

ESH Experience - FSCF Pre-Excavation

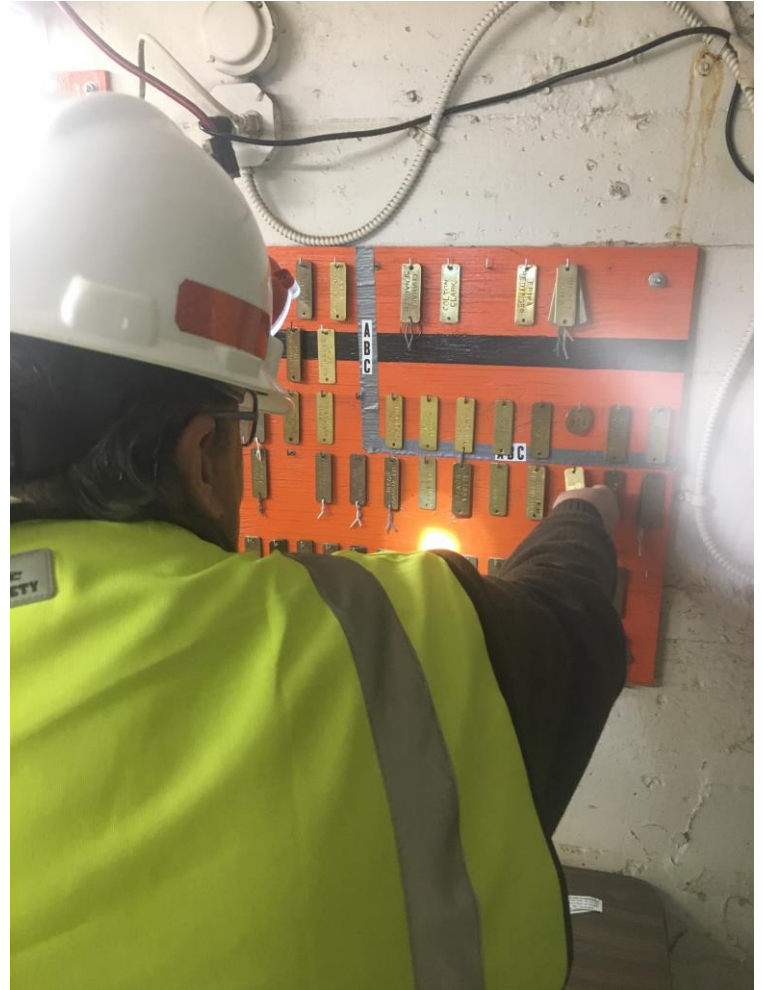
Michael P. Andrews

LBNF/DUNE Installation Workshop

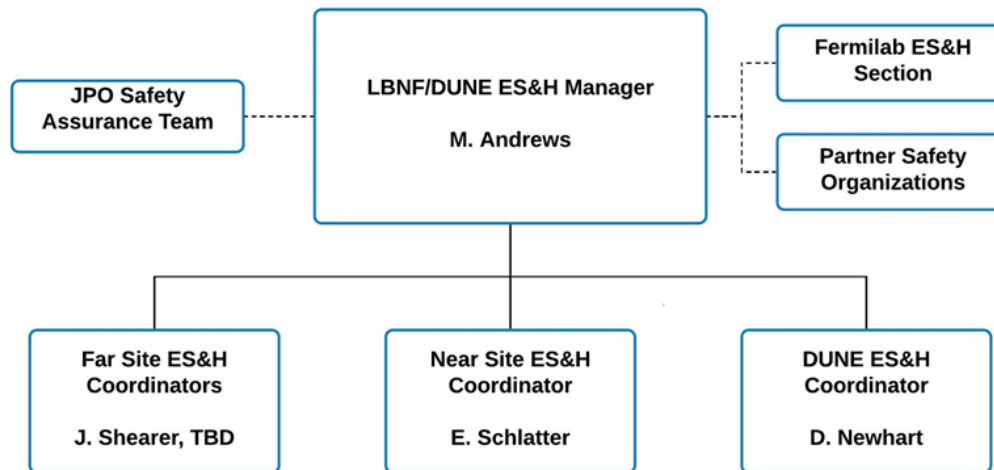
2 - 4 February 2020

Outline

- Far Site Staffing
- ESH program requirements
- Personnel Accountability & Training
- Work Planning & Controls
- ESH Support & Oversight
- Emergency Management
- Environmental
- Ventilation
- Project Safety Statistics

