Expansion of Novolyte Capacity for Lithium Ion Electrolyte Production

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Project ID: ARRAVT015

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## Overview

### Timeline
- Phase I Start: April 30\(^{th}\), 2010
- Phase I Complete: June 30\(^{th}\), 2013
- Phase II Start: January 1\(^{st}\), 2013
- Phase II Complete: April 29\(^{th}\), 2015
- Phase I is 16 % complete as of 3/2012

### Barriers and Risks
- Adoption rates and acceptance of xEVs
- Overcapacity due to delayed demand
- Undercapacity due to rapid xEV adoption
- Capital opportunity cost

### Budget
- Total project funding: $41,236,094
  - DOE Share: $20,618,047
  - Novolyte share: $20,618,047

### Partners
- None. Collaborators and partners will be evaluated as specific project requirements dictate.
Objectives / Relevance

• Objectives:
  – Phase I: Expand Novolyte lithium ion electrolyte manufacturing capacity to 4,500 metric tons (MT) by 2013
  – Phase II: Expand Novolyte lithium ion electrolyte manufacturing capacity to 10,000 MT by 2015

• Relevance to Vehicle Technologies and the American Recovery and Reinvestment Act (ARRA) of 2009:
  – Provide an adequate domestic supply of high quality lithium ion electrolyte for the local xEV battery market
  – Maintain and grow jobs: An estimated 18 jobs will be created and 18 will be retained by project completion
Technical Approach

• 2010 – 2013: Completion of Phase 1. Total Cost: $6,700,000

• Expansion Projects include:
  – Install new large scale raw material storage tank and associated equipment
  – Build new motor control center (MCC) building
  – Upgrade solvents distillation and expand production building
  – Build new control room center and upgrade high voltage transformer
  – Install new steam boiler and new vessel cleaning station
  – Upgrade lab and flammable storage building
Technical Accomplishments and Progress Phase I

• Installed and qualified analytical testing equipment for higher raw material and production volumes

• Upgraded Sample Reactor Material Handling

• Expanded and outfitted containment vessel fleet

• Upgraded Electrolyte Pumping System and transfer lines

• Preliminary Engineering Completed for Process Controls
Technical Approach

• 2013-2015: Completion of Phase 2. Total Cost: $34,536,095

• Planned Projects include:
  – Evaluation of alternative US sites, if necessary
  – Installation of approximately 60,000 square feet of new buildings, bulk chemical storage, materials purification, mixing and reactors
  – Installation of packaging and quality control/quality assurance capabilities consistent with current and expected product and market requirements
Collaborations and Partnerships

• Project Collaborators:
  – None at present. Will be evaluated as project pace continues.
Future Work: 2012

• Incremental Capacity Expansion Project:
  – Temperature and pressure monitoring upgrades, warehouse/storage upgrades, install additional reactor capacity, building expansion and upgrades, concrete upgrades, storage tanks and product loading system

• Installation of second larger sample reactor and temperature moderation equipment

• Infrastructure upgrades to material handling, warehouse, storage, concrete and HVAC

• Site survey and selection for Phase 2. Complete EA for new site, if required

• Engineering for reactor expansion

• Attain go / no-go decision point on reactor expansion and go / no-go decision point on Phase 2. Complete reactor expansion if required.
Future Work: 2012-2015

- Begin site selection for Phase 2, if required: 6/1/2012
- Begin engineering for reactor expansion: 4/1/2012
- Go/No Go Decision Point on reactor expansion: 5/1/2012
- Completion of EA for new site, if required: 12/31/2012
- Go/No Go Decision Point on Phase 2: 12/1/2012
- Completion of reactor expansion: 3/31/2013
- Kick off Phase 2: 1/1/2013
- Completion of Phase 1: 6/28/2013
- Phase 2 construction completed: 12/31/2014
- Phase 2 startup and commissioning completed: 1/31/2015
- All spending, re-billing, and reimbursement completed: 4/29/2015
Summary

• Novolyte’s electrolyte plant capacity expansion is a two phase project, timed to intersect with future market demand.

• Project risk is carefully managed by working closely with domestic customers to forecast and foresee project delays or to accelerate the completion of key tasks, if necessary.

• Phase I is approximately 16% complete and is focused on upgrading and expanding the existing Baton Rouge facility to 4,500 MT.

• Phase II, the expansion of 4,500 MT to 10,000 MT will commence on January 1st, 2013. Site selection activities will begin in Q1 of 2012.