DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION
ACTIVITY REPORT: On-site Inspection

N291572826

FACILITY: TOYOTA MOTOR NORTH AMERICA R&D		**SRN / ID:** N2915
LOCATION: 1555 WOODRIDGE, ANN ARBOR		**DISTRICT:** Jackson
CITY: ANN ARBOR		**COUNTY:** WASHTENAW
CONTACT: Rosario Martinez Halberstadt , Engineering Manager		**ACTIVITY DATE:** 07/29/2024
STAFF: Diane Kavanaugh Vetort	**COMPLIANCE STATUS:** Compliance	**SOURCE CLASS:** MAJOR
SUBJECT: Conducted complete inspection FCE Title V Major Source. Also with Madelyn Hanton, EE.		
RESOLVED COMPLAINTS:		

FULL COMPLIANCE EVALUATION (FCE).

FACILITY: N2915 Toyota Motor North America (TMNA) - R & D facility at 1555 and 1588 Woodridge, Ann Arbor referred to as " Ann Arbor Campus".

TMNA contacts present:

Rosario M. Halberstadt, Manager - Environmental Operations D: 734-995-0182 | C: 662-790-3164 Email: rosario.halberstadt@toyota.com

Madelyn (Maddie) Hanton, Environmental Engineer, On assignment at: TOYOTA MOTOR NORTH AMERICA | R&D D: 734-695-4992 | C: 734- 355-4183 Email: madelyn.hanton@toyota.com

PURPOSE OF INSPECTION

On July 29, 2024, Michigan Department of Environment, Great Lakes, and Energy (EGLE) Air Quality Division (AQD) conducted a complete scheduled compliance inspection at the Toyota Motor North America (TMNA) facility located at 1555 and 1588 Woodridge, Ann Arbor, MI. The purpose of the inspection is to determine TMNA's compliance status with applicable federal and state Air Pollution Control Regulations, particularly Michigan Act 451, Part 55 Air Pollution Control, the administrative rules, and the conditions of their Title V Renewable Operating Permit (ROP) MI-ROP-N2915-2023.

This facility also has an installed permit exempt natural gas fired Emergency Generator subject to federal National Emission Standard for Hazardous Air Pollutant (HAP) for Reciprocating Internal Combustion Engines (RICE) 40 CFR Part 63, Subpart ZZZZ also referred to as Maximum Achievable Control Technology (MACT) standard or RICE MACT. The facility is also subject to the Gasoline Dispensing Facilities MACT Subpart CCCCCC (GDFMACT) for dispensing fuel to engine testing dynamometers and fleet vehicles.

TMNA operates what they call two "campuses". The Ann Arbor site is a Major Stationary Source ROP subject facility (N2915) and the York Twp site on Platt Rd. has a HAP Opt Out Permit (P0615). Only N2915 is scheduled for inspection this FY. TMNA facilities are Minor (Area) Sources of HAPs. During this review period 2023/2024 TMNA's ROP Certifications and Deviation Reports were all received timely and reviewed. TMNA does not have any outstanding non-compliance issues. TMNA's 2023 MIENVIRO annual facility emissions were received timely. N2915 reported facility emissions of 7 tons of VOC, 31 tons CO, and 20 tons NOx emissions during the calendar year.

TMNA operates vehicle and engine research and developmental testing (R&D) for their automobile manufacturing company at the Ann Arbor location. The site contains two buildings referred to as Evaluation (1555) and Powertrain (1588). TMNA contacts Rosario and Maddie, accompanied me during the inspection and fully responded to all questions and requests for information. There are guard station checks at the entrance to the parking lot and in the lobby. Standard PPE is required. Telephone/computor camera lens are taped.

PRE-INSPECTION CONFERENCE

AQD explained the purpose of the inspection and requested general facility information and updates. TMNA representatives provided the information and significant updates. The facility has approximately 800 employees and current operation is generally 2 shifts, Monday thru Friday, with any engine testing possibly extending into a 3rd shift and over weekends.

Significant updates since the prior inspection (8/11/2022):

Maddie said they removed a cold cleaner from the exempt cold cleaner table in the permit. We discussed these template tables are built to allow adding / removing subject permit exempt equipment without modification.

Rosario explained they are preparing a PTI revision to remove the RTO control. RTO is currently required for operation of only 3 dynamometers EG-7, 8, and 9. AQD is aware it is oversized for this use, runs almost 24/7 and uses a lot of natural gas. The three dynos do not always operate, and usually not all together. The proposal has been discussed informally in the past and now TMNA and consultant FTCH are preparing the details to propose its removal. Rosario said they will likely ask for a pre-application meeting.

Permit exempt Battery testing, mainly those associated with hybrid cars, is another area of change. Rosario & Maddie said there should be no thermal destruction and no air related emissions or need for permitting. During the inspection I observed TMNA has built three above ground battery storage / containment bunkers at the rear of this facility. The actual Battery testing operations are planned for the Platt Rd faciity. More may be coming on this.

