2,820,000 gallons, Abated by A-14 Vapor Recovery System**

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**Arthur Valla**  
**Senior Air Quality Engineer**

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**July 22, 2011**



**Application 22971, S-913 NOx Box Revision**

**EVALUATION REPORT  
TESORO REFINING AND MARKETING COMPANY  
REVISED NOx BOX FOR S-913, F-13 No 2 FEED PREP HEATER  
APPLICATION 22971, PLANT 14628**

**BACKGROUND**

The Tesoro Golden Eagle Refinery (Tesoro) operates several furnaces and boilers that are subject to Regulation 9, Rule 10, Nitrogen Oxides And Carbon Monoxide From Boilers, Steam Generators And Process Heaters In Petroleum Refineries. Regulation 9-10-301 limits the refinery wide NOx emissions to 0.033 lb/MMBtu of fired duty. Regulation 9-10-502 requires the installation of a NOx, CO and O2 CEM to demonstrate compliance with Regulation 9-10-301. Regulation 9-10-502 also allows a CEM-equivalent parametric monitoring system to determine compliance with Regulation 9-10-301. The District and Tesoro have developed the CEM equivalent verification system. This system is called the “NOx Box”. The NOx Box is an operating window for the unit, expressed in terms of fired duty and oxygen content in the flue gas. The operating window is established by source tests for various operating conditions. The source tests demonstrate the NOx emissions are equal to or less than a specified emission factor. As long as the fired unit duty and oxygen content are in this NOx Box operating window, the specified emission factor is used to determine compliance with the 0.033 lb/MMBtu limit of Regulation 9-10-301. The Permit Condition that contains the details of the NOx Box is #18372.

Condition 18372, Part 30 required Tesoro to submit the initial NOx Box for the affected sources by January 1, 2005. Tesoro met this requirement via Application 15682. The NOx Box’s in the application were supported by properly conducted source tests and the NOx Box operating windows for all the affected sources have been included in Revision 4 of the Title V permit (reference: Section VI, Condition 18372, Part 31A, NOx Box Ranges).

This application requests a change in the NOx Box operating window for:

**S-913 F-13 No 2 Feed Prep Heater, 59 MMBTU/hr**

The change is as follows:

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
| 913 old    | 0.033                      | 1.2, 19.89   | 3.0, 14.80   | 1.5, 39.10  | 2.1, 15.53  | 4.2,39.50   |
|            | 0.033                      | 3.0, 14.80   | 4.5, 15.86   | 4.2,39.50   | 5.1, 24.59  | 5.0,30.30   |
| 913 new    | 0.033                      | 1.2, 19.89   | 3.0, 14.80   | 1.5, 39.10  | 2.1, 15.53  | <del>3.87, 40.234.2,39.50</del><br>50                           |

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
|            | 0.033                      | 3.0, 14.80   | 4.5, 15.86   | 4.2, 39.50  | <del>5.1,</del><br>24.593.87,<br>40.23  | <del>5.0, 30.306.0</del><br>, 21.03                             |

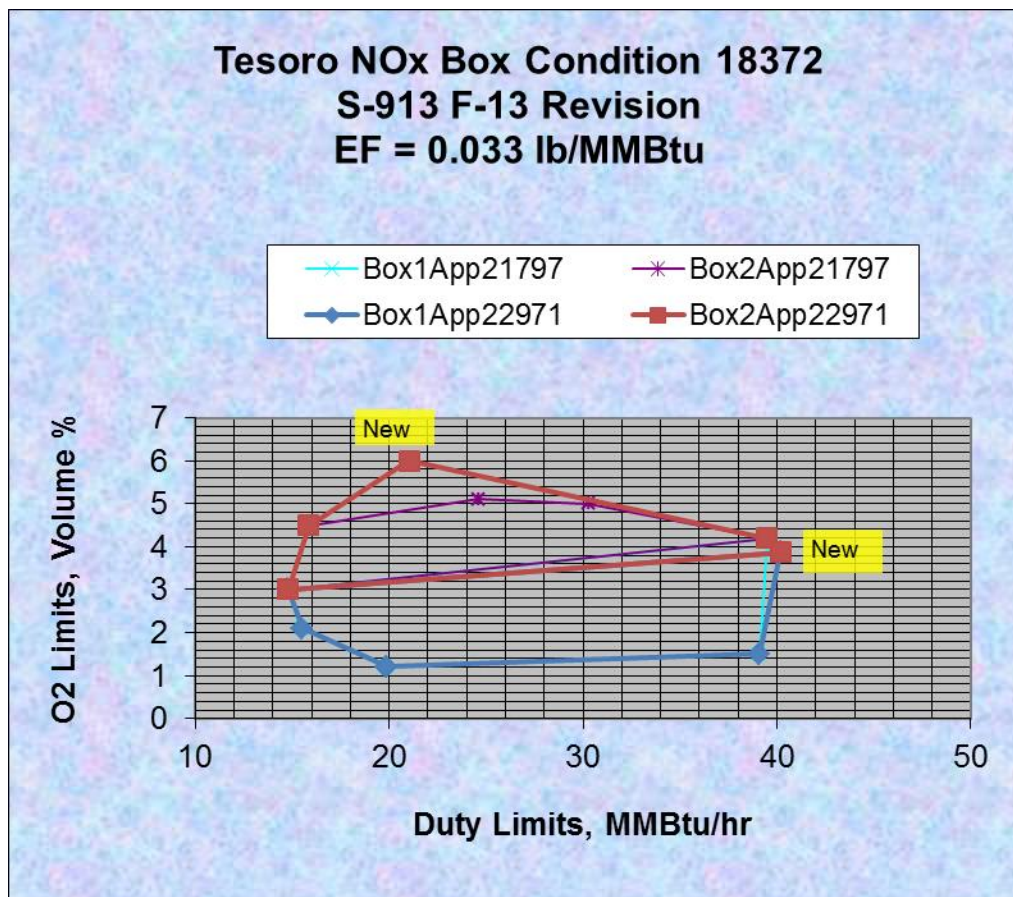
Even though this is the third revision to the S-913 NOx Box, a CEM is not required. The first revision was via Application 16888 and the change was granted April 4, 2008. The second revision was via Application 21797 and the change was granted June 11, 2010. However, neither the Application 16888 nor the Application 21797 revision changed the S-913 NOx emission factor. This Application 22971 also leaves the emission factor unchanged. According to Engineering Policy approved 4/11/03 and included in Appendix B of the December 2003 Title V Statement of Basis, a CEM is only required if two source tests in a 5-year period exceed the NOx emission factor.

Tesoro is using two operating ranges as allowed by Condition 18372, Part 30, even though both operating ranges have the same emission factor. This is because Condition 22621, Part 10, requires the emission factor of 0.033 lb/MMBtu in order to generate IERC's.

The changes are supported by source tests reviewed by the Source Test Section.

This application is being processed as an administrative change in conditions since there is no change to the specified NOx emission factor for this unit, based on the limit of Condition 22621-10.

The following diagram summarizes the Application 22971 changes to the S-913 NOx Box:



### **EMISSIONS SUMMARY**

There are no changes in emissions due to this application.

### **PLANT CUMULATIVE INCREASE**

There are no net changes to the plant cumulative emissions.

### **TOXIC RISK SCREEN**

This proposed NOx Box change would not emit toxic compounds in amounts different that previously emitted. Therefore, a toxic risk screen is not required.

### **BEST AVAILABLE CONTROL TECHNOLOGY**

BACT is triggered for new or modified sources that emit criteria pollutants in excess of 10 lbs/day. However, Regulation 2-1-234 defines a modified source as one that results in an increase in daily or annual emissions of a regulated air pollutant. For this application, there is no change in emissions. Therefore, BACT does not apply.

## PLANT LOCATION

According to the SCHOOL program, the closest school is Las Juntas Elementary, which is almost two miles from the facility.

## COMPLIANCE

The change to the NOx Box will not change the compliance for Furnace S-913. Emissions from S-913 will comply with Regulation 6 and Regulation 9, Rule 10 as before the change.

The closest school is over a mile from the facility, so the Public Notice requirements of Regulation 2-1-214 do not apply.

Toxics, CEQA, NESHAPS, BACT, Offsets and NSPS do not apply.

## CONDITIONS

The NOx Box Condition 18372, will be modified as shown below. Only the substantive changes for the S-913 NOx Box points detailed in Part 31A are shown. All of the other parts of Condition 18372 remain unchanged by this application.

### Condition 18372

31. Except as provided in part 31B & C, the owner/operator shall operate each source within the NOx Box ranges listed below at all times of operation. This part shall not apply to any source that has a properly operated and properly installed NOx CEM. (Regulation 9-10-502)

#### A. NOx Box ranges

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr) | Max O2 at Low Firing (O2% , MMBtu/hr) | Min O2 at High Firing (O2% , MMBtu/hr) | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr) |
|------------|----------------------------|---------------------------------------|---------------------------------------|--|--|--|
| 913        | 0.033                      | 1.2, 19.89                            | 3.0, 14.80                            | 1.5, 39.10                             | 2.1, 15.53   | <del>3.87, 40.23, 4.2, 39.50</del>     |
|            | 0.033                      | 3.0, 14.80                            | 4.5, 15.86                            | 4.2, 39.50                             | <del>3.87, 40.23, 5.1, 24.59</del>                   | <del>6.0, 21.03, 5.0, 30.30</del>      |

The limits listed above are based on a calendar day averaging period for both firing rate and O2%.

## **RECOMMENDATION**

It is recommended that a Change of Conditions to the Permit to Operate be granted to Tesoro for:

**S-913 F-13 No 2 Feed Prep Heater, 59 MMBTU/hr**

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Arthur P. Valla  
Senior Air Quality Engineer

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Date  
March 4, 2011

**Application 23006, NOx Box Condition 18372 Change of Conditions**

**ENGINEERING EVALUATION  
Tesoro Refining and Marketing Company  
PLANT NO. 14628  
APPLICATION NO. 23006**

**BACKGROUND**

Tesoro has submitted this application for a change in conditions for NOx Box Condition 18372. Several parts of the proposed changes are also included in the Tesoro Title V Renewal Permit 2011 Appeal. The proposed changes impact the following sources:

|             |  |
|-------------|--|
| <b>S904</b> | <b>No. 6 Boiler House</b>                                    |
| <b>S908</b> | <b>No. 3 Crude Heater</b>                                    |
| <b>S909</b> | <b>No. 1 Feed Prep Heater (F9)</b>                           |
| <b>S912</b> | <b>No. 1 Feed Prep Heater (F12)</b>                          |
| <b>S913</b> | <b>No. 2 Feed Prep Heater (F13)</b>                          |
| <b>S915</b> | <b>Platformer Intermediate Heater (F15)</b>                  |
| <b>S916</b> | <b>No. 1 HDS Heater (F16)</b>                                |
| <b>S917</b> | <b>No. 1 HDS Prefract Reboiler (F17)</b>                     |
| <b>S919</b> | <b>No. 2 HDS Heater (F19)</b>                                |
| <b>S920</b> | <b>No. 2 HDS Heater (F20)</b>                                |
| <b>S921</b> | <b>No. 2 HDS Heater (F21)</b>                                |
| <b>S922</b> | <b>No. 5 Gas Plant Debutanizer Reboiler</b>                  |
| <b>S926</b> | <b>No.2 Reformer Splitter Reboiler (F26)</b>                 |
| <b>S927</b> | <b>No. 2 Reformer Feed Preheater (F27)</b>                   |
| <b>S928</b> | <b>HDN Reactor A Heater (F28)</b>                            |
| <b>S929</b> | <b>HDN Reactor B Heater (F29)</b>                            |
| <b>S930</b> | <b>HDN Reactor C Heater (F30)</b>                            |
| <b>S931</b> | <b>Hydrocracker Reactor 1 Heater (F31)</b>                   |
| <b>S932</b> | <b>Hydrocracker Reactor 2 Heater (F32)</b>                   |
| <b>S933</b> | <b>Hydrocracker Reactor 3 Heater (F33)</b>                   |
| <b>S934</b> | <b>Hydrocracker Stabilizer Reboiler (F34)</b>                |
| <b>S935</b> | <b>Hydrocracker Splitter Reboiler (F35)</b>                  |
| <b>S937</b> | <b>Hydrogen Plant Heater (F37)</b>                           |
| <b>S950</b> | <b>No. 50 Unit Crude Feed Heater (F50) &amp; A1432</b>       |
| <b>S951</b> | <b>No. 2 Reformer Aux Reheater (F51)</b>                     |
| <b>S971</b> | <b>No. 3 Reformer Feed Preheater (F53) &amp; A1433</b>       |
| <b>S972</b> | <b>No. 3 Reformer Debutanizer Reboiler (F54) &amp; A1433</b> |
| <b>S973</b> | <b>No. 3 HDS Recycle Gas Heater (F55)</b>                    |
| <b>S974</b> | <b>No. 3 HDS Fractionator Feed Heater (F56)</b>              |

In this application, Tesoro has proposed the following revisions to Condition 18372:

- A. Removal of the source description information that documents the Tesoro NOx Compliance Plan.
- B. Removal of the source firing rates in Part 3.
- C. Removal of the requirement of SCR A1433 abating S972 No 3 Reformer Debutanizer Reboiler F-54.
- D. Revise the NOx Box Parts 29B and 31B 20% firing rate to 30%.

E. Revise the NOx Box Parts 32A, 33 and 33A2 time allowed to submit source test reports from 45 to 60 days.

In this evaluation, it is determined that all of the proposed changes are justified except B., which was superseded by mutual agreement after this application was submitted.

The specific appeal items covered by this application are #17 (item C above), #18 (item A) and #19 (item D), and are summarized below:

| Issue No. | Permit Section   | Source            | Basis for Appeal and Request for Modification        |
|-----------|--|-------------------|--|
| 17        | Table II-A.1<br>Table II B<br>Table IV-C.4.3<br>Condition 18372<br>Table VII-C.4.3 | S971<br>S972      | Correct S-971, S-972 abatement by A-1433             |
| 18        | Section VI, Condition 18372  | 18372 Source List | Remove Condition 18372 9-10 NOx Controls Description |
| 19        | Section VI, Condition 18372  | NOx Box sources   | Revise Low Fire Curtailed Operation Exemptions       |

Details of the Appeal items are attached at the end of this evaluation in Appendix A.

## EVALUATION

### A. Removal of the Source Description Information that Documents the Tesoro NOx Compliance Plan (Appeal Item # 18).

Condition 18372 includes as an introduction a list of sources. This list includes the firing rate and the NOx control specifics for the source. The NOx control specifics were included based on the original (2000/2001) NOx Control Plan Application 2209. This application represents the initial NOx control plan as it was first proposed. As time passed, the plan was modified based on better design information and performance of implemented phases. Subsequent applications, including 2001 Application 3460 and 2002 Application 5861 modified the NOx control plan. However, the source list in Condition 18372 was never updated to reflect the modified plan. This application identified the obsolete information and proposes to remove all the information from the source list except the source description.

The initial District response for this proposal was to correct the information rather than delete it. The information provides the details of the NOx Compliance Plan and the District considered it

more appropriate to correct the information to reflect the final plan. Tesoro pointed out that a source list containing these details is not contained in a permit condition for any other refinery, and therefore requested the same for Condition 18372. The final agreement of this discussion was to document the correct information in this evaluation, and then remove the obsolete information from the condition.

The details of the NOx Control Plan required to comply with the 2002 amendments of Regulation 9, Rule 10 and the correct source information are included in Appendix B.

B. Removal of the Source Firing Rates in Part 3 (not an Appeal item).

The proposed change to Condition 18372, Part 3, is superseded by a mutual agreement between Randi L. Wallach, Esq., District Assistant Counsel, and Kevin Poloncarz, Esq. for Tesoro. This agreement occurred after the submission of this application. Therefore, no changes are considered in this application. Details of this agreement are contained in Appendix C.

C. Removal of the Requirement of SCR A-1433 Abating S-972 No 3 Reformer Debutanizer Reboiler F-54.

In the original NOx Compliance Plan submitted via 2001 Application 2209, the No 3 Reformer furnaces were proposed to be controlled with SCR abatement on a common stack. The SCR was added to abate S-971, No. 3 Reformer UOP Furnace (F53), but S-972 remains unabated. However, in the review effort that resulted in the Renewed Title V Permit, S-972 was shown as abated by A-1433 SCR on a combined stack with S-971. This abatement was shown in the draft permit that was issued for public comment, and in the proposed permit that was issued for EPA review. (In fact, S-972 has been shown as abated by A-1433 in every Title V permit since the initial permit issued in December 2003.) The error was identified after the EPA comment period was completed, but not in time to incorporate into the final Renewed permit. This application proposes to correct the error and delete the A-1433 SCR abatement from S-972.

There was extensive discussion between Tesoro and the District regarding this proposed change. The details of this discussion are included in Appendix D.

In summary, S-972 is not abated by A-1433 SCR, and never has been, contrary to the information in the District record and over 5 years of Title V permits. NOx emissions for S-972 are reported in the quarterly 9-10 report grouped with S-971 and are based on the CEM in the common stack. It is likely that S-972 complies with the 75 ppm NOx limit of Condition 8077, Part B7A. If for some reason S-972 NOx emissions exceed the 75 ppm limit, NOx control on S-971 will compensate and a CEM on the common stack will ensure overall NOx emissions do not exceed 75 ppm. Removing the A-1433 from S-972 in Table II-A1 and in Table II-B of the Renewed Title V permit is justified.



D. Revise the NOx Box Parts 29B and 31B 20% low firing rate (of units with a maximum firing rate of 25MM Btu/hr or less) to 30%.

The Engineering Division performed a detailed evaluation of this proposed change, and concluded that this change is a relaxation of the 9-10-301 emission standard since more source operation becomes exempt from monitoring. Furthermore, this relaxation could result in an underreporting of NOx emissions with a potential to cause an increase in NOx emissions from other sources subject to Regulation 9, Rule 10. These findings are not agreed to by Tesoro. (Excerpts of the draft Engineering Division evaluation are included in Appendix E. Tesoro Comments are included in Appendix F. ) Furthermore, the changes requested by this application are subject to the Tesoro Title V appeal. The District Legal staff initially supported the emissions impact findings and litigated the Title V Appeal. However, District Legal Staff changed their position in part because the District granted a similar change in conditions for the Valero Refinery via Application 23454. Therefore, the District Senior Management decided to approve the proposed change similar to that approved for Valero.

E. Revise the NOx Box Parts 32A, 33and 33A2 time allowed to submit source test reports from 45 to 60 days.

Changing the time allowed as shown below is justified based on previous agreements between the District and Refinery staff. The specific changes are shown below.

32. NOx Box Deviations (Regulation 9-10-502)

A. The owner/operator may deviate from the NOx Box (either the firing rate or oxygen limit) provided that the owner/operator conducts a district approved source test which reasonably represents the past operation outside of the established ranges. The source test representing the new conditions shall be conducted no later than the next regularly scheduled source test period, or within eight months, whichever is sooner. The source test results will establish whether the source was operating outside of the emission factor utilized for the source. The source test results shall be submitted to the district source test manager within ~~60~~45 days of the test. The owner/operator may request, and the APCO may grant, an extension of 15 days for submittal of results. As necessary, a permit amendment shall be submitted.

33. For each source subject to Part 29, the owner/operator shall conduct source tests on the schedule listed below. The source tests are performed in order to measure NOx, CO, and O2 at the as-found firing rate, or at conditions reasonably specified by the APCO. The source test results shall be submitted to the district source test manager within ~~60~~45 days of the test. The owner/operator may request, and the APCO may grant, an extension of 15 days for submittal of results. (Reg. 9-10-502)

A. Source Testing Schedule

1. Heater < 25 MMBtu/hr

One source test per consecutive 12 month period. The time interval between source tests shall not exceed 16 months.

2. Heaters  $\geq$  25 MMBtu/hr

Two source tests per consecutive 12 month period. The time interval between source tests shall not exceed 8 months and not be less than 5 months apart. The source test results shall be submitted to the district source test manager within 6045 days of the test. (Reg. 9-10-502)

## EMISSIONS SUMMARY

There are no increases in emissions associated with this application, as detailed below:

- A. Removal of the source description information that documents the Tesoro NOx Compliance Plan. This proposed change only affects the descriptions of the sources and has no emissions impacts.
- B. Removal of the source firing rates in Part 3. This proposed change is superseded by subsequent agreement between Tesoro and the District and will not be made as part of this application. Even if this proposed change was made, the rationale is that the information is redundant to other condition information and thus has no emissions impacts.
- C. Removal of the requirement of SCR A1433 abating S972 No 3 Reformer Debutanizer Reboiler F-54. This is a correction, not an actual change. Therefore, there are no emission impacts.
- D. Revise the NOx Box Parts 29B and 31B 20% firing rate exemption to 30%. The emissions impact for this item is undeterminable. Since there are no emissions data for low fire operation that is not normal operation, the District cannot be certain what the emission impacts are for the proposed changes. Emission impacts can be estimated, but only by using conservative and disputed assumptions. To reconcile this problem, the District has agreed to condition revisions that allow compliance with either the permit condition or the rule.
- E. Revise the NOx Box Parts 32A, 33 and 33A2 time allowed to submit source test reports from 45 to 60 days. There is no emissions impact by changing the time allowed to submit a source test report.

## STATEMENT OF COMPLIANCE

There are no changes to the applicable requirements for the sources impacted by this application and there is no change to the compliance for these sources.

## PERMIT CONDITIONS

Permit Condition 18372 will be revised as follows. The language below is copied from the renewed Title V permit. The highlighted language is in the databank version of the condition, having been added to the condition since the June 28, 2011 Renewed Title V permit version.

When the District decided to revise Parts 29 and 31 in the same manner as that approved in Valero Application 23454, the revised Condition 18372 was sent to Tesoro 2/14/13 for review and comment. On 2/19/13, Tesoro disagreed with the proposed language in Part 31C. In the Valero language, the owner operator was required to select one method for determining compliance during startup, shutdown or curtailed operation, either Regulation 9-10-301.4.1 (operating day heat input) or Regulation 9-10-301.4.2 (30-day average heat input), and the choice had to be applied consistently for all sources. In a phone conversation, Tesoro's ERM consultant explained that this one time selection was acceptable to Valero since Valero complies with the Regulation 9-10-301 Refinery-wide NOx Emission Limit using emission credits (Regulation 9-10-301.4.1 will always provide the lowest NOx mass emissions, so the one time choice for all sources was easily accommodated). For Tesoro, mass emissions are not important since the Regulation 9-10-301 limit is an emission rate (0.033 lbNOx/MMBtu). Therefore, Tesoro requested the flexibility to select between Regulation 9-10-301.4.1 and Regulation 9-10-301.4.2 on a daily basis, the selection being driven by selecting the lowest emission rate. The District responded that the one-time choice for all sources imposed on Valero was to enhance enforceability of the permit condition. However, the District acknowledged that Regulation 9-10-301.4 only requires the selection of one method, but is silent on the frequency of this choice and whether the choice is applicable to all sources or not. Therefore, Tesoro will be allowed the flexibility to choose the compliance method without the frequency or source applicability being specified in the permit condition. The tracked Part 31C below is based on the language of Valero Condition 21233, Part 5C.

In the 2/19/13 Tesoro comments, an additional comment was added by Tesoro regarding the firing rate clarifying language contained in Part 3. Tesoro often refers to firing rates such as those in Part 3 as evidence that the listed sources are NSR sources with firm firing rates. Research conducted revealed that the firing rates in Part 3 were not established through the requirements of Regulation 2, Rule 2, New Source Review. The firing rates were associated with 2001 Applications 2209, 9-10 Compliance Plan. In the Engineering Evaluation for Application 2209, there was no emission increases specified for NOx, POC, NPOC, CO, SOx or PM10, therefore Regulation 2, rule 2 was not triggered. The only time these firing rates were used to calculate emission impacts was when the 9-10 Compliance Plan Application 2209 altered a source with the retrofit of a SCR (S-927, S-950, S-971 and S-972), in which case ammonia emissions were addressed. [In addition, some of the firing rates listed in Part 3 are not the correct permitted rates. S-919 was permitted for 111MMBtu/hr via 1991 NSR Application 6468, S-971 was permitted for 210MMBtu/hr via 1978 NSR Application 26645 and S-972 was permitted for 34MMBtu/hr via 1978 NSR Application 26645.] In order to ensure that these firing rates are properly used in the future, the clarifying language was added.

The permitting action that triggered the clarifying language was 2011 Application 23194 proposing to replace the burners in S-904 No 6 Boiler to resolve a boiler tube flame impingement problem. In this application Tesoro claimed S-904 was a NSR source with firm NSR limits, and submitted the application as an alteration because emissions would not increase (the new burners were the same capacity as the existing burners). In the review of the S-904 permitting history, it was determined that S-904 was a grandfathered source originally placed in service in 1956 and

has never been issued a District Authority to Construct. The equipment associated with S-904 that has been issued an Authority to Construct includes an SCR, fuel gas lines, and burner pilots. However, none of the Authorities to Construct were granted by subjecting the S-904 combustion emissions to the requirements of Regulation 2, Rule 2, New Source Review. Therefore, after extensive negotiation, the application was only deemed an alteration after original pre-construction design specifications confirmed the grandfathered combustion firing rate would not be exceeded. These firing rates were imposed in Permit Condition 17322. However, since the firing rates were not created through the requirements of Regulation 2, Rule 2, clarifying language was added to 17322 stating the firing rates were not NSR rates.

During the evaluation of Application 23194, the issue of using grandfathered rates as NSR rates received a lot of discussion. In the Engineering Division Refinery Workgroup the discussion concluded that a combustion source can only be considered a NSR source with NSR firing rate limits if the combustion emissions were subject to and satisfied the requirements of Regulation 2, Rule 2. In a meeting with Tesoro in June of 2011, where Tesoro reiterated its position that S-904 was a NSR source because it had Authorities to Construct (e.g. for the SCR, the fuel gas lines, and the burner pilots), the Engineering Division Director advised Tesoro that these Authorities to Construct probably do not convert S-904 into a NSR source. Hence, the firing rate clarifying language was added to other permit conditions that contained firing rates that were not created by subjecting the combustion emissions to Regulation 2, Rule 2. [Note that, contrary to statements by Tesoro, the clarifying language was not created in a vacuum solely by the District permit engineer – it was subject to and revised through a peer review, and was reviewed and approved by the Supervising Air Quality Engineer, the Air Quality Engineering Manager, and the Engineering Division Director.] In addition to Condition 17322 (containing the S-904 firing rate) and 18372 (containing the firing rates used to evaluate the 9-10 compliance plan), the clarifying language was added to Condition 16685 (the “Billing” condition created without a permit application pursuant to Regulation 2-1-403), and Condition 22590 (containing the S-904 firing rate created when S-904 was altered by adding burner pilots in 2005).

When the Application 23194 Authority to Construct was granted to Tesoro 8/22/11 for S-904, Tesoro promptly disputed the clarifying language. The language was revised to the current form in early 2012 by mutual agreement between Randi Wallach, Esq. for the District and Kevin Poloncarz, Esq. for Tesoro. Nonetheless, Tesoro is not honoring this mutual agreement and is resolute that the clarifying language be removed from Condition 18372.

Even though the record supports the basis of and the mutual agreement for the clarifying language, the District has decided to remove the language. As indicated above, similar clarifying language is contained in other permit conditions and in Tesoro Application 23322, No 3 Reformer Modification, Tesoro agreed that the disputed language will be addressed separately. While this Application 23006 is not the avenue to address the issue (it is not included in the application), and the issue is not contained in the Tesoro Title V Appeal (see Appendix A), Tesoro has insisted that the issue be resolved before Tesoro agrees to withdraw the Title V Appeal. The District agreed, with the provision that it may be added back to Condition 18372 at a later time.

### **Condition 18372**

Application #2209 and 16484  
Plant #14628

- Application 15682 (April, 2007) Initial establishment of NOx box parameters.  
Delete part 4.
- Application 14752 (January 2007) S-927 modification of Part 18.
- Application 16888 (April 2008) Modification of S-913
- Application 16889 (June 2008) Modification of S-951
- Modified by App. 18739 (Nov 2008) Removal of S924 from Parts 27 and 31
- Application 19300 (December 2008) Removed S-904 Backup CO Boiler Service
- Application 18748 (December 2008) Modification of S-919 Administratively  
Revised via Application 19647 (March 2009) Consolidation of Bubble  
Condition 4357 with Condition 8077
- Administratively Revised by Application 19874 (July 2009) Updates for  
Combustion Sources
- Application 20359 (June 2009) Modification of S-920
- Application 20259 (February 2010) Modification of S-909
- Application 17470 (February 2010) Modification of S-916
- Application 21732 (May 2010) Modification of S-919
- Administratively Reinstated Source List, Part 3 and Part 27 by Application 21464  
(April 2010)
- ~~Application 23194 (August 2011) S-904 Burner Replacement Alteration (added  
clarifying language regarding firing limits prior to Part 1 and in Part 3)~~
- ~~Application 23871 (December 2011) Modification of S-916~~
- Application 23006 (October 2012), Revised Introduction to remove source  
details, Parts 20, 21, 22 and 27 to correct S-972 abatement, Parts 29 and 31 to  
allow compliance with the 2010 Amendment to Regulation 9, Rule 10, and Parts  
32A, 33 and 33A2 to reflect a 60 day allowance to submit Source Test Reports.
- S-904 No. 6 Boiler; ~~Riley Stoker, Maximum Firing Rate: 775 MMBtu/hr~~
- S-912 ~~No. 12 Furnace F-12; Born, Maximum Firing Rate: 135 MMBtu/hr, No. 1  
Feed Prep Unit Vacuum Residuuum Feed Heater F-12 with Callidus  
Technologies Inc. LE-CSG-W Low NOx Burners or equivalent~~
- S-913 ~~No. 13 Furnace F-13; Petrochem, Vertical Cylindrical, Maximum Firing  
Rate: 59 MMBtu/hr, No. 2 Feed Prep Unit Vacuum Residuuum Feed  
Heater F-13 with Callidus Technologies Inc. LE-CSG Low NOx Burners  
or equivalent~~
- S-916 No. 1 HDS Charge Heater F-16; ~~Braun, Cabin; Maximum Firing Rate: 55  
MMBtu/hr with Callidus Technologies Inc. LE-CSG-W Low NOx  
Burners or equivalent~~
- S-919 No. 2 HDS Depentanizer Reboiler F-19 Charge Heater, No. 19 Furnace,  
~~Foster Wheeler, Maximum Firing Rate: 65 MMBtu/hr with Callidus  
Technologies Inc. LE-CSG-W Low NOx Burners or equivalent~~

- S-920 No. 2 HDS Charge Heater, ~~No. F-20 Furnace, Foster Wheeler, Maximum Firing Rate: 63 MMBtu/hr with Callidus Technologies Inc. LE-CSG-W Low NOx Burners or equivalent~~
- S-921 No. 2 HDS Charge Heater F-21; ~~Foster Wheeler, Cabin; Maximum Firing Rate: 63 MMBtu/hr with Callidus Technologies Inc. LE-CSG-W Low NOx Burners or equivalent~~
- S-922 No. 5 Gas Plant Debutanizer Reboiler F-22; ~~Petrochem, Vertical Cylindrical; Maximum Firing Rate: 130 MMBtu/hr with Callidus Technologies Inc. LE-CSG-W Low NOx Burners or equivalent~~
- S-926 No. 2 Reformer Splitter Reboiler, ~~No. F-26 Furnace, Petrochem, Maximum Firing Rate: 145 MMBtu/hr with Callidus Technologies Inc. LE-CSG-W Low NOx Burners or equivalent~~
- S-927 No. 2 Reformer Reactor Feed Preheater F-27; ~~Lummus Multicell Cabin; Maximum Firing Rate: 280 MMBtu/hr abated by A-1431 Technip Selective Catalytic Reduction System w Hitachi Catalyst or equivalent~~
- S-950 No. 50 Unit Crude Feed Heater F-50; ~~Alcorn, Box; 440 MMBtu/hr abated by A-1432 Technip Selective Catalytic Reduction System w Hitachi Catalyst or equivalent~~
- S-971 No. 3 Reformer ~~UOP Furnace~~ Feed Preheater F-53; ~~KTI, Multicell Box; Maximum Firing Rate: 300 MMBtu/hr abated by A-1433 Technip Selective Catalytic Reduction System w Hitachi Catalyst or equivalent~~
- S-972 No. 3 Reformer Debutanizer Reboiler F-54; ~~KTI, Vertical Cylindrical; Maximum Firing Rate: 45 MMBtu/hr abated by A-1433 Technip Selective Catalytic Reduction System w Hitachi Catalyst or equivalent~~

~~The firing limits shown above are part of the source description as used in the NOx Compliance Plan required by Regulation 9, Rule 10. The firing limits shown above are not considered firm enforceable New Source Review emissions limits since these sources were not subject to Regulation 2, Rule 2 when this condition was created.~~

- 1.) Deleted. (The fuel meter requirement is redundant with Regulation 9-10-502.2.)
- 2.) Permittee/Owner/Operator shall ensure that each of S-912, S-913, S-916, S-919, S-920, S-921, S-922, S-926, S-927, S-950, S-971, and S-972 is fired exclusively on natural gas and/or refinery fuel gas. (basis: Regulation 9, Rule10)

- 3.) Permittee/Owner/Operator shall ensure that the maximum firing rate of each source listed does not exceed the corresponding HHV maximum firing rate, based on an operating day average (the amount of fuel fired over each 24 hour day divided by 24:

| Source (#) | Maximum Firing Rate (HHV) (mmBtu/hr) | Maximum Firing Rate (HHV) (mmBtu/yr) |
|------------|--------------------------------------|--------------------------------------|
| S-912      | 135                                  | 1,182,600                            |
| S-913      | 59                                   | 516,840                              |
| S-916      | 55                                   | 481,800                              |
| S-919      | 65                                   | 569,400                              |
| S-920      | 63                                   | 551,880                              |
| S-921      | 63                                   | 551,880                              |
| S-922      | 130                                  | 1,138,800                            |
| S-926      | 145                                  | 1,270,200                            |
| S-927      | 280                                  | 2,452,800                            |
| S-950      | 440                                  | 3,854,400                            |
| S-971      | 300                                  | 2,628,000                            |
| S-972      | 45                                   | 394,200                              |

~~These firing limits are enforceable not to exceed limits used to determine the NOx emission reductions required by the NOx Compliance Plan. These firing limits are not considered firm New Source Review emissions limits. (basis: Regulation 9, Rule 10)~~

- 4.) (Deleted: Specific NOx limits should not have been applied to S-912 and S-926, since they are both regulated under Regulation 9-10-301.)
- 5.) Deleted. Replaced with Part 30.
- 6.) Deleted. Replaced with Part 31.
- 7.) Deleted. Replaced with Part 31.
- 8.) Deleted. Replaced with Part 31.
- 9.) Deleted. Replaced with Part 31.
- 10.) Deleted. Replaced with Part 31.
- 11.) Deleted. S-921 is out of service. If returned to service, this part will be replaced with Part 31.
- 12.) Deleted. NOx CEM installed on S-922.
- 13.) Deleted. Replaced with Part 31.
- 14.) Deleted. Replaced with Part 33.



- 15.) Deleted. Replaced with Part 33.
- 16.) Deleted. Replaced with Part 34.
- 17.) Deleted. Replaced with Part 35.
- 18.) Combustion exhaust from S-927 shall be ducted to and continuously abated by A-1431 whenever a fuel is fired at S-927, except startup and shutdown as defined by Regulation 9-10-218 and on a temporary basis for catalyst regeneration at S-1004 No. 2 Catalytic Reformer. The exhaust gasses from S-927 and A-1431 shall be measured by a District approved CEM that continuously monitors and records the emission rate of NO<sub>x</sub>, CO, and O<sub>2</sub> in the exhaust gasses, including periods when S-927 is operated without SCR abatement. (basis: Regulation 9, Rule 10)
- 19.) Combustion exhaust from S-950 shall be ducted to and continuously abated by A-1432 whenever a fuel is fired at S-950 and the exhaust gasses from A-1432 shall be measured by a District approved CEM that continuously monitors and records the emission rate of NO<sub>x</sub>, CO, and O<sub>2</sub> in the exhaust gasses. (basis: Regulation 9, Rule 10)
- 20.) Combustion exhaust from S-971 shall be ducted to and continuously abated by A-1433 whenever a fuel is fired at S-971 and the exhaust gasses from A-1433 shall be vented to stack P-76. Combustion exhaust from S-972 shall be vented to stack P-76. The combined exhaust gases from S-971/A-1433 and S-972 shall be measured by a District approved CEM that continuously monitors and records the emission rate of NO<sub>x</sub>, CO, and O<sub>2</sub> in the exhaust gasses. (basis: Regulation 9, Rule 10)
- 21.) Deleted via Application 23006. The portion of Authority to Construct granted via Application 2209 authorizing the abatement of S-972 with A-1433 was never exercised. Combustion exhaust from S-972 shall be ducted to and continuously abated by A-1433 whenever a fuel is fired at S-972 and the exhaust gasses from A-1433 shall be measured by a District approved CEM that continuously monitors and records the emission rate of NO<sub>x</sub>, CO, and O<sub>2</sub> in the exhaust gasses. (basis: Regulation 9, Rule 10)
- 22.) For each of S-927, S-950 and; S-971, ~~and S-972~~, ammonia slip from the SCR system abating the source shall not exceed 20 ppmv, dry, corrected to 3% oxygen. (basis: toxics)
- 23.) Deleted. (The recordkeeping requirement is redundant with Regulation 9-10-504.)
- 24.) Deleted. (The source test log requirement was effective until January 1, 2005, when the NO<sub>x</sub> Box recordkeeping requirements became effective.)



- 25.) Deleted. (The fuel use recordkeeping requirement is redundant with a more stringent Regulation 9-10-504.)
- 26.) Deleted. (S-904 no longer providing backup Coker CO Boiler service so the requirements of Regulation 9-10-304 no longer apply.)
27. The following sources are subject to the refinery-wide NOx emission rate and CO concentration limits in Regulation 9-10. (Regulation 9-10-301, 303, & 305)

| S#   | Description                                       | NOx/CO<br>CEM |
|------|---|---------------|
| S904 | No. 6 Boiler House                                | Y/Y           |
| S908 | No. 3 Crude Heater(F8)                            | Y/N           |
| S909 | No. 1 Feed Prep Heater (F9)                       | N/N           |
| S912 | No. 1 Feed Prep Heater (F12)                      | N/N           |
| S913 | No. 2 Feed Prep Heater (F13)                      | N/N           |
| S915 | Platformer Intermediate Heater (F15)              | N/N           |
| S916 | No. 1 HDS Heater (F16)                            | N/N           |
| S917 | No. 1 HDS Prefract Reboiler (F17)                 | N/N           |
| S919 | No. 2 HDS Heater (F19)                            | N/N           |
| S920 | No. 2 HDS Heater (F20)                            | N/N           |
| S921 | No. 2 HDS Heater (F21) (out of service)           | N/N           |
| S922 | No. 5 Gas Plant Debutanizer Reboiler              | Y/N           |
| S926 | No.2 Reformer Splitter Reboiler (F26)             | N/N           |
| S927 | No. 2 Reformer Feed Preheater (F27) & A1431       | Y/Y           |
| S928 | HDN Reactor A Heater (F28)                        | N/N           |
| S929 | HDN Reactor B Heater (F29)                        | N/N           |
| S930 | HDN Reactor C Heater (F30)                        | N/N           |
| S931 | Hydrocracker Reactor 1 Heater (F31)               | N/N           |
| S932 | Hydrocracker Reactor 2 Heater (F32)               | N/N           |
| S933 | Hydrocracker Reactor 3 Heater (F33)               | N/N           |
| S934 | Hydrocracker Stabilizer Reboiler (F34)            | Y/N           |
| S935 | Hydrocracker Splitter Reboiler (F35)              | Y/N           |
| S937 | Hydrogen Plant Heater (F37)                       | Y/N           |
| S950 | No. 50 Unit Crude Feed Heater (F50) & A1432       | Y/Y           |
| S951 | No. 2 Reformer Aux Reheater (F51)                 | N/N           |
| S971 | No. 3 Reformer UOP Furnace (F53) & A1433          | Y/Y           |
| S972 | No. 3 Reformer Debutanizer Reboiler (F54)-& A1433 | Y/Y           |
| S973 | No. 3 HDS Recycle Gas Heater (F55)                | Y/N           |
| S974 | No. 3 HDS Fractionator Feed Heater (F56)          | Y/N           |

28. The owner/operator of each source with a maximum firing rate greater than 25 MMBtu/hr listed in Part 27 shall properly install, properly maintain, and properly operate an O2 monitor and recorder. (Regulation 9-10-502)
29. The owner/operator shall operate each source listed in Part 27, which does not have a NOx CEM, within specified ranges of operating conditions (firing rate and oxygen content) as detailed in Part 31. The ranges shall be

established by utilizing data from district-approved source tests. The owner/operator may choose to comply with either 29B or 29C. (Reg. 9-10-502)

- A. The NOx Box for units with a maximum firing rate of 25 MMBtu/hr or more shall be established using the procedures in Part 30.
- B. The NOx Box for units with a maximum firing rate less than 25MMBtu/hr shall be established as follows: High-fire shall be the maximum rated capacity. Low-fire shall be 20% of the maximum rated capacity. There shall be no maximum or minimum O<sub>2</sub>. OR
- B-C. The NOx Box for units with maximum firing rate less than 25MMBtu/hr shall be established as follows: High-fire shall be the maximum rated capacity. Low-fire shall be 30% of the maximum rated capacity. There shall be no maximum or minimum O<sub>2</sub>.

30. The owner/operator shall establish the initial NOx box for each source subject to Part 29 . The NOx Box may consist of two operating ranges in order to allow for operating flexibility and to encourage emission minimization during standard operation. (Regulation 9-10-502)

The procedure for establishing the NOx box is:

- A. Conduct district approved source tests for NOx and CO, while varying the oxygen concentration and firing rate over the desired operating ranges for the furnace;
- B. Determine the minimum and maximum oxygen concentrations and firing rates for the desired operating ranges (Note that the minimum O<sub>2</sub> at low-fire may be different than the minimum O<sub>2</sub> at high-fire. The same is true for the maximum O<sub>2</sub>). The owner/operator shall also verify the accuracy of the O<sub>2</sub> monitor on an annual basis.
- C. Determine the highest NOx emission factor (lb/MMbtu) over the preferred operating ranges while maintaining CO concentration below 200 ppm; the owner/operator may choose to use a higher NOx emission factor than tested.
- D. Plot the points representing the desired operating ranges on a graph. The resulting polygon(s) are the NOx Box, which represents the allowable operating range(s) for the furnace under which the NOx emission factor from part 31A is deemed to be valid.
  - 1) The NOx Box can represent/utilize either one or two emission factors.
  - 2) The NOx Box for each emission factor can be represented either as a 4- or 5-sided polygon. The NOx box is the area within the 4- or 5-sided polygon formed by connecting the source test parameters

that lie about the perimeter of successful approved source tests. The source test parameters forming the corners of the NOx box are listed in Part 31A.

E. Upon establishment of each NOx Box, the owner/operator shall prepare a graphical representation of the box. The representation shall be made available on-site for APCO review upon request. The box shall also be submitted to the BAAQMD with permit amendments.

31. Except as provided in parts 31B OR 31C and & 31DC, the owner/operator shall operate each source within the NOx Box ranges listed below at all times of operation. During periods of startup, shutdown, or curtailed operation, and for sources temporarily out of service, the owner/operator may choose to comply with either 31B OR 31C. This part shall not apply to any source that has a properly operated and properly installed NOx CEM. (Regulation 9-10-502)

A. NOx Box ranges

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr)    | Max O2 at Low Firing (O2% , MMBtu/hr)      | Min O2 at High Firing (O2% , MMBtu/hr) | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr) |
|------------|----------------------------|--|--|--|--|--|
| 909        | 0.146                      | 9.5, 27.46                               | 11.7, 30.67                                | 2.1, 83.60                             | 3.1, 67.35   | 5.7, 76.49                             |
|            | 0.148                      | 11.7, 30.67                              | 11.2, 61.81                                | 2.1, 83.60                             | 5.7, 76.49   | 7.3, 79.58                             |
| 912        | 0.027                      | 2.1, 60.50                               | 3.4, 70.10                                 | 1.9, 101.51                            | 4.0, 104.13  | 5.4, 100.24                            |
|            | 0.034                      | 2.1, 60.50                               | 7.0, 57.57                                 | 5.4, 100.24                            | 3.4, 70.10   | 6.5, 99.68                             |
| 913        | 0.033                      | 1.2, 19.89                               | 3.0, 14.80                                 | 1.5, 39.10                             | 2.1, 15.53   | 3.6, 39.45                             |
|            | 0.033                      | 3.0, 14.80                               | 4.5, 15.86                                 | 3.6, 39.45                             | N/A  | 4.2, 39.50                             |
| 915        | 0.143                      | 0, 4 @ 20%<br>or 6 @ 30% <del>3.85</del> | 8.0, 4 @ 20%<br>or 6 @ 30% <del>3.85</del> | 0.0, 20.00                             | N/A  | 8.0, 20.00                             |
|            | 0.098                      | 8.0, 4 @ 20% or 6 @ 30% <del>3.85</del>  | >8.0, 4 @ 20% or 6 @ 30% <del>3.85</del>   | 8.0, 20.00                             | N/A  | >8.0, 20.00                            |
| 916        | 0.090                      | 5.9, 9.53                                | 9.3, 9.17                                  | 6.0, 34.60                             | 4.0, 17.40   | 7.1, 34.00                             |
|            | 0.102                      | 9.3, 9.17                                | 10.6, 24.64                                | 7.1, 34.00                             | N/A  | 10.4, 33.11                            |
| 917        | 0.061                      | 0.0, 3.60 @ 20% or 5.4 @ 30%             | (Note 1)-, 3.6 @ 20% or 5.4 @ 30%          | 0.0, 18.00                             | N/A  | (Note 1)-, 18.00                       |
| 919        | 0.047                      | 3.9, 23.30                               | 8.7, 18.56                                 | 6.6, 58.76                             | 9.2, 39.12   | 8.0, 60.68                             |
|            | 0.056                      | 9.2, 39.12                               | 9.5, 21.10                                 | 8.0, 60.68                             | 8.7, 18.56   | 10.1, 47.20                            |
| 920        | 0.046                      | 5.0, 24.84                               | 7.7, 17.86                                 | 6.7, 55.12                             | 7.1, 15.34   | 8.0, 60.26                             |
|            | 0.055                      | 7.7, 17.86                               | 10.8, 27.53                                | 8.0, 60.26                             | N/A  | 10.0, 45.15                            |
| 926        | 0.032                      | 1.8, 32.81                               | 6.0, 40.89                                 | 2.9, 126.72                            | 4.4, 32.81   | 3.9, 131.59                            |
|            | 0.037                      | 6.0, 40.89                               | 7.0, 77.89                                 | 3.9, 131.59                            | N/A  | 4.2, 122.33                            |
| 928        | 0.044                      | 0.0, 4 @ 20% or 6 @ 30% <del>4.00</del>  | < 6.0, 4 @ 20% or 6 @ 30% <del>4.00</del>  | 0.0, 20.00                             | N/A  | < 6.0, 20.00                           |
|            | 0.073                      | 6.0, 4 @ 20% or 6 @ 30% <del>4.00</del>  | > 6.0, 4 @ 20% or 6 @ 30% <del>4.00</del>  | 6.0, 20.00                             | N/A  | > 6.0, 20.00                           |

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr) | Max O2 at Low Firing (O2% , MMBtu/hr)   | Min O2 at High Firing (O2% , MMBtu/hr) | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr) |
|------------|----------------------------|---------------------------------------|---|--|--|--|
| 929        | 0.024                      | 0.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | < 6.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | 0.0, 20.00                             | N/A  | < 6.0, 20.00                           |
|            | 0.087                      | 6.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | > 6.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | 6.0, 20.00                             | N/A  | > 6.0, 20.00                           |
| 930        | 0.033                      | 0.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | < 6.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | 0.0, 20.00                             | N/A  | < 6.0, 20.00                           |
|            | 0.077                      | 6.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | > 6.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | 6.0, 20.00                             | N/A  | > 6.0, 20.00                           |
| 931        | 0.034                      | 0.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | < 9.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | 0.0, 20.00                             | N/A  | < 9.0, 20.00                           |
|            | 0.073                      | 9.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | > 9.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | 9.0, 20.00                             | N/A  | > 9.0, 20.00                           |
| 932        | 0.037                      | 0.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | < 4.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | 0.0, 20.00                             | N/A  | < 4.0, 20.00                           |
|            | 0.053                      | 4.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | > 4.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | 4.0, 20.00                             | N/A  | > 4.0, 20.00                           |
| 933        | 0.035                      | 0.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | < 5.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | 0.0, 20.00                             | N/A  | < 5.0, 20.00                           |
|            | 0.050                      | 5.0, 4 @<br><u>20% or 6 @ 30%4.00</u> | >5.0, 4 @<br><u>20% or 6 @ 30%4.00</u>  | 5.0, 20.00                             | N/A  | > 5.0, 20.00                           |
| 951        | 0.143                      | 5.2, 2.68                             | 9.2, 2.21                               | 4.2, 7.78                              | 8.3, 19.3  | 14.1, 12.7                             |
|            | 0.175                      | 12.1, 0.78                            | 13.6, 1.73                              | 9.2, 2.21                              | N/A  | 14.1, 12.7                             |

Note 1: Per Part 29B and Part 29C, Oxygen limits do not apply to sources with maximum firing rates less than 25 MMBtu/hr. High fire is defined as 100% of rated heat input, and low fire is defined as 20% (Part 29B) or 30% (Part 29C) of rated heat input

The limits listed above are based on a calendar day averaging period for both firing rate and O2%.

B. Part 31A. does not apply to low firing rate conditions (i.e., firing rate less than or equal to 20% of the unit’s rated capacity), during startup or shutdown periods, or periods of curtailed operation (ex. during heater idling, refractory dryout, etc.) lasting 5 days or less. During these conditions the means for determining compliance with the refinery wide limit shall be accomplished using the method described in 9-10-301.4.2 (previous 30-day average fire rate i.e. units out of service & 30 day averaging data) OR

~~B.C.~~ Part 31A does not apply to units in Curtailed Operation (i.e. operation at 30% or less of rated heat input) or to units undergoing startup or shutdown, or to units that are temporarily out of service. For units in curtailed operation or undergoing startup or shutdown, the means for determining compliance with the refinery wide limit shall be in accordance with Regulation accomplished using only one method described in 9-10-301.4 consistently for all sources (previous 30-day average or actual firing rate). For units temporarily out of service, the means for determining compliance with the refinery wide limit shall be in accordance with Regulation accomplished using the method described in 9-10-301.5 (previous 30-day average firing rate).

~~C.D.~~ Part 31A. does not apply during any source test required or permitted by this condition. (~~Reg. 9-10-502~~). See Part 33 for the consequences of source test results that exceed the emission factors in Part 31.

32. NOx Box Deviations (Regulation 9-10-502)

A. The owner/operator may deviate from the NOx Box (either the firing rate or oxygen limit) provided that the owner/operator conducts a district approved source test which reasonably represents the past operation outside of the established ranges. The source test representing the new conditions shall be conducted no later than the next regularly scheduled source test period, or within eight months, whichever is sooner. The source test results will establish whether the source was operating outside of the emission factor utilized for the source. The source test results shall be submitted to the district source test manager within ~~60~~45 days of the test. The owner/operator may request, and the APCO may grant, an extension of 15 days for submittal of results. As necessary, a permit amendment shall be submitted.

1. Source Test  $\leq$  Emission Factor

If the results of this source test do not exceed the higher NOx emission factor in Part 31, or the CO limit in Part 35, the unit will not be considered to be in violation during this period for operating out of the "box."

a. The facility may submit an accelerated permit program permit application to request an administrative change of the permit condition to adjust the NOx Box operating range(s), based on the new test data.

2. Source Test  $>$  Emission Factor

If the results of this source test exceed the permitted emission concentrations or emission rates then the actions described below must

be followed:

- a. Utilizing measured emission concentration or rate, the owner/operator shall perform an assessment, retroactive to the date of the previous source test, of compliance with Section 9-10-301. The unit will be considered to have been in violation of 9-10-301 for each day the facility was operated in excess of the refinery wide limit.
- b. The facility may submit a permit application to request an alteration of the permit condition to change the NOx emission factor and/or adjust the operating range, based on the new test data.

B. Reporting - The owner/operator must report conditions outside of box within 96 hours of occurrence.

33. For each source subject to Part 29, the owner/operator shall conduct source tests on the schedule listed below. The source tests are performed in order to measure NOx, CO, and O2 at the as-found firing rate, or at conditions reasonably specified by the APCO. The source test results shall be submitted to the district source test manager within 6045 days of the test. The owner/operator may request, and the APCO may grant, an extension of 15 days for submittal of results. (Reg. 9-10-502)

A. Source Testing Schedule

1. Heater < 25 MMBtu/hr

One source test per consecutive 12 month period. The time interval between source tests shall not exceed 16 months.

2. Heaters  $\geq$  25 MMBtu/hr

Two source tests per consecutive 12 month period. The time interval between source tests shall not exceed 8 months and not be less than 5 months apart. The source test results shall be submitted to the district source test manager within 6045 days of the test. (Reg. 9-10-502)

3. If a source has been shutdown longer than the period allowed between source testing periods (e.g. <25 MMBtu/hr-> 12 mos or > 25 MMBtu/hr - > 8 mos), the owner/operator shall conduct the required source test within 30 days of start up of the source.

B. Source Test Results > NOx Box Emission Factor

If the results of any source test under this part exceed the permitted concentrations or emission rates the owner/operator shall follow the requirements of Part 32A2. If the owner/operator chooses not to submit an application to revise the emission factor, the owner/operator shall conduct another Part 33 source test, at the same conditions, within 90 days of the initial test.

34. For each source listed in Part 27 with a NO<sub>x</sub> CEM installed that does not have a CO CEM installed, the owner/operator shall conduct semi-annual district approved CO source tests at as-found conditions. The time interval between source tests shall not exceed 8 months. District conducted CO emission tests associated with District-conducted NO<sub>x</sub> CEM field accuracy tests may be substituted for the CO semi-annual source tests. (Regulation 9-10-502, 1-522)
35. For any source listed in Part 27 with a maximum firing limit greater than 25 MMBtu/hr for which any two source test results over any consecutive five year period are greater than or equal to 200 ppmv CO at 3% O<sub>2</sub>, the owner/operator shall properly install, properly maintain, and properly operate a CEM to continuously measure CO and O<sub>2</sub>. The owner/operator shall install the CEM within the time period allowed in the District's Manual of Procedures. (Regulation 9-10-502, 1-522)
36. In addition to records required by 9-10-504, the facility must maintain records of all source tests conducted to demonstrate compliance with Parts number 27 and 31. These records shall be kept on site for at least five years from the date of entry in a District approved log and be made available to District staff upon request. (Recordkeeping, Regulation 9-10-504)

## RECOMMENDATION

It is recommended that a Change in Conditions be granted to Tesoro for the following sources:

|             |   |
|-------------|---|
| <b>S904</b> | <b>No. 6 Boiler House</b>                   |
| <b>S908</b> | <b>No. 3 Crude Heater</b>                   |
| <b>S909</b> | <b>No. 1 Feed Prep Heater (F9)</b>          |
| <b>S912</b> | <b>No. 1 Feed Prep Heater (F12)</b>         |
| <b>S913</b> | <b>No. 2 Feed Prep Heater (F13)</b>         |
| <b>S915</b> | <b>Platformer Intermediate Heater (F15)</b> |
| <b>S916</b> | <b>No. 1 HDS Heater (F16)</b>               |
| <b>S917</b> | <b>No. 1 HDS Prefract Reboiler (F17)</b>    |
| <b>S919</b> | <b>No. 2 HDS Heater (F19)</b>               |
| <b>S920</b> | <b>No. 2 HDS Heater (F20)</b>               |
| <b>S921</b> | <b>No. 2 HDS Heater (F21)</b>               |
| <b>S922</b> | <b>No. 5 Gas Plant Debutanizer Reboiler</b> |

|             |   |
|-------------|---|
| <b>S926</b> | <b>No.2 Reformer Splitter Reboiler (F26)</b>                |
| <b>S927</b> | <b>No. 2 Reformer Feed Preheater (F27)</b>                  |
| <b>S928</b> | <b>HDN Reactor A Heater (F28)</b>                           |
| <b>S929</b> | <b>HDN Reactor B Heater (F29)</b>                           |
| <b>S930</b> | <b>HDN Reactor C Heater (F30)</b>                           |
| <b>S931</b> | <b>Hydrocracker Reactor 1 Heater (F31)</b>                  |
| <b>S932</b> | <b>Hydrocracker Reactor 2 Heater (F32)</b>                  |
| <b>S933</b> | <b>Hydrocracker Reactor 3 Heater (F33)</b>                  |
| <b>S934</b> | <b>Hydrocracker Stabilizer Reboiler (F34)</b>               |
| <b>S935</b> | <b>Hydrocracker Splitter Reboiler (F35)</b>                 |
| <b>S937</b> | <b>Hydrogen Plant Heater (F37)</b>                          |
| <b>S950</b> | <b>No. 50 Unit Crude Feed Heater (F50) &amp; A1432</b>      |
| <b>S951</b> | <b>No. 2 Reformer Aux Reheater (F51)</b>                    |
| <b>S971</b> | <b>No. 3 Reformer Feed Preheater (F53) &amp; A1433</b>      |
| <b>S972</b> | <b>No. 3 Reformer Dubtanizer Reboiler (F54) &amp; A1433</b> |
| <b>S973</b> | <b>No. 3 HDS Recycle Gas Heater (F55)</b>                   |
| <b>S974</b> | <b>No. 3 HDS Fractionator Feed Heater (F56)</b>             |

By: \_\_\_\_\_  
Arthur Valla  
Senior Air Quality Engineer

\_\_\_\_\_  
February 26, 2013



**Appendix A -- Tesoro Appeal Item Details**

|      |  |              |   |
|------|--|--------------|---|
| 17   |  | S971<br>S972 | <b>Condition 18372, Parts 20, 21, 22, and 27 incorrectly require that S971 and S972 both be abated by A1433 SCR and that the exhaust gas from A1433 be monitored with NOx, O2, and CO CEMS. Prior to Application 19874/19875, Condition 18372, Part 21 included a conditional statement that read, “Part 21 of these conditions shall not take effect until Permittee/Owner/ Operator exercises the portion of Authority to Construct #2209 authorizing the abatement of S-972 with A-1433.” In fact, the portion of Authority to Construct #2209 authorizing the abatement of S972 with A1433 was never exercised, and the statement quoted above was incorrectly removed from Part 21 by Application 19874/19875. In the final as-built configuration for the S971/S972, the combustion exhaust from the much larger S971 (300 MMBTU/hr) is abated by A1433 SCR, and the exhaust gas from A1433 is vented to stack P76. The combustion exhaust from the S972 (45 MMBTU/hr) is not abated and is vented directly to stack P76 where it mixes with the exhaust gas from A1433. The combined exhaust gases in stack P76 are then monitored by NOx, O2, and CO CEMS. Permit application 23006/23007 has been submitted requesting changes to Parts 20, 21, 22, and 27 of Condition 18372 to correctly state the abatement and monitoring requirements for S971 and S972. The associated errors in the 06/28/2011 Title V permit are listed below.</b> |
| 17.1 | Table II-A.1                                 | S971         | Change Description to read:<br>“Abated by A-1433 SCR. A1433 vents to combined stack with S-972”   |
| 17.2 | Table II-A.1                                 | S972         | Delete “Abated by A-1433 SCR on combined stack with S-971”<br>Add “NOTE: S972 Shares stack with S971, but flue gas from S972 is not abated by A1433 SCR”  |
| 17.3 | Table II B<br>A1433, row 1                   | S971<br>S972 | Delete “S972” from Sources Controlled column<br>Change 1 <sup>st</sup> Applicable Requirement to “BAAQMD<br>Condition 18372, part 20 “  |
| 17.4 | Table II B<br>A1433, row 2                   | S971<br>S972 | Add following NOTE to Description column: “NOTE: S971 and S972 share a common stack and the combined NOx emissions are monitored in the common stack downstream of A1433 for compliance with Condition 8077, Part B7A, but only the S971 emissions are abated by A1433. The flue gas from S972 is not routed through A1433.”<br><br>Delete “S972” from Sources Controlled column<br>Add following NOTE to Sources Controlled column: “(Abated S971 combined with unabated S972 exhaust gas prior to monitoring – see NOTE)”   |
| 17.5 | Table IV-C.4.3<br>Condition<br>18372 Part 20 | S971<br>S972 | Change Description to read, “S971 to be abated by A1433.<br>Combined S971, S972 exhaust monitored by P-76 NOx, CO, O2<br>CEM (Regulation 9-10)”   |
| 17.6 | Table IV-C.4.3<br>Condition<br>18372 Part 21 | S971<br>S972 | Delete Part 21  |

|           |  |              |  |
|-----------|--|--------------|--|
| 17.7      | Table IV-C.4.3<br>Condition<br>18372 Part 22               | S971<br>S972 | Delete “and S972” from Description   |
| 17.8      | Section VI<br>Condition<br>18372 Part 20                   | S971<br>S972 | Change Part 20 to read:<br>“Combustion exhaust from S-971 shall be ducted to and continuously abated by A-1433 shall be vented to stack P-76. Combustion exhaust from S-972 shall be vented to stack P-76. The combined exhaust gases from S-971/A-1433 and S-972 whenever a fuel is fired at S-971 and the exhaust gasses from A-1433 shall be measured by a District approved CEM that continuously monitors and records the emission rate of NOx, CO, and O2 in the exhaust gasses. (basis: Regulation 9, Rule 10)”   |
| 17.9      | Section VI<br>Condition<br>18372 Part 21                   | S972         | Delete Part 21   |
| 17.10     | Section VI<br>Condition<br>18372 Part 22                   | S972         | Change Part 22 to read:<br>“For each of S-927, S-950, and S-971, ammonia slip from the SCR system abating the source shall not exceed 20 ppmv, dry, corrected to 3% oxygen. (basis: toxics)”   |
| 17.11     | Section VI<br>Condition<br>18372 Part 27                   | S972         | In Part 27:<br>Delete “& 1433” from S972   |
| 17.12     | Table VII-C.4.3<br>Row 1                                   | S971<br>S972 | For monitoring for 400 ppm CO Limit from 9-10-305, Add “S972” to the S971 Monitoring Requirement<br>Delete the separate S972 Monitoring Requirements   |
| 17.13     | Table VII-C.4.3<br>Row 12                                  | S972         | Delete “S972” from NH3 slip (S971, S972) row   |
| 17.14     | Table VII-C.4.3<br>Rows 13, 14,<br>16                      | S971<br>S972 | For the three NOx limit rows for BAAQMD 9-10-301, BAAQMD 9-10-303, and Condition 8077, Part B7A (S971, S972):<br>Add “S972” to each S971 Monitoring Requirement<br>Delete all separate S972 Monitoring Requirements  |
| <b>18</b> | <b>Section VI<br/>Condition<br/>18372<br/>Introduction</b> |              | <b>Several of the NOx control descriptions in the introduction to Condition 18372 are incorrect. The NOx control descriptions in the introduction to Condition 18372 reflect what was originally proposed in Application 2209 – NOx Controls Phase II, Regulation 9-10 Control Plan in 2001. Application 2209 and the associated NOx Control Plan were subsequently modified by Applications 3460 and 5861, but the introduction to Condition 18372 was not updated to reflect the changes in the NOx Control Plan. In all cases, there may be future changes in the NOx controls for these sources. It is misleading to leave this unnecessary information in Condition 18372 when it is now outdated or could become outdated in the future. Permit application 23006/23007 has been submitted requesting that all information be removed from the introduction to Condition 18372. The associated errors in the 06/28/2011 Title V permit are listed below.</b> |

|           |   |  |  |
|-----------|---|--|--|
| 18.1      | Section VI<br>Condition<br>18372<br>Introduction                    |  | Delete source listing with descriptions. Add “See Part 27 for the list of sources for this permit condition”   |
| <b>19</b> | <b>Section VI<br/>Condition<br/>18372<br/>Parts 29B and<br/>31B</b> |  | <b>Condition 18372, Part 29B and Part 31B, as currently written, define “low firing rate conditions” as less than or equal to 20% of the unit’s rated capacity. District Regulation 9, Rule 10 was revised on December 15, 2010. In that revision, paragraph 9-10-222 was added to define Curtailed Operation as operation at no more than 30% of the rated heat capacity. Regulation 9-10-301 was also revised on December 15, 2010 to include curtailed operation and to provide new methods to calculate the emissions from sources undergoing startup or shutdown, that are temporarily out of service, or that are in curtailed operation. Permit application 23006/23007 has been submitted to revise Parts 29B and 31B to change the definition of “low firing rate conditions” from 20% to 30% of maximum rated capacity and to revise Part 31B to incorporate the changes in paragraph 9-10-301. The associated errors in the 06/28/2011 Title V permit are listed below.</b> |
| 19.1      | Section VI<br>Condition<br>18372<br>Part 29B                        |  | Change “20%” to “30%”  |
| 19.2      | Section VI<br>Condition<br>18372<br>Part 31B                        |  | Part 31B to read: “Part 31A does not apply during startup or shutdown periods, periods of curtailed operation (firing rate less than or equal to 30% of the unit’s rated heat input), or to units temporarily out of service. During these conditions compliance with the refinery wide limit shall be determined using the methods described in 9-10-301.4 and 9-301.5.”  |

## Appendix B – Tesoro Regulation 9, Rule 10 NOx Compliance Plan

The chronology of the NOx Control Plan required to comply with the amendments of Regulation 9, Rule 10 is as follows. (SCR = Selective Catalytic Reduction; ULNB = Ultra Low NOx Burners)

Prior to the NOx Compliance Plan:

S-908 New LNB proposed, and in final scope SCR added via 1989 Application 3318.

| Phase 1 proposed this: | What Happened is this:                               |
|------------------------|--|
| S-904 New SCR          | New SCR (via 1999 App. 19418, AC 5/18/00, PO 2/5/04) |
| S-919 New ULNB         | Not Implemented                                      |
| S-920 New ULNB         | Not Implemented                                      |
| S-937 New ULNB         | Not Implemented                                      |
| S-928 New ULNB         | Not Implemented                                      |
| S-929 New ULNB         | Not Implemented                                      |
| S-930 New ULNB         | Not Implemented                                      |
| S-931 New ULNB         | Not Implemented                                      |
| S-932 New ULNB         | Not Implemented                                      |
| S-933 New ULNB         | Not Implemented                                      |

Phase 2 proposed this in 1999 Application 2209:

|                            |   |
|----------------------------|---|
| S-912 New ULNB             | Implemented during original AC period           |
| S-913 New ULNB             | Not Implemented (Removed in Application 5861)   |
| S-916 New ULNB             | Not Implemented (Removed in Application 5861)   |
| S-921 New ULNB             | Not Implemented (Removed in Application 5861)   |
| S-922 New ULNB             | Not Implemented (Removed in Application 5861)   |
| S-924 New ULNB             | Not Implemented (Removed in Application 3460)   |
| S-927 New SCR              | Implemented during 1 <sup>st</sup> AC extension |
| S-934 New ULNB             | Not Implemented (Removed in Application 3460)   |
| S-935 New ULNB             | Not Implemented (Removed in Application 3460)   |
| S-950 New SCR              | Implemented during 1 <sup>st</sup> AC extension |
| S-951 Duct to SCR on S-927 | Not Implemented (Removed in Application 5861)   |
| S-971 New SCR              | Implemented during 1 <sup>st</sup> AC extension |
| S-972 Duct to New SCR      | Not Implemented (Removed in Application 5861)   |

Amendment to Phase 2 via 2001 Application 3460:

|                |   |
|----------------|---|
| S-919 New ULNB | Originally in Phase 1, Not Implemented          |
| S-920 New ULNB | Originally in Phase 1, Not Implemented          |
| S-926 New ULNB | Implemented during 1 <sup>st</sup> AC extension |

Removed from Phase 2 by Application 3460:

|                |
|----------------|
| S-924 New ULNB |
| S-934 New ULNB |

S-935 New ULNB

Amendment to Phase 2 via 2002 Application 5861:

S-908 New ULNB Not Implemented

Removed from Phase 2 by Application 5861:

S-913 New ULNB

S-916 New ULNB

S-921 New ULNB

S-922 New ULNB

S-951 Duct to new SCR (S-927)

S-972 Duct to S-971 SCR

Therefore, after all the amendments, the final Ultramar (currently Tesoro) NOx Control Plan was as follows:

S-904 New SCR Implemented via Application 19418

S-908 New SCR Implemented via Application 3318

S-912 New ULNB Implemented via Application 2209

S-926 New ULNB Implemented via Application 2209

S-927 New SCR Implemented via Application 2209

S-950 New SCR Implemented via Application 2209

S-971 New SCR Implemented via Application 2209

Based on this chronology, the following is the final NOx Compliance Plan configuration with edits tracked from the Renewed Title V permit language:

S-904 No. 6 Boiler; Riley Stoker, Maximum Firing Rate: 775 MMBtu/hr, with Babcock and Wilcox Selective Catalytic Reduction System including Babcock-Hita catalyst

S-908 No. 3 Crude Unit, Alco Products, Maximum Firing Rate: 220MMBtu/hr, with Babcock and Wilcox Selective Catalytic Reduction System

S-912 No. 12 Furnace F-12; Born, Maximum Firing Rate: 135 MMBtu/hr, No. 1 Feed Prep Unit Vacuum Residuum Feed Heater with Callidus Technologies Inc. Ultra Blue (CUB) Ultra Low NOx Burners ~~LE-CSG-W Low NOx Burners or equivalent~~

S-913 No. 13 Furnace F-13; Petrochem, Vertical Cylindrical, Maximum Firing Rate: 59 MMBtu/hr, No. 2 Feed Prep Unit Vacuum Residuum Feed Heater with Callidus Technologies Inc. (CUBL) Ultra Low NOx Burners ~~LE-CSG Low NOx Burners or equivalent~~

S-916 No. 1 HDS Charge Heater F-16; Braun, Cabin; Maximum Firing Rate: 55 MMBtu/hr with Callidus Technologies Inc.-., Low NOx Burners (previous generation). ~~LE-CSG-W Low NOx Burners or equivalent~~

S-919 No. 2 HDS Charge Heater, No. 19 Furnace, Foster Wheeler, Maximum Firing Rate: 65 MMBtu/hr with Callidus Technologies Inc. LE-CSG-W Low NOx Burners ~~or equivalent~~

S-920 No. 2 HDS Charge Heater, No. 20 Furnace, Foster Wheeler, Maximum Firing Rate: 63 MMBtu/hr with Callidus Technologies Inc. LE-CSG-W Low NOx Burners ~~or equivalent~~

S-921 No. 2 HDS Charge Heater F-21; Foster Wheeler, Cabin; Maximum Firing Rate: 63 MMBtu/hr ~~with Callidus Technologies Inc. LE-CSG-W Low NOx Burners or equivalent~~

S-922 No. 5 Gas Plant Debutanizer Reboiler F-22; Petrochem, Vertical Cylindrical; Maximum Firing Rate: 130 MMBtu/hr with McGill Low NOx Burners ~~Callidus Technologies Inc. LE-CSG-W Low NOx Burners or equivalent~~

S-926 No. 2 Reformer Splitter Reboiler, No. 26 Furnace, Petrochem, Maximum Firing Rate: 145 MMBtu/hr with Callidus Technologies Inc. Ultra Blue Retrofit (CUBR) Ultra Low NOx Burners ~~LE-CSG-W Low NOx Burners or equivalent~~

S-927 No. 2 Reformer Reactor Feed Preheater F-27; Lummus Multicell Cabin; Maximum Firing Rate: 280 MMBtu/hr abated by A-1431 Technip Selective Catalytic Reduction System w Hitachi Catalyst ~~or equivalent~~

S-950 No. 50 Unit Crude Feed Heater F-50; Alcorn, Box; 440 MMBtu/hr abated by A-1432 Technip Selective Catalytic Reduction System w Hitachi Catalyst ~~or equivalent~~

S-971 No. 3 Reformer Feed Preheater F-53; KTI, Multicell Box; Maximum Firing Rate: 300 MMBtu/hr abated by A-1433 Technip Selective Catalytic Reduction System w Hitachi Catalyst ~~or equivalent~~

S-972 No. 3 Reformer Debutanizer Reboiler F-54; KTI, Vertical Cylindrical; Maximum Firing Rate: 45 MMBtu/hr with McGill conventional raw gas burner. abated by A-1433 Technip Selective Catalytic Reduction System w Hitachi Catalyst or equivalent

For S-904, S-908, S-912, S-926, S-927, S-950 and S-971, the updates shown above are for the modified sources. For the sources not part of the final compliance plan, S-913, S-916, S-919, S-920, S-921, S-922 and S-972, the revisions reflect the current (2012) detail of the source.

### Appendix C – Permit Condition 18372, Part 3

Condition 18372, Part 3, is shown in the Title V permit as follows:

- 3.) Permittee/Owner/Operator shall ensure that the maximum firing rate of each source listed does not exceed the corresponding HHV maximum firing rate, based on an operating day average (the amount of fuel fired over each 24 hour day divided by 24:

| Source<br>(#) | Maximum Firing Rate (HHV)<br>(mmBtu/hr) | Maximum Firing Rate (HHV)<br>(mmBtu/yr) |
|---------------|---|---|
| S-912         | 135                                     | 1,182,600                               |
| S-913         | 59                                      | 516,840                                 |
| S-916         | 55                                      | 481,800                                 |
| S-919         | 65                                      | 569,400                                 |
| S-920         | 63                                      | 551,880                                 |
| S-921         | 63                                      | 551,880                                 |
| S-922         | 130                                     | 1,138,800                               |
| S-926         | 145                                     | 1,270,200                               |
| S-927         | 280                                     | 2,452,800                               |
| S-950         | 440                                     | 3,854,400                               |
| S-971         | 300                                     | 2,628,000                               |
| S-972         | 45                                      | 394,200                                 |

(basis: Regulation 9, Rule 10)

Tesoro proposed the deletion of these firing rates because they are redundant with other requirements, namely Permit Condition 16685.

The firing rates in Part 3 were the basis for the emission calculations in 2001 Ultramar Application 2209 for Phase I of the NOx Compliance Plan. For S-927, S-950, S-971 and S-972, the firing rates were used to calculate toxic emissions (ammonia, since these were SCR sources in the application). For the other sources, the Application 2209 firing rates were considered alterations.

For Condition 16685, the firing rates were imposed for billing purposes and to stop the “capacity creep” problem. Condition 16685 was created without an application pursuant to Regulation 2-1-403 and the intended use of the firing rates, outside billing, is not documented in an engineering evaluation. Therefore, even though the firing rate numbers themselves are identical, it would not be totally accurate to say the firing rates in the two conditions are redundant since the creation of the firing rates in the two conditions have different bases. The only similarity of the firing rates, besides the numerical value, is the fact that neither firing rate is considered a NSR limit since, at the time the condition was created, the source was not subject to the requirements of Regulation 2, Rule 2.

Secondly, Condition 18372, Part 3 was deleted via 2009 Application 19874. This deletion was eventually considered unacceptable to Tesoro and the firing rates were reinstated via 2010 Application 21464.

Lastly, the firing rates in Part 3 are not NSR limits. To make this clear, in Tesoro Application 23194 clarifying language was added (as amended by mutual agreement between Kevin Poloncarz for Tesoro and Randi Wallach for the District) to Part 3 as follows:

3. Permittee/Owner/Operator shall ensure that the maximum firing rate of each source listed does not exceed the corresponding HHV maximum firing rate, based on an operating day average (the amount of fuel fired over each 24 hour day divided by 24:

| Source (#) | Maximum Firing Rate (mmBtu/hr) | Maximum Firing Rate (HHV) (mmBtu/yr) |
|------------|--------------------------------|--------------------------------------|
| S-912      | 135                            | 1,182,600                            |
| S-913      | 59                             | 516,840                              |
| S-916      | 55                             | 481,800                              |
| S-919      | 65                             | 569,400                              |
| S-920      | 63                             | 551,880                              |
| S-921      | 63                             | 551,880                              |
| S-922      | 130                            | 1,138,800                            |
| S-926      | 145                            | 1,270,200                            |
| S-927      | 280                            | 2,452,800                            |
| S-950      | 440                            | 3,854,400                            |
| S-971      | 300                            | 2,628,000                            |
| S-972      | 45                             | 394,200                              |

These firing limits are enforceable not-to-exceed limits used to determine the NOx emission reductions required by the NOx Compliance Plan. These firing limits are not considered firm New Source Review emissions limits since these sources were not subject to Regulation 2, Rule 2 when this condition was created. (basis: Regulation 9, Rule 10)

[The original clarifying language included a sentence that stated if any of the listed sources were subject to Regulation 2, Rule 2, the firing rate, emissions limits and other associated requirements would be contained in a separate enforceable permit condition. Tesoro correctly pointed out that some sources were subject to NSR – either Regulation 2, Rule 2, or prior to the adoption of Regulation 2, Rule 2, without the creation of permit conditions. Therefore, by mutual agreement between Randi L. Wallach, Esq., District Assistant Counsel, and Kevin Poloncarz, Esq. for Tesoro, this sentence was deleted.]

The Authority to Construct for Application 23194 was granted 8/22/11, and the final clarifying language was agreed to after that. The proposed deletion of the Part 3 firing rates pre-dates this agreement. Therefore, it is not recommended to make the proposed deletion of the firing rates from Part 3 since the Part 3 language has been the subject of an agreement since this application.





## Appendix D – A-1433 SCR Abatement Correction

There was lengthy discussion between Tesoro and the District regarding this proposed correction. The question that arose in the review of this application is how is S-972 compliance determined. Both S-971 and S-972 have 75 ppm (corrected to 3% O<sub>2</sub>) NO<sub>x</sub> limits in Permit Condition 8077-B7A. This 75ppm limit was imposed when S-971 and S-972 were first permitted via 1978 Tosco NSR Application 24465. The common stack has a NO<sub>x</sub> CEM on it, but this CEM measures the total exhaust stream concentration. When both S-971 and S-972 were proposed to be abated with A-1433 SCR (as was proposed in the 2001 Ultramar Application 2209), a common stack CEM was adequate monitoring. However, with S-972 not abated, the configuration allows S-972 to exceed the 75 ppm NO<sub>x</sub> limit and any exceedances would be undetectable since only the combined emissions are monitored. Several options were explored:

1. Source Testing S-972. Tesoro indicated that this option was not feasible because the exhaust duct configuration did not allow the a source test to comply with the requirements in the Manual of Procedures.
2. CEM readings without S-971 operating. Tesoro indicated that S-972 cannot be operated independently of S-971 under normal operations.
3. CEM readings with only S-972 operation during a special test. Tesoro considered this option unacceptable because any results would not be representative of emissions during normal operation.

With no ability to measure actual emissions, a last option was suggested:

4. Design data for the burners. Tesoro indicated that there was no design data available for the burners installed in S-972. Tesoro could find a NO<sub>x</sub> guarantee of 60ppm for the original design of S-971. Since these furnaces were designed at the same time, Tesoro believes it is likely that S-972 is also designed for the 60 ppm NO<sub>x</sub> guarantee.

While this discussion was transpiring, Tesoro found a sample point in the S-972 exhaust duct that could be used (although not compliant with the Manual of Procedures). In a phone conversation with ERM, a consultant for Tesoro, the District was advised that Tesoro used a portable analyzer that demonstrated that S-972 did indeed meet the 75ppm NO<sub>x</sub> limit of Condition 8077-B7A. Tesoro did not provide any test data or results. Nonetheless, the NO<sub>x</sub> CEM on the common stack provides accurate NO<sub>x</sub> emission monitoring.

[There was 2001 documentation provided from Tesoro files that Tesoro interpreted to mean the District accepted the common stack CEM for S-972 emissions. A review of the documentation showed that the purpose of the document was for the Source Test Section to approve source test

sample point locations of seven sources. In the sample point document proposed by Ultramar (previous owners of the Golden Eagle Refinery), there was no source test sample point proposed for S-972. The document did refer to and show in an attached sketch the CEM location for the S-971/S-972 common stack. However, since there was no source test sample point location proposed, it would be inappropriate to conclude that no source test sample point in the proposal means the Source Test Section was approving no source test sample location. In the December 3, 2001 letter from Gary Fend of the District's Source Test Section to Sharon Lim of Ultramar, only the sampling locations summarized in the Ultramar proposal were deemed acceptable. A sampling location for S-972 was not included in the proposal.]

In summary, S-972 is not abated by A-1433 SCR, and never has been, contrary to the information in the District record and over 5 years of Title V permits. NO<sub>x</sub> emissions for S-972 are reported in the quarterly 9-10 report grouped with S-971 and are based on the CEM in the common stack. It is likely that S-972 complies with the 75 ppm NO<sub>x</sub> limit of Condition 8077, Part B7A. If for some reason S-972 NO<sub>x</sub> emissions exceed the 75 ppm limit, NO<sub>x</sub> control on S-971 will compensate and a CEM on the common stack will ensure overall NO<sub>x</sub> emissions do not exceed 75 ppm. Removing the A-1433 from S-972 in Table II-A1 and in Table II-B of the Renewed Title V permit is justified.

## Appendix E – Engineering Evaluation of Proposed Changes to Curtailed Operation

Condition 18372 is the parametric monitoring system that is allowed by Regulation 9-10-502 instead of installing a NO<sub>x</sub>, carbon monoxide (CO) and oxygen (O<sub>2</sub>) continuous emissions monitoring (CEM) on the affected source. Regulation 9-10-502 is included in Appendix 1. This CEM-equivalent parametric monitoring system is also known as the NO<sub>x</sub> Box, and Condition 18372 is known as the NO<sub>x</sub> Box Condition. Condition 18372 is included in Appendix 2.

The NO<sub>x</sub> Box parametric monitoring system is an operating window for the source designated in terms of firing rate for the source and oxygen content in the flue gas. Tesoro has 16 NO<sub>x</sub> Box sources. The initial operating windows for the sources were established in 2007 Application 15682, based on District approved source tests. The firing rate, oxygen content, and NO<sub>x</sub> emission factor determined from these source tests are detailed in Condition 18372, Part 31A. As long as the source is operated in operating window defined in Condition 18372, Part 31A, the NO<sub>x</sub> emission factor defined in Part 31A is used for the daily emissions calculations required to determine compliance with the 0.033 lb NO<sub>x</sub> per MMBtu Refinery-wide NO<sub>x</sub> Emission Limit (Regulation 9-10-301). There are semiannual or annual source tests required to verify that the source is operated in the operating window. There are provisions to cover the case where a source is not operating “in-the-box”. If for any reason the source is operated “out-of-the-box” and the refinery does not comply with the Condition 18372 provisions to correct this situation, then the source does not qualify for the parametric monitoring system and pursuant to Regulation 9-10-502, a NO<sub>x</sub>, CO and O<sub>2</sub> CEM is required.

Condition 18372 was developed in the early 2000s by discussions and negotiations between the District and the Western States Petroleum Association (WSPA). The write-up that serves to document the intent and detail of this monitoring system was contained in the Statement of Basis for Revision 1 of the Tesoro Refining and Marketing Company’s Title V Permit issued December 16, 2004. This write-up is in Part C., Permit Content, Section VI., Permit Conditions, and is entitled "Regulation 9-10 Background Analysis and Basis for Conditions" under Condition # 18372. This write-up is included in Appendix 3.

The key provisions of the NO<sub>x</sub> Box Condition 18372 that are addressed by this application are the Small Unit NO<sub>x</sub> Box contained in Part 29B and the Low Fire Exemption contained in Part 31B. The changes proposed by this application are shown below:

29B. ~~The NO<sub>x</sub> Box for units with a maximum firing rate less than 25 MMBtu/hr shall be established as follows: High-fire shall be the maximum rated capacity. Low-fire shall be 30% of the maximum rated capacity. There shall be no maximum or minimum O<sub>2</sub>.~~

31B ~~Part 31A. does not apply to low firing rate conditions (i.e., firing rate less than or equal to 20% of the unit’s rated capacity); during startup or shutdown periods, or periods of curtailed operation (firing rate less than or equal to 30% of the unit’s rated heat~~

~~inputex. during heater idling, refractory dryout, etc.) lasting 5 days or less. During these conditions the means for determining compliance with the refinery-wide limit shall be accomplished-determined using the method described in 9-10-301.42 and 9-10-301.5(i.e. units out of service & 30-day averaging data).~~

There are two proposed changes that may potentially impact emissions:

1. Changing the curtailed operation definition from 20% to 30%, and
2. Allow unlimited curtailed operation (no 5-day limit).

Tesoro frames this application simply to revise Permit Condition 18372 to "match" the 2010 amendment to Regulation 9, Rule 10.

However, a detailed review of the proposed changes indicates that there is a conflict with the original purpose and intent of the NOx Box Parametric Monitoring System (see Appendix 4). More importantly, this evaluation determined that there is an emissions impact for the proposed changes.

## II. EMISSION CALCULATIONS

It is difficult to determine the emissions impact of the proposed changes because the NOx emission factors are not known at low-fire conditions. All of the required source tests are completed at or close to "in-the-box" operating conditions, either during the testing that led to the 2007 initial NOx Box establishment or during the required periodic re-testing.

Therefore, it is assumed that during low-fire operation, the NOx emissions factor would be similar to a conventional burner emissions factor (120 ppm @ 3% O<sub>2</sub> or 0.145 lb/MMBtu). Using this emission factor would likely result in an estimate of the worst case potential emissions impact since any burner in a combustion source has the potential to act like a conventional burner at low-fire conditions (especially with no restriction on oxygen content).

### Potential NOx Emissions Impact

To determine the total potential emissions impact for the proposed changes, an evaluation of all 16 NOx Box sources is required.

An analysis of all 16 sources was not completed. Once it was determined that the proposed change in conditions for "Curtailed Operations" were not administrative, the purpose of this evaluation switched from a quantitative assessment of the emissions impact to a demonstration that there is a potential emissions impact (which would then disqualify the proposed changes from being administrative).

To demonstrate the emissions impact of this application, S-912 No. 1 Feed Prep Heater F-12 was evaluated. S-912 was selected because it has a high firing rate (of the NOx Box sources) and because curtailed operation is sufficiently removed from NOx Box

operating window. The details of the Tesoro Process Heaters and of S-912 are included in Appendix 5.

S-912 is rated at 135 MM Btu/hr. To evaluate the impact of the 30% low fire exemption, S-912 is assumed to operate at 29% of maximum fire for 365 days per year. This operation is unlikely, but the requested changes to Condition 18372 would allow this operation, so it is valid for this evaluation to estimate the potential emissions impact.

$$\begin{aligned}\text{S-912 NOx emissions} &= 135 * .29 * 0.145 \text{ lb/MM} = 5.677 \text{ lb NOx/hr} \\ &= 136 \text{ lb NOx/day} = 49,728 \text{ lb NOx/yr} \\ &= 24.864 \text{ ton/yr NOx emissions}\end{aligned}$$

However, when S-912 is in curtailed operation, Tesoro is allowed to use "normal" operation NOx emissions in its daily 9-10 compliance determination. A review of the Tesoro 9-10 compliance reports shows that 50 lb/day of NOx emissions are used for S-912 "normal" emissions when Tesoro uses the data substitution allowances of Regulation 9-10-301. Assuming that this 50 lb/day data substitution would be typical of future data substitutions, the NOx emissions underreporting would be as follows:

$$\begin{aligned}\text{Underreported NOx} &= \text{Calculated NOx} - \text{Reported NOx} \\ &= 136 \text{ lb/day} - 50 \text{ lb/day} \\ &= 86 \text{ lb/day}\end{aligned}$$

$$\text{Annual NOx Underreporting} = 86 \text{ lb/day} * 365 / 2000 = 15.695 \text{ tons NOx/yr}$$

Therefore, for the single source S-912, the potential underreported NOx emissions due to unlimited 30% curtailed operation is estimated at about 16 tons/yr. It is not certain that the other 15 NOx Box sources will have emission impacts of the same magnitude. However, directionally the emissions impacts for all 16 NOx Box sources do have the potential to be higher than 16 ton/yr.

This underreporting of NOx emissions allows Tesoro to increase NOx emissions at any of the other sources subject to Regulation 9, Rule 10. Therefore, if S-912 is operating in curtailed operation and the refinery is just complying with the Regulation 9-10-301 0.033 lb NOx/MMBtu limit, then the S-912 NOx underreporting allows the refinery to report compliance with the Regulation 9-10-301 limit when in fact, the refinery is not in compliance with the limit. A detailed quantification and evaluation of this regulatory compliance impact is included in Appendix 6.

#### NOx Emissions Impact Based On Operating Data

On April 12, 2012, Tesoro provided two years of operation data for the NOx Box sources impacted by this application. These data included daily firing rates for each NOx Box source, but did not include any flue gas Oxygen content. Tesoro's review and evaluation of this data concluded that the changes requested by this application would impact emissions between 0.30 and 2.3 tons of NOx per year. This evaluation was similar to one completed for the Valero application for the similar NOx Box change in conditions.

However, a detailed review of the calculations determined that the emission impacts calculated by Tesoro were actually a comparison of the two data substitution methods

allowed by the amended Regulation 9-10-301, not the impact of the actual proposed condition changes. Furthermore, all of the calculations were based on the NOx Box emission factors, which would not apply during curtailed operation outside of the NOx Box.

The operating data submitted by Tesoro show a 45-day period of curtailed operation for S-912 in early 2010. A review of these data demonstrated the following emission impacts during the 45-day period:

| Proposed Change | Number of Days Impacted | Calculated Average NOx Lb/day | Reported NOx Lb/day | Average Under-reported NOx lb/day | Equivalent Annual Underreporting =Lb/day*365/2000 |
|-----------------|-------------------------|-------------------------------|---------------------|-----------------------------------|---|
| 20% -> 30%      | 7 Days                  | 112                           | 50                  | 62                                | 11.3 tons/yr                                      |
| No 5-day limit  | 40 Days                 | 53.3                          | 50                  | 3.3                               | 0.6 tons/yr                                       |

A detailed analysis of this Tesoro operating data is included in Appendix 7.

Therefore, were the 9-10 amendment effective during early 2010, Tesoro would have underreported NOx emissions from S-912 in the 9-10 Compliance Report. Furthermore, this underreporting would have allowed Tesoro to increase NOx emissions from other 9-10 combustion sources and/or to report compliance with the Regulation 9-10-301 Refinery-Wide NOx Emission Limit when in fact, it may not have been in compliance.

### Conclusion

The “Curtailed Operations” changes proposed by Tesoro in this application cannot be approved as an Administrative Change of Conditions. Pursuant to Regulation 3-306.1, an administrative change of conditions cannot result in any increase in emissions. Based on both the potential emission impacts and on selected emission impacts based on the review of actual 2010 operating data, the “Curtailed Operations” changes to Condition 18372 proposed by Tesoro has a potential to increase emissions.

### **III. PLANT CUMULATIVE INCREASE SINCE 4/5/1991**

There is no cumulative increase associated with this application.

### **IV. STATEMENT OF COMPLIANCE**

As explained above, and detailed in Appendix 6, if the changes proposed to Condition 18372, Parts 29B and 31B were approved, Tesoro would be allowed to report compliance with Regulation 9-10-301 Refinery-wide NOx Emission Limit, when in fact it may not be in compliance. Therefore, a Statement of Compliance cannot be proclaimed.

In addition, Tesoro has provided information that indicates the sources impacted by this application may not be in compliance with the CEM-equivalent parametric monitoring system detailed in Permit Condition 18372. If Tesoro is not in compliance with the

CEM-equivalent parametric monitoring system, pursuant to Regulation 9-10-502, a NOx, CO and O2 CEM is required.

## V. CONDITIONS

It is recommended that Permit Condition 18372, Part 31B be revised to clarify the applicability and limited duration of the low fire exemption and also to correct the compliance demonstration requirement by replacing the 9-10-301.2 reference to 9-10-301.4. 9-10-301.2 was deleted from the rule when Regulation 9, Rule 10 was amended on 12/15/2010. A detailed discussion of this recommended clarification is contained in Appendix 8. This recommended revision to 18372-31B is as follows:

31B Part 31A- does not apply to low firing rate conditions. Low (i.e., firing rate conditions are any operation less than or equal to 20% of the unit's rated capacity.); There are three types of low fire operation:

- 1) during startup periods,
- 2) during shutdown periods, or
- 3) during periods of curtailed operation (~~ex. during heater idling, refractory dryout, etc.)~~

Curtailed operation (i.e., all low fire operation that is not during a startup or shutdown period) is limited to lasting 5 days or less. During these low fire conditions the means for determining compliance with the refinery-wide limit shall be accomplished using the method described in Regulation 9-10-301.42 (i.e., units in Start-up or Shutdown or in Curtailed Operation out of service & 30 day averaging data).

After the recommended revisions, Part 31B would read as follows:

31B Part 31A does not apply to low firing rate conditions. Low firing rate conditions are any operation less than or equal to 20% of the unit's rated capacity. There are three types of low fire operation:

- 1) during startup periods,
- 2) during shutdown periods, or
- 3) during periods of curtailed operation .

Curtailed operation (i.e., all low fire operation that is not during a startup or shutdown period) is limited to lasting 5 days or less. During these low fire conditions the means for determining compliance with the refinery-wide limit shall be accomplished using the method described in Regulation 9-10-301.4 (i.e., units in Start-up or Shutdown or in Curtailed Operation).

## IX. RECOMMENDATION

District Staff recommends that the proposed change to NOx Box Condition 18372, Parts 29B and 31B not be approved via this Application 23006 for an Administrative Change of Conditions. It is recommended that a new NSR Application be created to address the proposed changes as a NSR Change of Conditions.



