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**Plein Disposal Inc. and Turtle Island
Recycling Trucks
Equipped with *i-phi*[™] Hydrogen Generating Technology**

Prepared by

Global MRV

For

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Innovative Hydrogen Solutions

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EXECUTIVE SUMMARY



In the fall of 2010, Stewardship Ontario representative Rick Denyes and Ontario Continuous Improvement Fund Representative Andy Campbell met with Innovative Hydrogen Solutions Inc. (IHS) to discuss what the impacts of installing the IHS *i-phi*[™] (Partial Hydrogen Injection) system on Recycling Trucks used in the Stewardship's Blue Box Recycling Program by way of conducting a series of on-road tests. Based on these discussions, IHS contracted Global MRV to validate data from a series of four test runs over a six month period for the purpose of determining the impact of the *i-phi*[™] system on Fuel Economy and Emissions Reduction. Global MRV would act as a Third Party Verification Entity to ascertain any noticeable emission and/or fuel reductions associated with using the *i-phi*[™] system.

To determine the affects of the *i-phi*[™] system, five Recycling Trucks were used in three separate evaluations. The test plan for the three evaluations each included a baseline segment and three different test segments. Treatment data was collected after 60 days, 120 days and 180 days, simulating real world driving conditions but in a controlled format. The test involved using three Trucks from Turtle Island in Aurora, Ontario and two Trucks from Plein Transport in Elmira, Ontario utilizing a predetermined city route and a predetermined rural route. Testing began on April 3rd, 2011 and was completed on October 2nd, 2011. The testing was conducted over this period of time to ensure that enough time passed to properly allow what IHS calls the "Hydrogen Break-in" phenomenon to purge the system.

The parties used Global MRV's Axion R/S Portable Emissions Measurement System (PEMS) for all testing to quantify both emissions and fuel improvements attributable to the *i-phi*[™] system.

The test plan was based on the collection of vehicle data operating on repeated driving routes. In order to obtain comparable data, the vehicle emissions were mapped to engine operating parameters using modal analysis techniques. The analysis of the data yielded statistically significant results for three of the five vehicles tested. Mechanical repair unrelated to the project of one of the test vehicles further reduced the number of vehicles with statistically valid results to two.

The two successfully tested vehicles showed reductions in all pollutants tested, as well as fuel consumption. As more fully detailed in the attached report and after the Hydrogen Break-In phenomenon, the average reductions (excluding a confidence rating +/-) in NOx and PM averaged 29.89% and 38.26% respectively. The corresponding fuel reductions averaged 7.27%.

The trends of the actual results in Emission Reductions and Fuel Reductions in all of the Testing phases are reflective and supported by previous Third Party Testing Verifications conducted by Global MRV in September through November of 2005 in Manitoba and by the University of Auburn's Program for Advanced Vehicle Evaluation's SAE J1321 (TMC RP-1102) Type 2 Fuel Consumption Test in 2010 using the IHS *i-phi*[™] Technology.

The general trends demonstrate that better fuel savings correlates to reduced emissions, which clearly backs up the claims that the *i-phi*[™] system is enhancing the combustion process.

A handwritten signature in black ink, appearing to read 'D. Miller', is positioned above the typed name.

David Miller
Chief Technology Officer
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