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Air Quality Assessment- TAFE Campbell Street Interim Report – John Gorrie

Final Report

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Note: This Interim Report has had additional commentary added to provide further context and explanation of the conditions prevailing and known by the TasTAFE Senior Safety Manager Keith Rolls. *No technical data or information has been altered or removed from this report.*

1 Background

ES&D were engaged by TasTAFE to undertake an air quality assessment of their automotive workshops and teaching areas in their Campbell Street building. This request arose because **fumes were reported by staff in the offices of the lower floors in the Campbell Street building on 14 August 2024.** On that day, a lot of cars had been running in the workshops. Carbon Monoxide is a high-risk contaminant, and priority will be given to assuring that CO does not build up in the workshops.

The odour issue was raised by teaching staff with management. TCM (the building ventilation maintenance contractors) then investigated the issue. It was reported that the filter on the air intake to the building (which is close to the exhausts) was blocked. This was causing air to be drawn into the intake via leaks in the system. This had the effect of intake air not passing through a filter but instead the offices were receiving unfiltered air from outside.

Recently, staff and students have complained of smells and odours inside the workshops and outside the workshops.

2 Activities to date

Air Quality Assessment- TAFE Campbell Street Interim Report – John Gorrie

Recommendations were made.

2.1 Building exhaust system

Table 1: theoretical air changes per hour in four areas					
Area	Area (m2)	Height (m)	Area Volume (M3)	Extraction per hour (m3)	Theoretical air changes per hour
Ground Floor Workshop area	326	3.7	2413	7796	3.23
Ground Floor Cricket Pitch	236	3.7	873	5497	6.3
Basement AB-18 (Barack St side)	159	3	477	6991	14.7

Table 1: theoretical air changes per hour in four areas					
Basement AB-01	343	3	1029	12262	11.9

3 Scope

A survey of carbon monoxide (CO), carbon dioxide (CO₂), hydrogen sulphide (H₂S), volatile organic compounds (VOC), lower explosive limit's (LEL's) & nitrogen dioxide (NO₂) was conducted in the ground floor and basement automotive areas of the TasTAFE Campbell Street facility.

Investigation of air flows and the sources of adverse vapours and gases have been investigated. The operation of the workshops with open doors and low air exchange is resulting in impacts on the other offices and areas outside the workshops. Specific offices and classrooms have been monitored. The investigation is to pinpoint the cause and recommend actions to prevent impacts to staff and students.

4 Investigation – 28/10/2024

Investigation began Monday 28th October and the monitoring undertaken is presented in the results table below. Investigation moved to the engines, cars and air flows once CO gas was detected above trigger limits.

5 Sample Plan

6 Discussion

Initial site visit indicated that the ground floor and basement areas contain workshops that contain cars and engines. The initial gas survey work confirmed that both floors did not contain adverse gases under normal conditions, and the rooms outside the workshops did not contain these gases either.

Ground Floor Area:

The ground floor workshop AG-01 has a door that is constantly left open into AG-07 the student lounge area. Measurements indicate that under normal conditions gas does not enter the AG-07 area. Under normal conditions the office AG-12 and administration reception area has no adverse gas conditions. There have been events that have caused impacts in the AG-12 reception area in the past.

The general ground floor workshop (AG-01) has a low air exchange at 3.23 volumes per hour. This means that when the vehicles are started there may not be sufficient air for the general air extraction and the exhaust extraction to operate efficiently and vehicle emissions will build up in the workshop. When there are no carbon monoxide leaks detected from faulty engine manifolds or exhaust systems the vehicle exhaust extraction system is working effectively to remove carbon monoxide gases from the vehicle and engine exhaust pipes.

Observation in the AG-01 workshop confirmed that because training occurs inside the workshop, the General Air extraction system does not remain on, but is only run when motors are running. Also, due to the perceived noise with the general extraction fan and the motors running, the general air extraction fan is shut off if teaching is occurring in the AG-01 workshop.



Figure 1 General Air Extraction Noise level - 71 dBA

This action results in a contaminating event as gas would build up and move out of the workshop through AG-07 and into AG-12. The door at AG-07 must be kept closed to prevent contamination of the offices. The general air extraction system could be interlocked as it is unsafe to not have it running with engines running. If there is carbon monoxide leakage that the vehicle exhaust extraction system isn't removing e.g. from engine manifold or exhaust pipe leakage then when the general extraction system is turned off there is the potential for

these gases to exit the AG-01 workshop and flow into the AG-07 student lounge area and AG-12 reception area if the doors to these areas are left open.

Based on the low air exchange rate in AG-01, to keep the internal doors closed the workshop roller door will need to be opened (min 500 mm) to allow additional fresh air into the workshop until an alternative air inflow is in place. A Draft Standard Operating Procedure Automotive Workshops – Operations was implemented on the 1st November which addresses the operation of the general exhaust system and vehicle exhaust extraction systems. This is an interim measure which remains under review as required.



Figure 2 Roller door north wall AG-01 workshop

The interim assessment found that there is no dedicated / forced air flow into AG-01. The previously forced air system to the ground and basement level workshops (refer to figure 3) was investigated by TCM and found to be blanked off on the 2nd floor some years ago. The only fresh air coming into the AG-01 workshop area is via the air conditioning system located in the adjacent classroom AG-02 or through the open roller door (refer to figure 2).

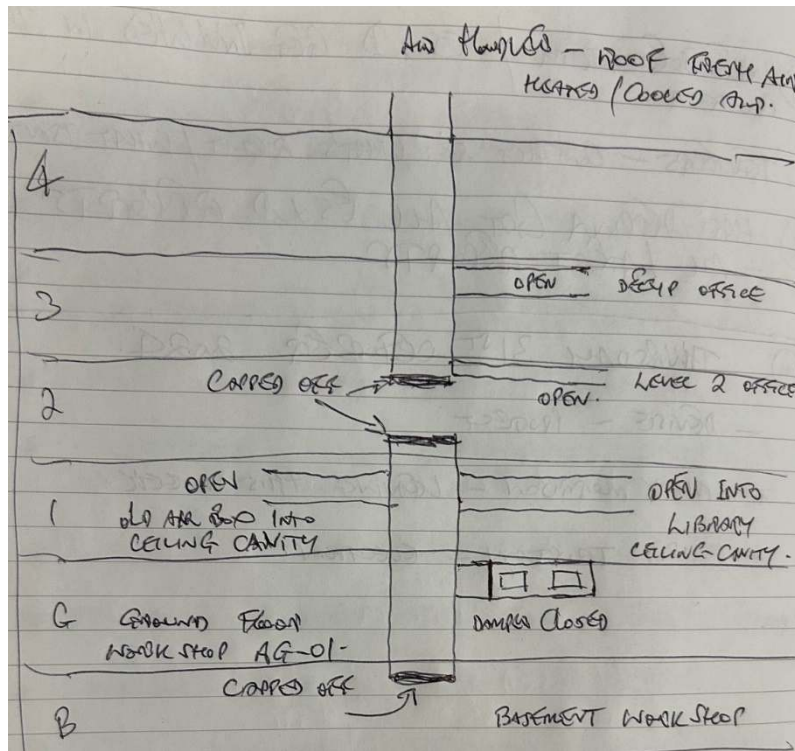


Figure 3 diagram of previously forced air system for AG-01/Basement workshops

The remaining ducting (refer to figure 3) can act as a conduit and gas can flow into the offices on other levels (library ceiling cavity) outside the workshop. The damper has now been closed and covers placed over the vents to isolate the ducting from other levels of the building. This system is currently being investigated by TCM to determine if it can be reinstated as a source of inflowing air into AG-01 and the basement workshop areas (along with other options to achieve the same result).

In addition, 4 out of 8 of the engines (on stands) were found to be leaking CO at, or near the exhaust manifolds. These leaks are NOT collected by the directly coupled exhaust extraction system hoses. The exhaust extraction system hoses must be connected manually to each vehicle / engine exhaust pipe. All leaks in the engines must be rectified or CO gas will leak into the workshop area if engines are left running.



Figure 4 Entrance to AG-01 Workshop

The fixed and flexible exhaust extraction system hoses connected to each engine and vehicle are ALL working well, with no carbon monoxide gas leakage detected around any of the exhaust pipe connection points. Some of the flexible exhaust hoses have been damaged and partly crushed, thus reducing flow. These damaged hoses could be replaced with spring steel heli-coil ones which are more durable and resilient, or repaired to be fit for purpose.

There are 3 obsolete 250 mm diameter round ducts extending from the exhaust duct system above the bank of engines. These should be sealed off to improve air flow at the exhaust system hoses where they connect to each exhaust pipe.



Figure 5 location of unsealed ductsThe majority of stand mounted engines in the AG-01 workshop area are only operated for a short period of time.

Regular surveys with gas meters will detect any engine / exhaust system CO leaks and prevent these leaks impacting on the air quality in the workshop area.

The noise level in the workshops reach 85DbA (to be confirmed as soon as possible) with the main exhaust and the diesel ute revving. So, if two engines are started simultaneously, the noise can easily exceed the nominal 85DbA level trigger limit requiring Hearing Protection for the area (to be confirmed as soon as possible).

There are many unguarded rotating parts (fans and pulleys) and this is deemed an Eye Protection Zone.

AG-40 Workshop - (31/10/24)

All exhaust flow rates in this area are acceptable and procedures seem to be followed. There was no discernible difference in the general exhaust system air flow with the roller door (Bathurst Street) up or down. (The Draft Standard Operating Procedure Automotive Workshops – Operations states the roller door will be open).