Permit Evaluation and Statement of Basis: Site B2758 & B2759, Tesoro Refining & Marketing Company, LLC,  
Golden Eagle Refinery, 150 Solano Way, Martinez, CA 94553

It is also recommended that Condition 18372, Part 31B be administratively changed to clarify the definition and limited duration applicability of the Low Fire Exemption.

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**Arthur Valla**  
**Senior Air Quality Engineer**

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**Draft January 04, 2012**

## **Appendix 1 Regulation 9-10-502**

### **Regulation 9-10-502, Amended December 15, 2010.**

- 9-10-502 Monitoring:** A person subject to Sections 9-10-301, 303, 304, 305 or 307 shall maintain in good working order, and operate the following equipment:
- 502.1 An in-stack nitrogen oxide (NO<sub>x</sub>), carbon monoxide (CO), and oxygen (O<sub>2</sub>) continuous emission monitoring system (CEMS), or equivalent parametric monitoring system as specified in a Title V Permit. The CEMS must meet the requirements of the District Manual of Procedures, Volume V, Continuous Emission Monitoring, Policy and Procedures.
  - 502.2 A fuel-flow meter in each fuel line for each boiler, steam generator and process heater, including each CO boiler.

*(Amended July 17, 2002 and December 15, 2010)*

### **Regulation 9-10-502, Amended July 17, 2002.**

- 9-10-502 Monitoring:** A person subject to Sections 9-10-301, 303, 304, and 305 shall submit to the APCO a monitoring plan to provide, properly install, maintain in good working order, and operate the following equipment:
- 502.1 An in-stack nitrogen oxide (NO<sub>x</sub>), carbon monoxide (CO), and oxygen (O<sub>2</sub>) continuous emission monitoring system (CEMS), or equivalent verification system. The CEMS must meet the requirements of the District Manual of Procedures, Volume V, Continuous Emission Monitoring, Policy and Procedures.
  - 502.2 A fuel-flow meter in each fuel line for each affected unit.

*(Amended July 17, 2002)*

### **Regulation 9-10-502, Adopted January 5, 1994.**

- 9-10-502 Monitoring:** A person subject to Sections 9-10-301, 304, and 305 shall submit to the APCO a monitoring plan to provide, properly install, maintain in good working order, and operate the following equipment:
- 502.1 An in-stack nitrogen oxide (NO<sub>x</sub>), carbon monoxide (CO), and oxygen (O<sub>2</sub>) continuous emission monitoring system (CEMS), or equivalent verification system. The CEMS must meet the requirements of the District Manual of Procedures, Volume V, Continuous Emission Monitoring, Policy and Procedures.
  - 502.2 A fuel-flow meter in each fuel line for each affected unit.

**Appendix 2**  
**Condition 18372**

**Part 1 -- June 28, 2011 Renewed Title V Permit Version**  
**Part 2 -- Databank Version (contains revisions since the Renewal)**

**Part 1 – June 28, 2011 Renewed Title V Permit Version**

Condition 18372

Application #2209 and 16484  
Plant #14628

Application 15682 (April, 2007) Initial establishment of NOx box parameters.  
Delete part 4.

Application 14752 (January 2007) S-927 modification of Part 18.

Application 16888 (April 2008) Modification of S-913

Application 16889 (June 2008) Modification of S-951

Modified by App. 18739 (Nov 2008) Removal of S924 from Parts 27 and 31

Application 19300 (December 2008) Removed S-904 Backup CO Boiler Service

Application 18748 (December 2008) Modification of S-919 Administratively  
Revised via Application 19647 (March 2009) Consolidation of Bubble  
Condition 4357 with Condition 8077

Administratively Revised by Application 19874 (July 2009) Updates for  
Combustion Sources

Application 20359 (June 2009) Modification of S-920

Application 20259 (February 2010) Modification of S-909

Application 17470 (February 2010) Modification of S-916

Application 21732 (May 2010) Modification of S-919

Administratively Reinstated Source List, Part 3 and Part 27 by Application 21464  
(April 2010)

S-904 No. 6 Boiler; Riley Stoker, Maximum Firing Rate: 775 MMBtu/hr

S-912 No. 12 Furnace F-12; Born, Maximum Firing Rate: 135  
MMBtu/hr, No. 1 Feed Prep Unit Vacuum Residuum Feed Heater with  
Callidus Technologies Inc. LE-CSG-W Low NOx Burners or equivalent

S-913 No. 13 Furnace F-13; Petrochem, Vertical Cylindrical, Maximum  
Firing Rate: 59 MMBtu/hr, No. 2 Feed Prep Unit Vacuum Residuum Feed  
Heater with Callidus Technologies Inc. LE-CSG Low NOx Burners or  
equivalent

S-916 No. 1 HDS Charge Heater F-16; Braun, Cabin; Maximum Firing  
Rate: 55 MMBtu/hr with Callidus Technologies Inc. LE-CSG-W Low  
NOx Burners or equivalent

- S-919 No. 2 HDS Charge Heater, No. 19 Furnace, Foster Wheeler, Maximum Firing Rate: 65 MMBtu/hr with Callidus Technologies Inc. LE-CSG-W Low NOx Burners or equivalent
- S-920 No. 2 HDS Charge Heater, No. 20 Furnace, Foster Wheeler, Maximum Firing Rate: 63 MMBtu/hr with Callidus Technologies Inc. LE-CSG-W Low NOx Burners or equivalent
- S-921 No. 2 HDS Charge Heater F-21; Foster Wheeler, Cabin; Maximum Firing Rate: 63 MMBtu/hr with Callidus Technologies Inc. LE-CSG-W Low NOx Burners or equivalent
- S-922 No. 5 Gas Plant Debutanizer Reboiler F-22; Petrochem, Vertical Cylindrical; Maximum Firing Rate: 130 MMBtu/hr with Callidus Technologies Inc. LE-CSG-W Low NOx Burners or equivalent
- S-926 No. 2 Reformer Splitter Reboiler, No. 26 Furnace, Petrochem, Maximum Firing Rate: 145 MMBtu/hr with Callidus Technologies Inc. LE-CSG-W Low NOx Burners or equivalent
- S-927 No. 2 Reformer Reactor Feed Preheater F-27; Lummus Multicell Cabin; Maximum Firing Rate: 280 MMBtu/hr abated by A-1431 Technip Selective Catalytic Reduction System w Hitachi Catalyst or equivalent
- S-950 No. 50 Unit Crude Feed Heater F-50; Alcorn, Box; 440 MMBtu/hr abated by A-1432 Technip Selective Catalytic Reduction System w Hitachi Catalyst or equivalent
- S-971 No. 3 Reformer Feed Preheater F-53; KTI, Multicell Box; Maximum Firing Rate: 300 MMBtu/hr abated by A-1433 Technip Selective Catalytic Reduction System w Hitachi Catalyst or equivalent
- S-972 No. 3 Reformer Debutanizer Reboiler F-54; KTI, Vertical Cylindrical; Maximum Firing Rate: 45 MMBtu/hr abated by A-1433 Technip Selective Catalytic Reduction System w Hitachi Catalyst or equivalent
- 1.) Deleted. (The fuel meter requirement is redundant with Regulation 9-10-502.2.)
  - 2.) Permittee/Owner/Operator shall ensure that each of S-912, S-913, S-916, S-919, S-920, S-921, S-922, S-926, S-927, S-950, S-971, and S-972 is fired exclusively on natural gas and/or refinery fuel gas. (basis: Regulation 9, Rule10)
  - 3.) Permittee/Owner/Operator shall ensure that the maximum firing rate of each source listed does not exceed the corresponding HHV maximum

firing rate, based on an operating day average (the amount of fuel fired over each 24 hour day divided by 24:

| <b>Source (#)</b> | <b>Maximum Firing Rate (HHV) (mmBtu/hr)</b> | <b>Maximum Firing Rate (HHV) (mmBtu/yr)</b> |
|-------------------|---|---|
| S-912             | 135   | 1,182,600                                   |
| S-913             | 59  | 516,840                                     |
| S-916             | 55  | 481,800                                     |
| S-919             | 65  | 569,400                                     |
| S-920             | 63  | 551,880                                     |
| S-921             | 63  | 551,880                                     |
| S-922             | 130   | 1,138,800                                   |
| S-926             | 145   | 1,270,200                                   |
| S-927             | 280   | 2,452,800                                   |
| S-950             | 440   | 3,854,400                                   |
| S-971             | 300   | 2,628,000                                   |
| S-972             | 45  | 394,200                                     |

(basis: Regulation 9, Rule 10)

- 4.) (Deleted: Specific NOx limits should not have been applied to S-912 and S-926, since they are both regulated under Regulation 9-10-301.)
- 5.) Deleted. Replaced with Part 30.
- 6.) Deleted. Replaced with Part 31.
- 7.) Deleted. Replaced with Part 31.
- 8.) Deleted. Replaced with Part 31.
- 9.) Deleted. Replaced with Part 31.
- 10.) Deleted. Replaced with Part 31.
- 11.) Deleted. S-921 is out of service. If returned to service, this part will be replaced with Part 31.
- 12.) Deleted. NOx CEM installed on S-922.
- 13.) Deleted. Replaced with Part 31.
- 14.) Deleted. Replaced with Part 33.
- 15.) Deleted. Replaced with Part 33.
- 16.) Deleted. Replaced with Part 34.
- 17.) Deleted. Replaced with Part 35.

- 18.) Combustion exhaust from S-927 shall be ducted to and continuously abated by A-1431 whenever a fuel is fired at S-927, except startup and shutdown as defined by Regulation 9-10-218 and on a temporary basis for catalyst regeneration at S-1004 No. 2 Catalytic Reformer. The exhaust gasses from S-927 and A-1431 shall be measured by a District approved CEM that continuously monitors and records the emission rate of NO<sub>x</sub>, CO, and O<sub>2</sub> in the exhaust gasses, including periods when S-927 is operated without SCR abatement. (basis: Regulation 9, Rule 10)
- 19.) Combustion exhaust from S-950 shall be ducted to and continuously abated by A-1432 whenever a fuel is fired at S-950 and the exhaust gasses from A-1432 shall be measured by a District approved CEM that continuously monitors and records the emission rate of NO<sub>x</sub>, CO, and O<sub>2</sub> in the exhaust gasses. (basis: Regulation 9, Rule 10)
- 20.) Combustion exhaust from S-971 shall be ducted to and continuously abated by A-1433 whenever a fuel is fired at S-971 and the exhaust gasses from A-1433 shall be measured by a District approved CEM that continuously monitors and records the emission rate of NO<sub>x</sub>, CO, and O<sub>2</sub> in the exhaust gasses. (basis: Regulation 9, Rule 10)
- 21.) Combustion exhaust from S-972 shall be ducted to and continuously abated by A-1433 whenever a fuel is fired at S-972 and the exhaust gasses from A-1433 shall be measured by a District approved CEM that continuously monitors and records the emission rate of NO<sub>x</sub>, CO, and O<sub>2</sub> in the exhaust gasses. (basis: Regulation 9, Rule 10)
- 22.) For each of S-927, S-950, S-971, and S-972, ammonia slip from the SCR system abating the source shall not exceed 20 ppmv, dry, corrected to 3% oxygen. (basis: toxics)
- 23.) Deleted. (The recordkeeping requirement is redundant with Regulation 9-10-504.)
- 24.) Deleted. (The source test log requirement was effective until January 1, 2005, when the NO<sub>x</sub> Box recordkeeping requirements became effective.)
- 25.) Deleted. (The fuel use recordkeeping requirement is redundant with a more stringent Regulation 9-10-504.)
- 26.) Deleted. (S-904 no longer providing backup Coker CO Boiler service so the requirements of Regulation 9-10-304 no longer apply.)

27. The following sources are subject to the refinery-wide NOx emission rate and CO concentration limits in Regulation 9-10. (Regulation 9-10-301, 303, & 305)

| S#   | Description                                  | NOx/CO<br>CEM (Y/N) |
|------|--|---------------------|
| S904 | No. 6 Boiler House                           | Y/Y                 |
| S908 | No. 3 Crude Heater(F8)                       | Y/N                 |
| S909 | No. 1 Feed Prep Heater (F9)                  | N/N                 |
| S912 | No. 1 Feed Prep Heater (F12)                 | N/N                 |
| S913 | No. 2 Feed Prep Heater (F13)                 | N/N                 |
| S915 | Platformer Intermediate Heater (F15)         | N/N                 |
| S916 | No. 1 HDS Heater (F16)                       | N/N                 |
| S917 | No. 1 HDS Prefract Reboiler (F17)            | N/N                 |
| S919 | No. 2 HDS Heater (F19)                       | N/N                 |
| S920 | No. 2 HDS Heater (F20)                       | N/N                 |
| S921 | No. 2 HDS Heater (F21) (out of service)      | N/N                 |
| S922 | No. 5 Gas Plant Debutanizer Reboiler         | Y/N                 |
| S926 | No.2 Reformer Splitter Reboiler (F26)        | N/N                 |
| S927 | No. 2 Reformer Feed Preheater (F27) & A1431  | Y/Y                 |
| S928 | HDN Reactor A Heater (F28)                   | N/N                 |
| S929 | HDN Reactor B Heater (F29)                   | N/N                 |
| S930 | HDN Reactor C Heater (F30)                   | N/N                 |
| S931 | Hydrocracker Reactor 1 Heater (F31)          | N/N                 |
| S932 | Hydrocracker Reactor 2 Heater (F32)          | N/N                 |
| S933 | Hydrocracker Reactor 3 Heater (F33)          | N/N                 |
| S934 | Hydrocracker Stabilizer Reboiler (F34)       | Y/N                 |
| S935 | Hydrocracker Splitter Reboiler (F35)         | Y/N                 |
| S937 | Hydrogen Plant Heater (F37)                  | Y/N                 |
| S950 | No. 50 Unit Crude Feed Heater (F50) & A1432  | Y/Y                 |
| S951 | No. 2 Reformer Aux Reheater (F51)            | N/N                 |
| S971 | No. 3 Reformer UOP Furnace (F53) & A1433     | Y/Y                 |
| S972 | No. 3 Ref Debutanizer Reboiler (F54) & A1433 | Y/Y                 |
| S973 | No. 3 HDS Recycle Gas Heater (F55)           | Y/N                 |
| S974 | No. 3 HDS Fractionator Feed Heater (F56)     | Y/N                 |

28. The owner/operator of each source with a maximum firing rate greater than 25 MMBtu/hr listed in Part 27 shall properly install, properly maintain, and properly operate an O2 monitor and recorder. (Regulation 9-10-502)

29. The owner/operator shall operate each source listed in Part 27, which does not have a NOx CEM, within specified ranges of operating conditions (firing rate and oxygen content) as detailed in Part 31. The ranges shall be established by utilizing data from district-approved source tests. (Reg. 9-10-502)

- A. The NOx Box for units with a maximum firing rate of 25 MMBtu/hr or more shall be established using the procedures in Part 30.

- B. The NO<sub>x</sub> Box for units with a maximum firing rate less than 25MMBtu/hr shall be established as follows: High-fire shall be the maximum rated capacity. Low-fire shall be 20% of the maximum rated capacity. There shall be no maximum or minimum O<sub>2</sub>.
30. The owner/operator shall establish the initial NO<sub>x</sub> box for each source subject to Part 29 . The NO<sub>x</sub> Box may consist of two operating ranges in order to allow for operating flexibility and to encourage emission minimization during standard operation. (Regulation 9-10-502)

The procedure for establishing the NO<sub>x</sub> box is:

- A. Conduct district approved source tests for NO<sub>x</sub> and CO, while varying the oxygen concentration and firing rate over the desired operating ranges for the furnace;
  - B. Determine the minimum and maximum oxygen concentrations and firing rates for the desired operating ranges (Note that the minimum O<sub>2</sub> at low-fire may be different than the minimum O<sub>2</sub> at high-fire. The same is true for the maximum O<sub>2</sub>). The owner/operator shall also verify the accuracy of the O<sub>2</sub> monitor on an annual basis.
  - C. Determine the highest NO<sub>x</sub> emission factor (lb/MMbtu) over the preferred operating ranges while maintaining CO concentration below 200 ppm; the owner/operator may choose to use a higher NO<sub>x</sub> emission factor than tested.
- D. Plot the points representing the desired operating ranges on a graph. The resulting polygon(s) are the NO<sub>x</sub> Box, which represents the allowable operating range(s) for the furnace under which the NO<sub>x</sub> emission factor from part 31A is deemed to be valid.
- 1) The NO<sub>x</sub> Box can represent/utilize either one or two emission factors.
  - 2) The NO<sub>x</sub> Box for each emission factor can be represented either as a 4- or 5-sided polygon. The NO<sub>x</sub> box is the area within the 4- or 5-sided polygon formed by connecting the source test parameters that lie about the perimeter of successful approved source tests. The source test parameters forming the corners of the NO<sub>x</sub> box are listed in Part 31A.
- E. Upon establishment of each NO<sub>x</sub> Box, the owner/operator shall prepare a graphical representation of the box. The representation shall be made available on-site for APCO review upon request. The box shall also be submitted to the BAAQMD with permit amendments.
31. Except as provided in parts 31B & 31C, the owner/operator shall operate each source within the NO<sub>x</sub> Box ranges listed below at all times of



operation. This part shall not apply to any source that has a properly operated and properly installed NOx CEM. (Regulation 9-10-502)

A. NOx Box ranges

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr) | Max O2 at Low Firing (O2% , MMBtu/hr) | Min O2 at High Firing (O2% , MMBtu/hr) | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr) |
|------------|----------------------------|---------------------------------------|---------------------------------------|--|--|--|
| 909        | 0.146                      | 9.5, 27.46                            | 11.7, 30.67                           | 2.1, 83.60                             | 3.1, 67.35   | 5.7, 76.49                             |
|            | 0.148                      | 11.7, 30.67                           | 11.2, 61.81                           | 2.1, 83.60                             | 5.7, 76.49   | 7.3, 79.58                             |
| 912        | 0.027                      | 2.1, 60.50                            | 3.4, 70.10                            | 1.9, 101.51                            | 4.0, 104.13  | 5.4, 100.24                            |
|            | 0.034                      | 2.1, 60.50                            | 7.0, 57.57                            | 5.4, 100.24                            | 3.4, 70.10   | 6.5, 99.68                             |
| 913        | 0.033                      | 1.2, 19.89                            | 3.0, 14.80                            | 1.5, 39.10                             | 2.1, 15.53   | 3.6, 39.45                             |
|            | 0.033                      | 3.0, 14.80                            | 4.5, 15.86                            | 3.6, 39.45                             | N/A  | 4.2, 39.50                             |
| 915        | 0.143                      | 0, 3.85                               | 8.0, 3.85                             | 0.0, 20.00                             | N/A  | 8.0, 20.00                             |
|            | 0.098                      | 8.0, 3.85                             | >8.0, 3.85                            | 8.0, 20.00                             | N/A  | >8.0, 20.00                            |
| 916        | 0.090                      | 5.7, 9.53                             | 9.3, 9.17                             | 5.4, 30.00                             | N/A  | 7.1, 34.00                             |
|            | 0.102                      | 9.3, 9.17                             | 10.6, 24.64                           | 7.1, 34.00                             | N/A  | 10.4, 33.11                            |
| 917        | 0.061                      | 0.0, 3.60                             | -, 3.6                                | 0.0, 18.00                             | N/A  | -, 18.00                               |
| 919        | 0.047                      | 3.9, 23.30                            | 8.7, 18.56                            | 6.6, 58.76                             | 9.2, 39.12   | 8.0, 60.68                             |
|            | 0.056                      | 9.2, 39.12                            | 9.5, 21.10                            | 8.0, 60.68                             | 8.7, 18.56   | 10.1, 47.20                            |
| 920        | 0.046                      | 5.0, 24.84                            | 7.7, 17.86                            | 6.7, 55.12                             | 7.1, 15.34   | 8.0, 60.26                             |
|            | 0.055                      | 7.7, 17.86                            | 10.8, 27.53                           | 8.0, 60.26                             | N/A  | 10.0, 45.15                            |
| 926        | 0.032                      | 1.8, 32.81                            | 6.0, 40.89                            | 2.9, 126.72                            | 4.4, 32.81   | 3.9, 131.59                            |
|            | 0.037                      | 6.0, 40.89                            | 7.0, 77.89                            | 3.9, 131.59                            | N/A  | 4.2, 122.33                            |
| 928        | 0.044                      | 0.0, 4.00                             | < 6.0, 4.00                           | 0.0, 20.00                             | N/A  | < 6.0, 20.00                           |
|            | 0.073                      | 6.0, 4.00                             | > 6.0, 4.00                           | 6.0, 20.00                             | N/A  | > 6.0, 20.00                           |
| 929        | 0.024                      | 0.0, 4.00                             | < 6.0, 4.00                           | 0.0, 20.00                             | N/A  | < 6.0, 20.00                           |
|            | 0.087                      | 6.0, 4.00                             | > 6.0, 4.00                           | 6.0, 20.00                             | N/A  | > 6.0, 20.00                           |
| 930        | 0.033                      | 0.0, 4.00                             | < 6.0, 4.00                           | 0.0, 20.00                             | N/A  | < 6.0, 20.00                           |
|            | 0.077                      | 6.0, 4.00                             | > 6.0, 4.00                           | 6.0, 20.00                             | N/A  | > 6.0, 20.00                           |

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr) | Max O2 at Low Firing (O2% , MMBtu/hr) | Min O2 at High Firing (O2% , MMBtu/hr) | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr) |
|------------|----------------------------|---------------------------------------|---------------------------------------|--|--|--|
| 931        | 0.034                      | 0.0, 4.00                             | < 9.0, 4.00                           | 0.0, 20.00                             | N/A  | < 9.0, 20.00                           |
|            | 0.073                      | 9.0, 4.00                             | > 9.0, 4.00                           | 9.0, 20.00                             | N/A  | > 9.0, 20.00                           |
| 932        | 0.037                      | 0.0, 4.00                             | < 4.0, 4.00                           | 0.0, 20.00                             | N/A  | < 4.0, 20.00                           |
|            | 0.053                      | 4.0, 4.00                             | > 4.0, 4.00                           | 4.0, 20.00                             | N/A  | > 4.0, 20.00                           |
| 933        | 0.035                      | 0.0, 4.00                             | < 5.0, 4.00                           | 0.0, 20.00                             | N/A  | < 5.0, 20.00                           |
|            | 0.050                      | 5.0, 4.00                             | >5.0, 4.00                            | 5.0, 20.00                             | N/A  | > 5.0, 20.00                           |
| 951        | 0.143                      | 5.2, 2.68                             | 9.2, 2.21                             | 4.2, 7.78                              | 8.3, 19.3  | 14.1, 12.7                             |
|            | 0.175                      | 12.1, 0.78                            | 13.6, 1.73                            | 9.2, 2.21                              | N/A  | 14.1, 12.7                             |

The limits listed above are based on a calendar day averaging period for both firing rate and O2%.

B. Part 31A. does not apply to low firing rate conditions (i.e., firing rate less than or equal to 20% of the unit’s rated capacity), during startup or shutdown periods, or periods of curtailed operation (ex. during heater idling, refractory dryout, etc.) lasting 5 days or less. During these conditions the means for determining compliance with the refinery wide limit shall be accomplished using the method described in 9-10-301.2 (i.e. units out of service & 30-day averaging data).

C. Part 31A. does not apply during any source test required or permitted by this condition. (Reg. 9-10-502). See Part 33 for the consequences of source test results that exceed the emission factors in Part 31.

32. NOx Box Deviations (Regulation 9-10-502)

A. The owner/operator may deviate from the NOx Box (either the firing rate or oxygen limit) provided that the owner/operator conducts a district approved source test which reasonably represents the past operation outside of the established ranges. The source test representing the new conditions shall be conducted no later than the next regularly scheduled source test period, or within eight months, whichever is sooner. The source test results will establish whether the source was operating outside of the emission factor utilized for the source. The source test results shall be submitted to the district source test manager within 45 days of the test. The owner/operator may request, and the APCO may grant, an

extension of 15 days for submittal of results. As necessary, a permit amendment shall be submitted.

1. Source Test  $\leq$  Emission Factor

If the results of this source test do not exceed the higher NO<sub>x</sub> emission factor in Part 31, or the CO limit in Part 35, the unit will not be considered to be in violation during this period for operating out of the "box."

- a. The facility may submit an accelerated permit program permit application to request an administrative change of the permit condition to adjust the NO<sub>x</sub> Box operating range(s), based on the new test data.

2. Source Test  $>$  Emission Factor

If the results of this source test exceed the permitted emission concentrations or emission rates then the actions described below must be followed:

- a. Utilizing measured emission concentration or rate, the owner/operator shall perform an assessment, retroactive to the date of the previous source test, of compliance with Section 9-10-301. The unit will be considered to have been in violation of 9-10-301 for each day the facility was operated in excess of the refinery wide limit.
- b. The facility may submit a permit application to request an alteration of the permit condition to change the NO<sub>x</sub> emission factor and/or adjust the operating range, based on the new test data.

**B.** Reporting - The owner/operator must report conditions outside of box within 96 hours of occurrence.

33. For each source subject to Part 29, the owner/operator shall conduct source tests on the schedule listed below. The source tests are performed in order to measure NO<sub>x</sub>, CO, and O<sub>2</sub> at the as-found firing rate, or at conditions reasonably specified by the APCO. The source test results shall be submitted to the district source test manager within 45 days of the test. The owner/operator may request, and the APCO may grant, an extension of 15 days for submittal of results. (Reg. 9-10-502)

**A.** Source Testing Schedule

1. Heater  $<$  25 MMBtu/hr

One source test per consecutive 12 month period. The time interval between source tests shall not exceed 16 months.

2. Heaters  $\geq$  25 MMBtu/hr

Two source tests per consecutive 12 month period. The time interval between source tests shall not exceed 8 months and not be less than 5 months apart. The source test results shall be submitted to the district source test manager within 45 days of the test. (Reg. 9-10-502)

3. If a source has been shutdown longer than the period allowed between source testing periods (e.g.  $<25$  MMBtu/hr  $\rightarrow$  12 mos or  $> 25$  MMBtu/hr  $\rightarrow$  8 mos), the owner/operator shall conduct the required source test within 30 days of start up of the source.

B. Source Test Results  $>$  NO<sub>x</sub> Box Emission Factor

If the results of any source test under this part exceed the permitted concentrations or emission rates the owner/operator shall follow the requirements of Part 32A2. If the owner/operator chooses not to submit an application to revise the emission factor, the owner/operator shall conduct another Part 33 source test, at the same conditions, within 90 days of the initial test.

34. For each source listed in Part 27 with a NO<sub>x</sub> CEM installed that does not have a CO CEM installed, , the owner/operator shall conduct semi-annual district approved CO source tests at as-found conditions. The time interval between source tests shall not exceed 8 months. District conducted CO emission tests associated with District-conducted NO<sub>x</sub> CEM field accuracy tests may be substituted for the CO semi-annual source tests. (Regulation 9-10-502, 1-522)
35. For any source listed in Part 27 with a maximum firing limit greater than 25 MMBtu/hr for which any two source test results over any consecutive five year period are greater than or equal to 200 ppmv CO at 3% O<sub>2</sub>, the owner/operator shall properly install, properly maintain, and properly operate a CEM to continuously measure CO and O<sub>2</sub>. The owner/operator shall install the CEM within the time period allowed in the District's Manual of Procedures. (Regulation 9-10-502, 1-522)
36. In addition to records required by 9-10-504, the facility must maintain records of all source tests conducted to demonstrate compliance with Parts number 27 and 31. These records shall be kept on site for at least five years from the date of entry in a District approved log and be made available to District staff upon request. (Recordkeeping, Regulation 9-10-504)

**Part 2 -- Databank Version (contains revisions since the Renewal)**

COND# 18372 -----

Application #2209 and 16484  
Plant #14628

Application 15682 (April, 2007) Initial  
establishment of NOx box parameters. Delete part 4.

Application 14752 (January 2007) S-927 modification  
of Part 18.

Application 16888 (April 2008) Modification of S-  
913

Application 16889 (June 2008) Modification of S-951

Modified by App. 18739 (Nov 2008) Removal of S924  
from Parts 27 and 31

Application 19300 (December 2008) Removed S-904  
Backup CO Boiler Service

Application 18748 (December 2008) Modification of S-  
919

Application 19647 (March 2009) Consolidate with  
Condition 4357

Administratively Revised by Application 19874 (July  
2009) Updates for Combustion Sources

Application 20359 (June 2009) Modification of S-920

Application 21072 (October 2009) Modification of S-912

Application 20259 (February 2010) Modification of S-909

Application 17470 (February 2010) Modification of S-916

Application 21732 (May 2010) Modification of S-919

Administratively Reinstated Source List, Part 3 and Part 27

by Application 21464 (April 2010)

Application 21797 (June 2010) Modification of S-913

Application 21787 (July 2010) Modification of S-926

Application 22149 (Sept 2010) Modification of S-919

Application 22580 (November 2010) Modification of S-920

Application 22582 (November 2010) Modification of S-926

Application 22971 (March 2011) Modification of S-913

Application 23339 (June 2011) Modification of S-920

Application 23194 (August 2011) S-904 Burner Replacement  
Alteration (added clarifying language regarding firing  
limits prior to Part 1 and in Part 3)

Application 23871 (December 2011) Modification of S-916

Application 23006 (October 2012) Revised Introduction to  
remove source details, Parts 20, 21, 22 and 27 to correct S-  
972 abatement, and Parts 32A, 33 and 33A2 to reflect a 60  
day allowance to submit Source Test Reports.

|       |  |
|-------|--|
| S-904 | No. 6 Boiler                                   |
| S-912 | No. 1 Feed Prep Heater F-12                    |
| S-913 | No. 2 Feed Prep Heater F-13                    |
| S-916 | No. 1 HDS Charge Heater F-16                   |
| S-919 | No. 2 HDS Depentanizer Reboiler F-19           |
| S-920 | No. 2 HDS Charge Heater F-20                   |
| S-921 | No. 2 HDS Charge Heater F-21                   |
| S-922 | No. 5 Gas Plant Debutanizer Reboiler F-<br>22  |
| S-926 | No. 2 Reformer Splitter Reboiler F-26          |
| S-927 | No. 2 Reformer Reactor Feed Preheater F-<br>27 |
| S-950 | No. 50 Unit Crude Feed Heater F-50             |
| S-971 | No. 3 Reformer UOP Furnace F-53                |
| S-972 | No. 3 Reformer Debutanizer Reboiler F-54       |

1. Deleted. (The fuel meter requirement is  
redundant with Regulation 9-10-502.2.)

2. Permittee/Owner/Operator shall ensure that each of S-912, S-913, S-916, S-919, S-920, S-921, S-922, S-926, S-927, S-950, S-971, and S-972 is fired exclusively on natural gas and/or refinery fuel gas. (basis: Regulation 9, Rule10)

3. Permittee/Owner/Operator shall ensure that the maximum firing rate of each source listed does not exceed the corresponding HHV maximum firing rate, based on an operating day average (the amount of fuel fired over each 24 hour day divided by 24:

| Source (#) | Maximum Firing Rate (mmBtu/hr) | Maximum Firing Rate (mmBtu/yr) |
|------------|--------------------------------|--------------------------------|
| S-912      | 135                            | 1,182,600                      |
| S-913      | 59                             | 516,840                        |
| S-916      | 55                             | 481,800                        |
| S-919      | 65                             | 569,400                        |
| S-920      | 63                             | 551,880                        |
| S-921      | 63                             | 551,880                        |
| S-922      | 130                            | 1,138,800                      |
| S-926      | 145                            | 1,270,200                      |
| S-927      | 280                            | 2,452,800                      |
| S-950      | 440                            | 3,854,400                      |
| S-971      | 300                            | 2,628,000                      |
| S-972      | 45                             | 394,200                        |

These firing limits are enforceable not-to-exceed limits used to determine the NOx emission reductions required by the NOx Compliance Plan. These firing limits are not considered firm New Source Review emissions limits since these sources were not subject to Regulation 2, Rule 2 when this condition was created. (basis: Regulation 9, Rule 10)

4. (Deleted: Specific NOx limits should not have been applied to S-912 and S-926, since they are both regulated under Regulation 9-10-301.)  
Basis: Regulation 9-10-301.

5. Deleted. Replaced with Part 30.

6. Deleted. Replaced with Part 31.

7. Deleted. Replaced with Part 31.

8. Deleted. Replaced with Part 31.

9. Deleted. Replaced with Part 31.

10.Deleted. Replaced with Part 31.

11.Deleted. S-921 is out of service. If returned to service, this part is replaced with Part 31.

12.Deleted. NOx CEM installed on S-922.

13.Deleted. Replaced with Part 31.

14.Deleted. Replaced with Part 32.

15.Deleted. Replaced with Part 33.

16.Deleted. Replaced with Part 34.

17.Deleted. Replaced with Part 35.

18.Combustion exhaust from S-927 shall be ducted to and continuously abated by A-1431 whenever a fuel is fired at S-927, except startup and shutdown as defined by Regulation 9-10-218 and on a temporary basis for catalyst regeneration at S-1004 No. 2 Catalytic Reformer. The exhaust gasses From S-927 and A-1431 shall be measured by a District approved CEM that continuously monitors and records the emission rate of NOx, CO, and O2 in the exhaust gasses, including periods when S-927 is operated without SCR abatement. (basis: Regulation 9, Rule 10, Bubble Condition 4357/8077 via Application 19647)

19.Combustion exhaust from S-950 shall be ducted to and continuously abated by A-1432 whenever a fuel is fired at S-950 and the exhaust gasses from A-1432 shall be measured by a District approved CEM that continuously monitors and records the emission rate of NOx, CO, and O2 in the exhaust gasses. (basis: Regulation 9, Rule 10)

20.Combustion exhaust from S-971 shall be ducted to and continuously abated by A-1433 whenever a



fuel is fired at S-971 and the exhaust gasses from A-1433 shall be vented to stack P-76. Combustion exhaust from S-972 shall be vented to stack P-76. The combined exhaust gases from S-971/A-1433 and S-972 shall be measured by a District approved CEM that continuously monitors and records the emission rate of NOx, CO, and O2 in the exhaust gasses. (basis: Regulation 9, Rule 10)

21. Deleted via Application 23006. The portion of Authority to Construct granted via Application 2209 authorizing the abatement of S-972 with A-1433 was never exercised.

22. For each of S-927, S-950 and S-971 ammonia slip from the SCR system abating the source shall not exceed 20 ppmv, dry, corrected to 3% oxygen. (basis: toxics)

23. Deleted. (The recordkeeping requirement is redundant with Regulation 9-10-504.)

24. Deleted. (The source test log requirement was effective until January 1, 2005, when the NOx Box recordkeeping requirements became effective.)

25. Deleted. (The fuel use recordkeeping requirement is redundant with a more stringent Regulation 9-10-504.)

26. Deleted. (S-904 no longer providing backup Coker CO Boiler service so the requirements of 9-10-304 no longer apply.)

27. The following sources are subject to the refinery-wide Nox emission rate and CO concentration limits in Regulation 9-10. (Regulation 9-10-301, 303 & 305)

| S#   | Description                  | CEM (NOx/CO) |
|------|------------------------------|--------------|
| S904 | No. 6 Boiler House           | Y/Y          |
| S908 | No. 3 Crude Heater           | Y/N          |
| S909 | No. 1 Feed Prep Heater (F9)  | N/N          |
| S912 | No. 1 Feed Prep Heater (F12) | N/N          |
| S913 | No. 2 Feed Prep Heater (F13) | N/N          |

|  |     |
|--|-----|
| S915 Platformer Intermediate Heater (F15)        | N/N |
| S916 No. 1 HDS Heater (F16)                      | N/N |
| S917 No. 1 HDS Prefract Reboiler (F17)           | N/N |
| S919 No. 2 HDS Heater (F19)                      | N/N |
| S920 No. 2 HDS Heater (F20)                      | N/N |
| S921 No. 2 HDS Heater (F21)(out of service)      | N/N |
| S922 No. 5 Gas Plant Debutanizer Reboiler        | Y/N |
| S926 No.2 Reformer Splitter Reboiler (F26)       | N/N |
| S927 No. 2 Reformer Feed Preheater (F27)         |     |
| & A1431  | Y/Y |
| S928 HDN Reactor A Heater (F28)                  | N/N |
| S929 HDN Reactor B Heater (F29)                  | N/N |
| S930 HDN Reacator C Heater (F30)                 | N/N |
| S931 Hydrocracker Reactor 1 Heater (F31)         | N/N |
| S932 Hydrocracker Reactor 2 Heater (F32)         | N/N |
| S933 Hydrocracker Reactor 3 Heater (F33)         | N/N |
| S934 Hydrocracker Stabilizer Reboiler(F34)       | Y/N |
| S935 Hydrocracker Splitter Reboiler (F35)        | Y/N |
| S937 Hydrogen Plant Heater (F37)                 | Y/N |
| S950 No. 50 Unit Curde Feed Heater (F50)         |     |
| & A1432  | Y/Y |
| S951 No. 2 Reformer Aux Reheater (F51)           | N/N |
| S971 No. 3 ReformerFeed Preheater (F53)          |     |
| & A1433  | Y/Y |
| S972 No. 3 Reformer Dubtanizer Reboiler<br>(F54) | Y/Y |
| S973 No. 3 HDS Recycle Gas Heater (F55)          | Y/N |
| S974 No. 3 HDS Fract Feed Heater (F56)           | Y/N |

28.The owner/operator of each source with a maximum firing rate greater than 25 MMBtu/hr listed in Part 27 shall properly install, properly maintain, and properly operate an O2 monitor and recorder. (Regulation 9-10-502)

29.The owner/operator shall operate each source listed in Part 27, which does not have a NOx CEM within specified ranges of operating conditions (firing rate and oxygen content) as detailed in Part 31. The ranges shall be established by utilizing data from district-approved source tests. (Reg. 9-10-502)

A.The NOx Box for units with a maximum firing rate of 25 MMBtu/hr or more shall be established using the procedures in Part 30.

B. The NO<sub>x</sub> Box for units with a maximum firing rate less than 25MMBtu/hr shall be established as follows: High-fire shall be the maximum rated capacity. Low-fire shall be 20% of the maximum rated capacity. There shall be no maximum or minimum O<sub>2</sub>.

30. The owner/operator shall establish the initial NO<sub>x</sub> box for each source subject to Part 29. The NO<sub>x</sub> Box may consist of two operating ranges in order to allow for operating flexibility and to encourage emission minimization during standard operation. (Regulation 9-10-502) The procedure for establishing the NO<sub>x</sub> box is:

A. Conduct district approved source tests for NO<sub>x</sub> and CO, while varying the oxygen concentration and firing rate over the desired operating ranges for the furnace;

B. Determine the minimum and maximum oxygen concentrations and firing rates for the desired operating ranges (Note that the minimum O<sub>2</sub> at low-fire may be different than the minimum O<sub>2</sub> at high-fire. The same is true for the maximum O<sub>2</sub>). The owner/operator shall also verify the accuracy of the O<sub>2</sub> monitor on an annual basis.

C. Determine the highest NO<sub>x</sub> emission factor (lb/Mmbtu) over the preferred operating ranges while maintaining CO concentration below 200 ppm; the owner/operator may choose to use a higher NO<sub>x</sub> emission factor than tested.

D. Plot the points representing the desired operating ranges on a graph. The resulting polygon(s) are the NO<sub>x</sub> Box, which represents the allowable operating range(s) for the furnace under which the NO<sub>x</sub> emission factor from part 31a is deemed to be valid.

1) The NO<sub>x</sub> Box can represent/utilize either one or two emission factors.

2)The NOx Box for each emission factor can be represented either as a 4- or 5-sided polygon The NOx box is the area within the 4- or 5-sided polygon formed by connecting the source test parameters that lie about the perimeter of successful approved source tests. The source test parameters forming the corners of the NOx box are listed in Part 31.

E. Upon establishment of each NOx Box, the owner/operator shall prepare a graphical representation of the box. The representation shall be made available on-site for APCO review upon request. The box shall also be submitted to the BAAQMD with permit amendments.

31.Except as provided in part 31B & C, the owner/operator shall operate each source within the NOx Box ranges listed below at all times of operation. This part shall not apply to any source that has a properly operated and properly installed NOx CEM. (Regulation 9-10-502)

A. NOx Box ranges

Source No./|Emission Factor (lb/MMBtu)/Min O2 at Low Firing(O2% , MMBtu/hr)/Max O2 at Low Firing(O2% , MMBtu/hr)/Min O2 at High Firing(O2% , MMBtu/hr)/Mid O2 at Mid/High Firing (polygon)(O2% , MMBtu/hr)/Max O2 at High Firing(O2% , MMBtu/hr)

909/0.146/9.5, 27.46/11.7, 30.67/2.1, 83.60/3.1, 67.35/5.7, 76.49

909/0.148/11.7, 30.67/11.2, 61.81/2.1, 83.60/5.7, 76.49/7.3, 79.58

912/0.027/2.1, 60.50/4.1, 49.80/1.9, 101.51/4.0, 104.13/5.4, 100.24

912/0.034/4.1, 49.80/7.0, 57.57/5.4, 100.24/N/A/ 6.5, 99.68

913/0.033/1.2, 19.89/3.0, 14.80/1.5, 39.10/2.1,  
15.53/3.87,40.23

913/0.033/3.0, 14.80/4.5, 15.86/4.2, 39.50/3.87,  
40.23/6.0, 21.03

915/0.143/0, 3.85/8.0, 3.85/0, 20.00/N/A/8.0, 20.00

915/0.098/8.0, 3.85/>8.0, 3.85/8.0, 20.00/N/A/>8.0,  
20.00

916/0.090/5.9, 9.53/9.3, 9.17/6.0, 34.60/4.0, 17.40  
7.1, 34.00

916/0.102/9.3, 9.17/10.6, 24.64/7.1,  
34.00/N/A/10.4, 33.11

917/0.061/0, 3.60/-, 3.6/0, 18.00/N/A/-, 18.00

919/0.047/3.9, 10.35/8.7,18.56/6.6, 58.76/9.2,  
39.12/8.0, 60.68

919/0.056/8,7, 18.56/9.5, 21.10/8.0,  
60.68/9.2, 39.12/10.1, 47.20

920/0.041/2.5, 25.72/7.1, 15.24/2.7, 38.29/3.41,  
45.25/8.0, 60.26

920/0.055/7.1, 15.24/10.8, 27.53/8.0,  
60.26/N/A/10.0, 45.15

926/0.032/1.8, 32.81/5.3, 29.30/2.9, 126.72/N/A/  
3.9, 131.59

926/0.037/5.3, 29.30/8.3, 29.60/3.9, 131.59/N/A/  
7.0, 77.89

928/0.044/0.0, 4.00/< 6.0, 4.00/0.0, 20.00/N/A/<  
6.0, 20.00

928/0.073/6.0, 4.00/> 6.0, 4.00/6.0, 20.00/N/A/>  
6.0, 20.00

929/0.024/0.0, 4.00/< 6.0, 4.00/0.0, 20.00/N/A/<  
6.0, 20.00

929/0.087/6.0, 4.00/> 6.0, 4.00/6.0, 20.00/N/A/>  
6.0, 20.00

930/0.033/0.0, 4.00/< 6.0, 4.00/0.0, 20.00/N/A/<  
6.0, 20.00

930/0.077/6.0, 4.00/> 6.0, 4.00/6.0, 20.00/N/A/>  
6.0, 20.00

931/0.034/0.0, 4.00/< 9.0, 4.00/0.0, 20.00/N/A/<  
9.0, 20.00

931/0.073/9.0, 4.00/> 9.0, 4.00/9.0, 20.00/N/A/>  
9.0, 20.00

932/0.037/0.0, 4.00/< 4.0, 4.00/0.0, 20.00/N/A/<  
4.0, 20.00

932/0.053/4.0, 4.00/> 4.0, 4.00/4.0, 20.00/N/A/>  
4.0, 20.00

933/0.035/0.0, 4.00/< 5.0, 4.00/0.0, 20.00/N/A/<  
5.0, 20.00

933/0.050/5.0, 4.00/>5.0, 4.00/5.0, 20.00/N/A/>  
5.0, 20.00

951/0.143/5.2, 2.68/9.2, 2.21/4.2, 7.78/8.3,  
19.3/14.1, 12.7

951/0.175/12.1, 0.78/13.6, 1.73/9.2, 2.21/N/A/14.1,  
12.7

The limits listed above are based on a calendar day averaging period for both firing rate and O2%.

B. Part 31A. does not apply to low firing rate conditions (i.e., firing rate less than or equal to 20% of the unit's rated capacity), during startup or shutdown periods, or periods of curtailed operation (ex. During heater idling, refractory dryout, etc.) lasting 5 days or less. During these conditions the means for determining compliance with the refinery wide limit shall be accomplished using the method

described in 9-10-301.2 (i.e. units out of service & 30-day averaging data).

C. Part 31A. does not apply during any source test required or permitted by this condition. (Reg. 9-10-502). See Part 33 for the consequences of source test results that exceed the emission factors in Part 31.

### 32.NOx Box Deviations (Regulation 9-10-502)

A. The owner/operator may deviate from the NOx Box (either the firing rate or oxygen limit) provided that the owner/operator conducts a district approved source test which reasonably represents the past operation outside of the established ranges. The source test representing the new conditions shall be conducted no later than the next regularly scheduled source test period, or within eight months, whichever is sooner. The source test results will establish whether the source was operating outside of the emission factor utilized for the source. The source test results shall be submitted to the district source test manager within 60 days of the test. The owner/operator may request, and the APCO may grant, an extension of 15 days for submittal of results. As necessary, a permit amendment shall be submitted.

#### 1.Source Test $\leq$ Emission Factor

If the results of this source test do not exceed the higher NOx emission factor in Part 31, or the CO limit in Part 35, the unit will not be considered to be in violation during this period for operating out of the "box."

a.The facility may submit an accelerated permit program permit application to request an administrative change of the permit condition to adjust the NOx Box operating range(s), based on the new test data.

## 2. Source Test > Emission Factor

If the results of this source test exceed the permitted emission concentrations or emission rates then the actions described below must be followed:

a. Utilizing measured emission concentration or rate, the owner/operator shall perform an assessment, retroactive to the date of the previous source test, of compliance with Section 9-10-301. The unit will be considered to have been in violation of 9-10-301 for each day the facility was operated in excess of the refinery wide limit.

b. The facility may submit a permit application to request an alteration of the permit condition to change the NO<sub>x</sub> emission factor and/or adjust the operating range, based on the new test data.

B. Reporting - The owner/operator must report conditions outside of box within 96 hours of occurrence.

33. For each source subject to Part 29, the owner/operator shall conduct source tests on the schedule listed below. The source tests are performed in order to measure NO<sub>x</sub>, CO, and O<sub>2</sub> at the as-found firing rate, or at conditions reasonably specified by the APCO. The source test results shall be submitted to the district source test manager within 60 days of the test. The owner/operator may request, and the APCO may grant, an extension of 15 days for submittal of results.  
(Reg. 9-10-502)

### A. Source Testing Schedule

#### 1. Heater < 25 MMBtu/hr

One source test per consecutive 12 month period. The time interval between source tests shall not



exceed 16 months.

2.Heaters => 25 MMBtu/hr

Two source tests per consecutive 12 month period. The time interval between source tests shall not exceed 8 months and not be less than 5 months apart.

The source test results shall be submitted to the district source test manager within 60 days of the test. (Reg.9-10-502)

3.If a source has been shutdown longer than the period allowed between source testing periods (e. g. <25 MMBtu/hr-> 12 mos or > 25 MMBtu/hr - > 8 mos), the owner/operator shall conduct the required source test within 30 days of start up of the source.

B.Source Test Results > NOx Box Emission Factor

If the results of any source test under this part exceed the permitted concentrations or emission rates the owner/operator shall follow the requirements of Part 32A2 If the owner/operator chooses not to submit an application to revise the emission factor, the owner/operator shall conduct another Part 33 source test, at the same conditions, within 90 days of the initial test.

34.For each source listed in Part 27 with a NOx CEM installed, that does not have a CO CEM installed, the owner/operator shall conduct semi-annual district approved CO source tests at as-found conditions. The time interval between source tests shall not exceed 8 months. District conducted CO emission tests associated with District-conducted NOx CEM field accuracy tests may be substituted for the CO semi-annual source tests. (Regulation 9-10-502, 1-522)

35.For any source listed in Part 27 with a maximum firing limit greater than 25 MMBtu/hr for which any two source test results over any consecutive five year period are greater than

or equal to 200 ppmv CO at 3% O<sub>2</sub>, the owner/operator shall properly install, properly maintain, and properly operate a CEM to continuously measure CO and O<sub>2</sub>. The owner/operator shall install the CEM within the time period allowed in the District's Manual of Procedures. (Regulation 9-10-502, 1-522)

36. In addition to records required by 9-10-504, the facility must maintain records of all source tests conducted to demonstrate compliance with Parts number 27 and 31. These records shall be kept on site for at least five years from the date of entry in a District approved log and be made available to District staff upon request. (Recordkeeping, Regulation 9-10-504)

### **Appendix 3**

## **Description of Condition 18372**

### **from the Revision 1 Title V Permit Statement of Basis.**

#### Condition #18372

Regulation 9-10 NOx Box condition language has been added in parts 27 through 36. The current NOx Box language in parts 5 through 17 and part 24 expire on June 1, 2004. The new NOx Box conditions are effective June 1, 2004. Parts 1 through 3, 18 through 23, and 25 through 26, contain conditions that are not related to the NOx Box and have been retained. All other sources subject Regulation 9, Rule 10 have been added to part 27 and are subject to the conditions of the new NOx Box condition language. The following sources were added to the Regulation 9-10 condition: S908, S909, S915, S917, S924, S928, S929, S930, S931, S932, S933, S934, S935, S937, S951, S973, and S974.

#### Regulation 9-10 Background Analysis and Basis for Conditions

The following discussion explains changes to refinery permit conditions prescribing monitoring for compliance with Regulation 9-10 at units for which CEMs are not required, commonly known as the “NOx Box” permit conditions. To facilitate the reader’s understanding of the proposed changes, this discussion provides background on the 9-10 rule and CEM-equivalency monitoring provided for therein.

Regulation 9-10 requires each refinery to reduce NOx emissions from boilers and heaters. All of the boilers and heaters at each refinery above 10 MMBTU that were in existence on January 5, 1994 are included in determination of compliance with a facility-wide average emission rate of 0.033 lb/MMBtu. BAAQMD 9-10-301.

In order to demonstrate compliance, each affected heater must be equipped with a NOx CEM, or equivalent verification system (BAAQMD 9-10-502). Where combustion processes are sufficiently static over time, emissions factors combined with MMBtu data can be used to verify compliance with accuracy equivalent to that of CEMs. An emissions factor approach can be deemed equivalent if the integrity of the emissions factors can be assured. The NOx Box approach does this by: 1) verifying emissions factor accuracy through source-testing, 2) defining the parameters of operation within which emissions factors have been proven, and 3) requiring that any excursions outside of those parameters be the subject of a new source test.

Source tests to establish the NOx Box are conducted at extreme operating conditions (the “corners” of the NOx Box). As long as the facility operates within the perimeter defined by these source tests, emissions are assumed to be equal to the highest emission rate tested. By monitoring firing rate and O<sub>2</sub> in the exhaust, the validity of using the emission factor is reasonably assured. Periodic source tests confirm that the emission factor is still valid for the operating range. Operation outside the box results in scrutiny to determine compliance with the emission standard, including conduct of a test at the unproven conditions.

That the NOx Box approach is consistent with the intent of Regulation 9-10 is evidenced in the District Staff Report for that rule, which stated:

“District staff recommends that CEMS be only required on units equipped with SCR and SNCR due to high capital and maintenance costs. NOx can vary significantly for SCR and SNCR units based on temperature and amount of ammonia injected. On the contrary, NOx from non-SCR and SNCR units equipped with FGR and low NOx burners and are relatively stable and CEMS should not be necessary for these units.”

Rule Development Staff Report, Regulation 9, Rule 10, November 19, 1993, p. 7.

### *Federal Enforceability*

9-10-301 and 9-10-502 are not included in the SIP, and are therefore not federally enforceable. Revisions to the NOx Box Condition in the Title V permit may be made by Administrative Amendment. BAAQMD 2-6-201.

### *Changes from the current conditions*

The current Title V refinery permits contain NOx Box conditions based on an earlier District policy for demonstrating verification system equivalence. Experience with implementation of these conditions has allowed the District to identify certain areas for improvement. One problem with the current set of conditions is that it allows sustained operation at conditions that have never been tested for compliance with the NOx Box emission factor.

The proposed condition addresses this problem, and several others that have been raised by EPA, the facilities, and the public.

The changes can be summarized as follows:

- The old policy allowed for operation at conditions outside the perimeter of test conditions. The reason for this was to account for the fact that requiring the facility to test the furnace at specific conditions could have an expensive impact on production. While this is still true, there was also considerable opportunity for circumvention, where a facility could have sustained operation outside the box, and then test at conditions that happened to be well within the box. The new policy requires that a test be conducted that would capture the new conditions. The impact on process operation is mitigated by allowing the facility to delay testing until the next periodic source test.
- The old policy used one emission factor for all allowable operating conditions. The new policy allows two boxes, with two factors. One lower factor applies to routine operating conditions, while another higher factor may be used for normal operation at higher levels. This provides more flexibility without sacrificing the assurance of compliance.
- The NOx box can be a 5-sided polygon, rather than a simple box.
- Because the policy is, in some ways, more stringent, time to conduct the source tests to establish the new boxes has been allowed. Existing NOx Box conditions will remain in effect until June 1, 2004, when they will be replaced by the new conditions.

- Under the old policy, two Notices of Violations (NOVs) issued because of a single source would automatically trigger a requirement to install a NOx CEM. Under the new policy, two NOVs will trigger a review by District staff to determine if the NOx Box for that source is still deemed equivalent to a NOx CEM. If it is not, a NOx CEM will be required.
- The new policy allows a facility to operate at low firing rates (idling) for a limited period of time, without having to expand the box to include those conditions. There are two reasons for this. First, emissions at low fire are much lower than normal, even if the emission factor is higher. Second, it is an extreme hardship to require the facility to turn down its production in order to test at very low fire conditions.

The following summarizes the various parts of the proposed NOx Box conditions:

**Part 27** of the condition lists all of the combustion devices subject to 9-10-301.

**Part 28** requires installation of oxygen monitors. This is necessary because some of the smaller heaters are not required by Regulation 9-10 to have oxygen monitors. Oxygen content must be monitored continuously to demonstrate compliance with the condition. Operators will be allowed six months to install any newly-required oxygen monitors.

**Part 29** requires operation of each combustion device within the box. Failure to operate within the box is a violation of this condition, unless excused by one of the deviation procedures in Part 33.

Part 29B covers small units (<25MMBtu/hr). The NOx Box for small units is essentially the entire potential operating range for the unit. Rather than establishing the “corners” of the box, the box is defined to be the full range of firing rates, and all possible oxygen contents. Existing data may be used to establish the emission factor that will be applied. Unless the unit is fired above its rated capacity, it is not possible to operate outside the box. An annual source test will confirm that the factor used is still valid.

**Part 30** requires the operators to conduct the source tests necessary to establish the initial NOx boxes. Each combustion device may have two NOx boxes, one larger than the other. The smaller NOx box, with the lower emission factor, represents the typical operating range of the unit. As long as the unit operates within this range, the listed emission factor and the measured firing rate will be used to determine the unit’s contribution to the refinery-wide average. The operator may choose to have a second, larger box, to cover unusual operating conditions. This larger box will have a higher emission factor associated with it. The allowance for two boxes means that a higher emission factor can be used for occasional operation at harsher, higher-emitting conditions, while still allowing use of a lower emission factor during normal operation. The District believes this is an appropriate degree of flexibility that does not unduly complicate implementation.

The NOx box may be expanded by replacing corner points with new ones that have been tested. The operator may also decide to increase the emission factor associated with a NOx box. This may allow operation at a wider range of conditions; it may be necessary because a source test has shown that the old factor is no longer valid; it may be desirable to provide a margin of compliance.

**Part 31** describes the actual NO<sub>x</sub> box.

Part 31A contains the table that defines the perimeter of the NO<sub>x</sub> box, the perimeter of the second NO<sub>x</sub> box (if the operator chooses to use one), and the emission factors used

Part 31B allows established emission factors to be used for operation outside the box at low firing rate conditions. Although NO<sub>x</sub> or CO emission factors (expressed as lb/MMBtu) may be higher under these conditions, overall emissions are lower because of the greatly reduced firing rate. Testing under these conditions would have a significant cost because the operator would need to reduce firing (and production) to conduct a test. Instead, reduced firing will be treated in the same manner as a shutdown: for purposes of calculating the refinery average, the furnace will be treated as if it were operating at its normal firing rate and emission rate. In other words, though emission factors may be inaccurate in this low-firing range, there is not a possibility that emissions will be underestimated.

Part 31C allows a facility to conduct source tests outside the NO<sub>x</sub> box in order to increase the range of allowable operation.

**Part 32** describes the steps to be taken if operation outside the box occurs.

Operation outside the range for which the emission factor has been demonstrated raises certain questions. Is the emission factor valid for these conditions? If not, and if emissions were higher, did the higher emissions result in a violation of the refinery-wide average? The procedures of this part answer these questions.

Operation outside the NO<sub>x</sub> box triggers a requirement for the operator to test the unit under conditions that capture the new operating conditions. The test may be conducted in lieu of the next scheduled periodic source test (small furnaces, which may not normally be tested so soon, will have to be tested within 8 months). It is possible that the operator may not be able to reproduce the operating conditions during a source test. Failure to conduct the test will result in a violation of the Part 31 of the permit condition, and would be considered a violation of 9-10-502. If more than one such violation occurs during a 5-year period at a given unit, the District will review the NO<sub>x</sub> Box for that unit to determine whether it is, in fact, equivalent to a CEM. The District considered whether to establish in permit conditions a threshold for concluding that the NO<sub>x</sub> Box approach was inadequate for a particular unit and that CEMs must be installed. However, a simple algorithm for making this determination was not apparent. Instead, the District will evaluate each situation case by case, and will use its authorities to require installation of a CEM where appropriate.

If the test shows that emissions are below the factor used for the box, then no violation has occurred. The operator may choose to expand the box to utilize the new test results. This emission factor will then be used in the future.

If, however, the test shows that the emission factor for the new operating conditions exceeds the NO<sub>x</sub> box factor, the operator must reassess past emissions utilizing the higher emission factor. This may result in violations of the refinery-wide average (Regulation 9-10-301).

**Part 33** requires periodic source tests to demonstrate that the NO<sub>x</sub> Box factor is still valid. Usually, tests will be conducted at whatever conditions the unit is operating at on the day of the test. If, however, it has been some time since the extreme corners of the box have been tested, or if there is reason to believe that difficult operating conditions are being avoided during tests, the APCO may require that the test be conducted under specific conditions.

Small furnaces are tested once per year. Large furnaces are tested every six months.

**Part 34** requires periodic CO source tests for units equipped with NO<sub>x</sub> CEMs.

**Part 35** requires installation of a CO CEM if two sources tests show CO levels greater than 200 ppm. Normal CO concentrations are an order of magnitude lower. One high CO reading is an anomaly. Two high readings are an indication that CO may be a problem, and continuous monitoring of firing rate and O<sub>2</sub> is not equivalent to continuous monitoring for CO.

**Part 36** requires maintenance of records for the monitoring required by the permit condition.

After the public comment period for Revision 1, comments were received from the Western States Petroleum Association (WSPA). As a result of those comments, the conditions to the NO<sub>x</sub> box were modified slightly to fix typographical and grammatical errors and to allow an extension of source test report submittals if requested by the refineries. Source testing is also required within 30 days of startup if the source has been shutdown for a period of time that is longer than the required source test frequency.

In Part 28, the clarification for “each source with a maximum firing rate greater than 25 MMBtu/hr” has been added. Part 29 B does not require a minimum or maximum O<sub>2</sub> for units with a maximum firing rate less than 25 MMBtu/hr.

## **Appendix 4**

### **Curtailed Operation in Amended 9-10**

Curtailed Operation was not defined in Regulation 9, Rule 10 when the NOx Box Condition was initially developed. The Low Fire Exemption in Condition 18372, Part 31B was added at the request of WSPA because the refineries had concern over potential 9-10-301 compliance violations. The concern was based on higher NOx emission factors that are expected when the combustion sources are operated at low fire conditions.

Regulation 9, Rule 10 was amended December 15, 2010. In the amendment, Curtailed Operation was added to the definition section. According to the November 2010 9-10 Staff Report, Curtailed Operation was added to 9-10 because

...the Title V permit conditions for all refineries currently allow heaters in “curtailed operation” to also use historic data. For completeness, a definition of “curtailed operation” and the allowance to use historic data during curtailed operation is included in the proposed amendments.

However, the definition was different than that in the NOx Box Permit Condition. New Regulation 9-10-222 defined Curtailed Operation as *any* operation at no more than 30% of the rated heat input. The different definition was a last minute rule development change requested by WSPA:

WSPA comments

#2. Clarify in the staff report that while operating at less than 30% of permitted heat input, a heater would not be subject to NOx Box restrictions in permit conditions.

Response: Clarifying language has been added to the last paragraph of Section 3.3 of this staff report.

Consequently, this late change was not addressed until the December 2010 Staff Report Section 3.3:

The Title V permit conditions for all refineries currently address low-fire conditions by allowing heaters operating at no more than 20% of their rated heat input and also heaters in “curtailed operation” to use historic data rather than actual data. The term “curtailed operation” is not explicitly defined in the Title V permit conditions, although examples are provided of operations that would be considered curtailed operation. The proposed amendments add a definition of “curtailed operation” to the rule that would include all low-fire conditions. “Curtailed operation” is proposed to be explicitly defined as operation at no more than 30% of the heater’s rated heat input. As with heaters in start-up and shutdown, all heaters in “curtailed operation” would be allowed to use historic data for emission calculations. This reflects the District’s current practice in enforcing the Title V permit conditions. Heaters operating at up to 30% are expected to have reduced absolute NOx emission rates that justify the use of historic emission data rather than actual data. For consistency, the Title V permits should be amended so that “curtailed operation”, as defined and treated in the rule, is similarly treated in permits.



Note that there was no emissions impact addressed by adding the definition of curtailed operation, nor due to the definition being different than the definition in the NOx Box conditions. This omission was likely due to the lack of emissions impact included in the WSPA comment. The omission could have also been due to the assumption that any emission impact would be minor compared to 1462 ton/yr emissions reduction from the primary rule amendment purpose -- reducing NOx emissions from CO Boilers. In any case, the omission of emission impacts for the 9-10 amendment means the emissions impacts need to be addressed in the permit application.

## **Appendix 5**

### **Tesoro Source Summary**

#### Tesoro Process Heater Summary

Number of Process Heaters subject to 9-10-301 Refinery-wide NOx Emission Limit -- 28

Number of Process Heaters with NOx CEMs -- 12

Firing Range of Process Heaters with NOx CEMs -- 45MM to 775MM

Adjust by Adding Process Heaters with shared NOx CEMs -- 130MM to 775MM

Number of Process Heaters with NOx Boxes -- 16

Firing Range of Process Heaters with NOx Boxes -- 18MM to 145MM

Number of Process Heaters with NOx Boxes, 55MM to 145MM capacity -- 7

Number of Process Heaters with NOx Boxes, 30MM or less capacity -- 9

Portion of Process Heaters with NOx CEMs (Based on Max Firing Rate) -- 79%

Portion of Process Heaters with NOx Boxes (Based on Max Firing Rate) -- 20%

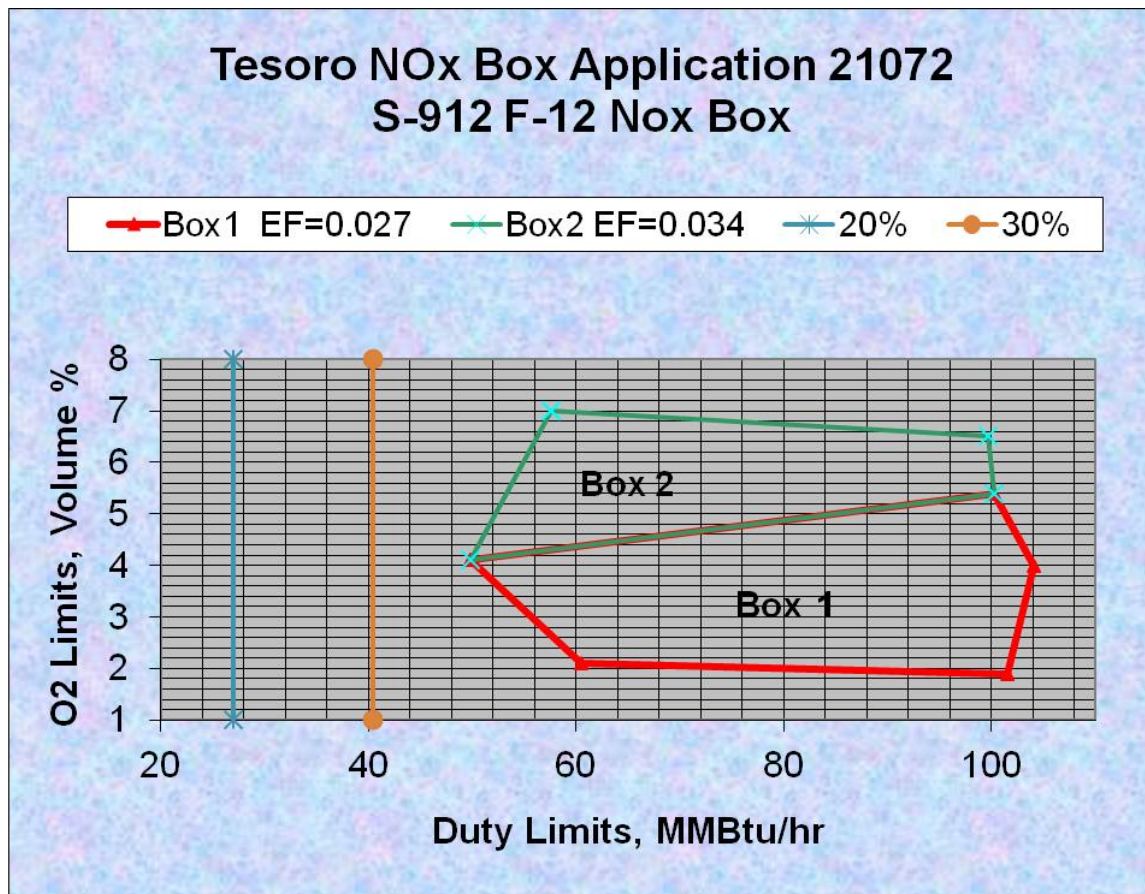
Portion of Process Heaters with Neither (S-921 permitted but OOS) -- 1%

S-912 No. 1 Feed Prep Heater F-12

Maximum Firing Rate: 135 MM Btu/hr  
 30% of Maximum firing Rate: 40.5 MMBtu/hr  
 20% of Maximum Firing Rate: 27.0 MM Btu/hr  
 NOx Box Lowest Firing Rate: 49.8 MM Btu/hr

18372, Part 31A NOx Box:

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr) | Max O2 at Low Firing (O2% , MMBtu/hr) | Min O2 at High Firing (O2% , MMBtu/hr) | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr) |
|------------|----------------------------|---------------------------------------|---------------------------------------|--|--|--|
| 912        | 0.027                      | 2.1, 60.50                            | 4.1, 49.80                            | 1.9, 101.51                            | 4.0, 104.13  | 5.4, 100.24                            |
|            | 0.034                      | 4.1, 49.80                            | 7.0, 57.57                            | 5.4, 100.24                            | N/A  | 6.5, 99.68                             |



## Appendix 6 Impact on Compliance with Regulation 9-10-301, Refinery Wide NOx Emissions Limit

In order to demonstrate how this potential underreporting of NOx emissions impacts regulatory compliance in a quantitative manner, a review of the 9-10 Quarterly Reports was completed for 2010. The reports are submitted in paper copy, so there are no spreadsheets to use for a comprehensive analysis. However, a review of the 365 pages submitted (one page for each operating day), in an operating day the 29 sources included in the Refinery Wide NOx Emissions Limit typically combust between 30,000 and 50,000 MMBtu. For the 2010 operating days, the Refinery Wide NOx Emissions typically range between 0.028 and 0.033 lb NOx/MMBtu.

The following two tables illustrate two approaches to interpret how the S-912 potential 16 tons/year of unreported NOx emissions impact compliance with Regulation 9, Rule 10. Table D7 considers the situation where Tesoro complies with the 0.033 lb/NOx/MMBtu limit of Regulation 9-10-301 with a typical margin of compliance, at 0.030 lb NOx / MMBtu. Table D8 considers the situation where Tesoro *just* complies with Regulation 9-10-301. Both tables demonstrate the impact of the S-912 NOx underreporting by evaluating three typical days of refinery operation : 30,000 MMBtu/day for the sources subject to Regulating 9-10-301, 40,000 MMBtu/day, and 50,000 MMBtu/day.

The S-912 potential NOx underreporting based on the evaluation above is 16 ton/yr. This is 32,000 lb/yr or an average of 88 lb/day NOx.

| Table D7 -- Daily Refinery-wide NOx Emissions = 0.030 lb NOx/MMBtu |              |                  |                     |
|--|--------------|------------------|---------------------|
| Daily MMBtu  | Daily NOx lb | + S912 88 lb NOx | Actual Lb NOx/MMBtu |
| 30,000   | 900          | 988              | 0.0329              |
| 40,000   | 1200         | 1288             | 0.0322              |
| 50,000   | 1500         | 1588             | 0.0318              |

| Table D8 -- Daily Refinery-wide NOx Emissions = 0.033 lb NOx/MMBtu |              |                  |                     |
|--|--------------|------------------|---------------------|
| Daily MMBtu  | Daily NOx lb | + S912 88 lb NOx | Actual Lb NOx/MMBtu |
| 30,000   | 990          | 1078             | 0.0359              |
| 40,000   | 1320         | 1408             | 0.0352              |
| 50,000   | 1650         | 1738             | 0.0348              |

Permit Evaluation and Statement of Basis: Site B2758 & B2759, Tesoro Refining & Marketing Company, LLC, Golden Eagle Refinery, 150 Solano Way, Martinez, CA 94553

For the day where the refinery is complying with the Regulation 9-10-301 0.033 lb NO<sub>x</sub>/MMBtu limit with a typical margin of compliance, the Table D7 shows that if the underreported NO<sub>x</sub> emissions from S-912 were properly reported, then the refinery would still comply with Regulation 9-10-301 by reducing the margin of compliance.

However, if the refinery is just complying with the Regulation 9-10-301 0.033 lb NO<sub>x</sub>/MMBtu limit, then the S-912 underreporting allows the refinery to report compliance with the Regulation 9-10-301 limit when in fact, as shown in Table D8, the refinery is not in compliance with the limit.

If the changes proposed by this application potentially allow Tesoro to report compliance with District Regulation, when in fact it is not in compliance, then this would be a significant impact of the Curtailed Operation changes proposed by this application.

## Appendix 7 Evaluation of Tesoro Operating Data

Tesoro provided operating data for most of the NOx Box sources for 2010 and 2011. This operating data is included in the application file. This operating data was evaluated by Tesoro and the results indicated that the emission impacts range from 0.3 to 2.3 tons/yr of different reported NOx Emissions. However, the Tesoro analysis compared the differences in NOx Emissions data substitution methods allowed by Regulation 9-10-301.4.1 and Regulation 9-10-301.4.2. This Tesoro analysis, while showing an emissions impact, did not focus on the emissions impact of the two key proposed Curtailed Operation changes (20% to 30% and removal of the 5-day limit).

In an attempt to estimate the emissions impact of the 20% to 30% and removal of the 5-day limit changes proposed by this application, an analysis of the same Tesoro operating data was completed. The data for S-912, No 1 Feed Prep Heater F12, was evaluated.

For S-912, the Tesoro operating data indicated low fire operation occurred during the period of 1/4/2010 to 2/17/10. This evaluation focuses on the operation during this period to estimate the emission impacts

Table D1 shows the operating data from Tesoro for S-912 during this period, along with the emissions and firing rate data contained in the Tesoro 9-10 quarterly compliance report for the period (The 9-10 Compliance Reports are submitted quarterly as required by Regulation 9-10-505.2, and are meant to demonstrate compliance with the 0.033 lb NOx/MMBtu Refinery-wide NOx Emission Limit Regulation 9-10-301 for each operating day).

| Table D1 -- S-912 Actual Firing Rates and the 9-10 Compliance Report Information |                        |                         |                       |                        |
|--|------------------------|-------------------------|-----------------------|------------------------|
| Date   | Average Daily MMBtu/Hr | Daily x 24 = MM BTU/Day | 9-10 Report MMBtu/day | 9-10 Report NOx lb/day |
| 1/4/2010   | 34.75                  | 834.1                   | 1861.1                | 50.25                  |
| 1/5/2010   | 0.26                   | 6.2                     | 1861.1                | 50.25                  |
| 1/6/2010   | 6.36                   | 152.7                   | 1861.1                | 50.25                  |
| 1/7/2010   | 3.83                   | 91.8                    | 1861.1                | 50.25                  |
| 1/8/2010   | 2.91                   | 69.7                    | 1860.52               | 50.23                  |
| 1/9/2010   | 4.07                   | 97.7                    | 1860.52               | 50.23                  |
| 1/10/2010  | 3.43                   | 82.2                    | 1860.52               | 50.23                  |
| 1/11/2010  | 3.43                   | 82.4                    | 1861.1                | 50.25                  |
| 1/12/2010  | 1.17                   | 28.1                    | 1861.1                | 50.25                  |
| 1/13/2010  | 4.83                   | 115.9                   | 1861.1                | 50.25                  |
| 1/14/2010  | 9.58                   | 230.0                   | 1861.1                | 50.25                  |
| 1/15/2010  | 14.02                  | 336.5                   | 1861.1                | 50.25                  |
| 1/16/2010  | 9.55                   | 229.2                   | 1861.1                | 50.25                  |
| 1/17/2010  | 1.24                   | 29.8                    | 1861.1                | 50.25                  |
| 1/18/2010  | 4.78                   | 114.7                   | 1861.1                | 50.25                  |

| Table D1 -- S-912 Actual Firing Rates and the 9-10 Compliance Report Information |                        |                         |                       |                        |
|--|------------------------|-------------------------|-----------------------|------------------------|
| Date   | Average Daily MMBtu/Hr | Daily x 24 = MM BTU/Day | 9-10 Report MMBtu/day | 9-10 Report NOx lb/day |
| 1/19/2010  | N/A                    | N/A                     | 1861.1                | 50.25                  |
| 1/20/2010  | N/A                    | N/A                     | 1861.1                | 50.25                  |
| 1/21/2010  | 7.43                   | 178.3                   | 1861.1                | 50.25                  |
| 1/22/2010  | 18.85                  | 452.5                   | 1861.1                | 50.25                  |
| 1/23/2010  | 27.72                  | 665.4                   | 1861.1                | 50.25                  |
| 1/24/2010  | 29.89                  | 717.4                   | 1861.1                | 50.25                  |
| 1/25/2010  | 24.44                  | 586.6                   | 1861.1                | 50.25                  |
| 1/26/2010  | 19.87                  | 476.8                   | 1861.1                | 50.25                  |
| 1/27/2010  | 13.96                  | 334.9                   | 1861.1                | 50.25                  |
| 1/28/2010  | 22.81                  | 547.5                   | 1861.1                | 50.25                  |
| 1/29/2010  | 24.15                  | 579.6                   | 1861.1                | 50.25                  |
| 1/30/2010  | 30.27                  | 726.6                   | 1861.1                | 50.25                  |
| 1/31/2010  | 36.94                  | 886.5                   | 1861.1                | 50.25                  |
| 2/1/2010   | 39.10                  | 938.3                   | 1861.1                | 50.25                  |
| 2/2/2010   | 41.49                  | 995.8                   | 1861.1                | 50.25                  |
| 2/3/2010   | 26.03                  | 624.8                   | 1861.1                | 50.25                  |
| 2/4/2010   | OOS                    | N/A                     | 1861.1                | 50.25                  |
| 2/5/2010   | 3.87                   | 92.8                    | 1861.1                | 50.25                  |
| 2/6/2010   | 4.86                   | 116.5                   | 1861.1                | 50.25                  |
| 2/7/2010   | 20.84                  | 500.2                   | 1861.1                | 50.25                  |
| 2/8/2010   | 13.34                  | 320.2                   | 1861.1                | 50.25                  |
| 2/9/2010   | 6.06                   | 145.4                   | 1861.1                | 50.25                  |
| 2/10/2010  | 11.32                  | 271.8                   | 1861.1                | 50.25                  |
| 2/11/2010  | 10.31                  | 247.5                   | 1861.1                | 50.25                  |
| 2/12/2010  | 7.92                   | 190.2                   | 1861.1                | 50.25                  |
| 2/13/2010  | 7.53                   | 180.8                   | 1861.1                | 50.25                  |
| 2/14/2010  | 7.54                   | 180.9                   | 1861.1                | 50.25                  |
| 2/15/2010  | OOS                    | N/A                     | 1861.1                | 50.25                  |
| 2/16/2010  | OOS                    | N/A                     | 1861.1                | 50.25                  |
| 2/17/2010  | 22.71                  | 545.0                   | 1861.1                | 50.25                  |

OOS = Out of Service, specified by Tesoro. N/A = Data not available.

Using the potential low fire emissions rate of a conventional NOx burner, Table D2 shows the calculated NOx emissions and the emissions reported in the 9-10 Compliance Report.

| Table D2 -- Calculated NOx Emissions for S-912     |                            |                                   |                       |                        |
|--|----------------------------|-----------------------------------|-----------------------|------------------------|
| Based on Conventional NOx Burner Emissions Factors |                            |                                   |                       |                        |
| Date   | MM BTU/Day (from Table D1) | Conventional Burner NOx lb/MM BTU | Calculated Lb NOx/day | 9-10 Report NOx lb/day |

| Table D2 -- Calculated NOx Emissions for S-912     |                               |   |                          |                           |
|--|-------------------------------|---|--------------------------|---------------------------|
| Based on Conventional NOx Burner Emissions Factors |                               |   |                          |                           |
| Date   | MM BTU/Day<br>(from Table D1) | Conventional<br>Burner NOx<br>lb/MM BTU | Calculated Lb<br>NOx/day | 9-10 Report<br>NOx lb/day |
| 1/4/2010   | 834.1                         | 0.145                                   | 120.945                  | 50.25                     |
| 1/5/2010   | 6.2                           | 0.145                                   | 0.899                    | 50.25                     |
| 1/6/2010   | 152.7                         | 0.145                                   | 22.142                   | 50.25                     |
| 1/7/2010   | 91.8                          | 0.145                                   | 13.311                   | 50.25                     |
| 1/8/2010   | 69.7                          | 0.145                                   | 10.107                   | 50.23                     |
| 1/9/2010   | 97.7                          | 0.145                                   | 14.167                   | 50.23                     |
| 1/10/2010  | 82.2                          | 0.145                                   | 11.919                   | 50.23                     |
| 1/11/2010  | 82.4                          | 0.145                                   | 11.948                   | 50.25                     |
| 1/12/2010  | 28.1                          | 0.145                                   | 4.075                    | 50.25                     |
| 1/13/2010  | 115.9                         | 0.145                                   | 16.806                   | 50.25                     |
| 1/14/2010  | 230.0                         | 0.145                                   | 33.35                    | 50.25                     |
| 1/15/2010  | 336.5                         | 0.145                                   | 48.793                   | 50.25                     |
| 1/16/2010  | 229.2                         | 0.145                                   | 33.234                   | 50.25                     |
| 1/17/2010  | 29.8                          | 0.145                                   | 4.321                    | 50.25                     |
| 1/18/2010  | 114.7                         | 0.145                                   | 16.632                   | 50.25                     |
| 1/19/2010  | N/A                           | N/A                                     | N/A                      | 50.25                     |
| 1/20/2010  | N/A                           | N/A                                     | N/A                      | 50.25                     |
| 1/21/2010  | 178.3                         | 0.145                                   | 25.854                   | 50.25                     |
| 1/22/2010  | 452.5                         | 0.145                                   | 65.613                   | 50.25                     |
| 1/23/2010  | 665.4                         | 0.145                                   | 96.483                   | 50.25                     |
| 1/24/2010  | 717.4                         | 0.145                                   | 104.023                  | 50.25                     |
| 1/25/2010  | 586.6                         | 0.145                                   | 85.057                   | 50.25                     |
| 1/26/2010  | 476.8                         | 0.145                                   | 69.136                   | 50.25                     |
| 1/27/2010  | 334.9                         | 0.145                                   | 48.561                   | 50.25                     |
| 1/28/2010  | 547.5                         | 0.145                                   | 79.388                   | 50.25                     |
| 1/29/2010  | 579.6                         | 0.145                                   | 84.042                   | 50.25                     |
| 1/30/2010  | 726.6                         | 0.145                                   | 105.357                  | 50.25                     |
| 1/31/2010  | 886.5                         | 0.145                                   | 128.543                  | 50.25                     |
| 2/1/2010   | 938.3                         | 0.145                                   | 136.054                  | 50.25                     |
| 2/2/2010   | 995.8                         | 0.145                                   | 144.391                  | 50.25                     |
| 2/3/2010   | 624.8                         | 0.145                                   | 90.596                   | 50.25                     |
| 2/4/2010   | OOS                           | N/A                                     | N/A                      | 50.25                     |
| 2/5/2010   | 92.8                          | 0.145                                   | 13.456                   | 50.25                     |
| 2/6/2010   | 116.5                         | 0.145                                   | 16.893                   | 50.25                     |
| 2/7/2010   | 500.2                         | 0.145                                   | 72.529                   | 50.25                     |
| 2/8/2010   | 320.2                         | 0.145                                   | 46.429                   | 50.25                     |
| 2/9/2010   | 145.4                         | 0.145                                   | 21.083                   | 50.25                     |
| 2/10/2010  | 271.8                         | 0.145                                   | 39.411                   | 50.25                     |
| 2/11/2010  | 247.5                         | 0.145                                   | 35.888                   | 50.25                     |
| 2/12/2010  | 190.2                         | 0.145                                   | 27.579                   | 50.25                     |
| 2/13/2010  | 180.8                         | 0.145                                   | 26.216                   | 50.25                     |



| Table D2 -- Calculated NOx Emissions for S-912     |                               |   |                          |                           |
|--|-------------------------------|---|--------------------------|---------------------------|
| Based on Conventional NOx Burner Emissions Factors |                               |   |                          |                           |
| Date   | MM BTU/Day<br>(from Table D1) | Conventional<br>Burner NOx<br>lb/MM BTU | Calculated Lb<br>NOx/day | 9-10 Report<br>NOx lb/day |
| 2/14/2010  | 180.9                         | 0.145                                   | 26.231                   | 50.25                     |
| 2/15/2010  | OOS                           | N/A                                     | N/A                      | 50.25                     |
| 2/16/2010  | OOS                           | N/A                                     | N/A                      | 50.25                     |
| 2/17/2010  | 545.0                         | 0.145                                   | 79.025                   | 50.25                     |

Table D2 demonstrates that the NOx mass emissions could be over reported or underreported, depending on the operating conditions. When the firing rate is low, the higher emissions factor is mitigated by low fuel usage and the 9-10 NOx lb/day reported by the data substitution allowance is higher than the calculated NOx lb/day. When the firing rate is higher, the 9-10 report NOx mass emissions are underreported by the data substitution allowance.

A detailed review of Table D2 shows that the low fire exemption rationale articulated in the 12/16/04 Tesoro Title V Permit Statement of Basis ("...though emission factors may be inaccurate in this low-firing range, there is not a possibility that emissions will be underestimated") would not be completely accurate for this worst case analysis where the S-912 NOx burner operates similar to a conventional NOx burner. However, for most of the 33 days where operation is below the 20% of maximum firing rate, NOx emissions are not underestimated (for 8 days the 50.25 lb/day NOx emissions are underestimated). The maximum NOx emission factor that would cause emissions never to be underestimated is dependent on how the 9-10 data substitution allowance is completed by Tesoro. However, for the 50.25 lb/day NOx emissions reported for S-912 during the period above, the maximum NOx emission factor consistent with the rationale is 0.0775 lb NOx / MMBtu, or about 64 ppmv @ 3%O2. The maximum NOx emission factor for 30% Curtailed Operation, consistent with the rationale that emissions would never be underestimated is 0.0517 lb NOx / MMBtu, or about 43 ppmv @ 3%O2. These emissions factors can be compared to the current NOx Box emission factors of 0.027 and 0.034 lb/MM. This detailed review is included as Appendix C of this evaluation.

#### Emissions Impact based on Operating Data

To determine the emissions impact of the proposals in this application, one needs to focus on the change from 20% to 30%, and on the change from a 5-day limit of curtailed operation to unlimited curtailed operation. To accomplish this, the Tesoro operating data needs to be screened as follows.

1. The first screening question is whether the operation is outside the NOx Box Operating window. Low fire operation within the NOx Box operating parameters is not impacted by this application. The lowest fired rate of the S-912 NOx Box is 57.57MM Btu/hr.
2. The next question is if the low fire operation is less than 30% of the maximum firing rate. Low fire operation below 30% of the maximum firing rate is one of the changes proposed by this application.

3. The next screening question is if the low fire operation is less than 20% of the maximum firing rate. Low fire below 20% is the current definition and is not impacted by this application.

4. The last screening question is regarding the duration of the curtailed operation. Curtailed operation lasting 5 days or less is not impacted by this application.

Table D3 summarizes the screening necessary to focus the evaluation.

| Table D3 -- S-912 Operating Data Screening |                         |             |               |       |       |                |                             |                     |
|--|-------------------------|-------------|---------------|-------|-------|----------------|-----------------------------|---------------------|
| Date                                       | Average Daily MMBtu /Hr | Out of Box? | % of Max Fire | <30%? | <20%? | 20-30% Impact? | Duration of Low Fire (Days) | Within 5-day Limit? |
| 1/4  | 34.75                   | Yes         | 25.7%         | Yes   | No    | Yes            | 1                           | Yes                 |
| 1/5  | 0.26                    | Yes         | 0.2%          | Yes   | Yes   | No             | 2                           | Yes                 |
| 1/6  | 6.36                    | Yes         | 4.7%          | Yes   | Yes   | No             | 3                           | Yes                 |
| 1/7  | 3.83                    | Yes         | 2.8%          | Yes   | Yes   | No             | 4                           | Yes                 |
| 1/8  | 2.91                    | Yes         | 2.2%          | Yes   | Yes   | No             | 5                           | Yes                 |
| 1/9  | 4.07                    | Yes         | 3.0%          | Yes   | Yes   | No             | 6                           | No                  |
| 1/10                                       | 3.43                    | Yes         | 2.5%          | Yes   | Yes   | No             | 7                           | No                  |
| 1/11                                       | 3.43                    | Yes         | 2.5%          | Yes   | Yes   | No             | 8                           | No                  |
| 1/12                                       | 1.17                    | Yes         | 0.9%          | Yes   | Yes   | No             | 9                           | No                  |
| 1/13                                       | 4.83                    | Yes         | 3.6%          | Yes   | Yes   | No             | 10                          | No                  |
| 1/14                                       | 9.58                    | Yes         | 7.1%          | Yes   | Yes   | No             | 11                          | No                  |
| 1/15                                       | 14.02                   | Yes         | 10.4%         | Yes   | Yes   | No             | 12                          | No                  |
| 1/16                                       | 9.55                    | Yes         | 7.1%          | Yes   | Yes   | No             | 13                          | No                  |
| 1/17                                       | 1.24                    | Yes         | 0.9%          | Yes   | Yes   | No             | 14                          | No                  |
| 1/18                                       | 4.78                    | Yes         | 3.5%          | Yes   | Yes   | No             | 15                          | No                  |
| 1/19                                       | N/A                     | N/A         | N/A           | N/A   | N/A   | N/A            | N/A                         | N/A                 |
| 1/20                                       | N/A                     | N/A         | N/A           | N/A   | N/A   | N/A            | N/A                         | N/A                 |
| 1/21                                       | 7.43                    | Yes         | 5.5%          | Yes   | Yes   | No             | 16                          | No                  |
| 1/22                                       | 18.85                   | Yes         | 14.0%         | Yes   | Yes   | No             | 17                          | No                  |
| 1/23                                       | 27.72                   | Yes         | 20.5%         | Yes   | No    | Yes            | 18                          | No                  |
| 1/24                                       | 29.89                   | Yes         | 22.1%         | Yes   | No    | Yes            | 19                          | No                  |

| Table D3 -- S-912 Operating Data Screening |                         |             |               |       |       |                |                             |                     |
|--|-------------------------|-------------|---------------|-------|-------|----------------|-----------------------------|---------------------|
| Date                                       | Average Daily MMBtu /Hr | Out of Box? | % of Max Fire | <30%? | <20%? | 20-30% Impact? | Duration of Low Fire (Days) | Within 5-day Limit? |
| 1/25                                       | 24.44                   | Yes         | 18.1%         | Yes   | Yes   | No             | 20                          | No                  |
| 1/26                                       | 19.87                   | Yes         | 14.7%         | Yes   | Yes   | No             | 21                          | No                  |
| 1/27                                       | 13.96                   | Yes         | 10.3%         | Yes   | Yes   | No             | 22                          | No                  |
| 1/28                                       | 22.81                   | Yes         | 16.9%         | Yes   | Yes   | No             | 23                          | No                  |
| 1/29                                       | 24.15                   | Yes         | 17.9%         | Yes   | Yes   | No             | 24                          | No                  |
| 1/30                                       | 30.27                   | Yes         | 22.4%         | Yes   | No    | Yes            | 25                          | No                  |
| 1/31                                       | 36.94                   | Yes         | 27.4%         | Yes   | No    | Yes            | 26                          | No                  |
| 2/1  | 39.10                   | Yes         | 29.0%         | Yes   | No    | Yes            | 27                          | No                  |
| 2/2  | 41.49                   | Yes         | 30.7%         | No    | No    | No             | 28                          | No                  |
| 2/3  | 26.03                   | Yes         | 19.3%         | Yes   | Yes   | Yes            | 28                          | SD                  |
| 2/4  | OOS                     | N/A         | N/A           | N/A   | N/A   | N/A            | N/A                         | N/A                 |
| 2/5  | 3.87                    | Yes         | 2.9%          | Yes   | Yes   | No             | 28                          | SU                  |
| 2/6  | 4.86                    | Yes         | 3.6%          | Yes   | Yes   | No             | 29                          | No                  |
| 2/7  | 20.84                   | Yes         | 15.4%         | Yes   | Yes   | No             | 30                          | No                  |
| 2/8  | 13.34                   | Yes         | 9.9%          | Yes   | Yes   | No             | 31                          | No                  |
| 2/9  | 6.06                    | Yes         | 4.5%          | Yes   | Yes   | No             | 32                          | No                  |
| 2/10                                       | 11.32                   | Yes         | 8.4%          | Yes   | Yes   | No             | 33                          | No                  |
| 2/11                                       | 10.31                   | Yes         | 7.6%          | Yes   | Yes   | No             | 34                          | No                  |
| 2/12                                       | 7.92                    | Yes         | 5.9%          | Yes   | Yes   | No             | 35                          | No                  |
| 2/13                                       | 7.53                    | Yes         | 5.6%          | Yes   | Yes   | No             | 36                          | No                  |
| 2/14                                       | 7.54                    | Yes         | 5.6%          | Yes   | Yes   | No             | 36                          | SD                  |
| 2/15                                       | OOS                     | N/A         | N/A           | N/A   | N/A   | N/A            | N/A                         | N/A                 |
| 2/16                                       | OOS                     | N/A         | N/A           | N/A   | N/A   | N/A            | N/A                         | N/A                 |
| 2/17                                       | 22.71                   | Yes         | 16.8%         | Yes   | Yes   | No             | 36                          | SU                  |

SU = Startup after OOS; SD = Shutdown prior to OOS.

This screening results in 7 days that are impacted by changing the 20% to 30% (the days with "Yes" in the 20-30% Impact column above).

The screening necessary to determine the impact of allowing unlimited curtailed operation was to simply count the days over the current 5-day limit. In addition, since curtailed operation does not include startup and shutdown operation, adjustments to the count had to be made. Tesoro reported three days where S-912 was out of service (OOS). Using the operating data provided by Tesoro, it is not possible to determine if the source was OOS for longer than the calendar day of the report. Therefore, a nominal adjustment of one day before and after the OOS was allowed for startup and shutdown.

Emissions Impact based on Operating Data for the 20% to 30% Change

To determine the emissions impact of the change from 20% to 30%, Table D4 evaluates the 7 days that are impacted determined by the screening questions.

| Table D4 -- Emissions Impacts of S-912 when Curtailed Operation is changed from 20% to 30%, based on Operating Data |            |                       |                        |                           |                             |
|---|------------|-----------------------|------------------------|---------------------------|-----------------------------|
| Date  | MM Btu/day | Calculated NOx lb/day | 9-10 Report NOx lb/day | Under-reported lb/day NOx | 9-10 Report Total lb NOx/MM |
| 1/4   | 834        | 121                   | 50                     | 71                        | 0.029                       |
| 1/23  | 665        | 96                    | 50                     | 46                        | 0.028                       |
| 1/24  | 717        | 104                   | 50                     | 54                        | 0.031                       |
| 1/30  | 727        | 105                   | 50                     | 55                        | 0.031                       |
| 1/31  | 886        | 128                   | 50                     | 78                        | 0.031                       |
| 2/1   | 938        | 136                   | 50                     | 86                        | 0.0304                      |
| 2/3   | 625        | 91                    | 50                     | 41                        | 0.0291                      |
| Average Under-reported NOx lb/day   |            |                       |                        | 62                        |                             |
| Equivalent NOx Tons/yr Under-reported<br>(= average lb/day x 365 / 2000)  |            |                       |                        | 11.3                      |                             |

Table D4 indicates that the emissions impact for the change from 20% to 30%, based on the operating data and the 9-10 Report provided by Tesoro, and a conventional burner emissions factor, is an average NOx emissions underreporting for S-912 of 62 lb/day. The equivalent annual NOx emissions impact could be as high as 11.3 tons/yr of underreported NOx emissions.

