

The hydrogen needed by Unit 590 will come from a new hydrogen plant built and operated by a separate company that specializes in hydrogen production. Although the emissions from this hydrogen plant are included in the emission summary of this permit, a separate permit must be obtained by the developer of that plant. The hydrogen plant project and the ULSD project are considered to be a larger, single project for purposes of New Source Review regulations.

1.1.2 List of Emission Units and Air Pollution Control Equipment

Emission Unit	Description	Emission Control Equipment
Unit 590	New Diesel Distillate Hydrotreater: hydrotreater with two process heaters.	None
South Plant Cooling Tower	Existing South Plant Cooling Tower: additional cooling water required for Unit 590.	Upgraded Drift Eliminators
Unit 115	Existing Light Distillate Hydrotreater: larger reactor capable of producing ultra low sulfur light distillate product; two existing heaters (115B-1 and 115B-2) will experience additional firing.	None
Unit 125	Existing Diesel Distillate Hydrotreater: additional ancillary equipment to be installed to improve quality of feed to Unit 590.	None
Unit 119	Existing Sulfur Plant: additional loading due to incremental sulfur removed in Unit 590.	Tail Gas Unit; Oxidizer
Unit 121	Existing Sulfur Plant: additional loading due to incremental sulfur removed in Unit 590.	Tail Gas Unit; Oxidizer
Refinery Flare System	Existing Refinery Flare System: additional tie ins for Unit 590, upstream of the existing gas recovery system, are necessary for emergency relief, startups, and shutdowns.	None
Components	New Fugitive Components (valves, flanges, etc).	Leak Detection and Repair (LDAR) Program

1.1.3 Applicable Provisions and Regulations

- a. The "affected heaters" for the purpose of these unit-specific conditions are the fuel gas combustion devices 590H-1 and 590H-2 described in Conditions 1.1.1 and 1.1.2.
 - i.
 - A. The affected heaters are subject to the NSPS for Petroleum Refineries, 40 CFR 60 Subpart J, and requirements of the General Provisions of the NSPS, 40 CFR 60, Subpart A. The Illinois EPA administers the NSPS for subject sources in Illinois pursuant to a delegation agreement with the USEPA.
 - B. The Permittee shall not burn in the affected heaters any fuel gas that contains hydrogen sulfide (H₂S) in excess of 230 mg/dscm (0.10 gr/dscf) [40 CFR 60.104(a)(1)].
 - ii.
 - A. The Permittee shall not cause or allow the emission of smoke or other particulate matter, with an opacity greater than 30 percent, into the atmosphere from the affected heaters except as provided below [35 IAC 212.123(a)].
 - B. The emission of smoke or other particulate matter from the affected heaters may have an opacity greater than 30 percent but not greater than 60 percent for a period or periods aggregating 8 minutes in any 60 minute period provided that such opaque emissions permitted during any 60 minute period shall occur from only one such emission unit located within a 305 m (1,000 ft) radius from the center point of any other such emission unit owned or operated by such person, and provided further that such opaque emissions permitted from each

Note: This permit does not address certain amendments to the NSPS for Petroleum Refineries proposed by USEPA (72 FR 27178, May 14, 2007). This is because USEPA has not completed the adoption of these amendments. If USEPA completes the adoption of these amendments, the provisions of the adopted rules would apply to new and modified emission units that are part of this project, as specified by the provisions of the adopted rules. As the adopted standards are more stringent than the standards of the current NSPS, which are provided in the above conditions, the provisions of the adopted NSPS would supersede the above conditions.

such emission unit shall be limited to 3 times in any 24 hour period [35 IAC 212.123(b)].

- iii. The Permittee shall not cause or allow the emission of carbon monoxide (CO) into the atmosphere from each affected heater to exceed 200 ppm, corrected to 50 percent excess air [35 IAC 216.121].
- b. The "affected components" for the purpose of these unit-specific conditions are the new components described in Conditions 1.1.1 and 1.1.2.
 - i. The affected components associated with the ULSD project are subject to National Emission Standards for Hazardous Air Pollutants From Petroleum Refineries, 40 CFR 63, Subpart CC and requirements of the General Provisions of the NESHAP, 40 CFR 63, Subpart A. The Illinois EPA administers the NESHAP for subject sources in Illinois pursuant to a delegation agreement with the USEPA. The Permittee shall comply with all applicable requirements of 40 CFR 63, Subparts A and CC.

