Actions Table from Fuel Cells Summit V, May 31, 2001

Application	Issue Description	Suggested Actions to Address	Responsible Party(ies)
Stationary/ Residential	No known standards exist for hydrogen piping. What type of material should be used for piping hydrogen at the pressures that are required by the fuel cell?	Check with Dave Conover to see if there is any applicable code or standard in place. If not, pursue development of one.	Not identified
	Piping connections need to be designed such that they would meet existing standards	Manufacturers should consider aiding the permitting process for an inspector in the field	NA
	Education agenda items are being developed for code officials, should we also be compiling points similar to the one above to be shared with manufacturers?	The list of issues identified at the Summit could be forwarded to the different manufacturers for feedback on some of the concerns and solicit additional comments/concerns from them.	Not identified
	Manufacturers will be installing initial units, but what will happen years down the road when thousands units are being sold/resold on the market? Will there be licensed installers, or will many be installed by relatively unskilled labor?	Should there be a federally mandated program to require that installers be certified by a state or federal agency? How much of this responsibility should we place on the manufacturers?	Not identified

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	Will there be certified mechanics to work on these units in the field? Who will be responsible for the maintenance and upkeep of the unit? The homeowner? Will new home owners know what to do with an existing unit? What if the technology doesn't pan out? What steps will be taken to appropriately dispose of/recycle the unit, components, fuel?	Need to maintain contact with manufacturers to ensure that they properly consider and address the long term issues	Not identified
	Education issues exist on many levels, and not just with code officials. A lot needs to be done with the general public creating awareness and a general understanding of the technology. Increasing public awareness will aid market penetration of the new technology.	Anne-Marie Borbely has already begun an education campaign for code officials about fuel cells and other DER technologies. Manufacturers can help with input and in generating materials for this ongoing activity.	Anne-Marie Borbely
Stationary – Commercial	*What is the impact of the fuel cell on the construction process? Specialty contractors?*	Modifications to rooftop cranes to allow for extra weight of FC units relative to current RTUs. The incremental cost of these changes at the time of construction would be minimal. Flue/ventilation requirements could be quite different for fuel cells.	Not identified

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	During the product development cycle the prototype may not be listable since the product is in flux – need opportunities to install prototypes without being listed	The semiconductor industry has experience with hydrogen-consuming equipment and their use in buildings. This equipment typically has a short life cycle.	Valerie Harris (City Public Service, San Antonio TX) will provide further information concerning other industries methods for managing this issue.
	There is a need for a consistent listing requirement between North America, EU, and Asia.	Track the progress of IEC TC 105 that is trying to address this issue. ANSI Z21.83 is being considered for safety requirements and NFPA 853 is being considered for installation requirements. USFCC has a C&S working group and disseminates information concerning the progress of C&S. Information is available to members on the USFCC website (http://www.usfcc.com/).	Andy Skok U.S. Fuel Cells Council
	Presentations and videos for code officials on the technology and how to inspect and approve installations	Need outreach not only to code officials and customers but also utility commissions, environmental commissions, legislators, customers, schools. Communication methods can also include training seminars, workshops, training CDs, test site visits and demos, newsletters.	Not identified

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	Attend and present at meetings of model code organizations (ICC, IAEI, BOCA, SBCCI, ICBO, NFPA)	Get contact information for each of the organizations.	Terrence Moore, DEM, Fairfax, VA. Conover is writing an article for IAEI magazine and one has been written in the NFPA Journal on fuel cells. Conover will also present information on fuel cells at educational sessions he is giving in 2001 at BOCA/ICBO and SBCCI annual meetings.
	Develop standards for verifying or testing as-installed performance, which may be required for interconnection to the utility. The requirements for verifying as-installed performance can vary depending on the capacity of the unit, interconnection voltage, line PQ etc. Having some sort of as-installed test standard that recognizes these needs could avoid unnecessary testing or simplify testing of as-installed equipment	Expand the scope of the item to include items beyond interconnection. Many of the issues are addressed by existing standards. Develop a recommended practice for commissioning associated with or included in ASME PTC50 or NFPA 853.	TBD
	Standard operational data communication protocol across technologies, manufacturers, countries.	No specific action at this time	Honeywell
	Hybrid systems	Should be done through ANSI Z21.83 and IEC TC 105	Not identified
		Develop/create a "political" process/forum/advocacy group to facilitate the "technical solutions" to meet power, energy, and infrastructure needs	Andy Skok will work on a proposal