Emissions Impact based on Operating Data for the Change Allowing Unlimited Curtailed Operation

To determine the emissions impact of the change from the 5-day limit to the unlimited curtailed operation, a similar calculation is shown in Table D5:

| Table D5 -- Emissions Impacts of S-912 when Curtailed Operation is changed from a 5-day limit to Unlimited |            |                       |                        |                           |
|--|------------|-----------------------|------------------------|---------------------------|
| Date   | MM Btu/day | Calculated NOx lb/day | 9-10 Report NOx lb/day | Under-reported lb/day NOx |
| 1/9  | 97.7       | 14                    | 50                     | -36                       |
| 1/10   | 82.2       | 12                    | 50                     | -38                       |
| 1/11   | 82.4       | 12                    | 50                     | -38                       |
| 1/12   | 28.1       | 4                     | 50                     | -46                       |
| 1/13   | 115.9      | 17                    | 50                     | -33                       |
| 1/14   | 230.0      | 33                    | 50                     | -17                       |
| 1/15   | 336.5      | 49                    | 50                     | -1                        |
| 1/16   | 229.2      | 33                    | 50                     | -17                       |
| 1/17   | 29.8       | 4                     | 50                     | -46                       |
| 1/18   | 114.7      | 17                    | 50                     | -33                       |
| 1/21   | 178.3      | 26                    | 50                     | -24                       |
| 1/22   | 452.5      | 66                    | 50                     | 16                        |
| 1/23   | 665.4      | 96                    | 50                     | 46                        |
| 1/24   | 717.4      | 104                   | 50                     | 54                        |
| 1/25   | 586.6      | 85                    | 50                     | 35                        |
| 1/26   | 476.8      | 69                    | 50                     | 19                        |
| 1/27   | 334.9      | 49                    | 50                     | -1                        |
| 1/28   | 547.5      | 79                    | 50                     | 29                        |

| Table D5 -- Emissions Impacts of S-912 when Curtailed Operation is changed from a 5-day limit to Unlimited |            |                       |                        |                           |
|--|------------|-----------------------|------------------------|---------------------------|
| Date   | MM Btu/day | Calculated NOx lb/day | 9-10 Report NOx lb/day | Under-reported lb/day NOx |
| 1/29   | 579.6      | 84                    | 50                     | 34                        |
| 1/30   | 726.6      | 105                   | 50                     | 55                        |
| 1/31   | 886.5      | 128                   | 50                     | 78                        |
| 2/1  | 938.3      | 136                   | 50                     | 86                        |
| 2/2  | 995.8      | 144                   | 50                     | 94                        |
| 2/6  | 116.5      | 17                    | 50                     | -33                       |
| 2/7  | 500.2      | 73                    | 50                     | 23                        |
| 2/8  | 320.2      | 46                    | 50                     | -4                        |
| 2/9  | 145.4      | 21                    | 50                     | -29                       |
| 2/10   | 271.8      | 39                    | 50                     | -11                       |
| 2/11   | 247.5      | 36                    | 50                     | -14                       |
| 2/12   | 190.2      | 28                    | 50                     | -22                       |
| 2/13   | 180.8      | 26                    | 50                     | -24                       |
| Average Under-reported NOx lb/day  |            |                       |                        | 3.3                       |
| Equivalent NOx Tons/yr Under-reported<br>(= average lb/day x 365 / 2000)                                   |            |                       |                        | 0.60                      |

Based on the operating data and the 9-10 Report provided by Tesoro, and a conventional burner emissions factor, there is an average NOx emissions underreporting for S-912 of 3.3 lb/day. The equivalent annual NOx emissions impact could be as high as 0.6 tons/yr of underreported NOx emissions.

## Appendix 8

### Interpretation of Low Fire Exemption Condition 18372, Part 31B

Tesoro maintains that there are no emission increases because emission factors at low fire operation are lower than the NOx Box emission factors (contrary to the refinery position in the Rule Development Workshops) and that there is no 5-day limit to curtailed operations. In a detailed review with Tesoro, it was found that Tesoro maintains that there are no emissions increase due to this part of the application because of a mis-interpretation of Part 31B. Tesoro interprets low fire operation to be in three parts, as shown below:

18372-31B. Part 31A. does not apply to (1) low firing rate conditions (i.e., firing rate less than or equal to 20% of the unit's rated capacity), (2) during startup or shutdown periods, or (3) periods of curtailed operation (ex. during heater idling, refractory dryout, etc.) lasting 5 days or less. During these conditions the means for determining compliance with the refinery wide limit shall be accomplished using the method described in 9-10-301.2 (i.e. units out of service & 30-day averaging data).

However, as explained previously, the 20% defines the low fire operation and this operation is divided into startup, shutdown, and curtailed operation. The correct interpretation of part 31B is as shown below:

18372-31B. Part 31A. does not apply to low firing rate conditions (i.e., firing rate less than or equal to 20% of the unit's rated capacity), during (1) startup or (2) shutdown periods, or (3) periods of curtailed operation (ex. during heater idling, refractory dryout, etc.) lasting 5 days or less. During these conditions the means for determining compliance with the refinery wide limit shall be accomplished using the method described in 9-10-301.2 (i.e. units out of service & 30-day averaging data).

Tesoro's mis-interpretation means that low fire conditions of 20% or less can occur unlimited since the 5-day limit only applies to #3. Tesoro has stated that some sources are operated in low fire conditions continuously. In fact, some NOx Box sources have NOx Box operating windows that extend to or below the 20% firing rate. All NOx Box sources except S-912 have NOx Box Operating windows below 30% firing rate. As long as the sources in low fire operation are operating within the NOx Box operating window, Tesoro is operating sources in continuous low fire operation in compliance with Permit Condition 18372.

If Tesoro is operating a source in low fire condition and the operation is not in the NOx Box operating window, then the low fire operation duration is limited. For Startup and Shutdown operation, the duration is limited by Regulation 9-10-218. For all other low fire operation (i. e. curtailed operation), the duration is limited to 5-days. The low fire duration limits as interpreted by the District are consistent with the rationale in the 12/16/04 Tesoro Title V Permit Statement of Basis (where low fire is characterized as "for a limited period of time") and are required to maintain the CEM equivalency purpose of the NOx Box parametric monitoring system allowed by Regulation 9-10-502.1. If low fire operation exceeds these duration limits, and Tesoro does not comply with the Condition 18372 requirements to redefine the NOx Box Operating window (to include the low fire operation that exceeds the duration limits), then the source does not

comply with Condition 18372, and does not qualify for the parametric monitoring system allowed by Regulation 9-10-502.. Therefore, to satisfy the monitoring requirements of Regulation 9-10-502.1, a CEM is required.

Notwithstanding the intent of and the record on the CEM equivalent NOx Box parametric monitoring system, there is some lack of clarity in 31B due to the placement of the first comma in the text. However, a review of the low fire exemption in other NOx Box conditions and the history of the condition indicates that this comma was placed in 31B by mistake. A comparison follows.

Tesoro Condition 18372, Part 31B:

31B. Part 31A. does not apply to low firing rate conditions (i.e., firing rate less than or equal to 20% of the unit's rated capacity), during startup or shutdown periods, or periods of curtailed operation (ex. during heater idling, refractory dryout, etc.) lasting 5 days or less. During these conditions the means for determining compliance with the refinery wide limit shall be accomplished using the method described in 9-10-301.2 (i.e. units out of service & 30-day averaging data).

Chevron Condition 21232, Part 5B:

5B) Part 5A does not apply to low firing rate conditions (i. e., firing rate less than or equal to 20% of the unit's rated capacity) during startup or shutdown periods or periods of curtailed operation (ex. during heater idling, refractory dryout, etc.) lasting 5 days or less. During these conditions the means for determining compliance with the refinery wide limit shall be accomplished using the method described in 9-10-301.2 (i.e. units out of service & 30-day averaging data).

Conoco-Phillips Condition 21235, Part 5b:

5b.Part 5a does not apply to low firing rate conditions (i. e., firing rate less than or equal to 20% of the unit's rated capacity) during startup or shutdown periods or periods of curtailed operation (ex. during heater idling,



refractory dryout, etc.) lasting 5 days or less.

During these conditions the means for determining compliance with the refinery wide limit shall be accomplished using the method described in 9-10-301.2 (i.e. units out of service and 30-day averaging data).

So for at least two Bay Area Refineries, the low fire exemption is consistent with intent of and the record on the NOx Box.

In order to clarify the requirements of 18372 to remove any ambiguity with Part 31B, it is recommended that part 31B be revised as follows (based on the agreed language):

31B Part 31A- does not apply to low firing rate conditions. Low (i.e., firing rate conditions are any operation less than or equal to 20% of the unit's rated capacity.); There are three types of low fire operation:  
4) during startup periods,  
5) during shutdown periods, or  
6) during periods of curtailed operation (ex. during heater idling, refractory dryout, etc.)  
Curtailed operation (i.e., all low fire operation that is not during a startup or shutdown period) is limited to lasting 5 days or less. During these low-fire conditions the means for determining compliance with the refinery wide limit shall be accomplished using the method described in Regulation 9-10-301.42 (i.e., units in Start-up or Shutdown or in Curtailed Operation out of service & 30-day averaging data).

After the recommended revisions, Part 31B would read as follows:

31B Part 31A does not apply to low firing rate conditions. Low firing rate conditions are any operation less than or equal to 20% of the unit's rated capacity. There are three types of low fire operation:  
4) during startup periods,  
5) during shutdown periods, or  
6) during periods of curtailed operation .  
Curtailed operation (i.e., all low fire operation that is not during a startup or shutdown period) is limited to lasting 5 days or less. During these low fire conditions the means for determining compliance with the refinery wide limit shall be accomplished using the method described in Regulation 9-10-301.4 (i.e., units in Start-up or Shutdown or in Curtailed Operation).

This recommended revision to 18372-31B also corrects the compliance demonstration requirement by replacing the 9-10-301.2 reference to 9-10-301.4. 9-10-301.2 was deleted from the rule when Regulation 9, Rule 10 was amended 12/15/2010.

## Appendix F – 1/22/13 Tesoro Comments on Draft Engineering Evaluation for Application 23006 Curtailed Operations

### Tesoro Response to January 2013 Draft Engineering Evaluation for AN 23006

Tesoro has the following comments on the District's January 2013 draft engineering evaluation for Application 23006 (Section D – Curtailed Operation).

1. In this engineering evaluation and in other communication between the District and Tesoro concerning Application 23006, the District has incorrectly treated the NOx box permit conditions in Tesoro's Condition 18372, Parts 27 through 36 as if they were separate from and unrelated to Regulation 9, Rule 10. The District has then used that incorrect separation as the justification for not making Tesoro's proposed changes, which would incorporate the December 2010 amendments to Regulation 9, Rule 10 into the permit condition.
  - a. The District is incorrect in treating Condition 18372, Parts 27 through 36 as if those conditions are unrelated to Regulation 9, Rule 10 and the District is incorrect in not modifying those conditions so they conform with Regulation 9, Rule 10. Condition 18372, Parts 27 through 36 are related to and wholly dependent upon Regulation 9, Rule 10 because the condition parts are based solely on that regulation. The District cannot separate the condition from the regulation unless they change the basis for those permit condition parts.
  - b. In the December 2010 Staff Report for the Regulation 9, Rule 10 Amendments, the District explained (in Section 3.3) the relationship between the December 2010 rule amendments related to curtailed operation and the existing permit conditions. The exact quote from the staff report is, *"The Title V permit conditions for all refineries currently address low-fire conditions by allowing heaters operating at no more than 20% of their rated heat input and also heaters in "curtailed operation" to use historic data rather than actual data. The term "curtailed operation" is not explicitly defined in the Title V permit conditions, although examples are provided of operations that would be considered curtailed operation. The proposed amendments add a definition of "curtailed operation" to the rule that would include all low-fire conditions. "Curtailed operation" is proposed to be explicitly defined as operation at no more than 30% of the heater's rated heat input. As with heaters in start-up and shutdown, all heaters in "curtailed operation" would be allowed to use historic data for emission calculations. This reflects the District's current practice in enforcing the Title V permit conditions. Heaters operating at up to 30% are expected to have reduced absolute NOx emission rates that justify the use of historic emission data rather than actual data. For consistency, the Title V permits should be amended so that "curtailed operation", as defined and treated in the rule, is similarly treated in permits."*
  - c. In the Introduction to this engineering evaluation, the District said, *"Tesoro has applied for an administrative change to NOx Box Condition 18372 to change "Curtailed Operation" in Part 31B (and a similar change to Part 29B). Tesoro justifies this change as administrative because it would simply revise Permit Condition 18372 to "match" the 2010 amendment to Regulation 9, Rule 10 (9-10)."* Tesoro did not ask the District to change Condition 18372, Parts 29B and 31B to make the condition "match" the Regulation just because we want it to match. We asked the District to make the changes to the permit condition because the District' Staff Report said those changes were needed to incorporate the December 2010 Regulation 9, Rule 10 amendments, and we



shutdown periods pass through the low fire area (0 to 20%), but the exemption in Part 31B includes the entire startup and shutdown period and is not limited only to that portion of startup and shutdown that are between 0 and 20% (low fire).

- b. Part 31B also exempts periods of "curtailed operation" which is described as those heater idling operations like refractory dryout where the process unit associated with the heater is not operating and the heater is being fired for some purpose other than the process unit operation. While heater idling typically occurs at very low firing rates, it can occur at firing rates greater than 20%.
  - c. See below for Tesoro's comments on the District's incorrect interpretation of the applicability of the Part 31B exemption and how the District's incorrect characterization of Part 31B as the "Low Fire Exemption" contributes to that error.
4. In the BACKGROUND section of this engineering evaluation, the District is incorrect when they say that, *"There are two proposed changes that may potentially impact emissions:*
1. *Changing the curtailed operation definition from 20% to 30%, and*
  2. *Allowing unlimited curtailed operation (no 5-day limit)."*
- a. The changes proposed by Tesoro to change the curtailment level from 20% to 30% by incorporating the definition of curtailed operation (December 2010 rule amendments) do not change the real NOx emissions for any source. For example, Tesoro's source S912 (F12) operating at a 19% firing rate and 4% oxygen will emit the same quantity of NOx regardless of whether the curtailment level is 20% or 30%. Similarly, F12 operating at a 29% firing rate and 5% oxygen will emit the same quantity of NOx regardless of the curtailment level. The reported NOx emissions from NOx box heaters are estimated by emission calculation methodologies that multiply a firing rate (MMBTU) by an emissions factor (lb NOx/MMBTU). Changes in the emission calculation methodology by changing either of these variables (firing rate or emission factor) will change the resulting emissions estimates and thus will change the reported NOx emissions for the NOx box heaters. As we will show in our comments below, the emission impacts shown in this engineering evaluation are not the result of the changes proposed by Tesoro to change the curtailment level from 20% to 30% (the December 2010 Regulation 9, Rule 10 amendments), but are the result of the District's change in the emission factor for low fire operations outside the NOx box and the incorrect application of that emission factor to the evaluation of the changes proposed by Tesoro.
  - b. The changes proposed by Tesoro do not change the allowance for unlimited operation below the curtailment level defined in the exemption in Part 31B. There is no 5 day limit on low fire operation (< 20%) in the existing permit condition, so operation at low-fire conditions is already unlimited. The 5 day limit is only on "curtailed operation" as it is defined in Part 31B for limited heater idling operations in the existing permit condition. There are no emissions impacts associated with the 5 day limit.
5. The District's incorrect characterization of Condition 18372, Part 31B as the *"Low Fire Exemption"* caused them to incorrectly interpret the meaning of that condition in Section V – CONDITIONS.

- a. The District's interpretation of Part 31B is based on the District's argument presented in the September 2012 draft engineering evaluation for AN 23006 questioning the placement of the commas in Part 31B. Tesoro provided evidence in our comments on the September 2012 draft evaluation showing that the comma placement in Tesoro's permit condition was correct and as the District specifically intended when these conditions were first added to Tesoro's Title V permit in Revision 1 of that permit in December 2004.
- b. Based on the placement of the commas in Tesoro's Part 31B and the commonly held grammatical convention that commas mean "or" or "and", it is clear that the exemption in Part 31B applies to three operations:
  - i. Low fire (< 20%); AND
  - ii. SU and SD; AND
  - iii. Curtailed operation (heater idling as described) lasting 5 days or less.
- c. As stated in the September 2012 draft engineering evaluation for AN 23006, District Legal agrees that with the comma placement in Tesoro's permit condition, there is validity in Tesoro's interpretation of Part 31B.
- d. The District is incorrect in the interpretation that the 5 day limit in the existing Part 31B applies to all low-fire operation except startup and shutdown and that the changes proposed by Tesoro (the changes made in the December 2010 amendments to Regulation 9, Rule 10) remove that 5 day limit and that removal of that 5 day limit causes an emissions increase.
  - i. The fact that there is no 5 day limit on low fire operation (< 20%) is supported by the Statement of Basis for the original NOx box permit conditions in Revision 1 of Tesoro's Title V permit (December 2004). The applicable section of the Revision 1 T5 Statement of Basis was included in Appendix C of this draft engineering evaluation. The Revision 1 Statement of Basis includes a description of each part of the NOx box conditions (Condition 18372, Parts 27 through 36). In the description of Part 29B, the method for creating NOx boxes for small units (< 25 MMBTU/hr rated capacity), the District states, *"Unless the unit is fired above its rated capacity, it is not possible to operate outside the box"*. For this District's statement to be true, operation at less than 20%, which is outside the NOx box created by Part 29B, must always be exempt in accordance with Part 31B. If operation at less than 20% was exempt only for 5 days in accordance with the District's interpretation, then District's statement in the Revision 1 Statement of basis could not be true.
  - ii. Examining Part 31B grammatically, if the 5 day limit in the third clause of the sentence for "curtailed operation" also applied to the first clause for low-fire operation (< 20%), then it would also apply to the second clause for startup and shutdown. It could not just skip over the second clause. We know that the 5 day limit cannot apply to startup and shutdown because these operations are limited to less than 5 days by 9-10-218. Therefore, grammatically, the 5

day limit only applies to the third clause for "curtailed operation" as defined in Part 31B.

6. There is no justification for the District to change the emission factor for calculating emissions for low fire operations outside the NOx Box.
  - a. In the EMISSIONS CALCULATION section, the District is incorrect to say that, "*the NOx emission factors are not known at low-fire conditions.*"
    - i. See Appendix A for Tesoro's heater data showing emission factors (lb/MMBTU) versus % maximum fire. Heater data is provided for the NOx box heaters with maximum firing rates > 25 MMBTU/hr and for two heaters, F22 and F34/F35, that could have NOx boxes, but for which Tesoro has voluntarily installed NOx CEMS.
    - ii. Contrary to the District's assertion, Tesoro's NOx emission factors are well known for "low fire operation".
    - iii. The data in Appendix A also shows that the NOx emission factors decrease as % fired duty decreases.
  - b. In the EMISSIONS CALCULATION section, the District is incorrect to say that, "*Therefore, it is assumed that during low-fire operation, the NOx emissions factor would be similar to a conventional burner emissions factor (120 ppm @ 3% O2 or 0.145 lb/MMBtu). Using this emission factor would likely result in an estimate of the worst case potential emissions impact since any burner in a combustion source has the potential to act like a conventional burner at low-fire conditions (especially with no restriction on oxygen content).*"
    - i. This assumption and new emission factor are based on the District's incorrect assumption that "*the NOx emission factors are not known at low-fire conditions*". Since this assumption is incorrect (see comment 6), then the District has no basis for imposing the new emission factor.
    - ii. The District was incorrect to present the new emission factor (0.145 lb/MMBTU, equivalent to 120 ppm @ 3% O2) without documentation as to its origin.
    - iii. The District was incorrect to present the assumption that all burners will act like raw gas burners at low fire conditions without any documentation to support that assumption.
    - iv. The emission factor proposed by the District is not supported by Tesoro's known heater data. See Appendix B for a comparison of Tesoro's heater data and the District's proposed emission factor. The new emission factor is much higher than the known NOx box emission factors for all of Tesoro's heaters except one – F9 and it is higher than the known emission factors for low fire operation of F9.
    - v. It is not reasonable to assume that the NOx emission rate will suddenly increase from the known emission rates at low fire operation to the District's new emission rate (orange line on plots in Appendix B) simply because the heater operation is outside the NOx box outline.

7. In the EMISSIONS CALCULATION section, the District's assumptions and emission calculations, are incorrect.
  - a. The emission calculations in this engineering evaluation do not analyze the impact of Tesoro's proposed changes in Application 23006. The emission calculations analyze the impact of the District's proposal to change the NOx emission calculation methodology for "low fire operations" outside the NOx box from calculations based on the NOx box emission factors to calculations based on the District's assumed emission factor of 0.145 lb NOx/MMBTU (equivalent to 120 ppm @ 3% O<sub>2</sub>).
  - b. The District's overall approach is incorrect because it assumes that the changes proposed by Tesoro (the December 2010 amendments to Regulation 9, Rule 10) require emissions for low fire out of box operations to be calculated using the District's new emission calculation methodology (higher emission factor), but that emissions for the same low fire out of box operations can be calculated using the existing emission calculation methodologies (NOx box emission factors) as long as the changes proposed by Tesoro (the December 2010 amendments to Regulation 9, Rule 10) are not made in Condition 18372, Part 31B. This assumption does not correlate with the District's basis for imposing the new emission factor. The basis for the new emission factor was the District's assumption that the NOx emission factors are not well known at low fire conditions. If this assumption were true, it would be true whether or not the changes proposed by Tesoro (the December 2010 amendments to Regulation 9, Rule 10) are incorporated into Condition 18372, Part 31B. Therefore, the change in emission factor for low fire operations outside the NOx box is not related to the changes proposed by Tesoro (the December 2010 amendments to Regulation 9, Rule 10).
  - c. The District is incorrect to evaluate the changes proposed by Tesoro by comparing emissions for two different operating conditions. The District's case for the 20% curtailment level is for operation at some unspecified firing rate <20% of maximum fire. The case for the 30% curtailment level estimates emissions for operation at 29% of maximum fire. This approach is incorrect. Source S12 can be operated at both 29% of maximum fire and at < 20% of maximum fire under both the existing permit condition and the permit condition with the changes proposed by Tesoro. To correctly evaluate the changes proposed by Tesoro, the District must compare emissions for the same operating conditions. For this evaluation, the correct evaluation for the 29% of maximum fire case is to compare emissions for operation at 29% of maximum fire as determined under the existing permit condition (20% curtailment; 9-10-301.2 calculation method) and as determined under the changes proposed by Tesoro (30% curtailment; 9-10-301.4 calculation method). Similarly, the correct evaluation for the <20% of maximum fire case is to compare emissions for operation at < 20% of maximum fire as determined under the existing permit condition (20% curtailment; 9-10-301.2 calculation method) and as determined under the changes proposed by Tesoro (30% curtailment; 9-10-301.4 calculation method).
  - d. The District is incorrect to evaluate the changes proposed by Tesoro by comparing emissions calculated using different changes than those proposed by Tesoro. Tesoro

proposed to change the curtailment level from 20% to 30% AND to change the emission calculation methodology from Regulation 9-10-301.2 to Regulation 9-10-301.4 (the December 2010 amendments to Regulation 9, Rule 10). The District does not evaluate the changes proposed by Tesoro. Instead the evaluation uses the District's new emission factor to evaluate emissions for the changes proposed by Tesoro. As we stated previously in comment 7, District does not and cannot link their new emission factor or their assumption about the burner operation to the changes proposed by Tesoro (and made by the District Board of Directors in the December 2010 amendments to Regulation 9, Rule 10). The changes proposed by Tesoro (December 2010 rule amendments) do not create the emissions increases that the District has used to justify their change in emission factor. Instead, the District's independent, unsupported and unjustified assumption about burner operation at low fire condition and their associated unsupported change in emission factor were used in this evaluation

8. The District's conclusions from this engineering evaluation are incorrect. In various places the District has concluded that: *"Detailed analysis of the proposed changes resulted in potential emissions impacts of 16 tons/year of underreported NOx emissions from a single NOx Box source."* and *"this proposed "Curtailed Operation" change has an emissions impact that is in conflict with the requirements of Regulation 3-306.1 Administrative Change of Conditions."* and *"District's Senior Management concluded that the proposed changes should be treated as a normal change of conditions with the appropriate new source review (NSR) evaluation including a best available control technology (BACT) determination and Offset requirements, and not as an administrative amendment."*
  - a. The District did not evaluate Tesoro's proposed changes in this draft engineering evaluation.
    - i. The potential emissions impacts identified by the District in this evaluation are the result of the District's change in the emission factor used to estimate NOx emissions from NOx box heaters.
    - ii. Evaluating the changes actually proposed by Tesoro shows that there are only minor changes in the emission estimates due to the differences in the calculation methodologies.
  - b. The District's proposed change in emission factor is unrelated to and was not caused by the changes proposed by Tesoro (the December 2010 rule amendments).
  - c. There is no potential for any real emissions increase from Tesoro's proposed changes. There is no potential for underreported NOx emissions from the changes proposed by Tesoro.
  - d. This application is not subject to New Source Review (NSR) To trigger NSR, there must be a new source or a modification to a source or a change in the method of operation of a source, or a change in the potential for emissions to be generated by a source. None of these requirements are met by the changes proposed by Tesoro:
    - i. There are no new sources; and
    - ii. There are no physical modifications to any source; and



- iii. There is no change in the method of operation for any source and there is no change in the potential for emissions to be generated by any source.
  - 1. The NO<sub>x</sub> box heaters do not operate differently or emit different quantities of NO<sub>x</sub> because the curtailment level is different. A source operating at any specified firing rate and % O<sub>2</sub> (i.e., 19%, 4% O<sub>2</sub>) has the same real emissions regardless of whether the curtailment level is 20% or 30%.
  - 2. In Condition 18372, Part 31B, the curtailment level defines the point below which the source is exempt from the NO<sub>x</sub> box provisions. All this means is that below the curtailment level, there are no source test requirements for out of box operation and the specified alternate emission calculation methods in Regulation 9-10-301 are used to calculate the daily average NO<sub>x</sub> emissions estimate and the daily average firing rate for use in the refinery-wide NO<sub>x</sub> emission limit in Regulation 9-10-301.
  - 3. Changes in the emissions estimate due to the use of different emission calculation methodologies are NOT changes in real emissions from the source.
- e. Since there are no emissions increases from the changes proposed by Tesoro (the changes made in the December 2010 rule amendments), and none of the NSR trigger requirements are met, there is no basis on which to analyze the changes for NSR or BACT or offsets and Tesoro's proposed changes should be processed as an administrative change of conditions.

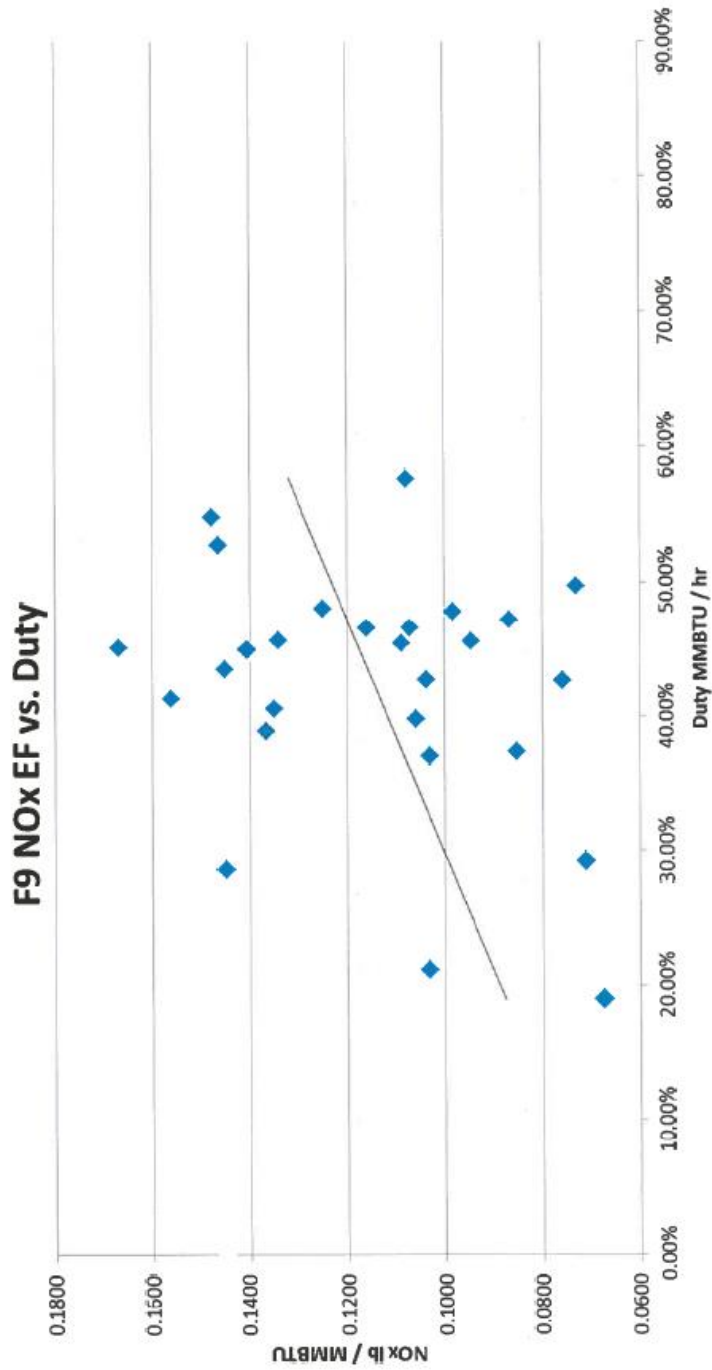
Tesoro Response to January 2013 Draft Engineering Evaluation for AN 23006

**APPENDIX A**

**TESORO HEATER DATA**

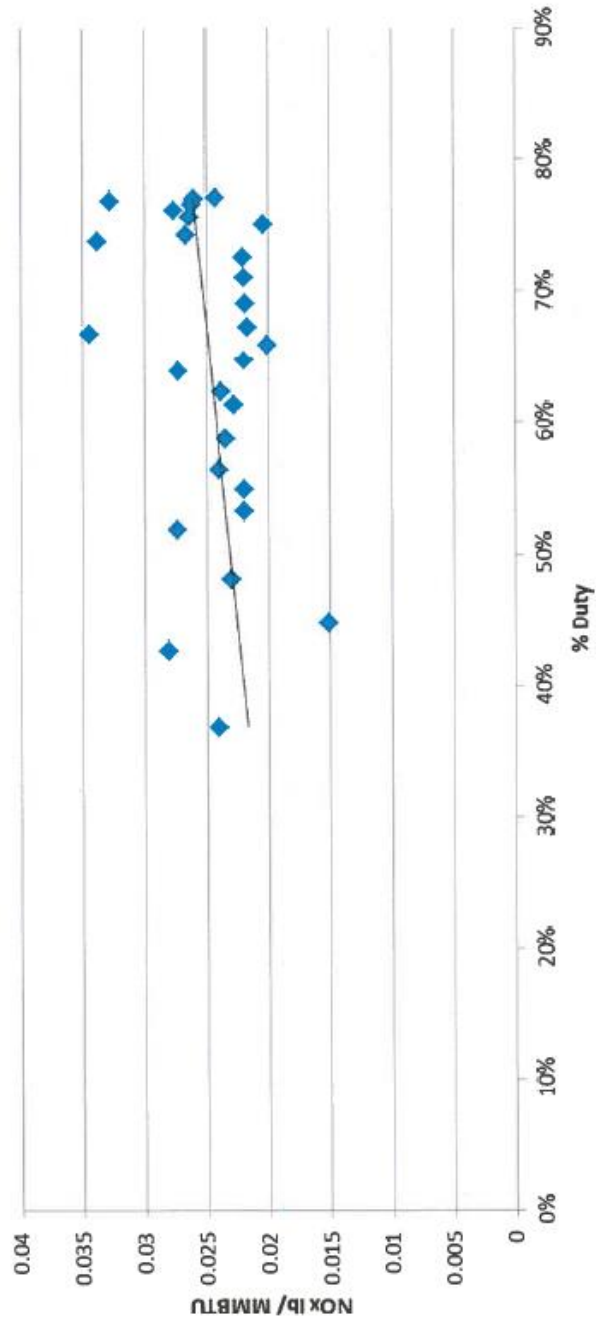
**NO<sub>x</sub> Emission Factors (lb NO<sub>x</sub>/MMBTU) vs % Maximum Firing Rate**

Tesoro Response to January 2013 Draft Engineering Evaluation for AN 23006



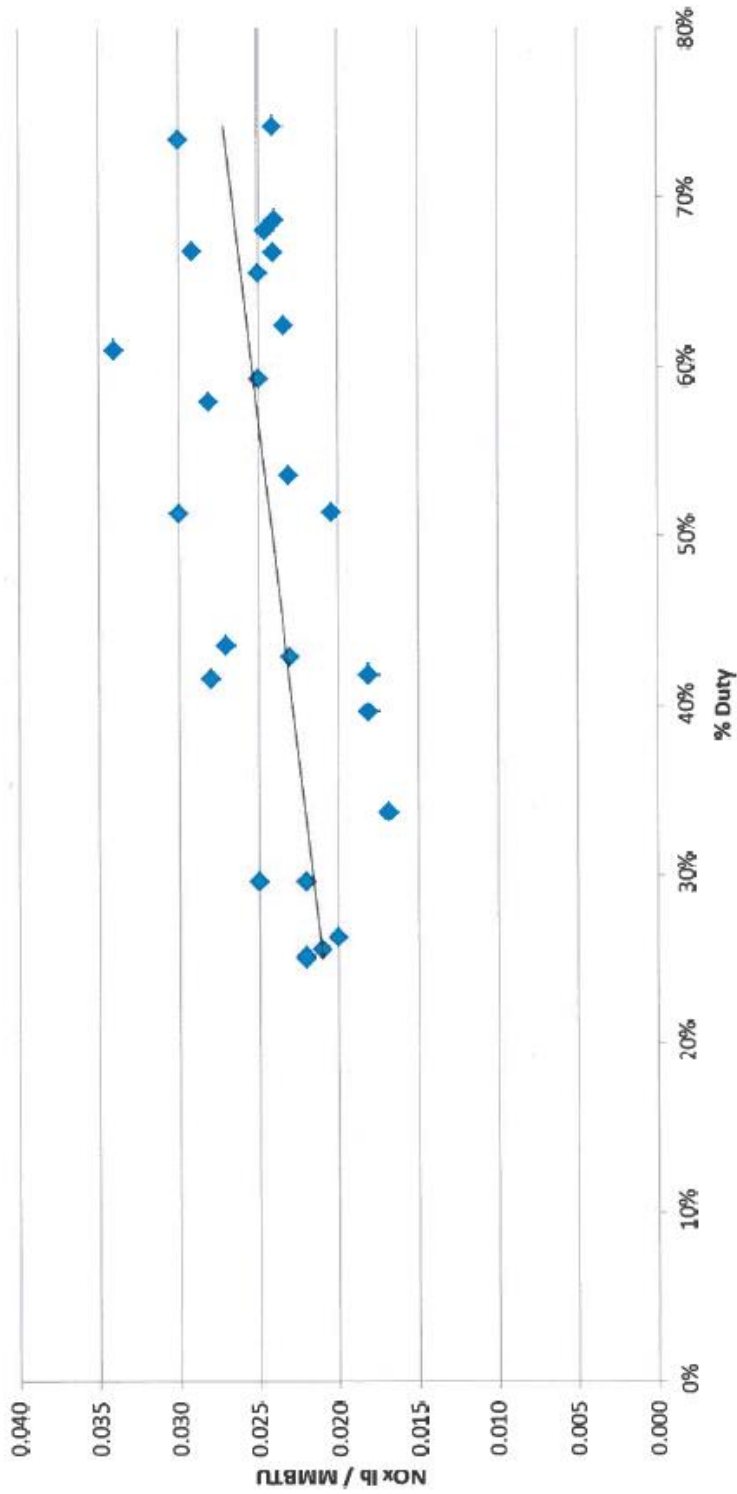
Tesoro Response to January 2013 Draft Engineering Evaluation for AN 23006

### F12 NOx EF vs. % Duty



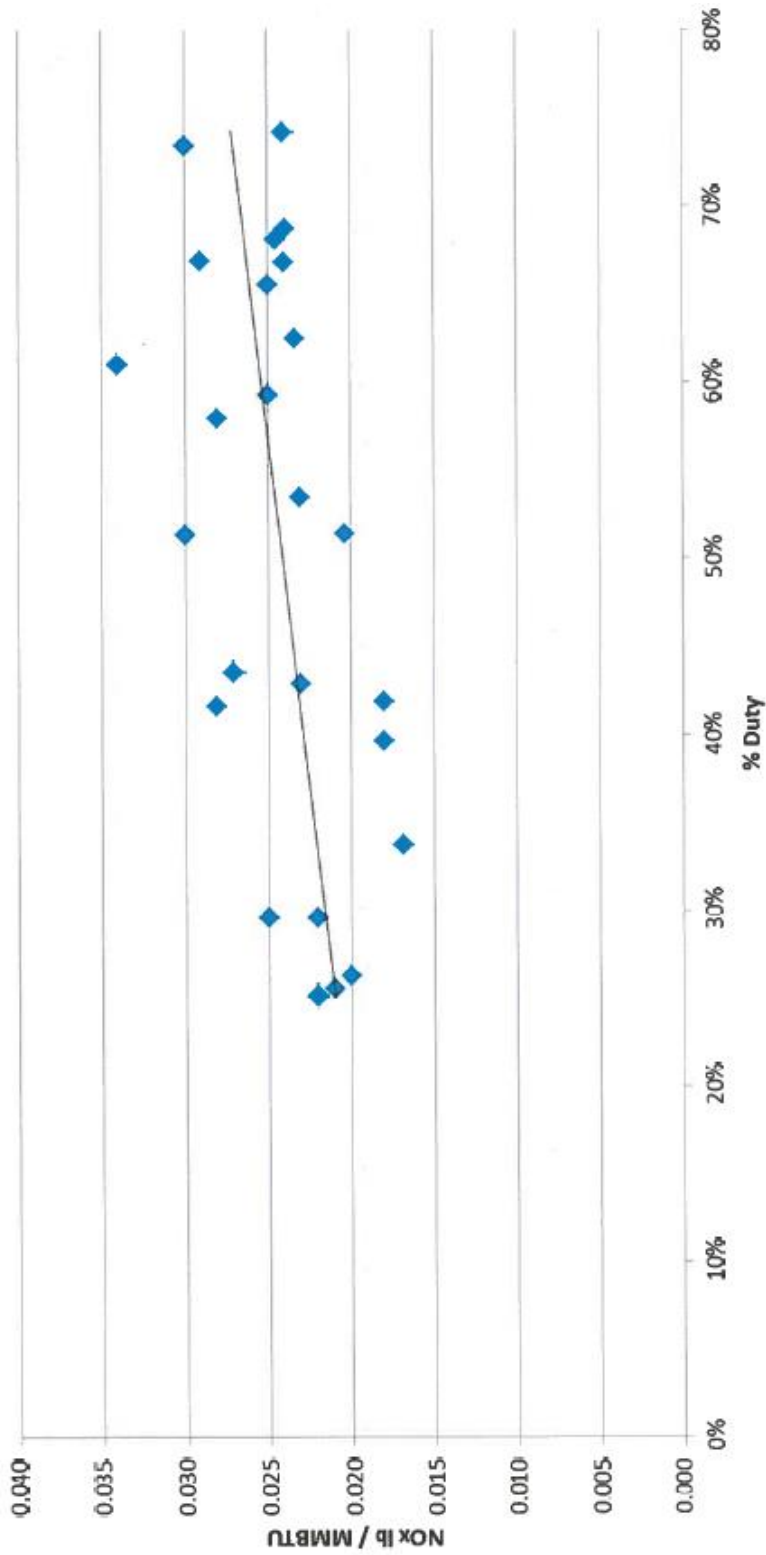
Tesoro Response to January 2013 Draft Engineering Evaluation for AN 23006

### F13 NOx EF vs. % Duty



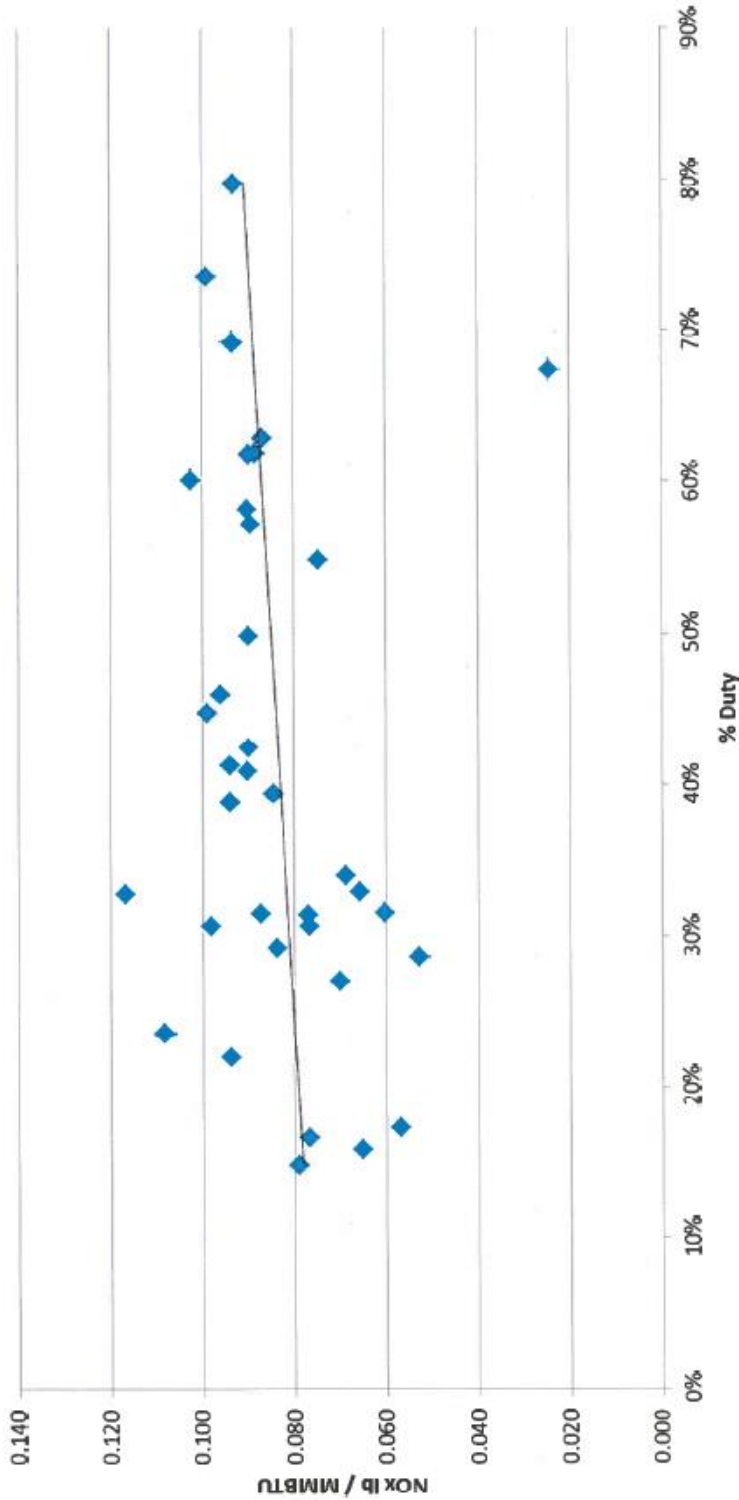
Tesoro Response to January 2013 Draft Engineering Evaluation for AN 23006

### F13 NOx EF vs. % Duty



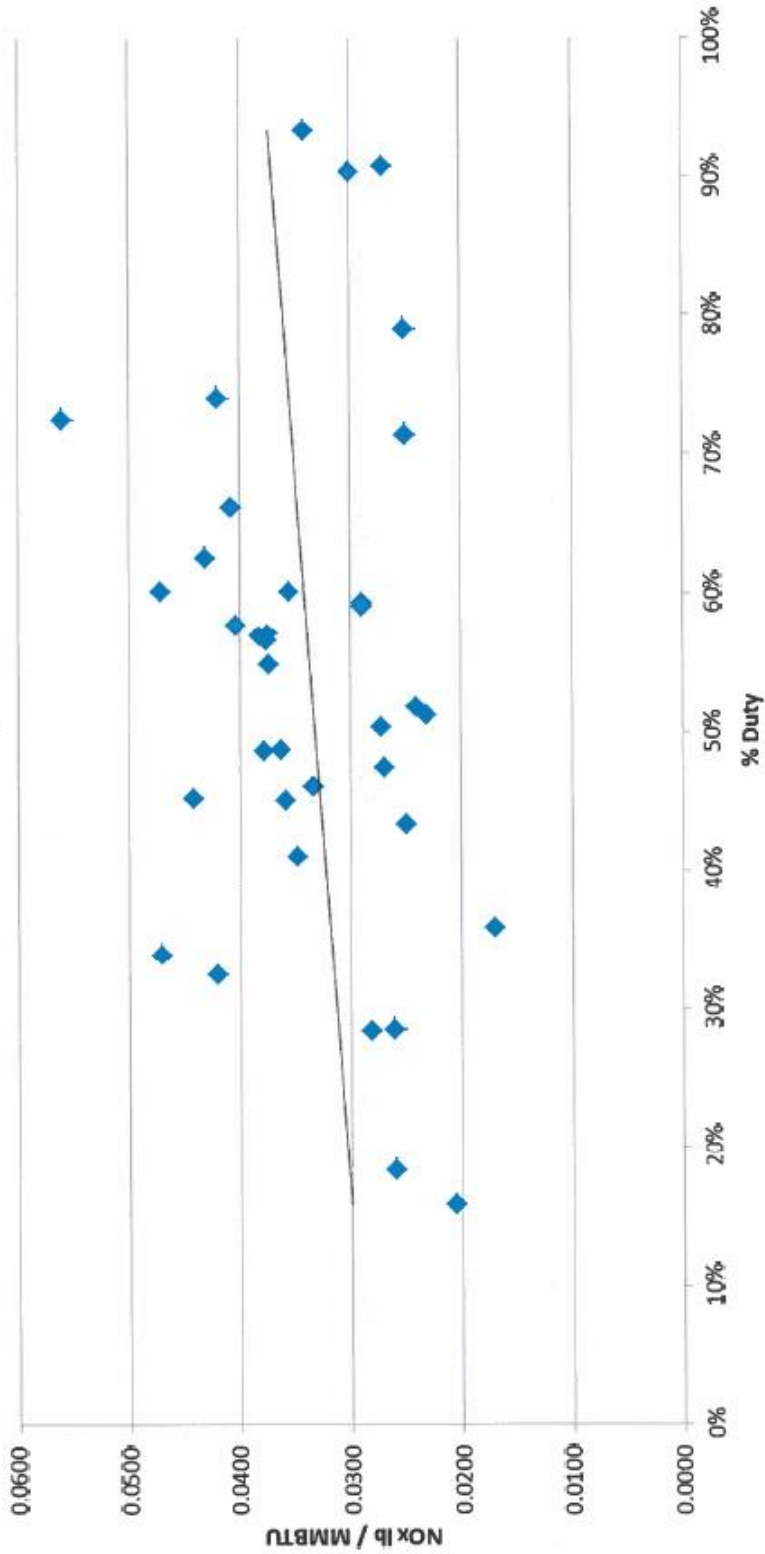
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### F16 NOx EF vs. % Duty



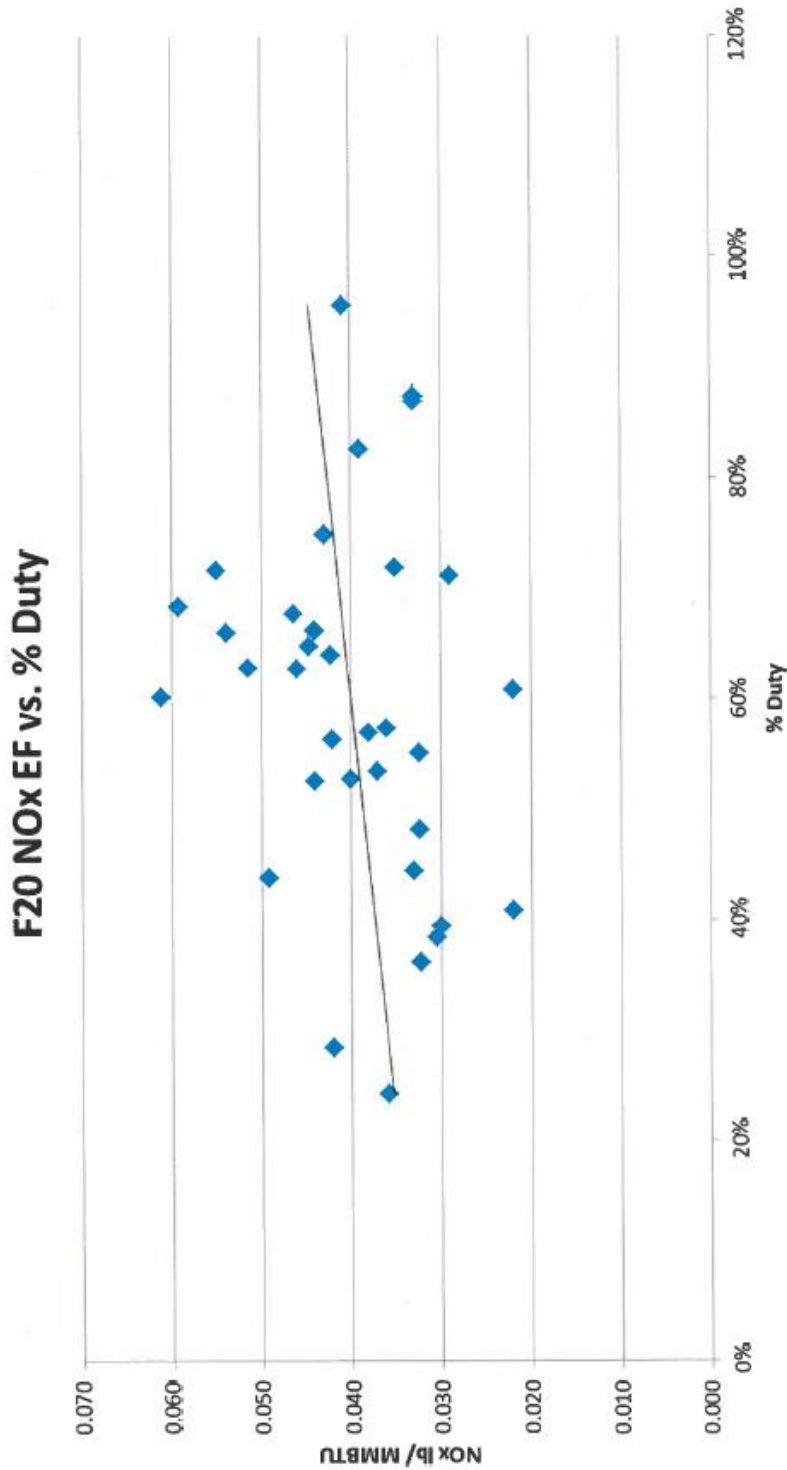
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### F19 NOx EF vs. % Duty



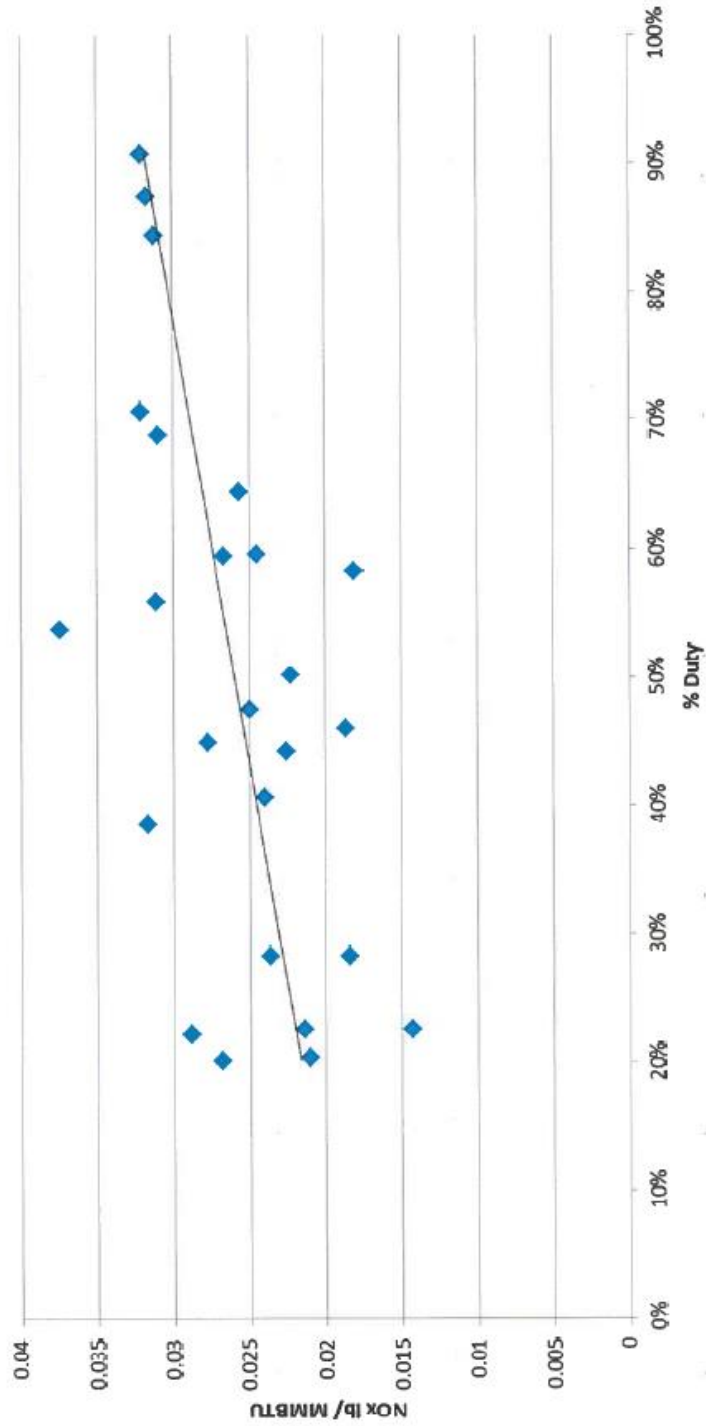


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### F26 NOx EF vs. % Duty



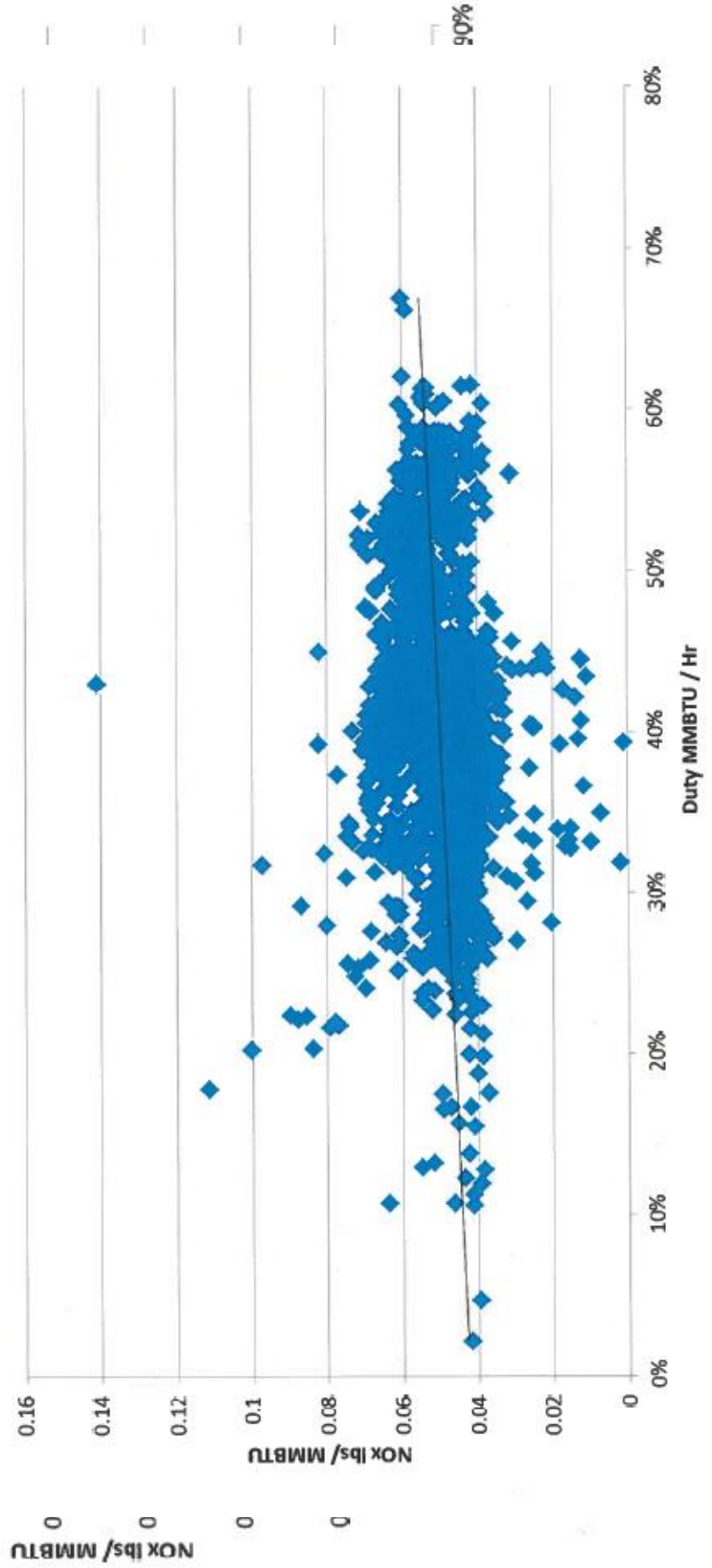
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### F22 NOx EF vs. % Max Firing Rate



Tesoro Response to January 2013 Draft Engineering Evaluation for AN 23006

### F34-F35 NOx EF vs. % of Max Firing



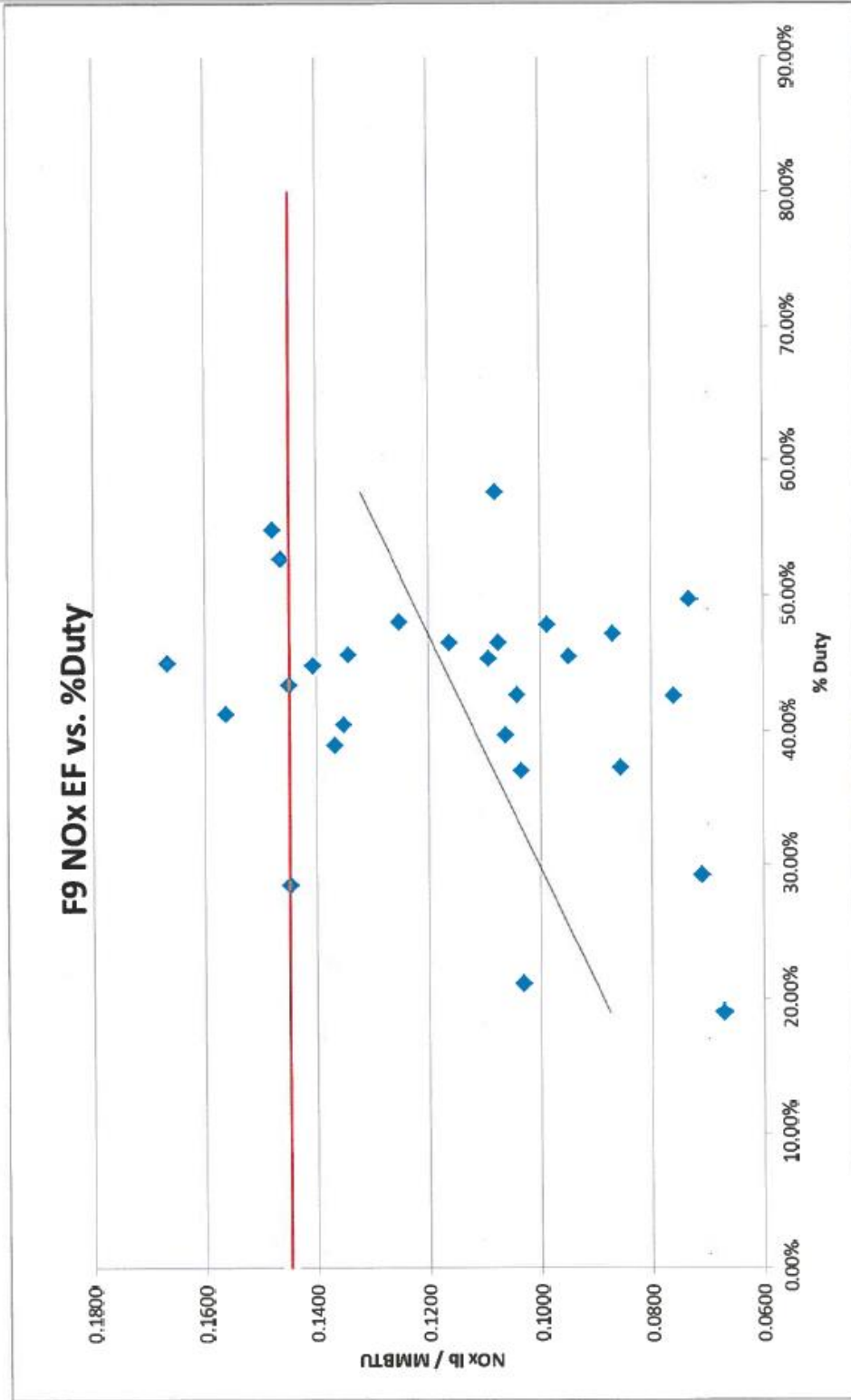
**Tesoro Response to January 2013 Draft Engineering Evaluation for AN 23006**

**APPENDIX B**

**TESORO HEATER DATA**

**COMPARED WITH BAAQMD PROPOSED NEW EMISSION FACTOR**

Tesoro Response to January 2013 Draft Engineering Evaluation for AN 23006



**Application 23075, Alteration to S-802 FCCU**

**EVALUATION REPORT  
TESORO - GOLDEN EAGLE REFINRY  
Application #23075 - Plant #14628**

**150 Solano Way  
Martinez, CA 94553**

**I. BACKGROUND**

Tesoro has submitted an application for an Authority to Construct and Permit to Operate for the following Alteration:

**S-802 Fluid Catalytic Cracking Unit, Alteration for Regenerator Cyclone Upgrade**

The existing 12 2-stage regenerator cyclones were installed in 1991 and are at the end of their useful life. The replacement cyclones will have a slightly improved performance, with an efficiency of over 99.9%. Catalyst losses averaged 8.9 tons/day in 2009. With the cyclone replacement catalyst losses are expected to be reduced by at least 3 tons/day. Directionally this should reduce particulate emissions downstream of the ESPs because the particulates in the ESP feed stream will go down. However, due to the variability of the ESP source test data, it is believed that the emission change downstream of the ESP would likely not be ascertained.

This Application qualified for the Accelerated Permitting Program and the Temporary Permit to Operate was granted April 4, 2011.

**II. EMISSION CALCULATIONS**

There are no emission changes associated with this application.

**III. PLANT CUMULATIVE INCREASE SINCE 4/5/1991**

There is no Cumulative Increase associated with this application.

**IV. STATEMENT OF COMPLIANCE**

There are no changes in compliance for S-802 FCCU. S-802 is subject to and expected to be in compliance with Regulation 6, Rule 1, Regulation 9, Rule 1, NSPS Subpart J, MACT Subpart UUU and the Consent Decree requirements codified in Permit Condition 11433.

This application for an alteration is categorically exempt from CEQA per Regulation 2-1-312.6 or 2-1-312.7, and therefore is not subject to CEQA review.

312.6 Permit applications relating exclusively to the repair, maintenance or minor alteration of existing facilities, equipment or sources involving negligible or no expansion of use beyond that previously existing.

312.7 Permit applications for the replacement or reconstruction of existing sources or facilities where the new source or facility will be located on the same site as the source or facility replaced and will have substantially the same purpose and capacity as the source or facility replaced.

This project is over 1,000 ft from the nearest public school and is therefore not subject to the public notification requirements of Regulation 2-1-412.

PSD, BACT, Toxics and Offsets are not applicable.

## V. CONDITIONS

There will be no changes to the existing permit conditions. Condition # 11433 will remain as follows:

Condition 11433

S802 FCCU Fluid Catalytic Cracker

S901 No. 7 Boiler

PERMIT CONDITION ID 11433 PLANT 14628 S-802 AND S-901, THE FCCU/CO BOILER PLANT:

ADMINISTRATIVELY REVISED VIA APPLICATION 15212 (MARCH 2007)  
ADDED CONSENT DECREE PARTS 7 THROUGH 12.

ADMINISTRATIVELY REVISED VIA APPLICATION 19647 (MARCH 2009)  
CONSOLIDATION OF BUBBLE CONDITION 4357 WITH CONDITION 8077

ADMINISTRATIVELY REVISED VIA APPLICATION 17500 (JUNE 2009)  
CLARIFICATION OF CONSENT DECREE REQUIREMENTS, ADDING PARTS 13 - 16.

NOTE: The consent decree referenced in this condition is:

Case No. SA-05-CA-0569-RF; United States of America v. Valero Refining Company – California, et.al. in the United States District Court, Western District of Texas, San Antonio Division, Lodged 6/15/2005, Entered 11/23/2005

1. The FCCU/CO Boiler Plant, Sources S-802/S-901, shall be abated at all times of operation by the electrostatic precipitator A-30 operating properly as designed. (basis: cumulative increase, BACT, offsets)

2. Total emissions to the atmosphere from the FCCU/CO Boiler Plant, Sources S-802/S-901, shall not exceed the following limits in any calendar year.

PM/PM10 151.5 ton/year

POC 5.8 ton/year

NO<sub>x</sub> 354.4 ton/year  
SO<sub>2</sub> 1335.5 ton/year  
CO 121.9 ton/year  
(basis: cumulative increase, BACT, offsets)

2A. The owner/operator shall continuously monitor and record SO<sub>2</sub> and NO<sub>x</sub> emissions exiting A30 to determine compliance with Part 2. Any new CEMs shall be reviewed and pre-approved the District Source Test Manager. (basis: cumulative increase, BACT)

2B. The owner/operator shall install a continuous opacity monitor to ensure that the emission is not greater than 20% opacity for a period or periods aggregating more than three minutes in any hour when the boiler is burning CO gas from the FCCU. (basis: Reg. 6-1-302)

3. Deleted. (All new hydrocarbon vapor pressure relief valves associated with this project are vented to the refinery flare gas recovery system.)

4. To demonstrate compliance with the emission limits of part 2 above and Condition ID 8077, part B2, the Owner/Operator shall monitor and calculate all emissions, in lb/day, of NO<sub>x</sub>, CO, POC, PM/PM<sub>10</sub>, and SO<sub>2</sub>, associated with the FCCU/CO Boiler Plant, S-802 and S-901, and summarize and report these emissions to the District on a monthly basis, in accordance with the procedures and requirements specified in Condition ID 8077, part B5. (basis: cumulative increase, BACT, offsets)

5. The Owner/Operator may submit for District review approved source test data to develop new emission factors for CO and precursor organic compounds, POC, to be used as alternatives to the emission factors specified in Permit No. 22769 (the No. 3 HDS Permit), if it can be shown that the new data are more representative of actual emissions. (basis: cumulative increase, offsets)

6. The Owner/Operator shall maintain a District approved file containing all measurements, records, charts, and other data which are required to be collected pursuant to the various provisions of this conditional permit, as well as all other data and calculations necessary to determine the emissions from the emission points covered by this permit, according to the procedures specified in Permittee/Owner/Operator's Permit No. 22769 (the No. 3 HDS Permit). This material shall be kept available for District staff inspection for a period of at least 5 years following the date on which such measurements, records or data are made or recorded. (basis: cumulative increase, offsets, BACT)

7. NO<sub>x</sub> concentration emission limits from the FCCU Regenerator shall not exceed 20 ppmvd at 0% O<sub>2</sub>, measured as a 365-calendar day rolling average, and 40 ppmvd at 0% O<sub>2</sub>, measured as a 7-calendar day rolling average, as determined prior to commingling with other streams. (basis: Consent Decree Paragraph 35)



8. SO<sub>2</sub> concentration emission limits from the FCCU shall not exceed 25 ppmvd at 0% O<sub>2</sub>, measured as a 365-calendar day rolling average, and 50 ppmvd at 0% O<sub>2</sub>, measured as a 7-calendar day rolling average. (basis: Consent Decree Paragraph 82)
9. CO emissions from the FCCU shall not exceed 500 ppmvd at 0% O<sub>2</sub>, measured as a one-hour block average. (basis: Consent Decree Paragraph 94)
10. Particulate concentration emissions limits from the FCCU shall not exceed 1 pound per 1000 pounds of coke burned (front half only according to Method 5B or 5F, as appropriate), measured as a one-hour average over three performance test runs. (basis: Consent Decree Paragraph 95)
11. The FCCU Regenerator (S-802) shall be an affected facility under 40 CFR 60 Subpart J for carbon monoxide (CO), opacity, particulate matter, and sulfur oxides (SO<sub>2</sub>) and the Owner/Operator shall comply with all applicable provisions of 40 CFR 60 Subparts A and J for FCCU Regenerators. The NSPS Subpart J limits for SO<sub>2</sub>, CO, opacity, and particulate matter, shall not apply during periods of startup, shutdown or malfunction of the FCCU or malfunction of the applicable control equipment. (basis: Consent Decree Paragraphs 99, 102, 107A and 110)
12. The FCCU short term NO<sub>x</sub> limit in Part 7 (40 ppmvd at 0% O<sub>2</sub>, measured as a 7-calendar day rolling average) and the short-term SO<sub>2</sub> limit in Part 8 (50 ppmvd at 0% O<sub>2</sub>, measured as a 7-calendar day rolling average) shall not apply during periods of FCCU feed hydrotreater outage, including startup, shutdown or malfunction of the hydrotreater. During hydrotreater outages, startup, shutdown or malfunction, Tesoro shall comply with the FCCU Feed Hydrotreater Outage Plan. (basis: Consent Decree Paragraph 85)
13. The Owner/Operator shall use NO<sub>x</sub> and O<sub>2</sub> CEMS to demonstrate compliance with the NO<sub>x</sub> emission limits in Part 7. The CEMS shall be installed, certified, calibrated, operated, and maintained in accordance with the applicable provisions of 40 CFR 60.13 and 40 CFR 60, Appendices A, B, and F. (basis: Consent Decree Paragraphs 61, 62)
14. The Owner/Operator of S-802 shall use SO<sub>2</sub> and O<sub>2</sub> CEMS to demonstrate compliance with the SO<sub>2</sub> emission limits in Part 8. The CEMS shall be installed, certified, calibrated, operated, and maintained in accordance with the applicable provisions of 40 CFR 60.13 and 40 CFR 60, Appendices A, B, and F. (basis: Consent Decree Paragraphs 90, 91)
15. The Owner/Operator of S-802 is exempt from notification requirements in accordance with 40 CFR Part 60, Subparts A and J, including without limitation 40 CFR 60.7, with respect to the provisions of 40 CFR Part 60, Subparts A and J, as such requirements apply to relate to CO, opacity, particulate matter, and SO<sub>2</sub> emissions from FCCU regenerators. (basis: Consent Decree Paragraphs 100, 108)
16. The Owner/Operator shall conduct the accuracy tests listed below on any CEMS used to comply with this permit condition unless that CEMS is otherwise subject to the requirements of NSPS Subparts A and J. These accuracy tests are allowed in lieu of the

requirements of Part 60, Appendix F Paragraphs 5.1.1, 5.1.3 and 5.1.4. (basis: Consent decree Paragraphs 62, 90, 101, 109)

- a. Conduct either a RAA or a RATA on each CEMS at least once every three (3) years.
- b. Conduct a CGA on each CEMS each calendar quarter during which a RAA or a RATA is not performed.
- c. Conduct a FAT, as defined in BAAQMD regulations or procedures, if desired, in lieu of any required RAA or CGA.

## VI. RECOMMENDATION

It is recommended that an Authority to Construct be waived and that a Permit to Operate be granted to Tesoro Refining & Marketing Company for the following equipment:

**S-802 Fluid Catalytic Cracking Unit, Alteration for Regenerator Cyclone Upgrade**

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Arthur Valla  
Senior Air Quality Engineer

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4May11

**Application 23232, S-963 Alkylation Unit Gas Turbine CAM Plan**

**ENGINEERING EVALUATION**  
**Tesoro Refining and Marketing Company**  
**PLANT NO. 14628**  
**APPLICATION NO. 23232**

**BACKGROUND**

The Tesoro Refining and Marketing Company (Tesoro) is applying for an Administrative Change in Conditions to their Permit to Operate to add the requirements of 40 CFR 64, Compliance Assurance Monitoring (CAM), for the following equipment:

**S-963 Alkylation Plant Gas Turbine 177, Natural Gas Fired, 113MM Btu/hr**

The CAM requirements for S-963 will be satisfied with fuel gas and steam monitoring already in place. 40 CFR 64.6(c) lists the minimum requirements that are required to be included in permit conditions. The requirements of 40 CFR 64 are listed in the table appended at the end of this engineering evaluation.

**EMISSION CALCULATIONS**

There are no emission increases associated with this application. This application simply incorporates the requirements of 40 CFR 64 into the Permit to Operate conditions.

**STATEMENT OF COMPLIANCE**

This application does not change the compliance of S963 Gas Turbine. S963 is expected to remain in compliance with the following:

Regulation 6, Rule 1, Particulate Matter General Requirements.

Regulation 9 Rule 9, Nitrogen Oxides from Stationary Gas Turbines.

NESHAPS Subpart YYYYY, National Emission Standards for Hazardous Air Pollutants for Stationary Combustion Turbines.

The project is exempt from CEQA pursuant to Regulation 2-1-312.1:

312.1 Applications to modify permit conditions for existing or permitted sources or facilities that do not involve any increases in emissions or physical modifications.

The project is over 1000 feet from the nearest school and therefore not subject to the public notification requirements of Reg. 2-1-412.

PSD, BACT, Offsets, and Toxics do not apply.

## PERMIT CONDITIONS

Permit Condition 19528 will be revised by adding Parts 21, 22 and 23 as follows:

### Condition 19528

Modified by App 18739 (Nov 2008) Removal of S924 from Part 6

Administratively Modified by Application 19326 (Feb2009), Removed Part 2 and 2A

Administratively changed by Application 19419 (June 2009). Updated to remove parts 7 and 7A redundant with District regulations.

Administratively Revised by Application 19874 (July 2009) Updates for Combustion Sources

Administratively Revised by Application 18261 Title V Renewal. Added Parts 20 and 20A for S-1411 SAP CAM.

Administratively Changed by Application 21711 (May 2010). Deleted Parts 8/8A. Deleted S1416 from Part 10/10A. Renumbered Part 11C.

Administratively Changed by Application 23232 (April 2012. Added 40 CFR 64 CAM requirements for S963 Gas Turbine.

[No change to Parts 1 through 20]

21. For S963 Gas Turbine, the Owner/Operator shall install, calibrate, maintain and operate a continuous monitoring system to monitor and record the fuel consumption, steam injection and ratio of steam injection to fuel being fired in the turbine. When the turbine is in normal operation, as indicated by a fuel flow rate greater than 100 lb/hr (1 hour average), the steam to fuel ratio calculated by the monitoring system shall be greater than or equal to 30:1 steam to fuel (1 hour average) to ensure compliance with the NOx limit in SIP Regulation 9, Rule 9. During normal operation a steam to fuel ratio less than 30:1 (1 hour average) shall be considered an excursion under the CAM 40 CFR 64 rule and an exceedance of SIP Regulation 9, Rule 9 NOx limit for S963. (Basis: Regulations 2-1-403, 2-6-503, 40 CFR 64)

22. For S963 Gas Turbine, the Owner/Operator shall keep the following records in a District approved log:

- a. The rate of fuel consumption, steam injection, and the steam to fuel ratio.
- b. Monitor performance data and corrective actions taken for monitor downtime.

c. Written Quality Improvement Plan(s) as required by 40 CFR 60.8 and activities undertaken to implement such plans.

d. Other supporting information as needed.  
(Basis: Regulations 2-1-403, 2-6-503, 40 CFR 64)

23. For S963 Gas Turbine, the Owner/Operator shall submit an semiannual monitoring report that includes the following information:

a. Summary of the number, duration and cause of the steam to fuel ratio excursions and exceedances.

b. Corrective actions taken for each excursion or exceedance.

c. Summary of the number, duration and cause of monitor downtime incidents for the S963 fuel and steam monitors.

d. Description of actions taken to implement a Quality Improvement Plan (QIP) during the reporting period.

e. Documentation that the implementation of the QIP has been completed and reduced the likelihood of similar excursions or exceedances occurring.

(Basis: Regulations 2-1-403, 2-6-503, 40 CFR 64.9)

## RECOMMENDATION

It is recommended that an Administrative Change in Conditions to the Permit to Operate be granted to Tesoro for the following equipment:

**S-963 Alkylation Plant Gas Turbine 177, Natural Gas Fired, 113MM Btu/hr**

By: \_\_\_\_\_

Arthur P Valla  
Senior Air Quality Engineer  
April 4, 2012

CAM Checklist

Application: 23232

Plant: 14628 Tesoro

Source: S963 Gas Turbine

Date: 21Mar12, based on Tesoro letter 12Mar12.

| <b>Citation 40<br/>CFR 64</b> | <b>Description</b>   | <b>Satisfied?</b> | <b>Where</b>   | <b>Notes</b>   |
|-------------------------------|--|-------------------|--|--|
| 64.3                          | Design Criteria  | N/A               |  |  |
| 64.3(a)                       | General  | N/A               |  |  |
| 64.3(a)(1)                    | Select Emission<br>or Parameters                             | Yes               | Table A  | Fuel and Steam rates similar to the monitoring in 60KKKK. Pressure and Humidity are part of the NOx reduction correlation, but are not included based on the presumption that 60KKKK monitoring is acceptable for CAM. |
| 64.3(a)(2)                    | Select Monitor<br>Ranges                                     | Yes               | Table A only<br>selects key<br>values  | Request in Incomplete Letter. Table A specifies Fuel range $\geq 100$ lb/hr, Steam-Fuel ratio $\geq 30$  |
|                               | Bypass Operation   | Yes               | 16May11<br>letter, #5  | Request in Incomplete Letter. There is no bypass operation. Steam injection is integral to turbine operation, and is only limited during startup and shutdown, by automatic turbine controls.                          |
| 64.3(a)(3)                    | Suggested Range<br>Basis                                     | N/A               |  |  |
| 64.3(b)                       | Performance<br>Criteria                                      | N/A               |  |  |
| 64.3(b)(1)                    | Detector<br>Location and<br>Specs                            | Yes               | In general on<br>Table A, but<br>no<br>Drawing(s).<br>P&IDs<br>provided in<br>21Mar12<br>letter. | Request drawings in Incomplete Letter. Fuel monitoring shown on P&ID, steam monitoring shown on schematic provided in 16May11 letter, Attachment 3.  |
| 64.3(b)(2)                    | Verification<br>Procedures for<br>New/Modified<br>Monitoring | N/A               |  | Existing Monitoring (to be confirmed in Incomplete Letter)   |

| <b>Citation 40<br/>CFR 64</b> | <b>Description</b>                                     | <b>Satisfied?</b> | <b>Where</b>   | <b>Notes</b>   |
|-------------------------------|--|-------------------|--|--|
| 64.3(b)(3)                    | QA practices   | Yes               | Inspection and PM Plan section, 28Jul11 letter, #7         | Need to confirm Plan conforms to Manufacturer's Recommendations. Plan meets or exceeds recommendations of Steam Injection system manufacturer Turbine Technology Services Corporation. |
| 64.3(b)(4)                    | Monitoring Frequency                                   | Yes               | Application States only continuous. 16May11 letter #4.     | Request frequency of discrete data points in Incomplete Letter. Frequency is more often than the 4/hr requirement of (b)(4)(ii).   |
| 64.3(c)                       | Evaluation Factors to consider site-specific situation | Yes               | Proposal uses existing monitoring. 28Jul11 letter #8.      | Existing Monitoring (to be confirmed in Incomplete Letter). Confirmed monitoring is existing.  |
| 64.3(d)                       | Consider other continuous monitoring requirements      | N/A               |  | S963 has no other requirement.   |
| 64.4                          | Submittal Requirements                                 | N/A               |  |  |
| 64.4(a)                       | Satisfies 64.3, Including:                             | N/A               |  |  |
| 64.4(a)(1)                    | Indicators   | Yes               | Table A  | Fuel gas and steam   |
| 64.4(a)(2)                    | Ranges   | Yes               | Table A only selects key values                            | Request in Incomplete Letter.. . Table A specifies Fuel range $\geq 100$ lb/hr, Steam-Fuel ratio $\geq 30$   |
| 64.4(a)(3)                    | Performance Criteria per 64.3(b)                       | Yes               | See 64.3(b)  |  |
| 64.4(a)(4)                    | Continuous Monitoring Range and Performance            | N/A               |  | Only applies for 64.3(d) continuous monitoring required by other regulations   |
| 64.4(b)                       | Justification of Monitoring                            | Yes               | Cited NSPS GG, but no correlation data. 16May11 letter #3. | Request correlation data in Incomplete Letter.<br>$NO_x = 10.54(P_{cd})^{1/2} * e^{(19(.0063-H))}$<br>$SREF1 = Q_f \ln(NO_x) - 3.738$  |

| <b>Citation 40<br/>CFR 64</b> | <b>Description</b>                                  | <b>Satisfied?</b> | <b>Where</b>                        | <b>Notes</b>   |
|-------------------------------|---|-------------------|-------------------------------------|--|
| 64.4(c)(1)                    | Operating parameter data                            | Yes               | 16May11 letter #3.                  | Request correlation data in Incomplete Letter  |
| 64.4(c)(2)                    | No changes since data                               | Yes               | 16May11 letter #3.                  | Request in Incomplete Letter. Confirmed no changes.  |
| 64.4(d)                       | If Operating Data missing                           | N/A               |                                     |  |
| 64.4(d)(1)                    | Provide Test Plan                                   | N/A               | 16May11 letter #3.                  | Request in Incomplete Letter. Testing completed 8/19/94.   |
| 64.4(d)(2)                    | Engineering assessments can be used in lieu of data | N/A               |                                     | Owner can propose when addressing test plan.   |
| 64.4(e)                       | Implementation Plan                                 | See Note          | 28Jul11 letter #8                   | Request confirmation of existing monitoring. Confirmed monitoring is existing.   |
| 64.4(f)                       | Common Control Device                               | N/A               |                                     |  |
| 64.4(g)                       | Multiple Control Device                             | N/A               |                                     |  |
| 64.5                          | Deadlines   | N/A               |                                     | This application is as soon as possible  |
| 64.6                          | Approval of Monitoring                              | N/A               |                                     |  |
| 64.6(a)                       | Permits shall approve                               | N/A               |                                     |  |
| 64.6(b)                       | Conditions allowed to confirm performance           | Yes               |                                     | Depends on the status of the correlation data. Performance confirmed in 8/19/94 initial test and by periodic source tests. |
| 64.6(c)                       | Minimum Conditions include:                         | N/A               |                                     |  |
| 64.6(c)(1)                    | Approved Monitoring                                 | Yes               | 12May12 letter #2, and Attachment 3 | Request in Incomplete Letter. All included in proposed revision to Condition 19528.  |
| 64.6(c)(1)(i)                 | Indicator Monitored                                 |                   |                                     |  |
| 64.6(c)(1)(ii)                | Device used to Monitor                              |                   |                                     |  |
| 64.6(c)(1)(iii)               | Performance Requirements                            |                   |                                     |  |
| 64.6(c)(2)                    | Define an exceedance                                |                   |                                     |  |



| <b>Citation 40<br/>CFR 64</b> | <b>Description</b>                        | <b>Satisfied?</b> | <b>Where</b>                               | <b>Notes</b>   |
|-------------------------------|---|-------------------|--|--|
| 64.6(c)(3)                    | Operation, QIP, Records                   |                   |  |  |
| 64.6(c)(4)                    | Minimum Data Collection                   |                   |  |  |
| 64.6(d)                       | Schedule of compliance                    | N/A               | 28Jul11 letter #8                          | Request confirmation of existing monitoring. Confirmed monitoring is existing.   |
| 64.6(e)                       | Disapproval                               | N/A               |  |  |
| 64.7                          | Operation                                 | N/A               |  |  |
| 64.7(a)                       | Commencement of operation                 | N/A               | 28Jul11 letter #8                          | Request confirmation of existing monitoring. Confirmed monitoring is existing.   |
| 64.7(b)                       | Proper maintenance                        | Yes               | In Inspection and PM Plan section          |  |
| 64.7(c)                       | Operate monitoring at all times           | Yes               | Implied                                    | Also required in permit conditions per 64.6(c)(3)  |
| 64.7(d)(1)                    | Response to Excursion                     | Yes               | Operator response cited on Page 1 of plan. |  |
| 64.7(d)(2)                    | Determination of acceptable performance   | Yes               |  | Need to address after correlation reviewed Performance confirmed in 8/19/94 initial test and by periodic source tests. |
| 64.7(e)                       | Improved Monitoring                       | N/A               |  | Applicable if existing monitoring inadequate Existing Monitoring Adequate  |
| 64.8                          | Quality improvement Plan                  | N/A               |  |  |
| 64.8(a)                       | QIP required when triggered by 64.7(d)(2) | N/A               |  |  |
| 64.9                          | Reporting and Recordkeeping               | N/A               |  |  |
| 64.9(a)(1)                    | Reporting per 70.6(a)(3)(iii)             | Yes               |  | Include in Permit Conditions per 64.6(c)(3) Included in proposed revision to Condition 19528-23.                       |

| <b>Citation 40<br/>CFR 64</b> | <b>Description</b>                         | <b>Satisfied?</b> | <b>Where</b> | <b>Notes</b>  |
|-------------------------------|--|-------------------|--------------|---|
| 64.9(a)(2)                    | Include 70.6(a)(3)(iii) requirements plus: | Yes               |              | Include in Permit Conditions per 64.6(c)(3) Included in proposed revision to Condition 19528.     |
| 64.9(a)(2)(i)                 | Excursions and Exceedances                 | Yes               |              | Include in Permit Conditions per 64.6(c)(3) Included in proposed revision to Condition 19528-23a. |
| 64.9(a)(2)(ii)                | Monitor downtime                           | Yes               |              | Include in Permit Conditions per 64.6(c)(3) Included in proposed revision to Condition 19528-23c  |
| 64.9(a)(2)(iii)               | QIP Actions                                | Yes               |              | Include in Permit Conditions per 64.6(c)(3) Included in proposed revision to Condition 19528-23d. |
| 64.9(b)(1)                    | Recordkeeping per 70.6(a)(3)(ii)           | Yes               |              | Include in Permit Conditions per 64.6(c)(3) Included in proposed revision to Condition 19528-22.  |
| 64.9(b)(2)                    | Alternative to paper records               | N/A               |              |   |
|                               |  |                   |              |   |

**Application 23322, S-1020 No. 2 Reformer Capacity Increase**

**ENGINEERING EVALUATION  
Tesoro Refining and Marketing Company  
PLANT NO. 14628  
APPLICATION NO. 23322**

**I. BACKGROUND**

The Tesoro Refining and Marketing Company (Tesoro) is applying for an Authority to Construct and/or Permit to Operate for a modification to the No. 3 Reformer, including the following equipment:

- S-971        No. 3 Reformer Charge Heater F-53**
- S-972        No. 3 Reformer Debutanizer Reboiler F-54**
- S-1020       No. 3 Reformer**

These sources were initially permitted in 1978 through New Source Review Application 26645. S-971 is abated with a SCR and this source contributes to the Regulation 9, Rule 10 NOx Compliance Plan. Under the Regulation 9-10-110.6 exemption, triggering NOx BACT would remove S-971 from the 9-10 bubble. Therefore, a permitting strategy for this application is to keep NOx emissions at or below the RACT adjusted baseline in order to keep S-971 in the Regulation 9-10 bubble. It should be noted that S-971 with an ULNB and SCR meet current NOx BACT if permit conditions were imposed to limit NOx emission concentrations.

The increase in capacity for this equipment is as follows:

| Source | Description                         | Current NSR Capacity        | Proposed Capacity           |
|--------|-------------------------------------|-----------------------------|-----------------------------|
| S-971  | F-53 No. 3 Reformer Charge Heater   | 210MM Btu/hr                | 300MM Btu/hr                |
| S-972  | No. 3 Reformer Debutanizer Reboiler | 34MM Btu/hr                 | 45MM Btu/hr                 |
| S-1020 | No. 3 Reformer                      | 20,000 BPD<br>7,300,000 BPY | 26,000 BPD<br>9,490,000 BPY |

The scope of the proposed modifications in this project is as follows:

| Source | Description                       | Project Scope   |
|--------|-----------------------------------|---|
| S-971  | F-53 No. 3 Reformer Charge Heater | Replace existing burners with new generation ULNB burners that fire |

| Source | Description                         | Project Scope   |
|--------|-------------------------------------|---|
|        |                                     | with shorter, more compact flames (at comparable firing rates).   |
| S-972  | No. 3 Reformer Debutanizer Reboiler | Replace existing burner with new generation ULNB burners.   |
| S-1020 | No. 3 Reformer                      | Debottlenecking boiler feed water system by replacing a control valve, debottlenecking product separator pumps by replacing a control valve and replacing the Net Gas Compressor Interstage Cooler tubesheet with enhanced surface area technology. |

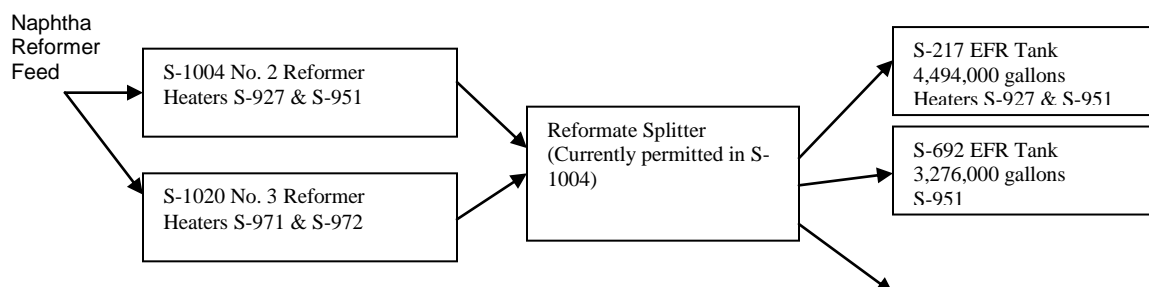
The equipment descriptions as detailed in Table II-A1 in the current Renewed Title V Permit are as follows:

**Table II A1 - Permitted Sources – Golden Eagle Refinery  
Plant #B2758 – Tesoro Refining and Marketing Company - Golden Eagle Refinery**

| S-#  | Description   | Make or Type         | Model                | Capacity                           | Grandfathered Limit, or Firm Limit and Basis                       |
|------|---|----------------------|----------------------|------------------------------------|--|
| 971  | No. 3 Reformer UOP Furnace (F53)<br>Refinery Fuel Gas, Natural Gas Abated by A-1433 SCR on combined stack with S-972          | KTI                  | Box                  | 300 mmbtu/hr<br>2,628,000 mmbtu/yr | Firm Limit<br>Condition #16685, part 1<br>Condition #18372, part 3 |
| 972  | No. 3 Reformer Debutanizer Reboiler (F54)<br>Refinery Fuel Gas, Natural Gas Abated by A-1433 SCR on combined stack with S-971 | Foster Wheeler / KTI | Vertical Cylindrical | 45 mmbtu/hr<br>394,200 mmbtu/yr    | Firm Limit<br>Condition #16685, part 1<br>Condition #18372, part 3 |
| 1020 | No. 3 UOP Reformer  |                      |                      | 25.2K bbl/day<br>8,760K bbl/yr     | Grandfathered Limit  |

Note: This table contains errors and will be corrected as proposed in Appendix A later in this evaluation.

The simplified process configuration for this equipment is as follows:



S-775 IFR Tank  
4,605,000 gallons

The S-1020 No. 3 Reformer operates in parallel with S-1004 No. 2 Reformer. S-1004 is currently out of service. The purpose of this modification to increase the capacity of S-1020 is to allow S-1004 to remain out of service. This proposed capacity increase improves refinery operation because S-1004 operates less efficiently than S-1020.

The equipment descriptions as detailed in Table II-A1 in the current Renewed Title V Permit for the sources associated with the No. 2 Reformer are as follows:

**Table II A1 - Permitted Sources – Golden Eagle Refinery  
Plant #B2758 – Tesoro Refining and Marketing Company - Golden Eagle Refinery**

| S-#  | Description   | Make or Type               | Model                | Capacity                           | Grandfathered Limit, or Firm Limit and Basis                       |
|------|---|----------------------------|----------------------|------------------------------------|--|
| 926  | No. 2 Reformer Splitter Reboiler(F26) Refinery Fuel Gas, Natural Gas                    | Petro Chem                 | Vertical Cylindrical | 145 mmbtu/hr<br>1270200 mmbtu/yr   | Firm Limit<br>Condition #16685, part 1<br>Condition #18372, part 3 |
| 927  | No. 2 Reformer Heat/Reheating (F27) Refinery Fuel Gas, Natural Gas Abated by A-1431 SCR | Lummus                     | Multicell Cabin      | 280 mmbtu/hr<br>2,452,800 mmbtu/yr | Firm Limit<br>Condition #16685, part 1<br>Condition #18372, part 3 |
| 951  | No. 2 Reformer Aux Reheater (F51) Refinery Fuel Gas, Natural Gas                        | Optimized Process Furnaces | Cabin                | 30 mmbtu/hr<br>131,400 mmbtu/yr    | Firm Limit<br>Condition #16685, part 1                             |
| 1004 | No. 2 Catalytic Reformer  |                            |                      | 38.4K bbl/day<br>14,016K bbl/yr    | Grandfathered Limit  |

Note: This table contains errors and will be corrected as proposed in Appendix A later in this evaluation.

