
Malfunction Abatement Plan (MAP)
Fiat Chrysler Automobiles - Dundee Engine Plant (DEP)

December 15th, 2019

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Introduction

Wet and Dry Machining Air Emissions Units

The Michigan Department of Environment, Great Lakes and Energy (EGLE), Air Quality Division (AQD), renewable operating permit (ROP) # MI-ROP-N7228-2018 modified by the recently issued Permit to Install (PTI) 42-19 for FCA – Dundee Engine Plant requires that the facility have a Malfunction Abatement Plan (MAP) for the air pollution control equipment used to control emissions from the wet and dry machining operations in the facility. The wet machining operations are controlled by mist collectors and the dry machining operations are controlled by dust collectors.

The equipment description for the emissions units are provided below:

EU- Dry Machine — various machining operations including grinding, boring, etc. The processes are maintained with PM filtration systems.

EU- Wet Machine — various machining operations including grinding, boring, etc. utilizing various cutting oils and coolants. The processes are maintained with oil mist collectors.

Malfunction Abatement Plan (MAP)

The Malfunction Abatement Plan consists of 3 parts as below and would be covered in detail in section 5

- 1 Preventive Maintenance Plan (PMP)**
- 2 List of Emissions Control Devices and Variables Monitored**
- 3 Corrective Procedures to Achieve Compliance**

1.0 Purpose:

To develop a malfunction abatement plan for air pollution control devices used for controlling emissions from wet and dry machining operations at FCA - Dundee Engine Plant.

2.0 Scope:

This plan addresses the operations of the dry machining dust collectors and wet machining oil mist collectors at the FCA - Dundee Engine Plant, in Dundee, Michigan.

3.0 Definitions:

Air Pollution Control Devices or Equipment — These are the dust collectors and oil mist collectors associated with dry and wet machining or filter gallery operations that reduce or remove air contaminants, primarily particulate matter prior to discharge into the atmosphere.

Total Maintenance System(TMS) - the TMS is a company-wide automated, electronic database that generates work tickets, logs, tracks, and monitors the preventative maintenance activities for all the equipment in the facility including the control equipment for the emissions units EU—Dry Machine and EU-Wet Machine.

4.0 Procedure:

The below-listed references outline all the items required to be in the malfunction abatement plan.

