


Fermilab Large Project ESH Programs

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Overview

- ▶ Project ESH Staffing
 - ▶ ESH Standards & Codes
 - ▶ Project Design Phase
 - ▶ Project Construction Phase
 - ▶ Project Installation Phase
 - ▶ Beamline/Experimental Operational Phase
 - ▶ Maintenance & Repair Activities
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Project ESH Staffing

- ▶ Project ESH Manager
 - Radiation Safety
 - Environmental Protection
 - ESH Construction Field Support
- ▶ Matrix ESH Support Functions
 - Industrial Hygiene Support
 - Fire Protection Engineer
 - Life Safety
 - Cryogenic Safety
 - Ventilation

ESH Standards & Codes

- ▶ Fermilab ESH Manual
 - OSHA/NFPA/ASME/ANSI/ASHRAE/EPA
- ▶ DOE ESH Orders
 - Integrated Safety Management (ISM)
 - Worker Safety 440.1 B
- ▶ Environmental 451.1 B
 - NEPA Compliance
 - Categorical Exclusion
 - Environmental Assessment (EA)
 - Environmental Impact Statement (EIS)
- ▶ Good Management Practice

Project Design Phase



Project Design Phase

- ▶ Preliminary Safety Assessment Document
 - Construction Hazards
 - Natural Phenomena Hazards
 - Environmental Hazards
 - Waste Hazards
 - Fire Hazards
 - Electrical Hazards
 - Noise, Vibration, Mechanical Hazards
 - Cryogenic Hazards
 - Radiation Hazards
 - Accelerator/Beamline Hazards
 - Chemical/Hazardous Material Hazards
 - Confined Space
 - Experimental Operations

Project Design Phase

- ▶ Preliminary Life Safety Assessment
 - Facility Description
 - Applicable Codes & Standards
 - Areas of Recommendation
 - Construction
 - Compartmentation
 - Smoke Control
 - Means of Egress
 - Automatic Fire Sprinkler & Standpipe Systems
 - Fire Detection & Alarm Systems
 - Emergency Power
 - Emergency Preparedness

Project Design Phase

- ▶ Preliminary Shielding Documentation
 - Radiation Modeling
 - Shielding
 - Ventilation Modeling
 - Air Decay
- ▶ Environmental Reviews
 - NEPA
- ▶ Internal Design Reviews
 - ESH, Electrical, Mechanical, Structural
- ▶ Technical Board Design Reviews
 - External Reviews
 - ESH, Mechanical, Electrical, Schedule, Budget, QA

Project Construction Phase



Tunnel Boring Machine



Construction Tunnel

Project Construction Phase

- ▶ Finalized Hazard Assessment Document
- ▶ Finalized Fire Protection & Life Safety Assessment
- ▶ Project Construction Project Safety & Health Plan
- ▶ Subcontractor Selection Process
 - Develop Minimal Bid Criteria
- ▶ Contractual Flow Down of ESH Requirements to Subcontractors
- ▶ Daily Work Planning & Hazards Analysis
- ▶ Waste Water Management & Treatment Plan
 - Apply for Necessary Permits

Project Construction Phase



Water Treatment



Rock Bolting

Project Installation Phase



Project Installation Phase

- ▶ Project Installation Plan
- ▶ Project Integrated Safety Management Plan
- ▶ Daily Planning Meetings
 - Both All Hands & Management Level
- ▶ Detailed Task Oriented Hazard Analysis
- ▶ Specialized Equipment Installation Carts
 - Design Reviews Completed
 - Operational Procedures Developed
- ▶ Transition from Fixed Price to Time & Materials Construction Activities
 - Training