Note: The Permittee has indicated that it generally complies with the equipment leak requirements specified in 40 CFR 63, Subpart CC by complying with the Standards of Performance for Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry 40 CFR 60, Subpart VV.
 - ii. The affected components in the new Unit 590 associated with the ULSD project are subject to the NSPS, 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, and requirements of the General Provisions of the NSPS, 40 CFR 60, Subpart A. The Illinois EPA administers the NSPS for subject sources in Illinois pursuant to a delegation agreement with the USEPA.

Note: Because the affected components are also subject to 40 CFR 63 Subpart CC, the Permittee is required to comply only with the provisions specified in Subpart CC (See also 40 CFR 63.640(p)).
 - iii. This permit is issued based on the affected components associated with the ULSD project being subject to 35 IAC Part 218 Subpart R: Petroleum Refining and Related Industries; Asphalt Materials.

Note: When the requirements for equipment leaks under 40 CFR Part 63 Subpart CC are more stringent than the LDAR requirements in 35 IAC 218.445-452, compliance with 40 CFR Part 63 Subpart CC shall be deemed compliance with 35 IAC 218.445-452.

- c. Existing affected units shall continue to comply with applicable regulations as set forth in the source's CAAPP permit (Permit No. 96030079).

1.1.4 Non-Applicability of Regulations of Concern

- a. The Permittee has addressed the applicability of 40 CFR 52.21, Prevention of Significant Deterioration (PSD) and 35 IAC Part 203, Major Stationary Sources Construction and Modification (MSSCAM) to this project. The limits in this permit are intended to ensure that this project does not constitute a major modification pursuant to these rules, as further explained in Attachments 1 and 2.

For this purpose, the source also addressed the potential emissions of the new hydrogen plant that will be developed by an independent company to supply additional hydrogen to the refinery (Hydrogen Plant). The maximum annual emissions of the hydrogen plant, as accounted for in this permit are 70.2 tons of NO_x, 1.2 tons of SO₂, 20.7 tons of CO, 12.0 tons of PM/PM₁₀, and 18.0 tons of VOM. Hydrogen plants are routinely developed at refineries with the owner and operator of the plant responsible for obtaining necessary air pollution control permits.

- b. i. This permit is issued based on the affected heaters not being subject to emission standards or other requirements pursuant to the NESHAP for Industrial, Commercial, and Institutional Boilers and Process Heaters, 40 CFR 63, Subpart DDDDD. This is because this NESHAP has been vacated by a court mandate, pursuant to a request by USEPA, and is no longer in effect.

Note: "Large gaseous fuel units," under this NESHAP would have been limited to CO emissions of no more than 400 ppm, dry basis at 3 percent oxygen, 30-day rolling average, excluding periods of startup, shutdown, malfunction, and low-load operation, which is less stringent than the standard set by 35 IAC 216.121 (See Condition 1.1.3(a)(iv)).

- ii. This permit is issued based on each affected heater not being a major source of HAPs for purposes of Section 112(g) of the Clean Air Act so that a case-by-case determination of Maximum Achievable Control

Technology (MACT) is not required for the affected unit pursuant to Section 112(g). This is because each affected heater is being constructed at a developed site and the potential annual emissions of HAPs from each affected heaters are less than 10 tons of any individual HAP and less than 25 tons of any combination of HAPs.

- iii. The affected heaters and the Permittee shall comply in a timely manner with all applicable provisions of a NESHAP adopted by USEPA or a case-by-case MACT determination made by the Illinois EPA that applies to the affected heaters. For this purpose, the Permittee shall address the affected heaters in an application submitted to the Illinois EPA pursuant to Section 112(j) of the Clean Air Act to support a case-by-case determination of MACT for the heaters at the source.

1.1.5 Control Requirements and Work Practices

- a. i. The affected heaters shall be equipped, operated, and maintained with ultra low NO_x burners. These burners shall be operated and maintained in conformance with good air pollution control practices.
- ii. Only gaseous fuels shall be burned in the heaters.
- b. The design drift loss from the drift eliminators on the cooling tower shall not exceed 0.002 percent (12-month rolling average).