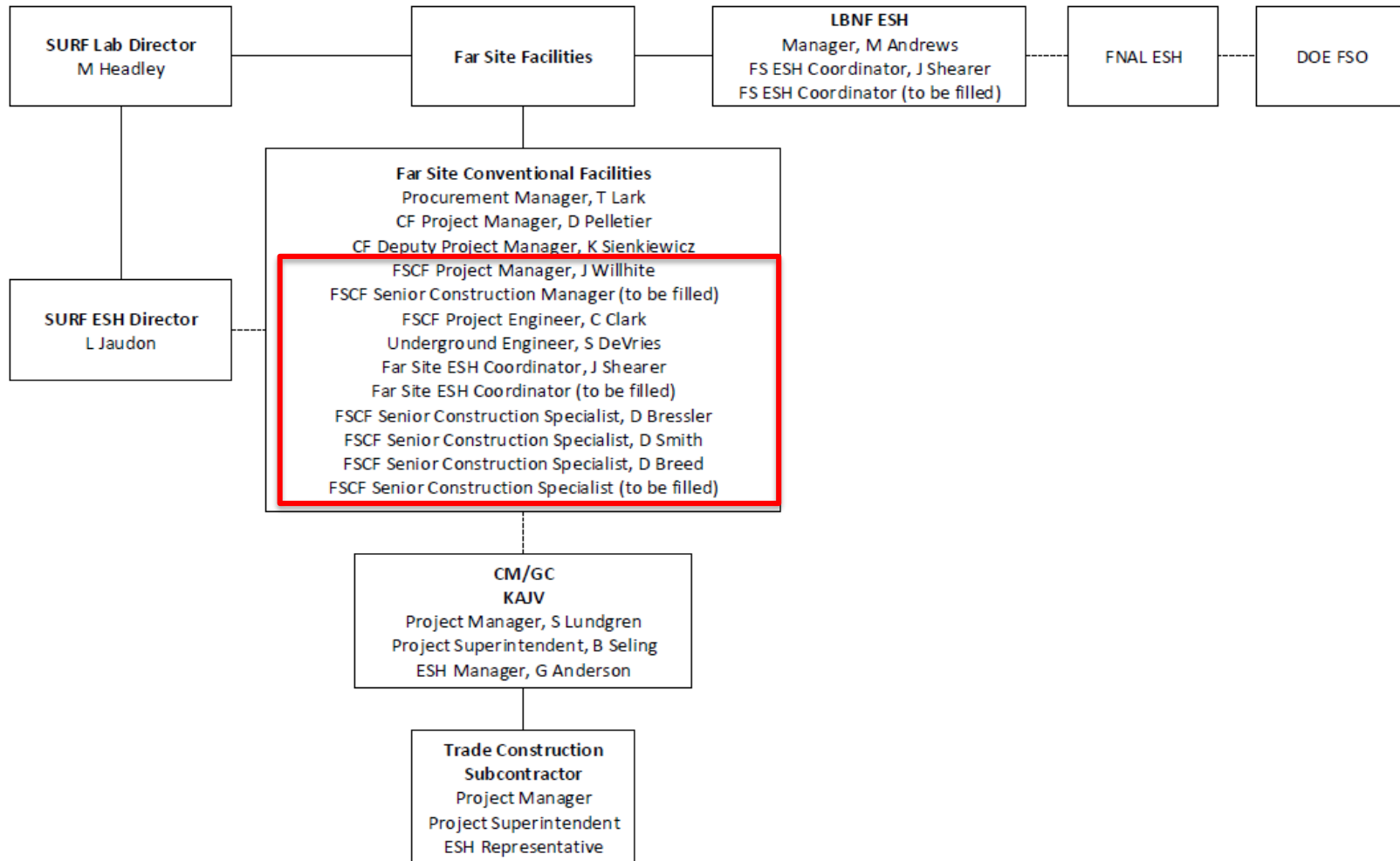


LBNF/DUNE Present ESH Staffing



- FS ESH Coordinator started in April 2019
 - Daily ESH field support
 - ESH POC for SDSTA & KAJV activities
- DUNE ESH Coordinator started in June 2019
 - Support for the consortia leads
 - ESH POC production factories
- NS ESH Coordinator started in Sept. 2019
 - ESH support for site prep construction activities

LBNF Far Site Conventional Facilities ESH Oversight



LBNF CF ESH Support Systems & Documentation

- Project Management & ESH documentation complete
 - [LBNF/DUNE Hazard Analysis Report](#)
 - [LBNF FSCF Construction Management Plan](#)
 - [LBNF Far Site Construction ESH Plan](#)
 - [LBNF Near Site Construction Management Plan](#)
 - [LBNF Near Site Construction ESH Plan](#)
 - [FSCF Interactions and Communications Guidelines](#)
- Following Fermilab's ESH Program for Construction, implementing DOE 10CFR851
 - Completing assurance visits to validate compliance

Communicating ESH Requirements & Expectations

- ESH coordination & support through
 - LBNF Project Management Meetings
 - L2 Project Office Meetings
 - Far Site & Near Site Integration Meetings
 - Conventional Facilities Coordination Meetings
 - LBNF/DUNE/CERN Interface Meetings
- Interfaces with major stakeholders ESH organization
 - Weekly meeting with Fermilab ESH Section Management
 - FRA-SDSTA joint coordination team
 - Bi-weekly ESH stakeholder meetings at the Far Site
 - Weekly subcontractor progress meetings
 - Daily working planning meetings at the field level

Communication of ESH Requirements to Subcontractors

Regulatory requirements referenced in construction subcontracts

