

**1. Can we get a copy of the slides to present to our management?**

Yes. We will make copies available to the participants individually. We will also post them on the Sandia website under Safety.

**2. Do we differentiate between suppression and containment?**

We, as the DOE ESS safety effort, do not differentiate between suppression and containment. That is something that standards and model codes currently address and could be expected to continue to address, not only ESS, but many other safety-related issues. We haven't differentiated between the two thus far, as we have been using a generic term 'protection' to date. The ICC International Fire Code and NFPA 1 and other standards and model codes address when one, or the other, or both are relevant in certain systems; noting those systems covered today are more traditional ESS.

Work under the R&D and CSR working groups will address this issue with respect to any needed revisions to standards and model codes for currently covered ESS technologies as well as how to apply suppression and/or containment to ESS technologies that are not currently covered by standards and model codes.

**3. Top priorities are related to chemical type solutions. Will standards also be created for flywheel type energy storage systems?**

ASME has initiated standards work related to thermal and mechanical systems.

1) Performance Test Code (PTC53) which deals with the performance, not safety, of those systems

2) Another ASME activity is underway to develop future standards to cover the safety of non-electrical (thermal and electric) systems.

The CSR working group will 'connect' with these ASME efforts and provide input to them where CSR working group members determine appropriate and make sure those involved in the CSR working group are aware of these efforts. Where research is needed, the R&D working group will be advised of those needs. As work of ASME comes to fruition the criteria will be communicated in collaboration with and through ASME and the ESS Education working group.

**4. Will there be a meeting where the three groups get together to discuss progress or will they be working now separately?**

We do envision that the three working groups will meet separately each focusing on specific activities; that said, we realize that those activities may be related (e.g. research informs CSR revisions or education is informed by newly revised CSRR). Beyond making sure the work of the three working groups is coordinated 'on paper' we will also have regularly scheduled combined meetings – perhaps on a quarterly basis – to collaborate and discuss progress made, as well as gaps that are still being addressed.

**5. Can we obtain a copy of UL 9540 draft or proposed language?**

Not yet. It is under development right now by a UL Standards Technical Panel (STP). When the work of the STP is completed the document will be available for public review. Input on the initial draft from the STP was due July 10<sup>th</sup> and we would expect a revised version based on that input in a few months. Under the CSR working group we envision coordinating efforts if folks want to come together and work as a team to provide a cohesive set of inputs for that document.

**6. Will there be a place for residential installations in the work that the working group is focusing on?**

In the CSR working group, each of the documents that we will be developing (or working with others to develop) may have a residential focus. In the draft Article 706 to the National Electrical Code there is a focus on residential. We envision the CSR working group discussing residential systems (or small vs.

large systems) as relevant to each standard or model code being addressed. Note that many of those existing documents may have specifics for residential (residential having a number of different potential definitions) as well as specifics for building equipment and systems based on the size. On that basis it is possible that some of the CSR work could be separated based on ESS capacity.

In Incident Response and Outreach residential systems is something that is on our radar and that we will be considering as we move forward in the process.

In Risk Assessment, Research and Development we will stay dynamic and address important issues, including residential, as needed and in concert with the other working groups.

**7. Will the R&D section also address grid scale ESS?**

Yes; our intent is to address this in terms of the areas of modeling and system-scale burn. This recognizes that potential safety incidents associated with ESS that we intend to address are 'blind' as to the location of the system in relation to the meter (e.g. grid or customer side).

**8. Does the scope of this safety effort include the conversion equipment (i.e. recifier/inverter, transformer, etc.)?**

Yes, there are standards (NEMA, IEEE, UL, and others) that apply to components of the energy storage system. A focus of the CSR working group will to make sure that those line up with the system-level standards and installation standards. Where the ESS is 'tested and listed' to a standard covering the system that activity would address the acceptability of any components associated with the system. Alternatively, the components can be separately 'tested and listed' to component related safety standards.

**9. How can small-scale, module-level testing play a role?**

As models are developed, small-scale testing can be used to feed into and validate large-scale models, and get a better idea of how things behave. Modeling efforts have a lot of promise in looking to see how larger systems will behave.

**10. Will the codes and standards be written to be technology agnostic so that they cover mechanical , thermal and electrochemical systems?**

Where a safety related issue is applicable to all ESS, CSR addressing that issue would be agnostic. Where the issue is only relevant to certain types of ESS then those CSR would have to specifically differentiate that type of ESS from others as it relates to that issue. Standards and model codes will be more inclusive and then where necessary provide separate ESS type criteria. Each technology is subtly different in how it needs to safely maintained – so it is not necessarily appropriate to have an over-arching standard that applies the same criteria to everything. We want something that's broad enough to cover all of the technologies out there, with specific application in its sub-sections for individual technologies.

**11. Has the group developed a priority list for testing by chemistry types?**

This level of specificity has not been developed, but will be part of the future efforts.

**12. I am from Factory Mutual Insurance. We are interested in risk-assessment related areas. What type of contribution and resources are expected from the working group members? Can you provide better understanding of the working modalities of the working groups in a little more detail?**

Each of the three working groups will determine what needs to be done to address ESS safety within their scope of activity and likely those needs will be compared to make sure they are complimentary (e.g. a CSR need may point to an R&D need). The amount of work needed to address each need is TBD but when determined all interested parties will be invited to participate. The amount of work needed can then be addressed by those who are willing to participate in the work. In short seeing what needs to be done and who is interested in participating will point to an answer.

Please see the slides for the details we have to date. You are free to participate in the working groups to get more detail as your schedules allow, or participate in future webinars to see how things have progressed.

**13. How many people do you expect that there will be in each working group? Will there be key decision makers and then support contributors or does everyone have an equal seat at the table?**

The working groups are open to whomever is interested in participating. There will be much work to do, and success towards achieving our purpose will require involvement by as many as want to participate. The structure and organization of the working groups is intended to be inclusive and to accommodate any who may want to participate.

As with the effort for the ESS performance protocol, everyone within the ESS working group has an equal place at the table; that said, since we are working within standards and model codes processes we will have to follow, collectively or as individuals, the established procedures.

**14. Are there any thoughts on how to prioritize by chemistry R&D efforts for BESS?**

The top priorities would be those ESS that are in the market now, and that are missing key safety-related information. I would also note that ESS chemistries in the lab now (years away from the market) should have this issue addressed by the entity conducting the research.

**15. We do research does work in the areas related to fire and explosion suppression as well?**

Yes. Research would be conducted to get answers to any safety-related question that we do not have answers to at present. A number of factors will drive the priorities associated with research.

**16. How do these working groups relate to the EPRI organized ESIC safety working group three?**

These efforts are intended to address R&D, CSR and education needs. We consider the work done by the ESIC that is related to any of the identified needs relevant to our efforts. One key in starting the work under the three working groups is to ID what is available to assist in the working groups efforts, whether from the ESIC or any other resource and then apply those resources where applicable in meeting identified needs.

**17. What steps are being taken to incorporate the UPS industry's input in these proceedings? After all, don't they present the same potential hazards and exposures?**

Input from any and all interested parties is encouraged. We have a robust communications effort to advise people what we are doing and we welcome all participation.

**18. How will we be able to participate/interact/contribute?**

ESSWG Kickoff Webinar Q&A

July 8, 2015

Respond to an upcoming e-mail from the three individual working groups POCs that should be released the week of July 13<sup>th</sup> or sooner.

**19. To be clear, it seems that focus is on chemical type; not flywheels?**

This effort is focused on safety of all ESS; that said, participants will 'drive' what needs are addressed. If there is a significant interest in any technology and participation by proponents of that technology then that would drive our focus.