Illinois Environmental Protection Agency
Bureau of Air, Permit Section

Project Summary for an Application from Phillips 66 Company for Revisions to the Construction Permit for the Ultra Low Sulfur Diesel Project at the Wood River Refinery in Roxana, Illinois

Site Identification No.: 119090AAA
Permit No.: 04050026

Illinois EPA Contacts

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Important Dates:

Application Received: August 29, 2013
Public Comment Period Begins:
Public Comment Period Closes:

I. INTRODUCTION

Phillips 66 Company operates the Wood River Refinery located in Roxana. The Wood River Refinery has requested a revision of its Ultra Low Sulfur Diesel Project permit to account for additional sulfur dioxide (SO_2) emissions at units combusting refinery fuel gas, which results from other sulfur compounds in the fuel gas besides hydrogen sulfide. The application for revision shows that this project still would not be a major project for purposes of New Source Review.

The Illinois EPA has reviewed the request and made a preliminary determination that it meets applicable requirements. Accordingly, the Illinois EPA has prepared a draft of the revised air pollution control construction permit that it would now propose to issue for this project. However, before issuing this revised permit, the Illinois EPA is holding a public comment period to receive written comments on the proposed issuance of this revised permit and the terms and conditions of the draft of the revised permit.

II. BACKGROUND INFORMATION

The Wood River Refinery was issued a construction permit for the Ultra Low Sulfur Diesel Project on December 7, 2004. That project addresses changes to equipment to enable the refinery to produce ultra low sulfur diesel as required by the federal regulations for “Highway Diesel Fuel Sulfur Requirements” (See also 40 CFR 60 Parts 80 and 86). The refinery has reduced sulfur in diesel fuel, in part, by desulfurization of various sulfur containing intermediate streams involved in the production of diesel. Various hydrotreating techniques are used to enable the desulfurization to occur.

III. PROJECT DESCRIPTION

Historically, the Wood River Refinery calculated SO_2 emissions from the affected combustion units based solely on the hydrogen sulfide concentration of their refinery fuel gas. The revised permit would provide for an increase in SO_2 emissions for affected combustion units, i.e., heaters HTR-ULD-H1, HTR-ULD-H4, HTR-DU1-F301 and HTR-DU1-F302, that combust refinery fuel gas. These increases account for sulfur compounds in the refinery fuel gas besides hydrogen sulfide.

IV. EVALUATION OF THE CHANGE IN EMISSIONS

The requested revision would only affect SO_2 emissions. Accordingly, only SO_2 emissions are addressed in this project summary. When the

permit was initially issued, Madison County was designated attainment[1] for SO_2, so the application compared the project emission increases with the major modification thresholds in the federal rules for Prevention of Significant Deterioration of Air Quality (PSD), 40 CFR 52.21. This comparison showed that the project was not a major modification. This comparison was updated for the revised permit and continues to show that the project is not a major modification. A summary of this comparison follows:

Summary of SO_2 Emissions Changes for the Project (Tons/Year)

Item of Equipment	Initial	Revised
Hydrogen Plant	59.2	1.6
Heater HTR-ULD-H4	7.7	14.5
Heater HTR-ULD-H1	0.6	6.4
Heater HTR-DU1-F301	30.8	14.5
Heater HTR-DU1-F302		
Heater HTR-CR2-N	0.5	17.9
Sulfur Recovery Unit	2.6	2.6
Total Increases:	101.4	57.5
Significance Threshold:	40	40
Greater Than Significant?	Yes	Yes

Summary of Net Change in SO_2 Emissions (Tons/Year)

	Initial	Revised
Project Emission Changes	101.4	57.5
Contemporaneous Emission Increases	46.4	63.8
Contemporaneous Emission Decreases	-3,766.2	-3,766.2
Totals:	-3,618.4	-3,644.9
Net Significance Threshold:	40	40
Greater Than Significant?	No	No

For heaters HTR-ULD-H4 and HTR-ULD-H1, the change in emissions calculation basis to account for all sulfur compounds in the refinery fuel gas being combusted rather than only hydrogen sulfide results in higher calculated SO_2 emissions. Accordingly, Wood River Refinery has requested higher SO_2 emission limits resulting in a larger increase in emissions compared to the permit as initially issued. The same is true for heaters HTR-DU1-F301 and F302; however, the revised change in emissions for these units is actually lower than represented in the permit as initially issued because the refinery is not requesting as much flexibility in the hydrogen sulfide content as in the original permit. For the hydrogen plant, a lower SO_2 emission limit is being requested as Heater HP-1 H-1 for the hydrogen plant was originally

[1] Although the attainment status for $PM_{2.5}$ has changed (Madison County is now designated as nonattainment for the annual $PM_{2.5}$ National Ambient Air Quality Standard with SO_2 being a precursor), the application appropriately evaluated the change in SO_2 emissions against the applicable rules in place at the time the permit was initially issued.

permitted to combust refinery fuel gas but that unit, as built, burns purchased natural gas only and is not capable of combusting refinery fuel gas. No change in emissions is expected at the sulfur recovery unit as this unit does not combust refinery fuel gas.

The results of this comparison show that the change in emissions for this proposed revision compared to the permit as initially issued will be lower, i.e., 40.1 tons/year now compared to 101.4 tons/year initially. While the project still results in a significant increase in emissions, i.e., an increase of 40 tons/year or more of SO_2, the net change in emissions is much less than significant.

V. CONTENTS OF PERMIT

The conditions of the proposed permit contain limitations and requirements to assure that this project would not be a major modification pursuant to the PSD rules.

For SO_2 emissions, this means limiting the operation of the affected combustion units so that the potential emissions, when compared with the units' actual emissions, will not result in a significant increase in emissions. For heater HTR-ULD-H1, SO_2 emission limits are not placed on the unit as this unit is an existing unit; however the permit identifies the change in emissions associated with this project. For the other affected combustion units (HP-1, HTR-ULD-H4, HTR-DU1-F301 and HTR-DU1-F302), the permit limits the maximum firing rate of these units as well as their SO_2 emissions. For heaters burning refinery fuel gas, records are required for the sulfur content of the fuel gas that addresses all sulfur compounds in the fuel gas, based on a combination of continuous monitoring for hydrogen sulfide and periodic sampling and analysis for other sulfur compounds.

VI. REQUEST FOR COMMENTS

It is the Illinois EPA's preliminary determination that this application for revision of the construction permit meets all applicable state and federal air pollution control requirements, subject to the conditions proposed in the draft of the revised permit. Comments are requested by the Illinois EPA on this proposed issuance of a revised permit.

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