- A. The Subcontractor and sub-tiered contractors shall comply with the following referenced documents. The publications referenced herein, form a part of this Section and Subcontract documents.
1. Fermilab ES&H Manual <http://eshq.fnal.gov/manuals/feshm/>
 2. 10 Code of Federal Regulations (CFR) 851, Department of Energy (DOE) Worker Safety and Health Program
 3. 10 CFR 820, Procedural Rules for DOE Nuclear Activities
 4. 10 CFR 835, Occupational Radiation Protection
 5. 10 CFR 860, Trespass to Land Owned & Leased by the US Government
 6. 10 CFR 708, DOE Contractor Employee Protection Program
 7. 29 CFR 1904, Record Keeping Guidelines for Occupational Injuries and Illnesses
 8. 29 CFR, 1910, Occupational Safety and Health General Industry Standards
 9. 29 CFR 1926, Occupational Safety and Health Standards for Construction
 10. 40 CFR Protection of the Environment (USA EPA)
 11. 49 CFR Transportation
 12. South Dakota's Rules of the Division of Motor Services
 13. South Dakota's Department of Environment & Natural Resources Codified Laws & Rules
 14. DOE Order 442.1A, Department of Energy Employee Concerns Program
 15. DOE Standard 1212, 2012, Explosives Safety
 16. SURF Explosive Safety Requirements
 17. National Fire Protection Association (NFPA) codes and standards
 18. NFPA 70E, Standard for Electrical Safety in the Workplace
 19. American Conference of Governmental Industrial Hygienists (ACGIH), "Threshold Limit Values for Chemical Substances and Physical Agents and Biological Exposure Indices"
 20. American Society of Mechanical Engineers (ASME) Codes and Standards:
 - a. ASME B30 Series, Crane Safety
 - b. ASME B31 Standards of Pressure Piping
 21. American National Standards Institute (ANSI) Standards:
 - a. ANSI A10, Construction Package
 - b. ANSI Z136.1 Safe Use of Lasers

