

# SURF Update and HR

**Mike Headley**

**SDSTA Executive Director  
SURF Lab Director**

**Cultural Advisory Committee  
July 13, 2023**



**Sanford**

Underground Research Facility

South Dakota Science and Technology Authority

# SURF Long-Term Goals

**By 9/29/2035, SURF will have world-leading multi-disciplinary experiments in operations with proposed experiments actively competing for newly developed underground laboratory space including:**

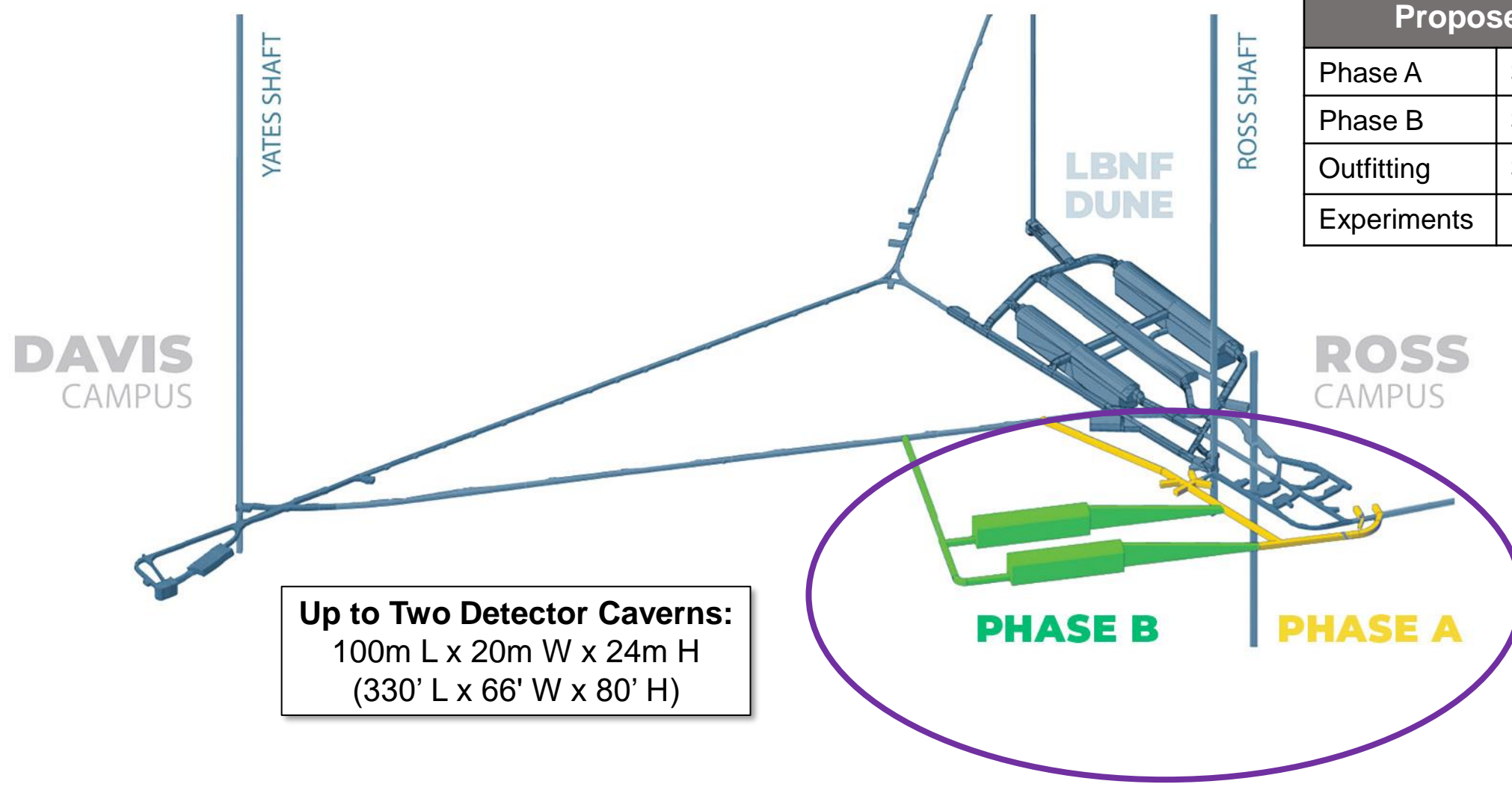
1. The Long-Baseline Neutrino Facility (LBNF) and Deep Underground Neutrino Experiment (DUNE) have been constructed and are fully operational.
2. Two additional large lab modules on the 4850L have been constructed and are fully operational.
3. Construction is underway on two 7400L lab modules including the required underground access infrastructure to provide lab space with increased shielding for future experiments.
4. Provide broader underground access to a range of science disciplines including depths below the 5000L.
5. The Institute for Underground Science at SURF has been constructed and is fully operational with compelling, vibrant science and education programs.
6. Foster commercial partnerships to advance technology development in the region, increase facility operations efficiency and safety, and expand workforce development opportunities.

