

NAATBatt Recycling Committee – 12May17 Meeting Minutes

Ann Arbor, Mi. Prepared by Peter Karlson, Committee Secretary.

Updated Goals/Deliverables of NAATBatt Recycling Committee

(Updated 12May17)

Most pertinent NAATBatt mission statements:

- To accelerate commercialization of emerging electrochemical energy storage technology by facilitating greater collaboration among private industry, research institutions and government laboratories.
- To promote the recycling of and development of aftermarkets for advanced batteries and electrochemical energy storage systems.

Proposed Committee goal that fits into NAATBatt mission:

- Promote a safe, high value and sustainable *large format battery recycling industry in the US and Canada* by collaborating on innovative solutions to improve the areas of logistics, material identification and recycling technology.

Action: Request to group for any comments on modifications, additions to the goals and specific areas of interest [Committee]

Action: Anyone interested in talking at Intersolar: Provide a brief synopsis of what you would like to cover by email to Jim Greenberger by Wednesday, May 17th. Focus strictly on solar storage systems, consider what home owners and CNI operators, grid scale do at end of life? [All Interested]

Pri.	Item	Deliverable	Notes/Action Items
Logistics			
Med	Transportation regulations	Understanding of current regulations and potential to influence in the interest of cost and sustainability	<ul style="list-style-type: none"> Provide a summary of 49 CFR 173.185 to the committee, then we can decide if there is something to take back to the department of transportation that the group sees as potentially moving us towards our goals. [Todd Coy]
Hi	Damaged battery transport	Create proposal for NAATBatt involvement in facilitating industry collaboration on damaged battery evaluation and packaging	<ul style="list-style-type: none"> Internally re-assess our process for having people assess batteries in case of damage then follow up with OEM discussions [OEMs] Look at proposal that insurance companies be invited to this committee. [Committee] Bring information on damaged battery SAE committee to NAATBatt recycling committee. [Don Karmer] Provide information that National Alternative Fuels Training Consortium, have on determination of damaged battery assessment and handling. [Pat Hayes]
Hi	Design for Disassembly/Recycling guidelines	Generate guidelines on battery characteristics that aid and inhibit recyclability and dismantlability	<ul style="list-style-type: none"> Provide information on California study looking at dismantling and recycling site to committee [Mark Caffarey] Recyclers provide high level guidelines on what aids and inhibits recyclability and dismantlability. [Recyclers]
Med	Logistics network efficiency	Propose NAATBatt role in industry collaboration required to optimize logistics	<ul style="list-style-type: none"> Prepare an executive summary level list of items for logistics companies to be aware of during transportation of batteries and share with committee. [Keith Loch and John Kincaide]
Identification			
Med	Methods to identify batteries in recycling stream (chemistry, energy, etc.)	Identify opportunities to improve labelling and hence recycling stream safety and cost	<ul style="list-style-type: none"> Committee to look at sufficiency of the SAE J2936 labelling.[Committee]

Recycling Technology			
Hi	Identify barriers to value-positive, sustainable Li Ion battery recycling in North America	Determine actions that NAATBatt can take to address these barriers and promote commercialization of value-positive, sustainable Li Ion recycling in North America	<ul style="list-style-type: none"> • Form subcommittee to define the questions that should be in the RFP and draft the RFP. • Interested members: Pablo Valencia, Peter Karlson, John Kincaide, Dave Mauer, Renata Aresenault, Mark Caffarey, Todd Coy, Carlos Helou. • Consider Including in RFP: <ul style="list-style-type: none"> ○ Study of technologies with eye to what creates most valuable, sustainable recycling. ○ Estimates of future recycling demands ○ Impacts of chemistry changes ○ Impact that delayed input stream due to secondary use has
Other (Propose these be covered later or in other forums/committees)			
	Education of public on handling/recycling of batteries		
	Battery disassembly location optimization	Create decision tree/best practices to optimize location of battery disassembly	There may be intermediary locations outside of recycling facility, for disassembly/optimization

Attendees:

Telephone Participants at May 12, 2017 Meeting

<u>First Name</u>	<u>Last Name</u>	<u>Company</u>	<u>E-mail</u>
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Charles-Alexandre	Tremblay	Prevost Car (Nova Bus-Volvo)	Charles-alexandre.tremblay@volvo.com

