

## **Orbital Engine Report Appendix 1 – Summary Explanation**

Orbital Engineering carried out independent before and after tests on 4 vehicles, in various states of repair and engine configuration, that had their injectors cleaned with the GLR cleaning process.

The following rationale notes are provided to assist the reader interpreting the reported outcomes shown in Orbital's Report Appendix No.1 - Diesel Results Summary.

### **RATIONALE BEHIND ORBITAL TESTS**

GLR provides the following rationale to assist your interpretation of the Orbital report findings and specifically the rationale for conducting tests on specific engines

#### **Toyota Hilux (normal)**

The figures show a 7.9 % improvement in fuel economy and a 34.9 % reduction in greenhouse gas emissions. These are typical outcomes of a GLR clean and demonstrate that cleaning injectors has a significant effect on engine performance, improving fuel economy and lowering green house emissions. These figures are consistent with the Gold Fields St Ives Gold Mine Independent test results.

#### **Nissan Atlas (new injectors)**

This vehicle had been fitted with new injectors. The rationale behind this test was to prove that, even with new injectors, our clean was beneficial to the motor as the fuel pump and combustion area were the focus of the clean. The most significant results were the marked reduction in greenhouse emissions which evidences successful cleaning of the fuel pump and combustion area, enabling these areas to operate as designed to ensure the correct fuel and air mix which promotes a cleaner burning engine.

#### **Nissan Patrol (old smoky)**

This high mileage vehicle, with a motor that was clearly worn out (due to oil smoke present while engine running), was cleaned to demonstrate that our Product and cleaning process would not remove carbon from around the piston rings which **is essential** to ensure the engine does not burn oil. The results conclusively proved that our Product and cleaning process did not remove carbon from the rings, evidenced by lower fuel consumption and emissions (whilst modest) being reported.

#### **Holden Rodeo (Modified Engine)**

This vehicle had a modified engine. A worked cam shaft altered the compression and rocker ratios and a super charger had been installed. The tests unfortunately did not include engine hp torque improvements in the rev range which, had it been reported would explain the variation in the figures reported as it would have shown the increase in hp torque for each test. When you consider a modified engine's purpose is to increase the air and fuel flow through the engine (valve overlap) the results make sense. i.e. 100 % emission increase means that more fuel and air flowed through the engine after our clean.

#### **Orbital Conclusion**

The Orbital independent tests were a tremendous success on all vehicles tested and conclusively demonstrate the benefits and effects of the GLR cleaning process on various engines.

Please refer to the detailed Orbital Engine test report for verification.

APPENDIX 1 DIESEL RESULTS SUMMARY

Vehicle	Fuel Consumption (g/min)						Smoke (Bosch smoke number)					
	Roadload Test			Smoke Test			Roadload Test			Smoke Test		
	Low Speed	High Speed	High Speed	Low Speed	High Speed	High Speed	Low Speed	High Speed	High Speed	Low Speed	High Speed	High Speed
Toyota Hilux (No Roadload Test) Pre Clean Post Clean % Difference	-	-	-	176.40	188.20	188.20	-	-	-	1.63	0.21	0.21
	-	-	-	174.90	173.40	173.40	-	-	-	1.61	0.14	0.14
	-	-	-	-0.9	-7.9	-7.9	-	-	-	-1.2	-34.9	-34.9
Nissan Atlas <i>msc system</i>	46.50	89.00	89.00	110.20	226.40	226.40	0.04	0.05	0.05	1.23	1.11	1.11
	46.90	89.00	89.00	105.70	230.10	230.10	0.03	0.05	0.05	0.93	0.88	0.88
	0.9	0.0	0.0	-4.1	1.6	1.6	-28.6	0.0	0.0	-24.7	-20.2	-20.2
Nissan Patrol <i>old Smoky</i>	88.30	113.80	113.80	226.60	252.80	252.80	0.02	0.02	0.02	0.56	1.03	1.03
	89.80	113.30	113.30	228.80	245.10	245.10	0.02	0.02	0.02	0.54	1.01	1.01
	1.7	-0.4	-0.4	1.0	-3.0	-3.0	0.0	0.0	0.0	-4.3	-1.4	-1.4
Holden Rodeo <i>Modified Engine.</i>	51.40	89.80	89.80	120.40	238.90	238.90	0.03	0.02	0.02	0.68	0.98	0.98
	49.30	91.40	91.40	134.10	242.10	242.10	0.01	0.04	0.04	1.11	1.06	1.06
	-4.1	1.8	1.8	11.4	1.3	1.3	-66.7	100.0	100.0	63.2	8.2	8.2