Figure 6 AG-40 Electrical Workshop

The battery storage is deemed a low risk from a vehicle gas exposure level. Usually only one battery is being charged. The battery charge area contains 17 auto batteries, with only one battery on charge at a time. This battery charging area was originally moved from the basement workshop AB-27 room which is a purpose-built battery charging room to be within the Auto Electrical Department on the ground floor level. The equipment can only charge up to 3 batteries max, (as identified by cabling). 4 batteries were open to atmosphere but not being charged at the time. There was no spillage evident. No VOC's nor O2 depletion were detected. This battery storage area could benefit from an exhaust snorkel connected to the exhaust duct directly above. Air exchange seems good. Investigation should be carried out to

determine if this area can be relocated back to the purpose-built battery charging room AB-27 in the basement workshop area.



Figure 7 AG-40 Workshop Battery Area

AG-40 Workshop – (1/11/2024)

VOC in AG-40 was detected as 0.1ppm. This presents no immediate risk.

Flow rates at the exhaust duct on the eastern wall were again checked. Same results as on the 31/10. The air flow rate at the exhaust inlet did NOT change with the southern Roller door (Bathurst Street) up 300mm, 600mm and fully open. There is sufficient air finding its way into this workshop area which indicates that the general exhaust system fan is operating efficiently. Opening the roller door can provide air flow security until we have inward air flow into the area, however, if required for security reasons the roller door can be left down which will not affect airflow into the area.

The recycling parts washer in room AG-40 is the ONLY equipment creating any VOC's in this area. This was found to be 0.7ppm near the top of unit. This unit has a re-cycle volume of nearly 40 litres and is meant to contain low volatility solvent for cleaning. Advised this unit is seldom used. 0.7 ppm VOC can have some long-term health impacts if left unchecked.



Figure 8 AG-40 Workshop Parts Washer

The 2 cars that have their exhaust pipes connected to the vehicle exhaust extraction system are only started approximately once per week, to once per month maximum. Both are to test electronic engine components only and do not run for a long period of time.

A Mazda Engine on a stand in the same area (AG-40) also runs approximately once per month for up to 2 mins, to check fuel injection systems.

Review of AG-01 Workshop. (1/11/2024) Auto Electrical Area Further Investigation.

The VOC in the room was 0.1ppm. The Main General Extraction System Exhaust Fan was again not running upon entry. This was started and the entry door closed.

Exhaust checks were repeated as for AG-01 and AG-02, with the northern roller door first closed and then part open, then fully open, and with entrance door to the area also closed. Exhaust air flow did not change with the nearby roller door shut or open. This may indicate that climatic conditions can impact air flows from day to day and a dedicated air inlet system is required.

Basement Floor Area:

AB-03 Classroom was checked for CO while a car idled close by (outside the entry door to the classroom). No CO was detected in the workshop, or in the classroom. It was disclosed by staff that a significant exhaust leak was detected and repaired the previous week on the vehicle that is located immediately outside the door to the AB-03 classroom.



Figure 9 - Entrance to classrooms off AB-02 Workshop

Basement air flows were assessed to determine if the roller doors can be opened to allow for additional air inflow to support extraction system effectiveness. Refer to comments below re: air flow rates AB-01 Workshop (1/11/2024) and AB-02 Workshop (1/11/2024).

VOC monitoring occurred late in the assessment. There are a number of plastic fuel tanks in the workshops, there is a residual background VOC in the room. VOC has a long-term impact on human health and so minimal fuel levels in tanks and good air flows will ensure levels are acceptable. A regular VOC check should be conducted. No engine requires a full 25lt fuel tank and smaller tanks containing less fuel should be considered.

AB-01 Workshop (1/11/2024)

All air flow rates in the basement area are acceptable. There was no discernible difference in the general exhaust system air flow with the roller door up or down on the date of testing.

Note: Further engineering assessments will determine correct air flows.

One asset [Rodeo Ute] was found to have a CO leak at the engine manifold. A teacher advised that this is a staged / deliberate CO leak in the engine manifold / exhaust system so the students can diagnose the fault as part of an assessment. This vehicle should have an extraction snorkel mounted above the engine to safeguard human health by removing any CO from the breathing zone of apprentices / teachers when carrying out these assessments. Advice received was that the vehicle engine is only run for a short period of time for this assessment process e.g. less than 5 minutes.

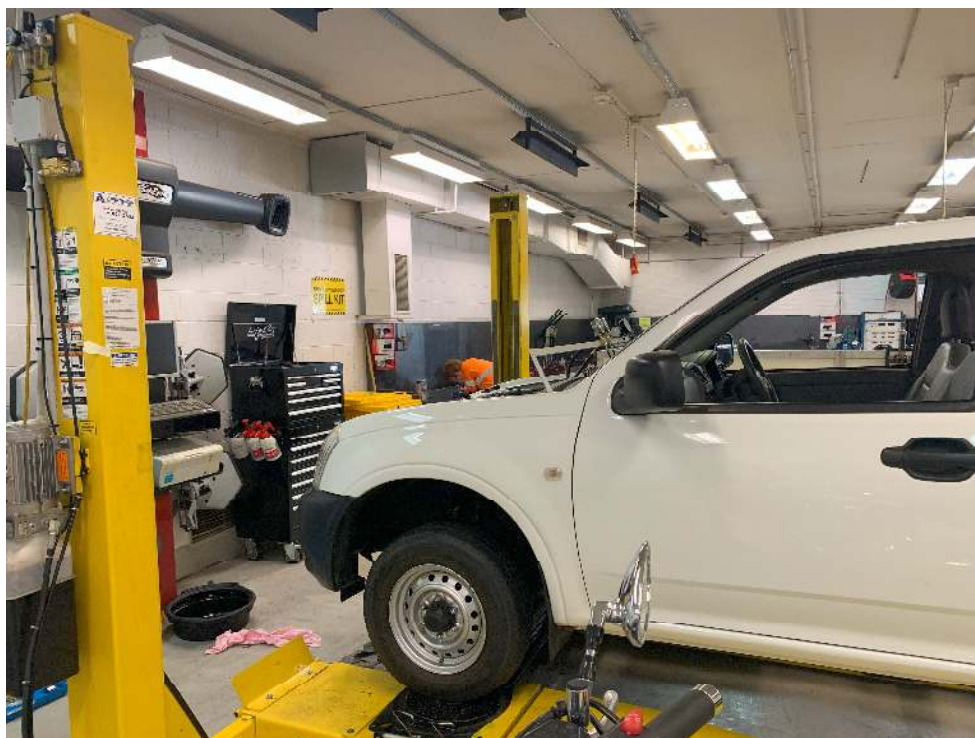


Figure 10 Rodeo in AB-01 Workshop

All other (6) vehicles in this area were found with no adverse emissions on this date.

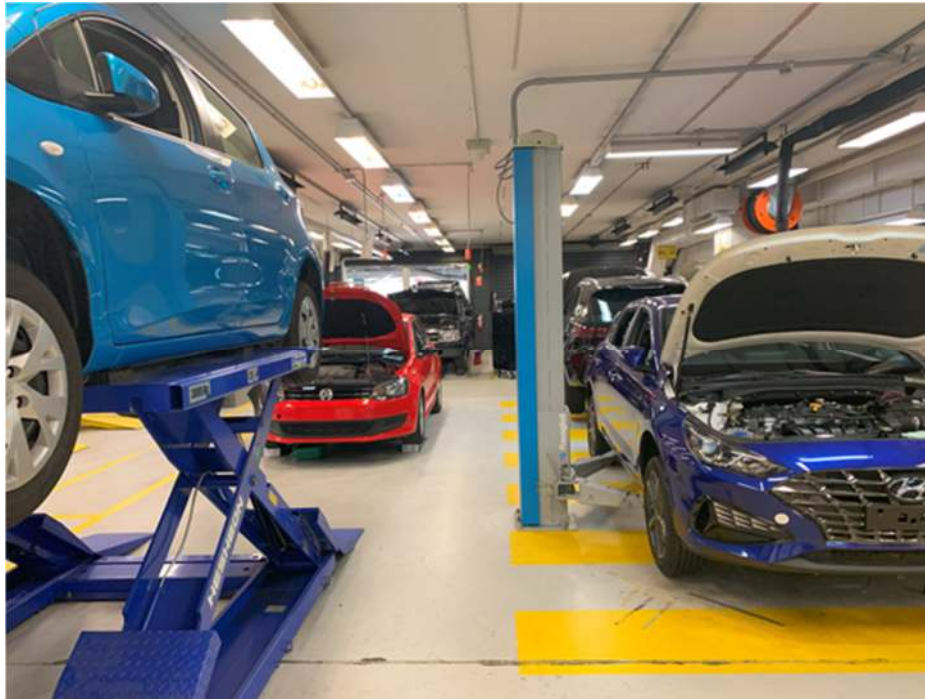


Figure 11 Other vehicles in AB-01 Workshop

No CO or VOC was detected in this area. No CO, VOC or LEL's were found in any of the adjacent rooms and classrooms. In the basement area it was noted that safety glasses were worn when equipment is running. Noise levels in this area are far lower than those in AG-01. Noise levels do not impact teaching.

AB-02 Workshop (1/11/2024)

All air flow rates in the basement workshop area are acceptable. There was no discernible difference in the general exhaust system air flow with the roller door up or down on the date of testing. **Note:** Further engineering assessments will determine correct air flows.



Figure 12 AB-02 & AB-18 Workshop Areas

Two assets (1 vehicle Toyota forerunner (see photo below) and 1 freestanding engine) were found to be leaking CO, at either the exhaust manifold or the exhaust pipework flange gasket. Both were locked out and isolated by teaching staff. One has been repaired and cleared, using the TAFE owned RIKEN KEIKI air quality meter.



