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Hot Press & Furnace Line Execution Strategy

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August 11, 2014

Outline

- Scope
- Background
- Project Life Cycle Schedule
- Execution Strategy
- Work Scope by Fiscal Year
- Summary

Scope

- To reliably support upcoming missions, it is necessary to install two new furnaces in GB 1235 and bring a new hot press with associated glovebox into operation. The new hot press is required to be operational by the end of FY17.

Background

- Hot Presses 1 & 2
 - Were moved from the old LANL DP site to PF-4 in the late late 1970s – early 1980s
 - Glovebox and Hot Press are late 1950s vintage
 - Used for process development prior to formal manufacturing mission
- Cassini Mission (1993-1996), more than 750 pellets
- October 2001 Hot Press #2 out of service due to induction feed thru failure. Occurred during coil replacement.
- Major corrective maintenance on Hot Press #1 will be required in the near future that will add to the urgency in getting a new Hot Press
- Hot Press #3 (new installation) started in early 90s
 - Risk identified during Cassini
 - Large funding cut upon completion of Cassini
 - On hold since 1995 due to lack of funding
 - Located in room during 2000 Type A Contamination Incident.

Hot Press System Description

- Overview: To form a pellet, sintered granules are blended in the ratio of 60% low-fired and 40% high-fired granules and loaded into a graphite die for hot pressing. The hot press system consists of a Materials Test Systems (MTS) hydraulic system, a vacuum system, a cooling system, and an induction heating system.

One of the Most Complicated Processes in PF-4

Hot Press System Description Cont.

Project Life Cycle

Fiscal Year	Major Focus	Cost per Year
FY13	Initiated requirements documents	\$.12M
FY14	Technology Assessment & Removal of Existing Hot Press #3	\$3M
FY15	Design & Fabrication	\$7M
FY16	Fabrication and Installation	\$4M
FY17	Complete Installation & Readiness	\$2M

A preliminary contingency analysis has been performed on the FY15 scope. Current estimate is for a cost and schedule contingency of \$1.2M and 2.4 month respectively

FY14 Scope

Hot Press	Furnace
<ul style="list-style-type: none">Develop D&D design for existing hot press equipment	<ul style="list-style-type: none">Develop procurement specifications
<ul style="list-style-type: none">Execute D&D	<ul style="list-style-type: none">Order prototype furnace
<ul style="list-style-type: none">Hot press equipment technology assessment	<ul style="list-style-type: none">Perform facility upgrades in cold test facility
<ul style="list-style-type: none">Develop procurement documentation	<ul style="list-style-type: none">Retrieve glovebox from storage
<ul style="list-style-type: none">Issue contract for hot press equipment	<ul style="list-style-type: none">Setup in cold test facility
<ul style="list-style-type: none">Generate conceptual glovebox design	<ul style="list-style-type: none">Evaluate glovebox shielding for compliance with RP requirements
<ul style="list-style-type: none">Develop FY15 schedule	
<ul style="list-style-type: none">Develop lifecycle schedule	

GTAT: Commercial Hot Press System

- Vendor: GT Advanced Technologies (formally Thermal Technology)
 - Site visit revealed a highly capable company
 - Experience with DOE Facility (INL)
- Procurement: Received RFQ on 7/30/14
 - Cost \$ 919K (Design & Fabrication)
 - Delivery Schedule 39 weeks ARO
- Current Activities
 - Technical Evaluation of RFQ
 - Review of quote for compliance with specifications
 - Design kick-off target 8/18/2014

FY15 Scope

Hot Press	Furnace
<ul style="list-style-type: none"> Design Change Form (DCF) closeout for D&D of existing hot press equipment 	<ul style="list-style-type: none"> Test furnace in glovebox
<ul style="list-style-type: none"> Design/Fabricate and cold test hot press equipment 	<ul style="list-style-type: none"> Update furnace glovebox design (seismic, shielding)
<ul style="list-style-type: none"> Design hot press glovebox 	<ul style="list-style-type: none"> Modify furnace glovebox
<ul style="list-style-type: none"> Develop 60% installation design 	<ul style="list-style-type: none"> Develop installation design
<ul style="list-style-type: none"> Cold test hot press equipment at LANL 	<ul style="list-style-type: none"> Procure production furnaces
<ul style="list-style-type: none"> Support equipment design & fabrication 	<ul style="list-style-type: none"> Assemble control racks
<ul style="list-style-type: none"> Develop FY16 schedule 	<ul style="list-style-type: none"> Initiate software quality

FY16 Scope

Hot Press	Furnace
<ul style="list-style-type: none">Fabricate hot press glovebox	<ul style="list-style-type: none">Integrate furnaces in glovebox
<ul style="list-style-type: none">Integrate hot press glovebox with equipment	<ul style="list-style-type: none">Install furnace glovebox
<ul style="list-style-type: none">Install hot press glovebox	

FY17 Scope

Hot Press	Furnace
<ul style="list-style-type: none">• Complete installation	<ul style="list-style-type: none">• Complete construction
<ul style="list-style-type: none">• Close DCF	<ul style="list-style-type: none">• Close DCF
<ul style="list-style-type: none">• Perform MSA/Readiness activities	<ul style="list-style-type: none">• Perform MSA/Readiness activities

Process Requirements (extra slide)

■ Hot Press

- Used to form fuel granules into densified pellets by compressing the fuel in a die while heated under vacuum
 - Argon atmosphere
 - ≤ 0.1 Torr (100 mTorr) vacuum
 - 2800 lb maximum pressing force
 - 1600° C fuel temperature (heating ramp rate)
 - Temperature soak of 30 minutes
 - Simultaneously press and heat under vacuum

System (extra slide)

■ For Reference Only (included with GTAT proposal)

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