Reformate from both S-1004 and S-1020 are processed in the Reformate Splitter. The Reformate Splitter contains distillation towers that produce a heavy reformate, and medium reformate, and a light reformate. The Reformate Splitter, a grandfathered source originally permitted in the S-1004 No. 2 Reformer, was modified and

subject to New Source Review via 1993 Clean Fuel Project 10912 when S-1038 Benzene Saturation Unit was added to treat the light reformate. In Application 10912, the Reformate Splitter was permitted at 40MBPD. The permit for the Reformate Splitter was retained in S-1004 No. 2 Reformer. The Reformer part of S-1004 is a grandfathered source with a capacity limit of 23,000 BPD (determined from historical maximum throughput data from 1996 provided by Tesoro). The current Permit to Operate for S-1004 incorrectly states the capacity of S-1004 as 1600 BPH (38.4MBPD)

Therefore, to minimize the confusion, the Reformate Splitter will be split out of S-1004 and become:

**S-1555 Reformate Splitter, 40,000 BPD**

**A. Tanks**

The application stated that this project will result in more product passing through tankage, and identified the following three tanks associated with the modification:

- S-217 EFR Tank, 4,494,000 gallons**
- S-692 EFR Tank, 3,276,000 gallons**
- S-775 IFR Tank, 4,605,000 gallons**

The equipment descriptions as detailed in Table II-A1 in the Renewed Title V Permit for these tanks are as follows:

**Table II A1 - Permitted Sources – Golden Eagle Refinery  
Plant #B2758 – Tesoro Refining and Marketing Company - Golden Eagle Refinery**

| <b>S-#</b> | <b>Description</b>                 | <b>Make or Type</b>    | <b>Model</b> | <b>Capacity</b>                 | <b>Grandfathered Limit, or Firm Limit and Basis</b>          |
|------------|------------------------------------|------------------------|--------------|---------------------------------|--|
| 217        | Tank A-217, White Ethers, Gasoline | External floating roof |              | 4,494K gal<br>10,375K bbl/yr    | Grandfathered Limit  |
| 692        | Tank A-692, White Gasoline         | External floating roof |              | 3,276K gal<br>10,000K bbl/yr    | Grandfathered Limit  |
| 775        | Tank A-849 Gasoline                | Internal floating roof |              | 4,605K gal<br>11,336,000 bbl/yr | Firm Limit<br>Condition #19762, part A1<br>New Source Review |

S-775 is an NSR tank with a throughput limit in Condition 19762. This tank was initially granted an Authority to Construct to store MTBE in 1992 via NSR Application 6625. The S-775 Authority to Construct was modified and a final Permit to

Operate was granted in 1996 via NSR Application 14580. S-775 was permitted to store gasoline via 2002 NSR Application 4579.

The other two tanks are grandfathered tanks. However, Tesoro later retracted the increase in storage tank throughput statement of the original application and instead claimed that the increase in capacity for S-1020 does not impact the throughput of the tanks. Tesoro based this new claim on the fact that there is no change in the capacity of the Reformate Splitter.

The proper time to address these grandfathered tanks was in Clean Fuels Project Application 10912, or in 1978 when Application 26645 added the new No. 3 Reformer. These tanks were not addressed in either Application 10912 or 26645. It was originally concluded that these tanks need to be addressed in this application (Re: Engineering Division Refinery Workgroup Meeting October 15, 2012, Agenda Item # 27). However, since the capacity of the reformate splitter remains unchanged in this application, District Staff decided that it would be improper to address these tanks now. The reason for this decision is that even though these tanks would have been modified in 1978 when reforming capacity was doubled, at the time grandfathered sources did not have throughput limits, and since the tanks were not physically modified, they were not addressed. Moreover, even if the tanks were to have been addressed in 1978, POC emissions would likely not have triggered BACT (then required if POC emissions exceeded 150 lb/day) or offsets (then required if POC emissions exceeded 40 ton/yr).

Accordingly, no reformate tanks are addressed in this application.

## B. Debottlenecking

In this application, Tesoro identifies other sources that may be impacted by the modification to increase the permitted capacity of S-1020. This impact is caused by an increase in the total refinery reformer capacity. Even though S-1004 is expected to remain out of service, the S-1004 Permit to Operate will be retained. Therefore, the increase in permitted capacity for S-1020 will increase the total reformer processing capacity which could impact any source that provides the reformer feedstock. These sources and their associated process heaters are summarized Table 1 below.

**Table 1 -- Sources Tesoro Identified as Impacted by an S-1020 Capacity Increase**

| <u>Associated Process Units</u>      | <u>Associated Process Heaters</u>   |
|--------------------------------------|---|
| • S-802 Fluid Catalytic Cracker Unit |   |
| • S-817 No. 3 Crude Unit             | S-908 No. 3 Crude Heater<br>S-1470 No. 3 Crude Vacuum Distillation Heater |
| • S-1002 No. 1 HDS Unit              | S-916 No. 1 HDS Heater<br>S-917 No. 1 HDS Prefract Reboiler               |
| • S-1004 No. 2 Catalytic Reformer    | S-926 No. 2 Reformer Splitter Reboiler                                    |
| • S-1006 No. 1 HDA Unit              | S-915 Platformer Intermediate Heater                                      |

- S-1007 Hydrocracker Unit
  - S-931 Hydrocracker Reactor No. 1 Heater
  - S-932 Hydrocracker Reactor No. 2 Heater
  - S-933 Hydrocracker Reactor No. 3 Heater
  - S-934 Hydrocracker Stabilizer Reboiler
  - S-935 Hydrocracker Splitter Reboiler
- S-1008 Hydrocracker Unit
  - S-928 HDN Reactor A Heater
  - S-929 HDN Reactor B Heater
  - S-930 HDN Reactor C Heater
- S-1038 Benzene Saturation Unit
- S-1105 No. 4 HDS Unit
  - S-1106 No. 4 HDS Reactor Feed Heater
- S-1510 Delayed Coker Unit
  - S-1511 Delayed Coker Heater #1
  - S-1512 Delayed Coker Heater #2

## 1. Process Units

Except S-802 FCCU and S-1004 No. 2 Reformer, all of the process units identified by Tesoro as potentially impacted are designated as NSR sources in the Title V permit and have NSR capacity limits in permit conditions.

S-802 FCCU is subject to an annual emissions 'mini-bubble' in Permit Condition 11433, but does not have a capacity limit in a permit condition. The capacity of S-802 is 47,500 BPSD according to the original 1977 data form. The District has no record of the S-802 capacity being increased to 75,000 BPD. Tesoro has indicated that it is likely this capacity increase was part of a permit application that addressed emissions by adjusting the refinery emissions cap. Updating and correcting the Tesoro Refinery Emissions Cap will be the subject of a future Tesoro permit application. The District has agreed with Tesoro to defer the apparent S-802 capacity discrepancy until Tesoro completes the analysis of the Refinery Emissions Cap.

This application does not impact S-1004 No. 2 Reformer because it is expected to remain out of service.

The equipment descriptions as detailed in Table II-A1 in the current Renewed Title V Permit for Process Units are shown below:

**Table II A1 - Permitted Sources – Golden Eagle Refinery  
Plant #B2758 – Tesoro Refining and Marketing Company - Golden Eagle Refinery**

| S-# | Description  | Make or Type                                       | Model | Capacity                      | Grandfathered Limit, or Firm Limit and Basis |
|-----|--|--|-------|-------------------------------|--|
| 802 | FCCU Fluid Catalytic Cracker Regenerator<br>Abated by S-901 CO Boiler and A-30 ESP | Reactor UOP Riser<br>Cracker Regenerator (Bechtel) |       | 75K bbl/day<br>27,375K bbl/yr | Grandfathered Limit                          |



| S-#  | Description                                   | Make or Type | Model | Capacity  | Grandfathered Limit, or Firm Limit and Basis                              |
|------|---|--------------|-------|---|---|
| 817  | No. 3 Crude Unit<br>A-12 Vapor Recovery       | Elliot Co.   |       | 63K bbl/day<br>22,995K bbl/yr                         | Firm Limit<br>Condition #17837,<br>part 1, part 2<br>New Source<br>Review |
| 1002 | No. 1 HDS Unit                                |              |       | 28K bbl/day<br>10,220K bbl/yr                         | Firm Limit<br>Condition #8350,<br>part A1<br>New Source<br>Review         |
| 1004 | No. 2 Catalytic Reformer                      |              |       | 38.4K bbl/day<br>14,016K bbl/yr                       | Grandfathered<br>Limit  |
| 1006 | No. 1 HDA Unit                                |              |       | 20K bbl/day<br>7300K bbl/yr                           | Firm Limit<br>Condition #8350,<br>part C1<br>New Source<br>Review         |
| 1007 | Hydrocracker Unit<br>[Hydrocracker 2nd Stage] |              |       | 37K bbl/day<br>12,775K bbl/yr                         | Firm Limit<br>Condition #8077,<br>Part C1<br>New Source<br>Review         |
| 1008 | Hydrocracker Unit<br>[Hydrocracker 1st Stage] |              |       | 37K bbl/day<br>12,775K bbl/yr                         | Firm Limit<br>Condition #8077,<br>Part C1<br>New Source<br>Review         |
| 1038 | Benzene Saturation Unit                       |              |       | 15,000 bbl/day<br>5,475 K bbl/yr                      | Firm Limit<br>Condition #23258,<br>part 1<br>New Source<br>Review         |
| 1105 | No. 4 HDS Unit                                |              |       | 40080 BPD<br>14,629,200 BPY                           | Firm Limit<br>Condition<br>#19199,<br>Part G0<br>New Source<br>Review     |
| 1510 | Delayed Coker                                 |              |       | 55.0K bbl/day<br>20,075K bbl/12<br>consecutive months | Firm Limit<br>Condition #23129,<br>part 3<br>New Source<br>Review         |

Note: This table contains errors and will be corrected as proposed in Appendix A later in this evaluation.

## 2. Fired Heaters

The equipment descriptions as detailed in Table II-A1 in the current Renewed Title V Permit for Associated Fired Heaters are shown below:

**Table II A1 - Permitted Sources – Golden Eagle Refinery  
Plant #B2758 – Tesoro Refining and Marketing Company - Golden Eagle Refinery**

| S-# | Description  | Make or Type            | Model                   | Capacity                              | Grandfathered Limit, or Firm Limit and Basis                             |
|-----|--|-------------------------|-------------------------|---------------------------------------|--|
| 908 | No. 3 Crude Heater (F8)<br>Natural Gas, Refinery Fuel Gas<br>Abated by A-908 SCR | Alco                    | Cabin                   | 220 mmbtu/hr<br>1,927,200<br>mmbtu/yr | Firm Limit<br>Condition #16685,<br>part 1,                               |
| 915 | Platformer Intermediate Heater<br>(F15)<br>Refinery Fuel Gas, Natural Gas        | Braun                   | Cabin                   | 20 mmbtu/hr<br>175,200 mmbtu/yr       | Firm Limit<br>Condition #16685,<br>part 1                                |
| 916 | No. 1 HDS Heater (F16)<br>Natural Gas, Refinery Fuel Gas                         | Braun                   | Cabin                   | 55 mmbtu/hr<br>481,800 mmbtu/yr       | Firm Limit<br>Condition #16685,<br>part 1<br>Condition #18372,<br>part 3 |
| 917 | No. 1 HDS Prefract Reboiler<br>(F17)<br>Refinery Fuel Gas, Natural Gas           | Industrial<br>Engineers | Vertical<br>Cylindrical | 18 mmbtu/hr<br>157,680 mmbtu/yr       | Firm Limit<br>Condition #16685,<br>part 1                                |
| 926 | No. 2 Reformer Splitter<br>Reboiler(F26) Refinery Fuel<br>Gas, Natural Gas       | Petro Chem              | Vertical<br>Cylindrical | 145 mmbtu/hr<br>1270200 mmbtu/yr      | Firm Limit<br>Condition #16685,<br>part 1<br>Condition #18372,<br>part 3 |
| 928 | HDN Reactor A Heater (F28)<br>Refinery Fuel Gas, Natural Gas                     | Foster Wheeler          | Cabin                   | 20 mmbtu/hr<br>175,200 mmbtu/yr       | Firm Limit<br>Condition #16685,<br>part 1                                |
| 929 | HDN Reactor B Heater (F29)<br>Refinery Fuel Gas, Natural Gas                     | Foster Wheeler          | Cabin                   | 20 mmbtu/hr<br>175,200 mmbtu/yr       | Firm Limit<br>Condition #16685,<br>part 1                                |
| 930 | HDN Reactor C Heater (F30)<br>Refinery Fuel Gas, Natural Gas                     | Foster Wheeler          | Cabin                   | 20 mmbtu/hr<br>175,200 mmbtu/yr       | Firm Limit<br>Condition #16685,<br>part 1                                |
| 931 | Hydrocracker Reactor 1 Heater<br>(F31)<br>Refinery Fuel Gas, Natural Gas         | Foster Wheeler          | Cabin                   | 20 mmbtu/hr<br>175,200 mmbtu/yr       | Firm Limit<br>Condition #16685,<br>part 1                                |
| 932 | Hydrocracker Reactor 2 Heater<br>(F32)<br>Refinery Fuel Gas, Natural Gas         | Foster Wheeler          | Cabin                   | 20 mmbtu/hr<br>175,200 mmbtu/yr       | Firm Limit<br>Condition #16685,<br>part 1                                |
| 933 | Hydrocracker Reactor 3 Heater<br>(F33)<br>Refinery Fuel Gas, Natural Gas         | Foster Wheeler          | Cabin                   | 20 mmbtu/hr<br>175,200 mmbtu/yr       | Firm Limit<br>Condition #16685,<br>part 1                                |

| S-#  | Description   | Make or Type                            | Model                    | Capacity  | Grandfathered Limit, or Firm Limit and Basis                     |
|------|---|---|--------------------------|---|--|
| 934  | Hydrocracker Stabilizer Reboiler (F34), Refinery Fuel Gas, Natural Gas                          | Foster Wheeler                          | Vertical Cylindrical     | 152 mmbtu/hr<br>1,331,520 mmbtu/yr  | Firm Limit<br>Condition #16685, part 1                           |
| 935  | Hydrocracker Splitter Reboiler (F35), Refinery Fuel Gas, Natural Gas                            | Foster Wheeler                          | Vertical Cylindrical     | 152 mmbtu/hr<br>1,331,520 mmbtu/yr  | Condition #16685, part 1   |
| 1106 | No. 4 HDS Reactor Feed Heater (F72), Natural Gas  | Tulsa Heater                            | Two Vertical Cylindrical | 30 mmbtu/hr (24-hour average)<br>225.257 mmscf/yr   | Firm Limit<br>Condition #19199, part H0, H3<br>New Source Review |
| 1470 | No. 3 Crude Vacuum Distillation Heater (F71) Refinery Fuel Gas, Natural Gas Abated by A-908 SCR |   |                          | 30 mmbtu/hr<br>262,800 mmbtu/yr   | Firm Limit<br>Condition #18539, part 9<br>New Source Review      |
| 1511 | Delayed Coker Heater #1 (F78) Natural gas, Refinery fuel gas Abated by A-1511 SCR               | John Zink, ultra-low-NOx, or equivalent |                          | 230 mmbtu/hr<br>2,014,800 MMbtu/<br>consecutive 12 months combined limit for fuel gas and natural gas | Firm Limit<br>Condition #23129, part 14<br>New Source Review     |
| 1512 | Delayed Coker Heater #2 (F79) Natural gas, Refinery fuel gas Abated by A-1512 SCR               | John Zink, ultra-low-NOx, or equivalent |                          | 230 mmbtu/hr<br>2,014,800 MMbtu/<br>consecutive 12 months combined limit for fuel gas and natural gas | Firm Limit<br>Condition #23129, part 14<br>New Source Review     |

Note: This table contains errors and will be corrected as proposed in Appendix A later in this evaluation.

For the process heaters identified by Tesoro as potentially debottlenecked by this application, only S-1106, S-1470, S-1511 and S-1512 have been subject to Regulation 2, Rule 2 New Source Review in recent permitting activity that imposed NSR Permit Conditions. For the other fired heaters, the initial application treated them as grandfathered sources. There are firing limits contained in Permit Condition 16685 and/or Permit Condition 18372. However neither of these permit conditions were created as a result of Regulation 2, Rule 2 New Source Review requirements. Therefore, the initial evaluation approach was that the combustion emissions from these grandfathered fired heater sources need to be permitted by the following previously agreed methodology for addressing similar sources (Re: Tesoro Application 23341 No. 50 Crude Unit AGO Project). A summary of the established methodology is shown below:

Option A, emissions will not increase at the source. Emissions are determined to not increase by an evaluation of the following:

- a. Peak historical hourly firing rate x 24 = Daily emissions limit.
- b. Peak historical daily firing rate x 365 = Annual emissions limit.

Permit conditions codify these daily and annual limits pursuant to Regulation 2-1-233 to ensure the source is not modified pursuant to Regulation 2-1-234.

Option B, emissions will increase at the source. In this case the source is modified pursuant to Regulation 2-1-234 and subject to the requirements of Regulation 2, Rule 2, requiring:

- a. A 3-year baseline throughput required by Regulations 2-2-604 and 2-2-605.
- b. Emission calculations for the baseline period.
- c. Emission calculations for the post-project operation.

Permit conditions for daily and annual emission limits are established.

The regulatory basis of these permitting requirements was established in Tesoro Application 23341.

Extensive research has been completed to evaluate the permitting history for the 'grandfathered' fired heaters impacted by this application. The results of this research conclude that many of the fired heaters have actually been subject to Regulation 2, Rule 2, contrary to the initial information provided in this application. The details of this research are included in Appendix B.

Based on this research, it can be concluded that, except for S-908, all of the associated fired heaters impacted by this application have been subject to Regulation 2, Rule 2 New Source Review.

S-908. The No. 3 Crude Heater is a grandfathered source initially placed in service in 1937. This source has NO<sub>x</sub> and CO concentration limits in Condition 8077, Part B7A. The maximum firing rate of this source was specified as 160MM Btu/hr in the original 1977 Lion Oil data form. S-908 was retrofitted with A-908 SCR via 1989 RMEC Application 3318 for offset purposes of the RMEC Project emission increases. Emission limits for the abated S-908 were imposed at 20ppmv NO<sub>x</sub> and 100ppmv CO, both dry at 3% O<sub>2</sub>, and emission credits were taken by Tosco (according to information provided by Tesoro in 2011 Application 24056). However, according to District records, S-908 was not permitted for a firing rate increase and subjected to Regulation 2, Rule 2. In 2001 Application 2318, when S-907 Vacuum Heater was replaced with S-1470 No. 3 Crude Vacuum Distillation Heater (F71), S-1470 was subject to Regulation 2, Rule 2 and abated with A-908 SCR to satisfy BACT requirements. In Application 2318 the emission limits of S-908 were changed to the same as S-1470 (10ppmv NO<sub>x</sub> and 50ppmv CO, both dry at 3% O<sub>2</sub>), pursuant to Regulation 1-107, Combination of Emissions. According to District records, S-908 was re-tubed in Application 2318, but there was no emissions increase attributed to this physical change and S-908 was not subject to Regulation 2, Rule 2. Therefore S-908 is a grandfathered source with a Grandfathered Capacity of 160MM Btu/hr, and any impacts to this source should be treated pursuant to Options A or B on the previous page.

Tesoro estimated the maximum firing rates for the impacted process furnaces and determined that all furnaces had historical firing rates higher than the predicted maximum firing rates. Therefore, emissions for S-908 will not increase as a result of the capacity increase for S-1020 No. 3 Reformer, and Option A on Page 9 is the methodology to use for this source. Tesoro has provided operating data that indicates S-908 has a historical firing rate of 220MM Btu/hr and 5280MM Btu/day.

Therefore, based on the research and information summarized above, the correct capacities for the sources impacted by this application are shown in the following table.

| Source | Description                           | Maximum Firing Rate<br>MM Btu/hr |   | Reference   |
|--------|---------------------------------------|----------------------------------|---|---|
|        |                                       | Grandfathered<br>Limit           | Correct<br>NSR<br>Limit                                   |   |
| 908    | No. 3 Crude Heater (F8)               | 220                              | N/A   | Grandfathered Limit<br>Altered by<br>Application<br>23322     |
| 915    | Platformer Intermediate Heater (F15)  | 20                               | 50  | NSR Application<br>6468                                       |
| 916    | No. 1 HDS Heater (F16)                | 55                               | 55  | NSR Application<br>6468                                       |
| 917    | No. 1 HDS Prefract Reboiler (F17)     | 18                               | 18  | NSR Application 164   |
| 919    | No. 2 HDS Depent Reboiler (F19)       | 65                               | 111   | NSR Application<br>6468                                       |
| 920    | No. 2 HDS Charge Heater (F20)         | 63                               | 63  | NSR Application<br>6468                                       |
| 921    | No. 2 HDS Charge Heater (F21)         | 63                               | 63  | NSR Application<br>6468                                       |
| 926    | No. 2 Reformer Splitter Reboiler(F26) | 145                              | 145<br>(effective currently)<br>or 64<br>(pending review) | NSR Application<br>10912<br>(see discussion in<br>Appendix B) |
| 928    | HDN Reactor A Heater (F28)            | 20                               | 18  | NSR Application 548   |
| 929    | HDN Reactor B Heater (F29)            | 20                               | 18  | NSR Application 548   |
| 930    | HDN Reactor C Heater (F30)            | 20                               | 18  | NSR Application 548   |

| Source | Description                            | Maximum Firing Rate<br>MM Btu/hr |                         | Reference           |
|--------|--|----------------------------------|-------------------------|---------------------|
|        |  | Grandfathered<br>Limit           | Correct<br>NSR<br>Limit |                     |
| 931    | Hydrocracker Reactor 1 Heater (F31)    | 20                               | 18                      | NSR Application 548 |
| 932    | Hydrocracker Reactor 2 Heater (F32)    | 20                               | 18                      | NSR Application 548 |
| 933    | Hydrocracker Reactor 3 Heater (F33)    | 20                               | 18                      | NSR Application 548 |
| 934    | Hydrocracker Stabilizer Reboiler (F34) | 152                              | 135                     | NSR Application 548 |
| 935    | Hydrocracker Splitter Reboiler (F35)   | 152                              | 135                     | NSR Application 548 |

### C. Tesoro Refinery Emissions Cap

Except for S-926, S-1106, S-1470, S-1511 and S-1512, all of these combustion sources are subject to the Refinery Emissions Cap Condition 8077, first created via 1981 Tosco Application 27769 to meet the NSR requirements of the No. 3 HDS Project. This Refinery Emissions Cap is outdated. Any adjustments to the Refinery Emissions Cap Condition 8077 due to this No. 3 Reformer Application 23322 will be deferred to this future Tesoro application.

## II. EMISSION CALCULATIONS

### A. S-1020 No. 3 Reformer.

All emissions from S-1020 are from fugitive emissions, summarized in the following table. Waste gas from catalyst regeneration is recovered and sent to the fuel gas system.

| Component                      | Number Added | Emission Factor (lb/day/component) | Fugitive Emissions (lb/day) |
|--------------------------------|--------------|------------------------------------|-----------------------------|
| Valves in Gas Service          | 0            | 0.0015288                          | 0.0                         |
| Valves in Light Liquid Service | 2            | 0.0014736                          | 0.003                       |
| Atmospheric PRVs in Gas        | 0            | 0.00972                            | 0.0                         |

|            |   |          |        |
|------------|---|----------|--------|
| Service    |   |          |        |
| Connectors | 0 | 0.004    | 0.0    |
| Pumps      | 0 | 0.028872 | 0.0    |
| Total      |   |          | 0.0030 |

Annual emission increase = 0.003 lb/day X 365 day/yr = 1.1 lb/yr = 0.001 ton/yr

**B. S-971 F-53 No. 3 Reformer Charge Heater**

**1. S-971 Baseline Emissions.**

Baseline emissions are derived from the emission calculations in 1978 Application 26645 at the permitted firing rate of 210MM Btu/hr. Since the post-project emissions will be based on current AP-42 emission factors, the baseline emissions will be adjusted by using the current emission factors. This will better represent the emission impacts of this project. The emission factors used in Application 26645 are as follows:

Hydrocarbons: 3 lb/MMCF of fuel gas combusted.  
 Particulate Matter: 5 lb/MMCF of fuel gas combusted  
 SO2: Based on 6 ppm of H2S in fuel gas combusted.  
 NOx: 75ppm @ 3% O2

These emissions factors convert to the following heat unit factors based on the 1104 Btu/SCF heat content of the fuel gas (Application 26645 used 1050 for SO2):

Hydrocarbons: 3 lb/MMCF / 1104 Btu/SCF = 0.00272 lb/ MMBtu  
 Particulate Matter: 5 lb/MMCF / 1104 Btu/SCF = 0.00453 lb/ MMBtu  
 SO2: 6 ppm \* 64 lb/lb-mole SO2 / 385 SCF/mole / 1050 Btu/SCF = 0.00095 lb/MMBtu  
 NOx: =75ppm\*(20.95/(20.95-3))\*46lb/lb-mole\*8710SCF/MMBtu/385/1000000=0.910 lb/MMBtu

The S-971 210MM Btu/hr Baseline Emissions are as follows:

| Pollutant | Emission Factor  | Lb/hour | Lb/day | Lb/year | Ton/year |
|-----------|------------------|---------|--------|---------|----------|
| POC       | 0.00272 lb/MMBtu | 0.571   | 13.7   | 4999    | 2.500    |
| PM-10     | 0.00453 lb/MMBtu | 0.951   | 22.8   | 8332    | 4.166    |
| SO2       | 0.00095 lb/MMBtu | 0.199   | 4.79   | 1747    | 0.874    |
| NOx       | 0.0910 lb/MMBtu  | 19.11   | 459    | 167,404 | 83.702   |

CO emissions were not addressed in 1978 Application 26645. In 1982 Application 27769, CO emission factors were 17 lb/BBtu, based on AP-42, Second Edition, Table 1.4-1 (1973). However, this emission factor was established prior to

establishing the trade-off between NOx and CO emissions. Tesoro proposes a baseline CO emission factor of 110 ppm @ 3% O2, based on the current AP-42 Table 1.4-1 for Low NOx Burners, or 0.0813 lb/MMBtu.

Baseline CO emissions = 210MMBtu/hr x 0.0813 lb/MM = 17.22 lb/hr = 413.3 lb/day.  
Annual Baseline CO emissions = 413.3 x 365 = 150,847 lb/yr = 75.424 tons/yr

Baseline NOx emissions need to be RACT adjusted. The RACT adjusted emission factor for NOx is the Regulation 9-10-301 limit of 0.033 lb/MM.

Therefore, the adjusted S-971 210MM Btu/hr Baseline Emissions are as follows:

| Pollutant | Emission Factor  | Lb/hour | Lb/day | Lb/year | Ton/year |
|-----------|------------------|---------|--------|---------|----------|
| POC       | 0.00272 lb/MMBtu | 0.571   | 13.7   | 4999    | 2.500    |
| PM-10     | 0.00453 lb/MMBtu | 0.951   | 22.8   | 8332    | 4.166    |
| SO2       | 0.00095 lb/MMBtu | 0.199   | 4.79   | 1747    | 0.874    |
| NOx       | 0.033 lb/MMBtu   | 6.93    | 166    | 60,707  | 30.353   |
| CO        | 0.0813 lb/MMBtu  | 17.1    | 410    | 149,559 | 74.780   |

Post project Emission factors for PM-10, POC and SO2 will be based on the latest AP-42 Table 1.4-1. In some cases these emission factors will be lower, and if the baseline emissions are not calculated with the same emission factors, the results will show a reduction in emissions. Therefore, the baseline emissions are re-calculated based on the latest AP-42 factor.

The final S-971 210MM Btu/hr Baseline emission are as follows:

| Pollutant | Emission Factor   | Lb/hour | Lb/day | Lb/year | Ton/year |
|-----------|-------------------|---------|--------|---------|----------|
| POC       | 0.005392 lb/MMBtu | 1.13    | 27.2   | 9919    | 4.960    |
| PM-10     | 0.00186 lb/MMBtu  | 0.391   | 9.37   | 3422    | 1.711    |
| SO2       | 0.000588 lb/MMBtu | 0.124   | 2.96   | 1082    | 0.541    |
| NOx       | 0.033 lb/MMBtu    | 6.93    | 166    | 60,707  | 30.353   |
| CO        | 0.082 lb/MMBtu    | 17.1    | 410    | 149,559 | 74.780   |

## 2. S-971 Post Project Emissions



Post Project emissions are based on the proposed permitted firing rate of 300MM Btu/hr. Emission factors for POC, PM10 and SO2 are based on the current AP-42. NOx and CO emissions will not increase from baseline to ensure BACT is not triggered.

| Pollutant | Emission Factor<br>lb/MMBtu | Concentration<br>ppmv @ 3%<br>O2 | Lb/hour | Lb/day | Lb/year | Ton/year |
|-----------|-----------------------------|----------------------------------|---------|--------|---------|----------|
| POC       | 0.005392                    | 12.8                             | 1.62    | 38.8   | 14179   | 7.085    |
| PM-10     | 0.001860                    | N/A                              | 0.558   | 13.4   | 4888    | 2.444    |
| SO2       | 0.000588                    | 0.35                             | 0.176   | 4.23   | 1545    | 0.773    |
| NOx       | 0.0231                      | 19                               | 6.93    | 166    | 60,707  | 30.353   |
| CO        | 0.0570                      | 78                               | 17.1    | 410    | 149,559 | 74.780   |

### 3. S-971 Emission Increases

The following table summarizes the emissions increases for S-971:

| Pollutant | Baseline |          | Post Project |          | Emissions Increase |          |
|-----------|----------|----------|--------------|----------|--------------------|----------|
|           | Lb/day   | Ton/year | Lb/day       | Ton/year | Lb/day             | Ton/year |
| POC       | 27.2     | 4.960    | 38.8         | 7.085    | 11.6               | 2.125    |
| PM-10     | 9.37     | 1.711    | 13.4         | 2.444    | 4.03               | 0.733    |
| SO2       | 2.96     | 0.541    | 4.23         | 0.773    | 1.27               | 0.232    |
| NOx       | 166      | 30.353   | 166          | 30.353   | 0                  | 0        |
| CO        | 410      | 74.780   | 410          | 74.780   | 0                  | 0        |

### C. S-972 No. 3 Reformer Debutanizer Reboiler

#### 1. S-972 Baseline Emissions.

Baseline emissions are derived from the emission calculations in 1978 Application 26645 at the permitted firing rate of 34MM Btu/hr. The emission factors and adjustment rationale are the same as for S-971.

The S-972 34MM Btu/hr Baseline Emissions are as follows:

| Pollutant | Emission Factor     | Lb/hour | Lb/day | Lb/year | Ton/year |
|-----------|---------------------|---------|--------|---------|----------|
| POC       | 0.00272<br>lb/MMBtu | 0.092   | 2.22   | 809     | 0.405    |
| PM-10     | 0.00453<br>lb/MMBtu | 0.154   | 3.70   | 1349    | 0.674    |
| SO2       | 0.00095<br>lb/MMBtu | 0.0323  | 0.775  | 283     | 0.141    |
| NOx       | 0.0910<br>lb/MMBtu  | 3.094   | 74.3   | 27,103  | 13.552   |

CO emissions were not addressed in 1978 Application 26645. In 1982 Application 27769, CO emission factors were 17 lb/BBtu. However, this emission factor was established prior to establishing the trade-off between NOx and CO emissions.

Tesoro proposes a baseline CO emission factor of 110 ppm @ 3% O<sub>2</sub>, based on the current AP-42 Table 1.4-1, or 0.0813lb/MMBtu.

Baseline CO emissions = 34MM Btu/hr x 0.0813 lb/MM = 2.76 lb/hr = 66.3 lb/day.  
Annual Baseline CO emissions = 66.3 x 365 = 24,214 lb/yr = 12.107 tons/yr

Baseline NO<sub>x</sub> emissions need to be RACT adjusted. The RACT adjusted emission factor for NO<sub>x</sub> is the Regulation 9-10-301 limit of 0.033 lb/MM.

Therefore, the adjusted S-972 34MM Btu/hr Baseline Emissions are as follows:

| Pollutant       | Emission Factor  | Lb/hour | Lb/day | Lb/year | Ton/year |
|-----------------|------------------|---------|--------|---------|----------|
| POC             | 0.00272 lb/MMBtu | 0.092   | 2.22   | 810     | 0.405    |
| PM-10           | 0.00453 lb/MMBtu | 0.154   | 3.70   | 1349    | 0.675    |
| SO <sub>2</sub> | 0.00095 lb/MMBtu | 0.0323  | 0.775  | 283     | 0.141    |
| NO <sub>x</sub> | 0.033 lb/MMBtu   | 1.12    | 26.9   | 9829    | 4.914    |
| CO              | 0.0813 lb/MMBtu  | 2.76    | 66.3   | 24,214  | 12.107   |

Similar to S-971, baseline emissions for S-972 were re-calculated using current AP-42 emission factors.

The final S-972 34MM Btu/hr Baseline emission are as follows:

| Pollutant       | Emission Factor   | Lb/hour | Lb/day | Lb/year | Ton/year |
|-----------------|-------------------|---------|--------|---------|----------|
| POC             | 0.005392 lb/MMBtu | 0.183   | 4.40   | 1606    | 0.803    |
| PM-10           | 0.00186 lb/MMBtu  | 0.063   | 1.52   | 554     | 0.277    |
| SO <sub>2</sub> | 0.000588 lb/MMBtu | 0.020   | 0.480  | 175     | 0.088    |
| NO <sub>x</sub> | 0.033 lb/MMBtu    | 1.12    | 26.9   | 9829    | 4.914    |
| CO              | 0.082 lb/MMBtu    | 2.76    | 66.3   | 24,214  | 12.107   |

## 2. S-972 Post Project Emissions

Post Project emissions are based on the new permitted firing rate of 45MM Btu/hr. POC, PM<sub>10</sub> and SO<sub>2</sub> emission factors are based on the current AP-42. NO<sub>x</sub> and CO emissions will not increase from baseline to ensure BACT is not triggered.

| Pollutant | Emission Factor<br>lb/MMBtu | Concentration<br>ppmv @ 3%<br>O <sub>2</sub> | Lb/hour | Lb/day | Lb/year | Ton/year |
|-----------|-----------------------------|--|---------|--------|---------|----------|
| POC       | 0.005392                    | 12.8   | 0.242   | 5.82   | 2126    | 1.063    |

|       |          |      |        |       |        |        |
|-------|----------|------|--------|-------|--------|--------|
| PM-10 | 0.001860 | N/A  | 0.0837 | 2.01  | 733    | 0.367  |
| SO2   | 0.000588 | 0.35 | 0.0265 | 0.635 | 232    | 0.116  |
| NOx   | 0.0249   | 20.5 | 1.12   | 26.9  | 9829   | 4.914  |
| CO    | 0.0613   | 83   | 2.76   | 66.3  | 24,214 | 12.107 |

### 3. S-972 Emission Increases

The following table summarizes the emissions increases for S-972:

| Pollutant | Baseline |          | Post Project |          | Emissions Increase |          |
|-----------|----------|----------|--------------|----------|--------------------|----------|
|           | Lb/day   | Ton/year | Lb/day       | Ton/year | Lb/day             | Ton/year |
| POC       | 4.40     | 0.803    | 5.82         | 1.063    | 1.42               | 0.260    |
| PM-10     | 1.52     | 0.277    | 2.01         | 0.367    | 0.49               | 0.090    |
| SO2       | 0.480    | 0.088    | 0.635        | 0.116    | 0.155              | 0.028    |
| NOx       | 26.9     | 4.914    | 26.9         | 4.914    | 0                  | 0        |
| CO        | 66.3     | 12.107   | 66.3         | 12.107   | 0                  | 0        |

### D. Total Project Cumulative Increase

The following table summarizes the Cumulative Increase for this application:

|           | S-1020   | S-971    | S-972    | Total Increase |
|-----------|----------|----------|----------|----------------|
| Pollutant | Ton/year | Ton/year | Ton/year | Ton/year       |
| POC       | 0.001    | 2.125    | 0.260    | 2.386          |
| PM-10     | 0.0      | 0.733    | 0.090    | 0.823          |
| SO2       | 0.0      | 0.232    | 0.028    | 0.260          |
| NOx       | 0.0      | 0        | 0        | 0.000          |
| CO        | 0.0      | 0        | 0        | 0.000          |

### E. Toxic Emissions

Tesoro identified the toxic emission compounds associated with this application. Using emission factors from a search of the ARB CATEF database, toxic emissions were estimated. The calculation details are included in the application file folder.

In addition, there are ammonia emissions associated with the S-971 SCR that Tesoro did not address in the application. Based on the Condition 18372, Part 22 ammonia slip limit of 20 ppm @ 3% O<sub>2</sub>, Ammonia emissions are estimated to be 2.69 lb/hr and 23,573 lb/yr.

Since several toxic triggers were exceeded, a Health Risk Screening Analysis was required. The Risk Screen was completed and the results were transmitted November 28, 2012. The results showing the maximum project risks are summarized in the following table.

| <i>Receptor</i> | <i>Cancer Risk (chances in a million)</i> | <i>Chronic Non-cancer Hazard Index</i> | <i>Acute Non-cancer Hazard Index</i> |
|-----------------|---|--|--------------------------------------|
| <i>Resident</i> | <i>8.0</i>                                | <i>0.056</i>                           | <i>0.05</i>                          |

The furnaces burn only natural gas and treated refinery fuel gas and good combustion practices are utilized. Therefore, the furnaces are considered to meet a TBACT level of control.

### III. BEST AVAILABLE CONTROL TECHNOLOGY (BACT)

Based on the emission calculations above, BACT is triggered for POC and PM-10 emissions from S-971. In addition, BACT for SO2 is triggered even though the calculations do not show SO2 emissions exceed 10 lb/day. This is because the SO2 emission calculations above are based natural gas combustion. Since the facility operates with a shortage of refinery fuel gas, any increase in fuel combustion translates to an increase in natural gas purchase, which is blended into the fuel gas system to meet demand. Therefore, the SO2 emission calculations are based on the overall refinery emissions increase due to the purchase of additional natural gas. (It is recognized that this SO2 emissions treatment is only valid if the increase in natural gas is combusted as a fuel by itself. If the increase in natural gas is blended with and combusted as refinery fuel gas, this treatment is not totally valid unless the blending does not impact fuel gas treatment. Nonetheless, this SO2 emissions calculation methodology is used since it was allowed in the 1978 Application 26645.) However, BACT requirements are by source, and the S-971 and S-972 furnaces are permitted to combust refinery fuel gas. Based on the Application 14141 Coker Modification Project SO2 BACT limit of 100 ppm TRS in any 24-hour average, SO2 BACT is triggered for both S-971 and S-972.

| Source | CMP BACT TRS ppm in fuel Gas | Emission Factor lb/MMBtu | SO2 Emissions lb/hr | SO2 Emissions lb/day |
|--------|------------------------------|--------------------------|---------------------|----------------------|
| S-971  | 100                          | 0.016                    | 4.75                | 114                  |
| S-972  | 100                          | 0.016                    | 0.726               | 17.4                 |

The BACT/TBACT Handbook provides BACT guidance in documents 94.2.1 or 94.3.1. BACT for POC is Good Combustion Practice. BACT for PM10 is fuel selection of natural gas or treated refinery fuel gas. BACT for SO2 is fuel selection with H2S content < 50ppmv and TRS content < 100 ppmv.

However, BACT for SO2 has been established for Tesoro in 2006 Coker Modification Project (CMP) Application 14141 as follows:  
 35 ppm TRS in the fuel gas based on a 365-day average  
 100 ppm TRS in the fuel gas based on a rolling 24-hour average

A review of the basis for the CMP SO2 BACT found that it was first determined in 2001 Ultramar Application 2813 No. 3 Crude Unit Expansion. Furthermore, it appears the 35 ppm and 100 ppm TRS limits were determined by BACT Achieved in Practice Determinations at other refineries, based on the specific fuel gas treating capabilities of that refinery. Tesoro cannot meet these SO2 BACT limits so it only fires natural gas for the CMP sources. After discussion with Tesoro, it was agreed

that the SO2 BACT for Tesoro could be the Achieved in Practice limits similar to the basis of the BACT Determinations at the other refineries. Tesoro agreed to submit a future permit application to propose a revision the Ultramar SO2 BACT Determination. For this No. 3 Reformer application, the SO2 BACT will be as detailed in the BACT documents 94.2.1 and 94.3.1 (fuel selection with H2S content < 50ppmv and TRS content < 100 ppmv).

Permit Conditions will be imposed to assure S-971 and S-972 achieves a BACT level of control.

#### IV. Offsets

Offsets are required for this project pursuant to Regulation 2, Rule 2, Sections 302 and 303. The following table summarizes the offset requirements for this project. The “Current” values are the outstanding emissions subject to offsets as reported by the District’s database.

| Tons/year              | POC    | NOx  | SO2    | CO     | PM <sub>10</sub> |
|------------------------|--------|------|--------|--------|------------------|
| Current                | 0.0    | 0.0  | 0.799  | 14.308 | 0.006            |
| Increase in emissions  | 2.386  | 0.0  | 0.260  | 0.0    | 0.823            |
| Total                  | 2.386  | 0    | 1.059  | 14.308 | 0.829            |
| Offsets Factor         | 1.15   | 1.15 | 1.00   | N/A    | 1.00             |
| Offsets Required       | 2.744  | 0    | 1.059  | N/A    | 0.0*             |
| Bank 968               | -2.744 |      |        |        |                  |
| Bank 915               |        |      | -1.059 |        |                  |
| Post Project Emissions | 0.0    | 0.0  | 0.0    | 14.308 | 0.829            |

\*In accordance with Regulation 2-2-303, offsets for PM10 emissions are not required since the total cumulative increase does not exceed 1.0 tons/year.

Emissions Banking Certificate 968 is based on a Certificate issued to Lesaffre Yeast Company in 2003. Emissions Banking Certificate 915 is based on a Certificate issued to Ultramar, Inc. (former owner of the Golden Eagle Refinery) via 2001 Application 2813 when S-906 and S-907 furnaces were removed from service and replaced with S-1470.

Emission Bank Certificate details are contained in Appendix C.

#### V. PSD

Tesoro provided a PSD applicability analysis prepared by Mr. Tony Widboom of Barr Engineering in Minneapolis, MN. Details of the analysis were not provided. Tesoro only submitted a memorandum from Barr Engineering dated 10/12/12 that summarized the total Baseline Actual Emissions (BAE) and Projected Actual Emissions (PAE) but did not provide a breakdown of the emissions by source, or even any indication of the sources included in the analysis. The Barr Engineering conclusion is that PSD is not triggered.

The Barr Engineering calculations cannot be verified. For example, Barr Engineering estimates the Project Emissions Increase for Greenhouse Gases to be 12,418 tons/yr CO<sub>2</sub>e. As shown in the following table, the CO<sub>2</sub> emissions based on only the increase in firing rates exceed the Barr Engineering calculation by over 400%. The analysis below only included CO<sub>2</sub> and does not include any of the other sources impacted by No. 2 Reformer Capacity increase. Consequently, it appears that the potential for the Barr Engineering analysis to significantly understate the Project Emissions Increase is high.

| Source         | MM Btu/hr | Lb CO <sub>2</sub> /MMBtu | Lb CO <sub>2</sub> /hr | Lb CO <sub>2</sub> /yr | Ton CO <sub>2</sub> /yr | Total Project Ton/yr | Tesoro Analysis |
|----------------|-----------|---------------------------|------------------------|------------------------|-------------------------|----------------------|-----------------|
| S-971          | 300       | 117                       | 35,100                 | 307,476,000            | 153,738                 |                      |                 |
| S-972          | 45        | 117                       | 5,265                  | 46,121,400             | 23,061                  |                      |                 |
| Total          |           |                           |                        |                        | 176,799                 | 176,799              |                 |
| S-971 Increase | 90        | 117                       | 10,530                 | 92,242,800             | 46,121                  |                      |                 |
| S-972 Increase | 11        | 117                       | 1,287                  | 11,274,120             | 5,637                   |                      |                 |
| Total          |           |                           |                        |                        | 51,578                  | 51,578               | 12,418          |

On October 31, 2012, Tesoro declined to provide any further detail on the Barr Engineering evaluation, claiming that the summary that was submitted was the appropriate level of detail for the District. Therefore, PSD applicability cannot be verified.

Nonetheless, Tesoro has stated that it chooses to evaluate PSD as allowed under NSR reform. PSD is a federal program that the District implements on EPA's behalf in limited circumstances under a partial delegation agreement. The District is not addressing federal PSD issues for this project because NSR Reform is outside the scope of the partial delegation agreement. To the extent that federal PSD requirements may or may not be applicable for this project, EPA has jurisdiction over such requirements. The District has notified EPA Region IX of the project and referred all PSD permitting issues to that agency for review.

## VI. STATEMENT OF COMPLIANCE

This application does not change the compliance of S-971, S-972, or S-1020, or any of the other sources impacted by the application. All sources are expected to remain in compliance with the following requirements, as applicable:

Regulation 2, Rule 2, New Source Review, including Regulation 2-2-301 Best Available Control Technology Requirement, Regulation 2-2-302, Offset Requirements, Precursor Organic Compounds and Nitrogen Oxides, NSR, and Regulation 2-2-303 Offset Requirement, PM<sub>10</sub> and Sulfur Dioxide, NSR.

Regulation 6, Rule 1 Particulate Matter General Requirements.

Regulation 8, Rule 18 Equipment Leaks

Regulation 8, Rule 28 Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants

Regulation 9 Rule 10 Nitrogen Oxides and Carbon Monoxide from Boilers, Steam Generators, and Process Heaters in Petroleum Refineries.

NSPS Subpart J Petroleum Refineries.

NESHAPS Subpart CC MACT for Petroleum Refineries.

NESHAPS for Source Categories Subpart UUU Petroleum Refineries.

In addition, when S-971 and S-972 combust refinery fuel gas, they are subject to NSPS Subpart Ja, Standards of Performance for Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007, for fuel gas combustion devices, including a choice between

- 1.) 60.102a(g)(1)(i) SO<sub>2</sub> emissions limited to 20ppmv, dry, corrected to 0% excess air, 3-hr rolling average, and SO<sub>2</sub> emissions limited to 8ppmv, dry, corrected to 0% excess air, determined daily on a rolling 365-day average, or
- 2.) 60.102a(g)(1)(ii) H<sub>2</sub>S content in the fuel gas limited to 162ppmv on a rolling 3-hour average and H<sub>2</sub>S content in the fuel gas limited to 60ppmv determined daily on a rolling 365-day average.

The project is considered to be ministerial under the District's CEQA Regulation 2-1-311 and therefore is not subject to CEQA review. Permit Handbook Chapter 2.1 addresses Process Heaters and fugitive emissions are addressed in Permit Handbook Chapter 3.4.

The project is over 1000 feet from the nearest school and therefore not subject to the public notification requirements of Reg. 2-1-412.

The project may trigger PSD but Tesoro's selection of the 'NSR Reform' method of evaluation eliminates the PSD determination from District authority and from this application.

## **VII. PERMIT CONDITIONS**

Permit conditions for this application were proposed, discussed with Tesoro, and revised accordingly. A summary of the discussion is contained in Appendix D.

Based on the discussions and agreements, the following permit conditions will be imposed by this application:

Tesoro Refinery and Marketing Company

Plant 14628, Application 23322  
No 3 Reformer Capacity Increase

1. The Owner/Operator shall ensure that the S-1020 No. 3 Reformer Unit throughput rate does not exceed 26,000 barrels per day based on a rolling 365-day average and that the throughput does not exceed 9,490,000 barrels during each 12 consecutive month period. (basis: cumulative increase).
2. The Owner/Operator shall ensure that the combined product reformates produced by both S-1004 No 2 Reformer and S-1020 No. 3 Reformer does not exceed 40,000 barrels per calendar day (basis: cumulative increase).
3. The Owner/Operator of S-971 shall not exceed 300MM Btu/hr, 7,200 MM Btu per day, and 2,628,000 MM Btu of firing in any consecutive 12-month period. (basis: cumulative increase, toxics)
4. The Owner/Operator of S-972 shall not exceed 45MM Btu/hr, 1,080 MM Btu per day, and 394,200 MM Btu of firing in any consecutive 12-month period. (basis: cumulative increase, toxics)
5. The Owner/Operator of S-908 shall not exceed 220MM Btu/hr of firing , on a rolling 24-hour average. (basis: Regulation 2-1-233)
6. The Owner/Operator of S-926 shall not exceed 145MM Btu/hr of firing, on a rolling 24-hour average. No later than 7/1/2013, Tesoro shall submit a permit application for a change of conditions for the correct S-926 firing rate. If Tesoro does not submit this permit application by 7/1/2013, the Owner/Operator of S-926 shall not exceed 64MMBtu/hr, the NSR firing limit used when S-926 was modified in 1993 Application 10912. (basis: Regulation 2-1-233, cumulative increase, Offsets)
7. The Owner/Operator shall burn in sources S-971 and S-972 only natural gas or refinery fuel gas. (basis: cumulative increase, BACT, toxics).
8. The Owner/Operator shall only operate S-971 and S-972 when annual POC emissions from S-971 and S-972 do not exceed 7.085 and 1.063 tons, respectively, per rolling consecutive 12 month period. (basis: cumulative increase, offsets)
9. The Owner/Operator shall only operate S-971 and S-972 when annual PM-10 emissions from S-971 and S-972 do not exceed 2.444 and 0.367 tons, respectively, per rolling consecutive 12 month period.(basis: cumulative increase, offsets)
10. The Owner/Operator shall only operate S-971 when NOx emissions do not exceed 166 pounds per calendar day, and 30.353 tons per rolling consecutive 12 month period. (basis: RACT, cumulative increase, BACT and offset avoidance)
11. The Owner/Operator shall only operate S-972 when NOx emissions do not exceed 26.9 pounds per calendar day, and 4.914 tons per rolling consecutive 12 month period. (basis: RACT, cumulative increase, BACT and offset avoidance)



12. The Owner/Operator shall only operate S-971 when CO emissions do not exceed 75.423 tons per rolling consecutive 12 month period. (basis:, cumulative increase,)
13. The Owner/Operator shall only operate S-972 when CO emissions do not exceed 12.211 tons per rolling consecutive 12 month period. (basis:, cumulative increase)
14. The Owner/Operator shall only operate S-971 or S-972 when the applicable requirements of NSPS 40CFR 60 Subpart Ja are met. (basis: NSPS)
15. The Owner/Operator shall abate S-971 with Selective Catalyst Reduction systems (A-1433), at any time that S-971 is in operation, not including the startup and shutdown periods allowed by Regulation 9, Rule 10 when A-1433 is not at operating temperature. (basis: cumulative increase)
16. The Owner/Operator shall calibrate, maintain, and operate a District-approved continuous emission monitoring system (CEMS) that continuously measures and records the concentration of nitrogen oxides (calculated as NO<sub>2</sub>), in ppmv units corrected to 3% oxygen, dry, in the combined combustion exhaust from S-971 abated by A-1433 and from S-972. The CEMS shall be in operation at all times when S-971 and/or S-972 operate except as allowed in the District's Manual of Procedures, which includes maintenance and malfunction. (basis: monitoring)
17. The Owner/Operator shall calibrate, maintain, and operate a District-approved continuous emission monitoring system (CEMS) that continuously measures and records the concentration of carbon monoxide (CO), in ppmv units corrected to 3% oxygen, dry, in the combined combustion exhaust from S-971 abated by A-1433 and from S-972. The CEMS devices shall be in operation at all times when S-971 and/or S-972 operate except as allowed in the District's Manual of Procedures, which includes maintenance and malfunction. (basis: monitoring)
18. Owner/Operator shall calibrate, maintain, and operate District-approved continuous emission monitoring system (CEMS) that continuously measures and records the concentration of oxygen in the combined combustion exhaust from S-971 abated by A-1433 and from S-972. The CEMS shall be in operation at all times when S-971 and/or S-972 operate except as allowed in the District's Manual of Procedures, which includes maintenance and malfunction. (basis: monitoring)
19. The Owner/Operator shall ensure that all natural gas burned at sources S-971 and S-972, shall be PUC quality gas. Compliance will be demonstrated through records that show the specification of natural gas by the supplier. (basis: BACT for SO<sub>2</sub> and BACT for PM<sub>10</sub> when firing natural gas)
20. The Owner/Operator shall not combust in sources S-971 and S-972 refinery fuel gas having a total hydrogen sulfide content greater than 50 ppmv, based on consecutive 365 day average, or a total reduced sulfur (TRS) content greater than 100ppmv, based on consecutive 365 day average. (basis: BACT for SO<sub>2</sub> when firing refinery fuel gas)
21. Owner/Operator shall ensure ammonia slip from the SCR system abating S-971 shall not exceed 20 ppmv, dry, corrected to 3% oxygen. (basis: toxics)
22. Not more than 30 days after the start-up of S-1020 following the project, the owner/operator shall provide the District's Engineering Division with a final count of fugitive components installed. The owner/operator has been permitted for an increase in the following fugitive

components:

0 valves in gas service

2 valves in liquid service

0 pumps

0 PRV in gas service

0 PRVs in liquid service

0 connectors/flanges

(basis: Cumulative Increase, offsets)

23. If there is an increase in the total fugitive component emissions, the plant's cumulative emissions for the project shall be adjusted to reflect the difference between emissions based on predicted versus actual component counts. The owner/operator shall provide to the District all additional required offsets at an offset ratio of 1.15:1 no later than 14 days after submittal of the final POC fugitive count. If the actual component count is less than the predicted, the total will be adjusted accordingly and all emission offsets applied by the owner/operator in excess of the actual total fugitive emissions will be credited back to the owner/operator. (basis: offsets)
  
24. The Owner/Operator shall maintain a District-approved record containing all measurements, calculations and other data required to demonstrate compliance with the throughput and concentration limits of this condition. This record shall include, but is not limited to, the daily throughput of feed processed by S-1020, summarized on a monthly basis, the daily reformate combined product from S-1004 and S-1020, summarized on a monthly basis, and the daily NOx mass emissions from S-971 and S-972. The NOx mass emissions shall be included in the monthly CEM reports required by Regulation 1-522. This information shall be kept available for District inspection for a period of at least 5 years following the date on which such measurements, records or data are made or recorded. (basis: recordkeeping)
  
25. Within 60 days of the first fire date of the modified S-971 and S-972 the owner/operator shall conduct a District approved source test that measures the emission rate of ammonia from the combined stacks of S-971 and S-972 at firing rates at normal operation. The ammonia concentration will be calculated and adjusted to reflect the concentration in the A-1433 exhaust stream prior to comingling with the exhaust stream from S-972. The owner/operator shall ensure that within 60 days of the date of completion of the source testing, two identical copies of the source tests results (each referencing permit application #23322 and plant #14628) are received by the District. One copy shall be sent to the Source Test Section of the Technical Division and the other shall be sent to the Engineering Division. These tests will be repeated for three years. If there are no exceedances of the ammonia limit, then testing shall be reduced to a frequency of every 5 years. (Basis: Cumulative Increase, Offsets, Toxics)
  
26. Within 60 days of the first fire date of the modified S-972 the owner/operator shall conduct District approved source tests while firing S-972 with refinery fuel gas. The District approved source test shall measure the emission rates of POC, PM-10, CO and NOx from S-972, at a firing rate greater than or equal to 80% of maximum firing rate. A second set of source tests will be completed one year after the initial source tests. Emission factors for S-972 (lb/MMBtu) will be developed from these tests. If it can be demonstrated that using the highest emission factor at maximum firing rate does not exceed the S-972 mass emission limits in Parts 8, 9, 11 and 13, then the source tests will be repeated at 5 year intervals. The owner/operator shall ensure that within 60 days of the date of completion of the source testing, two identical copies of the source

tests results (each referencing permit application #23322 and plant #14628) are received by the District. One copy shall be sent to the Source Test Section of the Technical Division and the other shall be sent to the Engineering Division. (Basis: Cumulative Increase, Offsets, BACT, Regulation 1-107)

27. Within 60 days of the first fire date of the modified S-971 and S-972 the owner/operator shall conduct District approved source tests while firing both S-971 and S-972 with refinery fuel gas. The District approved source test shall measure the emission rates of POC, and PM10 from the combined stacks of S-971 and S-972, both at firing rates equal to or greater than 80% of maximum firing rate. Mass emissions shall be calculated individually for S-971 and S-972 using the emission factor derived from the source tests required by Part 26 above. A second set of source tests will be completed one year after the initial source tests. If it can be demonstrated that using the highest emission factor at maximum firing rate does not exceed the S-971 mass emission limits in Parts 8, 9, 10 and 12, then the source tests will be repeated at 5 year intervals. The owner/operator shall ensure that within 60 days of the date of completion of the source testing, two identical copies of the source tests results (each referencing permit application #23322 and plant #14628) are received by the District. One copy shall be sent to the Source Test Section of the Technical Division and the other shall be sent to the Engineering Division. (Basis: Cumulative Increase, Offsets, BACT, Regulation 1-107)

28. If there is an increase in the POC or PM-10 emissions for either S-971 or S-972, the plant's cumulative emissions for the project shall be adjusted to reflect the difference between the emission limits in Parts 8 and 9 above versus the hourly emissions demonstrated by the source tests required in Parts 26 and 27, prorated by the factor Maximum Firing Rate/Source Test Firing Rate, multiplied by 8760. The owner/operator shall provide to the District all additional required offsets no later than 14 days after submittal of the final source test reports. If the actual emissions are less than the predicted, the total may be adjusted accordingly and all emission offsets applied by the owner/operator in excess of the actual emissions will be credited back to the owner/operator. (basis: offsets) In addition, the permit condition 16685 will be revised as follows.

Permit Condition 16685, Part 1:

Part #1:

Permittee/Owner/Operator shall ensure that each combustion source listed below does not exceed its indicated maximum firing rate (higher heating value), expressed in the units of million BTU per day (MM BTU/day). These firing rates are sustainable maximum firing rates. The sustainable hourly firing rates, used for billing purposes, are established by dividing the maximum daily firing rates by 24 hours. These firing limits are enforceable not-to-exceed limits but are not considered enforceable New Source Review emissions limits since these sources were not subject to Regulation 2, Rule 2 when this condition was created.

| District Source Number (#) | Firing Rate Used for Fees (MMBTU/hr) | Firing Rate Enforceable Limit (MMBTU/day) | District/Permittee Source Description |
|----------------------------|--------------------------------------|---|---------------------------------------|
| S-908                      | 220                                  | 5280                                      | #8 Furnace No. 3 Crude Heater         |

|  |                   |                     |  |
|--|-------------------|---------------------|--|
| S-909  | 145               | 3480                | #9 Furnace #1 Feed Prep. Heater                |
| S-912  | 135               | 3240                | #12 Furnace -#1 Feed Prep. Heater              |
| S-913  | 59                | 1416                | #13 Furnace -#2 Feed Prep. Heater              |
| S-915  | <del>5020</del>   | <del>1200480</del>  | #15Furnace –Plat former Intermediate Heater    |
| S-916  | 55                | 1320                | #16 Furnace -#1 HDS Heater                     |
| S-917  | 18                | 432                 | #17 Furnace -#1 HDS Prefractionator Reboiler   |
| S-919  | <del>11165</del>  | <del>26641560</del> | #19Furnace -#2 HDS Depentanizer                |
| Reboiler   |                   |                     |  |
| S-920  | 63                | 1512                | #20 Furnace -#2 HDS Charge Heater              |
| S-921  | 63                | 1512                | #21 Furnace -#2 HDS Charge Heater              |
| S-922  | 130               | 3120                | #22 Furnace -#5 Gas Debutanizer Reboiler       |
| S-926  | 145               | 3480                | #26 Furnace -#2 Reformer Splitter Reboiler     |
| S-927  | 280               | 6720                | #27 Furnace -#2 Reformer Heater AND Reheating  |
| S-928  | <del>1820</del>   | <del>43280</del>    | #28 Furnace –HDN Reactor A Heater              |
| S-929  | <del>1820</del>   | <del>43280</del>    | #29 Furnace –HDN ReactorB Heater               |
| S-930  | <del>1820</del>   | <del>43280</del>    | #30 Furnace –HDN Reactor C Heater              |
| S-931  | <del>1820</del>   | <del>43280</del>    | #31 Furnace –Hydrocracker Reactor 1 Heater     |
| S-932  | <del>1820</del>   | <del>43280</del>    | #32 Furnace –Hydrocracker Reactor 2 Heater     |
| S-933  | <del>1820</del>   | <del>43280</del>    | #33 Furnace –Hydrocracker Reactor 3 Heater     |
| S-934  | <del>135152</del> | <del>3240648</del>  | #34 Furnace –Hydrocracker Stabilizer           |
| Reboiler   |                   |                     |  |
| S-935  | <del>135152</del> | <del>3240648</del>  | #35 Furnace –Hydrocracker Splitter             |
| Reboiler   |                   |                     |  |
| S-937  | 743               | 17832               | #37 Furnace –Hydrogen Plant Heater             |
| S-950  | 440               | 10560               | #50 Furnace – 50 Unit Crude Heater             |
| S-951  | 30                | 720                 | #51 Furnace-#2 Reformer Auxiliary Reheater     |
| S-971  | 300               | 7200                | #53 Furnace -#3 Reformer UOP Furnace           |
| S-972  | 45                | 1080                | #54 Furnace -#3 Reformer Debutanizer           |
| Reboiler   |                   |                     |  |
| S-973  | 55                | 1320                | #55 Furnace-No. 3 HDS Recycle Gas Heater       |
| S-974  | 110               | 2640                | #56 Furnace-No. 3 HDS Fractionator Feed Heater |
| (basis: Regulation 2-1-403, Bubble Condition 4357/8077 for S917 via Application 19647, <u>1987 NSR Application 164 for S-917, 1987 NSR Application 548 for S-928 through S-935, 1991 NSR Application 6468 for S-915 and S-916.</u> ) |                   |                     |  |

### VIII. RECOMMENDATION

It is recommended that an Authority to Construct be granted to Tesoro Refining and Marketing Company for the following sources:

- S-971      No. 3 Reformer Charge Heater F-53**
- S-972      No. 3 Reformer Debutanizer Reboiler F-54**
- S-1020     No. 3 Reformer**

that a Permit to Operate be granted to:

- S-1555      Reformate Splitter, 40,000 BPD**

Permit Evaluation and Statement of Basis: Site B2758 & B2759, Tesoro Refining & Marketing Company, LLC,  
Golden Eagle Refinery, 150 Solano Way, Martinez, CA 94553

and that the Permit to Operate for S-1004 be corrected to:

**S-1004      No. 2 Reformer, 23,000 BPD**

It is also recommended that the Equipment Table II-A1 in the Renewed Title V Permit  
be updated as indicated in Appendix A.

By: \_\_\_\_\_

Arthur P Valla  
Senior Air Quality Engineer  
14Feb13

Appendix A  
Title V Permit Table II Corrections

The No. 3 Reformer Equipment is shown as follows in the Renewed Title V Permit issued June 28, 2011:

**Table II A1 - Permitted Sources – Golden Eagle Refinery  
Plant #B2758 – Tesoro Refining and Marketing Company - Golden Eagle Refinery**

| S-#  | Description   | Make or Type         | Model                | Capacity                           | Grandfathered Limit, or Firm Limit and Basis                       |
|------|---|----------------------|----------------------|------------------------------------|--|
| 971  | No. 3 Reformer UOP Furnace (F53)<br>Refinery Fuel Gas, Natural Gas Abated by A-1433 SCR on combined stack with S-972          | KTI                  | Box                  | 300 mmbtu/hr<br>2,628,000 mmbtu/yr | Firm Limit<br>Condition #16685, part 1<br>Condition #18372, part 3 |
| 972  | No. 3 Reformer Debutanizer Reboiler (F54)<br>Refinery Fuel Gas, Natural Gas Abated by A-1433 SCR on combined stack with S-971 | Foster Wheeler / KTI | Vertical Cylindrical | 45 mmbtu/hr<br>394,200 mmbtu/yr    | Firm Limit<br>Condition #16685, part 1<br>Condition #18372, part 3 |
| 1020 | No. 3 UOP Reformer  |                      |                      | 25.2K bbl/day<br>8,760K bbl/yr     | Grandfathered Limit  |

The correct table should be as follows:

**Table II A1 - Permitted Sources – Golden Eagle Refinery  
Plant #B2758 – Tesoro Refining and Marketing Company - Golden Eagle Refinery**

| S-# | Description   | Make or Type         | Model                | Capacity  | Grandfathered Limit, or Firm Limit and Basis   |
|-----|---|----------------------|----------------------|---|--|
| 971 | No. 3 Reformer UOP Furnace (F53)<br>Refinery Fuel Gas, Natural Gas Abated by A-1433 SCR on combined stack with S-972          | KTI                  | Box                  | <del>210,300</del> mmbtu/hr<br><del>1,839,600</del> <del>2,628,000</del> mmbtu/yr | Firm Limit<br><a href="#">1978 Application 26645</a><br><a href="#">New Source Review Condition #16685, part 1</a><br><a href="#">Condition #18372, part 3</a> |
| 972 | No. 3 Reformer Debutanizer Reboiler (F54)<br>Refinery Fuel Gas, Natural Gas Abated by A-1433 SCR on combined stack with S-971 | Foster Wheeler / KTI | Vertical Cylindrical | <del>3445</del> mmbtu/hr<br><del>297,840</del> <del>394,200</del> mmbtu/yr        | Firm Limit<br><a href="#">1978 Application 26645</a><br><a href="#">New Source Review Condition #16685, part 1</a><br><a href="#">Condition #18372, part 3</a> |

|      |                    |  |  |   |  |
|------|--------------------|--|--|---|--|
| 1020 | No. 3 UOP Reformer |  |  | <del>20.025-2</del> K bbl/day<br><del>7,3008,760</del> K bbl/yr | <u>Firm Limit</u><br><u>1978 Application</u><br><u>26645</u><br><u>New Source</u><br><u>Review</u><br><u>Grandfathered</u><br><u>Limit</u> |
|------|--------------------|--|--|---|--|

The updates based on this 2012 Application 23322 would be as follows:

**Table II A1 - Permitted Sources – Golden Eagle Refinery  
Plant #B2758 – Tesoro Refining and Marketing Company - Golden Eagle Refinery**

| S-#  | Description   | Make or Type         | Model                | Capacity   | Grandfathered Limit, or Firm Limit and Basis   |
|------|---|----------------------|----------------------|--|--|
| 971  | No. 3 Reformer UOP Furnace (F53)<br>Refinery Fuel Gas, Natural Gas Abated by A-1433 SCR on combined stack with S-972          | KTI                  | Box                  | <del>300210</del> mmbtu/hr<br><del>2,628,0001,839,600</del> mmbtu/yr | Firm Limit<br><del>1978 Application</del><br><del>26645</del><br><u>Condition 25476,</u><br><u>Part 3</u><br>New Source Review |
| 972  | No. 3 Reformer Debutanizer Reboiler (F54)<br>Refinery Fuel Gas, Natural Gas Abated by A-1433 SCR on combined stack with S-971 | Foster Wheeler / KTI | Vertical Cylindrical | <del>4534</del> mmbtu/hr<br><del>394,200297,840</del> mmbtu/yr       | Firm Limit<br><del>1978 Application</del><br><del>26645</del><br><u>Condition 25476,</u><br><u>Part 4</u><br>New Source Review |
| 1020 | No. 3 UOP Reformer  |                      |                      | <del>26.020.0</del> K bbl/day<br><del>9,4907,300</del> K bbl/yr      | Firm Limit<br><del>1978 Application</del><br><del>26645</del><br><u>Condition 25476,</u><br><u>Part 1</u> New Source Review    |

The information for the No. 2 Reformer equipment would be as follows:

**Table II A1 - Permitted Sources – Golden Eagle Refinery  
Plant #B2758 – Tesoro Refining and Marketing Company - Golden Eagle Refinery**

| S-# | Description | Make or Type | Model | Capacity | Grandfathered Limit, or Firm Limit and Basis |
|-----|-------------|--------------|-------|----------|--|
|-----|-------------|--------------|-------|----------|--|

|      |   |                            |                      |  |  |
|------|---|----------------------------|----------------------|--|--|
| 926  | No. 2 Reformer Splitter Reboiler(F26) Refinery Fuel Gas, Natural Gas                    | Petro Chem                 | Vertical Cylindrical | <del>64145</del> mmbtu/hr<br><del>560,640</del> <del>1270200</del> mmbtu/yr  | Firm Limit<br><a href="#">1993 Application 10912</a><br><a href="#">New Source Review Condition #16685, part 1</a><br><a href="#">Condition #18372, part 3</a> |
| 927  | No. 2 Reformer Heat/Reheating (F27) Refinery Fuel Gas, Natural Gas Abated by A-1431 SCR | Lummus                     | Multicell Cabin      | 280 mmbtu/hr<br>2,452,800 mmbtu/yr   | Firm Limit<br>Condition #16685, part 1<br>Condition #18372, part 3   |
| 951  | No. 2 Reformer Aux Reheater (F51) Refinery Fuel Gas, Natural Gas                        | Optimized Process Furnaces | Cabin                | 30 mmbtu/hr<br>131,400 mmbtu/yr  | Firm Limit<br>Condition #16685, part 1   |
| 1004 | No. 2 Catalytic Reformer  |                            |                      | <del>23.038</del> -4K bbl/day<br><del>8,395</del> <del>14,016</del> K bbl/yr | Grandfathered Limit  |

Note that the S-926 capacity is based on the firing rate used to determine emissions in NSR Application 10912. Tesoro believes this firing rate is a mistake, and may submit a permit application to change this firing rate. Also note that S-927 and S-951 were not identified by Tesoro as impacted by this Application 23322 No. 3 Reformer Capacity Increase. Therefore, no analysis of the firing rates of S-927 and S-951 has been completed.

The following corrections will be made to the process units associated with this application:

**Table II A1 - Permitted Sources – Golden Eagle Refinery  
Plant #B2758 – Tesoro Refining and Marketing Company - Golden Eagle Refinery**

| S-#  | Description   | Make or Type                                    | Model | Capacity                      | Grandfathered Limit, or Firm Limit and Basis  |
|------|---|---|-------|-------------------------------|---|
| 802  | FCCU Fluid Catalytic Cracker Regenerator Abated by S-901 CO Boiler and A-30 ESP | Reactor UOP Riser Cracker Regenerator (Bechtel) |       | 75K bbl/day<br>27,375K bbl/yr | <a href="#">Grandfathered Limit TBD Firm Limit</a><br><a href="#">Condition #11433, New Source Review</a> |
| 817  | No. 3 Crude Unit A-12 Vapor Recovery  | Elliot Co.                                      |       | 63K bbl/day<br>22,995K bbl/yr | Firm Limit<br>Condition #17837, part 1, part 2<br>New Source Review                                       |
| 1002 | No. 1 HDS Unit  |   |       | 28K bbl/day<br>10,220K bbl/yr | Firm Limit<br>Condition #8350, part A1<br>New Source Review   |



| S-#                  | Description                                   | Make or Type | Model | Capacity   | Grandfathered Limit, or Firm Limit and Basis                          |
|----------------------|---|--------------|-------|--|---|
| 1004                 | No. 2 Catalytic Reformer                      |              |       | <del>23,038.4K</del> bbl/day<br><del>8,395,14,016K</del><br>bbl/yr | Grandfathered Limit   |
| 1006                 | No. 1 HDA Unit                                |              |       | 20K bbl/day<br>7300K bbl/yr  | Firm Limit<br>Condition #8350,<br>part C1<br>New Source<br>Review     |
| 1007                 | Hydrocracker Unit<br>[Hydrocracker 2nd Stage] |              |       | 37K bbl/day<br>12,775K bbl/yr                                      | Firm Limit<br>Condition #8077,<br>Part C1<br>New Source<br>Review     |
| 1008                 | Hydrocracker Unit<br>[Hydrocracker 1st Stage] |              |       | 37K bbl/day<br>12,775K bbl/yr                                      | Firm Limit<br>Condition #8077,<br>Part C1<br>New Source<br>Review     |
| 1038                 | Benzene Saturation Unit                       |              |       | 15,000 bbl/day<br>5,475 K bbl/yr                                   | Firm Limit<br>Condition #23258,<br>part 1<br>New Source<br>Review     |
| 1105                 | No. 4 HDS Unit                                |              |       | 40080 BPD<br>14,629,200 BPY  | Firm Limit<br>Condition<br>#19199,<br>Part G0<br>New Source<br>Review |
| 1510                 | Delayed Coker                                 |              |       | 55.0K bbl/day<br>20,075K bbl/12<br>consecutive months              | Firm Limit<br>Condition #23129,<br>part 3<br>New Source<br>Review     |
| <a href="#">1555</a> | <a href="#">Reformate Splitter</a>            |              |       | <a href="#">40,000 BPD</a>   | <a href="#">1993 Application<br/>10912<br/>New Source<br/>Review</a>  |

Note: The original grandfathered capacity of S-802 is 47,500 BPSD according to the original 1977 data form submitted by a former owner of the refinery. S-802 was modified via 1994 Application 12722, and baseline emission limits were established to ensure there was no emissions increase associated with the project. This emissions ‘mini-bubble’ is contained in Part 2 of Condition 11433. However, District records do not indicate a permitted increase in S-802 capacity. Tesoro and the District agreed to address the S-802 capacity increase in the future permit application that brings the refinery emissions cap current.

The equipment descriptions as detailed in Table II-A1 in the current Renewed Title V Permit for Associated Fired Heaters are shown below:

**Table II A1 - Permitted Sources – Golden Eagle Refinery  
Plant #B2758 – Tesoro Refining and Marketing Company - Golden Eagle Refinery**

| S-# | Description  | Make or Type         | Model                | Capacity   | Grandfathered Limit, or Firm Limit and Basis   |
|-----|--|----------------------|----------------------|--|--|
| 908 | No. 3 Crude Heater (F8)<br>Natural Gas, Refinery Fuel Gas<br>Abated by A-908 SCR | Alco                 | Cabin                | 220 mmbtu/hr<br>1,927,200<br>mmbtu/yr  | <a href="#">Grandfathered Source</a><br>Firm Limit<br>Condition #16685,<br>part 1,<br><a href="#">Condition 25476, Part 5</a>                          |
| 915 | Platformer Intermediate Heater (F15)<br>Refinery Fuel Gas, Natural Gas           | Braun                | Cabin                | <del>5020</del> mmbtu/hr<br><del>438,000</del> <del>175,200</del><br>mmbtu/yr  | Firm Limit<br><a href="#">1991 Application 6468</a><br><a href="#">New Source Review</a><br>Condition #16685,<br>part 1                                |
| 916 | No. 1 HDS Heater (F16)<br>Natural Gas, Refinery Fuel Gas                         | Braun                | Cabin                | 55 mmbtu/hr<br>481,800 mmbtu/yr  | Firm Limit<br><a href="#">1991 Application 6468</a><br><a href="#">New Source Review</a><br>Condition #16685,<br>part 1<br>Condition #18372,<br>part 3 |
| 917 | No. 1 HDS Prefract Reboiler (F17)<br>Refinery Fuel Gas, Natural Gas              | Industrial Engineers | Vertical Cylindrical | 18 mmbtu/hr<br>157,680 mmbtu/yr  | Firm Limit<br><a href="#">1987 Application 164</a><br><a href="#">New Source Review</a><br>Condition #16685,<br>part 1                                 |
| 919 | No. 2 HDS Depent Reboiler (F19)<br>Refinery Fuel Gas, Natural Gas                | Foster Wheeler       | Cabin                | <del>11165</del> mmbtu/hr<br><del>972,360</del> <del>569,400</del><br>mmbtu/yr | Firm Limit<br><a href="#">1991 Application 6468</a><br><a href="#">New Source Review</a><br>Condition #16685,<br>part 1<br>Condition #18372,<br>part 3 |

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| S-# | Description  | Make or Type   | Model                | Capacity   | Grandfathered Limit, or Firm Limit and Basis   |
|-----|--|----------------|----------------------|--|--|
| 920 | No. 2 HDS Charge Heater (F20)<br>Refinery Fuel Gas, Natural Gas      | Foster Wheeler | Cabin                | 63 mmbtu/hr<br>551,880 mmbtu/yr                                | Firm Limit<br><a href="#">1991 Application 6468</a><br><a href="#">New Source Review</a><br>Condition #16685, part 1<br>Condition #18372, part 3   |
| 921 | No. 2 HDS Charge Heater (F21)<br>Refinery Fuel Gas, Natural Gas      | Foster Wheeler | Cabin                | 63 mmbtu/hr<br>551,880 mmbtu/yr                                | Firm Limit<br><a href="#">1991 Application 6468</a><br><a href="#">New Source Review</a><br>Condition #16685, part 1<br>Condition #18372, part 3   |
| 926 | No. 2 Reformer Splitter Reboiler(F26) Refinery Fuel Gas, Natural Gas | Petro Chem     | Vertical Cylindrical | <del>64145</del> mmbtu/hr<br>1270200 mmbtu/yr                  | Firm Limit<br><a href="#">1993 Application 10912</a><br><a href="#">New Source Review</a><br>Condition #16685, part 1<br>Condition #18372, part 3<br><a href="#">Condition 25476, Part 6</a> |
| 928 | HDN Reactor A Heater (F28)<br>Refinery Fuel Gas, Natural Gas         | Foster Wheeler | Cabin                | <del>1820</del> mmbtu/hr<br><del>157,680+75,200</del> mmbtu/yr | Firm Limit<br><a href="#">1987 Application 548</a><br><a href="#">New Source Review</a><br>Condition #16685, part 1  |
| 929 | HDN Reactor B Heater (F29)<br>Refinery Fuel Gas, Natural Gas         | Foster Wheeler | Cabin                | <del>1820</del> mmbtu/hr<br><del>157,680+75,200</del> mmbtu/yr | Firm Limit<br><a href="#">1987 Application 548</a><br><a href="#">New Source Review</a><br>Condition #16685, part 1  |

| S-#  | Description   | Make or Type   | Model                    | Capacity  | Grandfathered Limit, or Firm Limit and Basis   |
|------|---|----------------|--------------------------|---|--|
| 930  | HDN Reactor C Heater (F30)<br>Refinery Fuel Gas, Natural Gas            | Foster Wheeler | Cabin                    | <del>1820</del> mmbtu/hr<br><del>157,680</del> <del>175,200</del><br>mmbtu/yr                   | Firm Limit<br><a href="#">1987 Application</a><br><a href="#">548</a><br><a href="#">New Source</a><br><a href="#">Review</a><br>Condition #16685,<br>part 1                 |
| 931  | Hydrocracker Reactor 1 Heater (F31)<br>Refinery Fuel Gas, Natural Gas   | Foster Wheeler | Cabin                    | <del>1820</del> mmbtu/hr<br><del>157,680</del> <del>175,200</del><br>mmbtu/yr                   | Firm Limit<br><a href="#">1987 Application</a><br><a href="#">548</a><br><a href="#">New Source</a><br><a href="#">Review</a><br>Condition #16685,<br>part 1                 |
| 932  | Hydrocracker Reactor 2 Heater (F32)<br>Refinery Fuel Gas, Natural Gas   | Foster Wheeler | Cabin                    | <del>1820</del> mmbtu/hr<br><del>157,680</del> <del>175,200</del><br>mmbtu/yr                   | Firm Limit<br><a href="#">1987 Application</a><br><a href="#">548</a><br><a href="#">New Source</a><br><a href="#">Review</a><br>Condition #16685,<br>part 1                 |
| 933  | Hydrocracker Reactor 3 Heater (F33)<br>Refinery Fuel Gas, Natural Gas   | Foster Wheeler | Cabin                    | <del>1820</del> mmbtu/hr<br><del>157,680</del> <del>175,200</del><br>mmbtu/yr                   | Firm Limit<br><a href="#">1987 Application</a><br><a href="#">548</a><br><a href="#">New Source</a><br><a href="#">Review</a><br>Condition #16685,<br>part 1                 |
| 934  | Hydrocracker Stabilizer Reboiler (F34), Refinery Fuel Gas, Natural Gas  | Foster Wheeler | Vertical Cylindrical     | <del>135</del> <del>152</del> mmbtu/hr<br><del>1,182,600</del> <del>1,331,520</del><br>mmbtu/yr | Firm Limit<br><a href="#">1987 Application</a><br><a href="#">548</a><br><a href="#">New Source</a><br><a href="#">Review</a><br>Condition #16685,<br>part 1                 |
| 935  | Hydrocracker Splitter Reboiler (F35),<br>Refinery Fuel Gas, Natural Gas | Foster Wheeler | Vertical Cylindrical     | <del>452</del> <del>135</del> mmbtu/hr<br><del>1,182,600</del> <del>1,331,520</del><br>mmbtu/yr | <a href="#">Firm Limit</a><br><a href="#">1987 Application</a><br><a href="#">548</a><br><a href="#">New Source</a><br><a href="#">Review</a><br>Condition #16685,<br>part 1 |
| 1106 | No. 4 HDS Reactor Feed Heater (F72), Natural Gas                        | Tulsa Heater   | Two Vertical Cylindrical | 30 mmbtu/hr (24-hour average)<br>225.257 mmscf/yr   | Firm Limit<br>Condition #19199,<br>part H0, H3<br>New Source<br>Review   |

| <b>S-#</b> | <b>Description</b>   | <b>Make or Type</b>                     | <b>Model</b> | <b>Capacity</b>  | <b>Grandfathered Limit, or Firm Limit and Basis</b>                |
|------------|--|---|--------------|--|--|
| 1470       | No. 3 Crude Vacuum Distillation Heater (F71)<br>Refinery Fuel Gas, Natural Gas Abated by A-908 SCR |   |              | 30 mmbtu/hr<br>262,800 mmbtu/yr  | Firm Limit<br>Condition #18539,<br>part 9<br>New Source<br>Review  |
| 1511       | Delayed Coker Heater #1 (F78)<br>Natural gas, Refinery fuel gas Abated by A-1511 SCR               | John Zink, ultra-low-NOx, or equivalent |              | 230 mmbtu/hr<br>2,014,800 MMbtu/<br>consecutive 12<br>months combined<br>limit for fuel gas<br>and natural gas | Firm Limit<br>Condition #23129,<br>part 14<br>New Source<br>Review |
| 1512       | Delayed Coker Heater #2 (F79)<br>Natural gas, Refinery fuel gas Abated by A-1512 SCR               | John Zink, ultra-low-NOx, or equivalent |              | 230 mmbtu/hr<br>2,014,800 MMbtu/<br>consecutive 12<br>months combined<br>limit for fuel gas<br>and natural gas | Firm Limit<br>Condition #23129,<br>part 14<br>New Source<br>Review |

Appendix B  
Research into Permitting History

Extensive research has been completed to evaluate the permitting history for the 'grandfathered' fired heaters impacted by this application. The results of this research conclude that many of the fired heaters have actually been subject to Regulation 2, Rule 2, contrary to the initial information included in this application. The following table summarizes the permitting history determined by this research:

| Project                | Year | Application | Sources             | Scope/Comments  |
|------------------------|------|-------------|---------------------|---|
| S-917 Replacement      | 1987 | 164         | S-917               | S-917, a grandfathered source rated at 31MM Btu/hr, was replaced with new equipment rated at 15MM Btu/hr.   |
| Hydrocracker Expansion | 1987 | 548         | S-928 through S-935 | S-928 through S-933 are grandfathered sources initially operated in 1962 with a capacity of 18MM Btu/hr each. S-934 and S-935 are grandfathered sources initially operated in 1962 with a capacity of 117MM Btu/hr and 152MM Btu/hr, respectively. According to the 1988 Engineering Evaluation for the application it appears that combustion emissions were addressed by allowing no increase in the refinery emissions cap, and for NOx, offsets were quantified and provided by installing Low NOx burners on both S-934 and S-935. There is no record of an increase in furnace capacity being permitted. Nonetheless, there is adequate confidence that these sources were subject to Regulation 2, Rule 2. |

| Project   | Year | Application | Sources              | Scope/Comments  |
|---|------|-------------|----------------------|---|
| Refinery Modernization and Energy Conservation (RMEC) | 1989 | 3318        | S-908                | S-908 is a grandfathered source initially operated in 1937 at a maximum fuel rate of 160 MM Btu/hr. The original scope of the RMEC included a modification to the No. 3 Crude Unit (including S-908), but this sub-project was dropped from the final RMEC scope. According to the 1991 Engineering Evaluation, S-908 was retrofitted with an SCR to offset the NOx emissions associated with other subprojects associated with the RMEC Project. There is no record of an increase in furnace capacity being permitted. Altering S-908 to satisfy Regulation 2, Rule 2 requirements for other sources does not designate S-908 as a source subject to the requirements of Regulation 2, Rule 2.  |
| Diesel Modifications                                  | 1991 | 6468        | S-915, S-916 & S-917 | S-915, S-916 and S-917 are grandfathered sources initially operated in 1954 at capacities of 50MM Btu/hr, 55MM Btu/hr and 31MM Btu/hr, respectively. S-917 was replaced with a 15MM Btu/hr furnace in 1987 Application 164. Application 6468 granted permits for modifications to S-1002, S-1003 and S-1006. The application file is missing, including the engineering evaluation. According to documents provided by Tesoro, furnaces S-915, S-916, S-917, S-919, S-920, S-921 and Boiler S-904 were impacted by the process unit modifications and combustion emissions were increased (eg total project NOx increased 434 lb/day, 79 t/y). Tosco provided revised data forms and Risk Assessment information, but there is no record of permits being granted to the furnaces. Nonetheless, the limited documentation provides adequate confidence that these sources were subject to Regulation 2, Rule 2. |
| Clean Fuels   | 1993 | 10912       | S-926                | S-926 was originally operated in 1957 at a  |

| Project                       | Year | Application | Sources | Scope/Comments  |
|-------------------------------|------|-------------|---------|---|
| Project                       |      |             |         | firing rate of 107MM Btu/hr. S-926 was modified and subject to Regulation 2, Rule 2 in the Clean Fuels Project. The engineering evaluation for Application 10912 shows that the emissions for S-926 and the application offsets were based on a firing rate of 64MM. Therefore, there is adequate confidence that S-926 was subject to Regulation 2, Rule 2.  |
| No. 3 Crude Unit Modification | 2001 | 2813        | S-908   | This project increased the permitted capacity of S-817 No. 3 Crude unit, and replaced furnace S-907 with new furnace S-1470. To satisfy the requirements of Regulation 2, Rule 2, S-1470 was abated with the existing SCR on S-908. In this Application S-908 was re-tubed. However, the emissions of S-908 were not subject to Regulation 2, Rule 2. The reason given in the evaluation is that Tesoro represented the re-tube modification to improve heat exchange at S-908 to accommodate the increase in S-817 No. 3 Crude Unit Capacity, but without increasing fuel use. All Application 2813 emission increases were associated with S-1470. Altering S-908 at the same time S-1470 is required satisfy the requirements of Regulation 2, Rule 2 does not designate S-908 as a source subject to the requirements of Regulation 2, Rule 2 |

S-917, S-926, S-934 and S-935 were the subject of further discussion with Tesoro.

S-917. Tesoro provided operating data for S-917 that demonstrated the furnace has been fired as high as 18MM Btu/hr. The Permit to Operate granted S-917 at 15MM Btu/hr (via 1987 Application 164) was issued before furnace firing rates were standardized on fuel gas High Heating Value (HHV) heat content. Therefore, assuming the 15MM Btu/hr is based on fuel gas Low Heating Value (LHV), adjusting permitting firing rate for heating value is nominally 10% so  $15\text{MM Btu/hr} * 1.10 = 16.5\text{MM Btu/hr}$ . A maximum firing rate of 18MM Btu/hr translates to a  $18/16.5 = 1.09$  factor which means the furnace is capable of firing



9% above design. This extra 9% is not uncommon for typical furnace operation due to the inherent over-design that is typical for process furnaces. However, emission calculations associated with Application 164 were based on 15MM Btu/hr. Thus there is a discrepancy between the current furnace operation and the permitted furnace emissions. This apparent inconsistency was discussed with Tesoro. Based on these discussions, it was agreed that S-917 would be considered a NSR source with a permitted maximum firing rate of 18MM Btu/hr. This agreement was based on 1) Tesoro's assurance that the furnace has not been modified since 1987, 2) emission calculations do not clearly indicate an HHV or LHV basis, 3) 18MM Btu/hr is not out of the normal boundaries of burner overdesign, and 4) if the 18MM Btu/hr agreement proves to be wrong, the error would not result in a significant emissions impact.

S-926. S-926 is limited to 145MM Btu/hr in Permit Condition 16685 which was imposed in 1999 (not from a permit application but for billing purposes pursuant to Regulation 2-1-403). This appears to be in conflict with the 64MMBtu/hr limit used in the emission calculations for Application 10912. Tesoro reviewed operating data for S-926 and it shows S-926 has operated as high as 149MM Btu/hr on 4/20/1998 and at a peak of 145MM Btu/hr since 1999, in compliance with Condition 16685. The District decided it would be inappropriate to immediately impose the apparent 64MM Btu/hr NSR limit, causing Tesoro a unwarranted hardship since there has been a conflicting limit in Condition 16685 for over a decade. This decision was based on an agreement by Tesoro to perform further investigation in to S-926, and determine the correct firing rate limit. A permit condition will be imposed allowing Tesoro to continue with the 145MM Btu/hr limit (of Condition 16685) until 7/1/13. On 7/1/13, unless Tesoro submits a permit application that addresses the correct permitted firing rate of S-926, the maximum firing rate of S-926 will be 64MM Btu/hr -- the NSR limit that was the basis of Clean Fuels Project NSR Application 10912.

S-934 and S-935. Tesoro provided an internal note that suggested S-934 and S-935 firing rates as represented in the original Lion Oil data forms were incorrect. Tesoro also provide design data that indicated these two furnaces are identical, each with 9 burners designed for 15MMBtu/hr each. Therefore, the design firing rate for each furnace is  $15\text{MM Btu/hr} * 9 = 135\text{MM Btu/hr}$ . However, emission calculations associated with Application 548 were based on 117MM Btu/hr and 152MM Btu/hr. Thus there is a discrepancy between the documented furnace design and the permitted furnace emissions. This apparent inconsistency was discussed with Tesoro. Based on these discussions, it was agreed that S-934 and S-935 would be considered NSR sources with a permitted maximum firing rate of 135MM Btu/hr each. This agreement was based on 1) Tesoro's assurance that the furnace has not been modified since 1987, 2) S-934 and S-935 share a common stack equipped with a NOx CEM, and 3) there is little or no difference in emissions between two furnaces at 135MM Btu/hr each and two furnaces totaling  $117\text{MM Btu/hr} + 152\text{MM Btu/hr} = 269\text{MM Btu/hr}$ .

Appendix C  
Emission Banking Certificates 915 and 968

Banking Certificate: 915

Application no: 8454  
 Final Disposition: Certificate Issued 12/09/03  
 Condition #: 18379  
 Reduction Location: Ultramar, Inc [Martinez]  
 Certificate owner: Tesoro Refining & Marketing Company  
 Contact: Sharon Lim, tel: (925) 335-3467  
 Mailing address: 150 Solano Way, Martinez, CA 94553

Transfer from #: 892  
 Original cert.#: 891

| tons per year              | PM   | POC  | NOX   | S02   | CO    | NPOC | PM10 |
|----------------------------|------|------|-------|-------|-------|------|------|
| Requested                  | .000 | .000 | .000  | .000  | .000  | .000 | .000 |
| Approved                   | .000 | .000 | 9.671 | 4.584 | 2.938 | .000 | .327 |
| Applic:14917<br>Withdrawal | .000 | .000 | .175  | .000  | .000  | .000 | .000 |
| Applic:21023<br>Withdrawal | .000 | .000 | .000  | .000  | .000  | .000 | .318 |
| Balance                    | .000 | .000 | 9.496 | 4.584 | 2.938 | .000 | .009 |

Banking Certificate: 968

Application no: 13047  
 Final Disposition: Certificate Issued 04/17/06  
 Reduction Location: Lesaffre Yeast Corporation [Oakland]  
 Certificate owner: Tesoro Refining & Marketing Company  
 Contact: Sharon Lim, tel: (925) 335-3467  
 Mailing address: 150 Solano Way, Martinez, CA 94553

Transfer from #: 940  
 Original cert.#: 898

| tons per year              | PM   | POC    | NOX  | S02  | CO   | NPOC | PM10 |
|----------------------------|------|--------|------|------|------|------|------|
| Requested                  | .000 | 28.407 | .000 | .000 | .000 | .000 | .000 |
| Approved                   | .000 | 28.319 | .088 | .000 | .000 | .000 | .000 |
| Applic:14919<br>Withdrawal | .000 | 1.620  | .000 | .000 | .000 | .000 | .000 |
| Applic:14894<br>Withdrawal | .000 | .023   | .000 | .000 | .000 | .000 | .000 |
| Applic:14917               |      |        |      |      |      |      |      |

Permit Evaluation and Statement of Basis: Site B2758 & B2759, Tesoro Refining & Marketing Company, LLC,  
 Golden Eagle Refinery, 150 Solano Way, Martinez, CA 94553

|                            |      |        |      |      |      |      |      |
|----------------------------|------|--------|------|------|------|------|------|
| Withdrawal                 | .000 | .006   | .000 | .000 | .000 | .000 | .000 |
| Applic:12592<br>Withdrawal | .000 | .076   | .000 | .000 | .000 | .000 | .000 |
| Applic:16125<br>Withdrawal | .000 | 1.205  | .000 | .000 | .000 | .000 | .000 |
| Applic:16389<br>Withdrawal | .000 | .018   | .000 | .000 | .000 | .000 | .000 |
| Applic:16850<br>Withdrawal | .000 | .045   | .000 | .000 | .000 | .000 | .000 |
| Applic:15944<br>Withdrawal | .000 | .002   | .000 | .000 | .000 | .000 | .000 |
| Applic:16822<br>Withdrawal | .000 | .348   | .000 | .000 | .000 | .000 | .000 |
| Applic:13228<br>Withdrawal | .000 | .037   | .000 | .000 | .000 | .000 | .000 |
| Applic:18715<br>Withdrawal | .000 | .014   | .000 | .000 | .000 | .000 | .000 |
| Applic:14141<br>Withdrawal | .000 | 7.360  | .000 | .000 | .000 | .000 | .000 |
| Applic:21023<br>Withdrawal | .000 | .369   | .000 | .000 | .000 | .000 | .000 |
| Applic:12205<br>Withdrawal | .000 | 5.302  | .000 | .000 | .000 | .000 | .000 |
| Applic: 2298<br>Withdrawal | .000 | .008   | .000 | .000 | .000 | .000 | .000 |
| Applic:21713<br>Withdrawal | .000 | .003   | .052 | .000 | .000 | .000 | .000 |
| Applic:20968<br>Withdrawal | .000 | .075   | .000 | .000 | .000 | .000 | .000 |
| Applic:22152<br>Withdrawal | .000 | .001   | .036 | .000 | .000 | .000 | .000 |
| Applic:22615<br>Withdrawal | .000 | .079   | .000 | .000 | .000 | .000 | .000 |
| Applic:22823<br>Withdrawal | .000 | .476   | .000 | .000 | .000 | .000 | .000 |
| Balance                    | .000 | 11.252 | .000 | .000 | .000 | .000 | .000 |



Appendix D  
Permit Condition Discussion Summary

Permit conditions for this application were proposed, discussed with Tesoro, and revised accordingly. A summary of the discussion is shown below..