Getting Ready to Work at Far Site

- Request Fermilab ID through SDSD
- Complete KAJV/SURF ESH orientation training
- Obtain SURF ID Badge
- Review work planning documentation
- Attend daily planning meeting
- Get to work!



Personnel Protective Equipment Requirements

- Hard Hat w/ tether
- Steel toes boots above ankle
- Class 2 reflective vest
- Safety Glasses
- Gloves
- Underground Only
 - Cap Lamp & Belts
 - Self rescuer/Emergency Escape Breathing Apparatus
- Based on hazards analysis
 - Hearing protection (plugs/muffs)
 - Face shield
 - Respirators
 - Fall protection (harness w/retractable lanyards)



Far Site Access & Personnel Accountability

- Fermilab Sub-Contractor ID Request Form
 - Submitted to Fermilab Global Services for review & authorization
 - Fermilab ID number issued
- SURF Access Request Form
 - SURF ID Badge Issued after ESH orientation
- Construction Coordinators track active work areas & personnel
- Underground Access Controls
 - SURF Trip Action Plan (TAP)
 - TAP's can be copied for daily use
 - Individual Brass Boards at Ross Shaft



SURF Trip Action Plan Database Example

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LBNF

Far Site ESH Training

- FS Construction Management

- Fermilab Construction Coordinator Training
- Human Performance Improvement Training
- Ocenco self-rescuer & EBA
- Fall Protection
- OSHA 30 Hour
- Remote training capability

- SURF ESH Training

- Surface & Underground
- Unescorted Worker by level
- Guide training
- KAJV has been authorized by SURF ESH to provide this training

- Weekly KAJV ESH Indoctrination



- Documentation reviewed through shared databases with stakeholders

- | HAZARD ANALYSIS | | | |
|--|-------------------------------------|----------------------------------|--|
| DATE PREPARED: Feb. 07, 2018 | | PREPARED BY: United Global Group | |
| OPERATION: Forklift Operations | | | |
| STEP BY STEP PLAN: | | | |
| 1 Safety Training | | | |
| 2 Housekeeping | | | |
| 3 PPE and Equipment | | | |
| 4 Forklift Operations | | | |
| 5 | | | |
| 6 | | | |
| Strategic Risks | Event Risk | Needs Special Planning | |
| Equipment <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Exposure to Falls <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Confined Space <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Traffic <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Trenching / Excavation <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Lock-Out / Tag-out <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| MOSF Attached <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Utilities <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Electrical <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Critical LR Plan <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| On the Spot LR Plan <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Steel Erection <input checked="" type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| Night Work <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Personnel / Striking <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| Other Safety risks <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | |
| | <input type="checkbox"/> | <input type="checkbox"/> | |
| | <input type="checkbox"/> | <input type="checkbox"/> | |
| | <input type="checkbox"/> | <input type="checkbox"/> | |

Acces Identification	
Location	Type
Rosa Headframe	Overhead Door

Unique PPE Required	
Cutting Goggles <input type="checkbox"/>	<input type="checkbox"/>
Face Shield <input type="checkbox"/>	<input type="checkbox"/>
Leather/Kevlar Chaps <input type="checkbox"/>	<input type="checkbox"/>
Respiratory Protection <input type="checkbox"/>	<input type="checkbox"/>
Toe/Foot Guards <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Ear Plugs/Muffs <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Life Vest/PFD <input type="checkbox"/>	<input type="checkbox"/>
Welding Hood <input type="checkbox"/>	<input type="checkbox"/>
Welding Leathers <input type="checkbox"/>	<input type="checkbox"/>
Other PPE: Gloves <input type="checkbox"/>	<input type="checkbox"/>
Other PPE: Safety Glasses <input type="checkbox"/>	<input type="checkbox"/>
Other PPE: Hi-via vests <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Other PPE: Steel Toe Boots <input type="checkbox"/>	<input type="checkbox"/>
Other PPE: <input type="checkbox"/>	<input type="checkbox"/>
Supervisor/endent <input type="checkbox"/>	

