

**DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION**

ACTIVITY REPORT: Scheduled Inspection

N357040410

FACILITY: GENESEE POWER STATION LIMITED PARTNERSHIP		SRN / ID: N3570
LOCATION: G 5310 NORTH DORT HIGHWAY, FLINT		DISTRICT: Lansing
CITY: FLINT		COUNTY: GENESEE
CONTACT: Mitch Hefner , EHS Coordinator		ACTIVITY DATE: 05/24/2017
STAFF: Julie Brunner	COMPLIANCE STATUS: Compliance	
SUBJECT: Compliance inspection as part of an FCE.		SOURCE CLASS: MAJOR
RESOLVED COMPLAINTS:		

On May 24, 2017, I conducted a scheduled inspection in coordination with an observation of a stack test for Genesee Power Station (N3570). This inspection is part of a Full Compliance Evaluation (FCE). This facility was last inspected on May 18, 2016. The testing is required by 40 CFR 63, Subpart DDDDD. The testing of EU-BOILER was for mercury (Hg), particulate matter (PM), and hydrogen chloride (HCl). The test plan was approved on May 10, 2017.

Contacts:

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Mr. Ken Desjardins, Genesee Power Station, General Manager, phone: 810-785-4144, ext 222, ken.desjardins@cmsenergy.com

Stack Testers:

Mr. Derek Wong, PhD, P.E., Bureau Veritas, Director & VP, phone: 248-344-2669, derek.wong@us.bureauveritas.com

Mr. David Kawasaki, ASTI, Bureau Veritas, Consultant, phone: 248-344-3081, david.kawasaki@us.bureauveritas.com

Plus two personnel on the stack.

DEQ-AQD Personnel:

Ms. Julie Brunner, Inspector, Lansing District Office, phone: 517-284-6789, brunnerj1@michigan.gov

Mr. Dave Patterson, TPU, Lansing Central Office, phone: 517-284-6782, pattersond2@michigan.gov

Facility Description:

The Genesee Power Station (GPS) is a 35 Megawatt (MW) electric generating facility consisting of one spreader-stoker boiler with a maximum heat input rating of 523 MMBtu/hr, steam turbine(s), and associated electrical equipment. The boiler is permitted to fire wood-waste including demolition wood and animal bedding, natural gas (for startup), and tire derived fuel (TDF). The facility has not combusted animal bedding as a fuel since December 3, 2013, and references to it will be removed from the Renewable Operating Permit (ROP). Also, GPS has not fired any type of demolition wood since September 23, 2000.

GPS is owned and operated by Consumers Energy (CMS).

Emissions from combustion of the solid fuels are controlled by a multi-cyclone separator, an electrostatic precipitator (ESP) and a selective non-catalytic reduction system (SNCR). Emissions of carbon monoxide (CO), nitrogen oxides (NO_x), sulfur dioxide (SO₂), and opacity are monitored using continuous emission monitoring systems (CEMS).

Ancillary equipment includes fuel and fly-ash handling systems and storage, a diesel fuel-fired emergency generator, a diesel fuel-fired emergency fire pump, and a parts washer.

The wood-waste fuel which primarily consists of brush and tree trimmings is stored uncovered on seven (7) acres with a six-foot deep clay liner underneath, and is managed in a two-pile system to minimize any potential odors. Bulldozers are used to move the pile of fuel to be processed and fed to the boiler.

The power plant is located in the Dort Carpenter Industrial Park, Genesee Township, Flint. The industrial park is

joined by commercial and industrial property at its western boundary. To the north and east is agricultural and residential property. On the southern boundary begins the City of Flint which is urban residential.

Regulatory Overview:

Genesee Power (GP) is a major source of NO_x, CO, and hazardous air pollutants (HAPs). It is considered a major 40 CFR 70 source and is operating per the conditions contained in Renewable Operational Permit (ROP) No. MI-ROP-N3570-2012. This ROP was issued on August 24, 2012 and expires on August 24, 2017. An administratively complete ROP Renewal Application was received on January 3, 2017.

EU-BOILER at the stationary source is subject to the National Emission Standard for Hazardous Air Pollutants for Industrial, Commercial, and Institutional Boilers and Process Heaters promulgated in 40 CFR 63, Subparts A and DDDDD as an existing source. The effective date of the regulation was January 31, 2016.

EUEMERGGEN and EUFIREPUMP at the stationary source are subject to the National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE) promulgated in 40 CFR Part 63, Subparts A and ZZZZ.

