Natural Gas Vehicle Cylinder Safety, Training and Inspection Project

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CVEF Project Director:
Hank Seiff

This presentation does not contain any proprietary or confidential information

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Purpose of Work

Assure the safety of natural gas vehicle fuel systems in order to...

Help encourage the use of natural gas vehicles in order to...

• displace petroleum
• lower emissions and greenhouse gases
• lower vehicle fuel costs
“...We see NGVs as playing an important role, especially in targeted markets where the benefits of natural gas can have the biggest impact. Every dedicated NGV in use displaces 100 percent of the petroleum that vehicle otherwise would use. Therefore, a growing NGV market is good for America since it helps reduce the amount of oil we need to import.”

—Spencer Abraham, Secretary of Energy/U.S. Department of Energy
NGVs:

- are in widespread use (7 million worldwide)
- are safe (one US fatality caused by NG fuel system)
- are clean (NGVs can reduce emissions 70-90%)
- use domestic fuel (97% of the natural gas used in the US is produced in North America)
- reduce operating costs (gasoline $2.45/gal, natural gas $1.45/GGE [both before taxes or rebates])
- are steppingstones to hydrogen vehicles
Passenger Car
CNG Fuel System

CNG cylinders on roof of transit bus
Purpose of the Project

• Increase the understanding of the safe and proper use and maintenance of vehicular compressed natural gas (CNG) fuel cylinders

• Address CNG cylinder and associated pressure relief device needs related to existing law, codes and standards

• Address and improve available training and inspection programs

• Assure coordination among vehicle users, public safety officials, fueling station operators and training providers

• Provide information learned from CNG vehicle fuel systems to emerging hydrogen vehicle industry
Barriers

– Many NGV users are not aware of need for cylinder safety inspection

– NGV users must be able to find or train qualified cylinder inspectors

– Inspector training and certification testing must meet highest safety standards

– Industry Codes and Standards must be kept up to date for safety

– NGV “incidents” must lead to improvements in C&S

– If possible, cylinder life should be extended beyond 15-20 years

– Knowledge from NGV experience should be used to make hydrogen vehicles safer
Technical Approach

I – Public and Industry Awareness Campaign

II – Training Scholarships or Tuition (Funding) Assistance

III – Evaluate Current Training and Testing Practices

IV – CNG Cylinder Safety Monitoring & Investigation Activities

V – CNG Cylinder Recertification

VI – CH$_2$/ HCNG Cylinder Safety Considerations
Some Accomplishments

See [www.cleanvehicle.org](http://www.cleanvehicle.org) and click on “NGV Cylinder Safety, Training and Inspection Program”

Comes up first when you “Google” “Compressed Natural Gas Cylinder Safety”!
• 76 advertisements, articles, websites, etc.
• 224 scholarships granted

• All available cylinder manufacturers’ inspection criteria provided on CD to CSA for certified inspectors
• Working through NGV industry, AAMVA, NFPA, etc. to inform NGV users of need for cylinder inspection
• Certified inspectors contacted fleets to determine inspection procedures
• Working with CSA to improve/update certification test
• Providing information to NGV C&S organizations (CSA, SAE, NFPA, ISO, etc.)
• Helping with detailed NGV incident investigations
• Considering cylinder “recertification” process
• Reviewed worldwide cylinder inspection procedures and enforcement practices
• Providing “lessons learned” from NGVs to hydrogen C&S development

Some Things to be Learned from the “Other” Compressed Gas Fuel System

Henry E. Seiff
Clean Vehicle Education Foundation

ABSTRACT
Compressed natural gas vehicles were first commercialized after World War II in Italy. There are now seven million CNG vehicles on the road worldwide. The first US CNG vehicle “incident” in our files dates to 1954. “Those who cannot learn from history are doomed to repeat it” (1), so this paper will explore a few of the things to be learned from CNG vehicle history that can help assure the safety of compressed hydrogen tanks and fuel systems.

A LITTLE BACKGROUND INFORMATION
Compressed natural gas as a motor vehicle fuel has been around for a long time.

Figure 2: 1932 Chrysler “Ironsides” powered by a Megas Natural Gas System (3)
• Information on all 76 incidents in CVEF files, from 1984 – present, available on CD

• Representation on CSA, SAE, NFPA, ISO and other Codes and Standards organizations assures lessons learned make their way into codes and standards.
Technology Transfer

- More and better-trained cylinder inspectors
- Make all cylinder manufacturers inspection standards available to all inspectors
- Improved Codes and Standards to assure continued NGV safety record
- Evaluation of “incidents” and transfer of information to C&S to improve safety
- Bring “lessons learned” from NGV industry to hydrogen vehicle industry
This Year’s Activities

Continue and Complete Present Activities – Contract expires 12/31/08
Summary

Technical Accomplishment Highlights

• 76 advertisements, articles, websites, etc. provide information on cylinder safety

• 224 cylinder inspector scholarships granted

• Collecting “incident” data and supporting investigations to improve safety

• Representation on Codes and Standards groups assures lessons learned make their way into C&S (for both CNG and CH2)
Summary
Potential for Petroleum Displacement

• NGVs use zero petroleum fuel, lower emissions and GHG,
• 40% lower fuel cost
• 7 million in use worldwide – proven technology
• a steppingstone to hydrogen vehicles
• This project assures the continued safety of NGVs and brings their experience to the HGV industry