Ergonomic risks	
Lifting <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Repetitive Motion <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Vibration <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Awkward Position <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

Prepared and reviewed by:	
Name	Signature
Foreman	

Note: Solutions are part of the operation plan.



ESH Field Support & Oversight

- Construction Coordinator
 - Daily Reports
- ESH Coordinator
 - Document findings
- Weekly jobsite walkthroughs by stakeholders
- Management walkthroughs
- Fermilab ESH Subject Matter Expert's
- Subcontractor ESH representatives

Detail Report - Advanced

Criteria

Observation Type: Construction

Report Date Range: Merge results across types

Proj/Location(s): Previous 7 Day(s)

Show both safe and Deficient

LBNF Ross Headframe
LBNF 500SL
LBNF Ellison Yard
LBNF Conveyor/Open Cut
LBNF 485SL Lab

Ordered By: Proj/Location Ascending

Results:

Items Details - Deficient

Proj/Location	Sub/Landfill	Category	Sub-Category	Observation Date	Observer	Severity	Causal Analysis	Done?	Action Information	Due / Completed
LBNF Ellison Yard	SOSTA	Environmental	Precipitation in last 24 hours	5/02/2019 11:53AM	Jeffrey Shearer	Low		Yes		D - C: 05/02/2019
Comments: [5/02/2019 12:06PM] Jeffrey Shearer: 6 inches of new snow										
LBNF Ross Headframe	SOSTA	Electrical	LOTO procedures	5/02/2019 2:54PM	Jeffrey Shearer	Medium	A3 Human Performance Less Than Adequate	Yes	Foreman LOTO	D - C: 05/02/2019
Comments: [5/02/2019 3:41PM] Jeffrey Shearer: Overhead crane was not locked out, while lift was positioned above it										
Corrective Action: [5/02/2019 3:41PM] Jeffrey Shearer: The overhead crane was locked and tagged out										