Emission Unit (EU) Descriptions:

EU-BOILER	The 35 MW electric generation group consists of the wood waste boiler, a selective non-catalytic reduction (SNCR) system, a mechanical multi-cyclone separator (MMS), and an electrostatic precipitator (ESP). The boiler has a spreader-stoker design and is rated at 523 MMBtu/hr, and able to produce 345,000 pounds steam/hr.
EUPARTSWASHER	Parts washer with an air / vapor interface of not more than 10 square feet.
EUFIREPUMP	Emergency diesel fuel-fired engine for backup power to a fire pump (265 hp, 7.0 liters/cylinder) located at a major source of HAP emissions, existing emergency, combustion ignition (CI) reciprocating internal combustion engine (RICE) less than 500 brake hp.
EUEMERGGEN	500 kW emergency backup generator (750 HP) located at a major source of HAP emissions, existing emergency, combustion ignition (CI) reciprocating internal combustion engine (RICE) greater than 500 brake hp.

MAERS:

The facility reports to MAERS. It is considered a Category I source and is fee subject. The 2016 MAERS reporting was audited and the following emissions were reported:

Pollutant	Tons per Year (tpy) or Pounds per Year (ppy)
CO	169.5 tpy
Lead (Pb)	20.5 ppy
NO_x	127.6 tpy
PM10*	57.8 tpy
PM2.5**	48.1 tpy
SO₂	35.2 tpy

Volatile Organic Compounds (VOC)	8.7 tpy
HCl	10.9 tpy
Hg	0.5 ppy

* Particulate matter (PM) that has an aerodynamic diameter less than or equal to a nominal 10 micrometers.

** Particulate matter (PM) that has an aerodynamic diameter less than or equal to a nominal 2.5 micrometers.

Inspection:

Arrived: 9:30 am

Departed: 1:00 pm

Weather: 60°F, ENE 10 MPH

When I arrived, I detected no odors around the facility. There were no visible emissions from any exhaust stack vents.

I was met by Ken Desjardins and Mitch Hefner, and discussed the purpose of my visit. I gave a brief overview of the inspection process before heading to the testing trailer.

Testing was underway. Bureau Veritas staff were in the testing trailer and Dave Patterson was the AQD staff on-site for the test observation. The first test run started at 8:35 am. PM and Hg were being tested. The test runs were 2-hour in duration to get a large enough volume of sample. Monitoring of the test parameters was done during the test. Sample train setup and sample recovery was in the trailer, and two (2) testers were on the stack with the probes. Sample recovery (wet lab) using Method 29 procedures was being performed. It takes 1 – 2 hours to rinse and collect samples after the run. The samples are sent to a lab for analysis and it takes 15 days to get results.

Testing was being conducted with the boiler at a full load of 35 MW and steam load was being monitored. The fuel was wood and TDF which is worse-case according to past testing. Communication between the boiler control room and testing staff for the start and stop of each test run was occurring. One thing to note, that during testing opacity can appear to spike as stack probes are moved to sample across the stack flow. The reason for this is that the location of the port holes for the probes can put them in locations that block the opacity monitors. This happens every time during testing and it is noted when this occurs. GPS did look into moving the testing ports, but the engineer found that no more holes could be drilled into the stack.

Run #2 started at 11:15 am. The testing of EU-BOILER appeared to be proceeding according to the approved test plan. Complete PM, Hg, and HCl test results won't be available until after the lab analysis. All stack test results will be submitted and reviewed at a later time.

From the testing trailer, I went to the continuous emission monitoring system (CEMS) room. The CEMS measures NO_x, SO₂, and flow per 40 CFR Part 75, and CO and opacity per 40 CFR Part 60. The CEMS were installed in 2010 replacing a previous system. For opacity and flow, new monitors were installed in 2015. Monitoring Solutions is the Data Acquisition System (DAS) provider. They also QA/QC the data before it goes to the Clean Air Markets Division (CAMD).

At 9:55 am, the instantaneous readings from the CEMS were as follows:

Opacity – 1.2%

CO – 334 ppm to 1,000 ppm (this number varies a lot)

SO₂ – 21.3 ppm

NO_x – 153 ppm

The screen in the CEMS room had lines across the CO readout. It was reset between runs but appeared to be a technical issue (software?) that a work order will be needed for.

