End Product Components -- In Priority Order

Top Priority -- End Product 1

Grid interconnect standards, reduce duplication, and compile existing standards	Priority	Lead and supporting organizations	Overlaps
G3 -- Voluntary Sector-Developed Guidelines for SFCPP Grid Interconnection. This standard will aid uniformity and can help reduce a "crazy quilt" of differing utility criteria that must be satisfied for a grid- connect installation of SFCPPs. However, the definition of a strict single standard may not be feasible since interconnection requirements differ among utilities. A more feasible approach may be the development of consistent grid interconnection guidelines that both SFCPP users and electric utilities can utilize in determining "what to review" to assure effective grid interconnection criteria. This is a policy issue of high priority.	High	Lead = New group of manufacturers and utilities Support = IEEE, EPRI Comments: This issue is likely to have significant political and institutional sensitivities. Its wording and approach should be carefully thought out.	G2, G4
G2 -- A Standard that will Facilitate Elimination of Duplication in Grid Connect Safety Features. The availability of this standard will aid in simplifying and increasing the comfort level of utilities with manufacturers' electrical-side safety features. A key need is the development of a standard on the "testability" of safety features.	N/A	Lead = IEEE Support =	G3, G4
G4 -- Compilation/Integration of Applicable Grid-Connect Issues Covered by Existing Standards into One Document. There are currently a wide range of existing standards published by IEEE, CBEMA, NFPA, C-2, ANSI, UCA, etc. that were written before the emergence of SFCPP technology, and which would be applicable to the technology. The SFCPP -relevant parts of these need to be identified, compiled, and combined into one easy-to-use document that addresses relevant customer needs. ***(Note--this is also applicable in other standards areas.)***	High	Lead = Support =	G2, G3

Top Priority -- End Product 2

Test procedures for the performance of stationary fuel cell power plants	Priority	Lead and supporting organizations	Overlaps
P1 -- Standard Test Procedures for the System Performance of the SFCPP "Box". Standard test procedures are needed to measure performance of a SFCPP from its fuel input to conditioned power output. The procedures should also address how changes in performance over time can be projected, measured and verified. These procedures will allow "apple-to-apple" comparisons that can be warranted by manufacturers, and should address the following measures at minimum: • Efficiency -- electrical and thermal; peak and rated • Power Output (electric & thermal) -- peak and rated; power quality • Load-following Ramp Rates Turn-down Ability • Emissions.	High	Lead = ASME Supporting = IEEE, ANSI, EPA, EPRI, and others	P3
P3 -- Definition of Standard Test Conditions. This will define standard environmental test conditions (temperature, humidity, etc.) that should be used in performance testing (#PI), and means to adjust results to standard conditions if tests are conducted under different conditions. It should be capable of accommodating a user's load curves, and should be defined in coordination with the electric utility industry.	High	Same as #P1	P1

Top Priority -- End Product 3

Update building & safety codes, checklist, and certification & installation guidelines	Priority	Lead and supporting organizations	Overlaps
Bl -- Updates to ICC Codes and NFPA Documents. This is assigned a high priority because of its significance in this area, and because of a minimum three year update cycle, followed by several years before users will actually begin applying the updates. DOE is suggested as the lead organization because of its ability to coordinate meetings, submit changes impartially, and support expenses that are too high for any single manufacturer.	High	Lead = DOE Support = Manufacturers, vendors and users Comments: Involve the DOE Office of Codes & Standards; DOE's fiscal pockets are limited	B2, B4, B6
B4 -- Product Standards and Certification Procedures. Such standards and certifications must be defined and achieved by consensus among affected parties. Test procedures should included and may be headed by ASME in coordination with ANSI.	High	Lead = ANSI Support = Other organizations TBD	B1, B2, B6
B6 -- Installation Guidelines and Recommended Practices. Targeting especially the needs of designers, installers and local authorities, and focusing on the definition of minimum requirements for a good installation, these guidelines and recommended practices will facilitate the respective activities used by those parties for SFCPP installations.	High	Lead = Code agencies Support = Manufacturers	B 1, B2, B4
B2 -- Code Compliance Checklist for Local Authorities. This should be a relatively simple and easy-to-understand checklist that local authorities could use to quickly identify what codes are applicable to a SFCPP installation. It should follow and be coordinated with the updated codes activities described in #B1 above.	Med	Lead = DOE Support =	B I , B4, B6

Middle Priority --End Product 4

Standards for unattended operation	Priority	Lead and supporting organizations	Overlaps
B7 -- Standards for Unattended Operation. This should be defined as a function of size and other characteristics of SFCPPs, as well as addressing any certification requirements for an operator/attendant. It should emphasize that most SFCPPs do not require an operator/attendant, and should answer the following two questions: *"Do SFCPPs need an attendant? If so, at what point, and under what conditions?* " The answers will guide regulators, will preclude them from establishing unnecessary requirements for attended operation, and will avoid the potential for wide differences in such requirements among jurisdictions	N/A	Lead = Supporting = Comment: This guideline may be drawn as a function of pressures in a SFCPP in line with current requirements for conventional boilers; e.g., pressures over 15 psi.	Stand-alone

Middle Priority -- End Product 5

Standard terminology & definitions for SFCPP technology, performance and other factors	Priority	Lead and supporting	Overlaps
B5 -- Standard SFCPP Terminology and Definitions. This would aid uniformity and consistent understanding of SFCPP technology, performance and other relevant factors by manufacturers, regulators and users. Each standards organization should identify a point of contact who will provide the others with its set of definitions and terminology for review, with the ultimate goal of settling on a standard set.	High	Lead = Support =All standards organizations give specific Points of Contact (POC)	P2
P2 -- Definition of Reliability, Availability and Downtime. Provide a definition that can be used for reliability, availability and downtime of a SFCPP. Standards may not be appropriate or feasible for this performance measure. This definition may already be available from the National Electric Reliability Council (NERC).	Med	Lead = ASME Supporting = Industry, NERC	B5