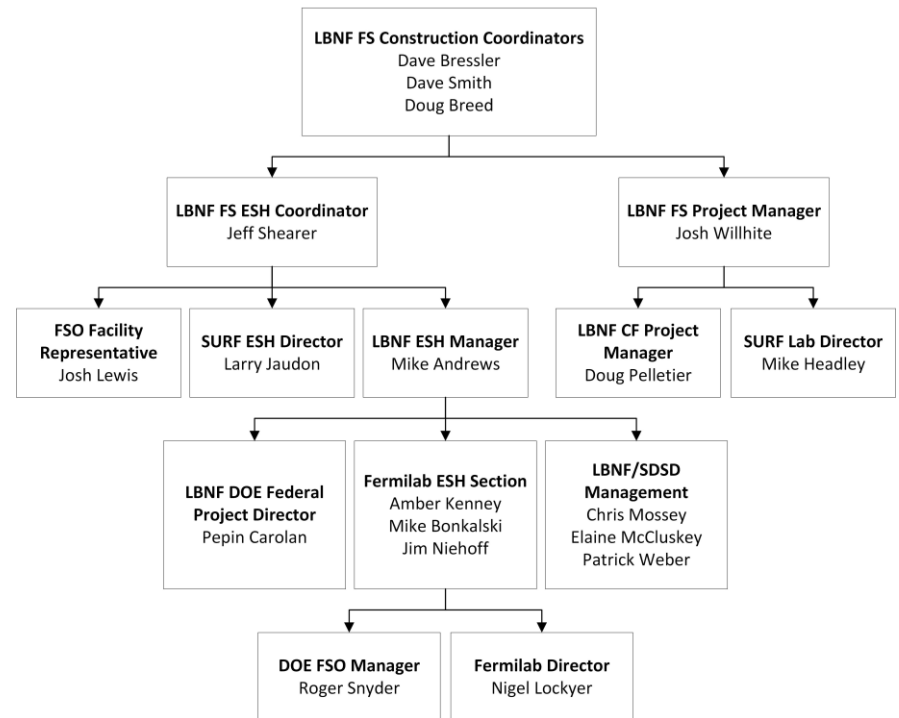
Items Details - Safe

Proj/Location	Sub/Landfill	Category	Sub-Category	Observation Date	Observer					
LBNF Ellison Yard	SOSTA	CONCRETE Cutting & Coring, Finishing	Other	5/02/2019 11:53AM	Jeffrey Shearer					
LBNF Ellison Yard	SOSTA	Environmental	Condition of all fence and wattles	5/02/2019 11:53AM	Jeffrey Shearer					
LBNF Ellison Yard	SOSTA	Environmental	Condition of spoil piles	5/02/2019 11:53AM	Jeffrey Shearer					
LBNF Ellison Yard	SOSTA	Environmental	Condition of wetland boundary	5/02/2019 11:53AM	Jeffrey Shearer					
LBNF Ellison Yard	SOSTA	Environmental	Containers labelled	5/02/2019 11:53AM	Jeffrey Shearer					
LBNF Ellison Yard	SOSTA	Environmental	Erosion prevention and sediment control	5/02/2019 11:53AM	Jeffrey Shearer					
LBNF Ellison Yard	SOSTA	Environmental	General housekeeping	5/02/2019 11:53AM	Jeffrey Shearer					
LBNF Ellison Yard	SOSTA	Environmental	Protection of surrounding flora	5/02/2019 11:53AM	Jeffrey Shearer					
LBNF Ellison Yard	SOSTA	Environmental	Secondary containment	5/02/2019 11:53AM	Jeffrey Shearer					
LBNF Ellison Yard	SOSTA	Environmental	Soil stabilization	5/02/2019 11:53AM	Jeffrey Shearer					
LBNF Ellison Yard	SOSTA	Environmental	Storm water protection general	5/02/2019 11:53AM	Jeffrey Shearer					
LBNF Ellison Yard	SOSTA	Environmental	Waste water discharge	5/02/2019 11:53AM	Jeffrey Shearer					
LBNF Ross Headframe	SOSTA	Fall Protection	Exhibit guardrails	5/02/2019 2:54PM	Jeffrey Shearer					
LBNF Ross Headframe	SOSTA	Fall Protection	Fall protection at B	5/02/2019 2:54PM	Jeffrey Shearer					
LBNF Ross Headframe	SOSTA	Fall Protection	Fall protection plan	5/02/2019 2:54PM	Jeffrey Shearer					
LBNF Ross Headframe	SOSTA	Fall Protection	Proper anchorage points	5/02/2019 2:54PM	Jeffrey Shearer					
LBNF Ross Headframe	SOSTA	Fall Protection	Safety harness and lanyard	5/02/2019 2:54PM	Jeffrey Shearer					

Far Site Emergency Management

- [LBNF Far Site Emergency Operations Plan](#)
- SDSTA ERT providing support on all shifts
- Participating in SURF quarterly underground evacuation & bi-annual surface drills
- KAJV Crisis Management Plan
- KAJV Severe weather plan
- KAJV paramedic on-site for all shifts (ALS certified)
- Refuge chamber upgrade completed to increase capacity to 144