# SURF Highlights

- LBNF excavation is 68% complete. Planning for outfitting and cryostat installation underway.
- Institute for UG Science at SURF kickoff planning underway. CETUP workshop underway.
- Funds in hand for Phase A of 4850L expansion. Design underway.
- SDSTA has provided significant input into P5 strategic planning process.
- Yates Shaft heavy maintenance continues and reached 1100L in May (plan was July). Now at the 1,250-foot mark. Planning to reach the 4100L in mid-2024.
- New Oro Hondo ventilation fan is in operation – advanced due to downtime on older fan.
- Education and outreach had another great year supporting students in SD.
- Efforts underway to “get out the word” about SURF in SD: RAP advertising, Washington Pavilion.
  - Washington Pavilion ribbon cutting is planned for Sep 21 at 1:00 pm CT. “SURF Day” at WP is set for Sep 23.
- LBNF/DUNE congressional briefing held in DC Jun 21. Dr. Jaret Heise represented SURF.
- Congressional Staff delegation visit to SURF planned for late Aug.

# SURF Current & Future Underground Facilities

Design underway. Excavation planned for first half 2024.



**Up to Two Detector Caverns:**  
 100m L x 20m W x 24m H  
 (330' L x 66' W x 80' H)

Proposed Funding Model	
Phase A	\$13M State of SD ✓
Phase B	\$100M Private
Outfitting	\$85M Federal
Experiments	Up to \$500M ea. - Fed/Intl

SD funding approved  
 Mar 23, 2023

# New Oro Hondo Fan Operational



# Davis-Bahcall Scholars - 2023

## Top Row:

### **Ike-Njoku Theresa Ahunna**

- Augustana University
- Previous – HS in Nigeria

### **Grace Davis**

- Brookings HS
- Will attend – Cal Tech

### **Joseph Bumann**

- SF Roosevelt HS
- Will attend – SDSU

### **Cara Ronish**

- Hill City HS
- Will attend – SD Mines



## Bottom Row:

### **Laura Jensen**

- RC Central HS
- Will attend – SD Mines

### **Connor Matthies**

- SDSU
- Previous – West Central HS

### **William Kuhl**

- SD Mines
- Previous – Hot Springs HS

### **Sophie Schmid**

- RC Stevens HS
- Will attend - U of Minnesota



# Scholar Feedback

*“I don’t think there’s any other program in the world that has the breadth of topics covered as well as the depth of connections made along the way.”*

Connor Matthies

# SURF Interns Summer 2023



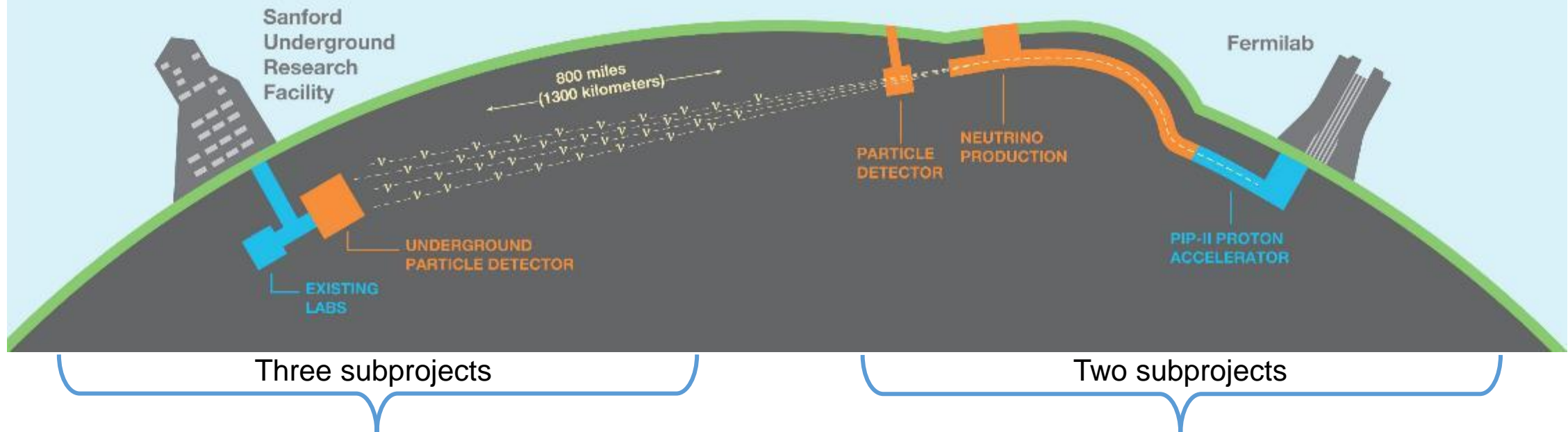
Department	NAME	SCHOOL	HOMETOWN	INTERNSHIP
Engineering	Luke Lichtenberg	SD Mines	Box Elder	Chris Bauer
Engineering	Jackson Busch	SD Mines	Rapid City	Chris Bauer
IT	Conner Curran	Belle Fourche HS	Belle Fourche	Dave Bozied
Science	Ellie Breidenbach	SD Mines	Sioux Falls	Jack Headley
Science	Erik Allen	Augustana	Rapid City	Dave Bozied
Communications	Ashley Beguin	BHSU	Spearfish	Dave Bozied
Education	Megan Gisi	BHSU	Rapid City	SD EPSCoR
Education	Ethan Johnston	BHSU	Isabel	SD EPSCoR
E&O/Ventilation	Emily Siemonsma	SDSU	Hill City	SD Space Grant Consortium
Facilities	Shot'e Snell	Job Corp	Miles City, MT	Dept of Labor Apprentice



# LBNF/DUNE Overview

**Far Site – SURF in Lead, SD**  
Facility/Infrastructure and Far Detectors

**Near Site – FNAL in Batavia, IL**  
Facility/Infrastructure, Neutrino Beamline,  
and Near Detectors



- **FSCF-EXC** – Far Site Excavation
- **FSCF-BSI** – Far Site Building & Site Infrastructure
- **FDC** – Far Detectors and Cryogenic Infrastructure