1.1.6 Production and Emission Limitations

- a. i. The firing rate of the heaters shall not exceed the following:

Heater	Firing Rate
	(mmBtu/hour) ¹
590H-1 and 590H-2	129.6
115B-1 and 115B-2	46.6

¹ Limits are based on a 12-month rolling average

- ii. The heaters shall not exceed the following short term emission limits:

Heater	Emissions (Lbs/mmBtu) ¹				
	NO _x	CO	SO ₂	VOM	PM/PM ₁₀
590H-1	0.04	0.0824	20.0	0.0027	0.0075
590H-2	0.04	0.0824	20.0	0.0027	0.0075
115B-1	0.0980	0.0824	161.5	0.0054	0.0075
115B-2	0.0980	0.0824	161.5	0.0054	0.0075

¹ The units for SO₂ emissions are expressed in terms of stack concentration (ppm_v) for 590H-1 and 590H-2, and fuel gas H₂S concentration for 115B-1 and 115B-2.

iii. The heaters shall not exceed the following annual emission limits:

Heater	Emissions (Tons/Year)				
	NO _x	CO	SO ₂	VOM	PM/PM ₁₀
590H-1	12.30	25.39	8.75	0.80	2.30
590H-2	10.40	21.35	7.36	0.70	1.90
115B-1	9.20	7.72	2.56	0.50	0.70
115B-2	10.80	9.09	3.01	0.60	0.80

b. Emissions of VOM from the affected components (i.e., valves, pumps, flanges, etc.) associated with the ULSD Project, excluding components located within the proposed hydrogen plant battery, shall not exceed 6.03 tons per year. Compliance with this limit shall be determined using published USEPA methodology for determining VOM emissions from leaking components.

c. i. The maximum rated capacity of the South Plant Cooling Tower shall not exceed 60,380 gallons/minute.

ii. Emissions and operation of the South Plant Cooling Tower shall not exceed the following limits:

Pollutant	Emissions	
	(Tons/Month)	(Tons/Year)
VOM	1.2	11.11
PM	0.7	4.58
PM ₁₀	0.6	3.76

d. i. A. The maximum production rate of Unit 119 shall not exceed 70 Long Tons/Day for A-Train and 70 Long Tons/Day for B-Train.

B. The maximum production rate of Unit 121 shall not exceed 190 Long Tons/Day for C-Train and 190 Long Tons/Day for D-Train.

ii. Emissions from the following equipment shall not exceed the following limits:

Unit	Emissions									
	NO _x		CO		SO ₂		VOM		PM/PM ₁₀	
	T/Mo	T/Yr	T/Mo	T/Yr	T/Mo	T/Yr	T/Mo	T/Yr	T/Mo	T/Yr
U119 ¹	0.2	1.32	3.2	31.90	9.2	91.20	0.1	0.47	---	0.10
U121 ²	3.4	33.44	15.8	157.34	15.2	151.12	1.9	18.42	0.2	2.08

¹ Trains A and B combined.

² Trains C and D combined.

- e. Compliance with annual limits shall be determined on a monthly basis from the sum of the data for the current month plus the preceding 11 months (running 12 month total).

1.1.7 Testing Requirements

a. Hydrogen Sulfide Testing

In accordance with 40 CFR 60.8, within 60 days after achieving the maximum production rate at which the affected heaters will be operated, but not later than 180 days after initial startup of the affected heaters and at such other times as may be required by the Illinois EPA, the Permittee shall conduct performance test(s) in accordance with 40 CFR 60.106(e) and furnish the Illinois EPA a written report of the results of such performance test(s).

Note: The hydrogen sulfide testing requirement is not necessary if the H₂S content of the fuel gas to the affected heaters is monitored by an existing CEM that previously demonstrated compliance.

b. Nitrogen Oxides Testing.

- i. Within 60 days after achieving the maximum production rate at which the affected heaters will be operated, but not later than 180 days after initial startup, the NO_x emissions of the affected heaters shall be measured during conditions which are representative of maximum emissions.

- ii. The following methods and procedures shall be used for testing of emissions, unless another method is approved by the Illinois EPA: Refer to 40 CFR 60, Appendix A, for USEPA test methods.

Location of Sample Points	USEPA Method 1
Gas Flow and Velocity	USEPA Method 2
Flue Gas Weight	USEPA Method 3, 3A, or 3B
Moisture	USEPA Method 4
Nitrogen Oxides	USEPA Method 7, 7A, 7C, 7D, or 7E

c. Sampling and Analysis for South Plant Cooling Tower.