- a. S-1020 throughput limits. The proposed permit condition limited S-1020 throughput to 26,000 barrels per operating day, and 9,490,000 barrels per each consecutive 12-month period. These limits were similar to the limits imposed on Delayed Coker S-1510 in Condition 23129 via 2006 Application 14141 (23129-3 limited S-1510 to 55,000 BPD midnight to midnight). Tesoro requested that the 26,000 BPD limit be based on a 365-day average because if the limit is maximum daily, then the annual limit will never be reached (since operating margin requires actual throughput to be below maximum allowable throughput). This averaging is contrary to Title V Standard Condition I.J.1 that states the throughput limits are the maximum allowable capacity, not an average capacity. A review of the current permit conditions for other process units found that daily throughput limits are imposed in a variety of ways. A summary is shown below. Based on the lack of standardization for process unit limits, and based on the fact that S-1020 emissions are solely fugitive and independent of throughput, the District agreed to allow the 365-day averaging period.
- S-817 -- No. 3 Crude -- 63,000 BPCD in 17837-1 & 22,995,000 BProlling365days in 17837-2
  - S-850 -- 3HDS -- 70,000 BPSD in 8077-B6B&C
  - S-1002 -- 1HDS -- 28,000 BPD 365-day average & 10,220,000 BPEachConsecutive12-month in 8350-A1
  - S-1003 -- 2HDS -- 40,000 BPD 365-day average & 14,600,000 BPEachConsecutive12-month in 8350-B1
  - S-1006 -- 1HDA -- 20,000 BPD 365-day average & 7,300,000 BPEachConsecutive12-month in 8350-C1
  - S-1007 -- HDN -- 35,000 BPCD & 37,000 BPSD in 8077-C1
  - S-1008 -- Hydrocracker -- 35,000 BPCD & 37,000 BPSD in 8077-C1
  - S-1038 -- BenSat -- 5,475,000 BpanyConsecutive12-month
  - S-1105 -- 4HDS -- 40,080 BPD Maximum & 14,629,200 BPY Maximum in 19199 & 40,080 BPCD in 19199-G0.
  - S-1510 -- Coker -- 55,000 BPD(midnight to midnight) & 20,075,000 Bpanyconsecutive12-months
- b. Combined reformat product limit. The increase in capacity of S-1020 increases the total reforming capacity at the Tesoro refinery because even though S-1004 No. 2 Reformer is out of service, Tesoro will retain the permit for S-1004. The increase in reforming capacity debottlenecks the upstream process units (and their associated fired heaters). Tesoro claims that the upstream sources are not debottlenecked because the capacity of the 40,000 BPD Reformat Splitter is the effective limit (S-1555 Reformat Splitter was modified to the 40,000 BPD capacity via 1993 Clean Fuels Project Application 10912). In early discussions with Tesoro, it was agreed that the total reformat production will be limited to ensure upstream sources are not debottlenecked. A permit condition was proposed that limited total reformat production from S-1004 and S-1020 to 40,000 BPD. Tesoro reviewed this proposed condition and suggested that the reformat production be limited as the feed to the reformat splitter, stating that summing up two streams is not necessary when there is a single stream to monitor. However, limiting the reformat feed to the reformat splitter allows Tesoro to produce more reformat from the reformers and send the excess over 40,000 BPD to another process. This would not ensure the upstream

units are not debottlenecked. Therefore, the District's counterproposal was to impose the reformate production at the reformate splitter with the provision that all reformate production from S-1004 and S-1020 is only fed to the S-1555 Reformate Splitter. Tesoro reviewed this counterproposal and agreed to the original proposal to limit the total reformate production from S-1004 and S-1020.

- c. S-908 firing limit. S-908 is a grandfathered source initially operated in 1937 at a firing rate of 160MMBtu/hr. S-908 was included in the refinery emissions cap when it was created to permit the emissions increases associated with the No. 3 HDS Project (1982 Application 27769). However, S-908 was not modified in the No. 3 HDS Project, only included in the Refinery Emissions Cap to address NSR for the new and modified sources of the No. 3 HDS project. S-908 has been the subject of subsequent permitting actions, such as retrofitting to add an SCR for compliance with Regulation 9, Rule 10 (1989 Application 3318), and re-tubed to improve heat exchange efficiency (2001 Application 2318), but all permitting actions were treated as alterations with no increase in S-908 emissions and none of the permitting actions included an increase in the S-908 firing rate. Therefore, the combustion emissions of S-908 have never been subject to Regulation 2, Rule 2, and are still considered grandfathered emissions. S-908 is limited to 220MM Btu/hr in Permit Condition 16685 which was imposed in 1999 (not from a permit application but for billing purposes pursuant to Regulation 2-1-403). However, Tesoro has provided operating data for the period of 1992 through 2012 that shows S-908 has been operating above 160MMBtu/hr consistently, with peak rates as high 225-235MM Btu/hr in 2005 and 2011. Therefore, it would be inappropriate and a severe hardship to impose the 160MM Btu/hr grandfathered firing rate on S-908 at this time. In discussions with Tesoro, Tesoro indicated that there may be errors in the permitting actions of S-908, and suggested that the potential errors be addressed. It was agreed that for the purposes of expediency this issue will not be addressed at this time. For this Application 23322, Tesoro has identified S-908 as impacted by the No. 3 Reformer Capacity Increase, but has stated the project simulations demonstrate that emissions do not exceed permitted levels. Therefore, S-908 is altered by this application, and to ensure S-908 emissions are not increased, the S-908 firing rate will be limited to 220MM Btu/hr pursuant to Regulation 2-1-233.
- d. S-926 firing limit. S-926 was originally operated in 1957 at a firing rate of 107MM Btu/hr. S-926 was modified and subject to Regulation 2, Rule 2 in the Clean Fuels Project (1993 Application 10912). However, the engineering evaluation for Application 10912 shows that the emissions for S-926 and the application offsets were based on a firing rate of 64MM Btu/hr. S-926 is limited to 145MM Btu/hr in Permit Condition 16685 which was imposed in 1999 (not from a permit application but for billing purposes pursuant to Regulation 2-1-403). However, Tesoro reviewed operating data for S-926 and it shows S-926 has operated as high as 149MM Btu/hr on 4/20/1998 and at a peak of 145MM Btu/hr since 1999 in compliance with Condition 16685. During Application 23322 discussions Tesoro stated 12/18/12 that there appears to be an error in the S-926 permitting in Application 10912. It was agreed that for the purposes of expediency this issue will not be addressed at this time. For this Application 23322, Tesoro has identified S-926 as impacted by the No. 3 Reformer Capacity Increase, but has stated the project simulations demonstrate that emissions do not exceed permitted levels. However, it is unclear what the correct permitted capacity should be, and Tesoro has declined to provide any details of the 'permitted levels' used in the project simulations. Permit conditions will limit S-926 to 145MM Btu/hr, subject to clarification by Tesoro regarding the correct firing limit. The condition will allow Tesoro about 5 months to submit an application for a change in conditions, and in the event that this future application is not submitted within the allowed time, the S-926 limit will revert to the

64MM Btu/hr NSR limit used in Application 10912.

- e. NO<sub>x</sub> emissions. S-971 and S-972 NO<sub>x</sub> emissions were limited on both a mass and concentration basis in the proposed permit conditions. Tesoro commented that the mass emission limits are the key limit to ensure BACT is not triggered. Imposing concentration limits was not acceptable to Tesoro because this would eliminate the operating flexibility needed to comply with the mass emission limits. The District agreed with this concern because as long as the RACT adjusted daily baseline mass emissions are not exceeded, BACT is not triggered. Tesoro also commented that the daily mass emission limits be based on a 365-day average. The District disagreed with this averaging because it means on a given day, mass emissions could exceed the RACT adjusted baseline emissions triggering BACT. It was agreed that the daily mass emission limits could be on a calendar day rather than on a rolling 24-hr basis.
- f. NSPS Subpart Ja. The proposed permit conditions contained specific sulfur standards from NSPS Subpart Ja. The District agreed to omit these conditions based on the current practice to eliminate redundancy. In place a condition will be included that simply states the sources will comply with NSPS Subpart Ja.
- g. SO<sub>2</sub> BACT. The proposed permit conditions included fuel gas sulfur limits of 50 ppmv H<sub>2</sub>S on a 365-day average and a 100 ppmv TRS on a 24-hr average, based on the SO<sub>2</sub> BACT determination in CMP Application 14141, contained in Permit Condition 23129, Part 11. In discussions with Tesoro, the District agreed to revise the TRS limit to a 365-day average. There was also discussion of the CMP BACT determination and the possibility of revision this determination and Tesoro's counterproposal included language allowing the re-determination. Tesoro agreed to remove the suggested language that a SO<sub>2</sub> BACT determination be submitted. Tesoro can submit a permit application for a change of conditions based on a new SO<sub>2</sub> BACT determination, but including this in a permit condition has potential to cause delay in approval.
- h. Monitoring. The proposed permit conditions included independent monitoring on both S-971 and S-972 to determine compliance with the permitted emissions. NO<sub>x</sub>, CO and O<sub>2</sub> CEMs were included for both S-971 and S-972 and annual source tests for SO<sub>2</sub>. PM<sub>10</sub>, POC were included for S-972 and annual source tests for SO<sub>2</sub>. PM<sub>10</sub>, POC and ammonia were included for S-971. These monitoring requirements were proposed since they would comply with all monitoring requirements. Tesoro responded that these monitoring requirements are impractical. The District requires monitoring to demonstrate compliance with emission standards. Furthermore, for a common stack the requirements of Regulation 1-107 Combination of Emissions are applicable. Since there are no adequate and reliable means to establish the nature, extent and quantity of emission from each source, the emission limits would be the most stringent, which would be the emissions limits from S-972. There was extensive discussion between the District and Tesoro on how to demonstrate adequate and reliable means to establish the nature, extent and quantity of emission from each source. In addition, SO<sub>2</sub> monitoring on S-971 and S-972 serves no purpose since the SO<sub>2</sub> emission calculations are based the increase in natural gas required for the refinery fuel gas balance. The final agreement comprised the following:
  - a. Annual source test for ammonia suitably corrected to determine concentrations downstream of A-1433 SCR before comingling with S-972. If three years of annual tests demonstrate no exceedance, the source test frequency shall be every 5 years.

- b. Initial source test on S-972 for POC, PM-10, CO and NOx while firing refinery fuel gas at a firing rate greater than or equal to 80% of maximum firing rate. A second source test will be completed the following year. If the second test confirms the mass emissions limits for S-972 are not exceeded, then the frequency of the source test shall be every 5 years.
- c. Initial source test on S-971 and S-972 common stack for POC and PM-10 while firing refinery fuel gas at a firing rate for each source greater than or equal to 80% of maximum firing rate. Mass emissions from S-971 and S-972 individually will be calculated using the emission factors determined for S-972. A second source test will be completed the following year. If the second test confirms the mass emissions limits for S-971 and S-972 are not exceeded, then the frequency of the source test shall be every 5 years.
- i. Condition 8077. Part B7A contains NOx concentration limits for S-971 and S-972. The proposed permit conditions changed the 75ppm limit to 19 and 20.5 ppmv limits, respectively. The District agreed to not change these NOx limits and leave 8077 unchanged. See discussion in paragraph e. above.
- j. Condition 16685. Condition revisions were based on the current databank version of 16685. The clarifying language in this condition was added in application 23194, and promptly disputed by Tesoro. It was agreed that this issue will be addressed separately in order to avoid further delays for this application.



Permit Evaluation and Statement of Basis: Site B2758 & B2759, Tesoro Refining & Marketing Company, LLC,  
Golden Eagle Refinery, 150 Solano Way, Martinez, CA 94553

**Application 23322, S-1020 No. 2 Reformer Capacity Increase Addendum**

Place holder for Addendum regarding implementation of the Authority to Construct and the  
granting of the Permit to Operate.

(will be included in final document)

Application 23339, S-920 NOx Box Revision

**EVALUATION REPORT**  
**TESORO REFINING AND MARKETING COMPANY**  
**REVISED NO<sub>x</sub> BOX FOR S-920, F-20**  
**No. 2 HDS CHARGE HEATER**  
**APPLICATION 23339, PLANT 14628**

**BACKGROUND**

The Tesoro Golden Eagle Refinery (Tesoro) operates several furnaces and boilers that are subject to Regulation 9, Rule 10, Nitrogen Oxides And Carbon Monoxide From Boilers, Steam Generators And Process Heaters In Petroleum Refineries. Regulation 9-10-301 limits the refinery wide NO<sub>x</sub> emissions to 0.033 lb/MMBtu of fired duty. Regulation 9-10-502 requires the installation of a NO<sub>x</sub>, CO and O<sub>2</sub> CEM to demonstrate compliance with Regulation 9-10-301. Regulation 9-10-502 also allows a CEM equivalent verification system to determine compliance with Regulation 9-10-301. The District and Tesoro (through WSPA) have produced the CEM equivalent verification system. This system is called the “NO<sub>x</sub> Box”. The NO<sub>x</sub> Box is an operating window for the unit, expressed in terms of fired duty and oxygen content in the flue gas. The operating window is established by source tests for various operating conditions. The source tests demonstrate the NO<sub>x</sub> emissions are equal to or less than a specified emission factor. As long as the fired unit duty and oxygen content are in this NO<sub>x</sub> Box operating window, the specified emission factor is used to determine compliance with the 0.033 lb/MMBtu limit of Regulation 9-10-301. The Permit Condition that contains the details of the NO<sub>x</sub> Box is #18372.

Condition 18372, Part 30 required Tesoro to submit the initial NO<sub>x</sub> Box for the affected sources by January 1, 2005. Tesoro met this requirement via Application 15682. The NO<sub>x</sub> Box’s in the application were supported by properly conducted source tests and the NO<sub>x</sub> Box operating windows for all the affected sources have been included in Revision 4 of the Title V permit (reference: Section VI, Condition 18372, Part 31A, NO<sub>x</sub> Box Ranges).

This application requests a change in the NO<sub>x</sub> Box operating window for:

**S-920 F-20 No. 2 HDS Charge Heater**

The change is as follows:

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
| 920        | 0.042                      | 2.5, 25.72   | 7.7, 17.86   | 2.7, 38.29  | 7.1, 15.34  | 8.0, 60.26  |
|            | 0.055                      | 7.7, 17.86   | 10.8, 27.53  | 8.0, 60.26  | N/A   | 10.0, 45.15   |
| 920 new    | 0.04 <del>2</del>          | 2.5, 25.72   | <u>7.1, 15.34</u>  | 2.7, 38.29  | <u>43.41, 45.25</u>   | 8.0, 60.26  |

|  |       |                             |                |            |     |             |
|--|-------|-----------------------------|----------------|------------|-----|-------------|
|  | 0.055 | <u>7.1,</u><br><u>15.34</u> | 10.8,<br>27.53 | 8.0, 60.26 | N/A | 10.0, 45.15 |
|--|-------|-----------------------------|----------------|------------|-----|-------------|

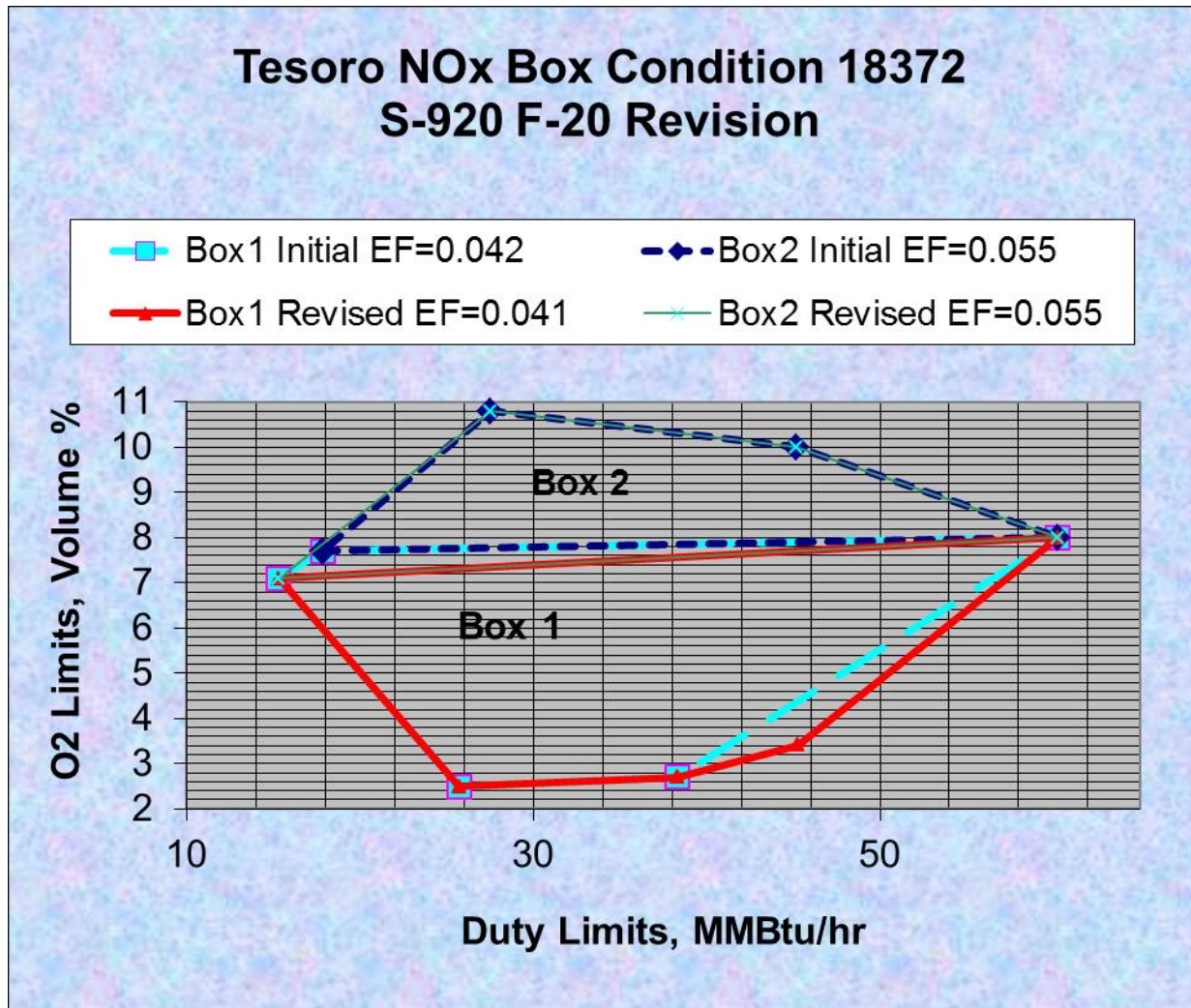
Tesoro is using two operating ranges as allowed by Condition 18372, Part 30.

The changes are supported by source tests reviewed by the Source Test Section.

This application is being processed as an administrative change in conditions since there is reduction to the specified NOx emission factor for this unit.

This is the third revision to the S-920 NOx Box, but the emission factor was not increased, so a CEM is not required. According to Engineering Policy approved 4/11/03 and included in Appendix B of the December 2003 Title V Statement of Basis, a CEM is only required if two source tests in a 5-year period exceed the NOx emission factor.

The following diagram summarizes the changes to the S-920 NOx Box:



## **EMISSIONS SUMMARY**

There are no changes in emissions due to this application. The emission factors are unchanged by this application and there will be no impact on the overall facility limit of 0.033 lb/MMBtu required by Regulation 9-10-301.

## **PLANT CUMULATIVE INCREASE**

There are no net changes to the plant cumulative emissions.

## **TOXIC RISK SCREEN**

This proposed NO<sub>x</sub> Box change would not emit toxic compounds in amounts different than previously emitted. Therefore, a toxic risk screen is not required.

## **BEST AVAILABLE CONTROL TECHNOLOGY**

BACT is triggered for new or modified sources that emit criteria pollutants in excess of 10 lbs/day. However, Regulation 2-1-234 defines a modified source as one that results in an increase in daily or annual emissions of a regulated air pollutant. For this application, there is no change in emissions. Therefore, BACT does not apply.

## **PLANT LOCATION**

According to the SCHOOL program, the closest school is Las Juntas Elementary, which is almost two miles from the facility.

## **COMPLIANCE**

The change to the NO<sub>x</sub> Box will not change the compliance for Furnace S-920. Emissions from S-920 will continue to comply with all applicable regulations, including Regulation 6, Rule 1 and Regulation 9, Rule 10.

The closest school is over a mile from the facility, so the Public Notice requirements of Regulation 2-1-214 do not apply.

Toxics, CEQA, NESHAPS, BACT, Offsets and NSPS do not apply.

## **CONDITIONS**

The NOx Box Condition 18372, will be modified as shown below. Only the substantive changes for the S-920 NOx Box points detailed in Part 31A are shown. All of the other parts of Condition 18372 remain unchanged by this application.

Condition 18372

31. Except as provided in part 31B & C, the owner/operator shall operate each source within the NOx Box ranges listed below at all times of operation. This part shall not apply to any source that has a properly operated and properly installed NOx CEM. (Regulation 9-10-502)

A. NOx Box ranges

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr)          | Max O2 at Low Firing (O2% , MMBtu/hr)          | Min O2 at High Firing (O2% , MMBtu/hr) | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr) |
|------------|----------------------------|--|--|--|--|--|
| 920        | 0.04 <del>12</del>         | 2.5, 25.72                                     | <del>7.1, 15.34</del><br><del>7.7, 17.86</del> | 2.7, 38.29                             | <del>7.1, 15.34</del><br><del>3.41, 45.25</del>      | 8.0, 60.26                             |
|            | 0.055                      | <del>7.1, 15.34</del><br><del>7.7, 17.86</del> | 10.8, 27.53                                    | 8.0, 60.26                             | N/A  | 10.0, 45.15                            |

The limits listed above are based on a calendar day averaging period for both firing rate and O2%.

**RECOMMENDATION**

It is recommended that a Change of Conditions to the Permit to Operate be granted to Tesoro for:

**S-920 F-20 No. 2 HDS Charge Heater**

\_\_\_\_\_  
Arthur P. Valla  
Senior Air Quality Engineer

\_\_\_\_\_  
Date  
June 20, 2011

**Application 23341, S-1001 50 Crude Unit AGO Project**  
**ENGINEERING EVALUATION**  
**Tesoro Refining and Marketing Company**  
**PLANT NO. 14628**  
**APPLICATION NO. 23341**

**BACKGROUND**

The Tesoro Refining and Marketing Company (Tesoro) is applying for an Authority to Construct and/or Permit to Operate for the 50 Crude Unit AGO Project, including the following equipment:

**S-621 Atmospheric Gas Oil Storage Tank 3360k gallons (exempt)**

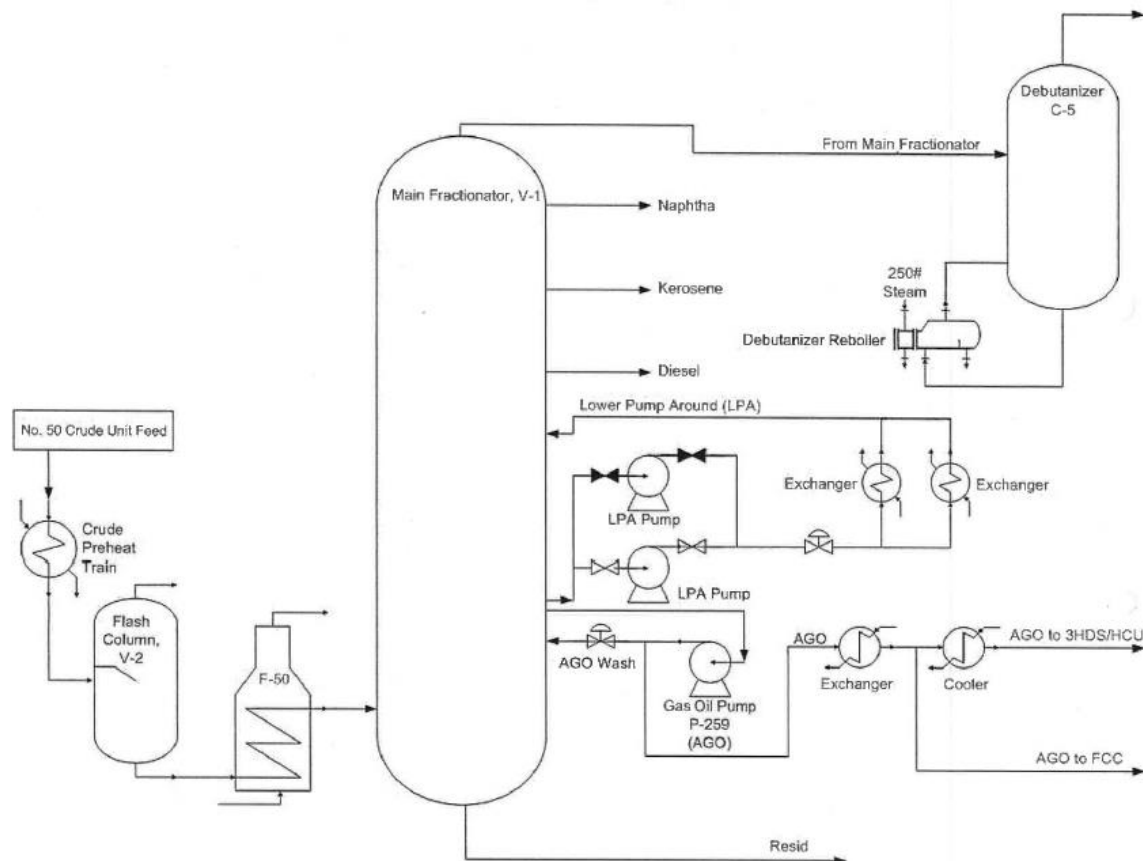
**S-1001 No 50 Crude Unit**

**S-1024 Atmospheric Gas Oil Storage Tank 3360k gallons (exempt)**

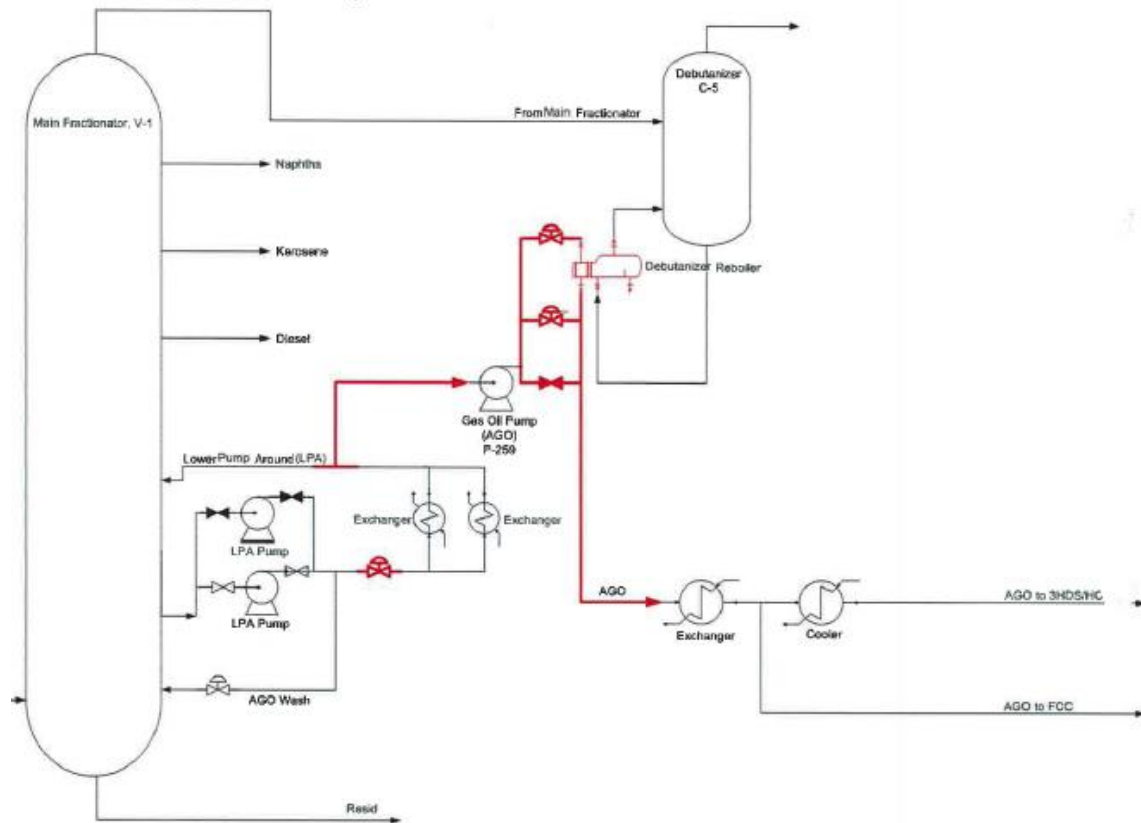
The initial application included a modification to S621 and S1024 to permit the storage of heavy distillate material. However, PAH emissions were not able to be quantified so the heavy distillate material was withdrawn from the application and S621 and S1024 retain the Regulation 2-1-123.3.2 exempt status storing gas oil.

The physical change proposed by this application is to replace the steam heat medium in the debutanizer reboiler with a gas oil stream from the crude distillation tower.

Before project:



After project:



This change causes a revision to the refinery heat and material balance, resulting in a potential to debottleneck the following sources:

**S-802 FCCU**

**S-815 No. 1 Feed Prep Unit**

**S-817 No. 3 Crude Unit**

**S-850 No 3 HDS Unit**

**S-901 FCCU CO Boiler**

**S-904 No. 6 Boiler**

**S-909 No. 1 Feed Prep Heater (F9)**

**S-912 No. 1 Feed Prep Heater (F12)**

**S-920 No. 2 HDS Charge Heater (F20)**

**S-950 No. 50 Unit Crude Feed Heater (F50)**

**S-1003 No 2 HDS Unit**

S-802 has emission limits in Condition 11433 and there are no proposed changes to these emission limits in this application. No further evaluation for this source was completed for this application.

S-815 emissions are fugitive and are not throughput dependent (combustion emissions from unit furnaces are evaluated at other sources). No further evaluation for this source was completed for this application.

S817, S850 and S1003 have throughput limits in Conditions 17837, 8077 and 8350, respectively, and there are no proposed changes to these throughput limits. No further evaluation for these sources was completed for this application.

The steam savings at the debutanizer reboiler will be realized at S901 and/or S904 boilers. However, no credits for a reduction to the firing rates were proposed, so no evaluation of S901 and S904 was completed for this application.

Therefore, the sources evaluated in this application are as follows:

**S-909 No. 1 Feed Prep Heater (F9)**

**S-912 No. 1 Feed Prep Heater (F12)**

**S-920 No. 2 HDS Charge Heater (F20)**

**S-950 No. 50 Unit Crude Feed Heater (F50)**

**S-1001 No 50 Crude Unit**

Since S909, S912, S920, S950 and S1001 have never been issued an Authority to Construct (aka Grandfathered sources), Section 2-1-234.3 is the regulation to use to determine if these sources are modified:

- 2-1-234 Modified Source:** Any existing source that undergoes a physical change, change in method of operation, increase in throughput or production, or addition and that results or may result in any of the following:
- 234.1 An increase in either the daily or annual emission level of any regulated air pollutant, or an increase in the production rate or capacity that is used to estimate the emission level, that exceeds emission or production levels approved by the District in any authority to construct.
  - 234.2 An increase in either the daily or annual emission level of any regulated air pollutant, or the production rate or capacity that is used to estimate the emission level, above levels contained in a permit condition in any current permit to operate or major facility review permit.
  - 234.3 For sources that have never been issued a District authority to construct and that do not have conditions limiting daily or annual emissions, an increase in either daily or annual emission level of any regulated air pollutant, or the production rate or capacity that is used to estimate the emission level, above the lower of the following:
    - 3.1 The highest of the following:
      - 3.1.1 The highest attainable design capacity, as shown in pre-construction design drawings, including process design drawings and vendor specifications.
      - 3.1.2 The capacity listed in the District permit to operate.
      - 3.1.3 The highest documented actual levels attained by the source prior to March 1, 2000.
    - 3.2 The capacity of the source, as limited by the capacity of any upstream or downstream process that acts as a bottleneck (a grandfathered source with an emission increase due to debottlenecking is considered to be modified).
- For the purposes of applying Section 234.3, only increases in annual emission levels shall be considered for storage vessels.



234.4 The emission of any regulated air pollutant or toxic air contaminant not previously emitted in a quantity that would result in a cancer risk (as defined in Regulation 2-5-206) greater than 1.0 in a million (10<sup>-6</sup>) or a chronic hazard index (as defined in Regulation 2-5-208) greater than 0.20.

For the purposes of applying this definition, an hourly limit or capacity may be converted to a daily limit or capacity by multiplication by 24 hours/day; a daily capacity may be converted to an annual capacity or limit by multiplication by 365 days/year.

In order to determine if S909, S912, S920, S950 and S1001 have been modified, the two capacities of Regulation 2-1-234.3 should be determined.

The first source capacity is the 2-1-234.3.1 capacity, which is the highest of the highest attainable design capacity, a capacity in the Permit to Operate, or the highest documented rate prior to March 1, 2000. The 2-1-234.3.1 capacities are as follows:

| Source                  | S1001                   | S909                               | S912                                | S920                                 | S950                              |
|-------------------------|-------------------------|------------------------------------|-------------------------------------|--------------------------------------|-----------------------------------|
| <b>Description</b>      | <b>No 50 Crude Unit</b> | <b>No. 1 Feed Prep Heater (F9)</b> | <b>No. 1 Feed Prep Heater (F12)</b> | <b>No. 2 HDS Charge Heater (F20)</b> | <b>50 Unit Crude Heater (F50)</b> |
| Initial Date of Service | 1947                    | 1944                               | 1953                                | 1956                                 | 1946                              |
| 2-1-234.3.1 Capacity *  | 120M BPD                | 145MM Btu/hr                       | 135MM Btu/hr                        | 63MM Btu/hr                          | 440MM Btu/hr                      |
|                         |                         | 3,840MM BTU/day                    | 3,240MM BTU/day                     | 1,512MM BTU/day                      | 10,560MM BTU/day                  |
| Annual Capacity         | 40,880 BPY              | 1,270,200 MM Btu/yr                | 1,182,600 MM Btu/yr                 | 551,880 MM Btu/yr                    | 3,854,400 MM Btu/yr               |

\* Hourly firing rates for the furnaces are from Permit Condition 16685 which was established for billing purposes.

The limits for S-1001 are consistent with the grandfathered source capacity determination conducted by former refinery owner Ultramar and no change to these limits will be imposed by this application.

The second source capacity is the 2-1-234.3.2 capacity, the capacity limited by upstream or downstream processes that act as a bottleneck. In order to address the 2-1-234.3.2 capacity, a comprehensive refinery evaluation is required to identify process bottlenecks that limit the capacity of individual sources. This evaluation is resource intensive, both at the refinery, where the evaluation is developed and analyzed, and at the District, where the evaluation needs to be reviewed, understood, and approved. Instead of performing this comprehensive evaluation, an alternative is allowed that uses the peak historical documented throughput for the source. The rationale for this alternative is that sometime during the 50+ year operation of a source, the peak capacity as limited by upstream or downstream processes has been achieved. Tesoro provided the peak historical hourly and daily throughput/firing rate for these sources. Pursuant to the last sentence of Regulation 2-1-234, the peak daily 2-1-234.3.2 capacity will be the historical hourly throughput multiplied by 24 and the peak annual 2-1-234.3.2 capacity will be the historical daily throughput multiplied by 365. The 2-1-234.3.2 capacities are as follows:

| Source | S909 | S912 | S920 | S950 |
|--------|------|------|------|------|
|--------|------|------|------|------|

| Description                         | No. 1 Feed Prep Heater (F9) | No. 1 Feed Prep Heater (F12) | No. 2 HDS Charge Heater (F20) | 50 Unit Crude Heater (F50) |
|-------------------------------------|-----------------------------|------------------------------|-------------------------------|----------------------------|
| Peak hourly MMBTU/hr                | 132                         | 142                          | 61                            | 410                        |
| Date of peak                        | 9/4/93                      | 12/10/93                     | 8/6/08                        | 7/5/08                     |
| Daily Limit MMBTU/day (hourly * 24) | 3,162                       | 3,408                        | 1,464                         | 9,840                      |
| Peak daily MMBTU/day                | 2,840                       | 3,189                        | 1,408                         | 9,363                      |
| Date of peak                        | 5/29/93                     | 5/6/04                       | 8/6/08                        | 7/5/08                     |
| Daily Limit MMBTU/yr (daily * 365)  | 1,036,600                   | 1,162,608                    | 513,920                       | 3,417,495                  |

The Regulation 2-1-234.3 capacity is the lower of the 2-1-234.3.1 and the 2-1-234.3.2 capacity. The following table shows the selection of the lowest capacity.

| Source                     | S909                        | S912                         | S920                          | S950                       |
|----------------------------|-----------------------------|------------------------------|-------------------------------|----------------------------|
| Description                | No. 1 Feed Prep Heater (F9) | No. 1 Feed Prep Heater (F12) | No. 2 HDS Charge Heater (F20) | 50 Unit Crude Heater (F50) |
| 2-1-234.3.1 MMBTU/day      | 3,840                       | <b>3,240</b>                 | 1,512                         | 10,560                     |
| 2-1-234.3.1 MMBTU/yr       | 1,270,200                   | 1,182,600                    | 551,880                       | 3,854,400                  |
| 2-1-234.3.2 MMBTU/day      | <b>3,162</b>                | 3,408                        | <b>1,464</b>                  | <b>9,840</b>               |
| 2-1-234.3.2 MMBTU/yr       | <b>1,036,600</b>            | <b>1,162,608</b>             | <b>513,920</b>                | <b>3,417,495</b>           |
| <b>2-1-234.3 MMBTU/day</b> | <b>3,162</b>                | <b>3,240</b>                 | <b>1,464</b>                  | <b>9,840</b>               |
| <b>2-1-234.3 MMBTU/yr</b>  | <b>1,036,600</b>            | <b>1,162,608</b>             | <b>513,920</b>                | <b>3,417,495</b>           |

Permit conditions will be imposed to assure S909, S912, S920 and S950 are altered by this application, pursuant to Regulation 2-1-233:

**2-1-233 Alter:** To make any physical change to, or change in the method of operation of, a source which may affect emissions. Such changes require a permit to operate, and may require permit conditions, whether or not the alteration results in an emission increase. A change in process stream composition is not an alteration if the source's description in the permit and permit conditions allow for the change in process stream composition, and the change does not increase emissions beyond permitted

levels. The following activities are specifically identified as “alterations.”

- 233.1 Replacement of burners with non-identical burners.
- 233.2 Maintenance of glass furnaces involving component replacement, unless all replacements are with identical components.
- 233.3 Expansion of the physical boundaries of a semiconductor fabrication area.

It will be clearly stated that these firing limits are enforceable not-to-exceed limits, but are not considered enforceable New Source Review emissions limits. None of the emissions from S909, S912, S920 and S950 have been subjected to Regulation 2, Rule 2, so S909, S912, S920 and S950 remain grandfathered sources never modified, never subject to BACT, nor have any of the S909, S912, S920 and S950 emissions been Offset.

### EMISSION CALCULATIONS

Since S909, S912, S920, S950 and S1001 are not modified pursuant to Regulation 2-1-234.3, this project is an alteration. Therefore, there are no emission increases associated with this application.

### PSD

Emission calculations required to determine the applicability of PSD are required. The following information was provided by Tesoro.

| Source                                       | S909                               | S912                                | S920                                 | S950                              |
|--|------------------------------------|-------------------------------------|--------------------------------------|-----------------------------------|
| <b>Description</b>                           | <b>No. 1 Feed Prep Heater (F9)</b> | <b>No. 1 Feed Prep Heater (F12)</b> | <b>No. 2 HDS Charge Heater (F20)</b> | <b>50 Unit Crude Heater (F50)</b> |
| Baseline Actual Firing Rate (9/1/02-8/30/04) | 591,429 MMBTU/yr                   | 795,455 MMBTU/yr                    | 312,322 MMBTU/yr                     | 2,696,808 MMBTU/yr                |
| Projected Actual Firing Rate                 | 580,788 MMBTU/yr                   | 762,996 MMBTU/yr                    | 394,200 MMBTU/yr                     | 2,608,991 MMBTU/yr                |
| PAE-BAE                                      | -10,641                            | -32,459                             | 81,878                               | -87,817                           |

Based on these firing rates PSD is not triggered. However, the PSD delegation agreement with EPA only allows the District to address PSD applicability using methods prior to NSR reform. The following table shows the information applicable to a pre-NSR reform PSD analysis.

| Source                                       | S909                               | S912                                | S920                                 | S950                              |
|--|------------------------------------|-------------------------------------|--------------------------------------|-----------------------------------|
| <b>Description</b>                           | <b>No. 1 Feed Prep Heater (F9)</b> | <b>No. 1 Feed Prep Heater (F12)</b> | <b>No. 2 HDS Charge Heater (F20)</b> | <b>50 Unit Crude Heater (F50)</b> |
| Baseline Actual Firing Rate (9/1/02-8/30/04) | 591,429 MMBTU/yr                   | 795,455 MMBTU/yr                    | 312,322 MMBTU/yr                     | 2,696,808 MMBTU/yr                |
| PTE Firing Rate                              | 1,036,600 MMBTU/yr                 | 1,162,608 MMBTU/yr                  | 513,920 MMBTU/yr                     | 3,417,495 MMBTU/yr                |
| PTE-BAE                                      | 445,171 MMBTU/yr                   | 367,153 MMBTU/yr                    | 201,598 MMBTU/yr                     | 720,695 MMBTU/yr                  |

Based on these firing rates, the pre-NSR reform evaluation shows PSD is triggered for NOx, CO and Greenhouse Gases (detailed calculations are in the application file folder). However, Tesoro chooses to evaluate PSD as allowed under NSR reform. Therefore, the authority for evaluating the PSD determination lies with EPA and not under this application. EPA was sent a courtesy notification about Tesoro's NSR reform method November 15, 2011.

## STATEMENT OF COMPLIANCE

This application does not change the compliance of S909, S912, S920, S950 and S1001. S909, S912, S920, S950 and S1001 are expected to remain in compliance with the following:

Regulation 6, Rule 1 Particulate Matter General Requirements.

Regulation 9 Rule 10 Nitrogen Oxides and Carbon Monoxide from Boilers, Steam Generators, and Process Heaters in Petroleum Refineries.

NSPS Subpart J as described in the Consent Decree.

The project is considered to be ministerial under the District's CEQA regulation 2-1-311 and therefore is not subject to CEQA review.

The project is over 1000 feet from the nearest school and therefore not subject to the public notification requirements of Reg. 2-1-412.

The project may trigger PSD but Tesoro's selection of the 'NSR Reform' method of evaluation eliminates the PSD determination from District authority and from this application.

BACT, Offsets, Toxics, and NESHAPS do not apply.

## PERMIT CONDITIONS

The following permit conditions will be imposed by this application:

Tesoro 50 Crude Unit AGO Project  
Application 23341 (January 2012)

1. The owner/operator shall operate the following sources only if firing rates do not exceed the following limits in any consecutive 365 calendar days:

|       |                  |
|-------|------------------|
| S-909 | 1,036,600 MM Btu |
| S-912 | 1,162,608 MM Btu |
| S-920 | 513,920 MM Btu   |
| S-950 | 3,417,495 MM Btu |

These firing limits are enforceable not-to-exceed limits but are not considered enforceable New Source Review emissions limits since these sources were not subject to Regulation 2, Rule 2 when this condition was created. If any source above was subject to Regulation 2, Rule 2, the firing rate, emissions limits and other associated requirements will be contained in a separate enforceable permit condition. (Basis: Regulations 2-1-233 and 2-1-403, Application No. 23341)

2. The owner/operator shall notify the District if in any calendar day, the following firing rates are exceeded:

|       |              |
|-------|--------------|
| S-909 | 3,168 MM Btu |
| S-912 | 3,240 MM Btu |
| S-920 | 1,464 MM Btu |

Permit Evaluation and Statement of Basis: Site B2758 & B2759, Tesoro Refining & Marketing Company, LLC, Golden Eagle Refinery, 150 Solano Way, Martinez, CA 94553

S-950 9,840 MM Btu

Notifications shall be made in writing to the address below within 96 hours of the occurrence and shall make reference to this condition.

Manager, Permit Evaluation Section  
Bay Area Air Quality Management District  
939 Ellis Street  
San Francisco, CA 94109

(Basis: Regulations 2-1-233 and 2-1-403, Application No. 23341)

3. All firing rate records for the sources subject to this condition shall be retained for at least five years from the date of entry, and shall be made available to the District upon request.

(Basis: Regulation 2-6-501)

## RECOMMENDATION

It is recommended that an Authority to Construct be granted to Tesoro Refining and Marketing Company for the following sources:

**S-909 No. 1 Feed Prep Heater (F9)**

**S-912 No. 1 Feed Prep Heater (F12)**

**S-920 No. 2 HDS Charge Heater (F20)**

**S-950 No. 50 Unit Crude Feed Heater (F50)**

**S-1001 No 50 Crude Unit**

By: \_\_\_\_\_

Arthur P Valla  
Senior Air Quality Engineer  
January 30, 2012

**Application 23848, Title V Renewal Appeal Items -- Engines**

**ENGINEERING EVALUATION  
Tesoro Refining and Marketing Company  
PLANT NO. 14628  
APPLICATION NO. 23848**

**BACKGROUND**

As part of the Title V Renewal Permit 2011 Appeal efforts, Tesoro Refining and Marketing Company is submitting several applications to address the Appeal items. This is one of those applications, an administrative change in conditions, to address the issues with the refinery engines, including the following sources:

|              |   |
|--------------|---|
| <b>S-952</b> | <b>No. 1 Gas Plant Compressor 4023 Engine, 300 BHP, Natural Gas Fired</b> |
| <b>S-953</b> | <b>No. 1 Gas Plant Compressor 4024 Engine, 300 BHP, Natural Gas Fired</b> |
| <b>S-954</b> | <b>No. 1 Gas Plant Compressor 4025 Engine, 300 BHP, Natural Gas Fired</b> |
| <b>S-955</b> | <b>No. 4 Gas Plant Compressor 4064 Engine, 880 BHP, Natural Gas Fired</b> |
| <b>S-956</b> | <b>No. 4 Gas Plant Compressor 4065 Engine, 880 BHP, Natural Gas Fired</b> |
| <b>S-957</b> | <b>No. 4 Gas Plant Compressor 4066 Engine, 880 BHP, Natural Gas Fired</b> |
| <b>S-958</b> | <b>No. 4 Gas Plant Compressor 4067 Engine, 880 BHP, Natural Gas Fired</b> |
| <b>S-959</b> | <b>No. 4 Gas Plant Compressor 4068 Engine, 880 BHP, Natural Gas Fired</b> |
| <b>S-960</b> | <b>No. 4 Gas Plant Compressor 4096 Engine, 660 BHP, Natural Gas Fired</b> |

In addition, the following existing abatement devices were permitted via 1996 Application 15392, but are omitted from the Tesoro Permit to Operate:

|              |   |
|--------------|---|
| <b>A-955</b> | <b>SCR for No. 4 Gas Plant Compressor 4064 Engine</b> |
| <b>A-956</b> | <b>SCR for No. 4 Gas Plant Compressor 4065 Engine</b> |
| <b>A-957</b> | <b>SCR for No. 4 Gas Plant Compressor 4066 Engine</b> |
| <b>A-958</b> | <b>SCR for No. 4 Gas Plant Compressor 4067 Engine</b> |
| <b>A-959</b> | <b>SCR for No. 4 Gas Plant Compressor 4068 Engine</b> |
| <b>A-960</b> | <b>SCR for No. 4 Gas Plant Compressor 4096 Engine</b> |

The original application also included an administrative change in conditions to the following sources:

|               |   |
|---------------|---|
| <b>S-56</b>   | <b>Amorco On-shore Diesel Fire-Water Pump, 660 BHP</b>                    |
| <b>S-57</b>   | <b>Amorco Off-shore/Wharf Diesel Fire-Water Pump, 700 BHP</b>             |
| <b>S-1469</b> | <b>Avon Wharf Fire Water Pump Engine; Diesel Fired, 400 BHP</b>           |
| <b>S-1471</b> | <b>Landsend Fire Water Pump Engine; Diesel Fired, 130 BHP</b>             |
| <b>S-1472</b> | <b>Tract 4 North Fire Water Pump Engine; Diesel Fired, 430 BHP</b>        |
| <b>S-1475</b> | <b>Trailer 1 Fire Water Pump Engine; Diesel Fired; Portable, 503 BHP</b>  |
| <b>S-1476</b> | <b>Trailer 4 Fire Water Pump Engine; Diesel Fired; Portable, 503 BHP</b>  |
| <b>S-1487</b> | <b>Tank 38 Fire-Water Pump Engine, Diesel Fired, 420 BHP</b>              |
| <b>S-1488</b> | <b>Canal Fire-Water Pump Engine, Diesel Fired, 538 BHP</b>                |
| <b>S-1518</b> | <b>North Reservoir West Fire Water Pump Engine, Diesel Fired, 360 BHP</b> |
| <b>S-1519</b> | <b>North Reservoir East Fire Water Pump Engine, Diesel Fired, 360 BHP</b> |

The specific appeal items initially covered by this application are #5, #6 and #7, and are shown at the end of this evaluation.

In the 4/26/12 letter from Tesoro regarding this application, all proposed revisions in this application regarding the sources other than the gas plant engines (i.e. all the sources in the second list above) were removed, both from the Title V Appeal and from this application. Therefore, only Appeal Item # 5 is addressed in this application and Appeal Items # 6 and # 7 have been removed from this application.

For the No. 1 Gas Plant engines, S-952, S-953 and S-954, the proposed revisions are administrative to show the NSCR abatement devices and to indicate that these devices abate CO emissions. The existing information in the Renewed Title V Permit treats the NSCR as only a NOx abatement device.

For the No. 4 Gas Plant engines, S-955, S-956, S-957, S-958, S-959 and S-960, the proposed revisions are administrative to correct capacities of S-956 and S-958 from the Model RA rating of 800 BHP to the Model HRA rating of 880 BHP. A review of the sources found that the original 1977 data forms for S-956, S-957, S-958 and S-959 specified these engines as Model RA8 engines. Furthermore, the District database did not show any of the No. 4 Gas Plant engines as abated. Therefore, this application resulted in a District database correction plus two issues that merited addressing:

1. Were any of the engines modified to the Model HRA8?
2. Is 40 CFR 64, Compliance Assurance Monitoring (CAM) applicable?

## EMISSIONS SUMMARY

There are no increases in emissions associated with this administrative change in condition application.

The No 4 Gas Plant engines were altered to add abatement via 1995 Application 15392. In this application the engines were specified to have a maximum firing rate of 7.1MMBtu/hr (5.3MM for S-960). NOx emission factors from AP-42, Table 3-2.1, is 3.17 lb/MMBtu for operation between 90% and 105% of load. The following table summarizes the NOx emissions from these engines:

| <i>Engine</i> | <i>MMBtu/hr</i> | <i>NOx<br/>lb/MM</i> | <i>Unabated NOx Emissions</i> |               |                |               | <i>Abatemt<br/>Factor*</i> | <i>Abated<br/>Ton/yr</i> |
|---------------|-----------------|----------------------|-------------------------------|---------------|----------------|---------------|----------------------------|--------------------------|
|               |                 |                      | <i>Lb/hr</i>                  | <i>Lb/day</i> | <i>Lb/yr</i>   | <i>Ton/yr</i> |                            |                          |
| <i>S-955</i>  | <i>7.1</i>      | <i>3.17</i>          | <i>22.5</i>                   | <i>540</i>    | <i>197,161</i> | <i>98.6</i>   | <i>80%</i>                 | <i>19.7</i>              |
| <i>S-956</i>  | <i>7.1</i>      | <i>3.17</i>          | <i>22.5</i>                   | <i>540</i>    | <i>197,161</i> | <i>98.6</i>   | <i>80%</i>                 | <i>19.7</i>              |
| <i>S-957</i>  | <i>7.1</i>      | <i>3.17</i>          | <i>22.5</i>                   | <i>540</i>    | <i>197,161</i> | <i>98.6</i>   | <i>80%</i>                 | <i>19.7</i>              |
| <i>S-958</i>  | <i>7.1</i>      | <i>3.17</i>          | <i>22.5</i>                   | <i>540</i>    | <i>197,161</i> | <i>98.6</i>   | <i>80%</i>                 | <i>19.7</i>              |
| <i>S-959</i>  | <i>7.1</i>      | <i>3.17</i>          | <i>22.5</i>                   | <i>540</i>    | <i>197,161</i> | <i>98.6</i>   | <i>80%</i>                 | <i>19.7</i>              |
| <i>S-960</i>  | <i>5.3</i>      | <i>3.17</i>          | <i>16.8</i>                   | <i>403</i>    | <i>147,177</i> | <i>73.6</i>   | <i>80%</i>                 | <i>14.7</i>              |

\* Abatement factor from Tesoro Data Form ICE dated 5/15/12.

*Similarly, emissions for the No 1 Gas Plant engines are shown below (based on emission factors for 4-stroke Rich Burn engines from AP-42 Table 3.2-3:*

| <i>Engine</i> | <i>MMBtu/hr</i> | <i>NOx<br/>lb/MM</i> | <i>Unabated NOx Emissions</i> |               |               |               | <i>Abatemt<br/>Factor*</i> | <i>Abated<br/>Ton/yr</i> |
|---------------|-----------------|----------------------|-------------------------------|---------------|---------------|---------------|----------------------------|--------------------------|
|               |                 |                      | <i>Lb/hr</i>                  | <i>Lb/day</i> | <i>Lb/yr</i>  | <i>Ton/yr</i> |                            |                          |
| <i>S-952</i>  | <i>3.0</i>      | <i>2.21</i>          | <i>6.63</i>                   | <i>159</i>    | <i>58,078</i> | <i>29.0</i>   | <i>95%</i>                 | <i>1.45</i>              |
| <i>S-953</i>  | <i>3.0</i>      | <i>2.21</i>          | <i>6.63</i>                   | <i>159</i>    | <i>58,078</i> | <i>29.0</i>   | <i>95%</i>                 | <i>1.45</i>              |
| <i>S-954</i>  | <i>3.0</i>      | <i>2.21</i>          | <i>6.63</i>                   | <i>159</i>    | <i>58,078</i> | <i>29.0</i>   | <i>95%</i>                 | <i>1.45</i>              |
| <i>Engine</i> | <i>MMBtu/hr</i> | <i>CO<br/>lb/MM</i>  | <i>Unabated CO Emissions</i>  |               |               |               | <i>Abatemt<br/>Factor*</i> | <i>Abated<br/>Ton/yr</i> |
|               |                 |                      | <i>Lb/hr</i>                  | <i>Lb/day</i> | <i>Lb/yr</i>  | <i>Ton/yr</i> |                            |                          |
| <i>S-952</i>  | <i>3.0</i>      | <i>3.72</i>          | <i>11.16</i>                  | <i>268</i>    | <i>97,762</i> | <i>48.9</i>   | <i>95%</i>                 | <i>2.4</i>               |
| <i>S-953</i>  | <i>3.0</i>      | <i>3.72</i>          | <i>11.16</i>                  | <i>268</i>    | <i>97,762</i> | <i>48.9</i>   | <i>95%</i>                 | <i>2.4</i>               |
| <i>S-954</i>  | <i>3.0</i>      | <i>3.72</i>          | <i>11.16</i>                  | <i>268</i>    | <i>97,762</i> | <i>48.9</i>   | <i>95%</i>                 | <i>2.4</i>               |

\* *Abatement factor from Databank.*

## STATEMENT OF COMPLIANCE

This application does not change the compliance of these engines. These engines are subject to, and are expected to remain in compliance with, the following:

Regulation 6, Rule 1, Particulate Matter; General Requirements  
 Regulation 9, Rule 8, Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines

Regulation 2, Rule 1, General Requirements.  
 Regulation 2, Rule 2, New Source Review

These sources in compliance with the permitting requirements of Regulation 2, Rule 1, and not subject to the New Source Review requirements of Regulation 2, Rule 2, as explained in the following paragraph.

All of the No 1 Gas Plant engines are grandfathered sources that were altered to add NSCR abatement via 1996 Application 16779. These engines satisfied the permitting requirements of Regulation 2, Rule 1 when altered in 1996, but because emissions were not increased, these engines were not subject to the New Source Review requirements of Regulation 2, Rule 2.

All of the No 4 Gas Plant engines were purchased and operated as Clark Model RA8 engines in 1945 (except S-960, which was a RA6). These engines have a rating of 100HP per cylinder or a total rating of 800HP. In 1949, Clark completed design improvements and introduced the Model HRA8 which has a rating of 110HP/cylinder, or 880HP. Some of these engines were upgraded to the Model HRA8 engines as indicated on the original Lion Oil data forms completed in 1977. Tesoro can find no records of any engine being upgraded since 1972. Therefore, it is likely that all engines were upgraded to the HRA8 models, if not in 1949 when Clark introduced the upgrade, then sometime in the 1950s or 1960s. In any case, the upgrades did not occur after 1972 when such an upgrade would have been a source modification subject to New Source Review. The engines were altered to add SCR via 1996 Application 15392. These engines satisfied the permitting requirements of



Regulation 2, Rule 1 when altered in 1996, but because emissions were not increased, these engines were not subject to the New Source Review requirements of Regulation 2, Rule 2.

40 CFR 64, Compliance Assurance Monitoring (CAM). CAM applies to any source that meets all of the following criteria:

1. Subject to a federally enforceable pollutant specific limit.
2. The pollutant subject to the limit in #1 is treated with a control device.
3. The pollutant subject to the limit in #1 has a pre-control PTE greater than the major source threshold for the pollutant.

These No 4 Gas Plant engines are subject to the SIP 9-8-301.2 NOx limit (140 ppmv, dry at 15% oxygen) and NOx emissions are controlled with an SCR control device. However, as can be seen in the NOx emissions summary table on the previous page, pre-control NOx emissions are 98.5 ton/yr, less than the 100 ton/yr major source threshold. Therefore, CAM 40 CFR 64 does not apply.

Similarly, for the No 1 Gas Plant engines, pre-control NOx and CO emissions are below the major source thresholds. Therefore, CAM 40 CFR 64 does not apply.

## PERMIT CONDITIONS

Permit conditions 13509 and 15204 will be revised as follows:

Condition 13509

~~Administratively changed by Application 19419 (June 2009). Updated to remove the completed source test Part 4 and parts redundant with District regulations.~~

S955 ~~IC~~Internal Combustion Engine, Compressor 4064, Abated by A955 SCR  
S956 ~~IC~~Internal Combustion Engine, Compressor 4065, Abated by A956 SCR  
S957 ~~IC~~Internal Combustion Engine, Compressor 4066, Abated by A957 SCR  
S958 ~~IC~~Internal Combustion Engine, Compressor 4067, Abated by A958 SCR  
S959 ~~IC~~Internal Combustion Engine, Compressor 4068, Abated by A959 SCR  
S960 ~~IC~~Internal Combustion Engine, Compressor 4096, Abated by A960 SCR

THE FOLLOWING CONDITIONS ARE EFFECTIVE JANUARY 1, 1997 ON SOURCES S-955, S-956, S-957, S-958, S-959 AND S-960,

APPLICATION #15392 (1996): ADD SCRs FOR NOX CONTROL

ADMINISTRATIVELY CHANGED BY APPLICATION 19419 (JUNE 2009): REMOVED REDUNDANT PARTS 2 & 3 AND COMPLETED PART 4.

ADMINISTRATIVELY CHANGED BY APPLICATION 23848 (JUNE 2012): UPDATED TO SHOW SOURCES ABATED BY SCRs (TESORO 2011 TV APPEAL ITEM 5).

1. This engine shall be fired exclusively on natural gas. (basis: toxics)
2. Deleted (basis: NOx emissions limit Redundant with Regulation 9-8-301.2)
3. Deleted (basis: CO emissions limit Redundant with Regulation 9-8-301.2)
4. Deleted (basis: Initial Source Test completed prior to the granting of the permit to operate August 1, 1996)

Condition 15204

S-952 IC Engine, Compressor 4023, Abated by A-952 NSCR  
S-953 IC Engine, Compressor 4024, Abated by A-953 NSCR  
S-954 IC Engine, Compressor 4025, Abated by A-954 NSCR

~~Administratively changed by Application 19419 (June 2009). Updated to remove parts redundant with District regulations.~~

THE FOLLOWING CONDITIONS FOR THE NO. 1 GAS PLANT COMPRESSOR ENGINES ARE EFFECTIVE JANUARY 1, 1997

APPLICATION 16779 (1996): ADD NSCRs FOR NOX CONTROL

Administratively changed by Application 19419 (June 2009). Updated to remove parts 2, 3 and 4 that are redundant with District regulations.

Administratively changed by Application 23848 (June 2012): Updated to show sources abated by NSCRs (Tesoro 2011 TV Appeal Item 5).

1. Compressor engines S-952, S-953, and S-954 shall be fired exclusively on natural gas. (basis: cumulative increase)
2. Delete (basis: NOx emissions limit Redundant with Regulation 9-8-301.1)
3. Delete (basis: CO emissions limit Redundant with Regulation 9-8-301.3)
4. Delete (basis: Particulate emissions limit redundant with Regulation 6-1-301)

## RECOMMENDATION

It is recommended that an Administrative Change in Conditions be granted to Tesoro for the following sources:

|              |   |
|--------------|---|
| <b>S-952</b> | <b>No. 1 Gas Plant Compressor 4023 Engine, 300 BHP, Natural Gas Fired</b> |
| <b>S-953</b> | <b>No. 1 Gas Plant Compressor 4024 Engine, 300 BHP, Natural Gas Fired</b> |
| <b>S-954</b> | <b>No. 1 Gas Plant Compressor 4025 Engine, 300 BHP, Natural Gas Fired</b> |
| <b>S-955</b> | <b>No. 4 Gas Plant Compressor 4064 Engine, 880 BHP, Natural Gas Fired</b> |
| <b>S-956</b> | <b>No. 4 Gas Plant Compressor 4065 Engine, 880 BHP, Natural Gas Fired</b> |
| <b>S-957</b> | <b>No. 4 Gas Plant Compressor 4066 Engine, 880 BHP, Natural Gas Fired</b> |
| <b>S-958</b> | <b>No. 4 Gas Plant Compressor 4067 Engine, 880 BHP, Natural Gas Fired</b> |
| <b>S-959</b> | <b>No. 4 Gas Plant Compressor 4068 Engine, 880 BHP, Natural Gas Fired</b> |
| <b>S-960</b> | <b>No. 4 Gas Plant Compressor 4096 Engine, 660 BHP, Natural Gas Fired</b> |

And that a Permit to Operate be granted for the following abatement devices:

|              |   |
|--------------|---|
| <b>A-955</b> | <b>SCR for No. 4 Gas Plant Compressor 4064 Engine</b> |
| <b>A-956</b> | <b>SCR for No. 4 Gas Plant Compressor 4065 Engine</b> |
| <b>A-957</b> | <b>SCR for No. 4 Gas Plant Compressor 4066 Engine</b> |
| <b>A-958</b> | <b>SCR for No. 4 Gas Plant Compressor 4067 Engine</b> |
| <b>A-959</b> | <b>SCR for No. 4 Gas Plant Compressor 4068 Engine</b> |
| <b>A-960</b> | <b>SCR for No. 4 Gas Plant Compressor 4096 Engine</b> |

By: \_\_\_\_\_  
Arthur Valla  
Senior Air Quality Engineer

\_\_\_\_\_  
June 1, 2012

Tesoro Renewed Title V Permit Appeal Items  
For Application 23848

## Tesoro Renewed Title V Permit Appeal Items For Application 23848

|          |                |  |  |
|----------|----------------|--|--|
| <b>5</b> |                | <b>S955<br/>S956<br/>S957<br/>S958<br/>S959<br/>S960</b> | <b>The information in the Capacity column for these sources is incorrect. S955 through S959 are each 880 BHP engines with design fuel consumption of 7110 scfh (natural gas). Assuming 1030 BTU/scf for natural gas, the design heat input is 8.322 BTU/HP-hr or 7.3 MMBTU /hr and 64,152 MMBTU /year. Similar values are calculated for S960, which is a 660 BHP engine, by applying a ratio of the engine BHP (660/880).</b>   |
| 5.1      | Table II-A.1   | S955<br>S956<br>S957<br>S958<br>S959                     | Correct Capacity column to read:<br>“17200 in <sup>3</sup> displacement<br>880 BHP<br>7.3 MMBTU/hr<br>64,152 MMBTU/yr”   |
| 5.2      | Table II-A.1   | S960   | Correct Capacity column to read:<br>“12900 in <sup>3</sup> displacement<br>660 BHP<br>5.5 MMBTU/hr<br>48,114 MMBTU/yr”   |
| <b>6</b> |                | <b>S1475<br/>S1476</b>                                   | <b>S1475 and S1476 are portable diesel fired emergency internal combustion engines (ICE). The regulatory applicability, permit conditions and allowable hours of operation shown for these sources in Section II and Table IV-C.3.4 are incorrect. These sources are subject to CARB ATCM 93116 which allows 50 hours per year for non-emergency operations. Permit applications (AN) 19419/19418 incorrectly deleted this limit from Condition 18947, Part 5 and changed applicability for these sources to treat them as in-use stationary emergency ICE subject to CARB ATCM 93115 and Condition 22851, which allow only 34 hours per year for non emergency operation.</b> |
| 6.1      | Table II-A.1   | S1475<br>S1476   | Change Capacity column to read:<br>“503HP, 50 hr/yr”<br>Change Grandfathered Limit or Firm Limit and Basis column to read:<br>“Firm Limit Condition # 18947, part 5<br>New Source Review”  |
| 6.2      | Table IV-C.3.4 | S1475<br>S1476   | Delete S1475 and S1476 from Title Block<br>Delete Condition 18947  |
| 6.3      | Section IV-C.3 | S1475<br>S1476   | Add new Table IV-C.3.7 for S1475 and S1476 with applicable requirements from Regulation 6, Rule 1; SIP Regulation 6; Regulation 9, Rule 1; CARB Portable Diesel Engine ATCM section 93116; and BAAQMD Condition 18947  |

| Tesoro Renewed Title V Permit Appeal Items<br>For Application 23848 |  |                        |   |
|---|--|------------------------|---|
| 6.4   | Section VI<br>Condition<br>18947<br>Part 5                                       | S1475<br>S1476         | Reinstate Part 5 to read: “The owner/operator of S-1475 and S-1476 shall not operate either engine for more than 50 hours during any consecutive 12-month period. [Cumulative Increase, BACT Toxic Risk Screen]”  |
| 6.5   | Section VI<br>Condition<br>22851<br>Introduction                                 | S1475<br>S1476         | Delete S1475, S1476   |
| 6.6   | Table VII-C.3.4  | S1475<br>S1476         | Delete S1475 and S1476 from Title Block<br>Delete monitoring requirements from section titled “S1475 and S1476”   |
| 6.7   | Section VII-C.3  | S1475<br>S1476         | Add new Table VII-C.3.7 for S1475 and S1476 with applicable monitoring requirements consistent with the applicable requirements in new Table IV-C.3.7   |
| 7   | <b>Table IV-C.3.4<br/>Table IV-C.3.5<br/>Table VII-C.3.4<br/>Table VII-C.3.5</b> | <b>S1487<br/>S1488</b> | <b>S1487 is a stationary diesel fired emergency internal combustion engine (ICE). It is incorrectly included in Tables IV-C.3.5 and VII-C.3.5 which include the requirements for new engines in CARB ATCM 93115. S1487 is subject to the requirements for an in-use engine in CARB ATCM 93115 and should be included in Tables IV-C.3.4 and VII-C.3.4. In addition, the monitoring requirements for S1488 in Table VII-C.3.5 need to be updated to correspond with current requirements for new engines in CARB ATCM 93115 and to correct monitoring requirements for Regulation 6 Rule 1 and SIP Regulation 6.</b> |
| 7.1   | Table IV-C.3.4   | S1487                  | Add “ <b>S1487 TANK 38 FIRE-WATER PUMP ENGINE; DIESEL FIRED</b> ” to title block<br>Add Condition 20672, parts A5, A6, and A8 for S1487 (move from Table IV-C.3.5)  |
| 7.2   | Table IV-C.3.5   | S1487                  | Delete S1487 from title block<br>Delete Condition 20672, parts A5, A6, and A8 for S1487 and remove explanation of applicability from Condition 20672 title block<br>Add “S1488” to Description for Condition 20672, parts B5, B6, B7, and B9  |
| 7.3   | Table VII-C.3.4  | S1487                  | Add “ <b>S1487 TANK 38 FIRE-WATER PUMP ENGINE; DIESEL FIRED</b> ” to title block<br>Add monitoring requirements for Condition 20672 for S1487 (move from Table VII-C.3.5)   |
| 7.4   | Table VII-C.3.5<br>Rows 1, 11, 15  | S1487                  | Delete each row and move to Table VII-C.3.4 for S1487<br>Row 1 [Type of Limit: CO (S1487)]<br>Row 11 [Type of Limit: NOx (S1487)]<br>Row 15 [Type of Limit: Sulfur Content (S1487)]   |
| 7.5   | Table VII-C.3.5<br>Rows 2, 12, 13  | S1488                  | Delete “(S1488)” from Type of Limit   |

| Tesoro Renewed Title V Permit Appeal Items<br>For Application 23848 |                                    |       |   |
|---|------------------------------------|-------|---|
| 7.6   | Table VII-C.3.5<br>Row 7           | S1488 | Delete "(S1487)" from Type of Limit<br>Add second Monitoring Requirement for this limit as follows:<br>Monitoring Requirement Citation: CCR, Title 17, Section 93115.10(e)(1)<br>Monitoring Frequency (P/C/N): C<br>Monitoring Type: Totalizing Meter                                 |
| 7.7   | Table VII-C.3.5<br>Rows 8, 9       | S1488 | Delete each row [Type of Limit: Hours of Operation PM (S1488)]  |
| 7.8   | Table VII-C.3.5<br>Rows 16, 17, 18 | S1488 | Delete each row (Regulation 6, Rule 1 and SIP Regulation 6 monitoring)  |
| 7.9   | Table VII-C.3.5<br>Row 19          | S1487 | Delete "(S1487)" from Type of Limit   |
| 7.10  | Table VII-C.3.5                    | S1488 | Add new row as follows:<br>Type of Limit: Visible Emissions<br>Citation of Limit: BAAQMD 6-1-303.1<br>FE Y/N: N<br>Limit: $\geq$ Ringelmann No. 2 for no more than 3 minutes/hour<br>Monitoring Requirement Citation: None<br>Monitoring Frequency (P/C/N): N<br>Monitoring Type: N/A |

**Application 23871, S-916 NO<sub>x</sub> Box Revision**  
**EVALUATION REPORT**  
**TESORO REFINING AND MARKETING COMPANY**  
**REVISED NO<sub>x</sub> BOX FOR S-916, F-16**  
**No. 1 HDS Heater**  
**APPLICATION 23871, PLANT 14628**

**BACKGROUND**

The Tesoro Golden Eagle Refinery (Tesoro) operates several furnaces and boilers that are subject to Regulation 9, Rule 10, Nitrogen Oxides And Carbon Monoxide From Boilers, Steam Generators And Process Heaters In Petroleum Refineries. Regulation 9-10-301 limits the refinery wide NO<sub>x</sub> emissions to 0.033 lb/MMBtu of fired duty. Regulation 9-10-502 requires the installation of a NO<sub>x</sub>, CO and O<sub>2</sub> CEM to demonstrate compliance with Regulation 9-10-301. Regulation 9-10-502 also allows a CEM equivalent verification system to determine compliance with Regulation 9-10-301. The District and Tesoro (through WSPA) have produced the CEM equivalent verification system. This system is called the “NO<sub>x</sub> Box”. The NO<sub>x</sub> Box is an operating window for the unit, expressed in terms of fired duty and oxygen content in the flue gas. The operating window is established by source tests for various operating conditions. The source tests demonstrate the NO<sub>x</sub> emissions are equal to or less than a specified emission factor. As long as the fired unit duty and oxygen content are in this NO<sub>x</sub> Box operating window, the specified emission factor is used to determine compliance with the 0.033 lb/MMBtu limit of Regulation 9-10-301. The Permit Condition that contains the details of the NO<sub>x</sub> Box is #18372.

Condition 18372, Part 30 required Tesoro to submit the initial NO<sub>x</sub> Box for the affected sources by January 1, 2005. Tesoro met this requirement via Application 15682. The NO<sub>x</sub> Box’s in the application were supported by properly conducted source tests and the NO<sub>x</sub> Box operating windows for all the affected sources have been included in Revision 4 of the Title V permit (reference: Section VI, Condition 18372, Part 31A, NO<sub>x</sub> Box Ranges).

This application requests a change in the NO<sub>x</sub> Box operating window for:

**S-916 No. 1 HDS Heater (F16)**

The change is as follows:

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
| 916        | 0.090                      | 5.7, 9.53  | 9.3, 9.17  | 5.4, 30.00  | N/A   | 7.1, 34.00  |
|            | 0.102                      | 9.3, 9.17  | 10.6, 24.64  | 7.1, 34.00  | N/A   | 10.4, 33.11   |
| 916 new    | 0.090                      | 5.7, 9.53  | 9.3, 9.17  | <del>5.4, 30.00</del><br>6.0, 34.6                              | <del>N/A</del><br>4.0, 17.4   | 7.1, 34.00  |
|            | 0.102                      | 9.3, 9.17  | 10.6, 24.64  | 7.1, 34.00  | N/A   | 10.4, 33.11   |

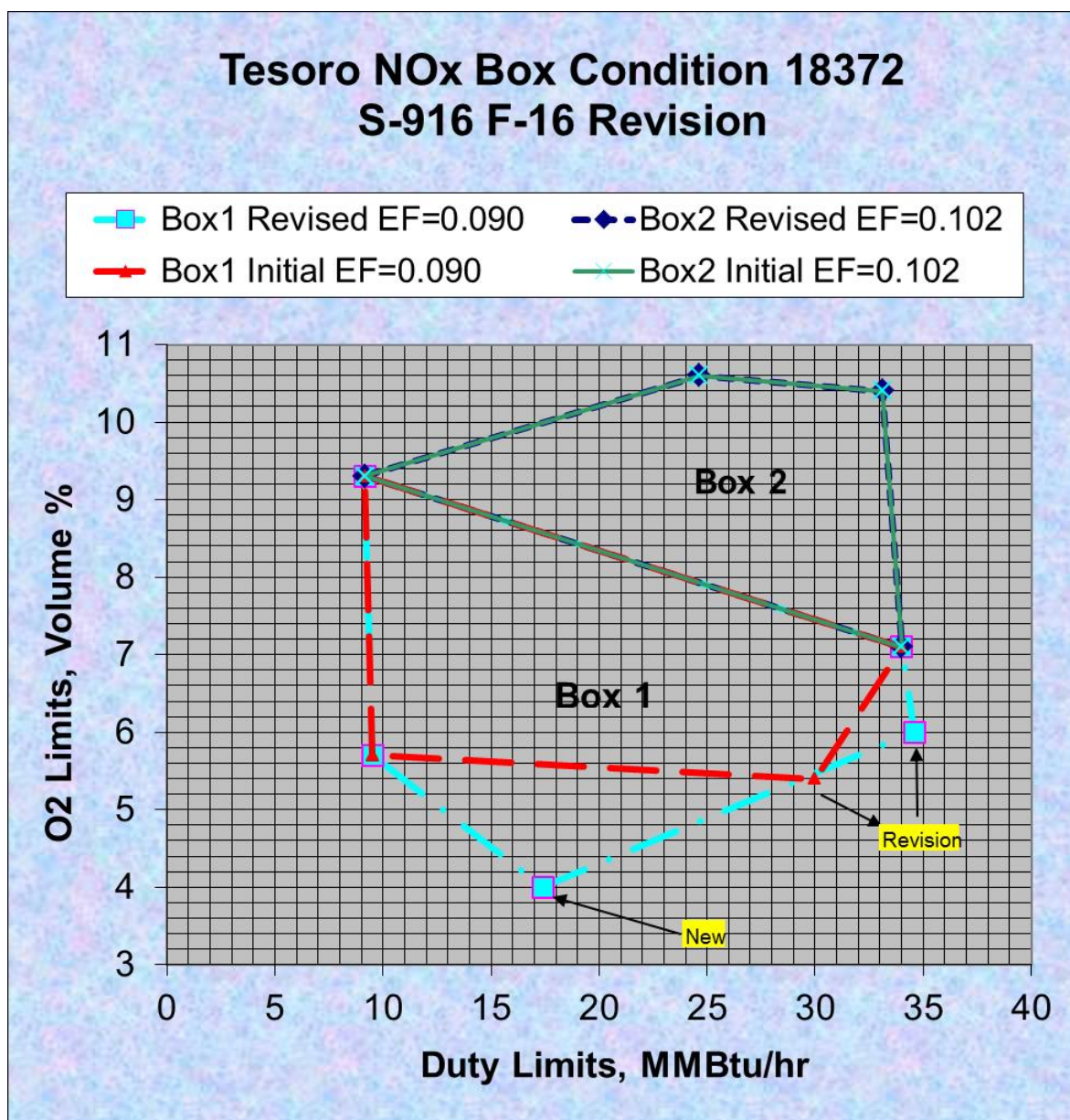
Tesoro is using two operating ranges as allowed by Condition 18372, Part 30.

The changes are supported by source tests reviewed by the Source Test Section.

This application is being processed as an administrative change in conditions since there is no change to the specified NOx emission factor for this unit.

This is the second revision to the S-916 NOx Box, but the emission factor was not increased, so a CEM is not required. According to Engineering Policy approved 4/11/03 and included in Appendix B of the December 2003 Title V Statement of Basis, a CEM is only required if two source tests in a 5-year period exceed the NOx emission factor.

The following diagram summarizes the changes to the S-916 NOx Box:





## **EMISSIONS SUMMARY**

There are no changes in emissions due to this application. The emission factors are unchanged by this application and there will be no impact on the overall facility limit of 0.033 lb/MMBtu required by Regulation 9-10-301.

## **PLANT CUMULATIVE INCREASE**

There are no net changes to the plant cumulative emissions.

## **TOXIC RISK SCREEN**

This proposed NOx Box change would not emit toxic compounds in amounts different than previously emitted. Therefore, a toxic risk screen is not required.

## **BEST AVAILABLE CONTROL TECHNOLOGY**

BACT is triggered for new or modified sources that emit criteria pollutants in excess of 10 lbs/day. However, Regulation 2-1-234 defines a modified source as one that results in an increase in daily or annual emissions of a regulated air pollutant. For this application, there is no change in emissions. Therefore, BACT does not apply.

## **PLANT LOCATION**

According to the SCHOOL program, the closest school is Las Juntas Elementary, which is almost two miles from the facility.

## **COMPLIANCE**

The change to the NOx Box will not change the compliance for Furnace S-916. Emissions from S-916 will continue to comply with all applicable regulations, including Regulation 6, Rule 1 and Regulation 9, Rule 10.

The closest school is over a mile from the facility, so the Public Notice requirements of Regulation 2-1-214 do not apply.

Toxics, CEQA, NESHAPS, BACT, Offsets and NSPS do not apply.

## **CONDITIONS**

The NOx Box Condition 18372, will be modified as shown below. Only the substantive changes for the S-916 NOx Box points detailed in Part 31A are shown. All of the other parts of Condition 18372 remain unchanged by this application.

Condition 18372

31. Except as provided in part 31B & C, the owner/operator shall operate each source within the NOx Box ranges listed below at all times of operation. This part shall not apply to any source that has a properly operated and properly installed NOx CEM. (Regulation 9-10-502)

A. NOx Box ranges

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
| 916        | 0.090                      | 5.7, 9.53  | 9.3, 9.17  | <del>5.4, 30.00</del><br><u>6.0, 34.6</u>                       | <del>N/A</del> <u>4.0, 17.4</u>   | 7.1, 34.00  |
|            | 0.102                      | 9.3, 9.17  | 10.6, 24.64  | 7.1, 34.00  | N/A   | 10.4, 33.11   |

The limits listed above are based on a calendar day averaging period for both firing rate and O<sub>2</sub>%.

**RECOMMENDATION**

It is recommended that a Change of Conditions to the Permit to Operate be granted to Tesoro for:

**S-916 No. 1 HDS Heater (F16)**

\_\_\_\_\_  
 Arthur P. Valla  
 Senior Air Quality Engineer

\_\_\_\_\_  
 Date  
 December 13, 2011

**Application 23854, Title V Renewal Appeal # 8&9, Wastewater, & #21 Miscellaneous**

**ENGINEERING EVALUATION**  
**Tesoro Refining and Marketing Company**  
**PLANT NO. 14628**  
**APPLICATION NO. 23854**

**BACKGROUND**

As part of the Title V Renewal Permit 2011 Appeal efforts, Tesoro Refining and Marketing Company is submitting several applications to address the Appeal items. This is one of those applications, submitted as a Minor Revision to the Title V permit. Since the proposed revisions do not change any permit conditions, a NSR application was not submitted. The equipment subject to the proposed revisions are as follows:

|              |  |
|--------------|--|
| <b>S-532</b> | <b>No. 50 Crude Unit Desalter Skim Tank, 630,000 gallon</b>        |
| <b>S-606</b> | <b>50 Unit Wastewater Air Stripper A</b>                           |
| <b>S-607</b> | <b>50 Unit Wastewater Air Stripper B</b>                           |
| <b>S-612</b> | <b>Internal floating roof Tank A-612, 420,000 gallons</b>          |
| <b>S-802</b> | <b>Fluid Catalytic Cracker Regenerator</b>                         |
| <b>S-819</b> | <b>API Oil-Water Separator/Dissolved Nitrogen Flotation System</b> |
| <b>S-901</b> | <b>FCCU CO Boiler (No. 7 Boiler)</b>                               |
| <b>S-902</b> | <b>FCCU Startup Heater</b>   |
| <b>S-904</b> | <b>No. 6 Boiler</b>  |
| <b>S-908</b> | <b>No. 3 Crude Heater (F8)</b>                                     |
| <b>S-909</b> | <b>No. 1 Feed Prep Heater (F9)</b>                                 |
| <b>S-912</b> | <b>No. 1 Feed Prep Heater (F12)</b>                                |
| <b>S-913</b> | <b>No. 2 Feed Prep Heater (F13)</b>                                |
| <b>S-915</b> | <b>Platformer Intermediate Heater (F15)</b>                        |
| <b>S-916</b> | <b>No. 1 HDS Heater (F16)</b>                                      |
| <b>S-917</b> | <b>No. 1 HDS Prefract Reboiler (F17)</b>                           |
| <b>S-919</b> | <b>No. 2 HDS Depent Reboiler (F19)</b>                             |
| <b>S-920</b> | <b>No. 2 HDS Charge Heater (F20)</b>                               |
| <b>S-921</b> | <b>No. 2 HDS Charge Heater (F21)</b>                               |
| <b>S-922</b> | <b>No. 5 Gas Debutanizer Reboiler (F22)</b>                        |
| <b>S-926</b> | <b>No. 2 Reformer Splitter Reboiler(F26)</b>                       |
| <b>S-927</b> | <b>No. 2 Reformer Heat/Reheating (F27)</b>                         |
| <b>S-928</b> | <b>HDN Reactor A Heater (F28)</b>                                  |
| <b>S-929</b> | <b>HDN Reactor B Heater (F29)</b>                                  |
| <b>S-930</b> | <b>HDN Reactor C Heater (F30)</b>                                  |
| <b>S-931</b> | <b>Hydrocracker Reactor 1 Heater (F31)</b>                         |
| <b>S-932</b> | <b>Hydrocracker Reactor 2 Heater (F32)</b>                         |
| <b>S-933</b> | <b>Hydrocracker Reactor 3 Heater (F33)</b>                         |
| <b>S-934</b> | <b>Hydrocracker Stabilizer Reboiler (F34)</b>                      |
| <b>S-935</b> | <b>Hydrocracker Splitter Reboiler (F35)</b>                        |
| <b>S-937</b> | <b>Hydrogen Plant Heater (F37)</b>                                 |
| <b>S-950</b> | <b>50 Unit Crude Heater (F50)</b>                                  |
| <b>S-951</b> | <b>No. 2 Reformer Aux Reheater (F51)</b>                           |
| <b>S-971</b> | <b>No. 3 Reformer UOP Furnace (F53)</b>                            |
| <b>S-972</b> | <b>No. 3 Reformer Debutanizer Reboiler (F54)</b>                   |

- S-973**      **No. 3 HDS Recycle Gas Heater (F55)**
- S-974**      **No. 3 HDS Fract Feed Heater (F56)**
- S-1005**     **No. 1 Hydrogen Plant**
- S-1012**     **West Air Flare**
- S-1020**     **No. 3 UOP Reformer**
- S-1106**     **No. 4 HDS Reactor Feed Heater (F72)**
- S-1401**     **Sulfur Recovery Unit**
- S-1412**     **Sulfuric Acid Mfg Plant Startup Heater**
- S-1470**     **No. 3 Crude Vacuum Distillation Heater (F71)**
- S-1484**     **No. 50 Crude Unit Desalter Brine, 1350 gallons**
- S-1511**     **Delayed Coker Heater #1 (F78)**
- S-1512**     **Delayed Coker Heater #2 (F79)**

The original application also included a Minor Revision for the following sources:

- S-100**      **Avon Wharf Loading Berth No. 1**
- S-108**      **Avon Wharf Loading Berth No. 5**

The specific appeal items initially covered by this application are #8, #9, #10, #13, #14 and #21 (Parts 1, 2, 4, 5, 6, 9, 10 & 13). Appeal Item #21.3 is addressed in Application 24056, Appeal Items #21.7 and #21.8 were rescinded from the Appeal by Tesoro, and are not part of any application, Appeal Item #21.11 is addressed in Application 24065, and Appeal item # 21.12 is addressed in Application 24058. The appeal items are summarized below:

| <b>Issue No.</b> | <b>Permit Section</b>  | <b>Source</b>  | <b>Basis for Appeal and Request for Modification</b>   |
|------------------|--|--|--|
| <b>8</b>         | <b>Table IV-G.4<br/>Table VII-G.4</b>  | <b>S532 S1484</b>  | <b>S-532, S-1484 Oil-Water Separators 40 CFR 61 Subpart FF (BWON) Applicability</b>                    |
| <b>9</b>         | <b>Table IV-A1, IV-G.5<br/>Table VII-G.5</b>   | <b>S606, S607,<br/>S950</b>  | <b>S606 and S607 50 Crude Unit Desalter Brine Strippers 40 CFR 61 Subpart FF (BWON) Applicability.</b> |
| <b>10</b>        | <b>Table IV-C.1.2<br/>Table IV-C.2.1<br/>Table IV-C.4.1<br/>Table IV-C.4.2<br/>Table IV-C.4.4<br/>Table IV-C.4.5</b> | <b>S902<br/>S904<br/>S950<br/>S1012<br/>S1412<br/>S1401<br/>Process furnaces in Table IV-C.4.2</b> | <b>40 CFR 60 Appendix F Applicability</b>  |
| <b>13</b>        | <b>Table IV-D.2</b>  | <b>S100</b>  | <b>S-100 Avon Wharf Berth 1 40 CFR 63 Subpart Y and Subpart CC Applicability</b>                       |
| <b>14</b>        | <b>Table IV-D.3</b>  | <b>S108</b>  | <b>S-108 Avon Wharf Berth 5 40 CFR 63 Subpart Y and Subpart CC Applicability</b>                       |
| <b>21</b>        |  |  | <b>Miscellaneous Changes</b>   |
| <b>21.1</b>      | <b>Table IV-A.1</b>  | <b>S973<br/>S974</b>   | <b>S-973 S-974 Condition 8077 Limit.</b>   |
| <b>21.2</b>      | <b>Table IV-A.1</b>  | <b>S935<br/>S937</b>   | <b>S-935 S-937 “Firm” Limit</b>  |

| Issue No. | Permit Section                   | Source                           | Basis for Appeal and Request for Modification          |
|-----------|----------------------------------|----------------------------------|--|
| 21.4      | Table IV-C.4.6<br>Table IV-C.4.7 | S1106<br>S1470<br>S1511<br>S1512 | Heater 40 CFR 60 Appendix F Requirements               |
| 21.5      | Table IV-G.8                     | S819                             | S-819 API Separator 60.695(b) Applicability            |
| 21.6      | Table VII-C.1.1                  | S901                             | S-901 CO Boiler CO Monitoring                          |
| 21.7      | Table VII-J.6                    | S590                             | S-590 DEA Flash Drum Fugitives Monitoring              |
| 21.8      | Table IV-J.0                     | Area 6<br>Unit 50                | Area 6 50 Unit 60-GGGa and VVa Applicability           |
| 21.9      | Table VII-B.6                    | S1005                            | S-1005 H2 Production Limit                             |
| 21.10     | Table VII-B.10                   | S1020                            | S-1020 63 Subpart UUU pH and Liquid/Gas ratio Criteria |
| 21.13     | Table II-A1                      | S612                             | S-612 Ethanol Throughput Limit                         |

Details of the Appeal Items are shown at the end of this evaluation.

In the 4/30/12 letter from Tesoro regarding this application, all proposed revisions in this application regarding S-100 and S-108 were removed from this application. In the April 2012 progress report Tesoro provided to the Hearing Board, Appeal Items # 13 and #14 were shown as withdrawn from the Appeal.

## EVALUATION

This evaluation section is divided into the following parts:

- A. Appeal Item #8, 40 CFR 61 Subpart FF Benzene Waste Operations NESHAPS (BWON) Applicability to S-532 and S-1484 50 Crude Unit Oil Water Separators.
- B. Appeal Item #9, 40 CFR 61 Subpart FF Benzene Waste Operations NESHAPS (BWON) Applicability to S-606 and S-607 50 Crude Unit Desalter Brine Strippers.
- C. Appeal Item #10, 40 CFR 60 Appendix F Applicability.
- D. Appeal Item #10.2, Flare S-1012 Regulation 10 and 40 CFR 60 Subpart J Applicability.
- E. Appeal Item #13, S-100 Avon Wharf Berth 1 40 CFR 63 Subpart Y and Subpart CC Applicability
- F. Appeal Item #14, S-108 Avon Wharf Berth 5 40 CFR 63 Subpart Y and Subpart CC Applicability
- G. Appeal Item #21.4, Fired Heater 40 CFR 60 Appendix F Applicability.
- H. Appeal Item #21.6, S-901 CO Boiler CO Monitoring
- I. Appeal Item #21.7, S-590 DEA Flash Drum Fugitives Monitoring .  
Appeal Item # 21.8, Area 6 Unit 50 Fugitives NSPS Subpart VVa and GGGa.
- J. Appeal Item #21.1, 21.2, 21.5, 21.9, 21.10 and 21.13. Remaining Miscellaneous Changes.