- **NSCF+B** – Near Site Conventional Facilities + Beamline
- **ND** – Near Detectors

# Excavation Progress



CUC (4850-36) Installing CT Bolts

Sanford Underground Research Facility



North Cavern (4850-33)

SURF Cultural Advisory Committee

July 13, 2023

10

# North Detector Cavern

- View of east end of cavern
- 36' of additional benching to be performed

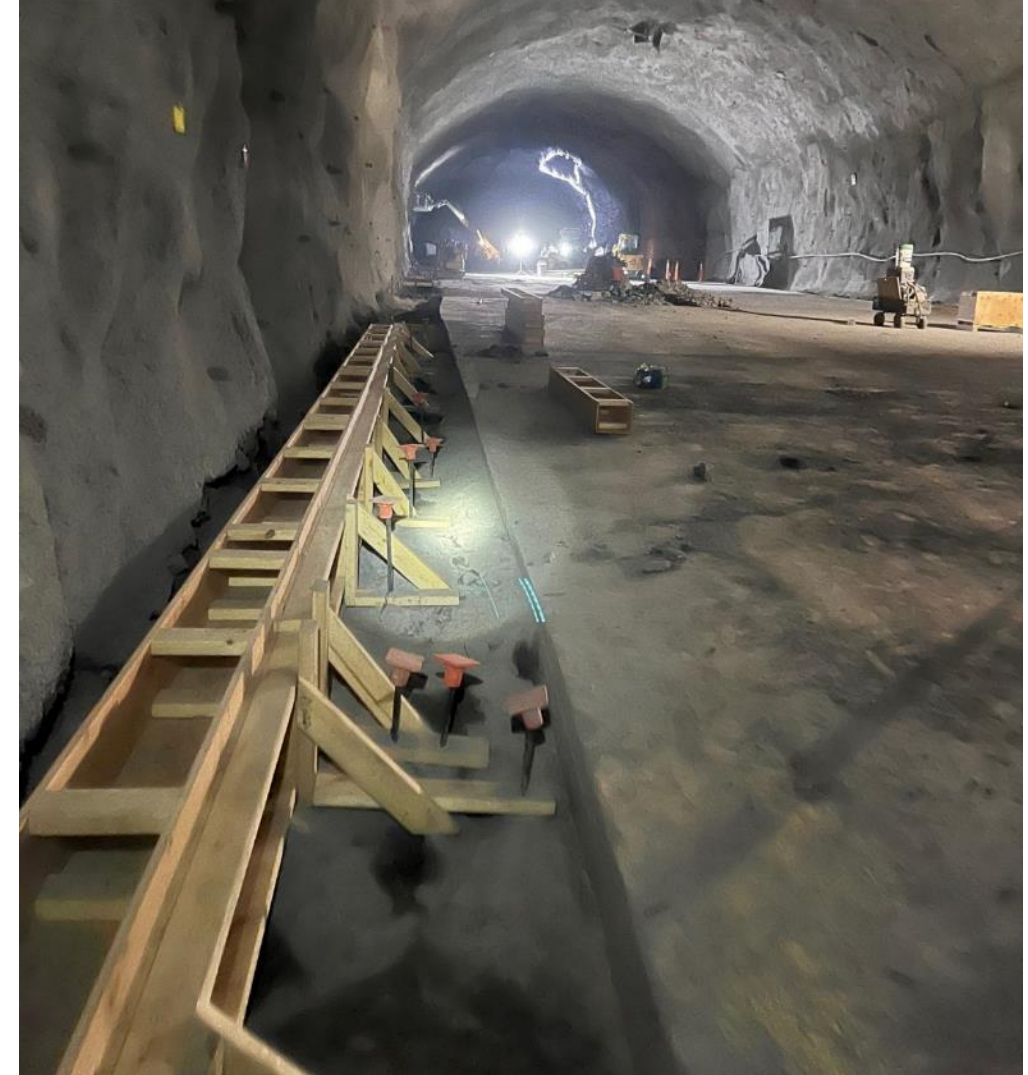
Photo by  
Ryan Postel,  
FNAL May 2023



# South Detector and Central Utility Caverns



South Detector Cavern



Central Utility Cavern

# CUC Concrete



Formwork for 1<sup>st</sup> slab section - Central Utility Cavern (4850-36)