TMNA's 2022 Renewal was issued last December 2023, this year they will be implementing the new CAM Plan change that allows for CCS Thermocouple replacement "as needed" instead of the prior prescribed annual requirement. TMNA said there have been no excursions or exceedances.

There was one recent 45 minute power outage where the Emergency Generator was used, it is there for data support only.

FGGENSETS have been used much less often in the past year. TMNA operations made a change to use only in peak hours. The new DTE Substation is planned for 2025, TMNA has been waiting a long time for this for power improvement.

FACILITY INSPECTION

During this inspection I physically walked through most all Engine testing areas and reviewed some controlled versus uncontrolled Dynamometers. I also walked outdoors around portions of the buildings. I observed the fuel storage areas, and the Natural Gas Gensets.

TMNA ROP is organized as detailed below. The Source-Wide Table allows for operational flexibility and restricts Carbon Monoxide (CO) emissions to below Prevention of Significant Deterioration (PSD) major source level. Source-Wide Special Conditions (SC) include all process equipment, including equipment covered by other permits, grand-fathered, and exempt equipment.

SOURCE-WIDE:

SC I. 1. Carbon Monoxide (CO) emission limit is 249.0 tons per year based on a 12 month rolling time period as determined at the end of each calendar month.

SC II. 1. Total Fuel Limit: 618,709 gallons / year 12 month rolling, Source-wide.

SC II. 1a. FGLEV, FGCONTROLLED and FGUNCONTROLLED Total Fuel Limit: 516,830 gal /yr. (of SC II.1) 12 month rolling.

SC II. 1b. FGCONTROLLED AND FGUNCONTROLLED Total Fuel Limit: 448,718 gal /yr. (of SC II.1a) 12 month rolling.

SC II. 1c. FGUNCONTROLLED Total Fuel Limit: 22,995 gallons/yr. (of SC II.1b) 12 month rolling.

SC II. 2. Natural Gas FUEL Limit: 532.23 MMscf/yr. (Source wide) 12 month rolling time period. NOTE: I was told during the inspection this facility is not conducting Natural Gas testing.

Other ROP FG Tables with applicable requirements for EU: FG-CAM, FGULEV, FGLEV, FGCONTROLLED, FGUNCONTROLLED, FGTANKS, FGGENSETS, FGGDFMACT, FGRICEMACT, FGRULE287(2)(c), FGCOLDCLEANERS.

FGUNCONTROLLED: EU-COLD, EU-EG3, EU-EG4, EU-CHDY6, EU-CHDY7

FGCONTROLLED: EU-EG6, EU-EG1, EU-EG2, EU-EG5, EU-TM1, EU-TM4, EU-TM5, EU-EG7, EU-EG8, EU-EG9.

FGCAM: EU-EG3, EU-EG4, EU-EG6 (INDIVIDUAL CATALYSTS); EU-EG1, EU-EG2, EU-EG5, EU-TM1, EU-TM4, EU-TM5 (CATALYST CONTROL SYSTEM CCS); EU-EG7, EU-EG8, EU-EG9 (THERMAL OXIDIZER).

Engine emission control refers to the type of catalyst used in the specific EU Test Cell listed above. Emissions are controlled with catalytic convertors, primarily individual production catalysts that meet EPA standards, FGULEV and FGLEV. Chassis Dynamometers (CHDY) are for whole vehicles with incorporated catalytic convertors, and are tested to meet these standards of catalytic control.

FGULEV: EU-ANECHOIC, EU-ENVIRON, EU-UPDOWN, EU-EG3, EU-EG4, EU-CHDY1, EU-CHDY2, EU-CHDY3, EU-CHDY4, EU-CHDY5, EU-CHDY6, EU-CHDY7, EU-CHDY8, EU-CHDY9, EU-CHDY10.

FGLEV: Same as above

Today's inspection included both the Evaluation Building (EV, 1555) and Powertrain Building (PT, 1588). Emission Units and Flexible Groups (EU/FG) are in both buildings and are identified mostly by EV or PT. Gasoline is the primary fuel used and the facility has multiple above ground storage tanks (FG-TANKS, FG-GDFMACT). I observed the majority of dynamometer test cells were not operating during the inspection. An operator we met during the inspection indicated the usual engines tested currently are 2 Liter 4 Valves, and 3 Liter 6 Valves. Hybrid engines are also common.