**A. Appeal Item #8, 40 CFR 61 Subpart FF Benzene Waste Operations NESHAPS (BWON) Applicability to S-532 and S-1484 50 Crude Unit Oil Water Separators.**

BWON is a complex regulation with several compliance alternatives. These are summarized in the following table:

**BWON Compliance Alternatives**

| <b>BWON Control Standard</b>   | <b>Summary of Requirements</b>   |
|--|--|
| “Segregate and Treat”<br>Basic Control Standard, Path 1<br>§61.342(c)(1)(i)<br>§61.348(a)(1), (a)(2) or (a)(3) | <ul style="list-style-type: none"> <li>• Segregate organic and aqueous waste streams that contain 10 ppmw benzene or more</li> <li>• Manage segregated wastes in controlled systems (affected units)</li> <li>• Remove benzene in segregated waste streams to a level less than 10 ppmw (or treat to 99 percent or greater removal and/or destruction) or return the wastes to the refining process</li> <li>• 2 Mg/yr exemption provided for organic and aqueous wastes with more than 10 ppmw benzene</li> </ul>                         |
| “Aggregate and Treat”<br>Basis Control Standard, Path 2<br>§61.342(c)(1)(i)<br>§61.348(a)(4) or (a)(5)         | <ul style="list-style-type: none"> <li>• Aggregate waste streams to facilitate treatment in a wastewater treatment system</li> <li>• Manage aggregated wastes in controlled systems (affected units) until treated to less than 1 Mg/yr benzene</li> <li>• Manage other organic and aqueous wastes with more than 10 ppmw benzene in controlled systems (affected units) until treated or recycled to the refining process.</li> <li>• 2 Mg/yr exemption provided for organic and aqueous wastes with more than 10 ppmw benzene</li> </ul> |
| “Process Wastewater”<br>Alternative Control Standard<br>§61.342(d)   | <ul style="list-style-type: none"> <li>• Limit benzene to less than 1 Mg/yr in treated and untreated process wastewater</li> <li>• Manage treated process wastewater in controlled systems (affected units)</li> <li>• Manage non-process wastewater (e.g. product tank drawdown and organic waste streams) with 10 ppmw or more benzene in controlled systems (affected units) until treated or returned to the refining process</li> <li>• No exemptions allowed</li> </ul>  |
| “6BQ”<br>Alternative Control Standard<br>§61.342(e)  | <ul style="list-style-type: none"> <li>• Limit benzene to 6 Mg/yr or less in aqueous wastes not managed in controlled systems (affected units)</li> <li>• Manage aqueous wastes in controlled systems (affected units) upstream of the characterization point</li> <li>• Manage all organic wastes with 10 ppmw benzene or more in controlled systems (affected units) until treated or returned to the refining process</li> <li>• No exemptions allowed</li> </ul>   |

Tesoro complies with the “6BQ” option, 40 CFR 61.342(e). This 6BQ option requires separate compliance paths for aqueous wastes (>10% water) and non-aqueous wastes (< 10% water).

Currently the Title V permit applies the non-aqueous requirements 61.342(e)(1) to the oil water separators, based on the previous applicability determination for the Renewed Permit. However, a subsequent detailed review of the materials processed in these oil/water separators, and re-examining the definition of aqueous waste in 61.342(e)(2), it is correct to remove the requirements of non-aqueous wastes and apply the requirements of aqueous wastes to 50 Unit Oil/Water Separators S-532 and S-1484. The substance of this revision is to remove all citations based on 61.342(e)(1), which lead to 61.342(c), and instead add citations based on 61.342(e)(2).

**B. Appeal Item #9, 40 CFR 61 Subpart FF Benzene Waste Operations NESHAPS (BWON) Applicability to S-606 and S-607 50 Crude Unit Desalter Brine Strippers.**

As explained above in Section A, Tesoro complies with 40 CFR 61 Subpart FF through the “6BQ” option 61.342(e). S-606 and S-607 are brine strippers for the 50 Crude Unit Desalters, stripping the benzene out of the brine water for combustion disposal in the S-950 50 Unit Crude Heater (F50). For aqueous wastes such as this desalter brine, 61.342(e)(2) allows Tesoro to manage and treat wastes such that the total benzene quantity from facility waste is equal to or less than 6.0 Mg/yr. There are no treatment standards to meet as long as the total benzene quantity meets the 6BQ limit.

Currently the Title V permit shows S-606 and S-607 as subject to the non-aqueous waste requirements of 61.342(e)(1) and applies the treatment standards of 61.342(c) and 61.348, and the control device requirements of 61.349. This application proposes to change the 6BQ requirement from 342(e)(1) non-aqueous wastes to 342(e)(2) aqueous wastes, to remove the treatment requirements of 61.342(c) and 61.348, and to move the control device requirements of 61.349 from S-606 and S-607 to the control device S-950. These proposed changes are justified.

**C. Appeal Item #10, 40 CFR 60 Appendix F Applicability.**

NSPS Appendix F contains Quality Assurance Procedures for continuous emission monitoring systems. There are three procedures included in Appendix F:

Procedure 1 for Gas monitors, Procedure 2 for Particulate Matter monitors, and Procedure 5 for Vapor Phase Mercury monitors (Procedures 3 & 4 are currently “reserved”).

NSPS Subpart A General Requirements 60.13 requires all continuous monitoring systems required by any NSPS subpart to be subject to the provisions of Appendix F if the continuous monitoring system is used to demonstrate compliance with emission limits on a continuous basis.

Currently in the Title V permit, the following sources are shown subject to Appendix F, Procedure 1:

|        |  |
|--------|--|
| S-902  | FCCU Startup Heater                    |
| S-904  | No. 6 Boiler                           |
| S-908  | No. 3 Crude Heater (F8)                |
| S-909  | No. 1 Feed Prep Heater (F9)            |
| S-912  | No. 1 Feed Prep Heater (F12)           |
| S-913  | No. 2 Feed Prep Heater (F13)           |
| S-915  | Platformer Intermediate Heater (F15)   |
| S-916  | No. 1 HDS Heater (F16)                 |
| S-920  | No. 2 HDS Charge Heater (F20)          |
| S-921  | No. 2 HDS Charge Heater (F21)          |
| S-922  | No. 5 Gas Debutanizer Reboiler (F22)   |
| S-926  | No. 2 Reformer Splitter Reboiler(F26)  |
| S-927  | No. 2 Reformer Heat/Reheating (F27)    |
| S-928  | HDN Reactor A Heater (F28)             |
| S-929  | HDN Reactor B Heater (F29)             |
| S-930  | HDN Reactor C Heater (F30)             |
| S-931  | Hydrocracker Reactor 1 Heater (F31)    |
| S-932  | Hydrocracker Reactor 2 Heater (F32)    |
| S-933  | Hydrocracker Reactor 3 Heater (F33)    |
| S-934  | Hydrocracker Stabilizer Reboiler (F34) |
| S-935  | Hydrocracker Splitter Reboiler (F35)   |
| S-937  | Hydrogen Plant Heater (F37)            |
| S-950  | 50 Unit Crude Heater (F50)             |
| S-1401 | Sulfur Recovery Unit                   |
| S-1412 | Sulfuric Acid Mfg Plant Startup Heater |

For these sources, the Appendix F, Procedure 1 requirements in the current permit are consistent with the same requirements in the previous Rev 4 Title V permit. These sources are subject to the sulfur standards of NSPS Subpart J, and the associated monitoring requirements. The fired heaters comply with the H<sub>2</sub>S limit in the fuel gas and require continuous monitoring. The S-1401 Sulfur Recovery Unit complies with the SO<sub>2</sub> limit and requires continuous SO<sub>2</sub> monitoring in the stack.



In January 2011, Tesoro sent an inquiry to EPA requesting clarification on how to apply the requirements of Appendix F, Procedure 1 to the gas chromatograph used to monitor H<sub>2</sub>S in the fuel gas. In the response, EPA's Mr. Foston Curtis stated the following in an e-mail dated 1/25/2011:

The H<sub>2</sub>S CEMS under Subpart J is an excess emissions monitor and not a continuous compliance monitor. The qualifying language in the subparts is not as clear as it should be on this. The requirement to report excess emissions in 60.105(e)(3)(ii) is one indicator. Also, there is no mention of Appendix F in 60.105(a)(4) nor minimum data requirements (needed for continuous compliance CEMS). The only CEMS used for continuous compliance under Subpart J is the SO<sub>2</sub>/O<sub>2</sub> CEMS on the FCCU catalyst regenerator. Note in 105(a)(12) that the language for this CEMS contains Appendix F, minimum data, and methods of collecting data when the CEMS is not operating.

Therefore, based on this message from Mr. Curtis, Tesoro is proposing that Appendix F, Procedure 1 is not applicable to the H<sub>2</sub>S fuel gas monitor (and also the SO<sub>2</sub> monitor for S-1401 since Mr. Curtis states the only Subpart J monitor subject to Appendix F is the SO<sub>2</sub>/O<sub>2</sub> CEMS on the FCCU).

However, the Consent Decree requires compliance with Appendix F, Procedure 1, for the fired heaters, as codified in Permit Condition 23562. Therefore, Tesoro is proposing to retain the requirements of Appendix F, Procedure 1 for the fired heaters, with the following clarification added: "Applicability specified in Condition 23562." This proposal covers Appeal Items # 10.1, 10.3, 10.4, 10.5 and 10.6

S-1401 Sulfur Recovery Unit is subject to 40 CFR 63, Subpart UUU. 40 CFR 63.1572 requires the continuous SO<sub>2</sub> monitor and Table 40 of Subpart UUU requires NSPS Appendix F, Procedure 1 except the RATA tests are required annually instead of quarterly. Therefore, Tesoro is proposing to retain the requirements of Appendix F, Procedure 1 for the Sulfur Recovery Unit, with the following clarification added: "Applicability specified in 40 CFR 63 Subpart UUU, Table 40." This proposal covers Appeal Item # 10.8.

In addition for S-1401, this application proposes, consistent with Appeal Item 10.7, that clarifying language be added to the Regulation 10 requirements as follows: "Applicability specified in Condition 267." Regulation 10 incorporates 40 CFR 60 NSPS by reference. Condition 267-5 requires S-1401 to be an affected source and subject to all applicable provisions of 40 CFR 60 Subparts A and J. The proposed clarifying language is consistent with similar language currently shown in the permit for Subpart J.

**D. Appeal Item #10.2, Flare S-1012 Regulation 10 and 40 CFR 60 Subpart J Applicability.**

Currently in the Title V permit, S-1012 West Air Flare is listed in Table IV-C.2.1 along with flares S-854, S-992, S-1517, and S-1524. All of these flares are subject to NSPS Subpart J by date of construction (all were constructed after the June 11, 1973 effective date) pursuant to 40 CFR 60.100. Appeal Item # 10.2 was based on S-1012 not being subject to NSPS by date of construction. Once it was verified that S-1012 was constructed in 1979 and is indeed subject to NSPS by date of construction, this item was rescinded by Tesoro and removed from this application on 6/11/2012. Minor changes to the Title V Tables IV-C.2.1 and VII-C.2.1 will be made to add clarification that all sources in the table are subject to NSPS by date of construction.

**E. Appeal Item #13, S-100 Avon Wharf Berth 1 40 CFR 63 Subpart Y and Subpart CC Applicability**

This item was withdrawn from the Tesoro Renewed Title V permit Appeal. In the 4/30/12 Tesoro letter in response to the 11/23/11 incomplete letter, Tesoro removed all proposed changes for S-100 from this application.

**F. Appeal Item #14, S-108 Avon Wharf Berth 5 40 CFR 63 Subpart Y and Subpart CC Applicability**

This item was withdrawn from the Tesoro Renewed Title V permit Appeal. In the 4/30/12 Tesoro letter in response to the 11/23/11 incomplete letter, Tesoro removed all proposed changes for S-108 from this application.

**G. Appeal Item #21.4, Fired Heater 40 CFR 60 Appendix F Applicability.**

This item is similar to Appeal Items #10, 40 CFR 60 Appendix F Applicability, addressed in Section C above. However, #21.4 addresses the following sources that are subject to NSPS Subpart J by date of construction:

|        |  |
|--------|--|
| S-1106 | No. 4 HDS Reactor Feed Heater (F72)          |
| S-1470 | No. 3 Crude Vacuum Distillation Heater (F71) |
| S-1511 | Delayed Coker Heater #1 (F78)                |
| S-1512 | Delayed Coker Heater #2 (F79)                |

As indicated above, according to EPA's Mr. Foston Curtis, Appendix F is not applicable to the fuel gas H<sub>2</sub>S monitors required by 40 CFR 60.105(a)(4), since Mr. Curtis has characterized the H<sub>2</sub>S monitor as an excess emissions monitor and not a continuous compliance monitor. This application proposes to remove all 40 CFR 60 Appendix F requirements for these sources.

In Appeal Item #10, Tesoro proposes to clarify the applicability of Appendix F for the sources that are listed in Permit Condition 23562. However, Condition 23562 was drafted in 2007 and the source list in 23562 only included the sources that are not subject to NSPS Subpart J by date of construction. At the time, it was understood that since the sources that were already subject to NSPS Subpart J (outside the Consent Decree) were also subject to the requirements of Appendix F. It was not until January 2011 that Mr. Curtis identified this Appendix F mis-understanding. However, the Consent Decree requires all heaters and boilers to comply with NSPS Subpart J (§118) and requires compliance with Appendix F (§121).

S-1106 is permitted only to fire only natural gas. Therefore, monitoring for the sulfur standard is not required so Appendix F does not apply.

S-1511 and S-1512 were placed in service after the 2005 effective date of the Consent Decree. The Authority to Construct for S-1511 and S-1512 was granted in August 2006, and the Permit to Operate was granted in June 2009. Since these sources did not exist Tesoro considers them not subject to the Consent Decree. Therefore, they are subject to Subpart J by date of construction and according to the EPA's Mr. Curtis, Appendix F does not apply.

S-1470 was in existence and operating when the Consent Decree was filed. The Permit to Operate for S-1470 was granted in January 2004. Currently S-1470 is fired with natural gas. However, S-1470 is permitted to fire both natural gas and refinery fuel gas in Permit Condition 18539, Part 1. Therefore, since the Consent Decree §118 requires all heaters and boilers to comply with subpart J, and §121 requires Appendix F, a better method to address the Appendix F requirements for these sources is to keep the requirements and add clarification that the requirements are as specified by the Consent Decree.

Tesoro has agreed to this amended proposed change.

#### **H. Appeal Item #21.6, S-901 CO Boiler CO Monitoring**

The proposed change in Appeal Item # 21.6 is to remove the CO CEM monitoring from S-901 (and also S-802) as it is related to the 121.9 ton/yr CO mass emission limit in Permit Condition 11433. A CO CEM is required by 40 CFR 60.105(a)(2) (imposed by the Consent Decree and codified in Part 11 of Condition 11433) to comply with the CO emissions limit of 500 ppmvd at 0% O<sub>2</sub> (codified in Part 9 of Condition 11433). This CO CEM was added in the renewed permit, and was not shown in the previous version of the title V permit (aka "Rev 4"). However, this CO CEM is not required to determine compliance with the CO mass emission limit in Part 2 of Condition 11433. Therefore, removing the CO CEM associated with this mass emission limit is justified.

However, returning the citation to the “Rev 4” citation was not acceptable to Tesoro. Prior to the Renewed Title V permit, the monitoring for the 121.9 ton/yr CO mass emissions limit was shown in Table VII-V for S901 as follows:

| Type of Limit | Citation of Limit                | FE Y/N | Future Effective Date | Limit                                   | Monitoring Requirement Citation  | Monitoring Frequency (P/C/N) | Monitoring Type |
|---------------|----------------------------------|--------|-----------------------|---|----------------------------------|------------------------------|-----------------|
| CO            | BAAQMD Condition # 11433, Part 2 | Y      |                       | Total from S-802/S-901 $\leq$ 121.9 tpy | BAAQMD Condition # 11433, Part 4 | C                            | Monitor         |
| CO            | BAAQMD Condition # 11433, Part 2 | Y      |                       | Total from S-802/S-901 $\leq$ 121.9 tpy | BAAQMD Condition # 11433, Part 4 | P/M                          | Source Test     |

A review of the permitting history shows that these monitoring citations have been in the Title V permit since December 16, 2004 (“Rev 1”) when the monitoring was revised in response to an EPA comment (reference EPA letter dated August 14, 2004, Enclosure B – Tesoro, page B-2) on the FCCU/CO Boiler monitoring. The “Rev 1” Statement of Basis states on page 30 that the “Monitoring requirements have been clarified for S901 in Table VII – V to reflect Tesoro’s current practices as required to demonstrate compliance with the emission limits in Condition #11433, Part 2.”

Tesoro now states that monthly source tests have never been the practice for monitoring the CO mass emissions. Tesoro has indicated that CO mass emissions are determined using the emission factors and calculation methods as detailed in the refinery emissions cap monthly report required by permit Condition 8077 (aka the No. 3 HDS Report, or the "EMIT" report). Therefore, the CO CEM should be removed and correct monitoring in Tables VII-B.1 and VII-C.1.1 would be as follows:

| Type of Limit | Citation of Limit              | FE Y/N | Future Effective Date | Limit  | Monitoring Requirement Citation                                   | Monitoring Frequency (P/C/N) | Monitoring Type                                       |
|---------------|--------------------------------|--------|-----------------------|--|---|------------------------------|---|
| CO            | BAAQMD Condition 11433, Part 2 | Y      |                       | Total from S-802/S-901 $\leq$ 121.9 tpy<br>[at exit of S901 CO Boiler] | BAAQMD Condition 11433, Part 4 Condition 8077, parts B4, B5A, B5B | P/M                          | Calculations and Refinery Emissions Cap “EMIT” Report |

**I. Appeal Item #21.7, S-590 DEA Flash Drum Fugitives Monitoring.**

### **Appeal Item # 21.8, Area 6 Unit 50 Fugitives NSPS Subpart VVa and GGGa.**

Appeal Item #21.7 was withdrawn from the Appeal by Tesoro, and is rescinded by Tesoro from this application. There are no changes proposed by this application for S-590 monitoring.

Appeal Item #21.8 was withdrawn from the Appeal by Tesoro, and is not included in this application. There are no changes proposed by this application for NSPS Subpart VVa and GGGa applicability.

### **J. Appeal Item #21.1, 21.2, 21.5, 21.9, 21.10 and 21.13. Remaining Miscellaneous Changes.**

These Appeal Items Item #21.1, 21.2, 21.5, 21.9, 21.10 and 21.13 are minor corrections and updates to the permit. Details of the proposed changes can be found in the detailed Appeal list at the end of this evaluation. All of the proposed changes are justified.

### **EMISSIONS SUMMARY**

*There are no increases in emissions associated with this application. This application only completes updates or clarifies the applicability of various sources, or proposes corrections to the Title V permit that have no impact on emissions.*

### **STATEMENT OF COMPLIANCE**

There are no changes to the applicable requirements for the sources impacted by this application and there is no change to the compliance for these sources. All sources in this application are expected to remain in compliance with all applicable rules and regulations.

### **PERMIT CONDITIONS**

There are no changes to any permit conditions as a result of the changes proposed in this application.

### **RECOMMENDATION**

It is recommended that a Minor Revision to the Tesoro Title V permit be approved for the following sources:

|               |  |
|---------------|--|
| <b>S-532</b>  | <b>No. 50 Crude Unit Desalter Skim Tank, 630,000 gallon</b>        |
| <b>S-606</b>  | <b>50 Unit Wastewater Air Stripper A</b>                           |
| <b>S-607</b>  | <b>50 Unit Wastewater Air Stripper B</b>                           |
| <b>S-612</b>  | <b>Internal floating roof Tank A-612, 420,000 gallons</b>          |
| <b>S-802</b>  | <b>Fluid Catalytic Cracker Regenerator</b>                         |
| <b>S-819</b>  | <b>API Oil-Water Separator/Dissolved Nitrogen Flotation System</b> |
| <b>S-901</b>  | <b>FCCU CO Boiler (No. 7 Boiler)</b>                               |
| <b>S-902</b>  | <b>FCCU Startup Heater</b>   |
| <b>S-904</b>  | <b>No. 6 Boiler</b>  |
| <b>S-908</b>  | <b>No. 3 Crude Heater (F8)</b>                                     |
| <b>S-909</b>  | <b>No. 1 Feed Prep Heater (F9)</b>                                 |
| <b>S-912</b>  | <b>No. 1 Feed Prep Heater (F12)</b>                                |
| <b>S-913</b>  | <b>No. 2 Feed Prep Heater (F13)</b>                                |
| <b>S-915</b>  | <b>Platformer Intermediate Heater (F15)</b>                        |
| <b>S-916</b>  | <b>No. 1 HDS Heater (F16)</b>                                      |
| <b>S-917</b>  | <b>No. 1 HDS Prefract Reboiler (F17)</b>                           |
| <b>S-919</b>  | <b>No. 2 HDS Depent Reboiler (F19)</b>                             |
| <b>S-920</b>  | <b>No. 2 HDS Charge Heater (F20)</b>                               |
| <b>S-921</b>  | <b>No. 2 HDS Charge Heater (F21)</b>                               |
| <b>S-922</b>  | <b>No. 5 Gas Debutanizer Reboiler (F22)</b>                        |
| <b>S-926</b>  | <b>No. 2 Reformer Splitter Reboiler(F26)</b>                       |
| <b>S-927</b>  | <b>No. 2 Reformer Heat/Reheating (F27)</b>                         |
| <b>S-928</b>  | <b>HDN Reactor A Heater (F28)</b>                                  |
| <b>S-929</b>  | <b>HDN Reactor B Heater (F29)</b>                                  |
| <b>S-930</b>  | <b>HDN Reactor C Heater (F30)</b>                                  |
| <b>S-931</b>  | <b>Hydrocracker Reactor 1 Heater (F31)</b>                         |
| <b>S-932</b>  | <b>Hydrocracker Reactor 2 Heater (F32)</b>                         |
| <b>S-933</b>  | <b>Hydrocracker Reactor 3 Heater (F33)</b>                         |
| <b>S-934</b>  | <b>Hydrocracker Stabilizer Reboiler (F34)</b>                      |
| <b>S-935</b>  | <b>Hydrocracker Splitter Reboiler (F35)</b>                        |
| <b>S-937</b>  | <b>Hydrogen Plant Heater (F37)</b>                                 |
| <b>S-950</b>  | <b>50 Unit Crude Heater (F50)</b>                                  |
| <b>S-951</b>  | <b>No. 2 Reformer Aux Reheater (F51)</b>                           |
| <b>S-971</b>  | <b>No. 3 Reformer UOP Furnace (F53)</b>                            |
| <b>S-972</b>  | <b>No. 3 Reformer Debutanizer Reboiler (F54)</b>                   |
| <b>S-973</b>  | <b>No. 3 HDS Recycle Gas Heater (F55)</b>                          |
| <b>S-974</b>  | <b>No. 3 HDS Fract Feed Heater (F56)</b>                           |
| <b>S-1005</b> | <b>No. 1 Hydrogen Plant</b>  |
| <b>S-1012</b> | <b>West Air Flare</b>  |
| <b>S-1020</b> | <b>No. 3 UOP Reformer</b>  |
| <b>S-1106</b> | <b>No. 4 HDS Reactor Feed Heater (F72)</b>                         |
| <b>S-1401</b> | <b>Sulfur Recovery Unit</b>  |
| <b>S-1412</b> | <b>Sulfuric Acid Mfg Plant Startup Heater</b>                      |
| <b>S-1470</b> | <b>No. 3 Crude Vacuum Distillation Heater (F71)</b>                |
| <b>S-1484</b> | <b>No. 50 Crude Unit Desalter Brine, 1350 gallons</b>              |
| <b>S-1511</b> | <b>Delayed Coker Heater #1 (F78)</b>                               |
| <b>S-1512</b> | <b>Delayed Coker Heater #2 (F79)</b>                               |

By: \_\_\_\_\_  
 Arthur Valla  
 Senior Air Quality Engineer

\_\_\_\_\_  
 June 15, 2012

| <b>Original Tesoro Renewed Title V Permit Appeal Details</b> |                                       |                       |  |
|--|---------------------------------------|-----------------------|--|
| <b>Issue No.</b>   | <b>Permit Section</b>                 | <b>Source</b>         | <b>Basis for Appeal and Request for Modification</b>   |
| <b>8</b>   | <b>Table IV-G.4<br/>Table VII-G.4</b> | <b>S532<br/>S1484</b> | <b>The 40 CFR 61 Subpart FF requirements for closed vent systems and control devices, except those that apply to bypass lines, should be removed from the permit for these sources. Emissions from S532 and S1484 are vented to the refinery fuel gas system and, in accordance with the exemption at 61.340(d), vapors directed to fuel gas systems are exempt from 40 CFR 61 Subpart FF.</b> |
| 8.1  | Table IV-G.4                          | S532<br>S1484         | Delete 61.349(a)(2)<br>Delete 61.349(a)(2)(i)  |
| 8.1  | Revised by Application<br>23854       |                       | Delete 61.342(c)(1);61.342(c)(1)(i); 61.342(c)(1)(ii)<br>Delete 61.342(c)(1)(iii); 61.342(e)(1)<br>Add 61.342(e)(2); 61.342(e)(2)(i); 61.342(e)(2)(ii)<br>Delete 61.349(a)(2); 61.349(a)(2)(i)<br>Add 61.355(k); 61.355(k)(2); 61.355(k)(2)(i)   |
| 8.2  | Table VII-G.4<br>Rows 3, 6            | S532<br>S1484         | Delete Row 3 [Type of Limit: POC and Citation of Limit 40 CFR 60.349(a)(1)(i)]<br>Delete Row 6 [Type of Limit: POC and Citation of Limit 40 CFR 60.349(f)]   |

| Original Tesoro Renewed Title V Permit Appeal Details |                              |          |   |
|---|------------------------------|----------|---|
| Issue No.   | Permit Section               | Source   | Basis for Appeal and Request for Modification   |
| 9   |                              |          | S606 and S607 are the 50 Crude Unit desalter brine strippers. They are affected waste management units for 40 CFR 61 Subpart FF (BWON) because they receive controlled benzene-containing aqueous wastes. The strippers “treat” the desalter brine to remove benzene and then the brine is discharged to the process sewer as an uncontrolled aqueous waste. The emissions from the strippers are routed to S950, Furnace F50, where they are combusted to destroy the benzene. The furnace (S950) and the closed vent system routing the stripper emissions to the furnace are a closed vent system and control device subject to 40 CFR 61.349. However, the strippers are not “treatment processes” as that term is used for processes subject to the requirements of 40 CFR 61.348(a). The performance objective of the strippers is to remove benzene such that the Refinery’s overall uncontrolled aqueous waste has less than 6 Mg/year benzene (the 6BQ option). The benzene concentration in the brine stripper bottoms is not required to comply with the 10 ppm benzene concentration limit option in 61.348(a)(1)(i) or the 99% abatement requirement option in 61.348(a)(1)(ii), and, because the waste itself is not combusted to destroy benzene, then 61.348(a)(1)(iii) does not apply to the strippers. The applicability requirements in Table IV-G.5 and the monitoring requirements in Table VII-G.5 need to be corrected to reflect this applicability determination and the related reporting requirements in Table IV-A.1 and Table IV-C.4.4 need to be deleted. |
| 9.1   | Table IV-A.1                 | Sitewide | Delete 61.357(d)(7)(i)<br>Delete 61.357(d)(7)(ii)   |
| 9.1   | Revised by Application 23854 |          | Delete 61.356(b)(6)<br>Delete 61.357(d)(7)(i)<br>Delete 61.357(d)(7)(ii)  |
| 9.2   | Table IV-C.4.4               | S950     | Delete 61.357(d)(7)(i)  |
| 9.2   | Revised by Application 23854 |          | Delete requirements related to 61.348 treatment requirements:<br>Delete 61.357(d)(7)(i)   |
| 9.2A  | Added by Application 23854   |          | Delete requirements for the closed vent system:<br>Delete 61.349(a); 61.349(a)(1)(i)<br>Delete 61.349(a)(1)(iii); 61.349(a)(1)(iv)  |



| <b>Original Tesoro Renewed Title V Permit Appeal Details</b> |                                 |               |   |
|--|---------------------------------|---------------|---|
| <b>Issue No.</b>   | <b>Permit Section</b>           | <b>Source</b> | <b>Basis for Appeal and Request for Modification</b>  |
| 9.3  | Table IV-G.5                    | S606<br>S607  | Delete 61.348(a); 61.348(a)(1); 61.348(a)(1)(i);<br>61.348(a)(3)<br>Delete 61.348(c); 61.348(c)(2)<br>Delete 61.348(f); 61.348(g)<br>Delete 61.354(a); 61.354(a)(1)<br>Delete 61.355(c)(3); 61.355(d)<br>Add 61.355(k); 61.355(k)(2); 61.355(k)(2)(i)<br>Delete 61.356(e)(1); 61.356(e)(3)<br>Delete 61.357(d)(7)(i)  |
| 9.3  | Revised by Application<br>23854 |               | Delete requirements related to 61.348 treatment<br>requirements:<br>Delete 61.342(c)(1); 61.342(c)(1)(i); 61.342(c)(1)(ii)<br>Delete 61.342(c)(1)(iii); 61.342(e)(1)<br>Add 61.342(e)(2); 61.342(e)(2)(i); 61.342(e)(2)(ii)<br>Delete 61.348(a); 61.348(a)(1); 61.348(a)(1)(i);<br>Delete 61.348(a)(3)<br>Delete 61.348(c); 61.348(c)(2)<br>Delete 61.348(f); 61.348(g)<br>Delete 61.354(a); 61.354(a)(1)<br>Delete 61.355(c)(3); 61.355(d)<br>Add 61.355(k); 61.355(k)(2); 61.355(k)(2)(i)<br>Delete 61.356(e); 61.356(e)(1); 61.356(e)(3)<br>Delete 61.356(e)(3); 61.356(e)(4)<br>Delete 61.356(j)(6)<br>Delete 61.357(d)(7)(i) |
| 9.3A   | Added by Application 23854      |               | Delete requirements for the control device:<br>Delete 61.349(a)(2); 61.349(a)(2)(i)<br>Delete 61.349(a)(2)(i)(A); 61.349(a)(2)(i)(B);<br>Delete 61.349(a)(2)(i)(C); 61.349(c)<br>Delete 61.349(c)(2); 61.349(e); 61.349(h)<br>Delete 61.354(a); 61.354(a)(1)<br>Delete 61.354(c); 61.354(c)(5)<br>Delete 61.355(i)<br>Delete 61.356(f); 61.356(f)(1); 61.356(f)(3)<br>Delete 61.357(d)(7); 61.357(d)(7)(iv);<br>61.357(d)(7)(iv)(G)   |
| 9.4  | Table VII-G.5<br>Row 1          | S606<br>S607  | Delete Row 1 [Type of Limit: Benzene]   |
| <b>10</b>  |                                 |               | <b>There are several places in Section IV where a statement is needed to limit the applicability of a listed citation or regulation</b>   |
| 10.1   | Table IV-C.1.2                  | S904          | In Title rows for Regulation 10 and 40 CFR 60<br>Appendix F:<br>Add “Applicability specified in Condition 23562”  |
| 10.2   | Table IV-C.2.1                  | S1012         | In Title rows for Regulation 10 and 40 CFR 60 Subpart<br>J:<br>Add “Applicability specified in Condition 24324 for<br>S1012”  |

| <b>Original Tesoro Renewed Title V Permit Appeal Details</b> |   |               |  |
|--|---|---------------|--|
| <b>Issue No.</b>   | <b>Permit Section</b>                               | <b>Source</b> | <b>Basis for Appeal and Request for Modification</b>   |
| 10.3   | Table IV-C.4.1                                      | S902          | In Title rows for Regulation 10 and 40 CFR 60 Appendix F:<br>Add “Applicability specified in Condition 23562”  |
| 10.4   | Table IV-C.4.2                                      | Multiple      | In Title rows for Regulation 10 and 40 CFR 60 Appendix F:<br>Add “Applicability specified in Condition 23562”  |
| 10.5   | Table IV-C.4.4                                      | S950          | In Title rows for Regulation 10 and 40 CFR 60 Appendix F:<br>Add “Applicability specified in Condition 23562”  |
| 10.6   | Table IV-C.4.5                                      | S1412         | In Title rows for Regulation 10 and 40 CFR 60 Appendix F:<br>Add “Applicability specified in Condition 23562”  |
| 10.7   | Table IV-H.2  | S1401         | In Title row for Regulation 10:<br>Add “Applicability specified in Condition 267”  |
| 10.8   | Table IV-H.2  | S1401         | In Title row for 40 CFR 60 Appendix F:<br>Add “Applicability specified by 40 CFR 63 Subpart UUU, Table 40”   |
| <b>13</b>  | <b>Table IV-D.2</b>                                 | <b>S100</b>   | <b>There are several errors in the Section IV table for S100:</b> <ul style="list-style-type: none"> <li>• <b>S100 is not subject to either the MACT or RACT standards of 40 CFR 63 Subpart Y, therefore, the MACT exemptions in §63.560(d) and the MACT standards in §63.562(b) do not apply.</b></li> <li>• <b>S100 is not an affected source as defined in §63.561 for 40 CFR 63 Subpart Y, therefore §63.560(c) does not apply.</b></li> <li>• <b>Under the exemption in 40 CFR 63 Subpart CC §63.651(c), the notification reports under §63.567(b) are not required</b></li> <li>• <b>Applicable requirements from 63.565 and 63.567 were omitted</b></li> <li>• <b>There are several duplicate rows in Table IV-D.2</b></li> </ul> |
| 13.1   | Table IV-D.2<br>40 CFR 63<br>Subpart Y Title<br>Row | S100          | Add “S55 is exempt from the MACT and RACT requirements of Subpart Y.”  |
| 13.1   | Revised by Application<br>23854                     |               | Add “S100 is exempt from the MACT and RACT requirements of Subpart Y. S100 is potentially subject to the RACT requirements of Subpart Y if annual throughput is greater than 10 MM barrels or 200 MM barrels (as defined in §63.561)”  |

| <b>Original Tesoro Renewed Title V Permit Appeal Details</b> |   |               |   |
|--|---|---------------|---|
| <b>Issue No.</b>   | <b>Permit Section</b>                               | <b>Source</b> | <b>Basis for Appeal and Request for Modification</b>  |
| 13.2   | Table IV-D.2<br>63.560(a)(2)                        | S100          | Change description to read: "Maximum Achievable Control Technology (MACT) Applicability; Existing sources with emissions less than 10 and 25 tons (as defined in §63.561) are not subject to MACT Standards in §63.562(b) and (d)."   |
| 13.3   | Table IV-D.2<br>63.560(a)(3)                        | S100          | Change description to read: "Maximum Achievable Control Technology (MACT) Applicability; Existing sources with emissions less than 10 and 25 tons (as defined in §63.561) are subject to recordkeeping at §63.567(j)(4) and emissions estimates at §63.565(l)"  |
| 13.4   | Table IV-D.2<br>63.560(b)(2)                        | S100          | Change description to read: "Reasonably Achievable Control Technology (RACT) Applicability: Sources with throughputs less than 10 M barrels (gasoline) and 200M barrels (crude oil) (as defined in §63.561) are not subject to RACT Standards in §63.562(c) and (d)."   |
| 13.5   | Table IV-D.2  | S100          | Delete 63.560(c)<br>Delete 63.560(d), 63.560(d)(7)<br>Delete 63.562, 63.562(b), 63.562(b)(2)<br>Add 63.565, 63,565(l)<br>Add 63.567, 63.567(j), 63.567(j)(4)<br>Delete duplicate rows for 63.651 and 63.560(d)(7)   |
| 13.6   | Table IV-D.2<br>63.651(c)                           | S100          | Change description to read: "Marine Vessel Tank Loading Operations Provisions; exceptions from 63 Subpart Y – The notification reports under §63.567(b) are not required"   |
| 13.6   | Revised by Application<br>23854                     |               | Delete 63.651 and all subparagraphs   |
| <b>14</b>  | <b>Table IV-D.3</b>                                 | <b>S108</b>   | <b>There are several errors in the Section IV table for S108:</b> <ul style="list-style-type: none"> <li>• <b>S108 is not subject to either the MACT or RACT standards of 40 CFR 63 Subpart Y, therefore, the MACT exemptions in §63.560(d) and the MACT standards in §63.562(b) do not apply.</b></li> <li>• <b>S108 is not an affected source as defined in §63.561 for 40 CFR 63 Subpart Y, therefore §63.560(c) does not apply.</b></li> <li>• <b>Under the exemption in 40 CFR 63 Subpart CC §63.651(c), the notification reports under §63.567(b) are not required</b></li> </ul> |
| 14.1   | Table IV-D.3<br>40 CFR 63<br>Subpart Y Title<br>Row | S108          | Add "S55 is exempt from the MACT and RACT requirements of Subpart Y."<br>Delete "S55 is exempt from Subpart Y unless loading material with vapor pressure of 1.5 psia or higher."   |
| 14.1   | Revised by Application<br>23854                     |               | Add "S108 is not subject to the MACT and RACT requirements of Subpart Y."   |

| <b>Original Tesoro Renewed Title V Permit Appeal Details</b> |  |   |   |
|--|--|---|---|
| <b>Issue No.</b>   | <b>Permit Section</b>                              | <b>Source</b>   | <b>Basis for Appeal and Request for Modification</b>  |
| 14.2   | Table IV-D.3<br>63.560(a)(2)                       | S108  | Change description to read: “Maximum Achievable Control Technology (MACT) Applicability; Existing sources with emissions less than 10 and 25 tons (as defined in §63.561) are not subject to MACT Standards in §63.562(b) and (d).”                                   |
| 14.3   | Table IV-D.3<br>63.560(a)(3)                       | S108  | Change description to read: “Maximum Achievable Control Technology (MACT) Applicability; Existing sources with emissions less than 10 and 25 tons (as defined in §63.561) are subject to recordkeeping at §63.567(j)(4) and emissions estimates at §63.565(l)”        |
| 14.4   | Table IV-D.3<br>63.560(b)(2)                       | S108  | Change description to read: “Reasonably Achievable Control Technology (RACT) Applicability: Sources with throughputs less than 10 M barrels (gasoline) and 200M barrels (crude oil) (as defined in §63.561) are not subject to RACT Standards in §63.562(c) and (d).” |
| 14.5   | Table IV-D.3                                       | S108  | Delete 63.560(c)<br>Delete 63.560(d), 63.560(d)(1), 63.560(d)(3),<br>63.560(d)(7)<br>Delete 63.562, 63.562(b), 63.562(b)(2)<br>Delete 63.567(b), 63.567(b)(1)   |
| 14.5   | Revised by Application<br>23854                    |   | Delete 63.560(c)<br>Delete 63.562, 63.562(b), 63.562(b)(2)<br>Delete 63.567(b), 63.567(b)(1)  |
| 14.6   | Table IV-D.3<br>63.651(c)                          | S108  | Change description to read: “Marine Vessel Tank Loading Operations Provisions; exceptions from 63 Subpart Y – The notification reports under §63.567(b) are not required”   |
| <b>21</b>  |  |   | <b>Miscellaneous Errors with explanations of each</b>   |
| 21.1A  | Table II-A1  | S973  | Correct Grandfathered Limit or Firm Limit and Basis Column from “Part B6B” to “Part B7B, combined limit with S974”<br>Correct error   |
| 21.1B  | Table II-A1  | S974  | Correct Grandfathered Limit or Firm Limit and Basis Column from “Part B6B” to “Part B7B, combined limit with S973”<br>Correct error   |
| 21.2   | Table IV-A.1                                       | S935<br>S937  | Add “Firm Limit” to Correct Grandfathered Limit or Firm Limit and Basis Column<br>Correct omission  |
| 21.4   | Table IV-C.4.3<br>Table IV-C.4.6<br>Table IV-C.4.7 | S917 S919<br>S951 S971<br>S972 S973<br>S974<br>S1106<br>S1470<br>S1511<br>S1512 | Delete all rows for 40 CFR 60 Appendix F.<br>The sources in these tables are subject to 40 CFR 60 Subpart J by date of construction or reconstruction.<br>Subpart J does not require compliance with 40 CFR 60 Appendix F.  |

| <b>Original Tesoro Renewed Title V Permit Appeal Details</b> |                                  |                                  |  |
|--|----------------------------------|----------------------------------|--|
| <b>Issue No.</b>   | <b>Permit Section</b>            | <b>Source</b>                    | <b>Basis for Appeal and Request for Modification</b>   |
| 21.4<br>Revised by App 23854                                 | Table IV-C.4.6<br>Table IV-C.4.7 | S1106<br>S1470<br>S1511<br>S1512 | Delete all rows for 40 CFR 60 Appendix F. S1106 and S1470 fire natural gas only and are not subject to Subpart J or to Appendix F (applicability imposed by the Consent Decree and Condition 23562). Sources S1511 and S1512 are the new DCU furnaces. They currently fire natural gas. If they fire fuel gas, it will not be either 40# or 100# fuel gas, for which the H2S CEMs are subject to Appendix F by the Consent Decree and Condition 23562, The new DCU fuel gas system will require a separate H2S CEM, which will not be subject to Appendix F because Subpart J does not require Appendix F for H2S CEMs on fuel gas systems.. |
| 21.5   | Table IV-G.8<br>60.695(b)        | S819                             | Delete "applies to A14 vapor recovery system"<br>Add "applies to A39"<br>Correct error   |
| 21.5   | Revised by Application<br>23854  |                                  | Delete 60.695(b)<br>The closed vent requirements in 40 CFR 60 Subpart QQQ do not apply to emission points vented to fuel gas systems (see definitions in 60.691).  |
| 21.6   | Table VII-C.1.1,<br>Row 5        | S901                             | Delete 1 <sup>st</sup> monitoring requirement for this limit:<br>Monitoring Requirement: BAAQMD Condition 11433, Part 11;<br>Monitoring Frequency: C<br>Monitoring Type: CEM<br>The FCCU mini bubble CO mass emission quantities are calculated using emission factors and methodology in the appendices of Condition 8077. The CEM was added only for compliance with the Consent Decree and related requirements   |
| 21.7   | Table VII-J.6                    | S590                             | Delete Condition 7405 monitoring requirement.<br>Change table to show no monitoring required;<br>Condition 7405 requirements have been deleted.  |
| 21.8   | Table IV-J.0                     | Area 6<br>Unit 50                | Delete "X" in column for 40 CFR 60 Subpart GGGa; 40 CFR 60 Subpart VVa for this Unit. Add "X" in column for 40 CFR 60 Subpart GGG; 40 CFR 60 Subpart VV.<br>Correct error.   |
| 21.9   | Table VII-B.6<br>Row 2           | S1005                            | Correct Throughput limit from 93.3 to 93 mmscf/day<br>The correct limit in Condition 24321, Part 1 is 93 mmscf/day.  |

| <b>Original Tesoro Renewed Title V Permit Appeal Details</b> |                         |               |  |
|--|-------------------------|---------------|--|
| <b>Issue No.</b>   | <b>Permit Section</b>   | <b>Source</b> | <b>Basis for Appeal and Request for Modification</b>   |
| 21.10  | Table VII-B.10<br>Row 2 | S1020         | Correct pH limit from “performance test limit” to “7.5”<br>Correct Liquid-to-gas ratio limit from ““performance test limit” to “1.5”<br>Incorporates the pH and liquid-to-gas ratio limits determined by the performance test for 40 CFR 63 Subpart UUU. |
| 21.13  | Table II-A1             | S612          | Correct capacity from 243K bbl/yr to 1,200K bbl/yr.<br>Throughput limit needs to match cited Firm Limit Condition 6740, Part 1.  |

**Application 23981, Title V Renewal Appeal # 3 & #4 S-613 and S-1025 Loading Rack**

**ENGINEERING EVALUATION**  
Tesoro Refining and Marketing Company  
PLANT NO. 14628  
**APPLICATION NO. 23891**

**BACKGROUND**

The Tesoro Refining and Marketing Company (Tesoro) is applying for an Administrative Change in Conditions to their Permit to Operate to revise Condition 21849 for the following equipment:

**S-613 Fixed Roof Tank A-613 with Internal Diaphragm Seal**  
**S-1025 Truck/Rail Bulk Plant, Gasoline, Naphtha, Kerosene, Diesel, Fuel Oil**

The issues addressed by this application are identified by the Tesoro Title V Appeal Items 3 and 4, summarized below:

| <b>Issue No.</b> | <b>Permit Section</b>                 | <b>Source</b> | <b>Basis for Appeal and Request for Modification</b>  |
|------------------|---------------------------------------|---------------|---|
| <b>3</b>         |                                       | <b>S-613</b>  | <b>S-613 is a Vapor Storage Tank subject to the requirements of Regulation 8 Rule 33 (8-33-308 and 8-33-502). It is not an organic liquid storage tank, and therefore is not subject to Regulation 8 Rule 5 or to 40 CFR 63 Subpart CC as shown in Table IV-F.3. S-613 should be removed from the Section IV-F and VII-F tank tables.</b> |
| <b>4</b>         | <b>Table IV-D.7<br/>Table VII-D.7</b> | <b>S-1025</b> | <b>S-1025 is gasoline loading rack. It is not subject to the Regulation 8, Rule 33 requirements for a vapor storage tank [8-33-308; 8-33-502]</b>   |

The specific changes to Condition 21849 are to the introduction and to Part 11:

S613 Vapor Recovery Tank A-613; Fixed Roof Tank, Capacity 420K Gallons,  
Storing: Organic ~~Liquid~~Vapor

11) To ensure that the S-1025 Bulk Plant Unloading Rack does not exceed an emission factor greater than 0.08 lb POC per 1000 gallons of material loaded, the owner/operator shall:

- a) not operate S-1025 unless vented to S-613 Vapor Recovery Tank ~~and/or~~ A-14 Vapor Recovery System.
- b) install a sample line from each of the pressure-vacuum valves located at the loading racks, which is easily accessible by District personnel to determine any valve leakage.
- c) install and maintain a pressure switch at the knockout pot, V-61, located at the interface of the vapor outlet of the S-1025 Loading Rack and the inlet to the A-14 Vapor Recovery and S-613 Vapor Recovery Tank

Systems. The pressure switch shall be set at 18 inches of water column as measured at the cargo tank/vapor coupler interface located the furthest from the knockout pot, V-61. If the pressure exceeds 18 inches, a high-pressure alarm will shutdown loading rack operations.

d) conduct District approved source tests to determine POC destruction efficiency at the following sources every 5 years ~~in the year prior to the Title V Permit Renewal~~ (initial compliance has been demonstrated in a source test for AN 6201 by TIAX on October 28, 2003).

S-908 No. 8 Furnace @ No. 3 Crude Unit

S-909 No. 9 Furnace @ No. 1 Feed Prep.

S-912 No. 12 Furnace @ No. 1 Feed Prep.

~~S-913 No. 13 Furnace @ No. 2 Feed Prep.~~

For each source, the owner/operator must measure the following:

- the fuel feed rate in pounds/hr
- the POC emission rate at the stack
- the flue gas flow rate in SCFM at the stack
- the oxygen content of the stack flue gas
- the stack temperature
- the destruction efficiency of POC as measured across the combustion device

The owner/operator shall submit individual copies of the results of the source tests (along with related calculations and process data) to the District's Engineering Division, Enforcement Division, and Source Test Section within ~~60~~45 days of the source test.

(basis: Cumulative Increase, Toxic Risk Screen, Regulation 8-33-301, Regulation 1-238, BACT)

These issues do not materially change the applicability or compliance of these sources nor are emissions changed by this application.

S-613 and S-1025 were out of service when the initial Title V permit was issued in 2003. In 2004, these sources were returned to service via Application 10668, Loading Rack Modernization Project.

In the Title V permits S-613 has been listed as a grandfathered organic liquid tank. In Application 10668, S-613 was refurbished by installing a double bottom and upgrading instrumentation and fire protection equipment. The evaluation of the tank refurbishment considered the changes an alteration assuming that there would be no increase in emissions, even though fugitive components were added as part of the refurbishment. The proper way to address a physical change like this to a grandfathered tank is to treat it as a modification and establish a 3-year baseline as required by Regulation 2, Rule 2. If S-613 was out of service during the baseline period, then it is likely that there would have been an increase in emissions, even aside from the fugitive component emissions. On the other hand, S-613 has vented to the vapor recovery system, both before and after the Loading Rack Modernization Project, so emission increases from the tank itself may have been



insignificant. Nonetheless, the Authority to Construct for the alteration was granted November 5, 2004.

In the Statement of Compliance section of the Application 10668 Engineering Evaluation, S-613 was identified as a vapor “bladder tank”, subject to Regulation 8, Rule 33, rather than Regulation 8, Rule 5. For unknown reasons this applicability did not make it into the Title V permit. This application corrects this omission.

The change in source test reporting requirements is consistent with recent agreements to allow 60 days for a source test report to be submitted.

The change to remove S-913 furnace from the testing requirements is another revision that should have been made previously. The fuel supply for S-913 was changed from the 40 lb fuel gas system to the 100 lb fuel gas system via 2005 Application 13047. It should have been removed from Condition 21849 (and others) at that time.

For S-1025 Loading Rack, the change proposed by this application is to remove Regulation 8 Rule 33 requirements for vapor storage tanks. These requirements would be applicable to S-613, so this change is acceptable and does not materially change the applicability of S-1025.

## **EMISSION CALCULATIONS**

There are no emission increases associated with this application.

## **STATEMENT OF COMPLIANCE**

This application does not change the compliance of either S-613 or S-1025.

The project is exempt from CEQA pursuant to Regulation 2-1-312.1:

312.1 Applications to modify permit conditions for existing or permitted sources or facilities that do not involve any increases in emissions or physical modifications.

The equipment is over 1000 feet from the nearest school and therefore not subject to the public notification requirements of Reg. 2-1-412.

PSD, BACT, Offsets, and Toxics do not apply.

## **PERMIT CONDITIONS**

Permit Condition 21849 Part 11 will be revised as shown above.

## **RECOMMENDATION**

It is recommended that an Administrative Change in Conditions to the Permit to Operate be granted to Tesoro for the following equipment:

**S-613 Fixed Roof Tank A-613 with Internal Diaphragm Seal**  
**S-1025 Truck/Rail Bulk Plant, Gasoline, Naphtha, Kerosene, Diesel, Fuel Oil**

By: \_\_\_\_\_  
Arthur P Valla  
Senior Air Quality Engineer  
April 18, 2012

**Application 24056, Title V Renewal Appeal Items # 21.3 and #22 Bubble Conditions**

**ENGINEERING EVALUATION**  
**Tesoro Refining and Marketing Company**  
PLANT NO. 14628  
**APPLICATION NO. 24056**

**BACKGROUND**

As part of the Title V Renewal Permit 2011 Appeal efforts, Tesoro Refining and Marketing Company is submitting several applications to address the Appeal items. This is one of those applications, an administrative change in conditions, to address the issues with the refinery emissions cap Condition 8077, mostly related to a CO emissions limit for the following sources:

- S-917            No. 1 HDS Prefract Reboiler (F17)**
- S-919            No. 2 HDS Depent Reboiler (F19)**
- S-922            No. 5 Gas Debutanizer Reboiler (F22)**
- S-927            No. 2 Reformer Heat/Reheating (F27)**
- S-934            Hydrocracker Stabilizer Reboiler (F34)**
- S-935            Hydrocracker Splitter Reboiler (F35)**
- S-971            No. 3 Reformer UOP Furnace (F53)**
- S-972            No. 3 Reformer Debutanizer Reboiler (F54)**
- S-973            No. 3 HDS Recycle Gas Heater (F55)**
- S-974            No. 3 HDS Fract Feed Heater (F56)**

There is also a separate appeal issue for the following source:

- S-1004            No. 2 Catalytic Reformer**

The specific appeal items covered by this application are 21.3 and 22, and are shown below:

| <b>Issue No.</b> | <b>Permit Section</b>        | <b>Source</b> | <b>Basis for Appeal and Request for Modification</b>   |
|------------------|------------------------------|---------------|--|
| 21.3             | Table IV-B.5, Condition 8077 | S1004         | Delete all rows for Condition 8077. S1004 is not listed in Introduction to Condition 8077 and there are no requirements in the permit condition for this source  |
| 22               |                              |               | CO limits are incorrectly shown in Condition 8077, Part B7A for S973, S974, S917, S919, S922, S927, S934, S935, S971, and S972. CO Source Test requirements are incorrectly shown in Condition 8077, Part B7D for S917 and S919. These conditions were incorrectly modified by Application 19647/19632 [Consolidation of Condition 4357 & Condition 8077] to add CO limits and source test requirements. Prior to that application, both Condition 4357 and Condition 8077 correctly contained a CO limit only for S908. |

| <b>Issue No.</b>  | <b>Permit Section</b>                         | <b>Source</b>  | <b>Basis for Appeal and Request for Modification</b>   |
|---|---|--|--|
| 22.1  | Section VI<br>Condition<br>8077, Part B7A     | S917<br>S919<br>S922<br>S927<br>S934<br>S935<br>S971<br>S972<br>S973<br>S974 | Delete 50 ppm from CO Limit column for the sources listed. Only S908 should list a CO limit in this permit condition.  |
| 22.2  | Section VI<br>Condition<br>8077, Part B7D     | S917<br>S919   | Remove source test requirement for CO emissions for S917 and S919 by deleting the following:<br>“and CO”<br>“, and 50 ppm”<br>“, respectively,”                              |
| 22.3  | Table VII-<br>C.4.2<br>Row 3                  | S922<br>S927<br>S934<br>S935   | Delete CO Limit and all monitoring requirements for Condition 8077, Part B7A for listed sources  |
| 22.4  | Table VII-<br>C.4.3<br>Row 2                  | S917<br>S919<br>S971<br>S972<br>S973<br>S974                                 | Delete CO Limit and all monitoring requirements for Condition 8077, Part B7A for listed sources<br>NOTE: This supersedes the change made to this row by Issue 17.12 for S972 |
| 22.5  | Table VII-<br>C.4.3<br>Row 1                  | S971<br>S972   | For monitoring for 400 ppm CO Limit from 9-10-305, Add “S972” to the S971 Monitoring Requirement<br>Delete the separate S972 Monitoring Requirements                         |
| In addition, the application added the following proposed change: |   |  |  |
| N/A   | Table IV-C.4.2<br>Condition<br>8077, Part B7D | S922<br>S927<br>S934<br>S935   | Correct Description to remove CO Source test.  |

In 2009, via Application 19647, the two Tesoro Refinery Emissions Cap Conditions 4357 and 8077 were consolidated in to one Condition. As a result of this consolidation, CO emission limits for the combustion sources listed at the beginning of this evaluation were added in error. Monitoring for these CO limits were added in error as well.

Tesoro and the District accepted these CO limits based on flawed rationale, and a comprehensive review of the permitting history for these sources has demonstrated that CO limits and the related monitoring were never imposed prior to the 2009 Application 19647, so therefore the removal of these limits and monitoring is justified as an administrative change of conditions. A summary of the permitting history is shown in the following table. The details of the permitting history are appended at the end of this evaluation.

| <b>New Source Review Application</b> | <b>Date &amp; Document</b>  | <b>Affected Sources</b>  | <b>NOx Control Added</b>              | <b>Limits Imposed</b>          |                         |
|--------------------------------------|---|--|---------------------------------------|--------------------------------|-------------------------|
|                                      |   |  |                                       | <b>NOx</b>                     | <b>CO</b>               |
| 26645 (No. 3 Reformer)               | 1978 (ATC)  | S971, S972 (NSR)   | LNB                                   | 0.09 lb/BBTU [75 ppmvd]@ 3% O2 | NA                      |
| 27769 (3 HDS)                        | 1982 (ATC and EVAL)   | S973, S974, S991 (NSR)   | SCR                                   | 40 ppmvd @ 3% O2               | NA                      |
| 32001 (S919)                         | 1986 (ATC)  | S919 (NSR - Reconstruction)                                    | "new" LNB                             | 60 ppmvd @ 3% O2               | NA                      |
| 164 (S917)                           | 1987 (ATC)<br>1988 (PTO)  | S917 (NSR - Replaced)  | "new" LNB                             | 60 ppmvd @ 3% O2               | NA                      |
| 548 (Hydrocracker Expansion)         | 1988 (ATC)<br>1992 (PTO)  | S922, S927, S934, S935 (install LNB)                           | "new" LNB                             | 60 ppmvd @ 3% O2               | NA                      |
| 3318 (RMEC)                          | 1991 (ATC)<br>1992 (EVAL)<br>Undated (Final Condition 4357 Changes for AN 3318) | S908 (install SCR - credits taken)                             | A908 SCR                              | 20 ppmvd @ 3% O2               | 100 ppmvd @ 3% O2       |
| 2813 (#3 Crude NOx & Reliability)    | 2001 (EVAL)<br>2001 (ATC)<br>2002 (PTO)   | S1470 (new)<br>S906 (demo)<br>S907 (demo)<br>S908 (new limits) | A908 SCR enlarged (shared S908/S1470) | 10 ppmvd @ 3% O2 (S908)        | 50 ppmvd @ 3% O2 (S908) |

Regarding the proposed revisions to S-1004 No 2 Catalytic Reformer, a review of the sources evaluated in 1982 Application 27769 No 3 HDS Project, when the Permit Condition for the Refinery emissions cap was created (initially un-numbered, eventually to be numbered Condition 4357, and currently numbered Condition 8077), S-1004 was not found to be included. However, in the review of the sources included in the Refinery Emissions Cap, several errors to the source list were discovered, and will be corrected by this application. These corrections are summarized below:

Sources currently in service and permitted by Application 27769:

- S850 No. 3 HDS Unit
- S851 Ammonia Recovery Unit
- S854 East Air Flare
- S856 Spare DEA Stripper

S973 No. 3 HDS Recycle Gas Heater (F55)  
S974 No. 3 HDS Fract Feed Heater (F56)  
S1024 No 3 HDS Feed Tank (Currently Exempt)  
S1401 Sulfur Recovery Unit  
S1421 ARU Sour Water Feed Tank

Tesoro has agreed to add these sources to the Condition 8077 Introduction if distinguished as NSR sources permitted by Application 27769.

Sources that are included in the Refinery Emissions Cap established by Application 27769, are currently in service, and are omitted from the source list in Permit Condition 8077:

S851 Ammonia Recovery Unit  
S922 No. 5 Gas Debutanizer Reboiler (F22)  
S927 No. 2 Reformer Heat/Reheating (F27)  
S950 50 Unit Crude Heater (F50)  
S1401 Sulfur Recovery Unit

Tesoro has agreed to add these omitted sources to the Condition 8077 Introduction.

There are other errors in Refinery Emissions Cap Condition 8077. The mass emissions limits included in this condition have not been updated for over a decade. Emission limit changes due to rule making, source modifications, and source removal have not been incorporated into the condition. Initially the District requested that these mass emission limit changes also be included in this application. It did not appear to make sense that only selected errors were addressed and other known errors were not addressed. However, correcting the mass emission limits of Condition 8077 requires a substantial effort, essentially requiring review of all refinery permitting for the past 30 years, and it was agreed to separate this effort from this application. Tesoro has committed to submitting an application to correct the remaining errors in Condition 8077 by September 30, 2012.

## **EMISSIONS SUMMARY**

There are no increases in emissions associated with this application. This application only completes the administrative effort to correct selected errors in Bubble Condition 8077.

## **STATEMENT OF COMPLIANCE**

There are no changes to the applicable requirements for the sources impacted by this application and there is no change to the compliance for these sources. However, at this time it is not possible to determine if the sources are in compliance with all rules, regulations and conditions. All sources in this application are subject to the refinery emissions cap and Tesoro is required to submit monthly compliance reports pursuant to Permit Condition 8077-B5. Engineering receives

a copy of this monthly report, but the report is unintelligible without any knowledge of how it is prepared. In order to determine if the sources are in compliance with the emissions cap, the methodology used to prepare the monthly report is needed. A request for this methodology was made through the Enforcement Division 4/19/12. According to the Enforcement Supervisor that received a response from Tesoro 6/4/12, Tesoro will allow the District to view the report methodology, but has refused to provide a copy of the report methodology to the District unless it is requested in writing. Consequently, it is not possible to determine if the sources impacted by this application are in compliance with all rules, regulations and conditions. Internal discussions are ongoing regarding how to address Tesoro's refusal to provide a copy of the refinery emissions cap report methodology. For the purposes of this application, compliance will remain the same (i.e. any compliance issues, if they exist, will be un-impacted by the proposed changes of this application).

## PERMIT CONDITIONS

Permit Condition 8077 will be revised as follows. Only the condition introduction and the Part B7 impacted by this application are shown.

### Condition 8077

Application 27769 The No. 3 HDS Unit (1981)

PERMIT NO. 3318: REFINERY MODERNIZATION PROJECT PERMIT CONDITIONS  
NEW PERMIT CONDITIONS FOR PERMIT NO. 3318

Application 14047: Clarify conditions to allow owner/operator to shutdown ammonia injection to A-31 SCR during both startup and shutdown of S-974 (Part A2A).

Application 19300 (December 2008) Added S-904 No. 6 Boiler House

Application 19647 (March 2009) Consolidate With Condition 4357

Administratively Revised by Application 19874 (July 2009) Updates for Combustion Sources

Administratively Changed by Application 21711 (May 2010) Deleted Parts A10-A14 (redundant or completed items). Revised Part B6B and deleted Part B6D (S848 out of service)

[Administratively Changes by Application 24056 \(June 2012\). Corrected source list and CO limits and monitoring in Part B7.](#)

Appendices A-D

Hyperlink to Appendix A to go here.

[http://www.baaqmd.gov/~media/Files/Engineering/Title%20V%20Permits/B2758%209/B2758-9\\_2005-08\\_reopen\\_02a.ashx](http://www.baaqmd.gov/~media/Files/Engineering/Title%20V%20Permits/B2758%209/B2758-9_2005-08_reopen_02a.ashx)

Hyperlink to Appendix B to go here.

[http://www.baaqmd.gov/~media/Files/Engineering/Title%20V%20Permits/B2758%209/B2758-9\\_2005-08\\_reopen\\_02b.ashx](http://www.baaqmd.gov/~media/Files/Engineering/Title%20V%20Permits/B2758%209/B2758-9_2005-08_reopen_02b.ashx)

Hyperlink to Appendix C to go here.

[http://www.baaqmd.gov/~media/Files/Engineering/Title%20V%20Permits/B2758%209/B2758-9\\_2005-08\\_reopen\\_02c.ashx](http://www.baaqmd.gov/~media/Files/Engineering/Title%20V%20Permits/B2758%209/B2758-9_2005-08_reopen_02c.ashx)

Hyperlink to Appendix D to go here.

[http://www.baaqmd.gov/~media/Files/Engineering/Title%20V%20Permits/B2758%209/B2758-9\\_2005-08\\_reopen\\_02d.ashx](http://www.baaqmd.gov/~media/Files/Engineering/Title%20V%20Permits/B2758%209/B2758-9_2005-08_reopen_02d.ashx)

S57 Tank A-57  
S323 Tank A-323  
S850 No. 3 HDS Unit ([Permitted by Application 27769](#))  
[S851 Ammonia Recovery Unit \(Permitted by Application 27769\)](#)  
[S854 East Air Flare \(Permitted by Application 27769\)](#)  
[S856 Spare DEA Stripper \(Permitted by Application 27769\)](#)  
S901 No. 7 Boiler  
S904 No. 6 Boiler  
S908 No. 3 Crude Heater (F8)  
S909 No. 1 Feed Prep Heater (F9)  
S912 No. 1 Feed Prep Heater (F12)  
S913 No. 2 Feed Prep Heater (F13)  
S915 Platformer Intermediate Heater  
S916 No. 1 HDS Heater (F16)  
S917 No. 1 HDS Prefract Reboiler (F17)  
S919 No. 2 HDS Depent Reboiler (F19)  
S920 No. 2 HDS Charge Heater (F20)  
S921 No. 2 HDS Charge Heater (F21)  
[S922 No. 5 Gas Debutanizer Reboiler \(F22\)](#)  
[S927 No. 2 Reformer Heat/Reheating \(F27\)](#)  
S928 HDN Reactor A Heater (F28)  
S929 HDN Reactor B Heater (F29)  
S930 HDN Reactor C Heater (F30)  
S931 Hydrocracker Reactor 1 Heater (F31)  
S932 Hydrocracker Reactor 2 Heater (F32)  
S933 Hydrocracker Reactor 3 Heater (F33)  
S934 Hydrocracker Stabilizer Reboiler (F34)  
S935 Hydrocracker Splitter Reboiler (F35)  
S937 Hydrogen Plant Heater (F37)  
[S950 50 Unit Crude Heater \(F50\)](#)  
S951 No. 2 Reformer Aux Reheater (F51)  
S952 Internal Combustion Engine  
S953 Internal Combustion Engine  
S954 Internal Combustion Engine  
S955 Internal Combustion Engine



- S956 Internal Combustion Engine
- S957 Internal Combustion Engine
- S958 Internal Combustion Engine
- S959 Internal Combustion Engine
- S960 Internal Combustion Engine
- S963 Gas Turbine 177
- S971 No. 3 Reformer UOP Furnace (F53)
- S972 No. 3 Reformer Debutanizer Reboiler (F54)
- S973 No. 3 HDS Recycle Gas Heater (F55) [\(Permitted by Application 27769\)](#)
- S974 No. 3 HDS Fract Feed Heater (F56) [\(Permitted by Application 27769\)](#)
- S1009 Alkylation Unit
- [S1024 No 3 HDS Feed Tank \(Permit Exemption by Application 27769\)](#)
- [S1401 Sulfur Recovery Unit](#)
- [S1421 Sour Water Feed Tank \(Permitted by Application 27769\)](#)

B7. Combustion Controls.

- A. Except during periods of startup or shutdown, emissions of nitrogen oxides (calculated as NO<sub>2</sub>) and carbon monoxide shall not exceed the following limits.

| NOx (ppmvd) | CO (ppmvd)        | Unit(s)                                      |
|-------------|-------------------|--|
| 10          | 50                | S-908  |
| 40          | <del>N/A 50</del> | S-973 and S-974                              |
| 60          | <del>N/A 50</del> | S-917, S-919, S-922,<br>S-927, S-934 & S-935 |
| 75          | <del>N/A 50</del> | S-971 and S-972                              |

Except for S-908, these limits shall be based on an 8 hour average and corrected to 3% excess oxygen on a dry basis. For S-908, the limit shall be based on a 3 (three) hour average and corrected to 3% excess oxygen.

(basis: cumulative increase, offsets, BACT)

- B. The sum of the maximum firing rates of the first two units listed in B4B above (S-973 and S-974) shall not exceed 123 MMBTU/hr. (basis: cumulative increase, offsets)
- C. For the furnaces listed in B4C above, Permittee/Owner/Operator shall demonstrate by source tests and calculations that, in the aggregate, NOx emissions do not exceed 160 lb. NOx per billion BTUs heat input when firing refinery fuel gas at, or as nearly as practicable to the maximum daily firing rates which occurred during the previous 6 months. Such demonstration shall be made annually. If aggregate emissions from these units exceed 160 lb. NOx per billion BTU heat input, Permittee/Owner/Operator will install additional controls on other refinery units so as to achieve the same amount of control that would be obtained if all of the units listed in B4C did achieve, in the aggregate, an emission rate of 160 lb. NOx/billion BTU heat input. (basis: cumulative increase, offsets)
- D. For the furnaces S917 and S919, Permittee/Owner/Operator shall demonstrate by source test that NOx ~~and CO~~ emissions do not exceed 60 ppmvd, ~~and 50 ppmv~~ at 3% oxygen, averaged over 8 hours, ~~respectively~~, when firing refinery fuel gas at, or as nearly as

practicable to the maximum daily firing rates which occurred during the previous 6 months. Such demonstration shall be made annually. (basis: cumulative increase, offsets)

## RECOMMENDATION

It is recommended that an Administrative Change in Conditions be granted to Tesoro for the following sources:

|               |  |
|---------------|--|
| <b>S-917</b>  | <b>No. 1 HDS Prefract Reboiler (F17)</b>         |
| <b>S-919</b>  | <b>No. 2 HDS Depent Reboiler (F19)</b>           |
| <b>S-922</b>  | <b>No. 5 Gas Debutanizer Reboiler (F22)</b>      |
| <b>S-927</b>  | <b>No. 2 Reformer Heat/Reheating (F27)</b>       |
| <b>S-934</b>  | <b>Hydrocracker Stabilizer Reboiler (F34)</b>    |
| <b>S-935</b>  | <b>Hydrocracker Splitter Reboiler (F35)</b>      |
| <b>S-971</b>  | <b>No. 3 Reformer UOP Furnace (F53)</b>          |
| <b>S-972</b>  | <b>No. 3 Reformer Debutanizer Reboiler (F54)</b> |
| <b>S-973</b>  | <b>No. 3 HDS Recycle Gas Heater (F55)</b>        |
| <b>S-974</b>  | <b>No. 3 HDS Fract Feed Heater (F56)</b>         |
| <b>S-1004</b> | <b>No. 2 Catalytic Reformer</b>                  |

By: \_\_\_\_\_  
Arthur Valla  
Senior Air Quality Engineer

\_\_\_\_\_  
June 6, 2012

## **Chronology of Permit Applications that Affected Condition 4357, Part 7A limits (Condition 8077, Part B7A]**

### **Application: 26645 – No. 3 Reformer Permit (S971 & S972)**

- Authority to construct from EPA issued December, 1978 – see Attached
- Contained permit conditions that established 75 ppmvd NOx limit (90 lb/BBTU/hr) and **no CO limit for S971 and S972.**
- It does not appear that permit conditions from ATC were added to the District's databank. Conditions were not included in the 12/1/2003 Rev 0 Title V permit. This was one of the first, if not the first, applications under the New Source Review rules and was handled by EPA rather than the local air district.
- These NOx limits were added to Part 7A of Condition 4357 with other changes for Application 3318 (see Application 3318 notes below).
- These NOx limits were consolidated into Part B7A of Condition 8077 with Application 19647.

### **Application: 27769 – 3HDS Permit (S973 & S974)**

- Authority to construct issued 2/11/1982 – see Attached
- Promulgated Condition 4357.
  - **No CO limits for any combustion sources.**
  - Specified NOx CEMS and NOx limits of 40 ppm @ 3% O<sub>2</sub>, 8 hour average for the new sources built under AN 27769 (**S973, S974**, and S991) [Part 7A]. These sources were constructed with SCRs (Appendix A, Group A). Per Appendix C, Group A sources were to use an emission factor of 50 lbs NOx per billion BTU for emissions estimates.
  - Listed **S971** and **S972** in Appendix A, Group B (Low NOx Burners) as S-1020 and S-1021 (later changed to S971 and S972, but not corrected in Appendices of AN 27769). Per Appendix C, Group B sources were to use an emission factor of 90 lbs/billion BTU (equivalent to 75 ppm) NOx for emissions estimates.
  - Listed **S922** and S950 in Appendix A, Group C as having O<sub>2</sub> analyzer NOx controls in baseline and future case. Per Appendix C, Group C sources were to use an emission factor of 160 lbs NOx per billion BTU for emissions estimates.
  - Listed S906, S907, **S908**, S909, S910, S911, S912, S913, S916, **S917**, S918, **S919**, S920, S921, S928, S929, S930, S931, S932, S933, S934, S935, S937, and S938 in Part 4C as requiring O<sub>2</sub> control only. These furnaces were in Appendix A, Group D and were to use an emission factor of 160 lb NOx per billion BTU for emissions estimates.
  - Listed S914, S915, S924, S925, S926, **S927**, S936, S939, S940, S941, S942, S951, Amorco heater in Appendix A, Group E (uncontrolled). Per Appendix C, Group E sources were to use an emission factor of 200 lbs NOx per billion BTU for emissions estimates.

### **Application: 32001 – S919 mods (1986/1987)**

- Authority to Construct issued 12/29/1986 – see attached
- Alterations to Furnace 19 at No. 2 HDS. Replace 40 existing burners with 10 new low-NOx burners. Remove internal re-radiating wall to improve energy efficiency. With lower oxygen levels for new burners, gross heat release at any rate will decrease resulting in reduction in emission of other pollutants besides NOx. Application showed NOx decrease of 11.8 tpy from LNB. LNB were RACT so no ERCs were allowed.
- Modified Condition 4357.
  - Reduced NOx cap in 4357 by 20 tpy (from 3330 to 3310 tpy).

- Removed S919 from Part 4C and from Group D and imposed 60 ppm NOx limit (3% O<sub>2</sub>; 8 hr average) for LNB. This is equivalent to 75 lb NOx/billion BTU for emission estimating purposes.
- **No CO limits imposed.**
- This NOx limit was added to Part 7A of Condition 4357 with other changes for Application 3318 (see Application 3318 notes below).
- This NOx limit was consolidated into Part B7A of Condition 8077 with Application 19647.

#### **Application: 164 – S917 replacement (1987)**

- Authority to Construct issued 8/24/1987 – see attached
- Permit to Operate issued 3/15/1988 – see attached
- Replace F17 at No. 1 HDS with new smaller more efficient furnace. Furnace has a one LNB and oxygen feedback control. Existing furnace heat release is 31 MMBTU/hr. New furnace design heat release 15 MMBTU/hr. NOx reduction about 50%. Max gross ht release will also decrease. Furnace had not been operated in about 2 years prior to AN. Application showed NOx decrease of 0.5 tpy from LNB. LNB were RACT so no ERCs were allowed.
- Modified Condition 4357.
  - Reduced NOx cap in 4357 by 2 tpy (from 3310 to 3308 tpy)
  - Removed S917 from Part 4C and from Group D and imposed 60 ppm NOx limit (3% O<sub>2</sub>; 8 hr average) for LNB. This is equivalent to 75 lb NOx/billion BTU for emission estimating purposes.
  - **No CO limit imposed.**
- This NOx limit was added to Part 7A of Condition 4357 with other changes for Application 3318 (see Application 3318 notes below).
- This NOx limit was consolidated into Part B7A of Condition 8077 with Application 19647.

#### **Application 548 – Hydrocracker Expansion Project (S922/S927/S934/S935)**

- Authority to Construct issued 10/21/1988 – see attached
- Permit to Operate issued 5/7/1992 – see attached
- Added LNB for S922, S927, S934 and S935. LNB were RACT so no ERCs were allowed.
- Promulgated Condition 1910 – See attached PTO
- Modified Condition 4357.
  - Reduced NOx cap in 4357 to 3182 tpy
  - Reduced hydrocarbon cap to 286 tpy (associated ERC application 2212 added back 10 tons to 296 tpy)
  - Removed S922 from Group C and imposed 60 ppm NOx limits (3% O<sub>2</sub>; 8 hr average) for LNB. This is equivalent to 75 lb NOx/billion BTU for emission estimating purposes.
  - Removed S934 and S935 from Part 4C and from Group D and imposed 60 ppm NOx limits (3% O<sub>2</sub>; 8 hr average) for LNB. This is equivalent to 75 lb NOx/billion BTU for emission estimating purposes.
  - Removed S927 from Group E and imposed 60 ppm NOx limits (3% O<sub>2</sub>; 8 hr average) for LNB. This is equivalent to 75 lb NOx/billion BTU for emission estimating purposes.
  - **No CO limits imposed.**
- These NOx limits were added to Part 7A of Condition 4357 with other changes for Application 3318 (see Application 3318 notes below). Other parts of Condition 1910 were also incorporated into Condition 4357 with Application 3318 changes.
- These NOx limits were consolidated into Part B7A of Condition 8077 with Application 19647.

### **Application 3318 – RMEC**

- Engineering Evaluation dated 10/7/1991 – see attached
- Authority to Construct issued 12/19/1991 – see attached
- ATC contained proposed changes to Condition 4357 to incorporate AN 3318. The ATC condition is unnumbered, but we can see that it later became Condition 8077 by comparing it with the version of Condition 8077 in Revision 4 and earlier versions of the Title V permit.
- RMEC Project planned to:
  - Construct No. 2 Hydrogen Plant
  - Add LNB to S908
- In the middle of the project, ATC 3318 was transferred to Air Products and renumbered for No. 2 Hydrogen Plant. A Permit to Operate was issued to Air Products for No.2 Hydrogen Plant containing the permit conditions that originated in the ATC 3318 permit condition.
- After the ATC was transferred to Air Products, the District approved and granted additional time for Tosco to install a new SCR (A908) at S908 rather than the originally planned LNB. This work was approved under ATC 3318.
  - The ATC original change to LNB removed S908 from Condition 4357, Part 4C and Group D and added it to the LNB group (60 ppm NOx limit).
  - The final change to SCR removed S908 from the LNB group and imposed 20 ppm NOx limit (3% O<sub>2</sub>; 3 hr average) and 100 ppm CO limit (3% O<sub>2</sub>, 3 hr average) for SCR.
- No PTO was issued to Tosco for Application 3318, and no final version of Condition 8077 issued in a PTO. Instead, Condition 4357 was changed to incorporate the proposed changes from the ATC permit condition as revised to incorporate only the conditions that applied to Tosco sources (and not to Air Products sources) and to incorporate conditions for the final configuration of S908 (SCR). Other changes were also incorporated to add permit condition requirements from earlier permit applications for sources in the “bubble”. The changes were made in accordance with the “final Condition 4357 changes for AN 3318” – see attached.
  - Although the “final Condition 4357 changes for AN 3318” document is undated, we know that it was incorporated into Condition 4357 (and not into Condition 8077) because the language in the markup matches Condition 4357 language found in later versions of the facility Permit to Operate and in the Title V permit, but does not match language in Condition 8077.
- It appears that Condition 8077 should never have been put into the District’s databank (permit to operate) because the final Application 3318 changes were incorporated into Condition 4357.

### **Application 2813 – 3 Crude NOx & Reliability**

- Engineering Evaluation dated 12/13/2001 – see attached
- Authority to Construct issued 12/19/2001 – see attached
- Project summary:
  - Construct new F71 (S1470) and route through existing SCR on S908 (A908) and through shared stack at S908
  - Permanently remove F6 and F7 (S906, S907) and use prior 3 year emissions as contemporaneous offsets for new S1470. Additional offsets were required and were paid with banked ERCs.
  - S1470 subject to BACT. S908 subject to same BACT limits as S1470 since they share a stack
    - 10 ppm NOx
    - 50 ppm CO
- S908 limits in Part 7A of Condition 4357 modified per markup in ??? – see Attached (were 20 ppm NOx and 100 ppm CO from AN 3318)

### **Application 3318 (RMEC) – S908 SCR & No. 2 H2 Plant (Air Products)**

- Originally installed LNB on S908 and built new No. 2 Hydrogen Plant (2 new furnaces with SCR)
- ATC (12/19/91) promulgated Condition 8077 (to replace Condition 4357)
  - Imposed 10 ppm NOx limit (3% O<sub>2</sub>; 8 hr average) and 50 ppm CO limit (3% O<sub>2</sub>; 8 hr average) on No. 2 Hydrogen Plant furnaces with SCRs
  - Removed S908 from Part 4C and from Group D and imposed 60 ppmv NOx limit (3% O<sub>2</sub>; 8 hr average) and 100 ppmv CO limit (3% O<sub>2</sub>; 8 hr average) on S908 with LNB.
  - Added note to Part 2A to reduce NOx cap by 58.2 tpy upon startup of No. 2 Hydrogen Plant
- #2 Hydrogen Plant was sold to Air Products and permit application was transferred to Air Products.
  - PTO never issued for AN 3318
    - Condition 8077 did not go to PTO, but it appears that it was not removed from the District's databank because both Condition 4357 and Condition 8077 were included in Tesoro's original Title V permit application
  - Mods proposed in Condition 8077 were made in Condition 4357 except specific requirements for #2 Hydrogen Plant sources were made in a new Condition for that facility.
- Tosco decided to put SCR rather than LNB on S908
  - Further reduced cap by 32.1 tpy for SCR vs LNB on S908 (Total of 58.2 + 32.1 tpy)
  - Imposed 10 ppm NOx limit (3% O<sub>2</sub>; 3 hr average) and 50 ppm CO limit (3% O<sub>2</sub>; 3 hr average) on S908 with SCR
  - Added S908 NOx and CO limit to Part 7A of Condition 4357 at some point

The following shows the permit condition language for the source test requirements to demonstrate compliance with the emission limits in Condition 4357, Part 7 and Condition 8077, Part B7A.

**Original Source Test Condition Language (from final changes to Condition 4357 for Application 3318)**

**4357-4E.** Annual source testing shall be completed on S-908, S- 917, S-919, S-934 and S-935 to demonstrate compliance with the NO<sub>x</sub>, CO and NH<sub>3</sub> emission limits in condition 7. Source tests shall be performed when firing refinery fuel gas at, or as nearly as practicable to, the maximum daily firing rates which occurred during the previous six months. Tosco shall provide to the District's Source Test Section, in writing and at least two weeks prior to testing, the proposed testing procedures, date and time. Source test procedures are subject to APCO approval.

**After AN 2813**

**4357-4E.** Annual source testing shall be completed on S-908, S- 917, S-919, S-934 and S-935 to demonstrate compliance with the NO<sub>x</sub>, CO and NH<sub>3</sub> emission limits in condition 7. Source tests shall be performed when firing refinery fuel gas at, or as nearly as practicable to, the maximum daily firing rates which occurred during the previous six months. Tosco shall provide to the District's Source Test Section, in writing and at least two weeks prior to testing, the proposed testing procedures, date and time. Source test procedures are subject to APCO approval. (Tosco may submit CEM data in lieu of source test data to demonstrate compliance with NO<sub>x</sub> emissions from S-908, since a CEM is required for that source.)

**Before AN 19647**

**4357-4E.** Annual source testing shall be completed on S-908, S- 917, S-919, S-934 and S-935 to demonstrate compliance with the NO<sub>x</sub>, CO and NH<sub>3</sub> emission limits in condition 7. Source tests shall be performed when firing refinery fuel gas at, or as nearly as practicable to, the maximum daily firing rates which occurred during the previous six months. Permittee/Owner/Operator shall provide to the District's Source Test Section, in writing and at least two weeks prior to testing, the proposed testing procedures, date and time. Source test procedures are subject to APCO approval. (Permittee/Owner/Operator may submit CEM data in lieu of source test data to demonstrate compliance with NO<sub>x</sub> emissions from S-908, since a CEM is required for that source.) (basis: cumulative increase, offsets, BACT)

**8077-B7D.** For the furnaces deleted from 4C above, namely sources 908, 917, 919, 934, 935, and 937, Permittee/Owner/Operator shall demonstrate by source test that NO<sub>x</sub> and CO emissions do not exceed the emission limits in Part B7A, when firing refinery fuel gas at, or as nearly as practicable to the maximum daily firing rates which occurred during the previous 6 months. Such demonstration shall be made annually. (basis: cumulative increase, offsets)

*COMMENTS: AN 19647 consolidated Condition 4357 and Condition 8077 with the intention to remove redundancy. Condition 4357 was archived and Condition 8077 and other Conditions for the sources in Condition 8077 were modified. Historical research indicates that original condition called "Condition 8077" was actually the AN 3318 ATC condition changes proposed for Condition 4357. Final changes from AN 3318 were made to Condition 4357. Condition 8077 was not removed from the Databank and was subsequently changed by other applications. Many of the changes made in AN 19647 (and subsequent Application 19874) need to be reconsidered based on the detailed historical research. Final changes will be made to create a single historically correct permit condition in the pending permit application to be submitted by September 30, 2012.*

**After AN 19647 and Before AN 19874**

**8077-B7D.** For the furnaces S908, S917, S919, S934, S935 and S937, Permittee/Owner/Operator shall demonstrate by source test that NO<sub>x</sub> and CO emissions do not exceed 60 ppmvd and 50 ppmv, at 3% oxygen, averaged over 8 hours respectively, when firing refinery fuel gas at, or as

nearly as practicable to the maximum daily firing rates which occurred during the previous 6 months. Such demonstration shall be made annually. The CO source test requirement shall not apply to S-937. (basis: cumulative increase, offsets)

*COMMENTS: This version of 8077-B7D is removed all sources with CEMS and also removed the allowance from Condition 4357-4E to allow CEMS data in lieu of source test data. This version of 8077-B7D is incorrect because it includes S937 which is not listed in Part B7A. S937 has two NOx mass emission limits from AN 28789 that were in Condition 4357-7D prior to AN 19647 and in Condition 677-1. The decision was made in AN 19647 to retain the limit in 677-1 but not to include the 4357-7D limit in the new Condition 8077. S937 has a NOx CEM and the District and Tosco reached agreement on a calculation methodology for the mass emission limits using the CEM data for S937 as part of AN 28789.*

*Background – Condition 8077-B7A and B7D. Part 7A in the original AN 27769 permit condition (see ATC in Attachment 1) listed the 40 ppm NOx limits for S973, S974, and S991, which were the new combustion sources (NSR) constructed by AN 27769. Source tests were not required to determine compliance with the NOx limits for S973, S974, and S991 because these sources were required to have NOx CEMS. Over time, as sources listed in Condition 4357 Part 4C (Appendix A, Group D) and other Appendix A Furnace Groups were controlled for NOx in permitting efforts that added source-specific NOx and/or CO limits, those sources were removed from Condition 4357 Part 4C and/or their original Appendix A, Furnace Group. The sources retrofitted with NOx controls and subject to a source-specific NOx limit were added to Part B7A by AN 3318. A source test requirement was added by AN 3318 in Condition 4357-4E for the sources that had been retrofitted with NOx controls and subject to a source-specific NOx or CO limit at that time. An allowance was made in the 4357-4E source test for submission of CEMS data in lieu of source test data for S908 NOx emissions because S908 had both a NOx and CO limit, but also had a NOx CEM. A source test was required for the CO limit, but CEM data was allowed for the NOx limit. There is a discrepancy in that S922 and S927 were added to Condition 4357-7A, but not to the source test requirement in Condition 4357-4E. Further research is needed to determine if those sources were equipped with NOx CEMS and so did not require a source test. AN 548 did not require NOx CEMS for S922, S927, S934 and/or S935 but did require that if source test results exceeded 66 ppmvd (60 ppmvd limit + 10%), then CEMS were required. At some point, yet to be determined in our research, S922, S927, S934/S935 have been equipped with NOx CEMS.*

#### **After AN 19874**

**8077-B7D.** For the furnaces S917 and S919, Permittee/Owner/Operator shall demonstrate by source test that NOx and CO emissions do not exceed 60 ppmvd, and 50 ppmv at 3% oxygen, averaged over 8 hours, respectively, when firing refinery fuel gas at, or as nearly as practicable to the maximum daily firing rates which occurred during the previous 6 months. Such demonstration shall be made annually. (basis: cumulative increase, offsets)

*COMMENTS: S908, S934, S935 and S937 were removed from 8077-B7D by AN 19874 because they have NOx CEMS. Specific NOx and (incorrect) CO limits added for remaining sources based on Condition 8077-B7A after AN 19647. It was correct to remove S937 since it is not listed in Part B7A, but by adding the incorrect CO limits from Part B7A for S917 and S919, correcting 8077-B7D for Application 24056 requires rewriting the condition.*





**Application 24065, Title V Renewal Appeal Items # 2 and #21.11 Flares**

**ENGINEERING EVALUATION**  
**Tesororo Refining and Marketing Company**  
PLANT NO. 14628  
**APPLICATION NO. 24065**

**BACKGROUND**

As part of the Title V Renewal Permit 2011 Appeal efforts, Tesoro Refining and Marketing Company is submitting several applications to address the Renewed Title V Permit Appeal items. This is one of those applications, an administrative change in conditions, to address flare issues of the following sources:

- S-854**      **East Air Flare**
- S-943**      **Tank A-691 Safety Flare**
- S-944**      **North Steam Flare**
- S-945**      **South Steam Flare**
- S-992**      **Emergency Flare**
- S-1012**     **West Air Flare**
- S-1013**     **Ammonia Plant Flare**
- S-1517**     **Coker Flare**
- S-1524**     **No 50 Crude Unit Flare**

The specific appeal items covered by this application are #2 and 21.11, summarized below:

| <b>Issue No.</b> | <b>Permit Section</b>   | <b>Source</b>                           | <b>Basis for Appeal and Request for Modification</b>  |
|------------------|---|---|---|
| <b>2</b>         | <b>Table II-A.1 and II-B<br/>Tables IV-C.2.1 and VII-C.2.1<br/>Section VI<br/>Condition<br/>24323</b> | <b>All Flares</b>                       | <b>All references to flares as control devices should be removed from the permit. In the Statement of Basis for the Renewal Permit in the <i>Complex Applicability Determination</i> section titled <i>Applicability of NSPS Subpart A 60.18 and NESHAP Subpart A 63.11 to Refinery Flares</i>, the District stated that the facility flares are not used as control devices.</b> |
| 21.11            | Table VII-C.2.1<br>Row 1  | S854<br>S992<br>S1012<br>S1517<br>S1524 | Subpart J and Consent Decree H2S limit  |

Details of the Appeal items are included at the end of this evaluation.

There are three changes proposed by this application:

1. Removal the 60.18 requirement for S-1524 Condition 24323-4.
2. Removal of "abates" from the flare descriptions in Table IIA.
3. Removal of the NSPS monitoring requirement of 60.105.

The first two items are Appeal Item # 2 and the third item is Appeal Item # 21.11.

1. Removal the 60.18 requirement for S-1524 Condition 24323-4.

The original Tesoro refinery design included several blowdown towers that collected selected refinery discharges and vented any vapors in the discharges to the atmosphere. Tesoro and the District executed a Compliance and Enforcement Agreement that required the removal of all blowdown towers.

For all blowdown towers except the one located in the 50 Crude Unit, the streams routed to the blowdown towers were rerouted to other systems, including the main refinery flare system. At 50 Crude Unit, the discharges that flowed to the S-834 No 50 Crude Unit Blowdown Tower could not be routed to the main refinery flare system because of high back pressures (50 Unit is in a location remote from the main Tesoro process block). Therefore, a new Flare S-1524 was installed.

One of the reasons for the Compliance and Enforcement Agreement was the inability to monitor leakage from the S-1001 No 50 Crude Unit discharge streams routed to the blowdown tower, as required by Regulation 8, Rule 18 and Rule 28. When the S-1524 flare was initially granted an Authority to Construct June 23, 2009 via Application 18752, the determination in the Engineering Evaluation was that NSPS 60 CFR 60.18 was applicable and this requirement was included in the permit conditions. The justification for the 2009 Application 18752 60.18 determination for S-1524 was that the same 50 Unit leaks were subject to NSPS Subpart GGGa or Subpart GGG (through MACT Subpart CC), and when the control requirements of GGG or GGGa were satisfied by a flare, then the requirements of 60.18 were triggered.

Since Application 18752 was approved in 2009 for S-1524, a new 60.18 determination was completed. This determination concluded that the Tesoro refinery flares were not control devices used to meet the requirements of NSPS, therefore 60.18 does not apply. This application proposes to change the S-1524 requirements to be consistent with the new 60.18 determination.

The removal of the NSPS 60 CFR 60.18 requirement for S-1524 in Condition 24323-4 is justified based on this new 60.18 Determination. (This 60.18 Determination is contained in the Renewed Title V Permit Statement of Basis.)

2. Removal of "abates" from the flare descriptions in Table IIA.

Tesoro proposed the removal of any reference to flares as abatement devices based on the "60.18 Determination" contained in the Renewed Title V Permit Statement of Basis. In this determination, flares were not considered control devices for the purposes of NSPS, NESHAPS and MACT. Tesoro considers abatement device and control device synonymous and therefore proposed any reference to flares as an abatement device be deleted.

The District considers flares to be abatement devices as defined in Regulation 1-240:

**1-240 Abatement Device:** Any equipment or process whose sole purpose is to reduce the

amount of one or more pollutants from the source.

Tesoro does not agree that flares are abatement devices as defined in Regulation 1-240 because Tesoro considers flares primarily as safety devices. Considering the flares as safety devices means the sole purpose of flares is not to reduce pollutants.

The District does not define "Safety device" in the regulations, so there is no justification to consider flares as exclusively safety devices, and there is nothing that prevents flares from being considered both abatement devices and safety devices. Historically flares have been considered as part of the refinery relief and blowdown safety systems that are designed to protect refinery equipment and staff during upset conditions. However, the actual safety devices are the valves, control systems, and pressure relief valves that are designed to handle the excess process waste gas when it occurs during upsets. Once these safety devices vent excess process gas, then the sole purpose of the flare is to reduce the amount of pollutants (hydrocarbons). If the flare did not exist and function to reduce hydrocarbons, the result would be both excessive emissions and a hazardous hydrocarbon cloud with the obvious safety implications. Combustion of excess process gas at a flare reduces the amount of hydrocarbon pollutants. Considering the excess process gas a hydrocarbon emission or a safety hazard (e.g. potentially resulting in an explosion) is not mutually exclusive.

The District does concur with the conclusion that Flares are not control devices for the purposes of federal regulations.

Therefore, Tesoro and the District agreed to distinguish the difference between control devices and abatement devices. This will be accomplished by revising the footnotes for Table II-A1 and Table II-B in the Renewed Title V Permit to read as follows:

Note 1: The main refinery hydrocarbon flares that reference this note are operated in accordance with the refinery Flare Minimization Plan required by Regulation 12, Rule 12. Under normal operation, refinery waste gas from most process units is discharged into the Flare Gas Recovery Header where it is gathered, compressed, and discharged into the refinery's 100# fuel gas system. In the 100# fuel gas system, the recovered waste gas is treated and combusted at the fuel gas combustion devices in that system. Under non-routine operation, when the quantity of the refinery waste gas exceeds the capacity of the flare gas recovery compressors, or when there is an event that automatically or manually vents excess process gas, the gas that is not recovered to the 100# fuel gas system is combusted in the flares. Sources that are vented to the flare gas recovery system are process units S802, S815, S816, S817, S850, S1001 (via A1524 vapor recovery system), S1002, S1003, S1004, S1005, S1006, S1007, S1008, S1009, S1020, S1038, S1105, S1510, tanks S656 and S658, and the Air Products No. 2 Hydrogen Plant. During normal operation, the emissions from many other refinery sources such as tanks, oil water separators, and product loading operations are vented to the A-14 Vapor Recovery System and routed to the refinery's 40# fuel gas system where they are combusted at the fuel gas combustion devices in that system. Under non-routine operation, when the quantity of gas exceeds the capacity of the A-14 vapor recovery system compressors, or when there is an event that automatically or manually vents excess process gas, the gas that is not recovered to the 40# fuel gas system is vented to

the refinery's flare gas recovery system header where it is managed in the 100# fuel gas system as discussed above or combusted in the flares. Sources that are vented to the A-14 vapor recovery system and the 40# fuel gas system are S100, S532, S815, S816, S817, S819, S1006, S1007, S1008, S1020, S1025, S1484, S1510, S1526, tanks S134, S137, S318, S323, S327, S367, S432, S513, S603, S613, S656, S658, S699, S714, and S1496. These flares are abatement devices as defined in Regulation 1-240. However, these flares are not control devices that are used to meet the requirements of 40 CFR 60, 40 CFR 61, or 40 CFR 63 (NSPS, NESHAPS or MACT) since refinery waste gas is combusted in the flares only during non-routine operation.

