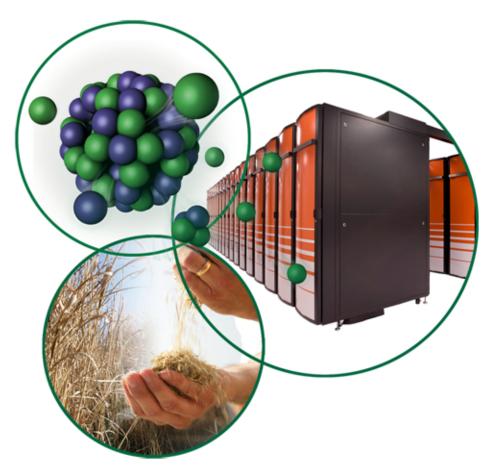
Hg System Decommissioning Activities



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NFMCC Friday Meeting Feb 29, 2008



Day 1 Activities

- Optical fibers removed except for VP #2
- Hg system draining preparations
 - Equipment in place (flasks, peristaltic pump, safety equipment, etc)
 - Extracted Hg system from solenoid
 - Radiation measurement center of snout ~70 μSv





Day 2 Activities

- Started Hg draining operations
 - Pumped into intermediate container 1st time
 - Moved peristaltic pump to container exit to provide Hg sample per CERN request
 - During this operation, Hg continued to gravity-feed into container, overflowing it
 - Per procedure, sump tank drain valve should have been closed after pump into container



Spill Conditions

- Operators and monitoring personnel wearing respiratory protection at all times
- Local ventilation in use
- Estimate total overflow ~200 ml
 - Most contained within tray or within container bucket
 - ~50 ml fell onto plastic or directly onto floor



Spill Response

- Drain valve immediately closed upon condition recognition
- Pumped Hg into flask to remove overflow condition from intermediate container, then closed flask
- Personnel not wearing PPE requested to leave area
- Prepared Hg vacuum cleaner, started cleanup of larger Hg pools then entire local area
- Wiped equipment with HgX solution and prepared to continue draining operations
- CERN fire brigade responded as required, inspected area, then allowed us to continue cleanup
- CERN Chemical Safety inspected operations, allowed draining operations to proceed



More Day 2 Activities

- After drain operations continued, syringe pump drained of Hg without incident
 - Tilted Hg system as required to maximize fluid removed
 - Respirator use & local ventilation continued
 - Each full flask weighed and placed back into transport drums
 - Left Hg in vacuum cleaner storage canister and in plastic intermediate container
- Vacuum cleaner and local ventilation exhaust monitored during cleanup – no vapors detected



Day 3 Activities

- Met with CERN Medical personnel
- Removed Hg from vacuum cleaner and plastic container, poured into shipping flask
- Cleaned floor with HgX solution, let dry ~4hrs, used vacuum to remove remaining liquid
 - Hg vapors ~200 µg/m^3 at floor level, ~0 a few cm above floor
- Placed Hg-absorbing powder on floor, left overnight
- Drained hydraulic fluid from HPU



Hg Drained From System

- Includes Hg added from vacuum cleaner and intermediate container
- Includes CERN sample volume
- Hg left in syringe < 0.5 liter

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	CERN Operations					
	System Fill 10 May 07			System Drain 5 Feb 08		
		Empty	Loaded	Empty		Drained
Flask No	Full (lbs)	(lbs)	(lbs)	(lbs)	Full (lbs)	(lbs)
1	88.3	25.3	63.0	25.3	77.4	52.1
2						
3	86.8	17.1	69.7	17.1	77.4	60.3
4	81.2	13.9	67.3	13.9	80.2	66.3
5						
6	86.2	15.3	70.9	15.4	78.0	62.6
7	83.4	15.8	67.6	15.7	81.1	65.4
8						
9						
10	52.2	16.4	35.8	16.4	85.5	69.1
11						
•		Mass (lbs)	374.3		Mass (lbs)	375.8
		Mass (kg)	169.8		Mass (kg)	170.5
		Volume (liter)	12.5		Volume (liter)	12.6



Day 4 Activities

- Blood sample taken by CERN Medical
 - Test results available in 2 weeks
- Cleaned Hg powder from floor
 - Vapor levels decreased by factor of 2 or better
- Reapplied powder to floor, will remove at 4pm
- Tools monitored and removed from area
- Hg system ready for transport



Day 5 Activities

- Performed final wipedown of spill area floor
 - Hg vapor readings ~20 µg/m^3
 - Indications from CERN
 RP were they were
 satisfied with our efforts
- Moved most of equipment out of ISR
 - Optical diagnostics crate to be shipped to BNL
 - Some large items need to be moved from ISR



Lessons Learned

- Don't deviate from procedure without careful consideration of possible consequences
- Perform dry run of operational procedures before real Hg operations
- Maximize amount of spill containment area



Future Plans

- Equipment to be removed from experimental areas by CERN transport group Feb/Mar
- One crate optical diagnostic equipment to be shipped to BNL soon
- Remaining MERIT equipment stored at CERN through Dec 07 for radiation decay
- Ship mercury and MERIT equipment to ORNL Jan 09
 - Current plans call for engineering study to modify syringe pump for use with new target (Pb-Bi)
 - Considering possibility of continuing Hg R&D
 - Appears ORNL is capable of performing integrated systems testing (no beam)