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Portable	Basis for designation of a fuel cell as stationary, portable, or vehicular - definition needed for battery substitutes.(remove cord and plug connection) May not be the case in scenarios.	A fuel cell generator of electricity, which is not fixed in place. A portable fuel cell appliance utilizes a cord and plug connection to a grid-isolated load and has an integral fuel supply.	Drafted at Summit by Breakout Session attendees
		Expand definition scope to include non-cord connected products i.e. laptop, flashlight	Harry Jones, JG to address with the ICC Ad Hoc Hydrogen Comm. in Golden, CO 06/04-5
		18.1 Occupancy (Code) 18.2 Container (Standard)	Beth Hock to verify
		Add “non-reversible” to definition ?	Not identified
		What about: - Micro fuel cells - Fire Codes – Stockpiling fuel - Quick disconnect to fuel tank ? OK but not to utility fuel line	Not identified

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	Indoor use (Confined Spaces) - work is being done by CSA 3.01 to address oxygen depletion, hydrogen emissions - limit power output/fuel supply of FC to intrinsic levels - toxicity - other indoor emissions issues i.e. MEOH, Propane etc.) Impact - Confined Space (Boat, house, RV's, aircraft) what standard will apply (ask T. Strothers) - Fuel storage technology (NaBH4, NH3…) - H2 Gaseous fuel Detection – Will H2 be odorized ? detection.	- Identify CSA limits - FC Council determine issues other than home/garage, commercial bldgs (Requires research) Make sure product standards insure full range of confined space issues including O2 depletion, H2 emissions, multiple appliance use.	Todd Strothers Fuel Cell Council Portable Group Not identified
	Education/Consumer Awareness - Literature, product search - USFCC Working Group (Web Site) - Educating Manufacturers - Educating Regulators - Educating Consumers	Status report at FC 6	Not identified
	Interchangeability of Components - Disposal/Recycling (Options and opportunities) - MF lifetime ownership - Product life cycle - Study hazards - Certification of replacement components (e.g., stack)	Expand the scope of the CSA to include other FC technologies	Not identified

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	Testing Protocols (Standards for operating range – performance	- Verify whether ASME PTC 50 covers portable Do we need performance standards ?	ask D. Conover/B. Wichert Conover response: My understanding is that ASME PTC 50 covers all fuel cells and associated components from fuel input to electric, heat and other outputs. Ask the USFCC WG regarding portable
	Transport of fuel supply - DOT - Fuel type	Update from portable WG for FC Summit 6 (RMES report)	
	Marking and labeling (misuse of appliance) – beyond standard (CSA) requirements. Product liability. Misuse of appliance.	Review and participate in the development of CSA 3.01. Encourage CSA to action and identify gaps. Review CSA standard at FC Summit 6	
	Reversible fuel cell appliances		

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Mobile/ Vehicular	Basis for designation of a fuel cell as stationary, portable, or vehicular	*IEC TC-105 Working Group #1 should handle this. Dave Conover will communicate with Kelvin Hecht and Steve Kazubski of the US TAG to ensure these three terms are addressed:* Stationary Fuel Cell Portable Fuel Cell Vehicular / Mobile Fuel Cell	Dave Conover, to be accomplished ASAP. Conover 6/23/01 update: E-mail on this topic sent to Kelvin and Steve; item resolution assumed to be underway.
	Safety related to hydrogen production	SAE has a Fuel Cell Standards Working Group on Safety, covering all aspects of vehicular safety for fuel cell vehicles, led by Glenn Scheffler.	SAE, Jane Hock
		On-Board Reformer design criteria is addressed by SSAE J2579 under the SAE Working Group. Jane Hock will convey this concern to the SAE Fuel Cell Standards Working Group at the next meeting on June 12.	SAE, Jane Hock

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		Vehicle crash response is covered by SAE J2578 under the SAE Safety Working Group. Jane Hock will follow up.	SAE, Jane Hock
	Identification of necessary safety concerns for each type of fuel cell and how to address them	List out safety issues associated with each fuel and storage scenario and I.D. who is working on each one of them. SAE has developed a list of safety issues, available on their web site. NHA and ISO TC-197 are also working on these issues. SAE has liaison agreements with NHA and ISO TC-197. ICC is also working on some of these issues. Dave Howell will work with PNGV to explore the task to compile a list of all these safety scenarios and keep it up to date.	Dave Howell