Figure 13 Leaking exhaust system - Toyota Forerunner

No CO, VOC or LEL's were found in any of the adjacent rooms and classrooms. This basement area requires safety glasses to be worn when equipment is running. Noise levels in this area are far lower than those in AG-01, and acceptable for teaching in the workshop areas.

The staff in AB-02 were very keen to use the RIKEN air quality meter to rectify the issue with the Mazda engine. These staff should be encouraged to use this meter. This action will safeguard staff and students. Students will also learn of effectiveness and sensitivity of such tools.

AB-27 Room – (1/11/2024) - Former Battery Storage Area.

This room has dedicated extraction exhaust flow of 8000 to 10000 CMM. This room is now used as a general storage room by the Auto Mechanical Dept. (Refer to Recommendations at the end of this document).



Figure 14 AB-27 Room - Former Battery Storage Area

AB-15 Room – (1/11/2024). Solvent / Flammable Liquid Storage Room Outside AB-01 Workshop. (Brooker Highway Carpark Area).

The VOC in this room was 0.4ppm, with a background level nearby of 0.1 ppm, which could have long term impacts if left unchecked.

The room contains 2 x 200Lt drums of Petrol, General Purpose Oil, one waste Oil container.

Remainder of containers are 20 litres or less, of cleaning chemical, solvents, oils, hydraulic oils, and 2 locked cupboards of Laboratory chemicals. Cylinders of LPG and Air. There is also conditioner gasses in bottles.

Storage could be better organised. Wooden shelving is inappropriate for the area. The outside door to this should be kept locked at all times, especially as it is easily accessible by anybody outside in the carpark area.



Figure 15 AB-15 Room - Solvent / Flammable Liquid Storage

There is an extraction fan with ducting installed in the wall of this room that provides continual exhaust extraction to this storage room. The exhaust air flow measured is ~13,000 CMM and exhausts into the carpark.

Note: This is a repeat of previous stated information that is not required.

7 Recommendations / General Comments

These recommendations / general comments address two primary causal factors as noted below.

1. Deficiencies with the inlet air flow systems into the workshop areas on the ground and basement levels.
2. Contaminating events that occur when engines have manifold / exhaust system leaks and extraction / exhaust systems are not utilised and maintained as required.

Both issues combine to produce contaminating events in the workshops that result in unacceptable levels of Carbon Monoxide being released into the workshop and offices. These events are caused by leaking gas from engines that are sometimes deliberately made to leak as part of the teaching process. To manage these events, it would be beneficial to have CO detectors available to the teachers and regular checks carried out on all vehicles and static engines to ensure there are no unplanned carbon monoxide leaks.

There have been situations occur that have resulted in staff complaints about fumes which have caused headaches and of feeling unwell. We did not detect gas escaping from the workshops into any classrooms or office areas and the historic issues appear to have escalated because staff do not have the tools to detect these leaks when any complaints had been raised.

The events occur because leaks are not detected and are escalated because the air exchange system is not balanced with inflowing air, resulting in doors being opened to allow air flow into the workshops (AG-01). It appears **(because we have not monitored an event)** actions taken to not turn the general extraction system on due to a perceived noise issue, creates the potential for contaminants to flow out the open doors into offices and classrooms.

The terminated ducting (refer to figure 3) may be providing a pathway to other offices (library ceiling cavity) and floors when the extraction systems in the AG-01 workshop are not used. This ducting has now been isolated and should remain isolated until a new air inlet system is in place. We recommend that the general extraction system be on automatically and that roller doors in the short term are opened at least 500 mm (AG-01 workshop) while engines are being run. This has been covered in the safe work procedure initiated while on site.

We recommend the ducted air inlets (refer to figure 3) be investigated to determine if they can be reinstated to all of the workshops so the roller doors can be closed and doors from the offices can be kept closed (consider automatic closers on doors that must remain closed).

We recommend staff use the TasTAFE owned RIKEN KEIKI air quality meter to check vehicles and static engines for carbon monoxide and any other relevant leaks on a scheduled basis. The meters would be available to check the air quality entering the building via the roller doors. The meters could be used to conduct air quality testing after any health condition or illness has been reported. This testing should be conducted by trained and competent TasTAFE WHS staff or a professional hygienist.

Once doors are kept closed, the ducted air is restored and the general extraction air is interlocked, the roller doors should be able to be kept closed. The use of the RIKEN KEIKI air quality meter will enable ongoing monitoring as required.

Other general air quality issues discovered during the investigation are:

- a. Air balances are variable and may change daily and therefore the air inlet system needs to account for climatic variations.
- b. The vehicle exhaust system hoses should be put on a maintenance schedule to ensure they are not damaged and do not leak.
- c. Eye protection areas should be set.
- d. Noise checks should be conducted to give staff confidence that the air extraction system is safe to operate.
- e. Volatile Organic Compounds (VOC) of >0.5 were detected. This has a potential for long term health impacts. Testing for VOC exposure should be repeated once the air flows are corrected.
- f. Battery Charging should be conducted under air extraction. Hydrogen (an explosive gas) is generated during charging. Although the volume of charging is small, it is good practice and training to have extraction of gas during these times.

Investigate if the purpose-built battery room AB-27 can be reinstated for the charging of batteries.

8 Results

Data table of Air emissions in various rooms:

AG01

28/10/2024							
AG01	O2	CO	LEL	NO2	H2S	CO2	Comments
11:46:00 AM	20.9	0	0	0.008	0		
11:49:00 AM	20.9	0	0		0		
11:52:00 AM	20.9	0	0		0		
11:55:00 AM	20.9	0	0		0		
11:58:00 AM	20.9	0	0	0.005	0		
12:01:00 PM	20.9	0	0	0.006	0		
12:04:00 PM	20.9	0	0	0.009	0		
12:07:00 PM	20.9	0	0		0		
12:10:00 PM	20.9	0	0		0		
12:13:00 PM	20.9	0	0		0		
12:16:00 PM	20.9	0	0	0.005	0		
12:19:00 PM	20.9	0	0	0.005	0		
12:22:00 PM	20.9	0	0		0		
12:25:00 PM	20.9	0	0		0		
12:28:00 PM	20.9	0	0		0		
12:31:00 PM	20.9	0	0	0.005	0		Engine on in AG 01
12:34:00 PM	20.9	2	0	0.01	0		
12:37:00 PM	20.9	17	0	0.02	0		Strong Smell
12:40:00 PM	20.9	37	0	0.02	0		ALARM
12:43:00 PM	20.9	25	0	0.02	0		Extraction & Exhaust on.
12:46:00 PM	20.9	9	0	0.02	0		Engine off
12:49:00 PM	20.9	4	0	0.02	0		Roller door open
12:52:00 PM	20.9	3	0	0.02	0		
12:55:00 PM	20.9	2	0	0.019	0		
12:58:00 PM	20.9	2	0	0.019	0		
1:01:00 PM	20.9	1	0	0.017	0		
1:04:00 PM	20.9	1	0	0.015	0		
1:07:00 PM	20.9	0	0	0.014	0		
1:10:00 PM	20.9	0	0	0.014	0		
1:13:00 PM	20.9	0	0	0.013	0		
1:16:00 PM	20.9	0	0	0.012	0		
1:19:00 PM	20.9	0	0	0.012	0		
1:22:00 PM	20.9	0	0	0.011	0		
1:25:00 PM	20.9	0	0	0.01	0		
1:28:00 PM	20.9	0	0	0.009	0		
1:31:00 PM	20.9	0	0	0.009	0		
1:34:00 PM	20.9	0	0	0.008	0		
1:37:00 PM	20.9	0	0	0.007	0		
1:40:00 PM	21	0	0	0.007	0		
1:43:00 PM	20.9	0	0	0.005	0		
1:46:00 PM	20.9	0	0	0.005	0		
1:49:00 PM	20.9	0	0		0		
1:52:00 PM	20.9	0	0		0		
1:55:00 PM	20.9	0	0		0		
1:58:00 PM	20.9	0	0	0.02	0		
2:01:00 PM	20.9	0	0	0.02	0		
2:04:00 PM	20.9	0	0		0		
2:07:00 PM	20.9	0	0		0		
2:10:00 PM	20.9	0	0		0		
2:13:00 PM	20.9	0	0		0		
2:16:00 PM	20.9	0	0	0.02	0		
2:19:00 PM	20.9	0	0	0.02	0		
2:22:00 PM	20.9	0	0		0		
2:25:00 PM	20.9	0	0		0		
2:28:00 PM	20.9	0	0		0		
2:31:00 PM	21	0	0	0.02	0		
2:34:00 PM	20.9	0	0	0.09	0		
2:37:00 PM	20.9	0	0	0.012	0		
2:40:00 PM	20.9	0	0	0.014	0		
2:43:00 PM	20.9	0	0	0.02	0		
2:46:00 PM	20.9	0	0	0.019	0		
2:49:00 PM	20.9	0	0	0.02	0		
2:52:00 PM	20.9	0	0	0.021	0		
2:55:00 PM	20.9	0	0	0.02	0		
2:58:00 PM	20.9	0	0	0.021	0		
3:01:00 PM	20.9	0	0	0.053	0		Ute Running
3:04:00 PM	20.9	0	0	0.042	0		
3:07:00 PM	21	0	0	0.04	0		
3:10:00 PM	20.9	0	0		0		
3:13:00 PM	20.9	0	0		0		
3:16:00 PM	20.9	0	0		0		
3:19:00 PM	20.9	0	0	0.015	0		
3:22:00 PM	20.9	0	0	0.017	0		
3:25:00 PM	20.9	0	0	0.015	0		
3:28:00 PM	21	0	0	0.016	0		
3:31:00 PM	20.9	0	0		0		
3:34:00 PM	20.9	0	0		0		
3:37:00 PM	20.9	0	0		0		
3:40:00 PM	20.9	0	0	0.015	0		
3:43:00 PM	20.9	0	0	0.015	0		
3:46:00 PM	20.9	0	0	0.009	0		
3:49:00 PM	21	0	0		0		
3:52:00 PM	20.9	0	0		0		
3:55:00 PM	20.9	0	0		0		
3:58:00 PM	20.9	0	0	0.015	0		