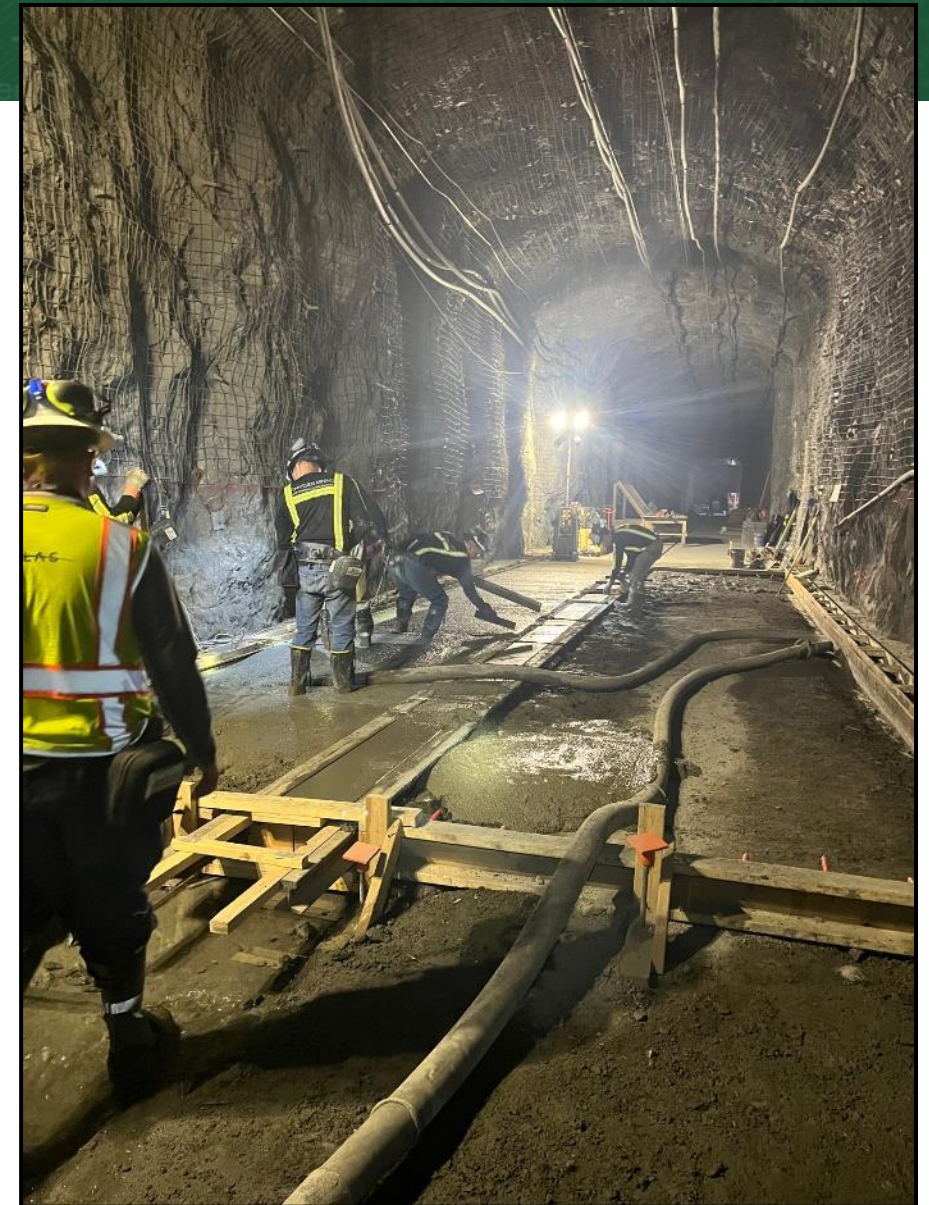


Prepping for mudmat pour - Central Utility Cavern (4850-36)

