

**DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: Scheduled Inspection**

P044537760

FACILITY: ARAMCO SERVICES COMPANY		SRN / ID: P0445
LOCATION: 46535 PEARY COURT, NOVI		DISTRICT: Southeast Michigan
CITY: NOVI		COUNTY: OAKLAND
CONTACT: Burke Davis , Business Manager		ACTIVITY DATE: 11/02/2016
STAFF: Kerry Kelly	COMPLIANCE STATUS: Compliance	SOURCE CLASS: SM OPT OUT
SUBJECT: FCE: Aramco appears to be in compliance with the evaluated air regulations and PTI 81-13B.		
RESOLVED COMPLAINTS:		

On November 2, 2016, I (Kerry Kelly) conducted a targeted, unannounced inspection at Aramco Services Company located at 46535 Peary Ct. in Novi, Michigan. The purpose of the inspection was to determine compliance with the Federal Clean Air Act; Article II, Part 55, Air Pollution Control of Natural Resources and Environmental Protection Act, 1994 Public Act 451; Michigan Department of Environmental Quality-Air Quality Division (MDEQ-AQD) Rules; and the conditions of Permit-To-Install (PTI) Number 81-13B for five dynamometer test cells without emission controls.

Aramco operates an engine testing facility in southwestern Oakland County, Michigan. The facility is located north of Interstate 96 and east of Beck Road. The surrounding area is populated primarily with commercial/industrial properties to the north, south, and west and residential properties to the east to east-northeast. The nearest residential area is approximately 0.15 miles east of Aramco.

Permit 81-13B was issued to Aramco Services Company on October 29, 2015. Equipment in PTI 81-13B consists of five engine dynamometers (FGTESTCELLS). Two of the dynamometers are capable of testing engines up to 430 hp (320 kW), one is capable of testing engines up to 603 hp (450 kW), one is capable of testing engines up to 1006 hp (750 kW), and one is capable of testing engines up to 87 hp (65 kW). The engines are fueled by gasoline, diesel, oxygenates (alcohols), hydrogen and gaseous hydrocarbon fuels, and various blends of these fuels. Gaseous hydrocarbon fuels include natural gas, compressed natural gas (CNG), liquefied petroleum gas (LPG), and their individual components. Air regulations that apply to reciprocating internal combustion engines and engine test cells/stands include; National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines (40 CFR 63 Subpart ZZZZ), NESHAP for Engine Test Cells/Standards (40 CFR 63 Subpart P P P P P), New Source Performance Standards (NSPS) for Stationary Compression Ignition Internal Combustion Engines (40 CFR 60 Subpart IIII), and NSPS for Stationary Spark Ignition Internal Combustion Engines (40 CFR 60 Subpart J J J J). The engines tested in FGTESTCELLS are not subject to 40 CFR 63 Subpart ZZZZ per 40 CFR 63.6585, 40 CFR 60 Subpart J J J J per 40 CFR 60.4230 (b), and 40 CFR 60 Subpart IIII per 40 CFR 60.4200 (b) because they are being tested at a stationary RICE test cell/stand. The engines are not subject to 40 CFR 63 Subpart P P P P P because Aramco is not considered a major source of hazardous air pollutants (HAPs).

Upon arriving at the site, I introduced myself, showed my photo identification, and stated the purpose of the visit to Mr. Burke Davis, Business Manager, Aramco and Mr. Chris Skaggs, Facility Operations, Aramco. Mr. Davis indicated that Aramco Services Company in Novi operates Monday through Friday from 7:00 AM to 4:30 PM and employs approximately 35 people. Aramco Services Company is a research, design, and development facility for production and prototype engines for the automotive industry. The company is conducting emissions and fuel economy research on the engines tested.

Operation of the five permitted dynamometer test cells began in July 2015. AQD received notification of initiation of trial operation on August 3, 2015, within 30 days of commencement of trial operation, as required in Special Condition VI.1. of PTI 81-13B. The notification of initiation of trial operation is on file at the DEQ-AQD Southeast Michigan District Office. In addition to the dynamometer test cells, the following equipment is also located at the facility: 1 - 500 gallon waste gasoline storage tank; 1 - 500 gallon waste diesel storage tank; 6 natural gas-fired Harsco Industrial/Patterson-Kelly Company boilers; 1 Lochinvar boiler; 1 natural gas-fired Generac emergency generator; 2 parts washers; 2 welding stations; 1 lathe; 1 drill press; 1 milling press; 1 belt sander; 1 sheet metal break; 1 ban saw; 1 portable sand blast unit; and 1 grinder.

PTI 81-13B limits CO emissions from FGTESTCELLS to 85.8 tons/year. The potential to emit calculations for the seven boilers and the emergency generator were submitted by Mr. Davis (attachment 1). According to these calculations the potential to emit for the seven boilers is 2.17 tons of CO per year. The potential to emit for the natural gas-fired generator is 0.0067 tons of CO per year, according to the calculations supplied by Mr. Davis. Based on this information the facility-wide potential to emit for CO is approximately 88 tons/year.

Aramco was in the process of installing a chassis dynamometer during my inspection. Chassis dynamometers are considered by AQD to be mobile sources of air emissions (attachment 2). States are prohibited from adopting or

attempting to enforce any standard relating to the control of emissions from new motor vehicles or new motor vehicle engines subject to 42 U.S.C Part A – Motor Vehicle Emission and Fuel Standards per 42 U.S.C 7543 (a).

The diesel and gasoline storage tanks at Aramco are used to store waste fuels and are not permitted. The diesel tank appears to be exempt from the requirement in R336.1201 to obtain a permit to install per R336.1284(g)(i). The gasoline storage tank is considered exempt per R336.1284(g)(i), as well, due to precedence. Documents/emails archived in the AQD Exemptions Team Room, designed to promote consistency and aid staff in analysis of the use of permit exemptions, propose R 336.1284 (g)(i) include gasoline containers at dynamometer test cells and suggest field staff are applying R 336.1284(g)(i) to gasoline containers at dynamometer facilities.

