EVIDENCE FOUND THAT NASA AND OTHER AGENCIES KNOW THAT SUPPLEMENTAL HYDROGEN IMPROVES FUEL EFFICENCY

Compelling Evidence found that NASA, U.S. Dept. of Transportation, U.S. Patent Office and Detroit, as well as Scientists from around the world, all know and claim that Supplemental Hydrogen improves Fuel Efficency, reduces Harmful Emmissions and allows Leaner Operation of Internal Combustion Engines.

The list below is a partial collection of references regarding supplemental hydrogen, from official publications of NASA (National Aeronautics and Space Administration), DOT (United States Department of Transportation), USPTO (United States Patent and Trademark Office) as well as other Patent Offices, JPL (Jet Propulsion Laboratory, California Institute of Technology) and surprisingly, "Detroit" itself (The Society of Automotive Engineers of Troy, MI).

Obviously not all documents are saying exactly the same thing, but the overall picture is clear when you look at the collective pointers and you observe where they are pointing.

What to do:
(a) Read these documents,
(b) Copy the references and spread them around, and
(c) If you have any to add, I would like a copy of (or link to) the original publication, please email me at ronda@riehl-ind.com

THE REFERENCES:

1. NASA: Hydrogen and Gasoline Mix Increases Mileage.

2. Department of Transportation: Guidelines For Use Of Hydrogen Fuel In Commercial Vehicles - see page 20 - "Onboard electrolyzers are used with hydrogen injection systems for diesel engines (see Section 3.5). In this case, only a small amount of hydrogen and oxygen are produced to supplement, not replace, the diesel fuel used in the engine. The electricity to operate the electrolyzer is typically supplied by the engine's alternator or 12/24-VDC electrical system."

3. Related articles by Hydro Kevin (Kevin Kantola from Redlands, California) Government Says Hydrogen Fuel Injection Is Viable Technology and U. S. DOT Supports Hydrogen Injection - Part 2

4. NASA in their Technical Note Report E-9105 (NASA-TN-D-8487) published May 1, 1977:

• This report is titled “Emissions And Total Energy Consumption Of A Multicylinder Piston Engine Running On Gasoline And A Hydrogen-Gasoline Mixture”, and NASA’s abstract (in their archives today) says: “A multicylinder reciprocating engine was used to extend the efficient lean operating range of gasoline by adding hydrogen. Both bottled hydrogen and hydrogen produced by a research methanol steam reformer were used. These results were compared with results for all gasoline. A high-compression-ratio, displacement production engine was used. Apparent flame speed was used to describe the differences in emissions and performance. Therefore, engine emissions and performance, including apparent flame speed and energy lost to the cooling system and the exhaust gas, were measured over a range of equivalence ratios for each fuel. All emission levels decreased at the leaner conditions. Adding hydrogen significantly increased flame speed over all equivalence ratios.”

• This research focused on using hydrogen as a supplemental fuel to gasoline to a 1969 production engine. The research demonstrated that the higher flame speed of hydrogen was responsible for being able to extend the efficient lean operating range of a gasoline engine:

• “Lean-mixture-ratio combustion in internal-combustion engines has the potential of producing low emissions and higher thermal efficiency for several reasons. First, excess oxygen in the charge further oxidizes unburned hydrocarbons and carbon monoxide. Second, excess oxygen lowers the peak combustion temperatures, which inhibits the formation of oxides of nitrogen. Third, the lower combustion temperatures increase the mixture specific heat ratio by decreasing the net dissociation losses. Fourth, as the specific heat ratio increases, the cycle thermal efficiency also increases, which gives the potential for better fuel economy.”

• “Adding hydrogen to gasoline significantly increased flame speed and allows for a leaner air-fuel ratio. All emissions levels decreased at these leaner conditions….significantly increased flame speed and allows for a leaner air/fuel ratio. All emissions levels decreased at these leaner conditions.”

• “The results were used to explain the advantages of adding hydrogen to gasoline as a method of extending the lean operating range. The minimum-energy-consumption equivalence ratio was extended to leaner conditions by

adding hydrogen, although the minimum energy consumption did not change. All emission levels decreased at the leaner conditions. Also, adding hydrogen significantly increased flame speed over all equivalence ratios."

• The official document may be downloaded from NASA Archives (document ID 19770016170):
http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19770016170_1977016170.pdf

5. The Society of Automotive Engineers of Troy, Michigan (="Detroit")
This is a huge organization with over 121,000 members! The list below shows a collection of references found in their official publications of the past 35 years (today it is published online http://www.sae.org/mags/aei/) - from which it is obvious that THEY HAVE KNOWN all about it [source: Google - this info appears on many websites and I couldn't tell who's the original compiler]:

• Publication #740187, February 1974: Adding hydrogen to gasoline resulted in significant efficiency improvements due to the extension of the lean operating limit.

• Publication #740600, February 1974: A compact onboard hydrogen generator has been developed for use with a hydrogen-enriched gasoline internal combustion engine.

• Publication #810348, February 1981: Adding hydrogen to gasoline showed a potential for very low pollutant emissions with increased energy efficiency.

• Publication #830897, April 1989: Adding hydrogen to gasoline produces improvements in engine efficiency and emissions due to accelerated flame speed and combustion rate.

• Publication #960603, February 1996: Adding hydrogen to gasoline produces improvements in engine efficiency and emissions, due to accelerated combustion.

• Publication #2000-01-2206, June 2000: Adding hydrogen to gasoline can reduce exhaust emissions and increase efficiency. A large reduction in nitrogen oxide emissions can be achieved without a catalytic converter due to very lean operation under certain conditions.