# Drift Rail



4850-02 Drift Formwork Including Rail

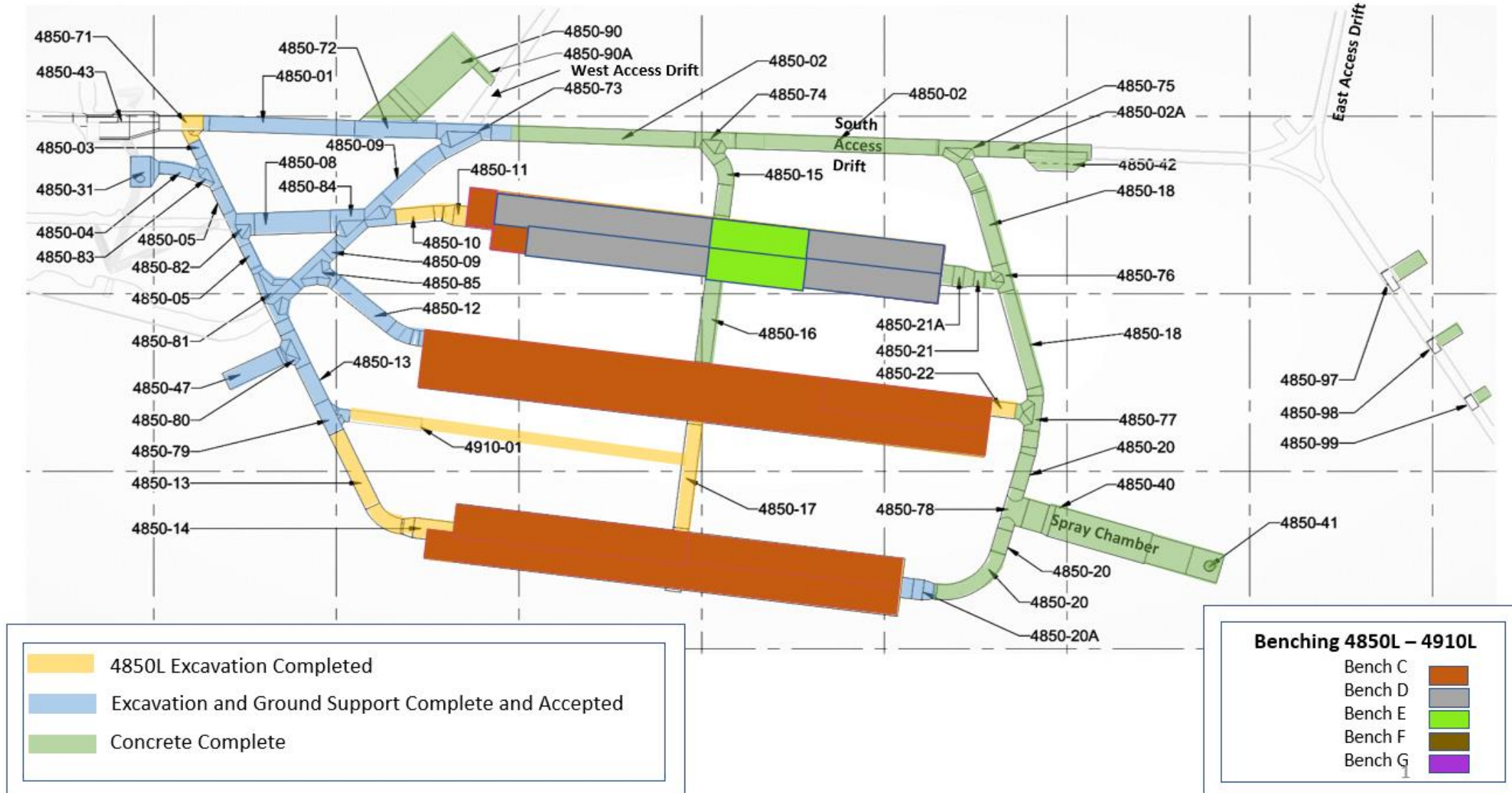


Pouring Concrete Slab in 4850-02 Drift

# Excavation Progress

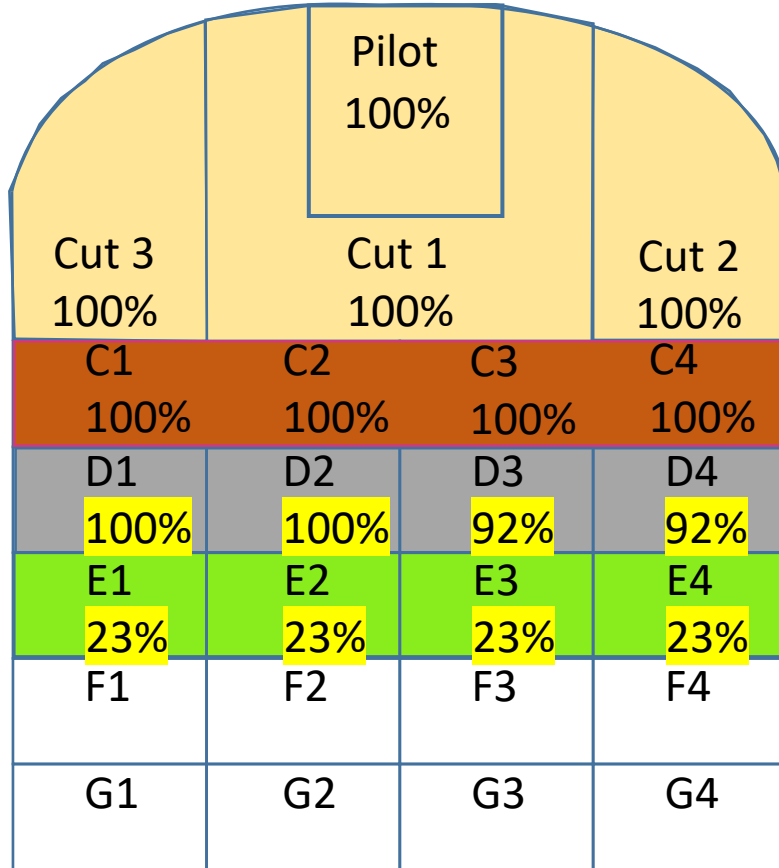
Total Excavation Completed to Date = 68%