Genesee Power is a dispatch plant. The power plant is on all the time but dispatched at either 10 MW or 35 MW depending on demand. Outages are scheduled twice a year in the spring and in the fall. When called on, the plant has approximately one (1) hour (minimum of two (2) hours to stabilize) to get up to load. When brought up, the boiler generally stays up for 8 hours (or 4 – 6 hours). A dispatch plant is rare (based on the power purchase agreement), but CMS has a few.

The fuel yard is clay-lined, 5 to 7-acres and is a two-pile system. The stack out pile is the in-coming wood fuel,

and the feed pile is the oldest pile. A road divides the two piles. The facility moves the stack out pile to the feed pile within 48-hours to minimize odors. The piles are moved with dozers. The wood piles feed to the clarification building where large chunks of wood are screened out. The large chunks go down a chute, are piled up, and a grinder is bought in later.

Mid-Michigan Recycling (MMR) provides the fuel. (They have staff on-site.) MMR gets waste-wood from Livonia and other mid-Michigan collection centers where utilities and residents can bring in brush and tree trimmings to the MMR yards.

Beside the wood piles is a TDF bunker. A backhoe is used to feed a hopper which feeds / blends 2% tire chips with the wood. The system automatically shuts down when the 20 tons per calendar day permit limit is reached. The TDF is pre-sized and contains some sidewall wires. Not all metal can be removed from the tires in processing. The TDF has a higher Btu content than wood, and will cause spikes in CO. So the feed rate of TDF is closely controlled and monitored.

The boiler is a shaker-stoker where wood is feed from the top at the end of the boiler, and air is added to feed the combustion process. A shaker screen moves off the ash that falls to the bottom. CO spikes when the screen is shaking. The boiler actually hangs from the ceiling. This is to allow for expansion in the boiler due to heat. Two (2) steam turbines used to generate electricity are located right across from the boiler.

A multi-clone separator (MMS) followed by a 3-field ESP is used for particulate control. PLC loggers are used to monitor ESP performance. The following information was collected at 11:27 am from the screen readouts in the ESP control room:

Field #1 (collects 85% of the ash*)	Primary: 123 - 200 amps Secondary: 0.57 - 0.76 amps Response: 47 - 51 sparks/min
Field #2	Primary: 207 - 220 amps Secondary: 0.79 - 0.83 amps Response: 39 - 42 sparks/min
Field #3	Primary: 290 amps Secondary: 1.39 amps Response: 1 - 2 sparks/min

* Fields can be switched if there is an operating problem with any field.

An operator checks on the ESP performance as part of the plant operator PO rounds once per day (generally at noon). Copies of operator logs for 5/15/2017 to 5/23/2017 show all the systems checked on the PO rounds and documents the rounds. A copy of the memo for "April, 2017 Derates" shows the reason the operation was taken out of service and the GPS MW Report (copy for May 2017 obtained) shows MWs produced on- and off-peak, and the times. This is all part of the PM/MAP required EU-BOILER in Special Condition (SC) III.3 and the monitoring/recordkeeping required in SC VI.5.

In the control room, three (3) operators are at any one time overseeing the boiler operations. There is a controls operator, a fuel operator, and a yard operator. Dennis Leese, Operation Manager was in the control room at various times and his office is right off the control room.

A screen shot of the operations screen was obtained showing stack flow, load, boiler operating parameters, CEMS output, and calculations. At 10:15 am, the readout in the control room showed that the boiler output of 34.9 MW. The following 24-hour rolling averages on May 24, 2017 were calculated by the monitoring system at the time of the inspection:

Pollutant	Monitor Results	Permit Limit
NOx	0.161 lb/MMBtu (24-hr rolling average)	0.20 lb/MMBtu (24-hr rolling average)
NOx	34.3 lb/hr (24-hr rolling	104.6 lb/hr (24-hr rolling

	average)	average)
CO	0.261 lb/MMBtu (24-hr rolling average)	0.35 lb/MMBtu (24-hr rolling average)
CO	59.8 lb/hr (24-hr rolling average)	183.1 lb/hr (24-hr rolling average)
SO ₂	10.7 lb/hr (24-hr rolling average)	35.4 lb/hr (24-hr rolling average)
Opacity	1.1% (6-min average)	10% (6-min average)

Notes: TDF flow was set at 0.5 ton/hr, and floated between 0 tons/hr to 2.5 tons/hr.