Lower Priority -- End Product 6

Internal guidelines for users to determine costs and benefits	Priority	Lead and supporting organizations	Overlaps
G1 -- Internal Guidelines for Users to Determine Cost/Benefit. This facilitates the need for comparability and uniformity in cost/benefit analyses of SFCPP for those customers who have such a need. While unique to various manufacturers and to each specific end-use situation, guidance on effective means to perform these analyses will be helpful.	N/A	Lead = Support =	Stand-alone

Lower Priority -- End Product 7

Parallel activities and coordination with the international standards organization (iso)	Priority	Lead and supporting organizations	Overlaps
B8 -- Parallel Activities and Coordination with the International Standards Organization (ISO). The United States and North American SFCPP manufacturers and organizations should take a lead role in coordinating the development of codes, standards and guidelines with ISO to ensure their consistency internationally. This may require coordination also with IEA and transfer of ANSI Z21 to those bodies. Actions should also ensure consistency with environmental guidelines such as those in the ISO 14 standard.	N/A	Lead = Support =	Stand-alone

Lower Priority -- End Product 8

Educational materials on sfcpps and their applications	Priority	Lead and supporting organizations	Overlaps
G5 -- Product Application Guidelines for Education. There is a need for education and training of many customers associated with design, installation, use, etc. of SFCPPs. This is primarily a technical activity.	N/A	Lead = Manufacturers Supporting = coordination among all interested parties	B3
B3 -- Educational Materials on SFCPPs. These materials should include at minimum: (a) Brief technology descriptions designed to bring local authorities up to speed on SFCPP technology; (b) Seminars for the same audience; (c) Listings, descriptions and information on existing successful SFCPP acceptability	Low to Med	Lead = Trade association TBD Support = Manufacturers Comments: Usable both in K-12 schools and in Boardrooms	G5

Lower Priority -- End Product 9

Means to address other related code and standards issues	Priority	Lead and supporting organizations	Overlaps
P4 -- Means to Address Other Related Issues. These include four main issues: (a) Coordination of test procedures to address stationary, transportation, and portable fuel cells; (b) The importance of emissions and the ability to test for them; (c) Expansion of test procedures for key "uncovered" components; and (d) Decreasing the long lead times needed to develop and "publish" standards and/or approve documents.	Low to Med	Lead & supporting organizations vary by issue, and include industry, DOE, DOT, SAE, PNGV, EPA and ASME.	Not defined

Lower Priority End Product Summary -- Action Plan, Tasks and Steps

Decisions made on April 30 (Day 2)

Final end product	Tasks needed to get end product	Responsibility	Due date
Grid Interconnect Standards, Reduce Duplication, and Compile Existing Standards (G2, G3, G4)	PAR completed and approved	Lead is IEEE (Kelvin)	6 Months
	Explore and propose supporting activities with standard setting committees of IEEE, including coordination w/other organizations	Lead is IEEE (Joe)	8 Months for 1st draft of proposal
	Complete and document all activities	Lead is IEEE	2 Years
Test Procedures for the Performance of Stationary Fuel Cell Power Plants (Pl, P3)	Explore what linkages and coordination are needed between ASME and IEEE	Joe (IEEE), Jack (ASME), Dave Johnson (Ballard)	
	Provide suggestions on linkages, coordination & responsibilities to Dave Conover (DOE)	Joe, Jack and Dave Johnson	Not stated
	Decide on actions, how to proceed, responsibilities, and scheduling	All above	Not stated
	Note - this was an extended and somewhat heated discussion between ASME & IEEE		

Update Building & Safety Codes, Checklist, and Certification & Installation ; Guidelines (B1, B2, B4, B6)	Prepare a list of relevant existing codes & standards; distribute to all participants	Lead is DOE -- Conover will prepare and send both the listing and the revised end product" statement.	6 Weeks
	Prepare a revised statement of the consolidated "end product" desired for this activity; distribute to all participants.		
	Define necessary actions based on responses from participants in close coordination with current ANSI and NFPA committees	ANSI and NFPA	Not stated
Standards for Unattended Operation (B7)	Not defined	Not defined, but Kelvin had the most vocal interest on this topic	Not stated
Standard Terminology and Definitions for SFCPP Technology Performance and Other Factors (B5, P2)	Provide a list of terms and definitions from FC Committee to all participants.	David Conover (DOE)	2 weeks
	Responses from participants on the list above sent back to Conover with comments	All Summit participants	6 weeks
	Compile responses and comments received and return results to participants	David Conover (DOE)	10 weeks
	Decide next steps and responsibilities with the group based on tasks above	TBD	3 to 4 months
Internal Guidelines for Users to Determine Costs and Benefits (G1)	Not discussed	Not discussed	Not stated
Parallel Activities and Coordination with the International Standards Organization (ISO) (B8)	Definition of both the appropriateness and the process required for such parallel activities and coordination	ASME (Jack) is willing to serve as the Secretariat for this activity	Not stated
Educational Materials on SFCPPs and their Applications (B3, B5)	Assemble a listing of what educational materials are available from DOE, including their target audiences, and distribute the list to all participants for information and comment.	Dianne (DOE) will provide the list to Conover (DOE); Conover will distribute to participants.	1 month
	Next steps to be defined based on comments.	Not defined	Not stated
Means to Address Other Related Code and Standards Issues (P4)	Not discussed	Not discussed	Not stated