29/10/2024							
AG01	O2	CO	LEL	NO2	H2S	CO2	
8:15:00 AM	20.9	0	0		0	517	
8:18:00 AM	20.9	0	0		0		
8:21:00 AM	20.9	0	0	0.002	0		
8:24:00 AM	20.9	0	0		0		
8:27:00 AM	20.9	0	0		0	520	
8:30:00 AM	20.9	0	0		0		
8:33:00 AM	20.9	0	0	0.002	0		
8:36:00 AM	20.9	0	0		0		
8:39:00 AM	20.9	0	0		0	525	
8:42:00 AM	20.9	0	0		0		
8:45:00 AM	20.9	0	0	0.002	0		
8:48:00 AM	20.9	0	0		0		
8:51:00 AM	20.9	0	0		0	522	
8:54:00 AM	20.9	0	0		0		
8:57:00 AM	20.9	0	0	0.002	0		
9:00:00 AM	20.9	0	0		0		
9:03:00 AM	20.9	0	0		0	525	
9:06:00 AM	20.9	0	0		0		
9:09:00 AM	20.9	0	0	0.002	0		
9:12:00 AM	20.9	0	0		0		
9:15:00 AM	20.9	0	0		0	525	
9:18:00 AM	20.9	0	0		0		
9:21:00 AM	20.9	0	0	0.002	0		
9:24:00 AM	20.9	0	0		0		
9:27:00 AM	20.9	0	0		0	530	
9:30:00 AM	20.9	0	0		0		
9:33:00 AM	20.9	0	0	0.002	0		
9:36:00 AM	20.9	0	0		0		
9:39:00 AM	20.9	0	0		0	533	
9:42:00 AM	20.9	0	0		0		
9:45:00 AM	20.9	0	0	0.002	0		
9:48:00 AM	20.9	0	0		0		
9:51:00 AM	20.9	0	0		0	540	
9:54:00 AM	20.9	0	0		0		
9:57:00 AM	20.9	0	0	0.002	0		
10:00:00 AM	20.9	0	0		0		
10:03:00 AM	20.9	0	0		0	540	
10:06:00 AM	20.9	0	0		0		
10:09:00 AM	20.9	0	0	0.002	0		
10:12:00 AM	20.9	0	0		0		
10:15:00 AM	20.9	0	0		0	540	
10:18:00 AM	20.9	0	0	0.002	0		
10:21:00 AM	20.9	0	0		0		
10:24:00 AM	20.9	0	0		0		
10:27:00 AM	20.9	0	0		0	540	
10:30:00 AM	20.9	0	0	0.002	0		
10:33:00 AM	20.9	0	0		0		
10:36:00 AM	20.9	0	0		0		
10:39:00 AM	20.9	0	0		0	517	
10:42:00 AM	20.9	0	0	0.002	0		
10:45:00 AM	20.9	0	0		0		
10:48:00 AM	20.9	0	0		0		
10:51:00 AM	20.9	0	0		0	517	
10:54:00 AM	20.9	0	0	0.037	0		
10:57:00 AM	20.9	0	0		0		
11:00:00 AM	20.9	44	0		0		Sarted No3
11:03:00 AM	20.9	10	0		0	517	
11:06:00 AM	20.9	10	0	0.012	0		
11:09:00 AM	20.9	21	0		0		
11:12:00 AM	20.9	63	0		0		
11:15:00 AM	20.9	40	0		0	580	
11:18:00 AM	20.9	20	0		0		
11:21:00 AM	20.9	10	0	0.024	0		
11:24:00 AM	20.9	60	0		0		Started No 2 Falcon
11:27:00 AM	20.9	40	0		0		leak detected abd fixed
11:30:00 AM	20.9	10	0		0	550	
11:33:00 AM	20.9	3	0		0		
11:36:00 AM	20.9	60	0	0.024	0		Started No 2 Falcon
11:39:00 AM	20.9	50	0		0		
11:42:00 AM	20.9	25	0		0	530	
11:45:00 AM	20.9	2	0		0		
11:48:00 AM	20.9	0	0	0.022	0		
11:51:00 AM	20.9	0	0		0		
11:54:00 AM	20.9	0	0		0	525	
11:57:00 AM	20.9	0	0		0		
12:00:00 PM	20.9	0	0	0.009	0		
12:03:00 PM	20.9	0	0		0		
12:06:00 PM	20.9	0	0		0	519	
12:09:00 PM	20.9	0	0		0		
12:12:00 PM	20.9	0	0	0.003	0		
12:15:00 PM	20.9	0	0		0		
12:18:00 PM	20.9	0	0		0	520	
12:21:00 PM	20.9	0	0	0.002	0		
30/10/2024							
AG01	O2	CO	LEL	NO2	H2S	CO2	
8:21:00 AM	20.9	0	0		0	480	
8:24:00 AM	20.9	0	0		0		
8:27:00 AM	20.9	0	0	0.002	0		
8:30:00 AM	20.9	0	0		0		
8:33:00 AM	20.9	0	0		0		
8:36:00 AM	20.9	0	0		0	480	
8:39:00 AM	20.9	0	0	0.003	0		
8:42:00 AM	20.9	0	0		0		
8:45:00 AM	21	0	0		0		
8:48:00 AM	20.9	0	0		0	490	
8:51:00 AM	20.9	0	0	0.004	0		
8:54:00 AM	20.9	0	0		0		
8:57:00 AM	20.9	0	0		0	460	
9:00:00 AM	20.9	0	0		0		
9:03:00 AM	20.9	0	0		0		
9:06:00 AM	20.9	0	0	0.003	0		
9:09:00 AM	20.9	0	0		0	532	2 engines running, no gas.
9:12:00 AM	20.9	0	0		0		
9:15:00 AM	21	0	0	0.005	0		
9:18:00 AM	20.9	0	0		0		
9:21:00 AM	20.9	0	0		0	525	
9:24:00 AM	20.9	0	0		0		
9:27:00 AM	20.9	0	0		0		
9:30:00 AM	20.9	0	0	0.005	0		

AG02

30/10/2024						
AG02	O2	CO	LEL	NO2	H2S	CO2
11:45:00 AM	20.9	0	0		0	530
11:48:00 AM	20.9	0	0	0.003	0	
11:51:00 AM	20.9	0	0		0	
11:54:00 AM	20.9	0	0		0	540
11:57:00 AM	20.9	0	0	0.002	0	
12:00:00 PM	20.9	0	0		0	
12:03:00 PM	21	0	0		0	520
12:06:00 PM	20.9	0	0	0.003	0	
12:09:00 PM	20.9	0	0		0	
12:12:00 PM	20.9	0	0		0	510
12:15:00 PM	20.9	0	0		0	
12:18:00 PM	20.9	0	0	0.003	0	
12:21:00 PM	20.9	0	0		0	509
12:24:00 PM	20.9	0	0		0	
12:27:00 PM	20.9	0	0	0.002	0	
12:30:00 PM	20.9	0	0		0	
12:33:00 PM	20.9	0	0		0	512
12:36:00 PM	20.9	0	0		0	
12:39:00 PM	20.9	0	0	0.003	0	
12:42:00 PM	20.9	0	0		0	511
12:45:00 PM	20.9	0	0		0	

AG03

30/10/2024						
AG03	O2	CO	LEL	NO2	H2S	CO2
11:45:00 AM	20.9	0	0		0	550
11:48:00 AM	20.9	0	0	0.003	0	
11:51:00 AM	20.9	0	0		0	
11:54:00 AM	20.9	0	0		0	530
11:57:00 AM	20.9	0	0	0.003	0	
12:00:00 PM	20.9	0	0		0	
12:03:00 PM	21	0	0		0	510
12:06:00 PM	20.9	0	0	0.004	0	
12:09:00 PM	20.9	0	0		0	
12:12:00 PM	20.9	0	0		0	508
12:15:00 PM	20.9	0	0		0	
12:18:00 PM	20.9	0	0	0.002	0	
12:21:00 PM	20.9	0	0		0	501
12:24:00 PM	20.9	0	0		0	
12:27:00 PM	20.9	0	0	0.003	0	
12:30:00 PM	20.9	0	0		0	
12:33:00 PM	20.9	0	0		0	510
12:36:00 PM	20.9	0	0		0	
12:39:00 PM	20.9	0	0	0.004	0	
12:42:00 PM	20.9	0	0		0	509
12:45:00 PM	20.9	0	0		0	

