

LOS ANGELES COUNTY PUBLIC WORKS
ALTERNATIVE FUEL TRUCK PILOT PROGRAM

JULY 30, 2020



Public Works

LOS ANGELES COUNTY

Alternative Fuel Truck Pilot Program

July 2020 Report

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EXECUTIVE SUMMARY

Public Works tested the viability of using a compressed natural gas (CNG) tractor truck on the Devil's Gate Reservoir Restoration Project. It was determined that the particular CNG tractor truck used in the test, pulling two bottom dump trailers, could haul the necessary loads in and out of the worksite and transport sediment to the placement sites.

BACKGROUND

In October 2019, Public Works conducted a series of nine tests to determine whether a CNG fueled tractor truck, pulling double bottom dump trailers, could match the performance of diesel fueled tractor trucks on the Devil's Gate Reservoir Restoration Project, in terms of transporting sediment between the reservoir and the two sites identified for placement of the sediment.

FINDINGS

When compared to the benchmark diesel test tractor truck, the CNG tractor truck had:

- less torque, yet was able to pull fully loaded trailers out of the reservoir and unloaded trailers out of both sediment placement sites.
- less power, so was slower going uphill on a steep section on the 210 freeway (45 mph).
- less range with CNG fuel tanks, so needed to be refueled daily.
- far fewer stations where it could be refueled. We did not identify a station where the CNG truck could be fueled near the jobsite, unless the trailers were first disconnected.

SPECIFICATIONS AND TESTS

Vehicle Specifications			
	Benchmark (Diesel)	Test Vehicle (CNG)	Difference
Manufacturer	Freightliner	Freightliner	None
Model	Cascadia X12564ST	Cascadia	Diesel vs. CNG
Year	2012	2016	4 Years Newer
Photo			
Engine Displacement	14.8 L	11.9 L	-2.9 L
Peak Horsepower	455	400	-55
Peak Horsepower RPM	1800	1800	0
Peak Torque	1750	1450	-300
Peak Torque RPM	1240	1200	-40
Fuel Tank Capacity (Diesel Gallon Equivalent)	200 Gallons	120 Gallon tank, of which 90 gallons are usable	-80 Gallons
Average Miles per Gallon (MPG) per manufacturer	6 MPG	5 MPG	-1 MPG
Average MPG observed during test	5 MPG	3.6 MPG	-1.4 MPG
Fuel Range	1200 mi. range (manufacturer)	450 mi. range (manufacturer)	-750 mi. range

Test 1 – Weight of tractor without trailers with full fuel tank minus fuel used to travel from fueling station to Devil’s Gate

	Benchmark (Diesel)	Test Vehicle (CNG)	Difference
Weight of Tractor without Trailer Attached (lbs.) – Full Fuel	16,840	18,440	+1600

Test 2 – Tare weight of tractor with trailer hooked up

	Benchmark (Diesel)	Test Vehicle (CNG)	Difference
Tare Weight of Tractor with Trailer hooked up (lbs.) (Both tractors with trailers fit on scales)	34,020	30,300	-3,720

Test 3 – Time to drive up west exit ramp at Devil’s Gate fully loaded (minutes & seconds)

	Benchmark (Diesel)	Test Vehicle (CNG)	Difference
Average of 3 Trials	1:22	1:12	-0:10

Test 4 – Time to drive up Devil’s Gate west exit ramp fully loaded, with stop for 10 seconds at base of ramp (minutes & seconds). Time includes the 10 second stop.

	Benchmark (Diesel)	Test Vehicle (CNG)	Difference
Average of 3 Trials	2:12	1:40	-0:32

Test 5 – Time to drive up Devil’s Gate west exit ramp fully loaded with stop and restart part way up the ramp (minutes & seconds). Time includes the 10 second stop.

	Benchmark (Diesel)	Test Vehicle (CNG)	Difference
Average of Trials	1:41	1:28	-0:12

Test 6 – Any Issues with fully loaded trucks entering Manning Pit -24% Slope Ramp?

	Benchmark (Diesel)	Test Vehicle (CNG)

3 Trials	No issues	No issues
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Test 7 – Any issues with fully loaded trucks exiting Manning Pit +12% slope ramp that is watered for dust abatement while differential lock is disengaged, and power divider (front rear and back rear axle) is off?

	Benchmark (Diesel) – with Differential Lock	Test Vehicle (CNG) – with Power Divider
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Both vehicles had similar performance

Test 8 – Any issues with fully loaded trucks exiting Manning Pit +12% slope ramp that is watered down while differential lock is engaged, and power divider (front rear and back rear axle) is on?

	Benchmark (Diesel) – Differential Lock	Test Vehicle (CNG) – Power Divider
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Both vehicles had similar performance

Test 9 – Any Issues with empty trucks exiting Manning Pit +12% slope ramp that is watered down while differential lock is engaged, and power divider is on?

	Benchmark (Diesel) – Differential Lock	Test Vehicle (CNG) – Power Divider
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Both vehicles had similar performance