June 19, 2023

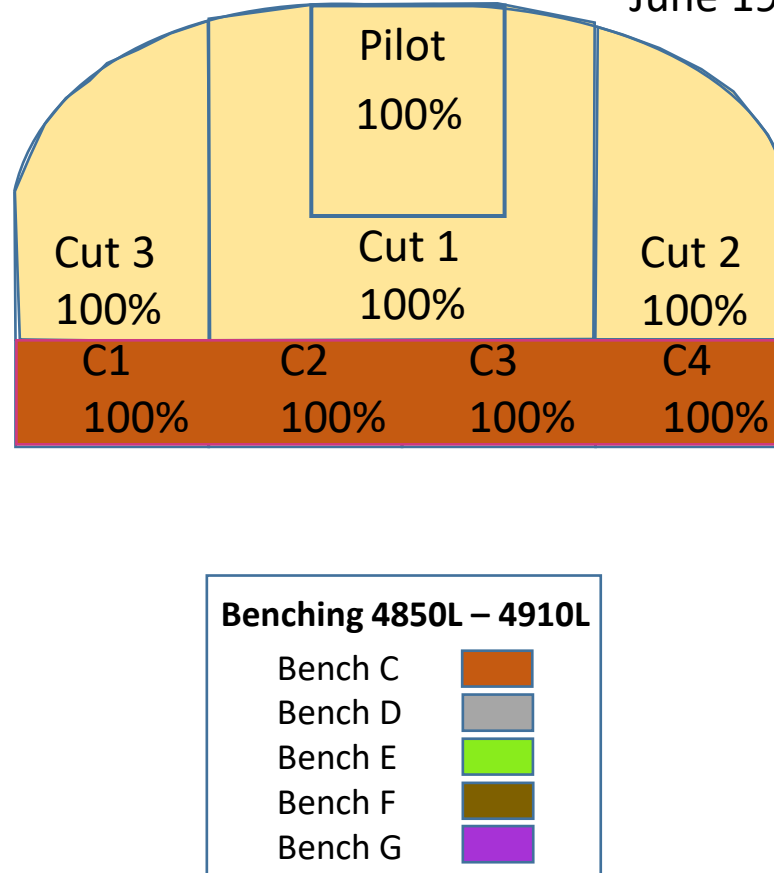


# Cavern Excavation Completion Percentage

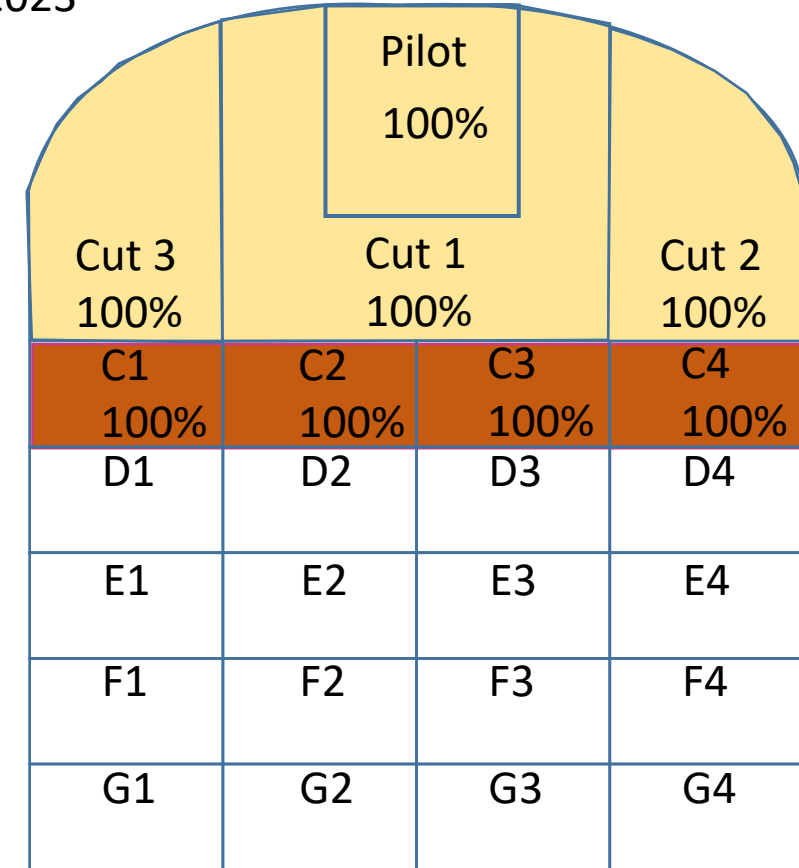
June 19, 2023



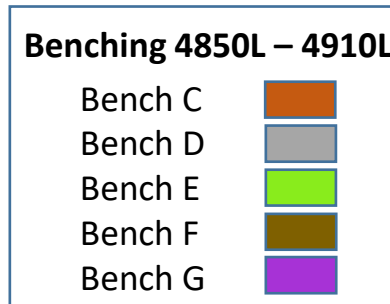
North Cavern



CUC Cavern



South Cavern





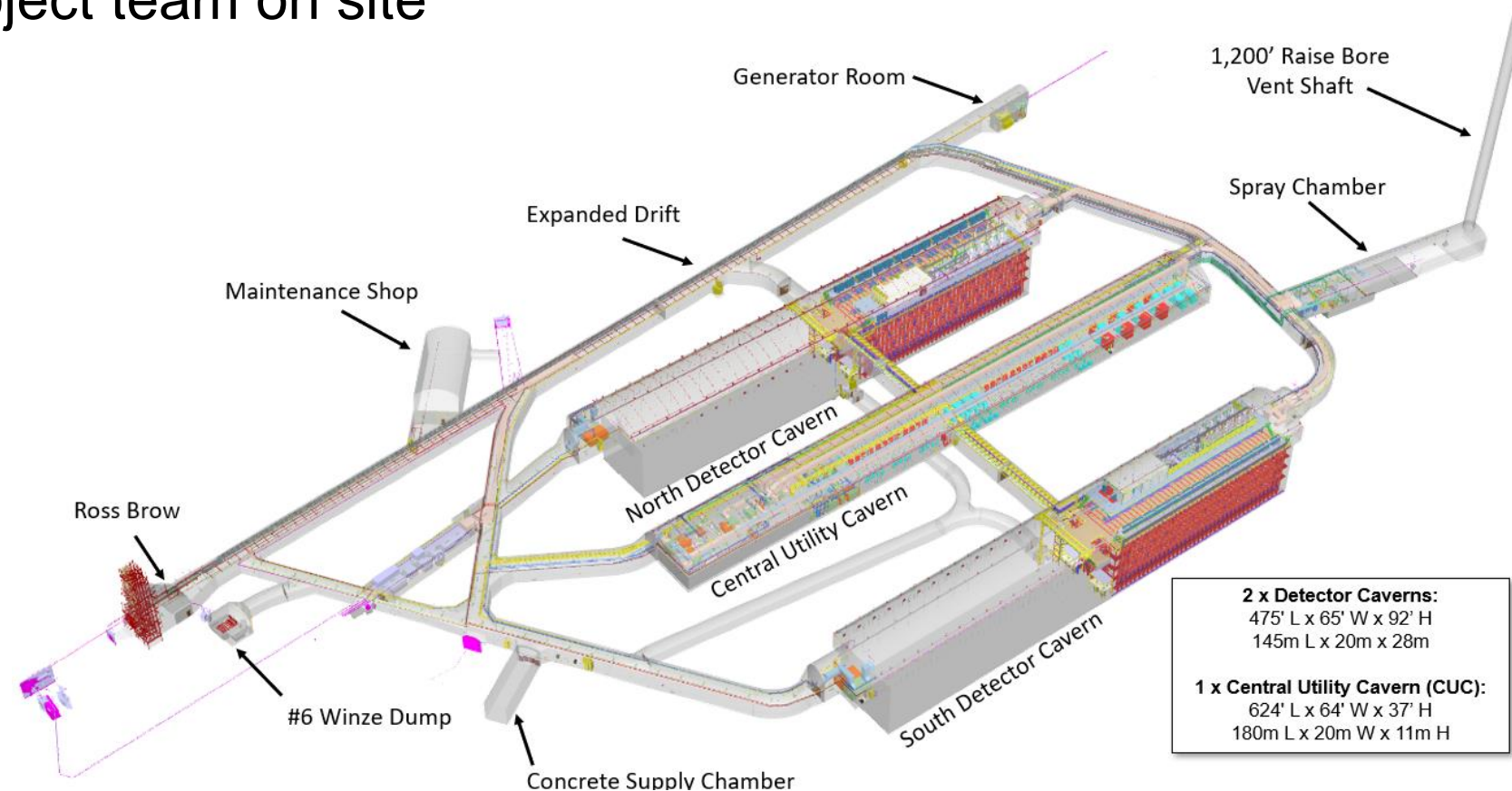
# Infrastructure Bidding Progress

- 23 packages planned (+/-)
- 5 package proposals in hand
- 2 packages in process
- Mostly regional contractor pool
- Anticipate similar number of people as currently, but divided between many firms
- Work planned to begin in summer 2024

SUB BID PACKAGES				
ID	Description	Out to Bid	Recommendation to FRA	Issue SA from FRA
BSI SUB-02	Civil/Concrete (Surface)	8/16/2023	10/6/2023	11/17/2023
BSI SUB-03	Masonry	2/2/2024	4/15/2024	5/15/2024
BSI SUB-04	Steel/Metals (Surface)	1/11/2024	3/22/2024	4/22/2024
BSI SUB-05	General Building	8/13/2023	10/6/2023	11/17/2023
BSI SUB-06	Painting/Finishes	1/2/2024	3/13/2024	4/12/2024
BSI SUB-07	Prefab Metal Building			
BSI SUB-08	Fire Protection	7/12/2023	9/22/2024	11/24/2023
BSI SUB-09	Plumbing	4/7/2023	7/14/2023	8/13/2023
BSI SUB-10	Early Equip (if necessary)	5/11/2023	7/21/2023	8/1/2023
BSI SUB-11	HVAC	4/7/2023	7/14/2023	10/12/2023
BSI SUB-12	Temporary Electric	2/1/2023	4/28/2023	6/27/2023
BSI SUB-13	Electrical Systems	2/1/2023	4/28/2023	7/27/2023
BSI SUB-14	Communication/IT	2/24/2023	5/12/2023	7/12/2023
BSI SUB-15	Fire Detection	2/24/2023	5/19/2023	7/19/2023
BSI SUB-16	System Commissioning	9/1/2023	11/14/2023	12/14/2023