The Permittee shall sample and analyze the water being circulated in the cooling tower on at least a monthly basis for the total dissolved solids content. Measurements of the total dissolved solids content in the wastewater discharge associated with the cooling tower, as required by a National Pollution Discharge Elimination System permit, may be used to satisfy this requirement if the effluent has not been diluted or otherwise treated in a manner that would significantly reduce its total dissolved solids content.

1.1.8 Monitoring Requirements

- a. i. The Permittee shall comply with the monitoring requirements specified in 40 CFR 60.105 for the affected heaters by installing, calibrating, maintaining and operating an instrument for continuously monitoring and recording the concentration (dry basis) of H₂S in fuel gases before being burned in the affected heaters.
- ii. Pursuant to 40 CFR 60.13(i), after receipt and consideration of written application, the USEPA may approve alternative monitoring procedures.
- b. For the affected heaters, the Permittee shall determine compliance with the H₂S standard in 40 CFR 60.104(a)(1) as follows: Method 11, 15, 15A, or 16 shall be used to determine the H₂S concentration in the fuel gas. The gases entering the sampling train should be at about atmospheric pressure. If the pressure in the refinery fuel gas lines is relatively high, a flow control valve may be used to reduce the pressure. If the line pressure is high enough to operate the sampling train without a vacuum pump, the pump may be eliminated from the sampling train. The sample shall be drawn from a point near the centroid of the fuel gas line [40 CFR 60.106(e)(1)].
- c. For the affected heaters, the Permittee shall maintain records of the concentration (dry basis) of H₂S in fuel gases before being burned in the affected heaters to demonstrate compliance with Condition 1.1.3(a)(i)(B).

1.1.9 Recordkeeping Requirements

- a. The Permittee shall maintain records of the following items for heaters 590H-1, 590H-2, 115B-1, 115B-2):
- i. Firing rate (mmBtu/hour on a 12-month rolling average).

- ii. Amount of fuel burned in the heaters (mmBtu/month and mmBtu/year).
 - iii. Heat content of the fuel gas (Btu/scf).
 - iv. NO_x, CO, VOM, SO₂, PM and PM₁₀ emissions (tons/month and tons/year).
- b. The Permittee shall maintain records of the following items for fugitive emissions from components in the ULSD Project:
- i. Number of new components by unit or location and type.
 - ii. Calculated VOM emissions including supporting calculations, attributable to these components (tons/year).
- c. The Permittee shall maintain records of the following items for the South Plant Cooling Tower:
- i. The Permittee shall maintain a file containing the maximum design circulation for the south plant cooling tower with supporting documentation.
 - ii. A log containing records of the sampling and analysis for South Plant Cooling Tower as required by Condition 1.1.7.
 - iii. Emissions of VOM and PM/PM₁₀ with supporting calculations (tons/month and tons/year).
- d. The Permittee shall maintain records of the following items for the Sulfur Plant:
- i. Production rate for each train in Unit 119 and Unit 121 (Long Tons/Day).
 - ii. NO_x, CO, VOM, SO₂, PM and PM₁₀ emissions (tons/month and tons/year).
- e. The requirements in Conditions 1.1.9 and 1.1.10 become effective when the Permittee begins operation of units in the ULSD Project to produce ultra low sulfur diesel for commercial sale.

1.1.10 Reporting Requirements

- a. The Permittee shall notify the Illinois EPA of any deviations with the permit requirements as follows. Reports shall be submitted as specified below or in a

revision to the source's CAAPP that address the affected units. Reports shall describe the probable cause of such deviations, and any corrective actions or preventive measures taken.

- i. Reports addressing the affected heaters shall be submitted in conformance with the requirements, content and schedule contained in 40 CFR 60.7.
- ii. As the operation of affected components is addressed by reporting requirements under applicable rules, reports shall be submitted with the periodic reports required by such regulations.

- b. The Permittee shall notify the Illinois EPA within 30 days of producing ultra low sulfur diesel for commercial sale, pursuant to this permit.

- 2. The emission units addressed by this construction permit may be operated under this permit until renewal of the CAAPP permit or a modification of the CAAPP permit is issued provided the Permittee submits a timely application to amend the current CAAPP permit to incorporate this project.