I also obtained the daily operating reports (including the calibration report) for NO_x, CO, SO₂, and opacity from May 1, 2017 to May 23, 2017. The daily reports are run from midnight to midnight. Up to 5 years of operating data is kept in Mitch's office and then moved to storage. Compliance with the requirements of Section VI for EU-BOILER was demonstrated.

I collected (with the help of GPS staff) samples of wood-waste and TDF from the feeders to the boiler. An analysis of the fuel parameters, proximate and ultimate analysis, metals and chlorine was done. The lab results are attached in the file, and summarized below:

Parameter	Wood-waste	TDF
Moisture, as received	37.51%	0.92%
Ash, dry	7.71%	15.55%
Btu/lb (HHV)	7630	13795
Btu/lb (LHV)	7151	13165
Sulfur, dry	0.031%	1.443%
Lb. SO ₂ /MMBtu	0.081	2.092
Chlorine (Cl), dry	0.062%	0.065%
Lb. Cl/MMBtu	0.08	0.05
Arsenic, dry	0.84 mg/kg	1.06 mg/kg
Beryllium (in ash)	<10 mg/kg	<10 mg/kg
Chromium (in ash)	475 mg/kg	83 mg/kg
Lead (in ash)	105 mg/kg	102 mg/kg
Mercury, dry	0.06 mg/kg	0.04 mg/kg

Material Handling Systems –

The bottom ash (wet) removed from the boiler and fly ash from the ESP and MMS ash go to separate bunkers. The fly ash is conveyed through covered conveyors to a fly ash "house". Fly ash is mixed/sprayed with water and dropped into a trailer below the mixing system in the fly ash "house". The ash is moved to a separate covered storage building where all ash is mixed. A backhoe is used to move the ash between the bunkers and storage building. If the ash gets dry it becomes concrete like. A waste hauler empties the ash out of the building. If the boiler is producing 35 MW, ash is hauled 2 to 3 times a week, 4 to 6 truckloads. There were no ash piles or visible emissions in the yard observed during the inspection. The program for continuous fugitive emission control for material handling operations required by SC III.4 is fully implemented.

Emergency Generators Exempt per Rule 285(2)(g) –

The engines are exempt from Rule 201(Permit to Install) but are subject to the ROP program per Rule 212(4).

1. EUFIREPUMP - The diesel fuel-fired fire pump generator sits in the main plant building.
2. EUEMERGEN - The diesel fuel-fired emergency backup generator sits on the east side of the main plant building in its own housing.

The following is a list of specifics for each generator:

Generator	Unit / Engine	Operating Hours	Notes
EUFIREPUMP - diesel fuel-fired	Detroit Diesel, 265 HP, Type #8100, 10x8x17 F size Model # 7064-7312, Serial # 6VA07/289, Pump # 951-95430-01-1	341.3 hours	Horizontal exhaust vent, hours since last oil change noted on the engine.
EUEMERGEN - diesel fuel-fired, Manf. 04/1995	Cummins Onan Power, 750 BHP, Model # KTTOA19G2, Serial # 62056	Total 2101.9 hours, 474 hours on the engine	Vertical exhaust vent, 5/11/2017 last oil change noted on the engine. Not original engine to the facility

The emergency engine and fire pump are subject to the National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE) promulgated in 40 CFR Part 63, Subparts A and ZZZZ as existing engines. This subpart establishes national emission limitations and operating limitations for HAPs emitted from stationary RICE located at major and area sources of HAP emissions. 40 CFR 63, Subpart ZZZZ applies to the RICE located at GPS which is a major source of HAPs. Michigan does not have delegation to implement and enforce this standard, but sources are still required to comply with this standard. The requirements for 40 CFR 63, Subpart ZZZZ that apply to the RICE are in the ROP.

The engines can operate in non-emergency situations for up to 50 hours per year, and for EUFIREPUMP it is not to exceed 100 hours per year for maintenance checks and readiness testing. The emergency generators are tested monthly and PM logs are kept for each engine. Logs of operating hours and fuel deliveries are kept. (Logs attached for 2017)

The sulfur content of the fuel oil used in the generators is less than 0.0015% by weight as required by the NRLM diesel fuel standard in 40 CFR 80.510(c). For emergency generators, it is assumed that they operate no more than 500 hours per year at worst-case.

Extra Records Review Notes:

All records obtained during the course of this inspection are attached in hard copy to this report.

EU-BOILER -

The 12-month rolling SO₂ emissions as of April-2017 were 44.7 tpy which is below the emission limit of 106 tpy in SC I.4.

The annual capacity factor for natural gas as of April-2017 was 0.02%.

