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Title: SCC Infrastructure Upgrades Project

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SCC INFRASTRUCTURE UPGRADES PROJECT

8/7/13

Advanced Simulation and Computing (ASC)

1

Significant infrastructure upgrades are required to support the next generation of ASC Advanced Technology Systems at LANL

	FY11	FY12	FY13	FY14	FY15	FY16	FY19	FY20
Machines		Trinity Procurement			Trinity	ATS-3 Procurement		ATS-3
				Trinity Site Prep			ATS-3 Site Prep	
Water		SERF						
		SCC 12MW Water Cooling						
					SCC 20 MW Water Cooling			
Electrical		SCC to 20MW						
					SCC to 45 MW			
					TA-3 substation			
							TA-3 conduits	
					Re-conductor Norton Line			
						Re-conductor Reeves line

Requirements and Limitations Driving SCC Upgrades

- Platform Strategy – Liquid Cooling and Power Assumptions
 - FY15 – 12MW
 - FY20 – 15MW – overlap to 27MW
 - FY25 – 18MW – overlap to 33MW
- ASC Program Office
 - 40MW cap on Power Cost
 - 2008 SWEIS Limitations: 15MW Power, 51Mgpy Domestic Water
 - 2018 SWEIS: provide updated ASC requirements
- Facilities and Site Infrastructure Enhancements
 - Reliable, dependable SERF – 88Mgpy (RO & Sanitary Effluent)
 - 2018 SWEIS increases for water and power
 - Increased transmission capacity - Los Alamos County and PNM
 - Electrical distribution to SCC – Utilities and Infrastructure

ATS-1 (Trinity), ATS-3 and ATS-5 Site Plan

SCC Infrastructure Upgrades Project Summary

- SCC Project supports the Trinity Platform – the first of several next generation Advanced Technology System (ATS) Platforms at LANL.
- Base Project Construction Cost Estimate ~\$15M
- Follow on Site Prep Project, Specific to Trinity and Future Platforms
- Facility to be ready for Trinity Arrival in July 2015
- Project consists of major mechanical and electrical infrastructure upgrades implementing **“warm water cooling”** technology based on:
 - 5 each – 1200 Ton Open Cell Cooling Towers
 - 2 each – 3000 Amp Electrical Substations

Cooling Tower Trade Study

- Alternative Cooling Tower Technologies were Initially Compared as Options to Existing Open Cell Cooling Towers in Order to Save Water:
 - Open Cell Cooling Towers...current towers (low power use, high water use)
 - Evaporative Fluid Cooler (higher power use, less water use)
 - Air Cooled Chillers (highest power use, no water use)
 - Closed Cell (Hybrid) Towers (higher power use, low water use)
- Cooling Tower Trade Study was Conducted at mid-design and compared Open Cell to Closed Cell (Hybrid) Cooling Tower Technology as the Two preferred Alternatives
- Study Revealed that Open Cell Towers were the Best Option from an Overall Perspective:
 - Initial Construction Costs, Operations and Maintenance, Simplicity of Controls, Chemical Treatment, Power Requirements and Familiarity to LANL Facility and Operations Team

Open Cell Tower Flow Diagram

SCC Infrastructure Project Layout

Project Overview, looking North

Existing West Parking Lot, Site of New Cooling Towers

Cooling Towers Buildout

Cooling Tower Loop Pump Room

HIGH PERFORMANCE COMPUTING

Primary Cooling Tower Pumps

Heat Exchangers and Process Loop Area

Heat Exchangers and Process Loop Pumps Layout

Heat Exchangers & Pump Buildout

Existing 3000 Amp Substation H

GFE Substations I and J in Storage

Infrastructure / Site Prep Transition

8" Dia. Process Loop Stubouts

SCC Project Schedule Highlights 2012-2015

Issues and Concerns

- **Pressure Safety Requirements (10 CFR 851)**
 - Stress Analysis Performed
 - Unlisted Items in ASM B31.9 Code
 - Ability to Obtain LANL Building Official Stamp for Construction Notice to Proceed
- **Power Transients**
 - Sudden Fluctuations in Power Needs as Programming Requirements Change
 - Power Grid Effects and Ability to Adapt
 - Cooling Plant Response Time as Transients Occur
 - PUE Results and Long Term Effects

SCC Infrastructure Upgrades Project

Questions?
&
Flythrough Video