28/10/2024							
AG 07	O2	CO	LEL	NO2	H2S	CO2	Comment
11:46:00 AM	20.9	0	0	0.008	0		
11:49:00 AM	20.9	0	0	0.005	0		
11:52:00 AM	20.9	0	0	0.005	0		
11:55:00 AM	20.9	0	0	0.005	0		
11:58:00 AM	21	0	0	0.005	0		
12:01:00 PM	20.9	0	0	0.006	0		
12:04:00 PM	20.9	0	0	0.009	0		
12:07:00 PM	20.9	0	0	0.005	0		
12:10:00 PM	20.9	0	0	0.005	0		
12:13:00 PM	20.9	0	0	0.005	0		
12:16:00 PM	20.9	0	0	0.005	0		
12:19:00 PM	20.9	0	0	0.005	0		
12:22:00 PM	21	0	0	0.005	0		
12:25:00 PM	20.9	0	0	0.005	0		
12:28:00 PM	20.9	0	0	0.005	0		
12:31:00 PM	20.9	0	0	0.005	0		Engine on in AG 01
12:34:00 PM	20.9	0	0	0.009	0		Door closed
12:37:00 PM	20.9	0	0	0.008	0		
12:40:00 PM	20.9	0	0	0.009	0		
12:43:00 PM	20.9	0	0	0.009	0		
12:46:00 PM	20.9	0	0	0.01	0		
12:49:00 PM	20.9	0	0	0.011	0		
12:52:00 PM	20.9	0	0	0.011	0		
12:55:00 PM	20.9	0	0	0.011	0		
12:58:00 PM	20.9	0	0	0.011	0		
1:01:00 PM	20.9	0	0	0.011	0		
1:04:00 PM	20.9	0	0	0.011	0		
1:07:00 PM	20.9	0	0	0.011	0		
1:10:00 PM	20.9	0	0	0.012	0		
1:13:00 PM	20.9	0	0	0.014	0		
1:16:00 PM	20.9	0	0	0.021	0		
1:19:00 PM	20.9	0	0	0.023	0		
1:22:00 PM	20.9	0	0	0.023	0		
1:25:00 PM	20.9	0	0	0.025	0		
1:28:00 PM	20.9	0	0	0.025	0		
1:31:00 PM	20.9	0	0	0.025	0		
1:34:00 PM	20.9	0	0	0.024	0		
1:37:00 PM	20.9	0	0	0.024	0		
1:40:00 PM	20.9	0	0	0.024	0		
1:43:00 PM	20.9	0	0	0.024	0		
1:46:00 PM	20.9	0	0	0.023	0		
1:49:00 PM	20.9	0	0	0.011	0		
1:52:00 PM	20.9	0	0	0.011	0		
1:55:00 PM	20.9	0	0	0.011	0		
1:58:00 PM	20.9	0	0	0.011	0		
2:01:00 PM	20.9	0	0	0.011	0		
2:04:00 PM	20.9	0	0	0.011	0		
2:07:00 PM	20.9	0	0	0.011	0		
2:10:00 PM	20.9	0	0	0.011	0		
2:13:00 PM	20.9	0	0	0.011	0		
2:16:00 PM	20.9	0	0	0.011	0		
2:19:00 PM	20.9	0	0	0.011	0		
2:22:00 PM	20.9	0	0	0.011	0		
2:25:00 PM	20.9	0	0	0.011	0		
2:28:00 PM	20.9	0	0	0.011	0		
2:31:00 PM	20.9	0	0	0.011	0		
2:34:00 PM	20.9	0	0	0.011	0		
2:37:00 PM	20.9	0	0	0.011	0		
2:40:00 PM	20.9	0	0	0.011	0		
2:43:00 PM	20.9	0	0	0.011	0		
2:46:00 PM	20.9	0	0	0.011	0		
2:49:00 PM	20.9	0	0	0.011	0		
2:52:00 PM	20.9	0	0	0.009	0		
2:55:00 PM	20.9	0	0	0.009	0		
2:58:00 PM	20.9	0	0	0.008	0		
3:01:00 PM	20.9	0	0	0.007	0		
3:04:00 PM	20.9	0	0	0.007	0		
3:07:00 PM	20.9	0	0	0.007	0		
3:10:00 PM	20.9	0	0	0.007	0		
3:13:00 PM	20.9	0	0	0.007	0		
3:16:00 PM	20.9	0	0	0.007	0		
3:19:00 PM	20.9	0	0	0.006	0		
3:22:00 PM	20.9	0	0	0.006	0		
3:25:00 PM	20.9	0	0	0.006	0		
3:28:00 PM	20.9	0	0	0.006	0		
3:31:00 PM	20.9	0	0	0.005	0		
3:34:00 PM	20.9	0	0	0.005	0		
3:37:00 PM	20.9	0	0	0.005	0		
3:40:00 PM	20.9	0	0	0.005	0		
3:43:00 PM	20.9	0	0	0.005	0		
3:46:00 PM	20.9	0	0	0.005	0		
3:49:00 PM	20.9	0	0	0.005	0		
3:52:00 PM	20.9	0	0	0.005	0		
3:55:00 PM	20.9	0	0	0.005	0		
3:58:00 PM	20.9	0	0	0.005	0		
30/10/2024							
AG07	O2	CO	LEL	NO2	H2S	CO2	Comment
8:00:00 AM	20.9	0	0		0	658	
8:03:00 AM	20.9	0	0	0.006	0		
8:06:00 AM	20.9	0	0		0		
8:09:00 AM	20.9	0	0		0	640	
8:12:00 AM	21	0	0	0.005	0		
8:15:00 AM	20.9	0	0		0		
8:18:00 AM	20.9	0	0		0	630	
8:21:00 AM	20.9	0	0	0.007	0		
8:24:00 AM	20.9	0	0		0		
8:27:00 AM	20.9	0	0		0	614	
8:30:00 AM	20.9	0	0		0		
8:33:00 AM	20.9	0	0	0.008	0		
8:36:00 AM	20.9	0	0		0	600	
8:39:00 AM	20.9	0	0		0		
8:42:00 AM	20.9	0	0	0.003	0		
8:45:00 AM	20.9	0	0		0	580	
8:48:00 AM	20.9	0	0		0		
8:51:00 AM	20.9	0	0		0		
8:54:00 AM	20.9	0	0	0.004	0		
8:57:00 AM	20.9	0	0		0	568	
9:00:00 AM	20.9	0	0		0		
9:03:00 AM	20.9	0	0	0.003	0		
9:06:00 AM	20.9	0	0		0	572	

28/10/2024							
AG12	O2	CO	LEL	NO2	H2S	CO2	Comment
8:00:00 AM	20.9	0	0		0	658	
8:03:00 AM	20.9	0	0	0.006	0		
8:06:00 AM	20.9	0	0		0		
8:09:00 AM	20.9	0	0		0	640	
8:12:00 AM	21	0	0	0.005	0		
8:15:00 AM	20.9	0	0		0		
8:18:00 AM	20.9	0	0		0	630	
8:21:00 AM	20.9	0	0	0.007	0		
8:24:00 AM	20.9	0	0		0		
8:27:00 AM	20.9	0	0		0	614	
8:30:00 AM	20.9	0	0		0		
8:33:00 AM	20.9	0	0	0.008	0		
8:36:00 AM	20.9	0	0		0	600	
8:39:00 AM	20.9	0	0		0		
8:42:00 AM	20.9	0	0	0.003	0		
8:45:00 AM	20.9	0	0		0	580	
8:48:00 AM	20.9	0	0		0		
8:51:00 AM	20.9	0	0		0		
8:54:00 AM	20.9	0	0	0.004	0		
8:57:00 AM	20.9	0	0		0	568	
9:00:00 AM	20.9	0	0		0		
9:03:00 AM	20.9	0	0	0.003	0		
9:06:00 AM	20.9	0	0		0	572	
29/10/2024							
AG012	O2	CO	LEL	NO2	H2S	CO2	
8:15:00 AM	20.9	0	0		0	532	
8:18:00 AM	20.9	0	0		0		
8:21:00 AM	20.9	0	0	0.002	0		
8:24:00 AM	20.9	0	0		0	525	
8:27:00 AM	20.9	0	0		0		
8:30:00 AM	20.9	0	0	0.002	0		
8:33:00 AM	20.9	0	0		0	560	
8:36:00 AM	20.9	0	0		0		
8:39:00 AM	20.9	0	0	0.002	0		
8:42:00 AM	20.9	0	0		0		
8:45:00 AM	20.9	0	0		0	550	
8:48:00 AM	20.9	0	0		0		
8:51:00 AM	20.9	0	0	0.003	0		
8:54:00 AM	20.9	0	0		0		
8:57:00 AM	20.9	0	0		0	540	
9:00:00 AM	20.9	0	0		0		
9:03:00 AM	21	0	0	0.002	0		
9:06:00 AM	20.9	0	0		0		
9:09:00 AM	20.9	0	0		0	550	
9:12:00 AM	20.9	0	0		0		
9:15:00 AM	20.9	0	0	0.002	0		
9:18:00 AM	20.9	0	0		0		
9:21:00 AM	20.9	0	0		0	545	
9:24:00 AM	20.9	0	0		0		
9:27:00 AM	20.9	0	0	0.002	0		
9:30:00 AM	20.9	0	0		0		
9:33:00 AM	20.9	0	0		0	535	
9:36:00 AM	20.9	0	0		0		
9:39:00 AM	21	0	0		0		
9:42:00 AM	20.9	0	0	0.002	0		
9:45:00 AM	20.9	0	0		0	580	
9:48:00 AM	20.9	0	0		0		
9:51:00 AM	20.9	0	0		0		
9:54:00 AM	20.9	0	0	0.009	0		
9:57:00 AM	20.9	0	0		0		
10:00:00 AM	20.9	0	0		0	665	
10:03:00 AM	20.9	0	0		0		
10:06:00 AM	20.9	0	0	0.011	0		
10:09:00 AM	20.9	0	0		0		
10:12:00 AM	20.9	0	0		0	630	
10:15:00 AM	20.9	0	0		0		
10:18:00 AM	20.9	0	0	0.009	0		
10:21:00 AM	20.9	0	0		0		
10:24:00 AM	20.9	0	0		0	590	
10:27:00 AM	21	0	0	0.009	0		
10:30:00 AM	20.9	0	0		0		
10:33:00 AM	20.9	0	0		0	580	
10:36:00 AM	20.9	0	0	0.013	0		
10:39:00 AM	20.9	0	0		0		
10:42:00 AM	20.9	0	0		0		
10:45:00 AM	20.9	0	0		0	590	
10:48:00 AM	20.9	0	0	0.009	0		
30/10/2024							
AG012	O2	CO	LEL	NO2	H2S	CO2	
8:00:00 AM	20.9	0	0		0	628	
8:03:00 AM	20.9	0	0		0		
8:06:00 AM	20.9	0	0	0.002	0		
8:09:00 AM	20.9	0	0		0		
8:12:00 AM	20.9	0	0		0	620	
8:15:00 AM	20.9	0	0		0		
8:18:00 AM	20.9	0	0		0		
8:21:00 AM	20.9	0	0	0.002	0		
8:24:00 AM	20.9	0	0		0	618	
8:27:00 AM	20.9	0	0		0		
8:30:00 AM	20.9	0	0	0.002	0		
8:33:00 AM	20.9	0	0		0	620	
8:36:00 AM	20.9	0	0		0		
8:39:00 AM	20.9	0	0	0.002	0		
8:42:00 AM	20.9	0	0		0		
8:45:00 AM	20.9	0	0		0	625	
8:48:00 AM	20.9	0	0		0		
8:51:00 AM	20.9	0	0	0.003	0		
8:54:00 AM	20.9	0	0		0		
8:57:00 AM	20.9	0	0		0	610	
9:00:00 AM	20.9	0	0		0		
9:03:00 AM	21	0	0	0.002	0		
9:06:00 AM	20.9	0	0		0	612	
9:09:00 AM	20.9	0	0		0		
9:12:00 AM	20.9	0	0		0		
9:15:00 AM	20.9	0	0	0.002	0		
9:18:00 AM	20.9	0	0		0		
9:21:00 AM	20.9	0	0		0	599	
9:24:00 AM	20.9	0	0		0		
9:27:00 AM	20.9	0	0	0.002	0		
9:30:00 AM	20.9	0	0		0		
9:33:00 AM	20.9	0	0		0	585	
9:36:00 AM	20.9	0	0		0		
9:39:00 AM	21	0	0		0		
9:42:00 AM	20.9	0	0	0.002	0		
9:45:00 AM	20.9	0	0		0	610	
9:48:00 AM	20.9	0	0		0		
9:51:00 AM	20.9	0	0		0		
9:54:00 AM	20.9	0	0	0.009	0		
9:57:00 AM	20.9	0	0		0		
10:00:00 AM	20.9	0	0		0	590	