Note 2 – S943 operation. S943 is the tank 691 (Refrigerated Butane Tank S691) safety flare. During routine operation, the butane tank is abated by a refrigeration system A21. A21 functions as a flare gas recovery system and controls the temperature and thus the pressure in the tank to maintain the butane as a liquid and prevent release of butane vapor. Butane is routed to and flared in S943 only during non-routine operations when the temperature and pressure in the tank increases and butane vapor is released.

Note 3 – S1013 operation. The ammonia plant flare is operated in accordance with the Refinery Flare Minimization Plan required by Regulation 12, Rule 12. S1013 is a safety flare device for pressure reliefs and control valves from the DEA regenerator (S825), Ammonia Recovery Unit (S851), Spare DEA Stripper (856), Scot Tailgas Unit (A1402) and Sulfur Recovery Unit (SRU) (S1401). S1013 does not receive any vent gas generated during routine operation. This flare is an abatement device as defined in Regulation 1-240. However, this flare is not a control device that is used to meet the requirements of 40 CFR 60, 40 CFR 61, or 40 CFR 63 (NSPS, NESHAPS or MACT) since refinery waste gas is combusted in the flare only during non-routine operation.

Note 4 -- S1524 operation. The 50 Unit Flare (S1524) is operated in accordance with the Refinery Flare Minimization Plan required by Regulation 12, Rule 12. Under normal operation, including planned startup and shutdown operation, waste gas from 50 Unit (S1001) is discharged into the A1524 50 Crude Unit Vapor Recovery System where it is gathered, compressed, and routed to the wet gas header at No. 5 Gas Plant (S1526), where it joins the main refinery flare gas recovery system and is managed as described in Note 1 above. Under non-routine operation, when the quantity of the 50 Unit (S1001) waste gas exceeds the capacity of the A1524 vapor recovery system, or when there is an event that automatically or manually vents excess process gas from 50 Unit, the 50 Unit waste gas that is not recovered to the refinery's main flare gas recovery system is combusted in the 50 Unit flare. This flare is an abatement device as defined in Regulation 1-240. However, this flare is not a control device that is used to meet the requirements of 40 CFR 60, 40 CFR 61, or 40 CFR 63 (NSPS, NESHAPS or MACT) since refinery waste gas is combusted in the flare only during non-routine operation.

### 3. Removal of the NSPS monitoring requirement of 60.105.

Tesoro proposed the removal of the 60.104(a)(1) fuel gas H2S standard monitoring as required by 60.105(a)(3) or (a)(4) as stipulated by the Consent Decree (CD). However, the District is not a party to the Consent Decree, and is unable to remove federal requirements that are based on regulatory applicability.

A detailed review of all gases that flow to the flares was conducted. Most gas streams are exempt from the 60.104(a)(1) fuel gas H2S standard and the associated 60.105(a)(3) or (a)(4) monitoring as summarized in the following table:

| <b>Gas to Flare</b>        | <b>Exemption from Standard</b>        | <b>Exemption from Monitoring</b>      | <b>Comment</b>   |
|----------------------------|---------------------------------------|---------------------------------------|--|
| Routine Refinery Operation | N/A -- No Vent Gas flow to the Flares | N/A -- No Vent Gas flow to the Flares | Only Purge gas and Pilot gas are burned during routine refinery operation.   |
| Process Upset Gas          | 60.104(a)(1)                          | 60.105(a)(4)(iv)                      | Process Upset Gas is defines in 40 CFR 60.101(e) as any gas generated during Startup, Shutdown, Upset or Malfunction |
| Pilot Gas (Natural Gas)    | 60.101(d)*                            | 60.105(a)(4)(iv)(A)                   |  |
| Pilot Gas (Other Gas)      | N/A                                   | 60.105(a)(4)(iv)(A)                   |  |
| Purge Gas(Natural Gas)     | 60.101(d)*                            | N/A                                   |  |
| Purge Gas(Nitrogen)        | N/A                                   | N/A                                   | Nitrogen is not burned.  |
| Purge Gas(Other Gas)       | N/A                                   | N/A                                   |  |
| Relief Valve Leakage       | 60.104(a)(1)                          | 60.105(a)(4)(iv)                      |  |

\* The H2S standard applies to fuel gas burned. The 60.101(d) definition of fuel gas includes natural gas only if it is combined and combusted with other gas generated at the refinery. Therefore, the H2S standard does not apply to natural gas.

Tesoro has provided the following information regarding all gases sent to the flares:

| <b>Source</b> | <b>Description</b>             | <b>Process Vent Gas</b>                      | <b>Pilot Gas</b>        | <b>Purge Gas</b>        |
|---------------|--------------------------------|--|-------------------------|-------------------------|
| S-854         | East Air Flare                 | Only During Startup, Shutdown or Malfunction | Exclusively Natural Gas | Exclusively Natural Gas |
| S-943         | Butane Tank A-691 Safety Flare | Only During Startup, Shutdown or Malfunction | Exclusively Natural Gas | Exclusively Natural Gas |
| S-944         | North Steam Flare              | Only During Startup, Shutdown or Malfunction | Exclusively Natural Gas | Exclusively Natural Gas |
| S-945         | South Steam Flare              | Only During Startup, Shutdown or Malfunction | Exclusively Natural Gas | Exclusively Natural Gas |
| S-992         | Emergency Flare                | Only During Startup, Shutdown or Malfunction | Exclusively Natural Gas | Exclusively Natural Gas |

| Source | Description            | Process Vent Gas                             | Pilot Gas               | Purge Gas                              |
|--------|------------------------|--|-------------------------|--|
| S-1012 | West Air Flare         | Only During Startup, Shutdown or Malfunction | Exclusively Natural Gas | Exclusively Natural Gas                |
| S-1013 | Ammonia Plant Flare    | Only During Startup, Shutdown or Malfunction | Exclusively Natural Gas | Exclusively Natural Gas                |
| S-1517 | Coker Flare            | Only During Startup, Shutdown or Malfunction | Exclusively Natural Gas | Exclusively Natural Gas                |
| S-1524 | No 50 Crude Unit Flare | Only During Startup, Shutdown or Malfunction | Exclusively Natural Gas | Nitrogen, with a backup of Natural Gas |

Based on the information summarized in the table above, it can be concluded that only 'exempt' gas will be burned at the Tesoro Flares. Therefore, Tesoro and the District have agreed to show the NSPS Subpart J monitoring that is subject to this application as follows:

**Table VII – C.2.1  
 Applicable Limits and Compliance Monitoring Requirements  
 Flares Subject to NSPS  
 S854-East Air Flare, S992-Emergency Flare, , S1012 West Air Flare,  
 S1517- Coker Flare, S1524-50 Unit Flare**

| Type of Limit | Citation of Limit   | FE Y/N | Future Effective Date | Limit   | Monitoring Requirement Citation   | Monitoring Frequency (P/C/N)            | Monitoring Type                                 |
|---------------|---------------------|--------|-----------------------|---|---|---|---|
| SO2           | 40 CFR 60.104(a)(1) | Y      |                       | H2S in fuel gas burned $\leq$ 230 mg/dscm (0.1 gr/dscf), except process upset gases, relief valve leakage or emergency malfunctions | 40 CFR 60.105(a)(4)(iv) exemption from 40 CFR 60.105(a)(4) and 60.105(e)(3) | P/E Within 15 Days of Loss of Exemption | Monitoring of flare gas composition and records |
| SO2           | 40 CFR 60.104(a)(1) | Y      |                       | H2S in fuel gas burned $\leq$ 230 mg/dscm (0.1 gr/dscf), except process upset gases, relief valve leakage or emergency malfunctions | Condition 24324, Part 2   | None                                    | N/A   |

The first row shows the standard, the exemption, and the action taken if, for any reason, the exemption is lost. This action is a requirement of 40 CFR 60.105(a)(4)(iv), as highlighted below:

(iv) The owner or operator of a fuel gas combustion device is not required to comply with paragraph (a)(3) or (4) of this section for fuel gas streams that are exempt under §60.104(a)(1) and fuel gas streams combusted in a fuel gas combustion device that are inherently low in sulfur content. Fuel gas streams meeting one of the

requirements in paragraphs (a)(4)(iv)(A) through (D) of this section will be considered inherently low in sulfur content. If the composition of a fuel gas stream changes such that it is no longer exempt under §60.104(a)(1) or it no longer meets one of the requirements in paragraphs (a)(4)(iv)(A) through (D) of this section, the owner or operator must begin continuous monitoring under paragraph (a)(3) or (4) of this section within 15 days of the change.

The first row is consistent with the regulatory requirement of NSPS

The second row shows the standard and the Consent Decree provision for no monitoring (as codified in Condition 24324).

## **EMISSIONS SUMMARY**

There are no increases in emissions associated with this administrative change in conditions application. Even though the removal of the 40 CFR 60.18 requirements from S-1524 could be interpreted to impact flare emissions, Tesoro has stated in Application 18752 (that imposed the 60.18 requirements) that S-1524 50 Unit Flare was designed to be in compliance with 60.18. Therefore, since S-1524 was designed and installed in compliance with 60.18, there removal of the 60.18 requirements from the S-1524 permit conditions does not, in fact, impact emissions.

## **STATEMENT OF COMPLIANCE**

This application does not change the compliance of the flares. The flares remain in compliance with all applicable District and Federal regulations. These include the following:

Regulation 6, Rule 1, Particulate Matter; General Requirements  
Regulation 12, Rule 11, Flare Monitoring at Petroleum Refineries  
Regulation 12, Rule 12, Flares at Petroleum Refineries

and

NSPS 40 CFR 60 Subpart J.

## **PERMIT CONDITIONS**

Permit conditions 23129, Part 56 and 24323, Parts 4 and 10 will be revised as follows:

Condition 23129

Application 14141/14144 Coker Modification Project

Modified by Application 16389/16390 and



Application 18311 (Modify Part 26 – Initial source tests for heaters).

Application 20679/20680 (July 2009) Revise throughput in Part 3

Application [24065 \(July 2012\) Revised Part 56 to include purge gas.](#)

[Parts 1-49 omitted since not pertinent to Flare S-1517]

Flare S-1517

50. The owner/operator of S-1517 shall not exceed Ringelmann Number 1.0 for three minutes in any consecutive 60-minute period or result in fallout on adjacent property in such quantities as to cause a public nuisance per Regulation 1-302. (basis: Regulation 6-1, and Regulation 1)

51. The owner/operator of S-1517 shall use steam in the flare to minimize smoking. (basis: BACT)

52. The owner/operator of S-1517 shall have a hydrocarbon destruction efficiency of at least 98.5 wt.% POC on a mass basis: (basis: BACT)

53. The owner/operator of S-1517 shall not exceed 1,314,000 standard cubic feet of natural gas for flare pilots in any consecutive 12-month period. (basis: cumulative increase)

54. The owner/operator shall comply with the requirements of 40 CFR 60, Subpart J. (basis: NSPS 40 CFR 60, Subpart J)

55. The owner/operator of S-1517 shall install H<sub>2</sub>S continuous monitoring and recording system to verify compliance with the requirement of Regulation 12-11. The owner/operator shall maintain the equipment in accordance with manufacturer's recommendations. (basis: Regulation 12, Rule 11)

56. The owner/operator of S-1517 shall fire only natural gas at all flare pilots [and purge gas.](#) (basis: cumulative increase)

57. The owner/operator shall maintain all records and reports required by this permit in a District-approved log. The following records shall be kept on site and made available for District inspection for a period of at least 5 years from the date on which a record is made. (basis: Regulation 2-6-501)

a. The continuous H<sub>2</sub>S concentration at source S-1517.

b. Total daily flow rate of the gas through the flare, summarized in a consecutive 12-month period.

Contemporaneous Emissions reduction credit

58. Deleted. (Sources S-806, S-808, S-836,

S-837, S-838, S-903, S-923, S-924 and S-925 were shutdown and removed from the Owner/Operator's permit via Application 18739.)

### Condition 24323

Application 18752 (May 2009)

Application 24065 (July 2012) Deleted Part 4 and revised Part 10.

No. 50 Crude Unit Blowdown Tower S-834 Replacement Project  
S-1001 No. 50 Crude Unit  
A-1524 No. 50 Crude Unit Vapor Recovery System  
S-1524 No. 50 Crude Unit Flare

1. Notwithstanding any provision of District regulations allowing for the malfunction of A-1524 due to a valid breakdown, the Owner/Operator shall operate S-1001 50 Crude Unit only when A-1524 Vapor Recovery System is in operation. (Basis: Cumulative Increase, Consent Decree §235(a))
2. The Owner/Operator shall only operate S-1524 50 Crude Unit Flare during upsets, malfunctions or emergencies. (Basis: BACT, Cumulative Increase)
3. The Owner/Operator of S-1524 50 Crude Unit Flare shall comply with all applicable requirements of NSPS Subpart J. (Basis: NSPS)
4. ~~Deleted. (40 CFR 60.18 is not applicable to S-1524). The Owner/Operator of S-1524 50 Crude Unit Flare shall comply with NSPS Subpart A, 40 CFR 60.18. (Basis: NSPS)~~
5. Deleted. (FMP Update submitted July 31, 2009.)
6. The owner/operator of S-1524 shall use steam assisted, staged combustion in the flare to minimize smoking. (Basis: BACT)
7. The owner/operator of S-1524 shall have a hydrocarbon destruction efficiency of at least 98% POC on a mass basis: (basis: BACT)
8. The owner/operator of S-1524 shall not exceed 3,942,000 standard cubic feet of natural gas for flare pilots in any consecutive 12-month period. The owner/operator shall fire only natural gas at all flare pilots. (Basis: cumulative increase)
9. The owner/operator of S-1524 shall install H<sub>2</sub>S continuous vent gas monitoring and recording system to verify compliance with the requirement of Regulation 12-11. The monitoring system shall be designed and operated

such that gas samples are taken at a location that ensures accurate vent gas composition. The owner/operator shall maintain the equipment in accordance with manufacturer's recommendations. (Basis: Regulation 12-11-501 and 12-11-506)

10. The owner/operator of S-1524 shall not exceed 3,767,000 standard cubic feet of natural gas for the flare purge in any consecutive 12-month period. The Owner/operator shall use only natural gas or nitrogen for the flare purge gas, except during periods of natural gas curtailment, when refinery fuel gas ~~or nitrogen~~ may be used if written notification is sent to the District. (Basis: cumulative increase, NSPS Subpart J)
11. The owner/operator shall maintain all records and reports required by this permit in a District-approved log. The following records shall be kept on site and made available for District inspection for a period of at least 5 years from the date on which a record is made. (basis: Regulation 2-6-501)
  - a. The continuous vent gas H<sub>2</sub>S concentration at source S-1524.
  - b. Total daily flow rate of the gas through the flare, summarized in a consecutive 12-month period.
  - c. Total daily flow rate of the pilot gas to the flare, summarized in a consecutive 12-month period
  - d. Total daily flow rate of the purge gas through the flare, including the type of gas and the reason natural gas was not used, when applicable, summarized in a consecutive 12-month period

## RECOMMENDATION

It is recommended that an Administrative Change in Conditions be granted to Tesoro for the following sources:

|               |                                |
|---------------|--------------------------------|
| <b>S-854</b>  | <b>East Air Flare</b>          |
| <b>S-943</b>  | <b>Tank A-691 Safety Flare</b> |
| <b>S-944</b>  | <b>North Steam Flare</b>       |
| <b>S-945</b>  | <b>South Steam Flare</b>       |
| <b>S-992</b>  | <b>Emergency Flare</b>         |
| <b>S-1012</b> | <b>West Air Flare</b>          |
| <b>S-1013</b> | <b>Ammonia Plant Flare</b>     |
| <b>S-1517</b> | <b>Coker Flare</b>             |
| <b>S-1524</b> | <b>No 50 Crude Unit Flare</b>  |

By: \_\_\_\_\_  
Arthur Valla  
Senior Air Quality Engineer

\_\_\_\_\_  
July 11, 2012

### Tesoro Appeal Item Details for Application 24065

|          |   |  |  |
|----------|---|--|--|
| <b>2</b> |   |  | <b>All references to flares as control devices should be removed from the permit. In the Statement of Basis for the Renewal Permit in the <i>Complex Applicability Determination</i> section titled <i>Applicability of NSPS Subpart A 60.18 and NESHAP Subpart A 63.11 to Refinery Flares</i>, the District stated that the facility flares are not used as control devices.</b>                              |
| 2.1      | Table II-A.1                                | S854<br>S944<br>S945<br>S992<br>S1517<br>S1524 | For each source:<br>Delete "Abates: See Note 1"<br>Add "Refer to Flare Minimization Plan"  |
| 2.2      | Table II-A.1                                | S943   | Delete "Abates: S691"<br>Add "Refer to Flare Minimization Plan"  |
| 2.3      | Table II-A.1                                | S1013  | Delete "Abates: S825 S851, S856, S1401, A1402"<br>Add "Refer to Flare Minimization Plan"   |
| 2.4      | Table II-A.1                                |  | Delete Notes 1, 2, and 3 at end of the table.  |
| 2.5      | Table II B                                  | S943,<br>S1013                                 | Delete Rows for S943 and S1013   |
| 2.6      | Table IV-C.2.1<br>Condition<br>24323 Part 4 | S1524  | Delete Part 4 (requirement to comply with 40 CFR 60 Subpart A, 60.18 requirements for flares as abatement devices)   |
| 2.7      | Section VI<br>Condition<br>24323 Part 4     | S1524  | Delete Part 4 (requirement to comply with 40 CFR 60 Subpart A, 60.18 requirements for flares as abatement devices)   |
| 2.8      | Table VII-C.2.1                             | S1524  | Delete Row 2 [Type of Limit: Flare Design (S1524 only)]<br>Delete Row 3 [Type of Limit: Presence of a Flame (S1524 only)]<br>Delete Row 11 [Type of Limit: Visible Emissions S1524]<br>In Section "The following requirement apply only to S1524":<br>Delete Row 2 [Type of Limit: Flare Design (S1524)]   |
| 21.11    | Table VII-C.2.1<br>Row 1                    | S854<br>S992<br>S1012<br>S1517<br>S1524        | Delete row 1 – 40 CFR 60 Subpart J H2S limit and monitoring for H2S limit in fuel gas for fuel gas combustion devices.<br>These flares comply with 40 CFR 60 Subpart J per Condition 24324, Part 2 as stipulated in the Consent Decree. They are not subject to the limit in 60.104(a)(1) or to the associated monitoring requirements in 60.105(a)(4) for that limit. See Item 21.12 for S1524 applicability. |

**Application 24362, Title V Renewal Appeal Item # 11, S-913 Fuel Gas**

**ENGINEERING EVALUATION  
 Tesoro Refining and Marketing Company  
PLANT NO. 14628  
**APPLICATION NO. 24362****

**BACKGROUND**

As part of the Title V Renewal Permit 2011 Appeal efforts, Tesoro Refining and Marketing Company is submitting several applications to address the Appeal items. This is one of those applications, an administrative change in conditions, to address the abatement of the following sources:

- S-134**      **Fixed Roof Tank A-134, Recovered Oil, 651,000 gallons**
- S-137**      **Fixed Roof Tank A-137, Waste Oil, Gasoline, 659,000 gallons**
- S-318**      **Fixed Roof Tank A-318, Crude Oil, Naphtha, 6,846,000 gallons**
- S-323**      **Fixed Roof Tank A-323, Fuel Oil, Jet ‘A’, Gasoline, Alkylate Gasoline Blending Components, 924,000 gallons**
- S-367**      **Fixed Roof Tank A-367, Distillate Oil, Gasoline, 3,360,000 gallons**
- S-432**      **Fixed Roof Tank A-432, Ethyl Alcohol, Distillate Oil, Gasoline, Naphtha, 2,688,000 gallons**
- S-513**      **Fixed Roof Tank A-513, Wastewater Sludge, 924,000 gallons**
- S-532**      **Oil Water Separator; #50 Crude Unit Desalter Skim Tank, 630,000 gallons**
- S-603**      **Fixed Roof Tank A-603, #50 Unit Desalter Break Tank, 126,000 gallons**
- S-613**      **Vapor Storage Tank A-613, with Internal Diaphragm Seal**
- S-696**      **Internal Floating Roof Tank A-696, Gasoline, 630,000 gallons**
- S-1025**     **Bulk Plant; Bottom Loading Facilities, Gasoline, Naphtha, Kerosene, Diesel, Fuel Oil**
- S-1496**     **Fixed Roof Tank A-876, Heavy Reformate With Pentanes, Straight Run Heavy Naphtha, 3,360,000 gallons**
- S-1504**     **Bulk Plant Unloading Rack, Ethanol**
- S-1528**     **Alkylate Railcar Unloading Rack , Four Unloading Slots, Multi-Product**

with vapor recovery that is combusted in

**S-913      No. 2 Feed Prep Heater (F13)**

The specific appeal item covered by this application is #11, and are shown below:

| Issue No. | Permit Section                       | Source | Basis for Appeal and Request for Modification  |
|-----------|--------------------------------------|--------|--|
| 11        |                                      |        | <b>Remove S913 as a source fired on the 40# fuel gas system. This source was previously fired on 40# fuel gas, but is now fired on the 100# fuel gas system.</b> |
| 11.1      | Table IV-C.4.2<br>Condition<br>20099 | S913   | Delete S913 from Title row   |

| <b>Issue No.</b> | <b>Permit Section</b>                             | <b>Source</b> | <b>Basis for Appeal and Request for Modification</b>   |
|------------------|---|---------------|--|
| 11.2             | Table IV-C.4.2<br>Condition<br>21053              | S913          | Delete S913 from Title row   |
| 11.3             | Table IV-C.4.2<br>Condition<br>21100              | S913          | Delete S913 from Title row   |
| 11.4             | Table IV-C.4.2<br>Condition<br>21849              | S913          | Delete S913 from Title row   |
| 11.5             | Table IV-C.4.2<br>Condition<br>21849<br>Part 11.d | S913          | Delete "(S-908, S-909, S-912, S-913 only)"<br>Add "(basis: Cumulative Increase, Toxic Risk Screen, Regulation 8-33-301, Regulation 1-238, BACT)" |
| 11.6             | Table IV-G.3<br>Condition<br>21053                | S913          | Delete S913 from Title row   |
| 11.7             | Section VI<br>Condition<br>13605<br>Part 4        | S913          | Delete "S-913 No. 13 Furnace @ No. 2 Feed Prep."   |
| 11.8             | Section VI<br>Condition<br>20099<br>Parts 5 and 6 | S913          | Delete "S-913 No. 13 Furnace @ No. 2 Feed Prep."   |
| 11.9             | Section VI<br>Condition<br>21053<br>Part 6        | S913          | Delete "or S-913"  |
| 11.10            | Section VI<br>Condition<br>21053<br>Part 7        | S913          | Delete "S-913 No. 13 Furnace @ No. 2 Feed Prep."   |
| 11.10            | Section VI<br>Condition<br>21100<br>Part 4        | S913          | Delete "S-913 No. 13 Furnace @ No. 2 Feed Prep."   |
| 11.11            | Section VI<br>Condition<br>21849<br>Part 11.d     | S913          | Delete "S-913 No. 13 Furnace @ No. 2 Feed Prep."   |

S-913 was originally fired with 40# fuel gas, similar to S-908, S-909 and S-912. In 2005 Application 13047, S-913 was switched to the 100 # fuel gas system when low NOx burners were installed. This application generated NOx IERCs and imposed Permit Condition 22621.

The 40# fuel gas system is the ultimate destination of the A-14 Vapor Recovery System. All of the sources listed at the beginning of this evaluation are abated by the A-14 Vapor Recovery System. Abatement efficiency for these sources are specified as high as 99.5%, and in some cases the abatement efficiency is the basis for Offsets and Toxic Emissions as well as the usual plant cumulative increase. To ensure these abated sources are properly permitted, permit conditions have been imposed to verify the abatement efficiency with source tests on the furnaces fired with 40# fuel gas.

For reasons unknown the permit conditions that included S-913 as an abatement device and imposed compliance source tests were not addressed in Application 13047. This application proposes changes to correct this oversight.

The proposed changes in this application are justified as an administrative change in conditions.

## **EMISSIONS SUMMARY**

There are no increases in emissions associated with this administrative change in conditions application.

## **STATEMENT OF COMPLIANCE**

This application does not change the compliance of the abated sources impacted by this application nor does it change the compliance of S-913. All of the abated sources remain abated with the other furnaces fired with 40# fuel gas, S-908, S-909 and S-912, and these sources are still subject to periodic source tests to verify compliance. S-913 remains subject to and is expected to remain in compliance with the following regulations:

Regulation 6, Rule 1, Particulate Matter; General Requirements  
Regulation 9, Rule 10, Nitrogen Oxides and Carbon Monoxide from Boilers, Steam Generators, and Process Heaters in Petroleum Refineries

and

NSPS 40 CFR 60 Subpart J.

## **PERMIT CONDITIONS**

Permit conditions 13605, 20099, 21053, 21100 and 21849 will be revised as follows:

Condition 13605

Application 25142 (March, 1996)

Amended by Application 10667 (November, 2004): Increase Reid vapor pressure from 2 to 9 psia, decrease throughput from 11,000,000 barrels/yr to 2,000,000 barrels/yr, add source testing to determine POC destruction efficiency of A-14 Vapor Recovery and process heaters.

Application 19415, (February 2009) added S-1528 Alkylate Railcar Unloading Rack

[Administratively Changed by Application 24362 \(June 2012\) Removed S-913 from the source test requirements of Part 4 since no longer fired with 40# fuel gas.](#)

S-323 Fixed Roof Tank; Tank A-323, Capacity 924K Gallons, Storing: Alkylate Gasoline Blending Components abated by A-14 Vapor Recovery System

S-1528 Alkylate Railcar Unloading Rack, for unloading into S-323

1. The Owner/Operator shall ensure that the net throughput of all VOC/petroleum materials at S-323 (Tank 323) and S-1528 does not exceed 2,000,000 barrels during each rolling consecutive 12-month period. A level-monitoring device in S-323 will measure the height of the tank. The change in height will be used to calculate throughput.  
(basis: cumulative increase)
2. The owner/operator may store hydrocarbon materials other than gasoline and alkylate blending components in S-323, provided the following two criteria are met:
  - a) the Reid vapor pressure of the alternate material is not greater 9.0 psia (true vapor pressure not greater than 7.6 psia at 70F), and
  - b) POC emissions, based on the maximum throughput in part 1, do not exceed 1922.79 pounds per year; and
  - c) the resulting toxic risk from the tank does not cause the tank to fail a risk screen analysis.(basis: cumulative increase, toxics)
3. Notwithstanding any provision of District regulations allowing for either the maintenance or malfunction of A-14 due to a valid break down at No. 1 Gas Plant vapor recovery compressor(s), the Owner/Operator shall ensure that fixed roof tank S-323 vents to existing vapor recovery unit, A-14, or an equivalent District-approved abatement system, having a minimum overall VOC control efficiency of 99.5% on a mass basis. In accordance with the NSPS requirements of 40 CFR 60, Subpart Kb, Owner/Operator shall ensure that this tank is maintained leak-free (less than 500 ppm above background as methane). (basis: cumulative increase, NSPS)
4. To determine compliance with part 3, the owner/operator shall conduct a District approved source test at each of the following sources every 5 years



in the year prior to the Title V Permit Renewal (initial compliance has been demonstrated in a source test for AN 6201 by TIAX on October 28, 2003).

S-908 No. 8 Furnace @ No. 3 Crude Unit  
S-909 No. 9 Furnace @ No. 1 Feed Prep.  
S-912 No. 12 Furnace @ No. 1 Feed Prep.  
~~S-913 No. 13 Furnace @ No. 2 Feed Prep.~~

For each source, the owner/operator must measure the following:

- the fuel feed rate in pounds/hr
- the POC emission rate at the stack
- the flue gas flow rate in SCFM at the stack
- the oxygen content of the stack flue gas
- the stack temperature
- the destruction efficiency of POC as measured across the combustion device

The owner/operator shall submit individual copies of the results of the source tests (along with related calculations and process data) to the District's Engineering Division, Enforcement Division, and Source Test Division within 35 days of the source test.

(basis: Cumulative Increase, Toxic Risk Screen, Offsets, Regulation 1-238)

5. To determine compliance with the above parts, the owner/operator shall maintain the following records and provide all of the data necessary to evaluate compliance with the above conditions, including, but not necessarily limited to, the following information:
  - a. On a monthly basis, type and amount of liquids transferred through S-1528 and stored in S-323 and Reid vapor pressure ranges of such liquids.
  - b. The throughput of material shall be added and recorded in the log for each month and for each rolling consecutive 12-month period.
  - c. The time, date, duration, and reason for each instance that S-323 is not abated by A-14.

These records shall be kept on-site for at least 5 years. All records shall be recorded in a District-approved log and made available for inspection by District staff upon request. These recordkeeping requirements shall not replace the recordkeeping requirements contained in any applicable District Regulations.

(basis: Cumulative Increase, Toxic Risk Screen, Offsets, Regulation 1-441, Regulation 8-5-501, Regulation 1-238)

Condition 20099

Application 6201 (November 2002), Condition updated after Start-up (December 2004).

S-532 Oil Water Separator; Tank 532,

modified to operate as an Oil Water Separator; Volume: 630K Gallons, Capacity: 286 BPH abated by A-14 Vapor Recovery System

Administratively Changed via Application 17537, July 2008

Application 17928/17458 (2008) Remove Demolished and OOS Sources

Administratively Changed by Application 24362 (June 2012) Removed S-913 from the source test requirements of Part 5 and 6 since no longer fired with 40# fuel gas.

1) Permittee/Owner/Operator shall ensure that the total throughput of all VOC/petroleum materials to S-532 does not exceed 2,505,360 barrels during any 12 consecutive month period. (basis: cumulative increase, toxics, BACT, offsets)

2) Deleted. Compliance with the tank vapor tight design criteria was verified when S-532 was granted a Permit to Operate in 2004 via Application 6201.

3) Notwithstanding any provision of District regulations allowing for the malfunction of A-14 due to a valid breakdown at No. 1 Gas Plant vapor recovery compressor(s), Permittee/ Owner/Operator shall ensure that S-532 (excluding the pressure vacuum relief valve vent), including the pressure vent at S-532, is abated by A-14 at all times that S-532 is operated and at all times that S-532 contains VOC/petroleum materials. basis: BACT, Regulation 8-8, cumulative increase, toxics, offsets)

4) Permittee/Owner/Operator shall ensure that VOC/POC emissions from S-532 that are ducted to A-14 are abated with a destruction efficiency of at least 98 percent, by weight, as measured across the combustion device(s) burning (the vapors from the) 40 Pound Fuel Gas system. (basis: BACT)

5) Not more than 120 days after the start-up of S-532 pursuant to Authority to Construct #6201, Permittee/Owner/Operator shall conduct a District approved source test at each of the following sources:

S-908 No. 8 Furnace @ No. 3 Crude Unit  
S-909 No. 9 Furnace @ No. 1 Feed Prep.  
S-912 No. 12 Furnace @ No. 1 Feed Prep.  
~~S-913 No. 13 Furnace @ No. 2 Feed Prep.~~

to measure for each source each of the following:

the fuel feed rate in pounds/hr  
the POC emission rate at the stack  
the flue gas flow rate in SCFM at the stack  
the oxygen content of the stack flue gas

the destruction efficiency of POC/VOC as measured across the Furnace/combustion device

Permittee/Owner/Operator shall ensure that two copies of the results of the source testing along with related calculations and relevant process data are received by the District's Engineering Division not more than 35 days following the date of the source test.

5A) Deleted. (S-991 was taken out of service in 1993). (basis: BACT)

6) To determine compliance with part 4, the owner/operator shall conduct a District approved source test at each of the following sources every 5 years in the year prior to the Title V Permit Renewal.

S-908 No. 8 Furnace @ No. 3 Crude Unit

S-909 No. 9 Furnace @ No. 1 Feed Prep.

S-912 No. 12 Furnace @ No. 1 Feed Prep.

~~S-913 No. 13 Furnace @ No. 2 Feed Prep.~~

For each source, the owner/operator must measure the following:

- the fuel feed rate in pounds/hr
- the POC emission rate at the stack
- the flue gas flow rate in SCFM at the stack
- the oxygen content of the stack flue gas
- the stack temperature
- the destruction efficiency of POC as measured across the combustion device

The owner/operator shall submit individual copies of the results of the source tests (along with related calculations and process data) to the District's Engineering Division, Enforcement Division, and Source Test Division within 35 days of the source test.

(basis: Cumulative Increase, Toxic Risk Screen, Offsets, Regulation 1-238)

7) During periods of preventative maintenance on A-14 Vapor Recovery System not to exceed 36 hours per rolling consecutive 12 month period, Permittee/Owner/Operator shall ensure that there is no liquid flow into S-532 and that under no circumstances shall the preventative maintenance begin prior to 6:00 PM PST. During the preventative maintenance on A-14 Vapor Recovery System S-532 does not need to be abated by A-14.

(basis: BACT)

8) On a monthly basis, in a District approved log, the Permittee/Owner/Operator shall record the throughput of liquid material throughput to S-532, in gallon or barrel units, for each month and for each rolling 12 consecutive month period. The Permittee/Owner/Operator shall ensure that the District approved log is retained on site for not less than 5 years from date of last entry, and that it is made

available to District staff upon request. (basis: cumulative increase, toxics, offsets)

9) On a monthly basis, in a District approved log, the Permittee/Owner/Operator shall record the time, date, duration, and reason for each instance during which S-532 is not abated by A-14. The Permittee/Owner/Operator shall ensure that the District approved log is retained on site for not less than 5 years from date of last entry, and that it is made available to District staff upon request. (basis: cumulative increase, toxics, offsets)

10) Deleted (S-46 TK046 has been taken out of service)

### Condition 21053

Tesoro Refining and Marketing Company  
150 Solano Way  
Martinez, CA 94533

Application 17928 (October 2008) Removed demolished sources S317, S324, S431, S457, S46, S21, and S991.

Application 19328/19329 (June 2009) Removal of S700 from Part 6

Administratively Changed by Application 24362 (June 2012) Removed S-913 from the source test requirements of Part 6 and 7 since no longer fired with 40# fuel gas.

1. Deleted. (See discussion of Compliance with Regulation 9-1-313.2 in the Revision 2 Statement of Basis).
2. The Owner/Operator shall monitor and record on a monthly basis the visible emissions from Sources S-1401, S-1404, and S-1411 to demonstrate compliance with Regulation 6-1-301 (Ringelmann 1 or 20% opacity). These records shall be kept for a period of at least 5 years from date of entry and shall be made available to District staff upon request. [Basis: Regulation 6-1-301]
3. The Owner/Operator shall conduct an annual District-approved source test on the S-323, to demonstrate that the combined collection/destruction efficiency of A-14 is no less than 99.5%, by weight, for VOC. The Owner/Operator shall submit the test results to the District's Compliance and Enforcement Division and the District's Engineering Division no less than 30 days after the test. These records shall be kept for a period of at least 5 years from date of entry and shall be made available to District staff upon request. [Basis: BAAQMD Condition 13605, Part 3 and 4, and BAAQMD Regulation 2-1-403]

4. To allow sufficient time to prepare test plans, train employees, and install any necessary equipment, the monitoring requirements are effective April 1, 2004.
5. Deleted. (See discussion of Compliance with Regulation 9-1-313.2 in the Revision 2 Statement of Basis).
6. The owner/operator of the listed tanks shall abate them by the A14 Vapor Recovery System at all times of operation, except as allowed in Regulation 8-5. A14 Vapor Recovery System compresses the vapors to be mixed with the refinery fuel gas system for combustion in S908, S909, or S912, ~~or S913~~. The owner/operator will meet a POC destruction efficiency of at least 95% by weight.  
Tanks: S318, S367, S134, S137, S513 (basis: 60.113b(c)(2))  
Tanks: S323, S432, , S603, (basis: 63.646(a), 63.120(d)(5))
7. The owner/operator shall conduct a District approved source test at each of the following sources every 5 years in the year prior to the Title V Permit Renewal.:

S-908 No. 8 Furnace @ No. 3 Crude Unit

S-909 No. 9 Furnace @ No. 1 Feed Prep.

S-912 No. 12 Furnace @ No. 1 Feed Prep.

~~S-913 No. 13 Furnace @ No. 2 Feed Prep.~~

to measure for each source each of the following:

the fuel feed rate in pounds/hr

the POC emission rate at the stack

the flue gas flow rate in SCFM at the stack

the oxygen content of the stack flue gas

the destruction efficiency of POC/VOC as measured across the  
Furnace/combustion device

The owner/operator shall ensure that two copies of the results of the source testing along with related calculations and relevant process data are received by the District's Engineering Division not more than 45 days following the date of the source test.

#### Condition 21100:

Application #8002 (December 11, 2003)

Amended by Application #9728 (June 25, 2004): Increase vapor pressure from 8 to 11 psig, decrease throughput from 5,500,000 barrels/yr to 2,500,000 barrels/yr, add monitoring.

Amended by Application 10659: Clarification of conditions including "net" versus "total" throughput limit.

Application 17928/17458(2008) Remove Demolished and OOS Sources.

Administratively Changed by Application 24362 (June 2012) Removed S-913 from the source test requirements of Part 4 since no longer fired with 40# fuel gas.

S-1496 Fixed Roof Tank; Tank A-876, Capacity: 80,000 Barrels, Storing: Heavy Reformate with Pentanes, Straight Run Heavy Naphtha abated by A-14 Vapor Recovery System

1) The total net throughput at tank S-1496 shall not exceed 2,500,000 barrels in any consecutive 12-month period. The owner/operator shall use a radar-monitoring device to measure the height of the tank. The owner/operator shall use the change in height to calculate throughput.

(basis: Cumulative Increase, Toxic Risk Screen, Offsets)

2) Notwithstanding any provision of District regulations allowing for the malfunction of A-14 due to a valid break down at No. 1 Gas Plant vapor recovery compressor(s), the owner/operator shall ensure that S-1496 (excluding the pressure vacuum relief valve vent), including the pressure vent at S-1496, is abated by A-14 at all times. The A-14 Vapor Recovery System shall have a destruction efficiency of at least 99.5% by weight as measured across the combustion device(s) burning the vapors from the fuel gas system.

(basis: Cumulative Increase, Toxic Risk Screen, Offsets, Regulation 8-5, NSPS, Regulation 10 Subpart Kb)

3) Materials stored in S-1496 shall be limited to the following:

a. Heavy reformate, heavy reformate with pentanes, fractionator splitter bottoms, conventional gasoline stock, heavy naphtha, or straight run gasoline with a true vapor pressure less than 11 psia.

b. A liquid other than those specified above may be stored in S-1496, provided that all of the following criteria are met:

1. True vapor pressure must be less than 11 psia

2. POC emissions, based on the maximum throughput in part 1, do not exceed 8,868 pounds per year; and

3. toxic emissions in lbs/year, based on the maximum throughput in part 1, do not exceed any risk screening trigger level.

(basis: Cumulative Increase, Toxic Risk Screen, Offsets)

4) To determine compliance with part 2, the owner/operator shall conduct a District approved source test at each of the following sources every 5 years in the year prior to the Title V Permit Renewal (initial compliance has been demonstrated in a source test for AN 6201 by TIAX on October 28, 2003).

S-908 No. 8 Furnace @ No. 3 Crude Unit

S-909 No. 9 Furnace @ No. 1 Feed Prep.

S-912 No. 12 Furnace @ No. 1 Feed Prep.

~~S-913 No. 13 Furnace @ No. 2 Feed Prep.~~

For each source, the owner/operator must measure the following:

- the fuel feed rate in pounds/hr
- the POC emission rate at the stack
- the flue gas flow rate in SCFM at the stack
- the oxygen content of the stack flue gas
- the stack temperature
- the destruction efficiency of POC as measured across the combustion device

The owner/operator shall submit individual copies of the results of the source tests (along with related calculations and process data) to the District's Engineering Division, Enforcement Division, and Source Test Division within 35 days of the source test.

(basis: Cumulative Increase, Toxic Risk Screen, Offsets, Regulation 1-238)

5) To determine compliance with the above parts, the owner/operator shall maintain the following records and provide all of the data necessary to evaluate compliance with the above conditions, including, but not necessarily limited to, the following information:

- a. On a monthly basis, type and amount of liquids stored and true vapor pressure ranges of such liquids.
- b. The throughput of material shall be added and recorded in the log for each month and for each rolling consecutive 12-month period.
- c. The time, date, duration, and reason for each instance that S-1496 is not abated by A-14.

These records shall be kept on-site for at least 5 years. All records shall be recorded in a District-approved log and made available for inspection by District staff upon request. These recordkeeping requirements shall not replace the recordkeeping requirements contained in any applicable District Regulations.

(basis: Cumulative Increase, Toxic Risk Screen, Offsets, Regulation 1-441, Regulation 8-5-501, Regulation 1-238)

#### Condition 21849

Application #10668 (October 29, 2004)  
Loading Rack Modernization Project

Application #13493 (October, 2005): Modification of emission limit from S-1025 to the RACT and Regulation 8-33-301 level of 0.08 lb POC per 1000 gallon of material loaded.

Administratively Changed by Application 18861 (June 2009) Removed completed parts and parts redundant with District Regulations

Application 17928/17458 (2008) Remove Demolished and OOS Sources

Administratively Changed by Application 24362 (June 2012) Removed S-913 from the source test requirements of Part 11 since no longer fired with 40# fuel gas.

S-613 Vapor Recovery Tank A-613; Fixed Roof Tank, Capacity 420K Gallons, Storing: Organic Liquid

S-696 Tank A-696; Internal Floating Roof Tank, Capacity 630K Gallons, Storing: Gasoline

S-1025 Bulk Terminal Bottom Loading Facilities: Gasoline, Naphtha, Kerosene, Diesel, Fuel Oil, Ethanol

S-1504 Bulk Terminal Unloading Rack: Ethyl Alcohol

Fugitive Components

1) Completed. Final fugitive count for the project submitted 5/5/2005 and offsets were provided.

2) Completed. Final fugitive count for the project submitted 5/5/2005 and offsets were provided.

3) Deleted. ATC construction requirement completed.

4) Deleted. ATC construction requirement completed.

5) Deleted. ATC construction requirement completed.

6) Deleted. ATC construction requirement completed. Redundant with Regulation 8-28.

7) Deleted. Redundant with Regulation 8-18. Components were incorporated into facility LDAR program on project startup.

S-1025 Bulk Plant Bottom Loading Facilities: Gasoline, Naphtha, Kerosene, Diesel, Fuel Oil, Ethanol

8) The owner/operator of S-1025 shall apply for the proper certification from the California Air Resources Board (CARB) for the A-14 Vapor Recovery System prior to startup.

(basis: Regulation 8-33-301, 302)

9) The owner/operator of S-1025 Bulk Plant Loading Facilities shall not exceed the following throughputs.

64,457 barrels (2,707,194 gallons) per day

18,615,000 barrels (781,830,000 gallons) per any 12 month consecutive period



(basis: toxic risk screen)

10) The owner/operator of S-1025 shall not transfer any material other than gasoline, naphtha, kerosene, diesel, fuel oil, or ethanol.

(basis: toxic risk screen)

11) To ensure that the S-1025 Bulk Plant Unloading Rack does not exceed an emission factor greater than 0.08 lb POC per 1000 gallons of material loaded, the owner/operator shall:

- a) not operate S-1025 unless vented to S-613 Vapor Recovery Tank or A-14 Vapor Recovery System.
- b) install a sample line from each of the pressure-vacuum valves located at the loading racks, which is easily accessible by District personnel to determine any valve leakage.
- c) install and maintain a pressure switch at the knockout pot, V-61, located at the interface of the vapor outlet of the S-1025 Loading Rack and the inlet to the A-14 Vapor Recovery and S-613 Vapor Recovery Tank Systems. The pressure switch shall be set at 18 inches of water column as measured at the cargo tank/vapor coupler interface located the furthest from the knockout pot, V-61. If the pressure exceeds 18 inches, a high-pressure alarm will shutdown loading rack operations.
- d) conduct District approved source tests to determine POC destruction efficiency at the following sources every 5 years in the year prior to the Title V Permit Renewal (initial compliance has been demonstrated in a source test for AN 6201 by TIAX on October 28, 2003).

S-908 No. 8 Furnace @ No. 3 Crude Unit

S-909 No. 9 Furnace @ No. 1 Feed Prep.

S-912 No. 12 Furnace @ No. 1 Feed Prep.

~~S-913 No. 13 Furnace @ No. 2 Feed Prep.~~

For each source, the owner/operator must measure the following:

- the fuel feed rate in pounds/hr
- the POC emission rate at the stack
- the flue gas flow rate in SCFM at the stack
- the oxygen content of the stack flue gas
- the stack temperature
- the destruction efficiency of POC as measured across the combustion device

The owner/operator shall submit individual copies of the results of the source tests (along with related calculations and process data) to the District's Engineering Division, Enforcement Division, and Source Test Section within 45 days of the source test.

(basis: Cumulative Increase, Toxic Risk Screen, Regulation 8-33-301, Regulation 1-238, BACT)

12) To determine compliance with the parts 8-11, the owner/operator shall maintain the following records and provide all of the data necessary to evaluate

compliance with the above conditions, including, but not necessarily limited to, the following information:

- a. California Air Resources Board certification of A-14.
- b. On a daily basis, type and quantity of product loaded.
- c. The throughput of material shall be added and recorded in the log for each month and for each rolling consecutive 12-month period.
- d. The time, date, duration, and reason for each instance that S-1025 is not abated by S-613 or A-14.

These records shall be kept on-site for at least 5 years. All records shall be recorded in a District-approved log and made available for inspection by District staff upon request. These recordkeeping requirements shall not replace the recordkeeping requirements contained in any applicable District Regulations. (basis: Cumulative Increase, Toxic Risk Screen, Offsets, Regulation 1-441, Regulation 1-238)

S-1504 Bulk Plant Unloading Rack: Ethanol

13) The owner/operator of S-1504 Bulk Plant Unloading Rack shall not exceed the following throughput.

1,200,000 barrels per any 12-month consecutive period

(basis: cumulative increase, offsets, toxic risk screen)

14) The owner/operator of S-1504 shall not transfer any material other than ethanol.

(basis: cumulative increase, offsets, toxic risk screen)

15) To determine compliance with parts 13 and 14, the owner/operator shall maintain the following records and provide all of the data necessary to evaluate compliance with the above conditions, including, but not necessarily limited to, the following information:

- a. On a daily basis amount of ethanol transferred.
- b. The throughput of material shall be added and recorded in the log for each month and for each rolling consecutive 12-month period.

These records shall be kept on-site for at least 5 years. All records shall be recorded in a District-approved log and made available for inspection by District staff upon request. These recordkeeping requirements shall not replace the recordkeeping requirements contained in any applicable District Regulations. (basis: Cumulative Increase, Toxic Risk Screen, Offsets, Regulation 1-441, Regulation 1-238, Regulation 8-6-501)

## RECOMMENDATION

It is recommended that an Administrative Change in Conditions be granted to Tesoro for the following sources:

**S-134          Fixed Roof Tank A-134, Recovered Oil, 651,000 gallons**  
**S-137          Fixed Roof Tank A-137, Waste Oil, Gasoline, 659,000 gallons**

**S-318 Fixed Roof Tank A-318, Crude Oil, Naphtha, 6,846,000 gallons**  
**S-323 Fixed Roof Tank A-323, Fuel Oil, Jet 'A', Gasoline, Alkylate Gasoline Blending Components, 924,000 gallons**  
**S-367 Fixed Roof Tank A-367, Distillate Oil, Gasoline, 3,360,000 gallons**  
**S-432 Fixed Roof Tank A-432, Ethyl Alcohol, Distillate Oil, Gasoline, Naphtha, 2,688,000 gallons**  
**S-513 Fixed Roof Tank A-513, Wastewater Sludge, 924,000 gallons**  
**S-532 Oil Water Separator; #50 Crude Unit Desalter Skim Tank, 630,000 gallons**  
**S-603 Fixed Roof Tank A-603, #50 Unit Desalter Break Tank, 126,000 gallons**  
**S-613 Vapor Storage Tank A-613, with Internal Diaphragm Seal**  
**S-696 Internal Floating Roof Tank A-696, Gasoline, 630,000 gallons**  
**S-913 No. 2 Feed Prep Heater (F13)**  
**S-1025 Bulk Plant; Bottom Loading Facilities, Gasoline, Naphtha, Kerosene, Diesel, Fuel Oil**  
**S-1496 Fixed Roof Tank A-876, Heavy Reformate With Pentanes, Straight Run Heavy Naphtha, 3,360,000 gallons**  
**S-1504 Bulk Plant Unloading Rack, Ethanol**  
**S-1528 Alkylate Railcar Unloading Rack , Four Unloading Slots, Multi-Product**

By: \_\_\_\_\_  
Arthur Valla  
Senior Air Quality Engineer

\_\_\_\_\_  
June 8, 2012

**Application 24921, S-916 NO<sub>x</sub> Box Revision**

**EVALUATION REPORT  
 TESORO REFINING AND MARKETING COMPANY  
 REVISED NO<sub>x</sub> BOX FOR S-916  
 No. 1 HDS Heater F-16  
 APPLICATION 24921, PLANT 14628**

**BACKGROUND**

The Tesoro Golden Eagle Refinery (Tesoro) operates several furnaces and boilers that are subject to Regulation 9, Rule 10, Nitrogen Oxides And Carbon Monoxide From Boilers, Steam Generators And Process Heaters In Petroleum Refineries. Regulation 9-10-301 limits the refinery wide NO<sub>x</sub> emissions to 0.033 lb/MMBtu of fired duty. Regulation 9-10-502 requires the installation of a NO<sub>x</sub>, CO and O<sub>2</sub> CEM to demonstrate compliance with Regulation 9-10-301. Regulation 9-10-502 also allows a CEM equivalent parametric monitoring system to determine compliance with Regulation 9-10-301. The District and Tesoro (through WSPA) have produced the CEM equivalent verification system. This system is called the “NO<sub>x</sub> Box”. The NO<sub>x</sub> Box is an operating window for the unit, expressed in terms of fired duty and oxygen content in the flue gas. Each point in the operating window is established by source tests at the operating conditions. The source tests demonstrate the NO<sub>x</sub> emissions are equal to or less than a specified emission factor. As long as the fired unit duty and oxygen content are in this NO<sub>x</sub> Box operating window, the specified emission factor is used to determine compliance with the 0.033 lb/MMBtu limit of Regulation 9-10-301. The Permit Condition that contains the details of the NO<sub>x</sub> Box is #18372.

Condition 18372, Part 30 required Tesoro to submit the initial NO<sub>x</sub> Box for the affected sources by January 1, 2005. Tesoro met this requirement via Application 15682. The NO<sub>x</sub> Box’s in Application 15682 were supported by properly conducted source tests at each defining point of the NO<sub>x</sub> Box operating windows. All of the affected sources NO<sub>x</sub> Boxes were included in Revision 4 of the Title V permit (reference: Section VI, Condition 18372, Part 31A, NO<sub>x</sub> Box Ranges).

This application requests a change in the NO<sub>x</sub> Box operating window for:

**S-916 No. 1 HDS Heater (F16)**

The change is as follows:

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
| 916        | 0.090                      | 5.7, 9.53  | 9.3, 9.17  | 6.0, 34.6   | 4.0, 17.4   | 7.1, 34.00  |
|            | 0.102                      | 9.3, 9.17  | 10.6, 24.64  | 7.1, 34.00  | N/A   | 10.4, 33.11   |

|            |              |                                      |                |  |                             |   |
|------------|--------------|--------------------------------------|----------------|--|-----------------------------|---|
| 916<br>new | <u>0.090</u> | <u>5.97,</u><br>9.53                 | 9.3, 9.17      | <u>6.0, 34.6</u><br><u>4.0, 17.4</u>   | <u>N/A</u> <u>4.0, 17.4</u> | <u>10.6, 24.64</u><br><u>7.1, 34.00</u> |
|            | 0.102        | <u>4.0, 17.4</u><br><u>9.3, 9.17</u> | 10.6,<br>24.64 | <u>5.0, 43.89</u><br><u>7.1, 34.00</u> | N/A                         | 10.4, 33.11                             |

Tesoro is using two operating ranges as allowed by Condition 18372, Part 30.

Since the establishment of the initial NOx Box For S-916, the following revisions have been approved:

2008 Application 17470, approved February 10, 2010

2011 Application 23871, approved May 10, 2012

This is the third revision to the S-916 NOx Box. This is the second revision to the S-916 NOx Box that increased NOx emission factors. Application 17470 increased emission factors as follows:

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr) | Max O2 at Low Firing (O2% , MMBtu/hr) | Min O2 at High Firing (O2% , MMBtu/hr) | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr) |
|------------|----------------------------|---------------------------------------|---------------------------------------|--|--|--|
| 916        | 0.088                      | 5.7, 9.53                             | 9.3, 9.17                             | 5.4, 30.00                             | N/A  | 9.1, 34.05                             |
|            | 0.099                      | 9.3, 9.17                             | 10.6, 24.64                           | 9.1, 34.05                             | N/A  | 10.4, 33.11                            |
| 916<br>New | <b>0.090</b>               | 5.7, 9.53                             | 9.3, 9.17                             | 5.4, 30.00                             | N/A  | 7.1, 34.00                             |
|            | <b>0.102</b>               | 9.3, 9.17                             | 10.6, 24.64                           | 7.1, 34.00                             | N/A  | 10.4, 33.11                            |

According to Engineering Policy approved 4/10/03 and included in Appendix B of the December 2003 Title V Statement of Basis, a CEM is only required if two source tests in a 5-year period exceed the NOx emission factor. The two source tests that determine if this policy is triggered are as follows:

4/20/2007 -- MMBtu/hr = 34.00, O2 = 7.1%, Emission factor = 0.090 lb/MMBtu

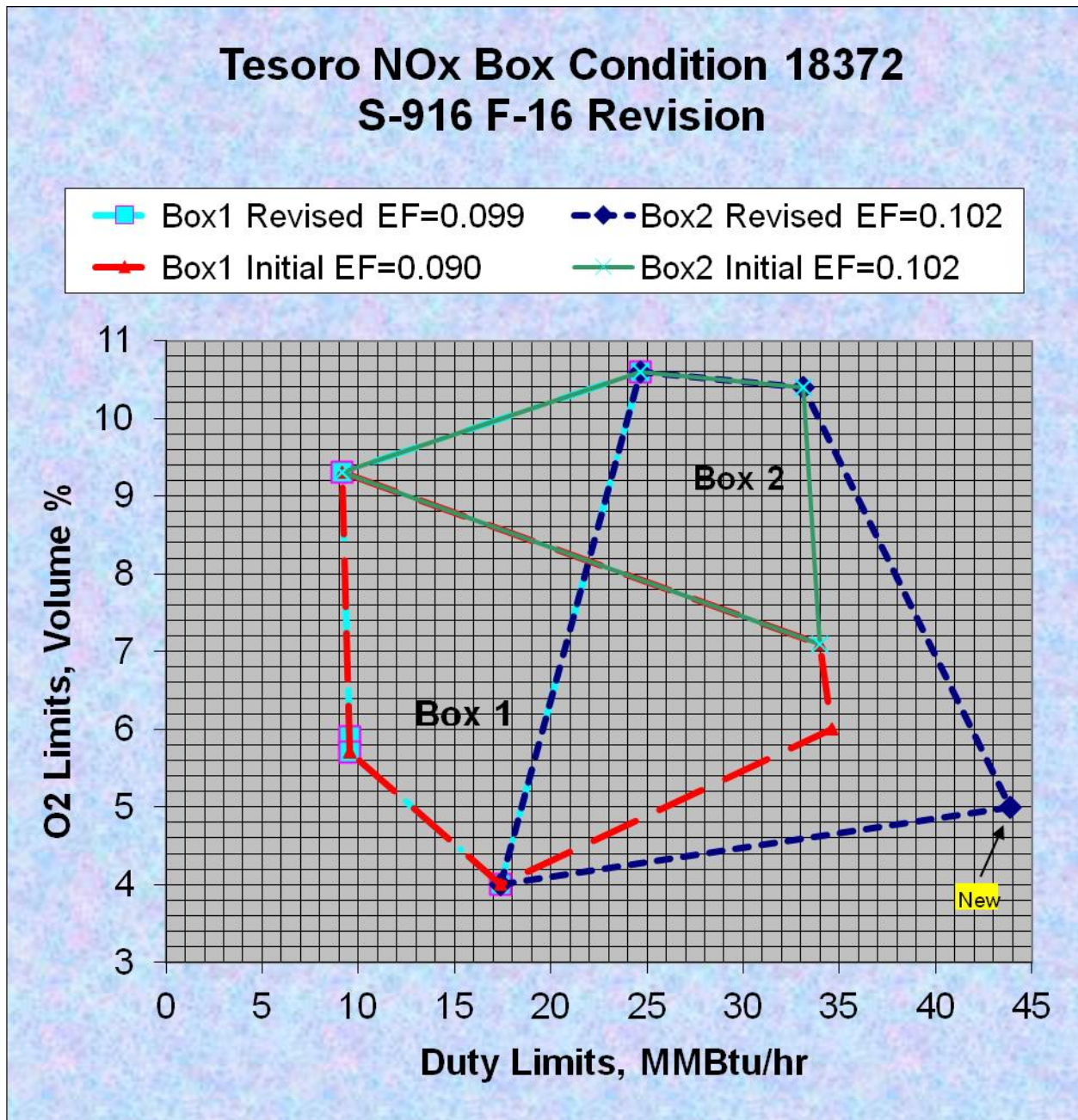
5/31/2012 -- MMBtu/hr = 43.89, O2 = 5.0%, Emission factor = 0.093 lb/MMBtu

Since these two source tests are not in a 5-year period, a CEM is not required.

The changes proposed by this application are supported by source tests reviewed by the Source Test Section.

This application is being processed as an administrative change in conditions. Even though there is an increase in the emissions factors for S-916, there is no change in overall NOx emissions due to this application. The refinery will still remain in compliance with the with the 0.033 lb/MMBtu limit of Regulation 9-10-301.

The following diagram summarizes the changes to the S-916 NOx Box:



S-916 is a grandfathered source initially operated in 1954 at a firing rate of 55MMBtu/hr. In 1991, S-916 was subject to the requirements of Regulation 2, Rule 2 New Source Review via Application 6468. However, when the Authority to Construct for Application 6468 was granted September 25, 1992, the firing rate and emissions limits of S-916 were not imposed in permit conditions. In 1999, Permit Condition 16885 limited the firing rates of Tesoro furnaces (including limiting S-916 to 55MM Btu/hr maximum) to stop the capacity creep issue and for billing purposes.

There has been some confusion regarding the applicability of the NOx Box Condition 18372, and in particular the low fire exemption Part 31B. Firstly, Regulation 9-10-502.1 requires a NOx, CO and O2 CEM unless an equivalent parametric monitoring system is used. Permit Condition 18372 defines the CEM equivalent parametric monitoring system that can be used instead of a CEM. This parametric monitoring system is commonly known as the NOx Box. Any source subject to Regulation 9, Rule 10 that is not monitored by a NOx, CO and O2 CEM is subject to the NOx Box CEM equivalent monitoring system and must operate in accordance with Permit Condition 18372.

Any source that operates in the NOx Box operating window defined in Condition 18372, Part 31A qualifies for the CEM equivalent monitoring system. Deviations from the NOx Box are allowed if properly addressed pursuant to Condition 18372, Part 32. There is also Part 31B, the low fire exemption, that allows source operation outside the operating windows in Part 31A during startup, shutdown, and curtailed operation.

This low fire exemption was originally just an exemption for startup and shutdown periods of less than three days. This exemption was detailed in Permit Systems Policy on NOx, CO and O2 Monitoring Compliance with Regulation 9, Rule 10, approved by the Director of Permit Services 4/10/2003, Section II.C.1, under the section entitled "PERMIT CONDITIONS", as underlined below:

- PERMIT CONDITIONS: The District will impose the following permit conditions:
  - a) Conditions establishing the daily average operating range (or the demonstrated four corner NOx Box). The facility will be allowed up to a 20% deviation from the originally demonstrated NOx Box provided that a district pre-approved source test is conducted within 45 days of the deviation demonstrating whether the deviation complies with the original NOx emission factor or not. The District Enforcement Division shall be notified immediately (within 96 hours of occurrence) upon deviation of the NOx Box. Source test results shall be submitted to the district for approval within 30 days of the source test date. The owner/operator shall submit an application for changes in either the NOx Box or the NOx emission rate/factor, if appropriate.

This requirement shall not apply to low firing rate conditions during startup or shutdown periods less than 3 days.

    - (1) If the results of the source test for the deviation exceed the permitted emission concentrations or emission rates, the unit will be considered to have been in violation for each day it operated outside of the defined operating range.
  - b) A condition limiting unit emissions to the NO<sub>x</sub> concentrations or rates in the Regulation 9, Rule 10 control plan. The permit conditions will be used for demonstrating compliance with Rule 9-10. As mentioned above, any change in the NOx concentrations or rates (NOx emission factor) shall require the submittal of an application and be treated as a modification.

This low fire exemption was expanded to include other low fire conditions (called "Curtailed Operations") at the request of WSPA during the development of the permit conditions detailing the CEM equivalent monitoring system based on the 2003 Policy. WSPA requested this low fire



exemption be expanded because there were periods of low fire operation besides startup and shutdown, and during this other low fire operation (referred to as "curtailed operation"), NOx emission factors could be higher than normal. Consequently, there was concern by WSPA that this higher emission rate may result in a compliance problem with the 0.033 lb/MMBtu limit of Regulation 9-10-301. WSPA indicated that this situation was limited and at the time neither WSPA or the District intended the low fire exemption to be applicable to any source unlimited. The intention of the exemption was to allow low fire for a limited duration, and was justified because mass emissions were expected to be low (even if emission factors were high) and that in any case the exemption was limited in duration. The original permit condition template created by Permit Services Manager Steve Hill after the WSPA request defined the low fire exemption in the "NOx Box Policy" document as follows:

- B. Part [31]A. does not apply to low firing rate conditions during startup or shutdown periods or periods of curtailed operation (ex. during heater idling, refractory dryout, etc.) lasting 3 days or less. During conditions described [above] the means for determining compliance with the refinery wide limit should be accomplished using the method described in 9-10-301.2 (i.e. units out of service & 30-day averaging data).

Clearly, the low fire exemption was intended to be limited. Ultimately, the exemption duration was increased from 3 days to 5 days. In any case, at this time the low fire exemption was never proposed by WSPA nor considered by the District to be unlimited. Consequently, since 2003, startup and shutdown durations are limited in Regulation 9-10-218 and curtailed operation is limited to 5 days or less in the permit condition. If any low fire operation exceeded the duration limit, either the NOx Box operating window had to be expanded to include this operation, or the source did not qualify for the 9-10-502 CEM-equivalent monitoring system and a NOx, CO and O2 CEM was required.

In December, 2010, when Regulation 9, Rule 10 was amended, "Curtailed Operation" was defined in Regulation 9-10-222 differently than in the permit condition and was allowed unlimited. However, the 2010 amendment did not change the monitoring requirement Regulation 9-10-502. Recent discussions with Rule Development identified the different treatment of "Curtailed Operations" in the Amended Regulation 9, Rule 10. It was concluded that the different definition of "Curtailed Operations" in Regulation 9-10-222 was unintentional and drafts of a future amendment to Regulation 9, Rule 10 corrected this oversight.

Regulation 9-10-222 in the 6/21/12 draft was corrected as follows:

**9-10-222 Curtailed Operation:** Operation of a boiler, steam generator or process heater at no more than 230% of its rated heat input, not including startup or shutdown periods.

Regulation 9-10-222 was further edited in OPTION 2 of the 10/26/12 draft issued in the 11/14/12 Workshop Notice as follows:

**9-10-222 Curtailed Operation or Curtailment:** Operation of a boiler, steam generator or process heater at no more than ~~3020%~~ of its rated heat input, and for not more than 5 consecutive days, when monitoring compliance as described in Section 301.4.2. Curtailment does not include startup or shutdown periods.

Both of these draft revisions to Regulation 9-10-222 change the Curtailed Operation definition to be consistent with Permit Condition 18372.



In summary, Condition 18372 details the parametric monitoring system allowed by Regulation 9-10-502. This permit condition limits the low fire exemption duration to maintain the integrity of a CEM-equivalent monitoring system. Allowing an unlimited monitoring exemption would not be equivalent to a CEM that monitors emissions even when firing rates are low.

Based on the S-916 55MM Btu/hr maximum firing rate, curtailed operation defined at 20% (pursuant to Condition 18372, Part 31B) is at or below 11MM Btu/hr, and curtailed operation defined at 30% (pursuant to Regulation 9, Rule 10, amended December 2010) is at or below 16.5MM Btu/hr. According to the NO<sub>x</sub> Box operating window shown in the diagram above, S-916 curtailed operation is normal operation when curtailed operation is defined at 30%. S-916 curtailed operation is likely abnormal operation when curtailed operation is defined at 20%. To meet the requirements of NO<sub>x</sub> Box Condition 18372, operation below 20% or 11MM Btu/hr for more than 5 days (excepting startup and shutdowns) requires a NO<sub>x</sub> Box revision as detailed in Condition 18372, Part 32. Failure to meet the revision requirements of Condition 18372, Part 32 means S-916 is not in compliance with Condition 18372. Any source not in compliance with Condition 18372 does not qualify for the parametric monitoring system allowance, and according to the requirements of Regulation 9-10-502.1, a NO<sub>x</sub>, CO and O<sub>2</sub> CEM is required.

This Application 24921 complies with the revision requirements of Condition 18372, so therefore, S-916 meets the requirements of Condition 18372 and a CEM is not required.

### **EMISSIONS SUMMARY**

There are no changes in emissions due to this application. The emission factor change will not impact on the overall facility limit of 0.033 lb/MMBtu required by Regulation 9-10-301.

### **PLANT CUMULATIVE INCREASE**

There are no net changes to the plant cumulative emissions.

### **TOXIC RISK SCREEN**

This proposed NO<sub>x</sub> Box change would not emit toxic compounds in amounts different than previously emitted. Therefore, a toxic risk screen is not required.

### **BEST AVAILABLE CONTROL TECHNOLOGY**

BACT is triggered for new or modified sources that emit criteria pollutants in excess of 10 lbs/day. However, Regulation 2-1-234 defines a modified source as one that results in an increase in daily or annual emissions of a regulated air pollutant. For this application, there is no change in emissions. Therefore, BACT does not apply.

### **PLANT LOCATION**

According to the SCHOOL program, the closest school is Las Juntas Elementary, which is almost two miles from the facility.

## COMPLIANCE

The change to the NOx Box will not change the compliance for Furnace S-916. Emissions from S-916 will continue to comply with all applicable regulations, including Regulation 6, Rule 1 and Regulation 9, Rule 10.

The closest school is over a mile from the facility, so the Public Notice requirements of Regulation 2-1-214 do not apply.

Toxics, CEQA, NESHAPS, BACT, Offsets and NSPS do not apply.

## CONDITIONS

The NOx Box Condition 18372, will be modified as shown below. Only the substantive changes for the S-916 NOx Box points detailed in Part 31A are shown. All of the other parts of Condition 18372 remain unchanged by this application.

Condition 18372

31. Except as provided in part 31B & C, the owner/operator shall operate each source within the NOx Box ranges listed below at all times of operation. This part shall not apply to any source that has a properly operated and properly installed NOx CEM. (Regulation 9-10-502)

### B. NOx Box ranges

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
| 916        | <del>0.099</del>           | <del>5.97,</del>   | 9.3, 9.17  | <del>4.0, 17.4</del>  | <del>N/A</del>  | <del>10.6, 24.64</del>  |
|            | <del>0.090</del>           | 9.53   |  | <del>6.0, 34.6</del>  | <del>4.0, 17.4</del>  | <del>7.1, 34.00</del>   |
|            | 0.102                      | <del>4.0, 17.4</del><br><del>9.3, 9.17</del>                   | 10.6, 24.64  | <del>5.0, 43.89</del><br><del>7.1, 34.00</del>                  | N/A   | 10.4, 33.11   |

The limits listed above are based on a calendar day averaging period for both firing rate and O<sub>2</sub>%.

## RECOMMENDATION

It is recommended that a Change of Conditions to the Permit to Operate be granted to Tesoro for:

**S-916 No. 1 HDS Heater (F16)**

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Arthur P. Valla  
Senior Air Quality Engineer

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Date  
January 30, 2013

**Application 25007, S-913 NO<sub>x</sub> Box Revision**  
**EVALUATION REPORT**  
**TESORO REFINING AND MARKETING COMPANY**  
**REVISED NO<sub>x</sub> BOX FOR S-913, F-13 No 2 FEED PREP HEATER**  
**APPLICATION 25007, PLANT 14628**

**BACKGROUND**

The Tesoro Golden Eagle Refinery (Tesoro) operates several furnaces and boilers that are subject to Regulation 9, Rule 10, Nitrogen Oxides And Carbon Monoxide From Boilers, Steam Generators And Process Heaters In Petroleum Refineries. Regulation 9-10-301 limits the refinery wide NO<sub>x</sub> emissions to 0.033 lb/MMBtu of fired duty. Regulation 9-10-502 requires the installation of a NO<sub>x</sub>, CO and O<sub>2</sub> CEM to demonstrate compliance with Regulation 9-10-301. Regulation 9-10-502 also allows a CEM-equivalent parametric monitoring system to determine compliance with Regulation 9-10-301. The District and Tesoro have developed the CEM equivalent parametric monitoring system. This system is called the “NO<sub>x</sub> Box”. The NO<sub>x</sub> Box is an operating window for the unit, expressed in terms of fired duty and oxygen content in the flue gas. The operating window is established by source tests for various operating conditions. The source tests demonstrate the NO<sub>x</sub> emissions are equal to or less than a specified emission factor. As long as the fired unit duty and oxygen content are in this NO<sub>x</sub> Box operating window, the specified emission factor is used to determine compliance with the 0.033 lb/MMBtu limit of Regulation 9-10-301. The Permit Condition that contains the details of the NO<sub>x</sub> Box is #18372.

Condition 18372, Part 30 required Tesoro to submit the initial NO<sub>x</sub> Box for the affected sources by January 1, 2005. Tesoro met this requirement via Application 15682. The NO<sub>x</sub> Box’s in the application were supported by properly conducted source tests and the NO<sub>x</sub> Box operating windows for all the affected sources have been included in Revision 4 of the Title V permit (reference: Section VI, Condition 18372, Part 31A, NO<sub>x</sub> Box Ranges).

This application requests a change in the NO<sub>x</sub> Box operating window for:

**S-913 F-13 No 2 Feed Prep Heater**

The change is as follows:

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
| 913 old    | 0.033                      | 1.2, 19.89   | 3.0, 14.80   | 1.5, 39.10  | 2.1, 15.53  | 3.87, 40.23   |
|            | 0.033                      | 3.0, 14.80   | 4.5, 15.86   | 4.2, 39.50  | 3.87, 40.23   | 6.0, 21.03  |
| 913 new    | 0.033                      | 1.2, 19.89   | <del>3.0, 14.80</del><br>4.5, 15.86                            | 1.5, 39.10  | 2.1, 15.53  | <del>3.87, 40.23</del><br>2.9, 43.83                            |
|            | 0.033                      | <del>3.0, 14.80</del><br>4.5, 15.86                            | <del>4.5, 15.86</del><br>6.0, 21.03                            | <del>4.2, 39.50</del><br>2.9, 43.83                             | <del>3.87, 40.23</del><br>N/A   | <del>6.0, 21.03</del><br>5.2, 43.37                             |

Since the establishment of the initial NOx Box for S-913, the following revisions have been approved:

- 2007 Application 16888, approved April 4, 2008
- 2010 Application 21797, approved June 11, 2010
- 2011 Application 22971, approved March 10, 2011

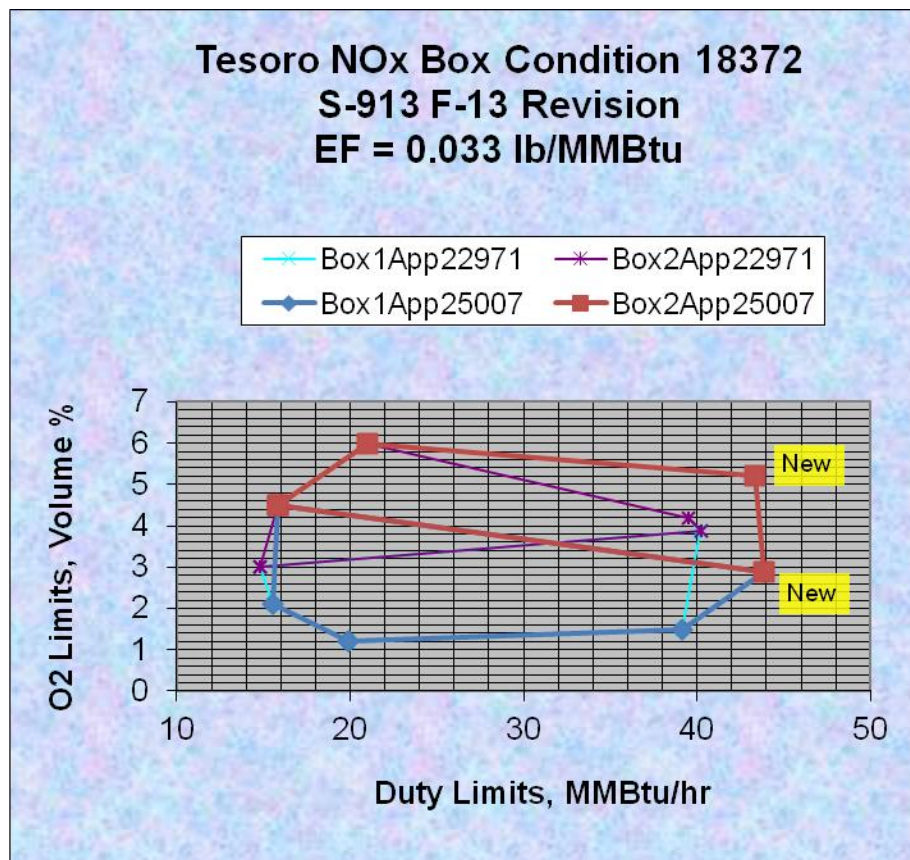
Even though this is the fourth revision to the S-913 NOx Box, a CEM is not required. None of the NOx Box revisions changed the S-913 NOx emission factor. This Application 25007 also leaves the emission factor unchanged. According to Engineering Policy approved 4/11/03 and included in Appendix B of the December 2003 Title V Statement of Basis, a CEM is only required if two source tests in a 5-year period exceed the NOx emission factor.

Tesoro is using two operating ranges as allowed by Condition 18372, Part 30, even though both operating ranges have the same emission factor. This is because Condition 22621, Part 10, requires the emission factor of 0.033 lb/MMBtu in order to generate IERC's.

The changes are supported by source tests reviewed by the Source Test Section.

This application is being processed as an administrative change in conditions since there is no change to the specified NOx emission factor for this unit, based on the limit of Condition 22621-10.

The following diagram summarizes the Application 22971 changes to the S-913 NOx Box:



S-913 is a grandfathered source initially operated in 1953 at a firing rate of 59MMBtu/hr. In 1999, Permit Condition 16885 limited the Tesoro refinery furnaces (including S-913 at 59MM Btu/hr maximum) to stop the capacity creep issue and for billing purposes. In 2005 via Application 13047 S-913 was altered by retrofitted with low NOx burners to comply with Regulation 9, Rule 10, and was modified to switch from the 40 psi fuel gas system to the 100 psi fuel gas system. The engineering evaluation of Application 13047 only evaluated the SO2 emission decrease due to the fuel gas supply modification (based on the 59MM Btu/hr firing rate) and the POC emissions increase due to added fugitive components. All of the grandfathered combustion emissions remain grandfathered since they have not been subject to the requirements of Regulation 2, Rule 2.

There has been some confusion regarding the applicability of the NOx Box Condition 18372, and in particular the low fire exemption Part 31B. Firstly, Regulation 9-10-502.1 requires a NOx, CO and O2 CEM unless an equivalent parametric monitoring system is used. Permit Condition 18372 defines the CEM equivalent parametric monitoring system that can be used instead of a CEM. This parametric monitoring system is commonly known as the NOx Box. Any source subject to the NOx Box CEM equivalent monitoring system must operate in accordance with Permit Condition 18372. Any source that operates in the NOx Box operating window defined in Condition 18372, Part 31A qualifies for the CEM equivalent monitoring system. Deviations from the NOx Box are allowed if properly addressed pursuant to Condition 18372, Part 32. There is also Part 31B, the low fire exemption, that allows source operation outside the operating windows in Part 31A during startup, shutdown, and curtailed operation. This low fire exemption was allowed at the request of WSPA during the development of the CEM equivalent monitoring system. WSPA requested this exemption because of the concern that during low fire operation, NOx emission factors could be higher than normal and there was concern this may result in a compliance problem with the 0.033 lb/MMBtu limit of Regulation 9-10-301. The intention of the exemption was to allow low fire for a limited duration, and was justified because mass emissions were expected to be low (even if emission factors were high) and that in any case the exemption was limited in duration. Startup and shutdown durations are limited in Regulation 9-10-218 and curtailed operation is limited to 5 days or less.

Based on the 59MM Btu/hr maximum firing rate, curtailed operation defined at 20% (pursuant to Condition 18372, Part 31B) is at or below 11.8MM Btu/hr, and curtailed operation defined at 30% (pursuant to Regulation 9, Rule 10, amended December 2010) is at or below 17.7MM Btu/hr. According to the NOx Box operating window shown in the diagram above, S-913 curtailed operation is normal operation when curtailed operation is defined at 30%. S-913 curtailed operation is abnormal operation when curtailed operation is defined at 20%. To meet the requirements of NOx Box Condition 18372, operation below 20% or 11.8MM Btu/hr for more than 5 days (excepting startup and shutdowns) requires a NOx Box revision as detailed in Condition 18372, Part 32. Failure to meet the revision requirements of Condition 18372, Part 32 means S-913 is not in compliance with Condition 18372. Any source not in compliance with Condition 18372 does not qualify for the parametric monitoring system allowance, and according to the requirements of Regulation 9-10-502.1, a NOx, CO and O2 CEM is required.

This Application 25007 complies with the revision requirements of Condition 18372, so therefore, S-913 meets the requirements of Condition 18372 and a CEM is not required.

## **EMISSIONS SUMMARY**

There are no changes in emissions due to this application.

### **PLANT CUMULATIVE INCREASE**

There are no net changes to the plant cumulative emissions.

### **TOXIC RISK SCREEN**

This proposed NOx Box change would not emit toxic compounds in amounts different than previously emitted. Therefore, a toxic risk screen is not required.

### **BEST AVAILABLE CONTROL TECHNOLOGY**

BACT is triggered for new or modified sources that emit criteria pollutants in excess of 10 lbs/day. However, Regulation 2-1-234 defines a modified source as one that results in an increase in daily or annual emissions of a regulated air pollutant. For this application, there is no change in emissions. Therefore, BACT does not apply.

### **PLANT LOCATION**

According to the SCHOOL program, the closest school is Las Juntas Elementary, which is almost two miles from the facility.

### **COMPLIANCE**

The change to the NOx Box will not change the compliance for Furnace S-913. Emissions from S-913 will comply with Regulation 6 and Regulation 9, Rule 10 as before the change.

The closest school is over a mile from the facility, so the Public Notice requirements of Regulation 2-1-214 do not apply.

Toxics, CEQA, NESHAPS, BACT, Offsets and NSPS do not apply.

### **CONDITIONS**

The NOx Box Condition 18372, will be modified as shown below. Only the substantive changes for the S-913 NOx Box points detailed in Part 31A are shown. All of the other parts of Condition 18372 remain unchanged by this application.

Condition 18372

31. Except as provided in part 31B & C, the owner/operator shall operate each source within the NOx Box ranges listed below at all times of operation. This part shall not apply to any source that has a properly operated and properly installed NOx CEM. (Regulation 9-10-502)

A. NOx Box ranges

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
| 913        | 0.033                      | 1.2, 19.89   | <del>3.0, 14.80</del><br><u>4.5, 15.86</u>                     | 1.5, 39.10  | 2.1, 15.53  | <del>3.87, 40.23</del><br><u>2.9, 43.83</u>                     |
|            | 0.033                      |  | <u>3.0, 14.80</u><br><u>4.5, 15.86</u>                         | <del>4.2, 39.50</del><br><u>2.9, 43.83</u>                      | <u>3.87, 40.23</u><br>N/A   | <u>6.0, 21.03</u><br><u>5.2, 43.37</u>                          |

The limits listed above are based on a calendar day averaging period for both firing rate and O<sub>2</sub>%.

**RECOMMENDATION**

It is recommended that a Change of Conditions to the Permit to Operate be granted to Tesoro for:

**S-913 F-13 No 2 Feed Prep Heater**

\_\_\_\_\_  
 Arthur P. Valla  
 Senior Air Quality Engineer

\_\_\_\_\_  
 Date  
 January 23, 2011



**Application 25523, S-926 No. 2 Reformer Splitter Reboiler**

Application 25758, S-1412 SAP Startup Heater

**ENGINEERING EVALUATION**  
**Tesoro Refining and Marketing Company**  
**PLANT NO. 14628**  
**APPLICATION NO. 25758**

**IX. BACKGROUND**

The Tesoro Refining and Marketing Company (Tesoro) is applying for a Permit to Operate, for the following equipment:

**S-1412 Sulfuric Acid Plant Startup Heater**

The heat exchanger and stack assembly adjacent to the heater are at end of life and need replacing. This intermittent service heater will be physically changed to increase the source efficiency. One of the potential impacts of this project is to reduce the startup time for the

**S-1411 Sulfuric Acid Plant**

The project will replace the S-1412 blower, replace the tube bundle with more surface area, improve the heat transfer with radial flow design, and increasing the flue gas stack height.

In addition, when Tesoro reported the S-1412 fuel rate for 2012 during the permit renewal, the reported 1609 MCF appeared to exceed the Title V Grandfathered limit of 1227MM Btu annually. When the District notified Tesoro of the exceedance, Tesoro stated on 6/6/13 that the applications required by Title V Standard Condition J.2 would be submitted. Standard condition J.2 requires these applications to be submitted within 30 days to report the exceedance. These required applications were not submitted and on 8/14/13 a referral was drafted and approved for Enforcement. This application was received 10/5/13.

While Tesoro was developing the permit application, and/or scoping the S-1412 project, records were located that showed the S-1412 burner installed in 1992 was designed for 17.1MM Btu/hr, higher than the 7.3 MM Btu/hr Grandfathered limit specified in the Title V permit. Tesoro submitted this application to correct the Grandfathered limit.

District records indicate that S-1412 was initially designated S-12 operated by Monsanto, the original owner of the Sulfuric Acid Plant (SAP). The source data form submitted by Monsanto in 1977 specifies the heater burner as a single Peabody type A15 with a maximum firing rate of 7.3MM Btu/hr. Monsanto specified that S-1412 was initially operated in 1953. The District concluded that S-1412 was modified in 1992, the year the 17.1MM Btu/hr burner was installed.

Tesoro rejected this conclusion. Further research of Tesoro's source records indicated that burners were installed in 1980 at a design firing rate of 14MM Btu/hr (LHV), which

Tesoro divides by 0.90 to convert to HHV and adds 10% to arrive at the maximum firing rate capacity of a source. Tesoro records also indicate S-1412 was originally constructed in 1980. Tesoro concluded that S-1412 was not modified in 1992 because the new burners did not exceed the capacity of the original burners.

It cannot be determined if the Monsanto S-12 was modified (when or by whom) which would be indicated by the same source number, or if the Tosco (now Tesoro) S-1412 was a new source (implied by the Tesoro records showing the initial construction in 1980) placed in the same start-up service as the Monsanto S-12. But regardless of what actually occurred, a larger capacity source probably was operated in about 1980. Therefore, the District has determined that S-1412 was a modified source in 1980 and the installed capacity of S-1412 in 1980 was 17.1MM Btu/hr.

The suggested approach for Application 25758 is a two-step process. Firstly, consider S-1412 modified and subject to the requirements of New Source Review Regulation 2, Rule 2 when the larger burner was installed and that the requirements of 1980 would apply. Secondly, consider S-1412 altered by this permit application. Tesoro has agreed to this approach.

After this application is approved, and the Title V permit is revised, S-1412 will be a NSR source with a permitted maximum firing rate of 17.1MM Btu/hr.

Lastly, since the maximum firing rate for S-1412 will be higher than 10MM Btu/hr, it no longer qualifies for the Regulation 9-10-111 Small Unit Limited Exemption. However, Tesoro has agreed to limit annual heat input to 90,000 therms, qualifying S-1412 to the Regulation 9-10-112 Low Fuel Usage Limited Exemption. Therefore, S-1412 will continue to remain out of the Regulation 9-10-301 Refinery Wide NOx Emission Limit.

## **X. EMISSION CALCULATIONS**

### **A. Emission Factors**

The following emissions factors are used to calculate emissions from S-1412 are as follows:

NOx: 100 lb/MMscf = 0.098 lb/MMBtu (81 ppmv @ 3% O<sub>2</sub>)

CO: 84 lb/MMscf = 8.24E-2 lb/MMBtu (112 ppmv @ 3% O<sub>2</sub>)

PM10 7.6 lb/MMscf = 7.45E-3 lb/MMBtu

VOC 5.5 lb/MMscf = 5.39E-3 lb/MMBtu (13 ppmv @ 3% O<sub>2</sub> as C<sub>1</sub>, assume to be all POC)

Emission factors are from Chapter 1, Tables 1.4-1 and 1.4-2 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors (lb/MMSCF / 1020Btu/SCF).

[As a courtesy to Tesoro, a draft of this engineering evaluation was provided to Tesoro before submission for approval. In Tesoro's review of this engineering evaluation,

Tesoro indicated that their records indicate CO emissions are high and requested that CO emissions be permitted at 400 ppm “that is specified in the tune-up procedure (9-10-605)”. The District Manual of Procedures, Volume I, Chapter 5, does include the 400 ppm CO value in the tune up requirements. However, the basis of the S-1412 emissions is AP-42, as originally agreed by Tesoro. Tesoro was provided many opportunities to provide the emission calculations for S-1412, but Tesoro never did, and the District used AP-42. Making a last minute change in CO emissions is inappropriate because no data or records were provided by Tesoro. If the source test shows the CO emissions exceed the AP42 EF, then a new application for a change in conditions can be provided.]

For SO2 emissions, the calculations will assume 30 ppm total sulfur in the fuel gas and that all sulfur is converted to SO2. It is recognized that this 30 ppm is more representative of the refinery fuel gas today, but as shown below, even if the fuel gas contained 1000 ppm sulfur, daily emission would not exceed 150 lbs, the BACT threshold in 1980.

$$\text{SO}_2: 30 \text{ ppm} * 64 \text{ lb/lb-mole SO}_2 / 385 \text{ SCF/mole} / 1020 \text{ Btu/SCF} = 0.00489 \text{ lb/MMBtu}$$

**B. S-1412 firing at a maximum rate of 7.3 MMBtu/hr**

| Pollutant | Emission Factor  | Lb/hour | Lb/day | Lb/yr |
|-----------|------------------|---------|--------|-------|
| POC       | 0.00539 lb/MMBtu | 0.039   | 0.94   | 345   |
| PM-10     | 0.00745 lb/MMBtu | 0.054   | 1.31   | 476   |
| SO2       | 0.00489 lb/MMBtu | 0.036   | 0.86   | 313   |
| NOx       | 0.098 lb/MMBtu   | 0.715   | 17.17  | 6267  |
| CO        | 0.0824 lb/MMBtu  | 0.602   | 14.44  | 5269  |

**C. S-1412 firing at a maximum rate of 17.1 MMBtu/hr**

| Pollutant | Emission Factor  | Lb/hour | Lb/day |
|-----------|------------------|---------|--------|
| POC       | 0.00539 lb/MMBtu | 0.092   | 2.21   |
| PM-10     | 0.00745 lb/MMBtu | 0.127   | 3.06   |
| SO2       | 0.00489 lb/MMBtu | 0.084   | 2.01   |
| NOx       | 0.098 lb/MMBtu   | 1.676   | 40.22  |

| Pollutant | Emission Factor    | Lb/hour | Lb/day |
|-----------|--------------------|---------|--------|
| CO        | 0.0824<br>lb/MMBtu | 1.409   | 33.82  |

SO2 at 1000 ppm Sulfur = 2.01 lb/day \* 1000 / 30 = 67 lb/day.

**D. S-1412 annual emissions limited by 90,000 therms/yr**

As explained in Section VI below, S-1412 will be limited to 90,000 therms annually to qualify for the Regulation 9-10-112 Low Fuel Usage. Therefore, the permitted annual PTE emissions from S-1412 will be as follows:

| S-1412 PTE Emissions as limited by Regulation 9-10-112 Low Fuel Usage |                     |         |        |       |        |
|---|---------------------|---------|--------|-------|--------|
| Pollutant   | Emission Factor     | Lb/hour | Lb/day | Lb/yr | Ton/yr |
| POC   | 0.00539<br>lb/MMBtu | 0.092   | 2.21   | 48.51 | 0.024  |
| PM-10   | 0.00745<br>lb/MMBtu | 0.127   | 3.06   | 67.05 | 0.034  |
| SO2   | 0.00489<br>lb/MMBtu | 0.084   | 2.01   | 44.01 | 0.022  |
| NOx   | 0.098<br>lb/MMBtu   | 1.676   | 40.22  | 882   | 0.441  |
| CO  | 0.0824<br>lb/MMBtu  | 1.409   | 33.82  | 742   | 0.371  |

**E. Total Project Increase**

The actual emissions increase for the 1980 modification that installed the larger burners would be based on an emissions baseline. However, it is impractical to determine an emissions baseline for operation prior to 1980. Therefore, for the purposes of determining the applicability of the New Source Review Regulation 2, Rule 2 requirements in 1980, the emissions at the 17.1MM Btu/hr firing rate will be used.

**F. Toxic Emissions**

In 1980, when S-1412 was modified by adding larger burners, Regulation 2, Rule 5 (New Source Review of Toxic Air Contaminants) did not exist. In addition, Regulation 2-1-316 (New or Modified Sources of Toxic Air Contaminants) and Table 2-1-316 (Toxic Air Contaminant Trigger Levels), the predecessor to Regulation 2, Rule 5, also did not exist. Therefore, the 1980 modification was not subject to a review of toxic emissions. The District did not have a policy on toxic emissions until 1987.

**XI. Offsets**

In 1980, Offsets were required by Regulation 2-2-303 if the cumulative increase for POC exceeded 40 tons/year, and for NOx if the cumulative increase exceeded 100 tons/yr. As can be seen in the Emission Calculation section above, total POC emissions were 0.404 tons/year and total NOx emissions were over 20 tons/year. However, during this period in 1980, facilities were able to increase emissions until the cumulative increase exceeded these Regulation 2-2-303 thresholds. It is impractical to determine the current cumulative increase in 1980 when S-1412 was modified. Moreover, all cumulative increases for all facilities were “forgiven” in 1991. Therefore, offsets do not apply.

## **XII. BACT**

In 1980, BACT was required by Regulation 2-2-301 if in a single day, emissions of POC, NPOC, NOx, SO2 or PM exceeded 150 lbs, or if CO emissions exceeded 550 lbs. As can be seen in the Emission Calculation section above, daily emissions do not exceed these thresholds. Therefore, BACT does not apply.

## **XIII. S-1412 Alteration**

As detailed in the Background section above, this 2014 permit application is for an alteration to S-1412. According to the information provided by Tesoro, the alteration project consists of replacing the heater blower, replacing the tube bundle with more surface area, improving the heat transfer with radial flow design, and increasing the flue gas stack height and the exhaust stack. The new blower will be capable of a slightly higher discharge pressure and a slightly smaller flowrate, the new exchanger bundle will increase heat transfer area and be re-designed for radial flow, and flue gas stack height will be increased by 4 feet. Tesoro originally stated that these changes will not impact the emissions of S-1412.

This project has the potential to reduce the start-up periods of S-1411 Sulfuric Acid Plant. When the start-up periods are shortened, the production periods are increased. The information in the application was not sufficient to quantify the production changes. It did indicate that there was 4 startup periods in 2012, and that the 90,000 therm limit would allow about 7 startups lasting 72 hours each. In any case, this shorter startup period appears to effectively increase the capacity of S-1411 which may increase emissions of SO2 and SAM. Therefore, this project has potential to debottleneck S-1411. S-1411 is a grandfathered source. According to Regulation 2-1-234.3.2, a grandfathered source with an emission increase due to debottlenecking is considered to be modified.

[As a courtesy to Tesoro, a draft of this engineering evaluation was provided to Tesoro before submission for approval. When Tesoro reviewed this engineering evaluation, Tesoro clarified that the purpose of the project is to replace end of life equipment with more efficient reliable equipment. Originally Tesoro stated this increase efficiency should reduce the startup time of the Sulfuric Acid Plant furnace. Tesoro expanded the explanation stating the number of start-up periods is dependent on whether the SAP has been shut down. A possible benefit of the startup heater project is that the higher

efficiency of the heater assembly may allow slightly faster heat transfer to the process air. If successful, it may be possible that the startup heater is run for less time, therefore reducing the amount of fuel combusted in the startup heater. However, the specific events during startup may vary and the exact time that the startup heater needs to be run for each event is variable. Also there are multiple steps before production is actually started. The efficiency and time of operation of the startup heater has no bearing on the SAP production.]