PT BUILDING INSPECTION: CHASSIS DYNOS: EU-CHDY1 – CHDY6; ENGINE DYNOS (EG): EU-EG1, EG2, EG3, EG4, EG5, EG6; TRANSMISSION DYNOS (TM): EU-TM1, TM4, TM5; EU-UPDOWN

EV BUILDING INSPECTION: CHASSIS DYNOS: EU-CHDY7, CHDY8, CHDY9, CHDY10; EUANECHOIC, EUENVIRON, EUCOLD; EU-EG7, EG8, EG9 and associated RTO; (1) UST with three compartments (NW side of bldg). *Chassis MAD - Mileage Accumulation Dyno.

***During the walking inspection outside the EV Building I observed a fenced building containing this MAD. Rosario, Maddie and I went inside, it was not operating but was obviously a chassis type dyno. I did not recall having seen or inspected this before. They did not have information on this equipment and operation and agreed to investigate and provide it to me following the inspection.**

TMNA uses both inline catalytic converters of various materials/configuration and "add-on permanent" CCS depending on the Cell and the test scenario. The CCS control is attached to the dynamometer, and they are all similar with different configurations. The Control Panel for each Cell monitors liters per hour fuel, and ambient temperature, Catalyst in/out temperatures, and Air to Fuel Ratio. I observed several Hard Copy log sheets at Test Cells where operators record the required data during operation. These sheets are submitted to Maddie for the spreadsheet and other records.

During the inspection we observed /walked inside several idle Dyno Test Cells and observed at least two of the Catalytic Oxidizer controls. We spoke with one or more EG Operators, and they took us into one or more Cells to point out the controls. The last Test Cell to have been stack tested for emissions is EG6 in 2017. TMNA uses Emission Factors (EF) for calculations.

Chassis Dynos EU-CHDY1 – CHDY6: During the inspection I noted that many of these were also not operating, CHDY1, CHDY2 (under construction), CHDY3, 4, and 6. CHDY5 has a soak area attached and there was a truck sitting in it.

Transmission Dynos (TM): EU-TM1, TM4, TM5: During the inspection I was told #1 isn't used, #2 and #6 are electric, #4 was not operating, #5 we observed inside and there was a 2.5 liter hybrid engine transmission set up there but no testing was in process.

I observed the fuel tank areas located outside the buildings. In the ROP, FG-TANKS contains TANK1 (UST), TANK5 (AST), EU-TANK6 and EU-TANK7 (colocated AST). All have permanent submerged fill. Tanks 1, 6, 7 include vapor balance or equivalent control. TMNA records also show Tank 8 and Tank 9 ASTs. All areas have very good housekeeping and no issues or odors were observed.

I observed the Regenerative Thermal Oxidizer (RTO) air pollution control equipment and Engine Dynamometer flexible group FG-EG789. The RTO was observed to be operating without any associated EGs currently in operation. Overall it appears in excellant condition. I observed the control panel, and the temperature was being recorded; required minimum is 1425 degrees F. TMNA has set a Temperature automatic shut-off at 1440 degrees F, interlock shuts off associated operating Dyno(s). I observed the current temperature read:1550 degrees F. Maddie & Rosario showed me the redundant monitoring/recording now on the Unit for backup in case of lost data in the primary system. They have temperature chart, an SD card download, hardcopy with daily maintenance check. During the inspection I observed a mezzanine area, near the RTO, containing Fuel Day Tanks labeled AG1-AG7. The Day Tanks are used to store/supply gasoline between the primary storage tanks outside and the Test Cells.

The RTO and FG-EG789 are also subject to the federal Compliance Assurance Monitoring (FG-CAM) requirements. The RTO appeared to be operating in compliance. AQD previously received and approved TMNA's RTO Malfunction Abatement Plan (MAP) in 2018 and it was revised during renewal April 14, 2022.

The FGCONTROLLED and the FG-CAM conditions and CAM Plan are also applicable for EU: EG1, 2, 5, TM1, 4, 5 for Catalyst Control Systems (CCS). A Programmable Logic Controller (PLC) is used to monitor fuel throughput in lieu of reaching a minimum temperature in certain Engine Types and Testing scenarios. During the inspection I observed CCS installed on several of the subject Test Cells.

Compliance testing was conducted for FG-GENSETS in September 2023 and was observed by AQD District and Technical Programs Unit. IMPACT is TMNA test consultant and AQD received and approved the test protocol prior to the testing.

I observed only one of FG-GENSETS, #2 was operating during this inspection. The two natural gas fired stationary generators are, 1,573 bhp (1,141 kW). The Units are run frequently and have appeared to be in excellent condition in the past and have tested in compliance to date. They are large units with individual exhaust stacks. Each Unit is equipped with a Catalyst and LEANOX air-to-fuel controllers. I have observed the catalyst section located in stack. Units are non-certified Generators subject to federal New Source Performance Standards (NSPS) Subpart JJJJ with NOx, CO and VOC limits and regular testing.

