Downgrading LANL TA-18 CEF from a Hazard Category 2 Nuclear Facility to a Radiological Facility

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DOE Mandate to Relocate the Critical Experiment Facility at TA-18

- April 2004 – NNSA issued letter to begin moving SNM to the NTS DAF. This became know as “Early Move”
- Required de-inventory all Sec. Cat. I/II SNM by end FY 05
- Was completed October 28, 05
- Removal of SNM alone did not significantly reduce the operating costs at TA-18.
- Joint proposal LANL & LASO to concatenate continued “Early Move” with downgrade to a Radiological Facility.

Brief Description of TA-18

- Located at LANL at confluence of two canyons.
- Approximately 40 structures. Critical Assembly and Storage Areas
  (CASA) -1, -2, -3; Building 30 main office building and control rooms for the CASAs
- Originally established in WW II as an explosive test facility
- Criticality experiments were performed by hand; ended after fatal accidents in 1945 and 1946
- 5 decades of criticality and other experiments supported emergency response, safeguards, and weapon programs

Early Move Risk Management

- Early Move and Transition Project had strong empirical opportunities for failure
- Consequently, project team identified high risk areas and mitigation strategies
- Availability of Critical Staff – several tasks required specialized expertise – periodic cross organization management meetings to ensure availability of critical staff
- Also included LASO involvement and approval of several task
  - transfer of OSRP to TA-55;
  - operation of temporary storage Cat. I/II facility;
  - availability of NTS warehouse to store TA-18 materials;
  - shipment of SNM to DAF (container availability)
- Regular and continuous communication with LASO included presentations and walkdowns kept approvals on track

Management Structure

- Early Move and Downgrade projects were coupled with wholesale management change at TA-18
- Lab Director replaced the then current management N-Division with NMT Division. N Div had operated TA-18/CEF since its inception
- Numerous Management areas were affected
  - Budget structure
  - Conduct of Operation infrastructure and performance improvements
  - Operational lines of Authority and Responsibility
  - Project schedule development tasks
  - Incorporating the new LANS organization
- All of these required constant and real time management

Existing Safety Basis

- Was constructed for continued CEF operations
- Included removing NM from Critical Assembly Machines, shipping and receiving NM
- No discussion to completely de-inventory TA-18 or disassemble and relocate the CAMS
- Removing NM and cessation of critical assembly operations lessened the operating risk
- One CAM, Godiva, removing the SNM required partial disassembly of the machine – Impacted a DF that was only necessary for operation of the CAM
- TSR included “Conformance with DF is not required during FACILITY SHUTDOWN or when the safety function of the DF is not applicable.”
- NNSA/LASO nullified that statement with TSR violation declaration
- NNSA/LASO subsequently approved continued disassembly of CAMs

Radiological Facility Safety Basis

- Established with 5 documents
  - Facility Hazard Category Report
  - Facility Safety Plan
  - Facility Disposition Report
  - Fire Hazard Analysis
  - Overarching Criticality Safety Evaluation
- FHCR established the foundation for the other documents to build on. Included categorization of chemical hazards

Facility Hazard Category Report

- Radiological Categorization
  - included accountable & sub-accountable sources and nuclear material items as well as activated metal.
  - Sub-accountable items don't have to be tracked by MASS or LRACS but contribute
  - TA-18 was surveyed to identify areas of contamination or find radiological material (sources) in untoward areas
  - Segmentation was employed. NTS was not ready to receive bulk metal nU & dU, which packaged for over-the-road shipment
  - Specific analysis to demonstrate independence and non-interaction
- Chemical Categorization
  - Be and Pb were used as reflectors/moderators and shielding
  - Solid form not processed but had many metric tons
  - Performed specific analysis for Be and Pb to demonstrate that ERPG-3 not exceeded at 100-m

Fire Hazard Analysis & Facility Safety Plan

- FHA was revised to reflect new mission
- FHA concurred with FHCR fire accidents
- FHA identified life safety code compliance issues which were submitted to issue tracking data base
- FSP applied graded approach
- Because of FHCR no DSA, FSA, TSRs or OSRs required for operations
- Controls consisted of SMPs needed to protect the safety basis and workers.

Facility Disposition Report & Criticality Safety Evaluation

- FDR supports downgrade because it catalogs and describes radiological & chemical inventory but also LANS due diligence findings. Also documents environmental issues.
- CSE was required because inventory exceed 700 g U-235 (-1027)
- CSE demonstrated a criticality accident was incredible
- Most of the NM was already packaged in drums and strong type boxes
- CSE required items to remain packaged as is and only move one item at a time

Implementation of New Safety Basis

- Two SMPs were vital to protect the new safety basis
- Activity Approval Process required review of new or significantly changed activities for:
  - Waste Generation/Disposition Requirements
  - Safety Basis Impact
  - Facility Impact etc.
- Radiological Material Inventory System
  - Two tiered approach LANL MASS&LRACS and TA-18 Inventory Spread Sheet (Accountable & Sub-accountable items)
  - Used Pu-239 equivalence factor which was demonstrated to be conservative w/r to DOE-STD-1027 quantities
  - Conservatism depended on activities & clearance class DCFs

Conclusion

- One of the greatest managerial successes was continual open communications
  - Multiple walkdowns and presentations
- Hierarchal regulator/operator structure maintained
- DOE approved FHCR without comment
- MSA took 1.5 weeks
- Mr. Tom d'Agostino label Early Move Project 'a model for project success and collaborative process between regulator and operating contractor.'