In Room Participants at May 12, 2017 Meeting

<u>First Name</u>	<u>Last Name</u>	<u>Company</u>	<u>E-mail</u>
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Jim	Greenberger	NAATBatt	jgreenberger@naatbatt.org
John	Kincaide	Wecyclebatteries	john.kincaide@wecyclebatteries.com

Mark	Caffarey	UMICORE	mark.caffery@om.unicore.com
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Pablo	Valencia	General Motors	pablo.valencia@gm.com

Detailed Meeting Minutes (Decisions in GREEN, Action items in RED) (Note that action items are duplicates of those in above summary)

- (Todd Coy) Introduction, request to review potential areas, want to discuss what is of interest to team and prioritize. Reviewed list of draft goals and areas of interest previously distributed
 - What information is currently out there?
 - Within the NAATBatt page have created a space for documents that can be a repository for information gathered. Added documents would be added by the NAATBatt IT manager.
 - **Request to group for any comments on modifications, additions to the goals and specific areas of interest [Committee]**
- Scope of Committee:
 - (Mark Cafferty) proposes that we determine the scope (US, global, Canada?)
 - (John Kincaide) Propose to include Canada and the US in scope.
 - (Jim Greenberger) – points out that US is still mainly a blank slate that we have leeway to mold (regulations are essentially non-existent). Look at international information to inform decisions. Proposal is to start with US, then look globally.
 - Todd C – Don't want to duplicate what other groups are doing. Want to data mine to understand what is being done by other committees.
 - *Decision: Committee to focus on US to begin with*
 - *Decision: Focus on large format, Li Ion batteries (non-consumer) – includes both mobile and stationary batteries.*
 - § Start with Li Ion, potentially then move to other chemistries (as suggested by John Kincaide)
 - § Other chemistries are fairly well addressed already.
 - § Voltage is irrelevant
- Consider SAE work in progress whom are working on a number of technical specifications. Data mine to understand this other work.
- Goal is to have the agendas represent the entire membership and market, not slanted towards only one side.
- (Pat Hayes) Gave a summary of the newly formed Responsible Battery Coalition
 - Looking at whole lifecycle of batteries, want to use 99% recycling rates of Lead Acid as a model that can be used in the Lithium Ion space
 - Have a number of people on their science advisory board
 - Goal is to define the solutions before they are defined for us
 - In process of defining their work streams, proposal from Jim G is that we continue to define our proposal and then run that by the Responsible Battery Coalition. Agreed that the two committees would work together.
- Review of items of potential interest listed on handout:

- John Kincaide – 49 CFR 173.185 high level summary
 - § Relates to Li Ion battery products. Some portions actually reduce the cost of shipping batteries.
 - § Provide a summary of the regulation to the committee, then we can decide if there is something to take back to the department of transportation that the group sees as potentially moving us towards our goals. [Todd Coy]
- Damaged Battery Transport (Decision: Include in scope of work)
 - § (Todd Coy) are there ways that we can collaborate on containers for damaged batteries?
 - § (Pablo V) Wonders how damaged battery transport is working for Prius? Proposes we use Ni MH as a model for what we are trying to do because that has been working without significant regulation. People figure out how to get these batteries because they have value
 - (Todd C) – feels that 80-90% of NiMH batteries are captured from the dealers (not referring to damaged)
 - Currently Retrieval sends a third party if there is a damaged Prius pack, to package it adequately.
 - Need to define what is a damaged battery? No clear delineation currently on what constitutes a damaged battery. Also, what about batteries that look damaged but there is no contained energy.
 - (Pablo Valencia) – proposed deliverables for OEMs:
 - Internally re-assess our process for having people assess batteries in case of damage then follow up with OEM discussions [OEMs]
 - (Dirk Spiers) – Feels the party that is missing here are the insurance companies who most often own damaged batteries. Proposes that they be invited to this committee.
 - Don Karmer – SAE committee on assessment of damaged batteries. John Kincaide is part of this committee. They are looking at the current regulations at this point. Bring information on this SAE committee to NAATBatt recycling committee. [Don Karmer]
 - (Pat Hayes) National Alternative Fuels Training Consortium, train all first and second responders, may have some information on determination of damage degree and handling. [Pat Hayes]
 - § SAE J1715 has a definition of terminology with regards to modules, packs, etc..
 - § (Todd Coy) proposes we make sure to keep any definitions we make on damaged batteries consistent with UN definitions, and one potential definition is that a battery is damaged if it doesn't meet the UN regulations anymore
 - § Need to consider large scale containerized battery systems. How damaged batteries from these systems dealt with and transported? Currently they are often moved in their original container?
 - § (Todd Coy) – need to collaborate with manufacturers when coming across certain complex damaged battery situations (what do they consider damaged or undamaged?)
- Battery disassembly location optimization
 - § Peter Karlson – can optimize at what point in the logistics chain items are torn down, shredded, etc.