The annual capacity factor for wood-waste as of April-2017 was 30.83%.

The annual capacity factor for TDF as of April-2017 was 3.16%.

The overall annual capacity factor for fuels as of April-2017 was 34.01%.

GPS combusted 4532.5 tpy of TDF as of April-2017. The material limit is 20 tons per day (SC II.3) which is a maximum of 175,200 tpy allowed.

GPS combusted 132,522.6 tpy of wood-waste as of April-2017 with a maximum sulfur content of 0.091%.

Quarterly reporting of "Excess Emissions and Monitoring Systems Performance" and "Data Assessment Report", semi-annual reporting of monitoring deviations and annual certification of compliance per the requirements of Section VII for EU-BOILER is all submitted in a timely and acceptable manner.

Summary:

The facility was in compliance with the applicable air quality rules and regulations, and ROP No. MI-ROP-N3570-2012.



Image 1(GPS Boiler Stack) : Testing setup on stack



Image 2(TDF hopper) : Hopper TDF sampling location

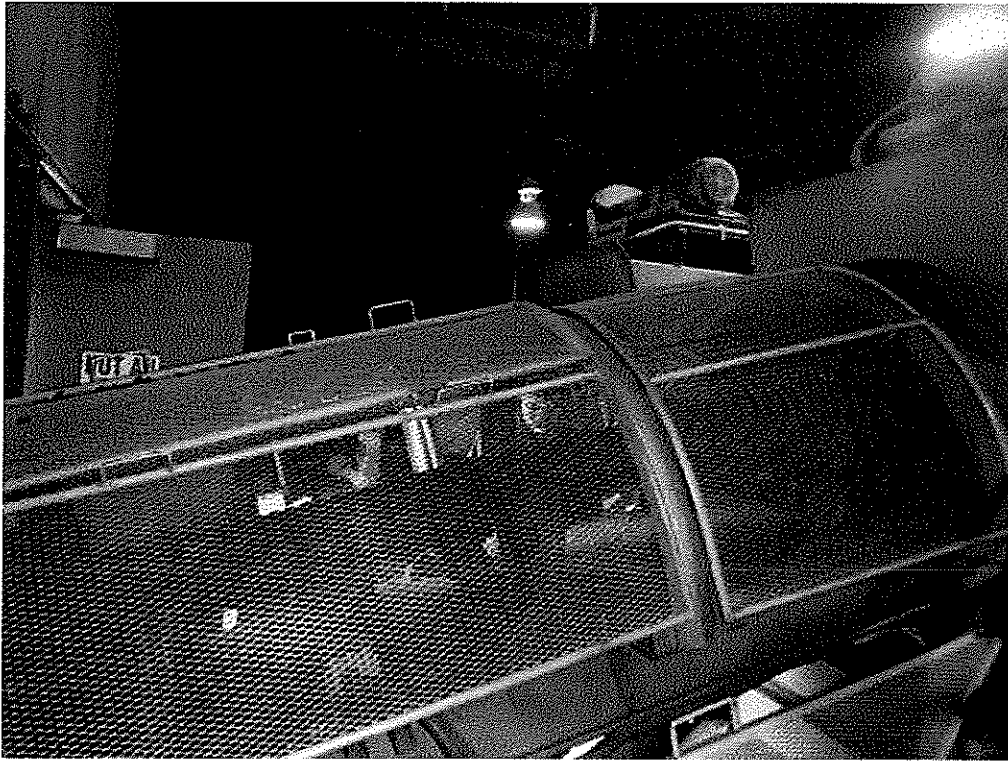


Image 3(Fuel conveyors) : B train and A train behind that were sampled.