LBNF Far Site Incident Notification



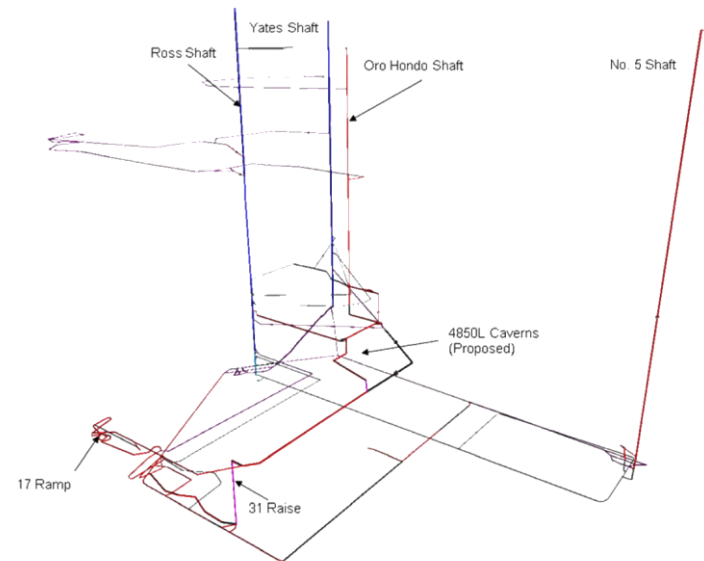
Far Site Environmental

- Environmental Assessment & FONSI completed in Sept. 2015
- Water discharge permit in place with the State of SD for the tramway
- Established air permit requirements associated with the conveyor
- Evaluating impacts of excavation activities on the SURF water treatment facility
- Lead/asbestos abatement processes well developed for construction activities in the headframe and crusher areas
- Weekly SWPPP inspections
 - Silt fence, stockpile storage, etc.
- EA commitments reviewed as part of the work planning process
 - Raptor Study completed for conveyor installation
 - Traffic management plan



Far Site Ventilation

- ARUP has developed multiple ventilation models reflecting phases of construction and final operations for LBNF
- ARUP modeling software utilized is industry standard, Vnet
- Ventilation consultant validated the LBNF ventilation modeling to verify alignment with the ODH analysis. Presently no major issues identified
- KAJV subcontract modified to accommodate change in ventilation compliance requirements from OSHA 1926.800 to MSHA 30 CFR 57



Lessons Learned Communication

- Management meetings
- Weekly Fermilab ESH summary reports
- Monthly DOE ORPS summary reports
- Monthly Fermilab ESH committee meetings
- Daily work planning meetings
- Weekly subcontractor progress meetings
- Monthly safety meetings
- SDSTA flash reports



Safety: LBNF/DUNE-US Incident Statistics

	Current Calendar Year to Date					Cumulative to Date				
Organization	Manhours*	DART Cases	DART Rate	TRC Cases	TRC Rate	Manhours*	DART Cases	DART Rate	TRC Cases	TRC Rate
LBNF/DUNE-US	139,689	0	0	0	0	858,890	0	0	0	0
SDSTA	51,944	0	0	0	0	128,032	1	1.6	2	3.1
KAJV	112,960	0	0	0	0	112,960	0	0	0	0
KENNY/JACOBS	794	0	0	0	0	794	0	0	0	0
OTHER SUBCONTRACTORS	2114	0	0	0	0	2114	0	0	0	0
Total	307,501	0	0	0	0	1,102,790	1	0.2	2	0.4

*Reflects manhours through December 2019

- Good safety record, but not without minor incidents
 - One first aid case – hand injury
- Response to issues-actively investigate ALL incidents to drive change and continuous improvement
- Communicate lessons learned to all levels of the project team

Summary

- Site access & badging process established
- Training requirements developed and in place
- PPE requirements defined
- Underground access process coordinated with SDSTA
- Work planning and control process implemented for all activities
- Support, oversight, & assurance of the ESH program at multiple levels of project oversight
- Frequent coordination with FNAL ESH