• Publication #2002-01-2196, July 2002: Adding hydrogen to gasoline increases the flame speed at all gasoline air/fuel ratios, so engine operation at very lean mixtures is possible.

• Publication #2003-01-0630, March 2003: Adding hydrogen to gasoline extended the lean limit of engine operation, resulting in greater efficiency and reduced emissions, both hydrocarbons and nitrogen oxides.

• Publication #2003-32-0011, September 2003: Adding hydrogen to gasoline resulted in improved engine.

• Publication #2004-01-0972, March 2004: Adding hydrogen to gasoline results in lower emissions and a significant increase in engine efficiency.

• Publication #2004-01-1270, March 2004: Adding hydrogen to gasoline produces improvements in engine efficiency and emissions.

• Publication #2004-01-1851, June 2004: Adding hydrogen to gasoline reduced knock due to accelerated fuel burn and shortened combustion period.

• Publication #2005-01-0232, April 2005: Adding hydrogen to gasoline produces lower emissions due to increased flame speed and resultant accelerated fuel burn.

• Publication #2005-01-0251, April 2005: Adding hydrogen to gasoline can extend the lean limits of the air/fuel ratio.

6. Some of the many Registered Patents from the USA, UK and Australia:

• 1918 - This is the oldest hydrogen-on-demand known (to me) patent FOR VEHICLE USE! Note the use of the term “Hydro-Oxygen Generators” used at the beginning of page 2 to describe the entire water-fuel industry. American inventor Charles H. Frazer filed this patent, number 1,262,034 on April 18, 1916 (the final approval was granted by the U.S. Patent Office 2 years later, on April 9, 1918. He described the purpose of the device to be: “In this manner, a very low grade fuel may be used and by properly setting the valves, the proper supply of gases may be added to render the fuel thoroughly combustible.”

• 1930 - Rudolf Erren - Erren engine - GB patent GB364180 - Improvements in and relating to internal combustion engines using a mixture of hydrogen and oxygen as fuel.

• 1939 - Rudolf Erren - Erren engine - US patent 2,183,674 - Internal combustion engine using hydrogen as fuel.

• 1980 - Charles T. Weber - U.S. Patent 4,344,831 “Apparatus for the Generation of Gaseous Fuel”.

• 2005 - Australian Patent AU-2005100722-A4 - granted by the Australian Patent Office to Robert Michael Roberts and Chau Kin Nam. Some relate it to the Joe Cell. In part, it looks similar to the devices shown experimented by Stanley Meyer.

7. Additional Patents:
• There are at least 40 patents in the last few decades alone, we are collecting the patents and will add them here.

8. California Environmental Engineering (CEE)
“CEE feels that the result of this test verifies that this technology is a viable source for reducing emissions and fuel consumption on large diesel engines.”
ORIGINAL NEEDED email me

9. The American Hydrogen Association Test Lab

“Emissions test results indicate that a decrease of toxic emissions was realized.” Zero emissions were observed on CO (carbon oxide). ORIGINAL NEEDED email me

10. Additional data based on http://en.allexperts.com/e/h/hy/hydrogen_fuel_injection.htm and other sources including http://en.wikipedia.org/wiki/Hydrogen_fuel_injection - ORIGINAL DUCUMENTS NEEDED:

In 1974 John Houseman and D.J. Cerini of the Jet Propulsion Laboratory, California Institute of Technology, produced a report for the Society of Automotive Engineers titled “On-Board Hydrogen Generator for a Partial Hydrogen Injection Internal Combustion Engine” (available at http://www.osti.gov/energycitations/product.biblio.jsp?osti_id=5206481 and http://www.sae.org/technical/papers/740600). F.W. Hoehn and M.W. Dowy, also of the Jet Propulsion Lab, prepared a report for the 9th Intersociety Energy Conversion Engineering Conference (held August 26-30, 1974 in San Francisco), titled “Feasibility Demonstration of a Road Vehicle Fueled with Hydrogen Enriched Gasoline.” (This research utilized onboard storage tanks to supply the hydrogen combustion enhancement.)

In 1993, researchers Y. Jamal and M.L.Wyszynski of the University of Birmingham, United Kingdom, released a review titled “Onboard Generation of Hydrogen-Rich Gaseous Fuels - a Review” in which they concluded: (3.) Hydrogen supplementation of gasoline combustion has been shown to yield reduction in fuel consumption. (4.) Hydrogen-rich gaseous fuels can be burned under ultra lean conditions to yield very low NOx emissions without running into lean flammability limit problems. and (5.) The lean burning conditions give possibilities for very low CO emissions.

In 1995, newer investigations have highlighted the potential for pollutant reduction. Research performed by scientists at the University of Birmingham, United Kingdom, released a study at the HYPOTHESIS Conference at the University of Cassino, Italy in which it was presented that “hydrogen, when used as a fractional additive at extreme lean engine operation, yields benefits in improved combustion stability and reduced nitrogen oxides and hydrocarbon emissions.”

In 1997, similar results have been presented by a team of scientists representing the Department of Energy Engineering, Zhejiang University, China, at an international conference held by the University of Calgary. Practical tests have been performed by California Environmental Engineering (CEE), The American Hydrogen Association Test Lab and Corrections Canada in which reduction in toxic exhaust emissions and fuel consumption were realized.

Here are the links to the actual articles.

http://ntrs.nasa.gov/archive/nasa/casi.ntrs.nasa.gov/19770016170_1977016170.pdf

http://www.sae.org/technical/papers/2002-01-2196

http://www.sae.org/technical/papers/2004-01-0582

http://www.fmcsa.dot.gov/facts-research/research-technology/report/Guidelines-H2-Fuel-in-CMVs-Nov2007.pdf

http://www.sae.org/technical/papers/740600