AG14

28/10/2024						
AG014	O2	CO	LEL	NO2	H2S	CO2
15:00:00 PM	20.9	0	0	0.012	0	
15:03:00 PM	20.9	0	0		0	612
15:06:00 PM	21	0	0		0	534
15:09:00 PM	20.9	0	0	0.015	0	
15:12:00 PM	20.9	0	0		0	
15:15:00 PM	20.8	0	0		0	524
15:18:00 PM	20.9	0	0		0	545
15:21:00 PM	20.9	0	0	0.015	0	510
15:24:00 PM	20.9	0	0		0	490
15:27:00 PM	20.9	0	0		0	514
15:30:00 PM	20.9	0	0	0.019	0	525
15:33:00 PM	20.9	0	0		0	534
15:36:00 PM	20.8	0	0	0.019	0	511
29/10/2024						
AG014	O2	CO	LEL	NO2	H2S	CO2
8:15:00 AM	20.9	0	0	0.012	0	
8:18:00 AM	20.9	0	0		0	612
8:21:00 AM	21	0	0		0	
8:24:00 AM	20.9	0	0	0.015	0	
8:27:00 AM	20.9	0	0		0	534
8:30:00 AM	20.8	0	0		0	
8:33:00 AM	20.9	0	0		0	
8:36:00 AM	20.9	0	0	0.015	0	
8:39:00 AM	20.9	0	0		0	490
8:42:00 AM	20.9	0	0		0	
8:45:00 AM	20.9	0	0		0	
8:48:00 AM	20.9	0	0	0.014	0	
8:51:00 AM	20.8	0	0		0	511

AG15

29/10/2024						
AG015	O2	CO	LEL	NO2	H2S	CO2
8:15:00 AM	20.9	0	0	0.011	0	
8:18:00 AM	20.9	0	0		0	
8:21:00 AM	20.9	0	0		0	
8:24:00 AM	21	0	0	0.012	0	
8:27:00 AM	20.9	0	0		0	
8:30:00 AM	20.9	0	0		0	
8:33:00 AM	20.9	0	0		0	
8:36:00 AM	20.9	0	0	0.016	0	
8:39:00 AM	20.9	0	0		0	
8:42:00 AM	20.9	0	0		0	
8:45:00 AM	21	0	0		0	
8:48:00 AM	20.9	0	0	0.015	0	
8:51:00 AM	20.9	0	0		0	
30/10/2024						
AG015	O2	CO	LEL	NO2	H2S	CO2
11:45:00 AM	20.9	0	0		0	490
11:48:00 AM	20.9	0	0		0	
11:51:00 AM	20.9	0	0		0	
11:54:00 AM	20.9	0	0		0	520
11:57:00 AM	20.9	0	0		0	
12:00:00 PM	20.9	0	0		0	
12:03:00 PM	20.9	0	0		0	510
12:06:00 PM	20.9	0	0		0	
12:09:00 PM	20.9	0	0		0	
12:12:00 PM	20.9	0	0		0	525
12:15:00 PM	20.9	0	0		0	
12:18:00 PM	20.9	0	0		0	

AG40

28/10/2024							
AG 40	O2	CO	LEL	NO2	H2S		Comments
11:46:00 AM	20.9	0	0	0.005	0		
11:49:00 AM	20.9	0	0	0.005	0		
11:52:00 AM	20.9	0	0	0.006	0		
11:55:00 AM	20.9	0	0	0.005	0		
11:58:00 AM	20.9	0	0	0.005	0		
12:01:00 PM	20.9	0	0	0.005	0		
12:04:00 PM	20.9	0	0	0.005	0		
12:07:00 PM	20.9	0	0	0.005	0		
12:10:00 PM	20.9	0	0	0.005	0		
12:13:00 PM	20.9	0	0	0.005	0		
12:16:00 PM	20.9	0	0	0.005	0		
12:19:00 PM	20.9	0	0	0.005	0		
12:22:00 PM	20.9	0	0	0.005	0		
12:25:00 PM	20.9	0	0	0.005	0		
12:28:00 PM	20.9	0	0	0.005	0		
12:31:00 PM	20.9	0	0	0.005	0		Engine on in AG 01
12:34:00 PM	20.9	0	0	0.005	0		
12:37:00 PM	20.9	0	0	0.005	0		
12:40:00 PM	20.9	0	0	0.005	0		
12:43:00 PM	20.9	0	0	0.005	0		
12:46:00 PM	20.9	0	0	0.005	0		Engine off
12:49:00 PM	20.9	0	0	0.005	0		
12:52:00 PM	20.9	0	0	0.005	0		
12:55:00 PM	21	0	0	0.005	0		
12:58:00 PM	20.9	0	0	0.011	0		
1:01:00 PM	20.9	0	0	0.011	0		
1:04:00 PM	20.9	0	0	0.012	0		
1:07:00 PM	20.9	0	0	0.013	0		
1:10:00 PM	20.9	0	0	0.013	0		
1:13:00 PM	20.9	0	0	0.013	0		
1:16:00 PM	20.9	0	0	0.012	0		
1:19:00 PM	20.9	0	0	0.011	0		
1:22:00 PM	20.9	0	0	0.009	0		
1:25:00 PM	20.9	0	0	0.008	0		
1:28:00 PM	20.9	0	0	0.007	0		
1:31:00 PM	20.9	0	0	0.006	0		
1:34:00 PM	20.9	0	0	0.005	0		
1:37:00 PM	20.9	0	0	0.005	0		
1:40:00 PM	20.9	0	0	0.005	0		
1:43:00 PM	20.9	0	0	0.005	0		
1:46:00 PM	20.9	0	0	0.006	0		
1:49:00 PM	20.9	0	0	0.007	0		
1:52:00 PM	20.9	0	0	0.005	0		
1:55:00 PM	20.9	0	0	0.005	0		
1:58:00 PM	20.9	0	0	0.005	0		
2:01:00 PM	20.9	0	0	0.005	0		
2:04:00 PM	20.9	0	0	0.005	0		
2:07:00 PM	20.9	0	0	0.007	0		
2:10:00 PM	20.9	0	0	0.006	0		
2:13:00 PM	20.9	0	0	0.005	0		
2:16:00 PM	20.9	0	0	0.005	0		
2:19:00 PM	20.9	0	0	0.005	0		
2:22:00 PM	20.9	0	0	0.005	0		
2:25:00 PM	21	0	0	0.005	0		
2:28:00 PM	20.9	0	0	0.005	0		
2:31:00 PM	20.9	0	0	0.006	0		
2:34:00 PM	20.9	0	0	0.005	0		
2:37:00 PM	20.9	0	0	0.005	0		
2:40:00 PM	20.9	0	0	0.005	0		
2:43:00 PM	20.9	0	0	0.005	0		
2:46:00 PM	20.9	0	0	0.007	0		
2:49:00 PM	20.9	0	0	0.006	0		
2:52:00 PM	20.9	0	0	0.005	0		
2:55:00 PM	20.9	0	0	0.005	0		
2:58:00 PM	20.9	0	0	0.005	0		
3:01:00 PM	20.9	0	0	0.005	0		
3:04:00 PM	20.9	0	0	0.005	0		
3:07:00 PM	20.9	0	0	0.005	0		
3:10:00 PM	20.9	0	0	0.005	0		
3:13:00 PM	21	0	0	0.005	0		
3:16:00 PM	20.9	0	0	0.005	0		
3:19:00 PM	20.9	0	0	0.006	0		
3:22:00 PM	20.9	0	0	0.005	0		
3:25:00 PM	20.9	0	0	0.005	0		
3:28:00 PM	20.9	0	0	0.005	0		
3:31:00 PM	20.9	0	0	0.005	0		
3:34:00 PM	20.9	0	0	0.005	0		
3:37:00 PM	20.9	0	0	0.007	0		
3:40:00 PM	20.9	0	0	0.006	0		
3:43:00 PM	20.9	0	0	0.005	0		
3:46:00 PM	20.9	0	0	0.005	0		
3:49:00 PM	21	0	0	0.005	0		
3:52:00 PM	20.9	0	0	0.005	0		
3:55:00 PM	20.9	0	0	0.005	0		
3:58:00 PM	20.9	0	0	0.005	0		
29/10/2024							
AG40	O2	CO	LEL	NO2	H2S	CO2	Comments
8:55:00 AM	20.9	0	0		0	524	
8:58:00 AM	20.9	0	0	0.002	0		
9:01:00 AM	20.9	0	0		0	1091	
9:04:00 AM	20.9	0	0	0.002	0		
9:07:00 AM	20.9	0	0		0	1000	
9:10:00 AM	20.9	0	0	0.003	0		
9:13:00 AM	20.9	0	0		0	800	
9:16:00 AM	20.9	0	0	0.003	0		
9:19:00 AM	20.9	0	0		0	700	
9:22:00 AM	20.9	0	0	0.002	0		
9:25:00 AM	20.9	0	0		0	500	
9:28:00 AM	20.9	0	0	0.002	0		
9:31:00 AM	20.9	0	0		0	500	
9:34:00 AM	20.9	0	0	0.002	0		
9:37:00 AM	20.9	0	0		0	500	