Tesoro assessed the debottlenecking of S-1411 and stated the startup heater is only one small phase in the startup process. The startup heater is necessary to get the temperature of the first two of the four reaction beds heated sufficiently so that Tesoro can add the acid gas to S-1411 and begin the reaction. However, there are still many steps before Tesoro can actually start production. Tesoro concludes that the efficiency and time of operation of the startup heater has no bearing on Tesoro's SAP production.

Furthermore, Tesoro states the project results in a decrease in emissions from the startup heater. The higher efficiency of the startup heater means that the heat transfer to the process air is slightly faster; and therefore, the startup heater will be needed for a slightly shorter time. This results in a decrease in emissions from the startup heater. Additionally, the time that Tesoro runs the startup heater is the time when converter bed temperatures are low. When the converter bed temperatures are low, Tesoro states that there is more potential for excess SO<sub>2</sub> emissions from S-1411. Therefore, the improved efficiency of the startup heater is better for reducing both the startup heater emissions and reducing the potential for higher or even excess emissions from S-1411.

Based on Tesoro's assessment of the project, the District decided to deem the project an alteration that qualifies for the Accelerated Permitting Program (APP). The basis of this determination is Tesoro's assertion that the increased efficiency of S-1412 will reduce or eliminate excess emissions during SAP startup. The temporary Permit to Operate was granted 7/3/2014 pursuant to Regulations 2-1-106 and 2-1-302.2. In order to verify that this project qualifies for the APP, in accordance with Regulation 2-1-302.2, Tesoro will be requested to provide the S-1411 SO<sub>2</sub> CEM data that demonstrates that emissions for S-1411 will not increase during startup as represented by Tesoro.

#### **XIV. STATEMENT OF COMPLIANCE**

This application does not change the compliance of S-1412 except for Regulation 9, rule 10, which will be addressed below. S-1412 is expected to remain in compliance with the following requirements:

Regulation 6, Rule 1 Particulate Matter General Requirements.

NSPS Subpart J Petroleum Refineries.

Regulation 2, Rules 1 and 2 (1980). This application is remedial to cover the 1980 modification of S-1412. The definition of a modified source was not included in the

1980 Regulation 2, Rule 1 (as Regulation 2-1-234 does currently) however the 1980 Regulation 2-1-301 did require an Authority to Construct for replacing the S-1412 burners with larger burners. This evaluation completed a “look-back” and has determined that the S-1412 modification did not trigger BACT or Offsets. If offsets were triggered based on the cumulative increase from projects other than the modification of S-1412, it would be inappropriate to collect them today because in 1991 all facility cumulative increases were set to zero (aka “forgiven”).

Regulation 2, Rules 1 and 2 (2014). The 2014 physical changes to S-1412 planned by Tesoro are expected to have no impact on emissions, so this application qualifies as an alteration pursuant to Regulation 2-1-233. Regulation 2, Rule 2 is not applicable.

Regulation 9, Rule 10. On 5/29/14, Tesoro proposed that this heater is exempt from Regulation 9, Rule 10, per 9-10-110.4 presumably because it is part of a Sulfuric Acid Plant that processes hydrogen sulfide process flue gas (according to sketches provided by Tesoro, and a PFD for the Acid Plant, the source itself does not process hydrogen sulfide process flue gas). However, when the District responded 5/30/14 and informed Tesoro that S-1412 was then subject to Regulation 9, Rule 7 (which has more stringent requirements), Tesoro revised its position stating S-1412 is not a process heater. This applicability issue has been discussed within the Engineering Division and with the Planning Division. The District has determined the following:

1. S-1412 is subject to either 9-7 or 9-10. S-1412 cannot be exempt from both regulations.
2. S-1412 is a process heater. Even if air is the process stream being heated, and even if there is not radiant section heat transfer and the heat transfer all occurs in a convection section, it is still a process heater per 9-10-214 or 9-7-217 (a similar Startup Heater at another SAP permitted in the District is a process heater subject to Regulation 9, Rule 7, Section 307.3).
3. The 9-10-110.4 exemption does not appear to apply because S-1412 is not processing hydrogen sulfide process flue gas.

S-1412 has always been subject to Regulation 9, Rule 10. Based on the original maximum firing rate of 7.3MM Btu/hr (this firing rate is consistent with Databank and the Title V permit), Regulation 9-10-111 Limited Exemption Small Units applied. However, since 1980, the firing rate of S-1412 has actually been 17.1MM Btu/hr. Therefore, S-1412 has not been a small unit. Rather than add S-1412 to the list of fired heaters subject to 9-10-301, Tesoro has agreed to accept a permit condition that limits the total annual firing of S-1412 to 90,000 therms, or 9000 MMBtu. Therefore, S-1412 is not subject to the limit of 9-10-301 pursuant to the low fuel usage limited exemption of Regulation 9-10-112. The limited exemption Regulation 9-10-112 is contingent on Regulation 9-10-306 Small Unit Requirements being satisfied. Tesoro has stated that it will comply with Regulation 9-10-306 Small Unit Requirements by the annual tune-up option of Regulation 9-10-306.2.

The project is over 1000 feet from the nearest school and therefore not subject to the public notification requirements of Reg. 2-1-412.

This permit application is exempt from CEQA because it has no potential for causing a significant adverse environmental impact. Pursuant to Regulation 2-1-312.7, this project will result in a refurbished S-1412 that has the same purpose and capacity of the



source before the project. Tesoro has submitted Form Appendix H in support of this exemption.

NESHAPS, PSD and Toxics do not apply to this alteration.

## **XV. PERMIT CONDITIONS**

The following permit conditions will be imposed by this application. Permit handbook conditions will be used, with minor adjustments to units and the addition of the Regulation 9-10-112 90,000 therm limit and the recordkeeping requirements of Regulation 2-1-302.2.

As a courtesy to Tesoro, a draft of this engineering evaluation was provided to Tesoro before submission for approval. In Tesoro's review of this engineering evaluation, Tesoro deleted Parts 2, 3 and 5, and deleted the POC part of the source test in Part 4. All of these parts are retained. Part 2 is required by Regulation 9-10-112, and Tesoro stated in its 1/14/14 letter (for the associated Title V Application 25759) that "Tesoro proposes that we accept a limit of 9000 MMBtu (90,000 therms) during each consecutive 12 month period." Part 3 is the recordkeeping necessary to assure compliance with Part 2. Part 4 is identical to the permit handbook condition, including a POC source test. Any deviation from the permit handbook raises CEQA issues. Part 5 is imposed to confirm Tesoro's position that this project does not debottleneck S-1411, and is allowed by Regulation 2-1-302.2. The records for previous startups are requested to make the comparison to the post project emissions. Requesting records for three years of startups will allow for a high-quality emissions average for pre-project emissions.

Tesoro Refinery and Marketing Company  
Plant 14628, Application 25758  
S-1412 SAP Startup Heater  
Modified in 1980  
Altered in 2014

1. The owner/operator of S-1412 shall operate this source on natural gas or refinery fuel gas exclusively. (basis: Cumulative Increase)
2. The owner/operator shall not use more than 9000 MM Btu of gas fuel at S-1412 in any consecutive twelve-month period. (basis: Cumulative Increase, Regulation 9-10-112)
3. To determine compliance with the above parts, the owner/operator shall maintain the monthly records of gas consumption at S-1412 in a District approved log. These logs shall be kept for at least 5 years and shall be made available to the District upon request. (basis: Cumulative Increase)
4. Within 60 days of startup, the owner/operator shall conduct a District approved source test of S-1412 to verify that it complies with the following emission factors when using gas as a fuel:
  - a. NO<sub>x</sub> = 81 ppm@ 3% O<sub>2</sub>

- b. CO = 112 ppm@3%O<sub>2</sub>
  - c. POC= 13 ppm @ 3% O<sub>2</sub>
- (basis: Cumulative Increase)

5. Within 60 days of the startup of the altered S-1412, the owner/operator shall provide the District with S-1411 SO<sub>2</sub> CEM data to demonstrate the S-1412 project impact on SO<sub>2</sub> emissions. The CEM data shall be provided in District approved electronic Excel® spreadsheet format, suitable for District evaluation, and include each month of 2012, 2013 and 2014 in which a S-1411 Sulfuric Acid Plant was started up with the use of S-1412, and in sufficient detail to evaluate emissions (hourly summaries for startup periods, daily summaries for periods before and after startup periods).

CEM data shall be sent to:

Air Quality Engineering Manager  
Bay Area Air Quality Management District  
939 Ellis Street  
San Francisco, CA 94109

Attn: Engineering Division, Permit Evaluation Section, Plant 14628, Application 25758  
(basis: Regulation 2-1-302.2)

**Evaluation Amendment 9/11/2014.** Following the approval of this evaluation and the granting of the permit on 8/7/14, Tesoro negotiated a change in the permit conditions with District Management. The comments made by Tesoro and the final changes are shown below.

Tesoro comment on Part 2:

Part 2 has a limit of 9000 MMBtu in a twelve month period. While this limit seems very high and should be well above our actual firing rate, it stems from the Regulation 9-10-112 low fuel exemption. If we were to lose the exemption, we would need to put the source in the 9-10 bubble. As this condition is written, we no longer have that option. While it is unlikely to exceed the 9000 MMBtu, if we did, we could not use the startup heater and would be unable to start up the acid plant and process the sulfur that we remove from the fuels.

When Tesoro provided comments on the draft engineering evaluation 7/17/14, Tesoro stated that this condition was redundant to the regulation and the condition should be deleted in its entirety. However, the 9-10-112 limited exemption states that it applies if the heater has an annual heat input less than 90,000 therms or accepts a condition in the Permit to Operate with this limit. Since S-1412 has the capacity to exceed 90,000 therms annually, a permit condition is a requirement of the limited exemption. Therefore, the condition is not redundant to the regulation, but a requirement of the regulation. Furthermore, it is an unlikely scenario that Tesoro suggests (in this latest comment) where Part 2 would prevent SAP startup. Since Tesoro expects the S-1412 startup heater to be in service for about 72 hours for each SAP startup, there would be multiple startups (about 7 if S-1412 is fired at full capacity for the entire 72 hour period) before the 90,000 therm limit would be exceeded. The fuel flow meter required by Regulation 9-10-502.2 and the recordkeeping requirements of Part 3 would provide Tesoro plenty of opportunity to submit a permit application to add S-1412 to the 9-10

bubble. The District agreed to revised the condition to allow Tesoro to add S-1412 to the 9-10 bubble.

#### Tesoro Comment on Part 4:

Part 4 requires compliance with AP-42 emission factors and source testing to demonstrate. Since we are not changing the burners or emissions, why are there new limits and why do we need to source test? The heater will typically ramp up from 0 to 17.1 MMBtu over the approximately 60 hour operating period. This will cause extreme variations in the emissions concentrations for NOx and CO. AP-42 factors cannot be a not to exceed limit. The tune-up procedure in the MOP contradicts the emissions limits in Part 4. During startup is not a good time to source test, but the tuneup requirement will necessitate it. Note that the exemption in 9-10- 110.4 would eliminate the need for source testing.

The Part 4 condition does not impose any new limits. It requires a source test to verify the emission factors used in engineering evaluation that is the basis of granting the permit. The language of Part 4 is identical to that in the Permit Handbook. During the completeness determination for this application, Tesoro was asked to provide the emission factors to use to estimate emissions. Tesoro had an opportunity to provide emission factors but instead elected to not do this. No emission factors were included on the Data Form C that Tesoro submitted in the application. Instead, Tesoro directed the District to use AP-42 emissions factors (Re: email message Wilma Dreessen to Arthur Valla dated 5/2/14). This was the basis of the engineering evaluation and the permit granted 8/7/14. It would be inappropriate to change an approved permit evaluation based on information provided after the permit was granted.

Tesoro also provided a 2013 S-1412 Tune-up report in support of using higher emissions factors. However, this Tune-up report was not provided until after the permit was granted. Furthermore, the report raises more questions:

- The 2013 tune-up report Tesoro provided says there was no fuel meter available. 9-10-502.2 requires a fuel-flow meter in each fuel line. It is understood that CO and NOx flue gas concentrations can be measured, but it is not understood how emission factors reported in lb/MMBtu can be determined without knowing the fuel rate.
- Without a fuel meter, it would also be difficult, if not impossible, to determine if S-1412 is operating at the "normal operation" required by the test procedure(MOP Volume I, Chapter 5).
- The 2013 tune-up test report says S-1412 was firing refinery fuel gas and has one 7.5MMBtu/hr John Zink burner. Tesoro has stated that this heater has a 17MMBtu/hr burner, and has asserted that this 17MM burner has been in place since 1980. The Tune-Up thus indicates that this application is also modifying S-1412 to install a larger burner. This would be an entirely different permit application.

Using the higher emission factors would result in CO and NOx emissions higher than 10 lb/day, and this application would no longer qualify for the accelerated permitting program.

Lastly, Tesoro proposed performing the source test after the initial startup because of refractory curing issues with the new equipment (a new stack and larger tubesheet is

installed by the project alteration includes refractory). Tesoro also proposed removing the POC source test since it is not required in the Tune-up procedure. (Tesoro also requested that the POC testing be removed from Part 4 when comments were provided on the draft engineering evaluation on 7/17/14.) Even though POC testing is required in the standard permit condition in the Permit Handbook, the District agreed to revise Part 4 to required the source test later and to remove the POC testing.

#### Tesoro Comment on Part 5:

Part 5 requires data that The Condition 5 requires a huge amount of data to be submitted, but no explanation of how it will be evaluated. There are so many factors involved in startups that you will find that the emissions will fluctuate significantly. The emissions will also be variable depending on which units are operating, what the load is to the sulfur plant, whether the startup was after a turnaround when the refinery is operating at a slower rate vs. an upset when all units are running. There is also variation due to the startup sequence timing. Frankly, Art would spend a tremendous amount of time trying to analyze a very complex number of variables and potentially draw erroneous conclusions. The monthly data required in Condition 5 would have such variation in feed and production that you would not be able to isolate the impact of the startup heater project. If this project could debottleneck the SAP then the annual update in 2014 or 2015 should show a problem and then we would have to submit an application under Subpart J in the Title V. It should not be necessary to submit the large amount of data for this startup heater alteration that is required in Part 5.

In the initial permit application received 10/5/13 Tesoro primarily addressed the 7.3MM Btu/hr grandfathered limit for S-1412, and the Title V Standard Condition J.2 requirement when grandfathered limits are exceeded. Tesoro also stated in the 9/30/13 cover letter that S-1412 would be altered with a new blower and stack, but provided no details of this project. Tesoro provided the missing application details on 5/2/14, and specified the scope of the project as replacement of the S-1412 blower and stack, improving the efficiency and reliability of the of the heater. Tesoro did not disclose that the project also included replacing the tube sheet (aka E-10) until 5/30/14. Furthermore, on 6/2/14, Tesoro disclosed that

"The purpose of replacing the blower and the heat exchanger for the startup heater is to enable a better hear transfer and reliability. The more efficient heat exchanger should reduce the startup time for the Sulfuric Acid furnace."

In response to this disclosure, the District recognized that this project has potential to debottleneck and reduce startup times of the S-1411 Sulfuric Acid Plant, which would result in an increase in production and potentially an increase the S-1411 emissions. S-1411 is a grandfathered source. According to Regulation 2-1-234.3.2, "a grandfathered source with an emissions increase do to debottlenecking is considered to be modified". When Tesoro was asked about this potential debottlenecking, Tesoro responded on 7/2/14 stating the following:

" The higher efficiency of the startup heater means that the heat transfer to the process air is slightly faster; and therefore, the startup heater will be needed for a slightly shorter time. This results in a decrease in emissions from the startup heater. Additionally, the time that we run the startup heater is the time when converter bed temperatures are low. When the converter bed temperatures are low, there is more potential for excess SO2 emissions from S-1411. Therefore, the improved efficiency of the startup heater is better for reducing both the startup heater emissions and reducing the potential for higher or even excess emissions from S-1411."

This statement was the basis for determining that this project was an alteration and that the application qualified for the Accelerated Permitting Program. Normally, Tesoro would have been required to provide information to support this statement that emissions would be reduced before the determination was made. However, Tesoro wanted the go-ahead for this project since it was ready to proceed, and in subsequent internal discussions, the District agreed to allow this determination without supporting information provided that the information was provided later. The approach as detailed in Part 5 is intended to get this information. Tesoro statement that the data is "huge" and that there are several variables may be true. And Tesoro can provide more data than was requested and Tesoro is free to evaluate the data before submission. However, it would be expected that Tesoro knew these complexities when it made the statement that emissions would be reduced by this project. Furthermore, Tesoro was asked about the approach for determining emissions would be reduced on 7/15/14, but Tesoro chose not to respond.

Therefore, this Part 5 is justified and will be used to support the Tesoro claim that emissions will be reduced. However, the District agreed to allow Tesoro more time to provide this data.

The following are the final permit conditions.

Tesoro Refinery and Marketing Company  
Plant 14628, Application 25758  
S-1412 SAP Startup Heater  
Modified in 1980  
Altered in 2014

1. The owner/operator of S-1412 shall operate this source on natural gas or refinery fuel gas exclusively. (basis: Cumulative Increase)
2. The owner/operator shall not use more than 9000 MM Btu of gas fuel at S-1412 in any consecutive twelve-month period unless a permit application is submitted within 7 days of the exceedance to the Air Quality Engineering Manager in the Engineering Division for including S-1412 into the Regulation 9, Rule 10 bubble. (basis: Cumulative Increase, Regulation 9-10-112)
3. To determine compliance with the above parts, the owner/operator shall maintain the monthly records of gas consumption at S-1412 in a District approved log. These logs shall be kept for at least 5 years and shall be made available to the District upon

request. (basis: Cumulative Increase)

4. Within 60 days of startup, the owner/operator shall conduct a District approved source test of S-1412 for NOx and CO to determine emissions when using gas as a fuel. If the source test shows higher emissions than those reported in the engineering evaluation report (Application 25758), then Tesoro may need to submit an administrative permit amendment to the District to change the engineering evaluation to reflect the higher emissions. (basis: Source Total Emissions) to verify that it complies with the following emission factors when using gas as a fuel:

- a. ~~NOx = 81 ppm @ 3% O2~~  
b. ~~CO = 112 ppm @ 3% O2~~  
c. ~~POC = 13 ppm @ 3% O2~~  
(basis: Cumulative Increase)

5. Within ~~60~~90 days of the startup of the altered S-1412, the owner/operator shall provide the District with S-1411 SO2 CEM data to demonstrate the S-1412 project impact on SO2 emissions. The CEM data shall be provided in District approved electronic Excel® spreadsheet format, suitable for District evaluation, and include each month of 2012, 2013 and 2014 in which a S-1411 Sulfuric Acid Plant was started up with the use of S-1412, and in sufficient detail to evaluate emissions (hourly summaries for startup periods, daily summaries for periods before and after startup periods). CEM data shall be sent to:

Air Quality Engineering Manager  
Bay Area Air Quality Management District  
939 Ellis Street  
San Francisco, CA 94109  
Attn: Engineering Division, Permit Evaluation Section, Plant 14628, Application 25758  
(basis: Regulation 2-1-302.2)

## XVI. RECOMMENDATION

It is recommended that a Permit to Operate be granted to Tesoro Refining and Marketing Company for the following sources:

**S-1412                      Sulfuric Acid Plant Startup Heater**

By: \_\_\_\_\_

Arthur P Valla  
Senior Air Quality Engineer  
11Sep14

## **Application 25942, S-1557 Emergency Generator Diesel Engine**

### **ENGINEERING EVALUATION Tesoro Refining & Marketing Company LLC Plant: 14628 Application: 25942**

## **BACKGROUND**

Tesoro Refinery has applied to obtain an Authority to Construct (AC) and/or a Permit to Operate (PO) for the following equipment:

### **S-1557 Emergency Standby Diesel Generator Set 2014 Caterpillar, Model: C15 762 bhp, 4.97 MMBtu/hr**

The Emergency Diesel Engine Generator Set (S1557) will be located at the Central Maintenance Building in Tesoro and is equipped with the best available control technology (BACT) for minimizing the release of air borne criteria pollutants and harmful air toxins due to fuel combustion. The criteria pollutants are nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), precursor organic compounds (POC) from unburned diesel fuel, sulfur dioxide (SO<sub>2</sub>) and particulate matter (PM<sub>10</sub>). All of these pollutants are briefly discussed on the District's web site at [www.baaqmd.gov](http://www.baaqmd.gov).

S-1557 meets the Environmental Protection Agency and California Air Resources Board (EPA/CARB) Tier 2 Off-road standard. The engine will burn commercially available California ultra low sulfur (ULS) diesel fuel. The sulfur content of the diesel fuel will not exceed 0.0015% by weight.

The engine is subject to attached condition no. 23811.

## **EMISSIONS**

Basis:

- 762 hp output rating.
- 50 hr/yr operation for testing and maintenance.
- 36.3 gallons/hr max fuel use rate.
- NMHC + NO<sub>x</sub>, CO, and PM<sub>10</sub> emission factors are EPA-certified emission levels (for EPA engine family name of DCPXL15.2NZS), per manufacturer's performance data sheet issued by Peterson Power Systems.
- SO<sub>2</sub> emissions are quantified based on the full conversion of 0.0015 wt% (~ 15 ppm) sulfur in the ULS diesel fuel. The SO<sub>2</sub> emission factor was derived from EPA AP-42, Table 3.4-1.

### **Annual Average Emissions:**

Annual emissions are calculated based on the number of hours per year of operation for testing and maintenance. See Table 1.

**Daily Emissions:**

Daily emissions are calculated to establish whether a source triggers the requirement for BACT (10 lb/highest day total source emissions for any class of pollutants). 24-hr/day of operation will be assumed since no daily limits are imposed on intermittent and unexpected operations. See Table 1.

**Table 1. Annual and Daily Emissions from CARB/EPA Certified Data**

| Source | Operating Hours (hr/yr) | Max Rated Output (bhp) | Fuel Use Rate (gal/hr) | Calculated MMBtu/hr | Pollutant                    | E.F. (g/bhp-hr) | Max Daily Emissions (lb/day) | Annual Emissions (lb/yr) | Annual Emissions (TPY) |
|--------|-------------------------|------------------------|------------------------|---------------------|------------------------------|-----------------|------------------------------|--------------------------|------------------------|
| S-1557 | 50                      | 762                    | 36.3                   | 4.97                | NO <sub>x</sub>              | 4.00            | 161.13                       | 335.68                   | 0.1678                 |
|        |                         |                        |                        |                     | POC                          | 0.07            | 2.82                         | 5.87                     | 0.0029                 |
|        |                         |                        |                        |                     | CO                           | 1.2             | 48.34                        | 100.7                    | 0.0504                 |
|        |                         |                        |                        |                     | PM <sub>10</sub>             | 0.07            | 2.82                         | 5.87                     | 0.0029                 |
|        |                         |                        |                        |                     | SO <sub>2</sub> <sup>1</sup> | 0.001515        | 0.18                         | 0.38                     | 0.00019                |

<sup>1</sup>Notes: SO<sub>2</sub> emission factor from AP-42 Table 3.4-1, SO<sub>2</sub> (15 ppm) E.F. is 0.001515 lb SO<sub>2</sub>/MMBtu.

**PLANT CUMULATIVE INCREASE**

Table 2 summarizes the cumulative increase in criteria pollutant emissions that will result at Plant 14628 from the operation of S-1557.

**Table 2. Plant Cumulative Emissions Increase, Post 4/5/91**

| Pollutant        | Existing Emissions, Post 4/5/91 (TPY) | New Increase with This Application (TPY) | Cumulative Emissions (TPY) |
|------------------|---------------------------------------|--|----------------------------|
| NO <sub>x</sub>  | 0.000                                 | 0.1678                                   | 0.1678                     |
| POC              | 0.000                                 | 0.0029                                   | 0.0029                     |
| CO               | 14.308                                | 0.0504                                   | 14.3584                    |
| PM <sub>10</sub> | 0.990                                 | 0.0029                                   | 0.9929                     |
| SO <sub>2</sub>  | 0.000                                 | 0.00019                                  | 0.00019                    |

**TOXIC RISK SCREENING ANALYSIS**

This application required a Toxics Risk Screening Analysis because the diesel particulate emissions from the operation of S-1557 are greater than the toxic trigger level. Regulation 2-5 requires that the cumulative impacts from all related projects permitted within the last two years be included in the risk screening analysis. There are no projects related to this application.

S-1557 meets Best Available Control Technology for toxics (TBACT) since the diesel particulate emissions are less than 0.15 g/bhp-hr. For a project with engines that meet the TBACT requirement, it must also pass the toxic risk screening level of less than ten in a million. Estimates of residential risk assume exposure to annual average toxic air contaminant concentrations occur 24 hours per day, 350 days per year, for a 70-year lifetime. Risk estimates



for offsite workers assume exposure occurs 8 hours per day, 245 days per year, for 40 years. Risk estimates for students assume a higher breathing rate, and exposure is assumed to occur 10 hours per day, 36 weeks per year, for 9 years.

Based on 50 hours per year of operation, the emergency generator set passed the Health Risk Screening Analysis (HRSA) conducted on January 30, 2014 by the District's Project Processing Section. The source poses no significant toxic risk, since the increased cancer risk to the maximally exposed receptor (Resident) is 5.4 in a million. The hazard index for a resident is 1.9 E-3. The source is not located near students. Thus, in accordance with Regulation 2-5, this source is in compliance with the TBACT and project risk requirements.

**BACT**

In accordance with Regulation 2-2-301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NOx, CO, SO<sub>2</sub> or PM<sub>10</sub>.

BACT is triggered for NOx and CO since the maximum daily emissions of each of these pollutants exceed 10 lb/day per source. Please refer to the discussion on “Daily Emissions” on page 1 of this evaluation. BACT for this source is presented in the current BAAQMD BACT/TBACT Workbook for IC Engine – Compression Ignition: Stationary Emergency, non-Agricultural, non-direct drive fire pump, Document #96.1.3, Revision 7 dated 12/22/2010. For NOx and CO, BACT(2) is the CARB ATCM standard for the respective pollutant at applicable horsepower rating.

S-1557 satisfies the current BACT(2) standards for NOx and CO (4.8 g/bhp-hr of NOx+NMHC, when NOx is 4.0 g/bhp-hr, and 2.6 g/bhp-hr of CO). The more restrictive BACT(1) standards are not applicable to this engine because it will be limited to operation as an emergency standby engine.

**OFFSETS**

Per Regulation 2-2-302, before an Authority to Construct or a Permit to Operate is issued for a new source at a facility emitting 35 tons per year or more, on a pollutant specific basis, of POC or NOx, emission offsets shall be provided, for the emissions from the new source and any pre-existing cumulative increase, minus any onsite contemporaneous emission reductions, at a 1.15 to 1.0 ratio. Per Regulation 2-2-303, before an Authority to Construct or a Permit to Operate is issued for a new source at a facility emitting 1 tons per year or more, on a pollutant specific basis, of PM10 or Sulfur Dioxide, emission offsets shall be provided, for the emissions from the new source and any pre-existing cumulative increase, minus any onsite contemporaneous emission reductions, at a 1.0 to 1.0 ratio. Additionally, the applicant must reimburse the District Small Facility Banking Account (SFBA) for any un-reimbursed offsets previously provided by the District, at a 1.0 to 1.0 ratio.

*The required offsets for this application are shown in the following table:*

| Pollutant | Cumulative Increase plant emissions associated with this application (TPY) | Offset Ratio | Offsets Required (TPY) | Comments   |
|-----------|--|--------------|------------------------|------------|
| NOx       | 0.1678   | 1.15         | 0.193                  | Cert# 915  |
| POC       | 0.0029   | 1.15         | 0.003                  | Cert# 968  |
| PM10      | 0.9929   | 1.0          | N/A                    | < 1.0 tons |

|     |         |     |     |            |
|-----|---------|-----|-----|------------|
| SO2 | 0.00019 | 1.0 | N/A | < 1.0 tons |
|-----|---------|-----|-----|------------|

## **NSPS**

The engine is subject to 40 CFR 60, Subpart III, Standards of Performance for Stationary Compression Ignition Internal Combustion Engines because it was manufactured after April 1, 2006, as required by Section 60.4200(a)(2)(i).

S-1557 engine has a total displacement of 15.20 liters and has 6 cylinders. Therefore, each cylinder has a volume of less than 10 liters. The engine is a 2013 model year engine and is not a firewater pump. Section 60.4205(b) requires these engines to comply with the emission standards in Section 60.4202, which refers to 40CFR89.112 and 40CFR89.113 for all pollutants.

For engines greater than 600 hp, these standards are:

NMHC+NOx: 4.77 g/hp-hr

CO: 2.61 g/hp-hr

PM: 0.15 g/hp-hr

According to EPA certification for engine family name of DCPXL15.2NYS, the engine will comply with the standards.

Sections 60.4206 and 60.4211(a) require that the owner/operator operate and maintain the engine according to the manufacturer's written instructions or procedures developed by the owner or operator that are approved by the engine manufacturer, over the entire life of the engine. The owner/operator is expected to comply with this requirement.

Section 60.4207(b) requires that by October 1, 2010, the owner/operator must use fuel that complies with 40 CFR 80.510(b). This means that the fuel must have a sulfur content of 15 parts per million (ppm) maximum, and the same cetane index or aromatic content as above. The owner/operator is expected to comply with this requirement because CARB diesel is required to be used in California.

Section 60.4209(a) requires a non-resettable hour meter. This requirement is already in the permit conditions.

The engine will comply with the requirements of Section 60.4211(c) because it has been certified in accordance with 40 CFR Part 89.

The engine will comply with the requirement in Section 60.4211(e) to run for less than 100 hours per year for maintenance checks and readiness testing, and the prohibition of running for any reason other than emergency operation, maintenance, and testing because it is limited by permit condition to 50 hours per year for reliability testing and otherwise may only operate for emergencies.

The owner/operator is not required to perform tests in accordance with Section 60.4212 or 60.4213.

Section 60.4214 states that owner/operators do not have to submit an initial notification to EPA for emergency engines.

Because the engine does not have a diesel particulate filter, the owner/operator is not subject to Section 60.4214(c).

The owner/operator is required to comply with certain sections of 40 CFR 60, Subpart A, General Provisions. The owner/operator is expected to comply with this requirement.

### **NESHAP**

This engine is subject to the emission or operating limitations in 40 CFR 63, Subpart ZZZZ, National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines. Per 40 CFR 63.6590(c)(1), a new or reconstructed stationary RICE located at an area source must meet the requirements of 40 CFR part 60 subpart III, for compression ignition engines. This engine is in compliance with the requirements of 40 CFR part 60 subpart III, as shown in the “NSPS” section of this evaluation.

### **CARB Stationary Diesel Engine ATCM**

The State Office of Administrative Law approved the Airborne Toxic Control Measure (ATCM) on November 8, 2004. State law requires the local Air Districts to implement and enforce the requirements of the ATCM. Effective January 1, 2005, there is a prohibition on the operation of new diesel emergency standby engines greater than 50 bhp unless the following operating requirements and emission standards are met:

**“Stationary Diesel Engine ATCM” section 93115, title 17, CA Code of Regulations.  
Emissions Standards and Hours of Operating Requirements for New Stationary  
Emergency Standby Diesel-Fueled Engines (>50 bhp):**

- a. meet the applicable emission standards for all pollutants for the same model year and maximum horsepower rating as specified in Table 1 Emission Standards for New Stationary Emergency Standby Diesel-Fueled CI Engines, in effect on the date of acquisition or submittal, as defined in section 93115.4, and

**Table 1: Emission Standards for New Stationary Emergency Standby Diesel-Fueled CI Engines g/bhp-hr (g/kW-hr)**

| Maximum Engine Power               | Model year(s) | PM          | NMHC+NOx               | CO        |
|------------------------------------|---------------|-------------|------------------------|-----------|
| 50 ≤ HP < 75<br>(37 ≤ kW < 56)     | 2007          | 0.15 (0.20) | 5.6 (7.5)<br>3.5 (4.7) | 3.7 (5.0) |
|                                    | 2008+         |             |                        |           |
| 75 ≤ HP < 100<br>(56 ≤ kW < 75)    | 2007          | 0.15 (0.20) | 5.6 (7.5)<br>3.5 (4.7) | 3.7 (5.0) |
|                                    | 2008+         |             |                        |           |
| 100 ≤ HP < 175<br>(75 ≤ kW < 130)  | 2007          | 0.15 (0.20) | 3.0 (4.0)              | 3.7 (5.0) |
|                                    | 2008+         |             |                        |           |
| 175 ≤ HP < 300<br>(130 ≤ kW < 225) | 2007          | 0.15 (0.20) | 3.0 (4.0)              | 2.6 (3.5) |
|                                    | 2008+         |             |                        |           |
| 300 ≤ HP < 600<br>(225 ≤ kW < 450) | 2007          | 0.15 (0.20) | 3.0 (4.0)              | 2.6 (3.5) |
|                                    | 2008+         |             |                        |           |
| 600 ≤ HP < 750<br>(450 ≤ kW < 560) | 2007          | 0.15 (0.20) | 3.0 (4.0)              | 2.6 (3.5) |
|                                    | 2008+         |             |                        |           |
| HP > 750<br>(kW > 560)             | 2007          | 0.15 (0.20) | 4.8 (6.4)              | 2.6 (3.5) |
|                                    | 2008+         |             |                        |           |

1. May be subject to additional emission limitations as specified in current applicable district rules, regulations or policies.

- b. after December 31, 2008, be certified to the new nonroad compression-ignition (CI) engine emission standards for all pollutants for 2007 and later model year engines as specified in 40 CFR, PART 60, Subpart III-Standards of Performance for Stationary Compression Ignition Internal Combustion Engines (2006); and
- c. not operate more than 50 hours per year for maintenance and testing purposes, except as provided in 93115.6(a)(3)(A)2. This subsection does not limit engine operation for emergency use and for emission testing to show compliance with 93115.6(a)(3).

Emergency standby diesel engine S- 1557 meets (1) the emission standards for all pollutants set in Table 1 Emission Standards for New Stationary Emergency Standby Diesel-Fueled CI Engines, (2) is subject to and in compliance with the EPA Tier 2 off-road CI engine standards, and (3) will operate for no more than 50 hours per year for maintenance and reliability testing per engine. Therefore, the diesel engine is in compliance with the above ATCM requirements.

**STATEMENT OF COMPLIANCE**

Source S-1557 is subject to and expected to be in compliance with the requirements of District Regulation 1-301 (Public Nuisance), Regulation 6-1-303 (Particulate Matter and Visible Emissions), Regulation 9-1 (Sulfur Dioxide) and Regulation 9-8 (NOx and CO from Stationary Internal Combustion Engines).

From Regulation 1-301, no person shall discharge from any source whatsoever such quantities of air contaminants or other material which cause injury, detriment, nuisance or annoyance to any considerable number of persons or the public; or which endangers the comfort, repose, health or safety of any such persons or the public, or which causes, or has a natural tendency to cause, injury or damage to business or property. For purposes of this section, three or more violation notices validly issued in a 30 day period to a facility for public nuisance shall give rise to a rebuttable presumption that the violations resulted from negligent conduct.

S-1557 is subject to the limitations of Regulation 6-1-303 (*Particulate Matter*). Regulation 6-1-303 states that a person shall not emit for a period or periods aggregating more than three minutes in any hour, a visible emission that is as dark or darker than No. 2 on the Ringelmann

Chart, or of such opacity as to obscure an observer's view to an equivalent or greater degree, nor shall said emission, as perceived by an opacity sensing device in good working order, where such device is required by District Regulations, be equal to or greater than 40% opacity. This low PM<sub>10</sub> emitting engine is not expected to produce visible emissions or fallout in violation of this regulation, and it will be assumed to be in compliance with Regulation 6 pending a regular inspection.

S-1557 is also subject to the SO<sub>2</sub> limitations of Regulation 9-1-301 (*Limitations on Ground Level Concentrations of Sulfur Dioxide*), Regulation 9-1-302 (*Limitations Sulfur Dioxide Emissions*) and 9-1-304 (*Burning of Solid and Liquid Sulfur Dioxide Fuel*). From Regulation 9-1-301, the ground level concentrations of SO<sub>2</sub> will not exceed 0.5 ppm continuously for 3 consecutive minutes or 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours. Per Regulation 9-1-302, a person shall not emit from any source a gas stream containing sulfur dioxide in excess of 300 ppm (dry). And Regulation 9-1-304, states that a person shall not burn any liquid fuel having sulfur content in excess of 0.5% by weight. Compliance with Regulation 9-1 is very likely since diesel fuel with a 0.0015% by weight sulfur is mandated for use in California.

From Regulation 9-8 (*NO<sub>x</sub> and CO from Stationary Internal Combustion Engines*), Section 110.5 (*Emergency Standby Engines*), S-1557 is exempt from the requirements of Regulations 9-8-301 (*Emission Limits on Fossil Derived Fuel Gas*), 9-8-302 (*Emission Limits on Waste Derived Fuel Gas*), 9-8-303 (*Emissions Limits – Delayed Compliance, Existing Spark-Ignited Engines, 51 to 250 bhp or Model Year 1996 or Later*), 9-8-304 (*Emission Limits – Compression-Ignited Engines*), 9-8-305 (*Emission Limits – Delayed Compliance, Existing Compression-Ignited Engines, Model Year 1996 or Later*), 9-8-501 (*Initial Demonstration of Compliance*) and 9-8-503 (*Quarterly Demonstration of Compliance*). However, it is subject to the monitoring and record keeping procedures described in Regulation 9-8-530 (*Emergency Standby Engines, Monitoring and Recordkeeping*). The requirements of this Regulation are included in the permit conditions below.

S-1557 is also subject to and expected to comply with Regulation 9-8-330 (*Emergency Standby Engines, Hours of Operation*) since non-emergency hours of operation will be limited in the permit conditions to 50 hours per year.

This application is considered to be ministerial under the District's Regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Permit Handbook Chapter 2.3.

PSD is not triggered.

This facility is located greater than 1,000 feet from the nearest school and therefore is not subject to the public notification requirements of Regulation 2-1-412.

### **PERMIT CONDITIONS**

COND# 23811 -----

Application 14917, September 2006

Modified by Application 16495, November 2007

Modified by Application 19330, February 2009

Modified by Application 21713, May 2010

Modified by Application 22152, October 2010

Modified by Application 25942, February 2014

Plant 14628 (B2758) Emergency Diesel Engines S-1518, S-1519, S-1557

Plant 14628 (B2758) Emergency Diesel Engine S-1522

Plant 14629 (B2759) Emergency Diesel Engine S-57

Plant 14629 (B2759) Emergency Diesel Engine S-58

Plant 21200 (B2759) Emergency Diesel Engine S-56

1. Operating for reliability-related activities is limited to 50 hours per year per engine. [Basis: "Stationary Diesel Engine ATCM", CA Code of Regulations, Title 17, Section 93115.6(b)(3)(A)2b and 93115.6(a)(3)(A)1c]

2. The owner or operator shall operate each emergency standby engine only for the following purposes: to mitigate emergency conditions, for emission testing to demonstrate compliance with a District, state or

Federal

emission limit, or for reliability-related activities (maintenance and other testing, but excluding emission testing). Operating hours while mitigating emergency conditions or while emission testing to show compliance with District, state or Federal emission limits is not limited. [Basis: Regulation 9-8-330, "Stationary Diesel Engine ATCM", CA Code of Regulations, Title 17, Section 93115.4(29)]

3. The owner/operator shall operate each emergency standby engine only when a non-resettable totalizing meter

(with

a minimum display capability of 9,999 hours) that measures the hours of operation for the engine is installed, operated and properly maintained. [Basis: Regulation 9-8-530, "Stationary Diesel Engine ATCM", CA Code of Regulations, Title 17, Section 93115.10(de)(1)]

4. Records: The owner/operator shall maintain the following

monthly records in a District-approved log for at least 60 months from the date of entry. Log entries shall be retained on-site, either at a central location or at

the

engine's location, and made immediately available to

the

District staff upon request.

- a. Hours of operation for reliability-related activities (maintenance and testing).
- b. Hours of operation for emission testing to show compliance with emission limits.
- c. Hours of operation (emergency).
- d. For each emergency, the nature of the emergency condition.
- e. Fuel usage for each engine(s)

[Basis: Regulation 9-8-530, Regulation 2-6-501, and "Stationary Diesel Engine ATCM", CA Code of Regulations, Title 17, Section 93115.10(~~f~~) ]

### **RECOMMENDATION**

*I recommend that Tesoro Refinery be issued an Authority to Construct for the following equipment:*

**S-1577 Emergency Standby Diesel Generator Set**  
2014 Caterpillar, Model: C15  
762 bhp, 4.97 MMBtu/hr

**Prepared by:** \_\_\_\_\_  
Arthur Valla, Senior Air Quality Engineer

**Date:** \_\_\_\_\_  
19Feb14

## **Application 26000, S-1470 No 3 Crude Vacuum Distillation Heater Alteration**

### **ENGINEERING EVALUATION Tesoro Refining and Marketing Company PLANT NO. 14628 APPLICATION NO. 26000**

#### **I. BACKGROUND**

The Tesoro Refining and Marketing Company (Tesoro) is applying for a Permit to Operate, for the following equipment:

**S-908 No 3 Crude Heater**

**S-1470 No. 3 Crude Vacuum Distillation Heater**

These two fired heaters share a common SCR, induced draft fans, and exhaust gas stack. The proposed project will install a damper in the flue gas duct of S-908 before it combines with the flue gas of S-1470. The purpose of this damper is to balance the duct hydraulics allowing S-1470 to fire at its full permitted NSR capacity of 30MM Btu/hr.

Based on the purpose of this project, it is clear that the highest attainable firing rate of S-1470 is below the capacity permitted when this source was first granted an Authority to Construct via 2001 NSR Application 2813. In addition, there are discrepancies in the permitting of the No 3 Crude Unit and there is no permit application record that supports the Title V specification that S-817 No 3 Crude Unit is a source that was subject to the requirements of Regulation 2, Rule 2 New Source Review. Nonetheless, the District has determined that this project qualifies as an alteration to S-1470.

#### **II. EMISSION CALCULATIONS**

##### **G. Criteria Pollutant Emissions**

There are no emission increases associated with this permit application. S-1470 was permitted to fire at a rate of 30MM Btu/hr in 2001 NSR Application 2813, and this application will not permit a firing rate above this permitted NSR limit.

##### **H. Toxic Emissions**

There are no toxic emissions increases associated with this permit application.

In 2001, a risk screen was required based on the estimated annual emissions of Benz(a)anthracene. If S-1470 were permitted as a new source today, a risk screen would not be triggered for Benz(a)anthracene because the toxic trigger was raised from 1.20 E-06 to 6.90E-02. However, if S-1470 were permitted as a new



source today, a risk screen would be required for 7,12-dimethylbenz-(a)anthracene and formaldehyde (toxic triggers for both TACs were lowered). Furthermore, based on the current TAC emission factors in CATEF, if S-1470 were permitted as a new source today, a risk screen would have been required because 15 toxic triggers are exceeded. For 8 of these 15 TACs, toxic triggers were not exceeded in 2001 because either the emissions factor was lower, or the toxic trigger was higher (or a combination of both). For the remaining 7 TACs, all are metals that were not part of the risk screen in 2001. A spreadsheet summarizing the TAC emissions is included in the application file folder.

In addition, Tesoro was unable to certify that emissions of TACs would not increase. This could mean that toxic emissions may increase and raised the issue of whether Regulation 2-5-214 Modified Source of Toxic Air Contaminants was triggered. However, even though there is nothing explicit in the regulations, it is common District practice to limit a source being modified for TACs only if a source is modified for pollutants as defined in Regulation 2-1-234.

### **III. STATEMENT OF COMPLIANCE**

This application does not change the compliance of S-1470. S-1470 is expected to remain in compliance with the following requirements:

Regulation 6, Rule 1 Particulate Matter General Requirements.

NSPS Subpart J Petroleum Refineries.

The project is over 1000 feet from the nearest school and therefore not subject to the public notification requirements of Reg. 2-1-412.

Offsets, BACT, NESHAPS, PSD and Toxics do not apply to this alteration.

### **IV. PERMIT CONDITIONS**

The following permit conditions will remain unchanged by this application.

Condition 18539

Administratively Revised via Application 19647 (February 2009) Consolidation of Bubble Condition 4357 with Condition 8077

Administratively Revised by Application 19874 (July 2009) Updates for Combustion Sources

[Unchanged when S-1470 was altered by Application 26000 \(July, 2014\)](#)

- S-908 Furnace F8; No. 3 Crude Heater, Alco, Maximum Firing Rate: 220 MMBtu/hr, Refinery Fuel Gas, Natural Gas abated by A-908 Selective Catalytic Reduction System
- S-1470 Furnace F-71; No. 3 Crude Vacuum Distillation Column Feed Heater, Maximum Firing Rate: 30 MMBtu/hr with low NOx burners and abated by A-908 Selective Catalytic Reduction System
- 1) Permittee/Owner/Operator shall ensure that S-1470 is fired exclusively on natural gas or refinery fuel gas. (basis: cumulative increase, toxics)
  - 2) Permittee/Owner/Operator shall ensure that S-1470 is not be operated unless it is equipped with a District approved, fuel flow meter that measures the volume of fuel throughput to S-1470 in units of standard cubic feet. (basis: cumulative increase)
  - 3A) Permittee/Owner/Operator shall ensure that no refinery fuel gas is fired at S-1470 until a District approved calorimeter is installed and operating at S-1470. Until the District approved calorimeter is installed and operating at S-1470, natural gas shall be the only fuel fired at S-1470. Until the instance when a fuel other than only natural gas is first fired at S-1470, there is no requirement for the Permittee/Owner/Operator to sample the natural gas fired at S-1470 to determine its BTU content. (basis: BACT, cumulative increase, offsets, toxics)
  - 3B) Permittee/Owner/Operator shall ensure that once refinery fuel gas is first fired at S-1470 and thereafter, all gaseous fuel fired at S-1470 shall be analyzed using a District approved calorimeter and the results of the analyses shall be recorded using a District approved data logging system. At least 4 times each hour, the calorimeter and data logging system shall measure and record the heating value of the gaseous fuel fired at S-1470 in British thermal units per standard cubic foot of fuel. (basis: BACT, cumulative increase, offsets, toxics)
  - 4) Permittee/Owner/Operator shall ensure that the total reduced sulfur content of gaseous fuel fired at S-1470 does not exceed 35 ppmv, based on a rolling 365 day average. (basis: cumulative increase, BACT, offsets)
  - 5) Permittee/Owner/Operator shall ensure that the total reduced sulfur content of the fuel gas fired at S-1470 does not exceed 100 ppmv, based on a rolling 24 hour average. (basis: BACT)
  - 6) When firing refinery fuel gas, Permittee/Owner/Operator of S-1470 shall operate a District approved device that at least four times per hour, samples the fuel gas to be fired at S-1470 and in ppmv units, measures and records the total reduced sulfur content of the fuel gas. These measurements and recordings shall disclose the rolling 24 hour average value of the total reduced sulfur concentration in the fuel gas in ppmv

units as well as the the value of total reduced sulfur concentration in the fuel gas, based on a rolling 365 day average. (basis: BACT)

- 7) When firing refinery fuel gas, at least four times per hour, Permittee/Owner/Operator shall measure and record the total reduced sulfur content of the fuel gas fired at S-1470, in ppmv units. (basis: BACT)
- 8) Permittee/Owner/Operator shall ensure that S-1470 is not be operated unless it is equipped with a District approved continuous emissions monitoring device that continuously measures and records the concentration of nitrogen oxides, in ppmv units, in the combustion exhaust from S-1470 and S-908, corrected to 3% oxygen, dry, and the device must measure and record the oxygen concentration of the combustion exhaust from S-1470 and S-908. (basis: cumulative increase, BACT, offsets)
- 9) Permittee/Owner/Operator shall ensure that the total fuel use at S-1470 does not exceed 262,800 MMBTU during any rolling 12 consecutive month period. (basis: cumulative increase, toxics, offsets)
- 10) Permittee/Owner/Operator shall ensure that NO<sub>x</sub> emissions from S-1470 do not exceed 10 ppmv, dry, at 3% oxygen, based on a three hour average. (basis: BACT, cumulative increase, offsets)
- 11) Permittee/Owner/Operator shall ensure that CO emissions from S-1470 do not exceed 50 ppmv, dry, at 3% oxygen. (basis: BACT, cumulative increase, offsets)
- 12) Permittee/Owner/Operator shall ensure that POC emissions from S-1470 do not exceed 0.683 ton per rolling consecutive 12 month period. (basis: cumulative increase, offsets)
- 13) Permittee/Owner/Operator shall ensure that PM-10 emissions from S-1470 do not exceed 0.946 ton per rolling consecutive 12 month period. (basis: cumulative increase, offsets)
- 14) Permittee/Owner/Operator shall ensure that SO<sub>2</sub> emissions from S-1470 do not exceed 1.793 ton per rolling consecutive 12 month period. (basis: cumulative increase, BACT, offsets)
- 15) Permittee/Owner/Operator shall ensure that ensure that S-1470 is abated by A-908 at all times that a fuel is fired at S-1470 except for 144 hours during any rolling 12 consecutive month period. The 144 hours is for start-up of S-1470. At all times other than the 144 hours per 12 consecutive month period, while a fuel is fired at S-1470, S-1470 shall be abated by A-908 and there shall be ammonia injection at A-908. (basis: BACT)

- 16) Permittee/Owner/Operator shall ensure that ammonia slip from A-908 does not exceed 20 ppmv, dry, at 3% oxygen, based on a 3 hour average. The owner/operator of A-908 shall conduct an annual source test, in accordance with the District's Manual of Procedures, to demonstrate compliance with the NH<sub>3</sub> emission limit. (basis: toxics, cumulative increase, offsets, Bubble Condition 8077 per Application 19647)
- 17) Deleted. (Initial Source Test completed April 10, 2002.)
- 17A) At least once per calendar year, Permittee/Owner/Operator shall ensure that a District approved source test is conducted for S-1470 measuring its CO emission rate and that the testing is done in compliance with the District's Manual of Procedures. (basis: Regulation 2-1-403; Regulation 9-10)
- 17B) Permittee/Owner/Operator shall ensure that within 45 days of the date of completion of the (each) District approved source test required by condition 18539 part 17A, two identical copies of the results of the source test, each referencing S1470, condition 18539 part 17A and part 17B, and plant #14628 are received by the District and that both copies are addressed to the District's Engineering Division. (basis: Regulation 2-1-403; Regulation 9-10)
- 18) In a District approved log, Permittee/Owner/Operator shall record, for S-1470 and S-908, the amount of each fuel fired at each source, the Btu value of the fuel fired at each source, the concentration of nitrogen oxides in the exhaust from S-1470 and S-908, the oxygen content in the combustion exhaust from S-1470 and S-908. For the fuel gas fired at S-1470, Permittee/Owner/Operator shall record the total reduced sulfur content and hydrogen sulfide content, sampled 4 times each hour, averaged over each 365 consecutive day period and averaged over each 24 consecutive hour period. The log shall be retained on site for at least 5 years from date of last entry, and shall be made available to the District staff upon request (basis: cumulative increase, offsets)
- 18A.) Permittee/Owner/Operator shall ensure that the maximum firing rate of S908 does not exceed the 1,927,200 MMBtu/yr based on the HHV of each fuel fired, during every 365 consecutive day period. (basis: cumulative increase)
- 19) Deleted. (S-906 and S-907 have been removed from service.)
- 20) If, based on District approved source test results, emissions from S-1470 exceed permitted and/or offset emission levels, Permittee/Owner/Operator shall provide additional District approved emission reduction credits to the District in the amount and of the type determined by the District to be due. (basis: offsets)

## V. RECOMMENDATION

It is recommended that an Authority to Construct be waived and a Permit to Operated be granted to Tesoro Refining and Marketing Company for the following sources:

### **S-1470 No. 3 Crude Vacuum Distillation Heater**

Alteration for the installation of a damper in the flue gas ducting upstream of the SCR A-908.

By: \_\_\_\_\_

Arthur P Valla  
Senior Air Quality Engineer  
2July14

**Application 26159, S-920 NOx Box Revision**

**EVALUATION REPORT  
TESORO REFINING AND MARKETING COMPANY  
REVISED NOx BOX FOR S-920, F-20  
No. 2 HDS CHARGE HEATER  
APPLICATION 26159, PLANT 14628**

**BACKGROUND**

The Tesoro Golden Eagle Refinery (Tesoro) operates several furnaces and boilers that are subject to Regulation 9, Rule 10, Nitrogen Oxides And Carbon Monoxide From Boilers, Steam Generators And Process Heaters In Petroleum Refineries. Regulation 9-10-301 limits the refinery wide NOx emissions to 0.033 lb/MMBtu of fired duty. Regulation 9-10-502 requires the installation of a NOx, CO and O2 CEM to demonstrate compliance with Regulation 9-10-301. Regulation 9-10-502 also allows a CEM equivalent verification system to determine compliance with Regulation 9-10-301. The District and Tesoro (through WSPA) have produced the CEM equivalent verification system. This system is called the “NOx Box”. The NOx Box is an operating window for the unit, expressed in terms of fired duty and oxygen content in the flue gas. The operating window is established by source tests for various operating conditions. The source tests demonstrate the NOx emissions are equal to or less than a specified emission factor. As long as the fired unit duty and oxygen content are in this NOx Box operating window, the specified emission factor is used to determine compliance with the 0.033 lb/MMBtu limit of Regulation 9-10-301. The Permit Condition that contains the details of the NOx Box is #18372.

Condition 18372, Part 30 required Tesoro to submit the initial NOx Box for the affected sources by January 1, 2005. Tesoro met this requirement via Application 15682. The NOx Box’s in the application were supported by properly conducted source tests and the NOx Box operating windows for all the affected sources have been included in Revision 4 of the Title V permit (reference: Section VI, Condition 18372, Part 31A, NOx Box Ranges).

This application requests a change in the NOx Box operating window for:

**S-920 F-20 No. 2 HDS Charge Heater**

The change is as follows:

| Source No. | Emission Factor (lb/MMBtu) | Min O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at Low Firing (O <sub>2</sub> % , MMBtu/hr) | Min O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) | Mid O <sub>2</sub> at Mid/High Firing (polygon) (O <sub>2</sub> % , MMBtu/hr) | Max O <sub>2</sub> at High Firing (O <sub>2</sub> % , MMBtu/hr) |
|------------|----------------------------|--|--|---|---|---|
| 920        | 0.042                      | 2.5, 25.72   | 7.1, 15.34   | 2.7, 38.29  | 3.41, 45.25   | 8.0, 60.26  |
|            | 0.055                      | 7.1, 15.34   | 10.8, 27.53  | 8.0, 60.26  | N/A   | 10.0, 45.15   |
| 920 new    | <u>0.041</u>               | 2.5, 25.72   | 7.1, 15.34   | <u>3.41, 45.25</u>  | <u>6.23, 55.3</u>   | 8.0, 60.26  |
|            | 0.055                      | 7.1, 15.34   | 10.8, 27.53  | 8.0, 60.26  | N/A   | 10.0, 45.15   |

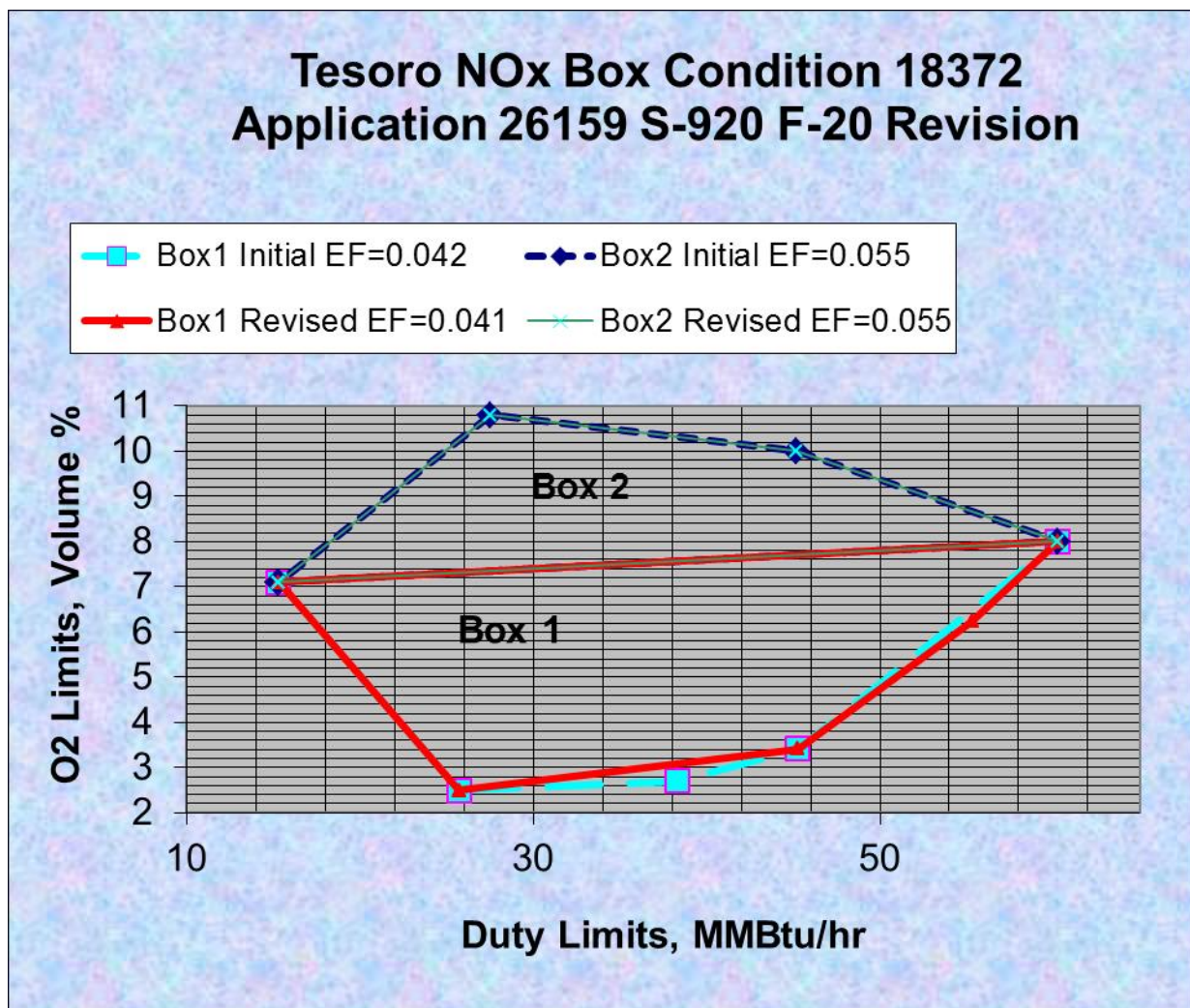
Tesoro is using two operating ranges as allowed by Condition 18372, Part 30.

The changes are supported by source tests reviewed by the Source Test Section.

This application is being processed as an administrative change in conditions since there is reduction to the specified NOx emission factor for this unit.

This is the fourth revision to the S-920 NOx Box, but the emission factor was not increased, so a CEM is not required. Previous revisions were approved in Permit Applications 20359, 25580 and 23339. According to Engineering Policy approved 4/11/03 and included in Appendix B of the December 2003 Title V Statement of Basis, a CEM is only required if two source tests in a 5-year period exceed the NOx emission factor.

The following diagram summarizes the changes to the S-920 NOx Box:



## **EMISSIONS SUMMARY**

There are no changes in emissions due to this application. The emission factors are unchanged or decreased by this application and there will be no impact on the overall facility limit of 0.033 lb/MMBtu required by Regulation 9-10-301.

## **PLANT CUMULATIVE INCREASE**

There are no net changes to the plant cumulative emissions.

## **TOXIC RISK SCREEN**

This proposed NOx Box change would not emit toxic compounds in amounts different that previously emitted. Therefore, a toxic risk screen is not required.

## **BEST AVAILABLE CONTROL TECHNOLOGY**

BACT is triggered for new or modified sources that emit criteria pollutants in excess of 10 lbs/day. However, Regulation 2-1-234 defines a modified source as one that results in an increase in daily or annual emissions of a regulated air pollutant. For this application, there is no change in emissions. Therefore, BACT does not apply.

## **PLANT LOCATION**

According to the SCHOOL program, the closest school is Las Juntas Elementary, which is almost two miles from the facility.

## **COMPLIANCE**

The change to the NOx Box will not change the compliance for Furnace S-920. Emissions from S-920 will continue to comply with all applicable regulations, including Regulation 6, Rule 1, Regulation 9, Rule 10, and 40 CFR 60 Subpart J.

The closest school is over a mile from the facility, so the Public Notice requirements of Regulation 2-1-214 do not apply.

This project is exempt from CEQA per Regulation 2-1-312.1 since there is no increase in emissions and no physical modifications. Form Appendix H has been submitted in support of the exemption.

Toxics, NESHAPS, BACT, and Offsets do not apply.

## **CONDITIONS**



The NOx Box Condition 18372, will be modified as shown below. Only the substantive changes for the S-920 NOx Box points detailed in Part 31A are shown. All of the other parts of Condition 18372 remain unchanged by this application.

Condition 18372

31. Except as provided in part 31B & C, the owner/operator shall operate each source within the NOx Box ranges listed below at all times of operation. This part shall not apply to any source that has a properly operated and properly installed NOx CEM. (Regulation 9-10-502)

A. NOx Box ranges

| Source No. | Emission Factor (lb/MMBtu) | Min O2 at Low Firing (O2% , MMBtu/hr) | Max O2 at Low Firing (O2% , MMBtu/hr) | Min O2 at High Firing (O2% , MMBtu/hr) | Mid O2 at Mid/High Firing (polygon) (O2% , MMBtu/hr) | Max O2 at High Firing (O2% , MMBtu/hr) |
|------------|----------------------------|---------------------------------------|---------------------------------------|--|--|--|
| 920        | 0.04 <del>12</del>         | 2.5, 25.72                            | 7.1, 15.34                            | <del>2.7,</del><br>38.293.41,<br>45.25 | <del>3.41,</del><br>45.256.23,<br>55.3               | 8.0, 60.26                             |
|            | 0.055                      | 7.1, 15.34                            | 10.8, 27.53                           | 8.0, 60.26                             | N/A  | 10.0,<br>45.15                         |

The limits listed above are based on a calendar day averaging period for both firing rate and O2%.

**RECOMMENDATION**

It is recommended that a Change of Conditions to the Permit to Operate be granted to Tesoro for:

**S-920 F-20 No. 2 HDS Charge Heater**

\_\_\_\_\_  
 Arthur P. Valla  
 Senior Air Quality Engineer

\_\_\_\_\_  
 Date  
 August 6, 2014

**Application 26272, No 3 HDS Performance Test and Bubble Revision**

**ENGINEERING EVALUATION  
Tesoro Refining and Marketing Company  
PLANT NO. 14628  
APPLICATION NO. 26272**

**VI. BACKGROUND**

The Tesoro Refining and Marketing Company (Tesoro) is applying for a Permit to Operate, Temporary Operation, pursuant to Regulation 2-1-302.3, to complete a performance test for the No 3 HDS Unit, including the following equipment:

- S-850 No 3 HDS Unit**
- S-973 No. 3 HDS Recycle Gas Heater (F56)**
- S-974 No. 3 HDS Fract Feed Heater (F55)**

This application is the second application for this performance test. The first Permit to Operate, Temporary Operation, was granted February 6, 2014 via Application 25876. Tesoro has not been able to complete the performance test within the 3-month term due to issues with the Alkylation Unit. Since this permit is non-renewable, Tesoro has submitted this application for another 3-month permit. The District agreed to process this new application administratively as long as there are no changes to the permit conditions imposed in Application 25876.

These sources were initially permitted in 1981 through New Source Review (NSR) Application 27769, where the emission increases were offset by the creation of the (former refinery owner) Tosco Refinery Emissions Cap, currently codified in Permit Condition 8077. The Authority to Construct was granted February 11, 1982. S-850 was permitted in 1981 at a capacity of 45,000 BPD. S-973 was permitted at a maximum firing rate of 52 MMBtu/hr and S-974 was permitted at a maximum firing rate of 67 MMBtu/hr.

The capacity of S-850 and S-974 were increased in 1989 by Tosco NSR Application 3318 Refinery Modernization and Energy Conservation (RMEC) Project. The RMEC Authority to Construct was granted December 19, 1991, and the Permit to Operate was granted May 5, 1995. S-850 was permitted at a capacity of 65,000 BPD. S-974 was permitted at a maximum firing rate of 110 MMBtu/hr. (District records are incomplete regarding S-974 in the Tosco RMEC Project. According to the Engineering Evaluation, the final RMEC Project scope included a modification to a furnace convection section. It was not clearly stated that this modification pertained to S-974, but the currently permitted capacity of S-974 is 110MMBtu/hr (up from the original NSR capacity of 67MMBtu/hr), so the statement on the S-974 permitted capacity of 110MMBtu/hr via Application 3318 is a conclusion inferred by the records available. Tesoro has not disputed this conclusion.)

In 1995, via (then refinery owner) Ultramar NSR Application 10912 Clean Fuels Project, modifications were proposed to S-850 to increase the capacity to 70,000 BPD.

The Authority to Construct was granted January 27, 1995. However, according to District records, the Authority to Construct was never exercised, and expired January 26, 1999. Tesoro confirmed that the S-850 element of the Clean Fuels Project was never installed when the offsets for the project were surrendered in 2011. One element of the Clean Fuels Project that was constructed was the S-1038 Benzene Saturation Unit. On November 7, 2000, when the S-1038 Permit to Operate was granted, S-1038 was conditionally permitted subject to Permit Condition 12016. The version of Condition 12016 included in the S-1038 Permit to Operate included the 70,000 BPD S-850 capacity that was granted in the S-850 Authority to Construct. Tesoro submitted this S-1038 Permit to Operate as documentation that S-850 is permitted at 70,000 BPD, has operated under this 70,000 BPD limit, and this limit is included in the Title V limit as a New Source Review limit. However, according to District records, the NSR permitted capacity of S-850 is 65,000 BPD as approved in NSR Application 3318, as explained above. Tesoro does not agree with the 65,000 BPD limit for S-850. Since the only emissions from S-850 are fugitive POC emissions, there is no emissions impact of the 65,000 BPD vs. 70,000 BPD issue (assuming Tesoro has not installed any additional fugitive components since the approval of the RMEC Application 3318 in 1995). Furthermore, if the performance test for the No 3 HDS Unit results in a future NSR Application for a S-850 capacity increase, the emissions increase for S-850 will not be different if the increase is above 65,000 BPD or above 70,000 BPD.

## **VII. EMISSION CALCULATIONS**

While the Temporary Operation Permit to Operate is valid for 3 months from the date of issuance, Tesoro has stated that the No 3 HDS testing will only require a maximum of 14 calendar days. Emission calculations will be based on this 14-day testing program. Emission impacts for other sources are not evaluated (e.g., emission increases caused by an increase in feed to the S-802 FCCU were not evaluated because Tesoro indicated that higher throughput for S-850 during the test will be confined to S-850 and the associated storage tanks, meaning the feed rate to S-802 will not be impacted).

### **A. S-850 No 3 HDS Unit.**

All emissions from S-850 are from fugitive emissions. There are no additional fugitive components needed to complete this performance test, therefore, there are no emission increases for S-850.

### **B. S-973 No. 3 HDS Recycle Gas Heater (F56)**

#### **1. S-973 Baseline Emissions.**

Baseline emissions are derived from a 3-year operation of S-973, NOx CEM data, Fuel Gas TRS data, and AP-42 emission factors. In order to expedite this application,

the 3-year baseline will be established by the annual throughputs reported for 2010 through 2012. Baseline NOx emissions will be based on the S-973/S-974 stack CEM 4.66 ppm (at 3% O2) average NOx concentration Tesoro reported for 2012. Baseline SO2 emissions will be based on the 30 ppm average fuel gas TRS concentration reported by Tesoro for 2012. PM10, CO and POC emissions will be based on AP-42 Table 1.4-1 and 1.4-2 factors:

Hydrocarbons (VOC): 5.5 lb/MMCF of fuel gas combusted.  
 Particulate Matter: 7.6 lb/MMCF of fuel gas combusted  
 Carbon Monoxide: 84 lb/MMCF of fuel gas combusted

These emissions factors convert to the following heat unit factors based on the 1020 Btu/SCF heat content of the fuel gas:

Hydrocarbons (VOC):  $5.5 \text{ lb/MMCF} / 1020 \text{ Btu/SCF} = 0.00539 \text{ lb/MMBtu}$   
 Particulate Matter:  $7.6 \text{ lb/MMCF} / 1020 \text{ Btu/SCF} = 0.00745 \text{ lb/MMBtu}$   
 CO:  $84 \text{ lb/MMCF} / 1020 \text{ Btu/SCF} = 0.0824 \text{ lb/MMBtu}$   
 SO2:  $30 \text{ ppm} * 64 \text{ lb/lb-mole SO}_2 / 385 \text{ SCF/mole} / 1020 \text{ Btu/SCF} = 0.00489 \text{ lb/MMBtu}$   
 NOx:  $=4.66\text{ppm} * (20.95 / (20.95 - 3)) * 46 \text{ lb/lb-mole} * 8710 \text{ SCF/MMBtu} / 385 / 1000000 = 0.00566 \text{ lb/MMBtu}$

The S-973 reported throughputs are as follows:

| Year  | Total Fuel Gas thousand SCF | MMBtu (HHV=1020 Btu/SCF) | Baseline Average Firing MMBtu/hr |
|-------|-----------------------------|--------------------------|----------------------------------|
| 2010  | 165,551                     | 168,862                  |                                  |
| 2011  | 282,121                     | 287,763                  |                                  |
| 2012  | 235,274                     | 239,979                  |                                  |
| Total |                             | 696,604                  | 26.51                            |

It is assumed all VOC emissions are POC emissions. It is also assumed all particulate emissions are of a size less than 10 microns. The baseline emissions, based on an average baseline firing rate of 26.51MM Btu/hr, are as follows:

| Pollutant | Emission Factor  | Lb/hour | Lb/day | 14-day Baseline, lbs |
|-----------|------------------|---------|--------|----------------------|
| POC       | 0.00539 lb/MMBtu | 0.143   | 3.43   | 48.02                |
| PM-10     | 0.00745 lb/MMBtu | 0.197   | 4.74   | 66.36                |
| SO2       | 0.00489 lb/MMBtu | 0.130   | 3.11   | 43.54                |
| NOx       | 0.00566 lb/MMBtu | 0.150   | 3.60   | 50.40                |
| CO        | 0.0824 lb/MMBtu  | 2.184   | 52.43  | 734.02               |

**2. S-973 Temporary Operation Emissions.**

The test operation emissions are based on Tesoro’s Application 25876 December 18, 2013 letter where it is stated that “the firing rate of the furnaces may increase in utilization up to 7 percent above the firing rate that occurs when the unit operation is at 70,000 barrels per day.” This statement is interpreted to mean that S-973 may fire at a rate of 52MM Btu/hr X 1.07 = 55.6MM Btu/hr. The emissions at 55.6MM Btu/hr are as follows:

| Pollutant | Emission Factor  | Lb/hour | Lb/day | 14-day Emissions, lbs |
|-----------|------------------|---------|--------|-----------------------|
| POC       | 0.00539 lb/MMBtu | 0.300   | 7.19   | 100.66                |
| PM-10     | 0.00745 lb/MMBtu | 0.414   | 9.94   | 139.16                |
| SO2       | 0.00489 lb/MMBtu | 0.272   | 6.53   | 91.42                 |
| NOx       | 0.00566 lb/MMBtu | 0.315   | 7.55   | 105.70                |
| CO        | 0.0824 lb/MMBtu  | 4.581   | 109.96 | 1539.44               |

The S-973 potential emission increases for the 14-day test period are as follows:

| Pollutant | 14 day Baseline Emissions, lbs | 14 day Potential Emissions, lbs | Emission Increase, lbs |
|-----------|--------------------------------|---------------------------------|------------------------|
| POC       | 48.02                          | 100.66                          | 52.64                  |
| PM-10     | 66.36                          | 139.16                          | 72.80                  |
| SO2       | 43.54                          | 91.42                           | 47.88                  |
| NOx       | 50.40                          | 105.70                          | 55.30                  |
| CO        | 734.02                         | 1539.44                         | 805.42                 |

**C. S-974 No. 3 HDS Fract Feed Heater (F55)**

**1. S-974 Baseline Emissions.**

Baseline emissions are derived from a 3-year operation of S-974, NOx CEM data, Fuel Gas TRS data, and AP-42 emission factors. In order to expedite this application, the 3-year baseline will be established by the annual throughputs reported for 2010 through 2012. Baseline NOx emissions will be based on the S-973/S-974 stack CEM 4.66 (at 3% O2) ppm average NOx concentration Tesoro reported for 2012. Baseline SO2 emissions will be based on the 30 ppm average fuel gas TRS concentration reported by Tesoro for 2012. PM10, CO and POC emissions will be based on AP-42 Table 1.4-1 and 1.4-2 factors:

Hydrocarbons (VOC): 5.5 lb/MMCF of fuel gas combusted.  
 Particulate Matter: 7.6 lb/MMCF of fuel gas combusted

Carbon Monoxide: 84 lb/MMCF of fuel gas combusted

These emissions factors convert to the following heat unit factors based on the 1020 Btu/SCF heat content of the fuel gas:

Hydrocarbons (VOC):  $5.5 \text{ lb/MMCF} / 1020 \text{ Btu/SCF} = 0.00539 \text{ lb/MMBtu}$

Particulate Matter:  $7.6 \text{ lb/MMCF} / 1020 \text{ Btu/SCF} = 0.00745 \text{ lb/MMBtu}$

CO:  $84 \text{ lb/MMCF} / 1020 \text{ btu/SCF} = 0.0824 \text{ lb/MMBtu}$

SO2:  $30 \text{ ppm} * 64 \text{ lb/lb-mole SO}_2 / 385 \text{ SCF/mole} / 1020 \text{ Btu/SCF} = 0.00489 \text{ lb/MMBtu}$

NOx:  $=4.66 \text{ ppm} * (20.95 / (20.95 - 3)) * 46 \text{ lb/lb-mole} * 8710 \text{ SCF/MMBtu} / 385 / 1000000 = 0.00566 \text{ lb/MMBtu}$

The S-974 reported throughputs are as follows:

| Year  | Total Fuel Gas thousand SCF | MMBtu (HHV=1020 Btu/SCF) | Baseline Average Firing MMBtu/hr |
|-------|-----------------------------|--------------------------|----------------------------------|
| 2010  | 397,778                     | 405,733                  |                                  |
| 2011  | 499,096                     | 509,078                  |                                  |
| 2012  | 424,768                     | 433263                   |                                  |
| Total |                             | 1,348,074                | 51.30                            |

It is assumed all VOC emissions are POC emissions. It is also assumed all particulate emissions are of a size less than 10 microns. The baseline emissions, based on an average baseline firing rate of 51.30MM Btu/hr, are as follows:

| Pollutant | Emission Factor  | Lb/hour | Lb/day | 14-day Baseline, lbs |
|-----------|------------------|---------|--------|----------------------|
| POC       | 0.00539 lb/MMBtu | 0.277   | 6.64   | 92.91                |
| PM-10     | 0.00745 lb/MMBtu | 0.382   | 9.17   | 128.41               |
| SO2       | 0.00489 lb/MMBtu | 0.251   | 6.021  | 84.29                |
| NOx       | 0.00566 lb/MMBtu | 0.290   | 6.97   | 97.56                |
| CO        | 0.0824 lb/MMBtu  | 4.227   | 101.45 | 1420.31              |

**2. S-974 Temporary Operation Emissions.**

The test operation emissions are based on Tesoro’s Application 25876 December 18, 2013 letter where it is stated that “the firing rate of the furnaces may increase in utilization up to 7 percent above the firing rate that occurs when the unit operation is at 70,000 barrels per day.” This statement is interpreted to mean that S-974

may fire at a rate of 110MM Btu/hr X 1.07 = 117.7MM Btu/hr. The emissions at 117.7MM Btu/hr are as follows:

| Pollutant | Emission Factor  | Lb/hour | Lb/day | 14-day Emissions, lbs |
|-----------|------------------|---------|--------|-----------------------|
| POC       | 0.00539 lb/MMBtu | 0.634   | 15.23  | 213.16                |
| PM-10     | 0.00745 lb/MMBtu | 0.877   | 21.04  | 294.62                |
| SO2       | 0.00489 lb/MMBtu | 0.576   | 13.81  | 193.39                |
| NOx       | 0.00566 lb/MMBtu | 0.666   | 15.99  | 223.84                |
| CO        | 0.0824 lb/MMBtu  | 9.698   | 232.76 | 3258.69               |

The S-974 potential emission increases for the 14-day test period are as follows:

| Pollutant | 14 day Baseline Emissions, lbs | 14 day Potential Emissions, lbs | Emission Increase, lbs |
|-----------|--------------------------------|---------------------------------|------------------------|
| POC       | 92.91                          | 213.16                          | 120.25                 |
| PM-10     | 128.41                         | 294.62                          | 166.21                 |
| SO2       | 84.29                          | 193.39                          | 109.10                 |
| NOx       | 97.56                          | 223.84                          | 126.28                 |
| CO        | 1420.31                        | 3258.69                         | 1838.38                |

**D. Total Testing Project Increase**

The following table summarizes the estimated Emissions Increase for this application:

|           | S-850 | S-973  | S-974    | Total Increase | Total Increase |
|-----------|-------|--------|----------|----------------|----------------|
| Pollutant | Lbs   | Lbs    | Lbs      | Lbs            | Tons           |
| POC       | 0.0   | 52.64  | 120.25   | 172.89         | 0.086          |
| PM-10     | 0.0   | 72.80  | 166.21   | 239.01         | 0.120          |
| SO2       | 0.0   | 47.88  | 109.10   | 156.98         | 0.078          |
| NOx       | 0.0   | 55.30  | 126.28   | 181.58         | 0.091          |
| CO        | 0.0   | 805.42 | 1,838.38 | 2,643.80       | 1.322          |

The total testing project emissions increase will be finalized after the testing program is completed.

**E. Toxic Emissions**

There are no health risks associated with this application due to the short term nature of this project (which will only last for 14 calendar days in a 3-month period). Therefore, a toxic emission review is not necessary.

**VIII. Offsets**

Since the operation proposed by this application may increase emissions, S-973 and S-974 are modified sources per Regulation 2-1-234. Modified sources are subject to Regulation 2, Rule 2, and specific offset requirements are contained in Regulations 2-2-302 and 2-2-303. However, Regulation 2-1-302.3.3 requires the operator to provide offsets, at a ratio of 1.15 to 1, for all increased emissions of NOx, POC, and PM10 resulting from the use of the temporary permit. Until a policy is approved that addresses this apparent duplicative requirement, only the requirements of Regulation 2-1-302.3.3 will be applied. The following table summarizes the offset requirements for this testing temporary operation, based on the emission estimates detailed above.

| <b>Tons/year</b>      | <b>POC</b> | <b>NOx</b> | <b>SO2</b> | <b>CO</b> | <b>PM<sub>10</sub></b> |
|-----------------------|------------|------------|------------|-----------|------------------------|
| Increase in emissions | 0.086      | 0.091      | 0.078      | 1.322     | 0.120                  |
| Offsets Factor        | 1.15       | 1.15       | N/A        | N/A       | 1.15                   |
| Offsets Required      | 0.099      | 0.105      | N/A        | N/A       | 0.138                  |
| Bank 968 Balance      | 8.508      |            |            |           |                        |
| Bank 915 Balance      |            | 9.496      |            |           | 0.009                  |
| Bank 1206 Balance     |            |            |            |           | 4.010                  |

Offsets were provided for Application 25876. Since there was no testing completed, the offsets provided for Application 25876 should be refunded and collected again for this application. A simpler approach would be to set the offset requirements for this application at zero. The net effect is the same, so offsets for this application are not required.

**IX. Refinery Emissions Cap**

As described in the Background section above, S-850, S-973 and S-974 were originally permitted in 1981 where emission increases were offset by the creation of the Refinery Emissions Cap. The Refinery Emissions Cap was established based on baseline emissions for all existing sources at the refinery at the time, except for tanks and flares (subsequent permit applications also removed fugitive emissions from the cap.) It is a logical conclusion that the Refinery Emissions Cap be valid and current in order for S-850, S-973 and S-974 to be properly permitted NSR sources.

For over a decade after the establishment of the cap, virtually all permitting action by former refinery owner Tosco resulted in an adjustment to the emissions cap. It



appears that this practice of maintaining the emissions cap current stopped in the mid-1990s. Refinery Emissions Cap Permit Condition 4357, and current Refinery Emissions Cap Permit Condition 8077 have been published many times since the mid-1990s, but the mass emissions cap does not appear to have been properly adjusted. Missing adjustments include specific permitting actions, regulatory changes, granted emissions credits, and adjustments required by the Consent Decree. Regulatory changes include Regulation 8, Rule 44, adopted 1/4/1989, Regulation 9, Rule 8 amendments effective 1/1/1997, Regulation 9, Rule 9 amendments effective 1/1/1997, Regulation 9, Rule 10 adopted 1/5/1994, and 40 CFR 63 Subpart UUU effective 4/20/2006. Emission credits granted to Tesoro for the decommissioning of the Fluid Coker have not been reflected Condition 8077. These emission credits were granted 2/23/2009 via Tesoro Banking Application 17798.

In 2012, there an agreement between Tesoro and Air Products, owner/operator of the No 2 Hydrogen Plant (located at Tesoro), that the emissions associated with the Air Products facility would be transferred to Air Products. Since the No 2 Hydrogen Plant emissions were originally approved via Tosco RMEC Application 3318, and the offset requirements associated with these emissions were addressed by including the emissions in the Tosco Refinery Emissions Cap, this agreement requires an adjustment to the mass emission limits in Permit Condition 8077.

In 2011, Tesoro Appealed the Renewed Title V Permit issued 6/28/2011 (Reference: Docket #3624). In Appeal Item #22, Tesoro disputed Refinery Emissions Cap Condition 8077 and identified selected corrections. However, Tesoro did not address all deficiencies in Permit Condition 8077. During the litigation before the District's Hearing Board, Tesoro and the District agreed that the selected corrections to Condition 8077 would be approved, providing that Tesoro would submit a permit application to correct the remaining deficiencies, including updates to the mass emission limits to bring the Refinery Emissions Cap current. Tesoro committed to the Hearing Board to submit this future permit application by 9/30/2012. Based on this Tesoro commitment to bring the Refinery Emissions Cap up to date, Tesoro permit applications 24056 and 24057 for the selected corrections to Condition 8077 were approved.

Tesoro has not met its commitment to the District's Hearing Board to submit the Emissions Cap Update application by 9/30/2012. The evaluation of the required changes has been completed, and Tesoro has invited the District to meetings that reviewed the status of the evaluation results. The last meeting was August 8, 2012. However, to date the promised application has not been submitted. It was suggested that the requirement to submit an application to update the bubble be placed in a permit condition. Draft permit conditions for this application included such a requirement.

On January 18, 2014 Tesoro stated it believes the Refinery Emissions Cap update is not necessary if the same emissions factors, calculation methodology and reporting is done. Tesoro further stated that they will discuss this current position with District Senior Management. This discussion has yet to be initiated.

The permit condition was proposed with an application due date that would allow time for Tesoro to meet with District Management. However, it was decided to leave this requirement out of the permit conditions. It is believed an application due date of 1/1/2015 would be allow more than enough time for Tesoro to meet with the District and for the District to decide if an update is required. If for some reason the issue is not resolved by 1/1/2015, the District may create a permit application and update the Tesoro Refinery Emissions Cap as necessary.

Tesoro did agree that the Refinery Emissions Cap should be adjusted by the emission credits granted in 2009 via Tesoro Banking Application 17798 (Coker Modification Project- CMP), and by the emissions associated with the Air Products No 2 Hydrogen Plant. Adjustments were estimated associated with NOx reductions associated with Regulation 9, Rule 10, however Tesoro does not agree to these adjustments.

The following tables summarize the adjustments to the Tesoro Refinery Emissions Cap:

Tesoro Refinery Emissions Cap, Adjustments to Annual Limits (tons)

| Pollutant                                  | Particulate   | Hydrocarbon   | NOx             | SO2             | CO            | Comment                                  |
|--|---------------|---------------|-----------------|-----------------|---------------|--|
| Current Limit                              | 443           | 221.7         | 2867.7          | 4580            | 573           | 8077-B2A                                 |
| CMP Banking Application 17798              | -12.6         | 0             | -272            | -2900.5         | -56.5         | Tesoro agrees to this adjustment         |
| Air Products No 2 Hydrogen Plant           | -12.9         | -3.87         | -16.13          | -4.46           | -21.13        | Tesoro agrees to this adjustment         |
| <b>Total Adjusted Limits</b>               | <b>417.50</b> | <b>217.83</b> | <b>2,579.57</b> | <b>1,675.04</b> | <b>495.37</b> | <b>Agreed adjusted limits</b>            |
| Estimated Regulation 9, Rule 10 Adjustment | 0             | 0             | -1344           | 0               | 0             | Tesoro does not agree to this adjustment |
| Potential Adjusted Limits                  | 417.50        | 217.83        | 1235.57         | 1675.04         | 495.37        |  |

Agreed adjusted limits highlighted will be included in permit conditions. The 9-10 adjustment is shown only for information.

Tesoro Refinery Emissions Cap, Adjustments to Monthly Limits (tons)

| Pollutant                                  | Particulate | Hydrocarbon | NOx     | SO2      | CO     | Comment                                  |
|--|-------------|-------------|---------|----------|--------|--|
| Current Limit                              | 46          | 77          | 339.67  | 684      | 57     | 8077-B2B                                 |
| CMP Banking Application 17798              | -1.05       | 0           | -22.667 | -241.708 | -4.708 | Tesoro agrees to this adjustment         |
| Air Products No 2 Hydrogen Plant           | -1.075      | -0.323      | -1.344  | -0.372   | -1.761 | Tesoro agrees to this adjustment         |
| Total Adjusted Limits                      | 43.875      | 76.677      | 315.659 | 441.920  | 50.531 | Agreed adjusted limits                   |
| Estimated Regulation 9, Rule 10 Adjustment | 0           | 0           | -112    | 0        | 0      | Tesoro does not agree to this adjustment |
| Potential Adjusted Limits                  | 43.875      | 76.677      | 203.659 | 441.920  | 50.531 |  |

Agreed adjusted limits highlighted will be included in permit conditions. The 9-10 adjustment is shown only for information.

## X. STATEMENT OF COMPLIANCE

This application does not change the compliance of S-973, S-974, or S-850. All sources are expected to remain in compliance with the following requirements, as applicable:

Regulation 6, Rule 1 Particulate Matter General Requirements.

Regulation 8, Rule 18 Equipment Leaks

Regulation 8, Rule 28 Episodic Releases from Pressure Relief Devices at Petroleum Refineries and Chemical Plants

Regulation 9 Rule 10 Nitrogen Oxides and Carbon Monoxide from Boilers, Steam Generators, and Process Heaters in Petroleum Refineries.

NSPS Subpart J Petroleum Refineries.

NESHAPS Subpart CC MACT for Petroleum Refineries.

Regulation 2, Rules 1 and 2. This application is for a change in operation that may increase emissions. Therefore, Regulation 2-1-234 is triggered and Regulation 2,

Rule 2 is applicable. The requirements of Regulation 2-2-301 BACT are satisfied by the BACT determination used when the sources were originally permitted in Application 27769. Even though this determination is over 30 years old, applying a current BACT determination to a temporary operation was not considered. A current BACT determination would apply were Tesoro to apply for an expansion for the NO 3 HDS Unit. The Offset requirements of Regulations 2-2-302 and 2-2-303 appear to be in conflict with those required by Regulation 2-1-302.3. As explained above, until a policy is approved addressing this apparent conflict, offset requirements of Regulation 2-1-302.3.3 will apply. As explained in Section III above, emission offsets provided for Application 25876 will apply to this application.

The project is exempt under the District's CEQA Regulation 2-1-312.6 since the performance testing is considered a minor alteration that will not expand S-850 beyond previously existing capacity.

The project is over 1000 feet from the nearest school and therefore not subject to the public notification requirements of Reg. 2-1-412.

PSD and Toxics do not apply to this permit for a temporary operation.

## **XI. PERMIT CONDITIONS**

The following permit conditions will be imposed by this application:

Tesoro Refinery and Marketing Company  
Plant 14628, Application 26272  
Permit to Operate, Temporary Operation for  
S-850 No. 3 Hydrodesulphurization Unit  
S-973 No. 3 HDS Recycle Gas Heater (F56)  
S-974 No. 3 HDS Fractionator Feed Heater (F55)

1. The Owner/Operator may operate S-850 No. 3 Hydrodesulphurization Unit at throughputs above the permitted throughput, to test the performance and process limits of S-850, for a period up to 14 calendar days within the 3-month period that the temporary operation permit is valid. (Basis: Regulation 2-1-302.3)
2. The Owner/Operator may operate S-973 No. 3 HDS Recycle Gas Heater (F56) at firing rates above the permitted firing rate, to test the performance and process limits of S-850 No. 3 Hydrodesulphurization Unit, for a period up to 14 calendar days within the 3-month period that the temporary operation permit is valid. (Basis: Regulation 2-1-302.3, Offsets)
3. The Owner/Operator may operate S-974 No. 3 HDS Fractionator Feed Heater (F55) at firing rates above the permitted firing rate, to test the performance and process limits of S-850 No. 3 Hydrodesulphurization Unit, for a period up to 14 calendar days within the 3-month

period that the temporary operation permit is valid. (Basis: Regulation 2-1-302.3, Offsets)

4. The Owner/Operator may operate S-973 and S-974 at a total combined firing rate above the permitted total combined firing rate, to test the performance and process limits of S-850 No. 3 Hydrodesulphurization Unit, for a period up to 14 calendar days within the 3-month period that the temporary operation permit is valid. (Basis: Regulation 2-1-302.3, Offsets)
5. The Owner/Operator shall fire S-973 and S-974 with refinery fuel gas at all times during the S-850 performance test. (Basis: Offsets)
6. The Tesoro Refinery Emissions Cap shall be reduced by the amount of the Coker Modification Project emissions credits granted by Tesoro Application 17798. (Basis: Cumulative Increase, Offsets, Regulation 2, Rule 4)
7. The Tesoro Refinery Emissions Cap shall be reduced by the amount of the No. 2 Hydrogen Plant emissions, as permitted in Permit Application 3318 Refinery Modernization and Energy Conservation Project, to reflect the ownership transfer of this plant to Air Products and Chemicals, Inc. (Basis: Cumulative Increase, Offsets)
8. To ensure compliance with Parts 8 and 9 above, Permit Condition 8077, Part B2A emission limits shall be revised to read as follows:

|              |         |           |
|--------------|---------|-----------|
| Particulates | 417.5   | tons/year |
| Hydrocarbons | 217.83  | tons/year |
| NOx          | 2579.57 | tons/year |
| SO2          | 1675.04 | tons/year |
| CO           | 495.37  | tons/year |

(Basis: Cumulative Increase, Offsets, Regulation 2, Rule 4)

9. To ensure compliance with Parts 8 and 9 above, Permit Condition 8077, Part B2B emission limits shall be revised to read as follows:

|              |         |             |
|--------------|---------|-------------|
| Particulates | 43.875  | tons/month  |
| Hydrocarbons | 76.677  | tons/ month |
| Nox          | 315.659 | tons/ month |
| SO2          | 441.920 | tons/ month |
| CO           | 50.531  | tons/ month |

(Basis: Cumulative Increase, Offsets, Regulation 2, Rule 4)

10. During the S-850 performance test, the Owner/Operator shall calibrate, maintain, and operate a District-approved continuous emission monitoring system (CEMS) that continuously measures and records the concentration oxygen and nitrogen oxides (calculated as NO<sub>2</sub>), in ppmv units corrected to 3% oxygen, dry, in the combined combustion

exhaust from S-973 and S-974 abated by A-31 SCR. The CEMS shall be in operation at all times during the S-850 performance test. (Basis: Offsets, Monitoring)

11. During the S-850 performance tests, Tesoro will record in a District approve log all operating data required to determine the emission increases during the temporary operation, including the calendar date of the tests, the duration of the tests, the throughput of S-850 No 3 HDS Unit during the tests, the firing rates of S-973 No. 3 HDS Recycle Gas Heater and S-974 No. 3 HDS Fractionator Feed Heater during the tests, the NOx and O2 content of the flue gas in the S-973/S-974 stack downstream of A-31 SCR, and the TRS content of the fuel gas combusted in S-973 and S-974. (Basis: Offsets)
12. No later than 30 days after the expiration of the Temporary Operation Permit, the Owner/Operator shall provide the District's Engineering Division with a final calculation report for the emissions during the S-850, S-973 and S-974 temporary operation. The report shall include all the data required by Part 11 above. (Basis: Regulation 2-1-302.3.3)
13. After the final emission calculations have been approved by the District, the Owner/Operator shall provide offsets for the temporary operation emission increases of NOx, POC, and PM10 at a ratio of 1.15 to 1. The Owner/Operator shall provide to the District all required offsets no later than 14 days after approval of the final emissions report. (Basis: Regulation 2-1-302.3.3, Offsets)

## **XII. RECOMMENDATION**

It is recommended that a Permit to Operate, Temporary Operation, be granted to Tesoro Refining and Marketing Company for the following sources:

**S-850 No 3 HDS Unit**  
**S-973 No. 3 HDS Recycle Gas Heater (F56)**  
**S-974 No. 3 HDS Fract Feed Heater (F55)**

By: \_\_\_\_\_  
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Senior Air Quality Engineer  
21May14