Reference 1: Equipment List: Mist & Dust Collector at DEP

Reference 2: Major Replacement Parts Inventory / Repair Time

Reference 3: Activity / Frequency / Responsibility Matrix for Mist Collectors

Reference 4: Activity / Frequency / Responsibility Matrix for Dust Collectors

Reference 5: Mist & Dust Collector Air Cleaning & Variables Monitored

Reference 1: Equipment List: Mist & Dust Collector at DEP



Mist/Dust Collector Information

62 Units Total, 41 North Plant & 21 South Plant

Asset Name	Asset #	Model	Plant	Extension	Column
BLK-1L	AAA184333	MH8000	North Plant	N. Block Line	B6
BLK-1R	AAA184311	MH8000	North Plant	N. Block Line	A6
BLK-2L	AAA184336	MH8000	North Plant	N. Block Line	B6
BLK-2R	AAA184313	MH8000	North Plant	N. Block Line	A6
BLK-3L	AAA184338	MH6000	North Plant	N. Block Line	B4
BLK-3R	AAA184318	MH6000	North Plant	N. Block Line	A3
BLK-4L	AAA184339	MH6000	North Plant	N. Block Line	B5
BLK-4R	AAA184316	MH6000	North Plant	N. Block Line	C5
BLK-5L	AAA184319	MH4000	North Plant	N. Block Line	B6
BLK-5R	AAA184334	MH4000	North Plant	N. Block Line	C6
CRK-1L	AAA184322	MH6000	North Plant	N. Crank Line	D7
CRK-1R	AAA184321	MH6000	North Plant	N. Crank Line	C7
CRK-3L	AAA184324	MH4000	North Plant	N. Crank Line	D5
CRK-3R	AAA184323	MH4000	North Plant	N. Crank Line	C5
CRK-4L	AAA184326	MH4000	North Plant	N. Crank Line	D3
CRK-4R	AAA184325	MH4000	North Plant	N. Crank Line	C3
CRK-5L	AAA184328	MH8000	North Plant	N. Crank Line	D4
CRK-5R	AAA184327	MH8000	North Plant	N. Crank Line	E4
CRK-6L	AAA184330	MH6000	North Plant	N. Crank Line	D5
CRK-6R	AAA184329	MH6000	North Plant	N. Crank Line	E5
CRK-7L	AAA184331	MH8000	North Plant	N. Crank Line	E8
NCRK-2R	AAA184309	CDC-5000-2	North Plant	N.Crank Line	C6
NCRK-2L	AAA184310	CDC-5000-2	North Plant	N.Crank Line	D6
HD-1L	AAA184312	MH8000	North Plant	N. Head Line	H5
HD-1R	AAA184332	MH8000	North Plant	N. Head Line	H4
HD-2L	AAA184320	MH4000	North Plant	N. Head Line	H6
HD-2R	AAA184335	MH4000	North Plant	N. Head Line	H6
HD-3L	AAA184342	MH8000	North Plant	N. Head Line	H7
HD-3R	AAA184343	MH8000	North Plant	N. Head Line	H8
HD-4L	AAA184315	MH6000	North Plant	N. Head Line	G7
HD-4R	AAA184317	MH6000	North Plant	N. Head Line	G7
CRK-5L2	AAA200825	MH8000	North Plant	N. Head Line	H6
CRK-5R2	AAA200826	MH8000	North Plant	N. Head Line	H6
HD-6L	AAA184347	MH8000	North Plant	N. Head Line	H3
HD-6R	AAA184314	MH8000	North Plant	N. Head Line	G3
HD-7L	AAA184344	MH6000	North Plant	N. Head Line	F4
HD-7R	AAA184345	MH6000	North Plant	N. Head Line	G4
CGB-1	AAA192138	MH6000	North Plant	N. Filter Gallery	C2
CGC-1	AAA192139	MH8000	North Plant	N. Filter Gallery	D2
CGC-2	AAA192140	MH6000	North Plant	N. Filter Gallery	D2
CGH-1	AAA192141	MH8000	North Plant	N. Filter Gallery	G1
SH-J12	AAA233550	OMC-060-3	South Plant	S. Head Line	J12
SH-J15	AAA233562	OMC-040-2	South Plant	S. Head Line	J15
SH-F19	AAA233587	OMC-080-4	South Plant	S. Head Line	F19
SH-F18	AAA233548	OMC-080-4	South Plant	S. Head Line	F18
SH-F16	AAA233590	OMC-060-3	South Plant	S. Head Line	F16
SH-F15	AAA233551	OMC-060-3	South Plant	S. Head Line	F15
SH-F13	AAA233593	OMC-060-3	South Plant	S. Head Line	F13
SH-F12	AAA233565	OMC-060-3	South Plant	S. Head Line	F12
SB-D13	AAA233552	OMC-040-2	South Plant	S. Crank Line	E12
SC-E17	AAA233549	OMC-080-4	South Plant	S. Crank Line	E17
SCD-E17	195970001027'	CDC-5000-2	South Plant	S. Crank Line	E17
SCD-E18	AAA233561	CDC-5000-2	South Plant	S. Crank Line	E18
SC-E12	AAA233566	OMC-040-2	South Plant	S. Block Line	D13
SB-C18	AAA233564	OMC-080-4	South Plant	S. Block Line	C18
SB-C17	AAA233588	OMC-040-2	South Plant	S. Block Line	C17
SB-C15	AAA233585	OMC-080-4	South Plant	S. Block Line	C15
SB-C13	AAA233591	OMC-060-3	South Plant	S. Block Line	C13
SFG-CGH	AAA233594	OMC-080-4	South Plant	S. Filter Gallery	G21
SFG-CGC2	AAA233568	OMC-060-3	South Plant	S. Filter Gallery	D20
SFG-CGC1	AAA233567	OMC-080-4	South Plant	S. Filter Gallery	D20
SFG-CGB	AAA233569	OMC-060-3	South Plant	S. Filter Gallery	C20

Reference 2: Major Replacement Parts Inventory / Repair Time



Dundee Engine Plant Mist & Dust Collector Critical Parts

Helical Dynamics (North Plant Mist Collectors)