29/10/2024						
AG 42	O2	CO	LEL	NO2	H2S	CO2
8:15:00 AM	20.9	0	0	0.002	0	534
8:18:00 AM	20.9	0	0		0	
8:21:00 AM	20.9	0	0		0	
8:24:00 AM	20.9	0	0		0	540
8:27:00 AM	20.9	0	0	0.01	0	
8:30:00 AM	20.9	0	0		0	
8:33:00 AM	20.9	0	0		0	543
8:36:00 AM	20.9	0	0		0	
8:39:00 AM	20.9	0	0	0.015	0	
8:42:00 AM	20.9	0	0		0	550
8:45:00 AM	20.9	0	0		0	
8:48:00 AM	20.9	0	0		0	560
8:51:00 AM	20.9	0	0	0.018	0	
8:54:00 AM	20.9	0	0		0	
8:57:00 AM	20.9	0	0		0	550
9:00:00 AM	20.9	0	0	0.019	0	
9:03:00 AM	20.9	0	0		0	
9:06:00 AM	20.9	0	0		0	560
9:09:00 AM	20.9	0	0	0.018	0	
9:12:00 AM	20.9	0	0		0	
9:15:00 AM	20.9	0	0		0	565
9:18:00 AM	21	0	0	0.021	0	
9:21:00 AM	20.9	0	0		0	
9:24:00 AM	20.9	0	0		0	560
9:27:00 AM	20.9	0	0	0.019	0	
9:30:00 AM	20.9	0	0		0	
9:33:00 AM	20.9	0	0		0	520
9:36:00 AM	20.9	0	0	0.025	0	
9:39:00 AM	20.9	0	0		0	
9:42:00 AM	20.9	0	0		0	525
9:45:00 AM	20.9	0	0		0	
9:48:00 AM	21	0	0	0.022	0	
9:51:00 AM	20.9	0	0		0	550
9:54:00 AM	20.9	0	0		0	
9:57:00 AM	20.9	0	0		0	528
10:00:00 AM	20.9	0	0	0.019	0	
10:03:00 AM	20.9	0	0		0	
10:06:00 AM	20.9	0	0		0	528
10:09:00 AM	20.9	0	0		0	
10:12:00 AM	21	0	0	0.027	0	
10:15:00 AM	20.9	0	0		0	560
10:18:00 AM	20.9	0	0		0	
10:21:00 AM	20.9	0	0		0	
10:24:00 AM	20.9	0	0		0	570
10:27:00 AM	21	0	0	0.022	0	
10:30:00 AM	20.9	0	0		0	
10:33:00 AM	20.9	0	0		0	550
10:36:00 AM	20.9	0	0	0.02	0	
10:39:00 AM	20.9	0	0		0	
10:42:00 AM	20.9	0	0		0	520
10:45:00 AM	20.9	0	0	0.019	0	
10:48:00 AM	20.9	0	0		0	
10:51:00 AM	20.9	0	0		0	520

28/10/2024							
AB01	O2	CO	LEL	NO2	H2S	CO2	Comment
2:35	20.9	0	0	0.032	0		
2:38	20.9	0	0		0		
2:41	20.9	0	0		0		
2:44	20.9	0	0		0		
2:47	20.9	0	0	0.041	0		
2:50	20.9	0	0		0		
2:53	20.9	0	0		0		
2:56	20.9	0	0		0		
2:59	20.9	0	0		0		
3:02	20.9	0	0	0.035	0		
3:05	20.9	0	0		0		
3:08	20.9	0	0		0		
3:11	21	0	0	0.059	0		
3:14	20.9	0	0		0		
3:17	20.9	0	0		0		
3:20	20.9	0	0		0		
3:23	20.9	0	0	0.023	0		
3:26	20.9	0	0		0		
3:29	20.9	0	0		0		
3:32	20.9	0	0		0		
3:35	20.9	0	0		0		
3:38	20.9	0	0	0.022	0		
3:41	21	0	0		0		
3:44	20.9	0	0		0		
3:47	20.9	0	0		0		
3:50	20.9	0	0	0.025	0		
29/10/2024							
AB01	O2	CO	LEL	NO2	H2S	CO2	Comment
8:35:00 AM	20.9	0	0		0	537	
8:38:00 AM	20.9	0	0		0		
8:41:00 AM	20.9	0	0	0.008	0		
8:44:00 AM	20.9	0	0		0	537	
8:47:00 AM	20.9	0	0		0		
8:50:00 AM	20.9	0	0		0		
8:53:00 AM	20.9	0	0	0.008	0		
8:56:00 AM	20.9	0	0		0	537	
8:59:00 AM	20.9	0	0		0		
9:02:00 AM	20.9	0	0		0		
9:05:00 AM	20.9	0	0	0.008	0		
9:08:00 AM	20.9	0	0		0		
9:11:00 AM	20.9	0	0		0	537	
9:14:00 AM	20.9	0	0		0		
9:17:00 AM	20.9	0	0		0		
9:20:00 AM	20.9	0	0	0.008	0		
9:23:00 AM	20.9	0	0		0		
9:26:00 AM	20.9	0	0		0	537	
9:29:00 AM	20.9	0	0		0		
9:32:00 AM	20.9	0	0	0.008	0		
9:35:00 AM	20.9	0	0		0	814	
9:38:00 AM	20.9	0	0		0		
9:41:00 AM	20.9	0	0		0		
9:44:00 AM	20.9	0	0	0.008	0		
9:47:00 AM	20.9	0	0		0		
9:50:00 AM	20.9	0	0		0	530	
9:53:00 AM	20.9	0	0		0		
9:56:00 AM	20.9	0	0		0		
9:59:00 AM	20.9	0	0	0.008	0		

29/10/2024							
AB02 & AB18	O2	CO	LEL	NO2	H2S	CO2	comment
8:30:00 AM	20.9	0	0	0.014	0		
8:33:00 AM	20.9	0	0		0		
8:36:00 AM	20.9	0	0		0	580	
8:39:00 AM	20.9	0	0	0.014	0		
8:42:00 AM	20.9	0	0		0		
8:45:00 AM	20.9	0	0		0		
8:48:00 AM	20.9	0	0		0		
8:51:00 AM	20.9	0	0		0	599	
8:54:00 AM	20.9	0	0		0		Car Run outsisde AB03
8:57:00 AM	20.9	0	0	0.014	0		Car Run outsisde AB03 fuel mix
9:00:00 AM	20.9	0	0		0		
9:03:00 AM	20.9	0	0		0	582	
9:06:00 AM	20.9	0	0		0		
9:09:00 AM	20.9	0	0	0.014	0		
9:12:00 AM	20.9	0	0		0		
9:15:00 AM	20.9	0	0		0	560	
9:18:00 AM	20.9	2	0		0		
9:21:00 AM	20.9	4	0	0.018	0		
9:24:00 AM	20.9	6	0		0		
9:27:00 AM	20.9	9	0		0		

30/10/2024							
							Comments
AB03	O2	CO	LEL	NO2	H2S	CO2	
8:30:00 AM	20.9	0	0		0	510	
8:33:00 AM	20.9	0	0	0.008	0		
8:36:00 AM	20.9	0	0		0		
8:39:00 AM	20.9	0	0		0	512	
8:42:00 AM	20.9	0	0	0.014	0		Students can smell something
8:45:00 AM	20.9	0	0		0		
8:48:00 AM	21	0	0		0	599	
8:51:00 AM	20.9	0	0		0		
8:54:00 AM	20.9	0	0	0.021	0		
8:57:00 AM	20.9	0	0		0		
9:00:00 AM	20.9	0	0		0	585	