BSI SUB-17	Cavern Elevators	3/24/2023	6/9/2023	7/2/2023
SELF PERFORM PACKAGES				
ID	Description	Define Scope	Recommendation to FRA	Issue SA from FRA
BSI SP-2B	Surface Bullgang	5/4/2023	7/8/2023	9/5/2023
BSI SP-3	UG Civil/Concrete Only	1/19/2024	3/24/2024	4/22/2024
BSI SP-4	UG Structural Steel/Metal Fab	9/6/2024	11/9/2024	1/7/2025
BSI SP-5	Hangers, Rock Drilling			
SERVICE PACKAGES				
ID	Description	Out to Bid	Recommendation to FRA	Issue SA from FRA
BSI SER-A-2	Quality Inspection Services	10/18/2023	1/2/2024	2/1/2024
BSI SER-B-2	Survey Services	10/18/2023	1/2/2024	2/1/2024
BSI SER-C-2	Pre-Mob Video Survey	10/18/2023	1/2/2024	2/1/2024

# Far Detectors and Cryogenics (FDC) Status

- FDC project is working to baseline cost/schedule in Sept 2023
- Work planned to start in fall 2024 with steel deliveries
- Will roughly double project team on site



# FDC Partners are delivering

At the far site, the LBNF project scope includes committed critical in-kind contributions from:

- ProtoDUNE detectors have proven technologies for FD1 and FD2



CERN – Membrane cryostats and portions of argon receiving facility (tanks)



Brazil/UNICAMP – Argon purification and recirculation systems



Switzerland/SERI – Argon condensing system



Poland/WUST – Internal cryogenics systems



FD1 and FD2 prototypes at CERN



CERN team inspecting cryostat fabrication in Spain



Cryostat beam in fabrication



Testing assembly of cryostat components (cryostat tilted 90 degrees to right)