Common Parts	<u>Part Description</u>	<u>MFG #</u>	<u>NPM</u>	<u>Repair Time</u>	<u>QTY on Hand</u>	<u>Order Qty</u>
	Photohelic Gauge	3005MR	56-170-0051	30 Minutes	0	
	5A 24VDC Power Supply	6EP1 3333BA10	24-292-1031	30 Minutes	3	
Model Specific Parts	<u>Part Description</u>	<u>MFG #</u>	<u>NPM</u>	<u>Repair Time</u>	<u>QTY on Hand</u>	<u>Order Qty</u>
<u>MH-8000</u>	25 H.P. Motor	25HP P28S3056-EG	26-950-1957	240 Minutes	0	
	40A Disconnect	FHL36040	22-339-1190	90 Minutes	0	
	Motor Starter	100-C43EJ10	22-204-1745	45 Minutes	2	
	Overload	193-EEFD	22-205-2050	20 Minutes	0	
<u>MH-6000</u>	15 H.P. Motor	15HP, 254 Frame, 3600RPM	26-835-0208	240 Minutes	1	
	30A Disconnect	FHL36030	22-025-2238	90 Minutes	1	
	Motor Starter	100-C43EJ10	22-204-1745	45 Minutes	2	
	Overload	193-EEFD	22-205-2050	20 Minutes	0	
<u>MH-4000</u>	10 H.P. Motor	10HP, 215 Frame, 3600RPM	26-830-0255	240 Minutes	3	
	20A Disconnect	FHL36020	22-339-1118	90 Minutes	0	
	Motor Starter	LC1D18BD	22-572-1982	45 Minutes	2	
	Overload	LRD16	22-339-0092	20 Minutes	0	

Monroe Enviromental (South Plant Mist Collectors and All Dust Collectors)

Common Parts	<u>Part Description</u>	<u>MFG #</u>	<u>NPM</u>	<u>Repair Time</u>	<u>QTY on Hand</u>	<u>Order Qty</u>
	Photohelic Gauge	3005MR	56-170-0051	30 Minutes	0	
	20A 24VDC Power Supply	6EP1 436-3BA00	22-150-0166	30 Minutes	3	
Model Specific Parts	<u>Part Description</u>	<u>MFG #</u>	<u>NPM</u>	<u>Repair Time</u>	<u>QTY on Hand</u>	<u>Order Qty</u>
<u>OMC-080-4</u>	25 H.P. Motor	25HP,284 TS-FRAME,3600RPM	26-011-H115	240 Minutes	1	
	40A Disconnect	FHL36040	22-339-1190	90 Minutes	0	
	Motor Starter	LC1D40BD	22-572-1984	45 Minutes	4	
	Overload	LR2D3555	22-572-1363	20 Minutes	0	
<u>OMC-060-3</u>	20 H.P. Motor	20HP, 256T-FRAME, 3600 RPM	26-011-H114	240 Minutes	0	
	35A Disconnect	FHL36035	22-339-1119	90 Minutes	0	
	Motor Starter	LC1D32BD	22-572-1691	45 Minutes	0	
	Overload	LRD1530		20 Minutes		
<u>OMC-040-2/CDC-5000-2</u>	15 H.P. Motor	15HP,254 T-FRAME,3600RPM	26-011-H113	240 Minutes	1	
	30A Disconnect	FHL36030	22-025-2238	90 Minutes	1	
	Motor Starter	LC1D25BD	22-339-1730	45 Minutes	4	
	Overload	LRD1521	22-572-0007	20 Minutes	0	

Consumables

Consumables	<u>Part Description</u>	<u>MFG #</u>	<u>NPM</u>	<u>Repair Time</u>	<u>QTY on Hand</u>	<u>Order Qty</u>
	95 DOP Filters	8PFHG124E24ED12000A0	29-201-0064	15 Minutes	36	
	Canister Filters	Total filtration systems 1212751	29-220-0287	20 Minutes	0	