Next to the FGGENSETS I observed the two associated Above Ground Gasoline Storage Tanks (AST) installed and appear to be operating properly. The tanks are fenced in together and each has 3 compartments. Per Rosario and Maddie, they supply gas to the AG1-7 Day Tanks.

FG-GDFMACT conditions require gasoline throughput of less than 100,000 gallons on an annual average determined monthly. TMNA stated they are still below 100,000 gallons and follow this. I requested these records be submitted; they are part of the usage/emissions spreadsheet. COMPLIANT

EUEMERGEN – TMNA confirmed they run weekly tests and do annual maintenance. The Unit is located in the courtyard between office and R&D buildings and was observed in passing. It has been inspected previously and appeared unchanged.

RECORDKEEPING REVIEW

During the inspection I requested TMNA Source-wide and FG/EU fuel usage and emission calculation recordkeeping spreadsheet to be received on or before August 7th. Requested compliance time period is July 2023 to June 2024. On August 6, I received an email from Rosario with TMNA recordkeeping submittal including the following documents: Cover Letter.pdf; Attachment 1 through 9.

TMNA Reports TOTAL FUEL: 88,629.7 gallons (<LIMIT 618,709 gal / 12 month roll). COMPLIANT.

FGLEV, FGCONTROLLED & FGUNCONTROLLED Fuel Usage: 80,228.1 gal / 12 month roll ending July 2022. (<LIMIT 516,830 gal / 12 month roll). COMPLIANT

FGCONTROLLED & FGUNCONTROLLED Fuel Usage: 54,235.9 gal / 12 month roll ending July 2022. (<LIMIT 448,718 gal / 12 month roll). COMPLIANT.

FGUNCONTROLLED Fuel Usage: 696.3 gal / 12 month roll ending July 2022 (<LIMIT 23,500 gal /12 month roll). COMPLIANT.

CARBON MONOXIDE EMISSIONS: 37.8 tons per 12 month rolling period ending July 2022. Plus 7.8 tons /12 month roll from Natural Gas sources. (<LIMIT 249 tons / 12 month roll). COMPLIANT.

FG-CAM Record includes documentation of the required CCS Thermocouple replacement. TMNA shows replaced on EG1, TM4, EG2, TM1, TM5, EG5 during the applicable 12 month period. COMPLIANT.

The Regenerative Thermal Oxidizer (RTO) as part of FG-CAM records include RTO Off-Line and On-Line PM Inspection Checklists, and spare parts list, which are very detailed. There were no excursions per TMNA. Record includes a Maintenance Log, and 2023 (December 28) Annual Service report from DURR (Manufacturer) and Thermocouple validations. COMPLIANT.

RTO Temperature Charts one per month during the requested time period demonstrate Temperature during Dyno operation is at or above the compliant temperature limit in the permit of 1425 degrees F. COMPLIANT.

FGTANKS and FGGDFMACT records indicated COMPLIANT. It is noted that the recent Renewal application included new Tanks 8 and 9.

FGEMERGEN records indicates hours of operation for testing and emergencies. COMPLIANT

OTHER: Above referenced MAD discussion and historic Chassis dyno regulatory information was provided: TMNA stated *"It is a chassis dyno used for fully assembled automobiles. It was originally installed in 2013* as an unenclosed structure with a canopy, and the vehicles vented directly outside. In 2015 a partial enclosure was installed around the chassis dyno. The east and west walls of this enclosure are louvers, which allows the vehicles to exhaust into the enclosure without the need for a separate tail pipe exhaust through a stack. Toyota's permitted chassis dynos all include separate exhaust fans and exhaust points. As the MAD dyno is outdoors and the vehicles only exhausts through their tailpipes, we have historically considered this dyno as not subject to stationary source requirements." ACCEPTABLE

COMPLIANCE SUMMARY

During the closing conference Rosario, Maddie and I discussed the requested records. It was agreed records would be submitted electronically by August 7th. During the closing conference I received some TMNA hard copy records they had prepared. Copies obtained today:

Monthly Air Permit Compliance Inspection Form, for January and March 2024, inspected on 2/10 and 4/10. AQD later emailed request for clarification. Rosario provided explaination and will add key.

Catalytic Control System (CCS) Daily Check for January 2024, for Cell TM1, TM4, TM5, and EG1, EG2, EG5. Daily check per shift of Catalyst In/Out Temp degree C; Fuel consumption (hrly avg.); Fuel Flow totalizer gallons; Team member initials. IF no testing is done, form is marked NT.

RTO records were unreadable & were resubmitted with record package on 8/6.

[All record keeping received is attached to this report for the AQD facility files.]

AQD has determined that TMNA, Ann Arbor facility is in substantial compliance with the conditions of their ROP, MI-ROP-N2915-2023 and with the applicable federal and state administrative rules reviewed at this time.

NAME Liliane Kavanaugh Vetort DATE 07/29/2024 SUPERVISOR