- § Consider high volumes when evaluating this
- § Determined this could be broken into 3 areas:
 - Location for disassembly (Decision: low priority, consider later)
 - Design for Disassembly/Recycling guidelines (Decision: high priority)
 - (Pablo Valencia) should consider laying out a recommended practice in design of batteries (e.g. use of adhesives, etc. Group defines recommendations in this area that reduces recycling and disassembly costs and (Jim Greenberger) assigns costs to elements that drive it.
 - (Mark Caffarey) Study was completed in California on where and when dismantling sites and recycling sites will be needed. Provide information on this study to committee [Mark Caffarey].
 - (Steve Tolen) Warns against stifling innovation by defining what can or cannot be done (gluing within a pack). Suggests that eventually the cost will come back to the OEM.
 - (Pablo Valencia) Lifecycle management inputs need to be fed into in advanced stage. Propose consolidating a set of Design for Recycling guidelines. Carries more weight if it's an industry statement of guidelines to allow for cost effective recycling.
 - Action item – Recyclers provide high level guidelines on what aids and inhibits recyclability and dismantlability. [Recyclers]
 - Dismantling processes (Decision: not part of committee scope)
 - Bryan S – CFR calls for prevention of short circuits during any preparation for shipment. Need to have as easy a way as possible to allow for covering of any exposed terminals during the process.
- Logistics Network efficiency
 - (Mark Caffarey and John Kincaide) – proposes that we need to communicate with logistics suppliers to increase their awareness of how to deal with transporting Li Ion batteries. Awareness is the issue.
 - Action Item – prepare an executive summary level list of items for logistics companies to be aware of during transportation of batteries and share with committee. [Keith Loch and John Kincaide]
- Recycling Technology
 - Evaluate SAE 2974 (report on automotive battery recycling) to see if it contains sufficient detail to provide input to identify barriers to value positive recycling item.
- Identify barriers to value positive recycling
 - (Pablo Valencia) - Proposes looking at the pieces that drive cost or value in the recycling of Li Ion batteries. Are there particular characteristics of cells that enable value-positive recycling (for example, a particular separator material?)
 - § Define value proposition, survey the market, determine what the barriers are and how they can potentially be addressed.

- (Jim Greenberger) Proposes the group define an RFP to do this study.
- **Action Item: Form subcommittee to define the questions that should be in the RFP and draft the RFP.**
 - § Interested members: Pablo Valencia, John Kincaide, Dave Mauer, Renata Aresenault, Mark Caffarey, Todd Coy, Carlos Helou.
- (Jim Greeberger) Intersolar Workshop
 - July 11-13 in San Francisco
 - Proposes that NAATBatt put on a “Battery recycling 101” workshop on lithium battery recycling, questions at this conference last year really drove the NAATBatt recycling meeting that was organized for last November.
 - Dave Mauer, Mark C, John K, Todd C, Tom Gage
 - (Todd Coy) Big push on solar/storage California (ads that say buy solar and get a free battery system)
 - **Action Item: Anyone interested in talking at Intersolar: Provide a brief synopsis of what you would like to cover by email to Jim Greenberger by Wednesday, May 17th. Focus strictly on solar storage systems, consider what home owners and CNI operators, grid scale do at end of life? [All Interested]**
- Next meeting of this recycling committee, including telephone option, in conjunction with Intersolar conference in July.
- Identification
 - Pablo V – does the SAE labelling scheme work for the purpose of separating Lead Acid from Li Ion. Li Ion 12V batteries are made to look like lead acid ones to encourage market acceptance, so these could be a concern. ABR has significant concerns with Li Ion getting into lead acid stream.
 - § Look at labelling from a value standpoint. How to we communicate how much of certain materials are in the batteries to be able to properly value it? Helps to establish the pull signal.
 - **Action item – committee to look at sufficiency of the SAE J2936 labelling.**
 - Darnell proposes consideration of color.
- Recycling volume study
 - Secondary use can impact the timing of the recycling
 - Ask RFP team to consider if this would be valuable to add into the RFP.