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	Ventilation needs for all parking garages *How combustible liquids and flammable gases can co-exist in the same interior spaces or be stored on the same site?*	Being researched by ICC for Fuel Cell Safety Standards Work by Dr. Swain in Florida applies to residential garages. Additional work on public/commercial garages and tunnels may be necessary. DOT and NHTSA may need to be involved. Jane Hock will convey this concern to the SAE Fuel Cell Standards Working Group at the next SAE meeting on June 12, 2001.	Jane Hock
	Standardization of data	The following proposed SAE standards address these issues: Fuel Cell System Performance Testing Fuel Processor Subsystem System Performance Testing Fuel Cell Stack Subsystem Performance Testing ASME PTC-50 also addresses fuel cell system efficiency performance. Jane Hock will bring this to the attention of SAE. Bob Wichert will bring this to the attention of ASME.	SAE, Jane Hock ASME, Bob Wichert

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	Basis for the acceptability of fuel cell vehicle storage, fueling, and use within the current building infrastructure	ICC ad hoc hydrogen working group is addressing this issue.	ICC ad hoc hydrogen working group
	Need to address reforming on board or off site and issues associated with each	See hydrogen production above	
	Operational guidelines for consumers and distributors	Education/Training	SAE/Industry/OEM/Component Manufacturers
	How to address hydrogen safety	Covered previously	
	Servicing and maintenance protocols are being explored by SAE in cooperation with the Service Technicians Society (STS)	Covered by SAE	Covered by SAE
	Need to integrate fuel cell technology into airline support applications	Covered by SAE	SAE, Jane Hock
	Need to integrate fuel cell technology into portable power applications.	Fuel Cell Manufacturers should work with various temporary power markets	Manufacturers
	Need to identify regulatory barriers to fuel cell utilization	Fuel Cell Manufacturers should work on this issue.	Manufacturers
	Need to compete against gearhead mentality regarding IC engine competition	Fuel Cell Manufacturers should educate appropriate audiences.	Manufacturers
	Need energy efficiency message to drive application of fuel cells	Develop education package	DOE, Fuel Cell Manufacturers, NGOs, Associations, EPA
	EMTs need help dealing with increased issues associated with use of fuel cells and related fuels	Covered by SAE action item above	SAE
	Service technicians need to be educated, in place and certified	Add qualified service technicians to operational guidelines above	Manufacturers, SAE, Jane Hock

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	Aircraft in process inspectors need to be trained in fuel cell technology	Add qualified service technicians to operational guidelines above	Manufacturers, SAE
	Auto Inspectors / mobile platform inspectors	Add qualified service technicians to operational guidelines above	Manufacturers, SAE
	What do commercial insurance carriers need?	Being accomplished by SAE in cooperation with insurance liability industry	SAE Working Group, Jane Hock
	SAE has started a dialogue with the Performance Review Institute (PRI) for potential mobile unit certification	No action required	
	Producing and storage of hydrogen on site may change the building categorization to a hazardous production facility facility-need to review use group iss	ICC is studying this issue ASAP	ICC ad hoc hydrogen working group
	SAE has relationship with transit standards consortium for standards for bus applications	Continue relationship	SAE, Transit Standards Forum
	Federal transit authority – bus standards on safety, but also performance	Continue this work	FTA
	Refueling stations may be a big issue (OEMS considering getting involved in distribution of fuel)	Inform ICC of the possibility of dealerships becoming fueling stations for hydrogen or otherwise	ICC, Guy Tomberlin
	SAE is doing a lot in codes and standards	Continue this effort	SAE
	Need hydrogen infrastructure	This is a market issue. DOE OPT (Carol Hammel) is assessing what needs to be done and developing a plan for what the infrastructure should be.	DOE (Carol Hammel), manufacturers, etc

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	Need to address parking garages?	See ICC item above	
	What about tunnels? (DOT and NITSA need to address this)	See ICC item above	
	Will state vehicle inspectors need to inspect fuel cell related components?	See educational item above	
	What about passive ventilation of enclosed spaces for hydrogen safety?	See ICC item above	
	NFPA Building Codes	Review NFPA Building, Mechanical, Electrical, Plumbing, and other new NFPA building codes to ensure proper coverage of fuel cells, consistent with work done for ICC Building Codes.	Manufacturers
	National Building Code of Canada, Administered by the National Research Council of Canada	Review National Building Code of Canada to ensure proper coverage of fuel cells, consistent with work done for ICC Building Codes.	Manufacturers
	Utility Company or Federal refueling stations may not be required to follow building codes	Utility companies and Federal facilities will have to review their requirements	Utility companies and Federal facilities.