Some photos by Dimitar Mladenov, CERN

# LBNF/DUNE Logistics Overview / ASF Test Lift / Test Lift



*Conestoga Trailer for Transport to Lead, SD*



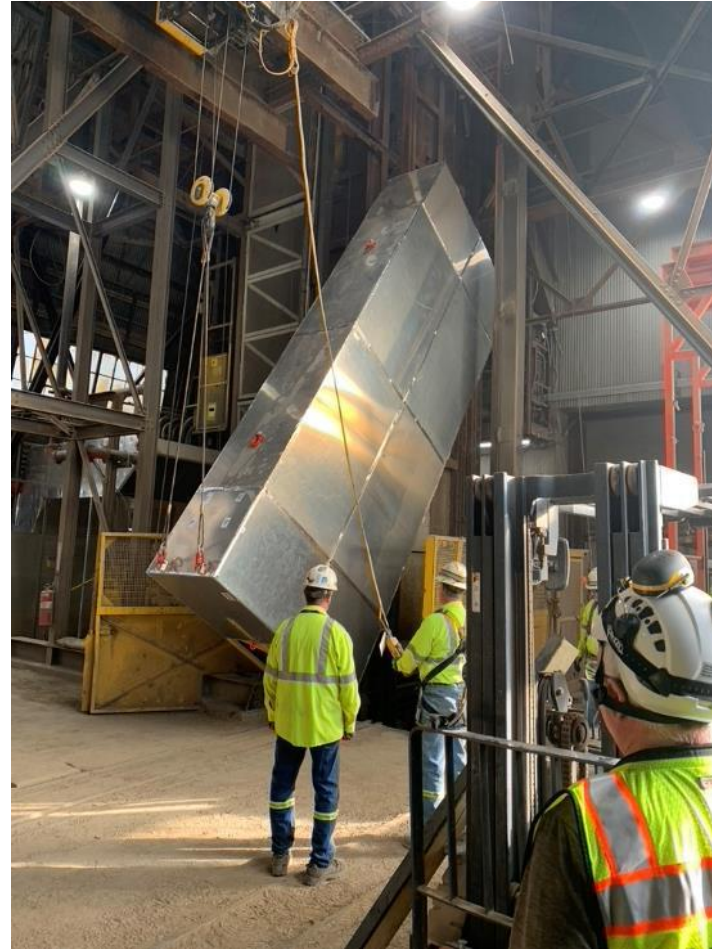
*ASF in Crusher Bldg.*



*Offload at Crusher Bldg. SURF*



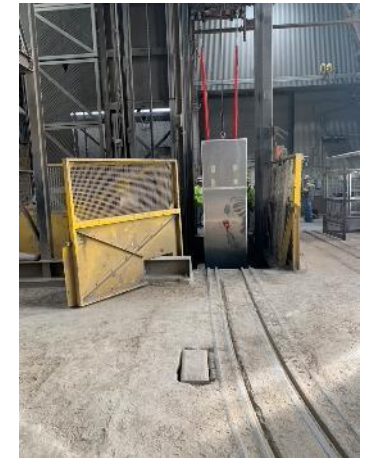
*ASF Stripped of the Base Frame moving to Ross Shaft*



*ASF insertion into Ross Shaft*

## • ASF Test Lift

- Departure FNAL 8/29/22
- Arrival Lead, SD 9/1/22
- Test 9/2/22
- Lift Test successful!



# CAC Review Recommendations Status

ID #	Recommendation	Status
13 Open	Host a Tribal Presidents/Chairmen/Elder Leaders' Day.	On hold.

# HR Report – 2<sup>nd</sup> Quarter 2023

- HR Initiatives to incorporate IDEA into the workplace
  - Expand Sourcing Efforts
    - Talent acquisition programming automatically posts to 20000 job boards.
  - Debias Position Descriptions and Job Adverts
  - Create More Objective Methods of Interviewing
  - Policy/practice revisions to support belonging, values and culture
    - People-Centric Policy and inclusive messaging
    - Well-Being Room
    - Holiday Pay Expansion
    - Vacation Expansion and Pay-Out Option
    - Sick Leave Expansion
    - Benefits Enhancement

# HR Report – 2<sup>nd</sup> Quarter 2023

	June 30, 2022	June 30, 2023
• <b>Headcount –</b>		
• Total	199	213
• Full-time	180	183
• Part-time	12	21
• Temporary	7	9
• <b>Demographics</b>		
• Avg Age	48	47
• Pre Baby Boomers (1900-1944)		.5%
• Baby Boomers (1945-1964)		27.7%
• Generation X (1965-1980)		38.2%
• Millennials (1981-1994)		23.5%
• Generation Z (1995-2010)		8.9%
• Male	78%	75%
• Female	22%	25%
• White	96%	93%
• American Indian or Alaska Native	0.5%	0.5%
• Two or More Races	2%	2%
• Hispanic or Latino	1%	1%
• <b>IDEA Sourcing Efforts</b>		
• Females Hired	11	17 (50%)
• Females Laterally Transferred/Promoted		2
• Veterans Hired		4 (11.8%)
• Underrepresented Populations Hired	1	1
• Pre Baby Boomers (1900-1944)		
• Baby Boomers (1945-1964)		5 (14.7%)
• Generation X (1965-1980)		13 (38.2%)
• Millennials (1981-1994)		8 (23.5%)
• Generation Z (1995-2010)		8 (23.5%)

# CAC Review Recommendations Status

ID #	Recommendation	Status
10	Increase diversity of applicants applying for SDSTA jobs.	Addressed in presentation slides.



# Questions?