Beamline/Experimental Operations



Radioactive Cooling
Water Systems



Operational Components

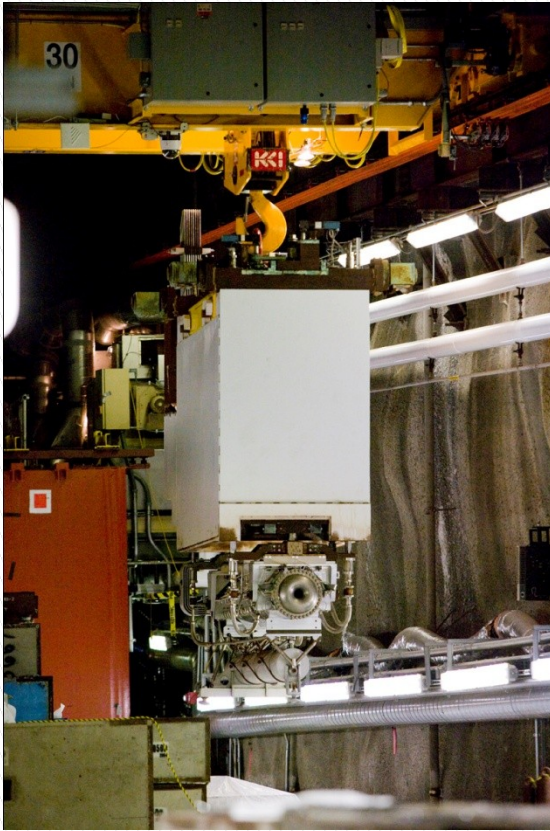
Beamline/Experimental Operations

- ▶ **Shielding Assessment**
 - Defines Facility & Operational Shielding Requirements
- ▶ **Safety Assessment Documentation**
 - Defines Operational ESH Requirements
- ▶ **Air Management & Monitoring Systems**
 - Monitoring for Air Releases
 - Dehumidification Systems – Tritium
- ▶ **Water Monitoring & Management**
 - Tritium Sampling
 - Condensate Evaporators

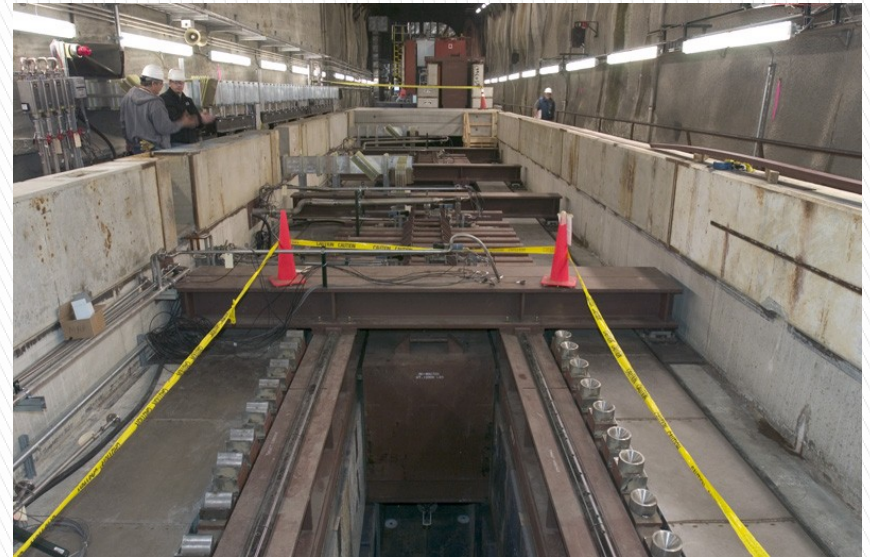
Maintenance & Repair Activities



Maintenance & Repair Activities



Radioactive Components



High Radiation Areas

Maintenance & Repair Activities



DATE: 8/11/11 TIME: 1540 PURPOSE: movement survey RWP#



NUMI Target
NT-03 Beam Right

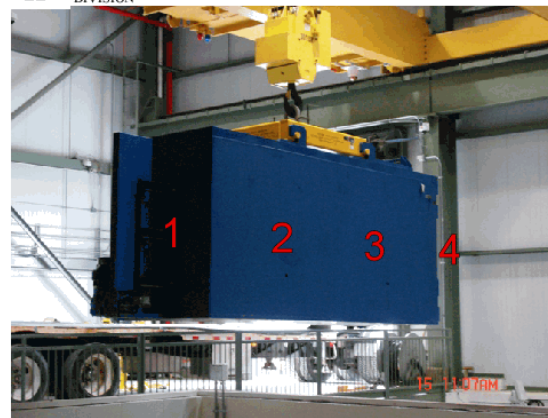
Point	Doserate @ 1 foot (mr/hour)
1	300
2	6000
3*	300000
4	4500