Reference 3: Activity / Frequency / Responsibility Matrix for Mist Collectors



Mist Collector PM Activities

Equipment	Activity Description	Procedure Description	Frequency	TMS Reference	Responsible Party
Mist Collector	Check HEPA Filter Gauge	Visually check to make sure the HEPA filter gauge is working properly. If gauge reads greater than 3.0 inches, filter must be replaced. With the unit off, ensure that the gauge reads zero. Adjust as necessary	6 months	1.3	DEPF Trades
Mist Collector	Check Air Pump and Float	Visually check to see if the air pump and float are in good operating condition,. Note that not all units have air pumps.	6 months	1.4	DEPF Trades
Mist Collector	Review and Push Backwash	Review the backwash cycle with control power on, fan off. Both the fan and access door and lower helix door must be open. Depress the prefilter wash test button and you should see the coolant flow.	6 months	1.5	DEPF Trades
Mist Collector	Check Air Lock	Visually check to make sure the airlock box is filled with coolant. Coolant should be above the drain pipe. If coolant is low, add coolant via the coolant wash test button.	6 months	1.6	DEPF Trades
Mist Collector	Check Airflow Restrictions	Visually check for airflow restrictions. Check the top of the helix tubes. Clear out any debris, as needed.	6 months	1.7	DEPF Trades
Mist Collector	Check Air Pressure Regulator	Verify air pressure settings on the air pump regulator. Set to 60 psi minimum.	6 months	1.8	DEPF Trades
Mist Collector	Create Thermographic History	Create a baseline thermographic signature of motor at first PM with a three month comparisons and then yearly.	Quarterly for 1 year, then 1/year	2074.1-8	DEPF Trades

Reference 4: Activity / Frequency / Responsibility Matrix for Dust Collectors



Dust Collector PM Activities

Equipment	Activity Description	Procedure Description	Frequency	TMS Reference	Responsible Party
Dust Collector	Pre-flight Check List	Check air pressure at air main air drop to collector and air reservoir. adjust between 50-60 psi	6 months	94	DEPF Trades
Dust Collector	Gauge check	1st stage cartridge filters-Check photohelic gauge for cartridge filters (first stage filtration), Black needle should be within 3/4" WG and 3" WG.	2 months	94.6	DEPF Trades
Dust Collector	General inspection	Check level of drum collecting material. If full, then replace drum with empty. Always replace drum when material is 3" from the top. Reset Photohelic gauge, see seq# 02.	2 months	94.11	DEPF Trades
Dust Collector	Fan / Blower	Check fan blower for any unusual noise or vibration.	6 months	1827.1	DEPF Trades
Dust Collector	Fan / Blower	Rotate the fan wheel by hand to distribute the grease on the internal bearing parts after greasing.	6 months	95.2	DEPF Trades
Dust Collector	Bearing Lubrication	Check bearings for lubrication & re-lubricate, if necessary. Inspect grease drain & remove any blockage.	6 months	95.2	DEPF Trades
Dust Collector	Fan / Blower	Check fan/blower for any unusual noise, vibration, sheave alignment & belt tension. If 1/2" slack in belt adjust tension.	6 months	1827.1	DEPF Trades
Dust Collector	Fan/ Blower	Check the fan/blower coupling for parallel & angular alignment.	Yearly	96.8	DEPF Trades
Dust Collector	Fan/ Blower	Lubricate the motor end snart bearing with 0.4 oz Chevron SRI #2 grease. After lubricating, run the motor for 20 minutes with the drain plug open to allow purging of excess grease. Shut the unit off	6 months	96.9	DEPF Trades
Dust Collector	Fan Motor	Add grease to grease fitting, consult manual for type/quantity and further instructions.	6 months	95.2	DEPF Trades
Dust Collector	3rd Stage HEPA Filters DOP	Check 3rd stage HEPA Filter DOP dirt level condition by way of photohelic gauge. Change the filter at 5" W.G. or greater	6 months	1827.3	DEPF Trades
Dust Collector	Create Thermographic History	Create a baseline thermographic signature of motor at first PM with a three month comparison, then yearly.	Quarterly for 1 year, then 1/year	2074.1-8	DEPF Trades

Reference 5: Mist & Dust Collector Air Cleaning & Variables Monitored



Parameters Monitored

Helical Dynamics (North Plant Mist Collectors)

2nd stage Monitoring (HEPA Filters)

Level 1: Dirty HEPA Filter Light at 3 iwg (Procedure is to replace HEPA filter at this time)

Level 2: Change HEPA Filter Light and Unit Shuts Down at 4 iwg

Monroe Environmental (South Plant Mist Collectors)

1st Stage Monitoring (Spiral Tubes)

Level 1: Service Spiral Tubes at 5 iwg

2nd Stage Monitoring (HEPA Filters)

Level 1: Replace 95% DOP Filter Light at 3 iwg

Level 2: Unit Shuts Down at 4 iwg

Monroe Environmental (North and South Plant Dust Collectors)