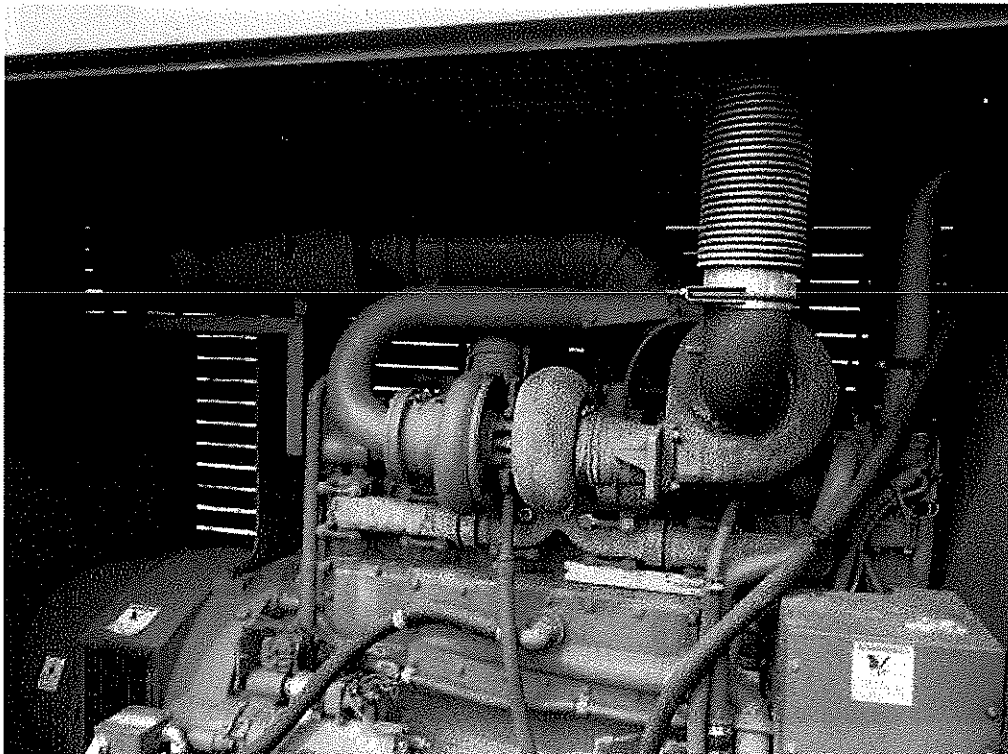


Image 4(EUEMERGGEM) : Emergency engine

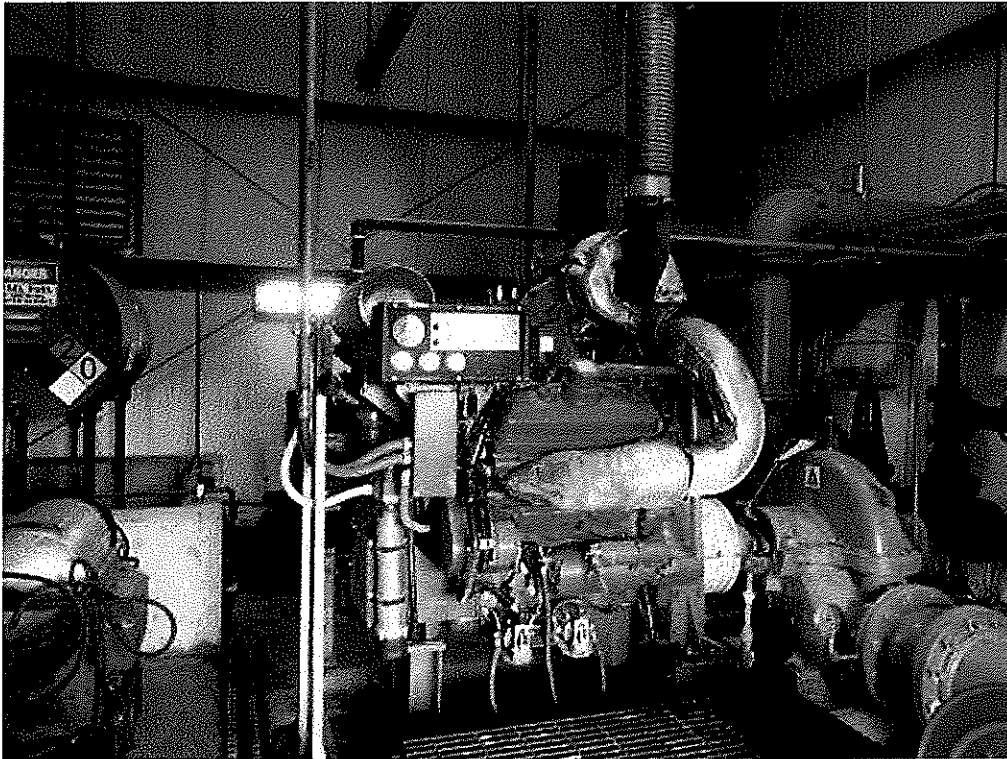


Image 5(EUFIREPUMP) : Fire pump engine

NAME Julie P. Egan

DATE 6/27/17

SUPERVISOR B.M.