30/10/2024							
AB04	O2	CO	LEL	NO2	H2S	CO2	Comment
2:30:00 PM	20.9	0	0	0.025	0		
2:33:00 PM	20.9	0	0		0		
2:36:00 PM	20.9	0	0		0	500	
2:39:00 PM	20.9	0	0		0		
2:42:00 PM	20.9	0	0	0.022	0		
2:45:00 PM	20.9	0	0		0		
2:48:00 PM	20.9	0	0		0		
2:51:00 PM	20.9	0	0		0	510	
2:54:00 PM	20.9	0	0		0		
2:57:00 PM	20.9	0	0	0.019	0		
3:00:00 PM	20.9	0	0		0		
3:03:00 PM	20.9	0	0		0	510	
3:06:00 PM	20.9	0	0		0		
3:09:00 PM	20.9	0	0	0.022	0		
3:12:00 PM	20.9	0	0		0		
3:15:00 PM	20.9	0	0		0	520	

AB06

30/10/2024							
AB06	O2	CO	LEL	NO2	H2S	CO2	Comment
2:30:00 PM	20.9	0	0	0.012	0		
2:33:00 PM	20.9	0	0		0		
2:36:00 PM	20.9	0	0		0	490	
2:39:00 PM	20.9	0	0		0		
2:42:00 PM	20.9	0	0	0.014	0		
2:45:00 PM	20.9	0	0		0		
2:48:00 PM	20.9	0	0		0		
2:51:00 PM	20.9	0	0		0	450	
2:54:00 PM	20.9	0	0		0		
2:57:00 PM	20.9	0	0	0.015	0		
3:00:00 PM	20.9	0	0		0		
3:03:00 PM	20.9	0	0		0	460	
3:06:00 PM	20.9	0	0		0		
3:09:00 PM	20.9	0	0	0.015	0		
3:12:00 PM	20.9	0	0		0		
3:15:00 PM	20.9	0	0		0	450	

AB20

28/10/2024							
AB20	O2	CO	LEL	NO2	H2S	CO2	Comments
2:35	20.9	0	0	0.021	0	-	
2:38	21	0	0	-	0	-	
2:41	20.9	0	0	-	0	-	
2:44	20.9	0	0	0.021	0	-	
2:47	20.9	0	0	-	0	-	
2:50	20.9	0	0	-	0	-	
2:53	21	0	0	0.022	0	-	
2:56	20.9	0	0	-	0	-	
2:59	20.9	0	0	-	0	-	
3:02	20.9	0	0	0.022	0	-	
3:05	20.9	0	0	-	0	-	
3:08	20.9	0	0	-	0	-	
3:11	20.9	0	0	0.022	0	-	
3:14	21	0	0	-	0	-	
3:17	20.9	0	0	-	0	-	
3:20	20.9	0	0	0.022	0	-	
3:23	20.9	0	0	-	0	-	
3:26	20.9	0	0	-	0	-	
29/10/2024							
AB20	O2	CO	LEL	NO2	H2S	CO2	Comment
8:30:00 AM	20.9	0	0	0.004	0		
8:33:00 AM	20.9	0	0		0	580	
8:36:00 AM	20.9	0	0		0		
8:39:00 AM	20.9	0	0	0.004	0		
8:42:00 AM	20.9	0	0		0	520	
8:45:00 AM	20.9	0	0		0		
8:48:00 AM	20.9	0	0		0		
8:51:00 AM	20.9	0	0	0.004	0		
8:54:00 AM	20.9	0	0		0	540	
8:57:00 AM	20.9	0	0		0		
9:00:00 AM	20.9	0	0	0.004	0		
9:03:00 AM	20.9	0	0		0		
9:06:00 AM	20.9	0	0		0	530	
9:09:00 AM	20.9	0	0		0		
9:12:00 AM	20.9	0	0	0.004	0		
9:15:00 AM	20.9	0	0		0	525	
9:18:00 AM	20.9	0	0		0		
9:21:00 AM	20.9	0	0	0.004	0		
9:24:00 AM	20.9	0	0		0		
9:27:00 AM	20.9	0	0		0	520	
9:30:00 AM	20.9	2	0		0		
9:33:00 AM	20.9	0	0		0		
9:36:00 AM	20.9	0	0	0.004	0		
9:39:00 AM	20.9	0	0		0	519	
9:42:00 AM	20.9	0	0		0		
9:45:00 AM	20.9	2	0	0.004	0		
9:48:00 AM	20.9	0	0		0	542	

Emissions of engines and vehicles:

28/10/2024	AG01	Ground Floor						
		CH4	o2	CO	H2S	NO2	Co2	Comments
# 1 Diesel	11:21	0	20.9	0	0	0.03	-	All good
# 2 Falcon Engine	11:25	0	20.9	60	0	0.024		Exhaust Leak to be repaired
# 3 Holden 6 Engine	11:00	0	20.9	43	0	0.12	-	Elevated behind the engine, Exhaust leak shut after 2 min
# 4 Ford Engine	12:45	0	20.9	70	0	0.018	-	Leak right side exhaust
# 5 Holden V6 engine	11:35	0	20.9	70	0	0.16	-	Burning oil right rear exhaust.
# 6 Holden 6 Engine	11:45	0	20.9	0	0	0.02	-	All good
# 7 Kia	11:50	0	20.9	0	0	0.019	-	All good
# 8 Hyundai	11:50	0	20.9	0	0	0.019		All good
30/10/2024	AB 01	Basement						Comments
		CH4	o2	CO	H2S	NO2	Co2	
Toyota Dyno	10:30	0	20.9	0	0	0		All Good
	2:40							Door open
VW Polo	10:30	0	20.9	0	0	0		All Good
Toyota Yaris	10:30	0	20.9	0	0	0		All Good
Deisel Ute	10:30	0	20.9	39	0	0		Intentional Manifold Leak . Ute needs snorkle over motor .
Genesis	10:30	0	20.9	0	0	0		All Good
Hyundai	10:30	0	20.9	0	0	0		Not Running - parts missing To check later
	12:45	0	20.9	0	0	0	455	All Good
3 cyl Deisel motor	10:30	0	20.9	0	0	0		All good
Forerunner	10:30	0	20.9	0	0	0		Bad Exhaust Leak at rear
3 ltr toyota Motor	11:30		20.9	200	0	0		Manifold leak
AG01 again								
Roller Door Open	2:40		20.9	0	0	0		Engines #2,3,4, 5
								Discussion is required to input separate investigation notes
30/10/2024	AG01	Ground Floor						
		CH4	o2	CO	H2S	NO2	Co2	Comments
# 2 Falcon Engine	2:55	0	20.9	45	0			Exhaust Leak
# 3 Holden 6 Engine	11:00	0	20.9	60	0		-	Elevated behind the engine, Exhaust leak shut after 2 min
# 4 Ford Engine	12:45	0	20.9	70	0		-	Leak right side exhaust
# 5 Holden V6 engine	11:35	0	20.9	138	0		-	Burning oil right rear exhaust.

Air Flow rates:

31/10/2024									
AG01	Exhaust extraction tubes			Air flow rate CMM	comments		Duct leakage		
	#1 Rodeo			8600	kinked		1100		
	#2 Middle one			9500	ok		1100		
	#3 East one			8400	kinked		1100		
	Hard piped (yellow)			23000	over 3 motors				
	Main Exhaust check			CMM -Roller door CLOSED			CMM -Roller door OPEN 500mm		
	#1 duct			17800			17900		
	#2 duct			15500			17100		
	#3 duct			19000			19500		
	#4 duct			18500			19500		
	#5 duct			19000			20200		
	#6 duct			20500			20200		
AG40									
	Main Exhaust check			CMM -Roller door CLOSED			CMM -Roller door OPEN 300mm		
	#1 duct			20000			20500		
	#2 duct			21000			21000		
	#3 duct			18000			18200		
	#4 duct			29000			28500		
	Exhaust extraction tubes			Air flow rate CMM	comments				
	#1 Blue car			13500	All good				
	#2 Red car			15000					
	#3 south one			14000					
AB01									
	Main Exhaust check			CMM -Roller door CLOSED			CMM -Roller door OPEN 1m		
	#1 duct			16000			16500		
	#2 duct			18000			18200		
	#3 duct			13000			12600		
	#4 duct			18000			17700		
	#5 duct			33000			31000		
	#6 duct			30000			30000		
	#7 duct			22000			22300		
	Vehicle extraction tubes				comments:				
	Dyno			17000	All good				
	Polo			6500	restrictor in line				
	Rodeo			10000	LEAKING ENGINE EXHAUST				
	Yaris			4500	False reading as tube is slotted				
	Genesis			107000					
	Hyundai			82000					
AB02									
	Main Exhaust check			CMM -Roller door CLOSED			CMM -Roller door OPEN 500mm		
	#1 duct			16400			16500		
	#2 duct			16800			16600		
	#3 duct			16800			17000		
	#4 duct			13900			14500		
	#5 duct			14800			14800		
	#6 duct			19000			18600		
	#7 duct			24000			23000		
	Vehicle extraction tubes				comments:				
	#1 Magna			40000	All good				
	#2 Forerunner			43000	LEAKING MUFFLER				
	#3 Toyota engine			35000	LEAKING ENGINE EXHAUST				