Collector Airflow

Level 1: Service Collector Light < 1 iwg

2nd Stage Cartridge Filters

Level 1: Pulse Clean at 3 iwg

Level 2: Replace Cartridge Filter Light at 4 iwg

3rd Stage DOP Filters

Level 1: Replace 95% DOP Filter Light at 3 iwg

Level 2: Unit Shuts Down at 4 iwg

1. Preventive Maintenance Plan (PMP)

This section covers the following:

- a. Maintenance tasks for the dust and mist collectors used in controlling the emissions from the operations of the dry and wet machining stations respectively.
- b. Identification of supervisory personnel responsible for maintenance, repairs and inspection of completed tasks on air pollution control devices.
- c. Description of items to be inspected the frequency of inspection and an inventory of major replacement parts which shall be maintained

4.1 All maintenance activities and schedules in **Reference 3 & 4** are, at a minimum, follows the manufacturers' recommendations for all mist and dust collectors in **Reference 1**.

4.2 These maintenance activities and schedules are entered into the TMS System during the initial installation of the emission unit. The TMS System provides advanced notifications for upcoming maintenance activities, generates work tickets, monitors work progress and maintains a history of completed maintenance activities for each EU—Dry Machine and EU-Wet Machine emission unit air pollution control device. Along with their associated meters, mechanisms and filters. The elements of this plan will be incorporated into the Total Maintenance System (TMS).

4.3 Responsibilities

4.3.1 Environmental Specialist and/or DEP EHS Group — Provides guidance regarding the required engineering controls and/or maintenance procedures required by the facility air permit.

4.3.2 Facilities Manager — Responsible for assuring that Facilities personnel are conducting the required preventative maintenance activities and/or follow-ups.

4.3.3 Facilities Maintenance Department

4.3.3.1 Develop and/or specify engineering controls for air pollution control equipment for dry and wet machining operations.

4.3.3.2 Perform required preventative maintenance on dry and wet machining air pollution control equipment.

4.3.3.3 Monitor equipment during malfunctions events.

4.3.3.4 Create and implement corrective action plans, as necessary.

4.3.3.5 Utilize the TMS to track, record, and provide follow-up to required PM activities.

4.4 All major replacement parts for Mist and Dust Collectors are in **Reference 2** and are tracked in TMS and/or with the Facilities Department.

4.5 The inventory of each part is determined by the Facilities Department and a minimum order quantity is determined based on historic usage data, condition of the machine, et cetera.

2. Air Cleaning Device & Variables Monitored

This section covers levels of air cleaning devices & variables monitored in DEP's mist and dust collector

4.6 **Reference 5** Covers different levels of air cleaning and variables monitored in the existing mist and dust collectors per the manufacturer's specifications.

3. Corrective Procedures to Achieve Compliance

This procedure consists of corrective actions in case of a failure during operations.

4.7 **Reference 2** contains major replacement components and their respective replacement time.

- 4.8 From plant's prior experience, malfunctions for mist and dust collectors would result in replacement of one or more of the components defines in **Reference 2**. The time frames for repair may vary somewhat due to location in the plant, accessibility for repairs, and time when malfunction occurs.
- 4.9 In the event that a malfunction occurs which results in the release of dust or mist and impacts the air quality as determined by the Plant Environment, Health and Safety Group causing the plant to exceed the permitted levels. Specific action will be taken to bring the plant back into compliance. Whenever required, the use of overtime, off-shift labor, outside consultants or contractors will be used, where reasonable to minimize the duration of the malfunction or release of excess emissions.
- 4.10 If the MAP fails to adequately address an event which is classified as a malfunction, the Environmental Specialist and Facilities Group shall revise the MAP within 45 days to address the shortcoming of the plan. The new MAP shall then be submitted to Michigan Department of Environment Great Lakes and Energy for approval.

Malfunction Abatement Plan (MAP) Approval Process

Any future revisions of the Malfunction Abatement Plan (MAP) would require the following approvals of the below -listed individuals:

1. Plant Manager
2. ME Manager
3. EHS Manager
4. Facilities Manager
5. Environment Specialist

Malfunction Abatement Plan (MAP) Modification Log

S.No	Date of Modification	Description
1	12/15/2019	Creation of Malfunction Abatement Plan due to PSU Relocation Project