All Dose Rates Below	N/A	mR/hr Unless Noted.	Background	cpm	Highest Dose Rate Found	6000	mR/hr at 1 ft.	
Inst Type:	teletector		Wipe #	Reading	ccpm	Wipe #	Reading	ccpm
Inst No:	4							
Inst Source Chk:	SSH							
Cal. Due Date:	6/2011							
LEGEND		Numbers appearing on map are mR/hr @ 1 ft readings unless denoted with symbols below						
* = mR/hr @ contact		N/A						
A = Air Sample		O = Wipe						
		D = Floor wipe						
Comments:		* Point 3 was taken on contact with the target snout.						
Surveyed By:		Busch						
Reviewed By:								

REVISED 8/6/09



DATE: 7/16/11 TIME: 0800 PURPOSE: movement survey RWP#



NUMI Horn 1-01
coffin movement

Point	Doserate @ 1 foot (mr/hour)
1	120
2	160
3	85
4	90

All Dose Rates Below	N/A	mR/hr Unless Noted.	Background	cpm	Highest Dose Rate Found	160	mR/hr at 1 ft.	
Inst Type:	teletector		Wipe #	Reading	ccpm	Wipe #	Reading	ccpm
Inst No:	4							
Inst Source Chk:	SSH							
Cal. Due Date:	6/2011							
LEGEND		Numbers appearing on map are mR/hr @ 1 ft readings unless denoted with symbols below						
* = mR/hr @ contact		N/A						
A = Air Sample		O = Wipe						
		D = Floor wipe						
Comments:								
Surveyed By:		Busch						
Reviewed By:								

REVISED 8/6/09

Component Radiation
Safety Mapping

Shielded Transport
Coffins

Maintenance & Repair Activities

- ▶ Training
 - Radiation Worker
 - Crane Operators
 - LOTO
 - Underground Safety
 - Hoisting & Rigging
- ▶ Work Planning
 - Over-All Schedules Disseminated
 - Daily Pre-Shift Work Planning Meetings
- ▶ Support Personnel
 - Scientific, Engineers, ESH personnel working together to develop plans

Maintenance & Repair Activities

- ▶ Radiation Safety
 - ALARA Plans
 - Radiation Safety Professional on-site
 - Radiation Dosimetry
 - Protective Clothing
- ▶ Hot Handling Procedures
 - Developed & Trained on
- ▶ Tools & Equipment
 - Transportation Rail System
 - Long Handled Tools
 - Specialized Cutting Tools

Need to Plan for All Types of Work

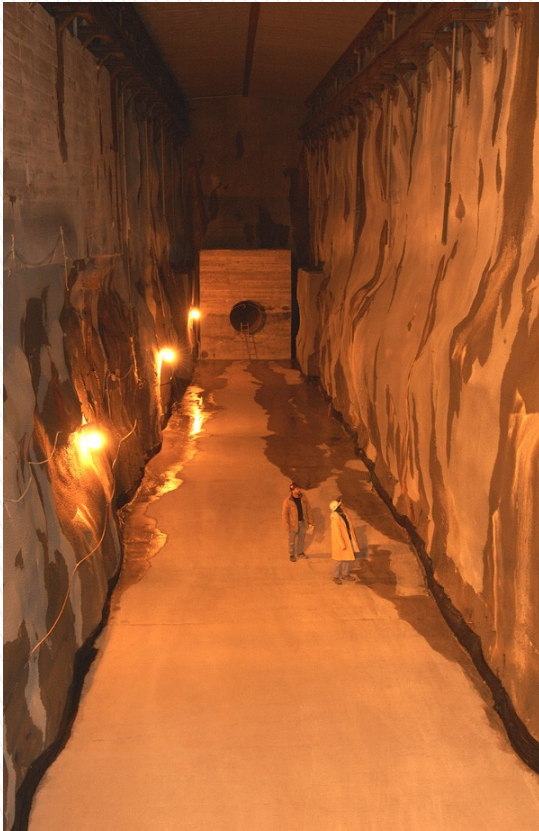


Survey & Alignment



Explosives for Blasting

From Mining to Rigging.....



Large Hall Excavations



Large Equipment Rigging
& Installation

Conclusion

- ▶ Clearly Defined of ESH Requirements & Goals
 - ▶ ESH Involvement in Design & Review
 - ▶ Solid Work Planning
 - ▶ Communication
 - ▶ Hazard Assessment
 - ▶ Radiation Safety ALARA Plans
 - ▶ Trained Support Personnel
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