Special Conditions I. 1 – 8 set emission limits for CO, VOC, Acetaldehyde, 1, 3-Butadiene, Formaldehyde, and Benzene. Mr. Davis provided the records required in Special Conditions VI. 3 and VI.4. to demonstrate compliance with the emission limits (attachment 3). Sampling a few calculations, it appears Aramco used the emission factors listed at the bottom of the emission limit table in PTI 81-12B to calculate emissions. According to the records provided, the CO, VOC, Acetaldehyde, 1, 3-Butadiene, Formaldehyde, and Benzene were within the permitted limits. The emission limits listed in Special Conditions I. 1 – 8 and the highest reported emissions between May 2015 and October 2016 are displayed in the table below;

Pollutant	Limit	Highest Reported
CO	85.8 ton/yr	7.04 ton/yr
VOC	126.4 lb/day	9.57 lb/day
VOC	4.4 ton/yr	0.36 ton/yr
Acetaldehyde	8.4 lb/day	0.14 lb/day
1,3-Butadiene	1.64 lb/day	0.12 lb/day
1,3-Butadiene	0.0572 ton/yr	0.00 ton/yr
Formaldehyde	0.0931 ton/yr	0.01 ton/yr
Benzene	0.1690 ton/yr	0.01 ton/yr

Mr. Davis provided records of the number of days that any of the engines were in operation, the types of fuel used in the engines, and the days the engines were operating while burning pure alcohol or predominately alcohol blends (attachment 4). Based on these records, Aramco appears to be only using the fuels approved in Special Condition II.1. Records of the total gallons of fuel used per day, month, and 12-month rolling, as required in Special Conditions VI.3. (a), (b), (c) and VI.4.(a) and (b), were also provided by Mr. Davis (attachment 4). Based on the records provided, the fuel use is less than the material limits in Special Conditions II. 2 – 4. Fuel limits and the highest reported fuel use between May 2015 and October 2016 are displayed in the table below;

Fuel	Limit	Highest Reported
Pure alcohol or predominately alcohol blends	552 gal/day	4.3 gal/day
Total Fuel	790 gal/day	59.8 gal/day
Total Fuel	55,000 gal/yr	4,514.4 gal/yr

Records of the maximum sulfur content in the diesel for each delivery were submitted by Mr. Davis as required in Special Condition VI.5 (attachment 5).

I inspected each of the stacks for FG-TESTCELLS. Each stack appeared to meet the permit's stack/parameter limits set forth in Special Condition VIII. 1. through 5.

There are a total of seven boilers at Aramco. Six of the boilers are used for building heating and one boiler is used to heat the sidewalk on the property. There are three boilers that have a maximum heat input rate of 900,000 BTU/hour, three that have a maximum heat input rating of 1,050,000 BTU/hour, and one that has a maximum heat input capacity of 285,000 BTU/hour. Photos of the nameplates of the boilers I inspected were provided by Mr. Davis (attachment 6, 7 and 8). These boilers are exempt from the requirement in R 336.1201 to obtain a permit to install pursuant to R 336.1282(b)(i) because they are used for space heating and indirect heating and have a heat input capacity of not more than 50,000,000 BTU/hour. The boilers do not appear to be subject to the NSPS for Small Industrial-Commercial-Institutional Steam Generating Units (40 CFR 60 Subpart Dc) because they are less than 2.9 MW (10 MMBtu/hr).

I inspected the Generac emergency generator nameplate and certification and Mr. Davis provided photos of this information (attachments 9 and 10). The generator was manufactured in March 2013 and is rated at 25 kW (33.5 HP). This generator is subject to NSPS for Stationary Spark Ignition Internal Combustion Engines (40 CFR 60 Subpart JJJJ). Wolverine maintains the engines. Mr. Davis provided records of the engine maintenance performed (attachment 11). Based on the maintenance records for October 2015 through October 2016, the engine ran for 0.3 hours for maintenance and 37.3 hours total. Mr. Davis and Mr. Nicodemus, Aramco, stated that the majority of the hours were due to emergency situations (attachment 12). The maintenance records and certification indicate compliance with 40 CFR 60 Subpart JJJJ.

There are two parts washers at Aramco. According to Mr. Davis the parts washer in the engine room, which can be heated, is empty and no longer being used (attachment 13). The air vapor interface of each parts washer is approximately 4.5 square feet. The cold cleaners are exempt from the requirement in R336.1201 to obtain a permit to install per R336.1281(h) because the air/vapor interface is less than 10 square feet. During the inspection the lids to the cold cleaners were closed and instructions were posted in a conspicuous location. LPA-142 is the solvent used in the parts washer. Mr. Davis provided the SDS for LPA-142 (attachment 14). According to the SDS, the vapor pressure of LPA-142 is 0.00619 psia at 68 degrees Fahrenheit. Waste solvent is stored in closed containers and removed by Future Environmental. It appears Aramco is operating the cold cleaners in compliance with R336.1707.

The lathe, drill press, milling press, belt sander, sheet metal break, ban saw, sand blast unit and grinder are used to fabricate or modify parts needed for engine testing. All of this equipment was vented to the general plant environment and is exempt from the requirement under R336.1201 to obtain a permit to install pursuant to R336.1285(i)(vi)(B). The welding machines are exempt from permitting requirements pursuant R336.1285(i).

Based on this inspection, it appears Aramco Services Company is in compliance with PTI 81-13B and the evaluated State and Federal regulations.

NAME K. Kelly DATE 12/2/16 SUPERVISOR SK