If you have any questions on this permit, please contact Jason Schnepf at 217/782-2113.

Edwin C. Bakowski, P.E.
Acting Manager, Permit Section
Division of Air Pollution Control

Date Signed: _____

ECB:JMS:psj

cc: Region 1
Lotus Notes
CES

Attachment 1: Project Emission Changes Summary (Tons/Year)

Operation	NO _x (NA NSR)	NO _x (PSD)	CO	SO ₂	VOM	PM	PM ₁₀
ULSD Project (Refinery)							
590H-1	12.30	12.30	25.39	8.75	0.80	2.30	2.30
590H-2	10.40	10.40	21.35	7.36	0.70	1.90	1.90
115B-1	5.16	5.16	4.22	1.94	0.28	0.28	0.39
115B-2	6.45	6.45	5.98	2.12	0.39	0.21	0.51
Unit 119, Trains A & B	-20.57	-20.57	-621.29	0	-6.77	-0.88	-1.21
Unit 121, Trains C & D	12.18	12.18	57.59	146.57	6.23	0.91	0.71
South Plant Cooling Tower Components	-----	-----	-----	-----	1.90	-9.73	-4.56
	-----	-----	-----	-----	6.03	-----	-----
SUBTOTAL ¹ :	46.49	46.49	114.53	166.74	16.33	5.60	5.81
Hydrogen Plant	80.20	80.20	20.70	3.00	18.00	12.00	12.00
SUBTOTAL:	126.69	126.69	135.23	169.74	34.33	17.60	17.81
Significance Threshold:	40	40	100	40	40	25	15
Greater Than Significant?	Yes	Yes	Yes	Yes	No	No	Yes

¹ Subtotal includes only units with emission increases (decreases are not included).

Attachment 2: Netting Analysis (Tons/Year)

	Date	NO _x (NA NSR)	NO _x (PSD)	CO	SO ₂	PM ₁₀
Project Emissions ¹		106.12	106.12	-486.06	169.74	12.04
Contemporaneous ² Increases						
Low Sulfur Gas. (01030085) ³	11/2003	71.64	71.64	90.69	----	8.17
Coker Deheading (05020061)	3/2006	13.20	13.20	19.29	17.44	2.33
U125 Mod. (04090068)	8/2007	22.90	22.90	17.07	20.27	1.55
Package Boilers (06080027)	9/2006	34.62	34.62	51.94	0.20	2.58
2002 Turnaround (01070060)	11/2002	----	----	----	----	----
Contemporaneous ² Decreases						
2002 Turnaround (01070060)	11/2002	-379.86	----	----	----	----
Aux Boiler LNB (05050037)	5/2006	-300.00 ⁴	-300.00 ⁴	0 ⁵	-300.00 ⁴	-20.00 ⁴
U119 TGU (07030063)	12/2008					
FCCU Controls (05070033)	11/2007					
Low Sulfur Gas. (01030085) ³	11/2003	----	----	----	-365.48	----
NET EMISSIONS CHANGE		-431.38	-51.52	-307.07	-457.83	6.67
Significance Threshold:		40	40	100	40	15
Greater Than Significant?		No	No	No	No	No

Notes:

- ¹ Includes decreases associated with the project.
- ² The contemporaneous time period for PSD pollutants is March 2003 through March 2010. The contemporaneous time period for NA NSR pollutants is September 2002 through March 2010.
- ³ Includes Hydrogen Plant for Low Sulfur Gasoline Project (Construction Permit 01070058).
- ⁴ Emission decreases are enforceable pursuant to the Consent Decree between CITGO, USEPA, and Illinois EPA (Civil Action Number H-04-3883 entered January 26, 2005 in the Southern District of Texas). Up to 300 tons of NO_x emission reductions, up to 300 tons of SO₂ emission reductions, and up to 20 tons of PM emission reductions are allowed for Consent Decree Emission Reductions pursuant to Paragraph 137 of the Consent Decree.
- ⁵ Use of CO emission reductions generated by Consent Decree required controls are prohibited, pursuant to Paragraph 136 of the Consent Decree between CITGO, USEPA, and Illinois EPA (Civil Action Number H-04-3883 entered January 26, 2005 in the Southern District of Texas).