

Getting Started with a Project at SURF

Jaret Heise, Science Director

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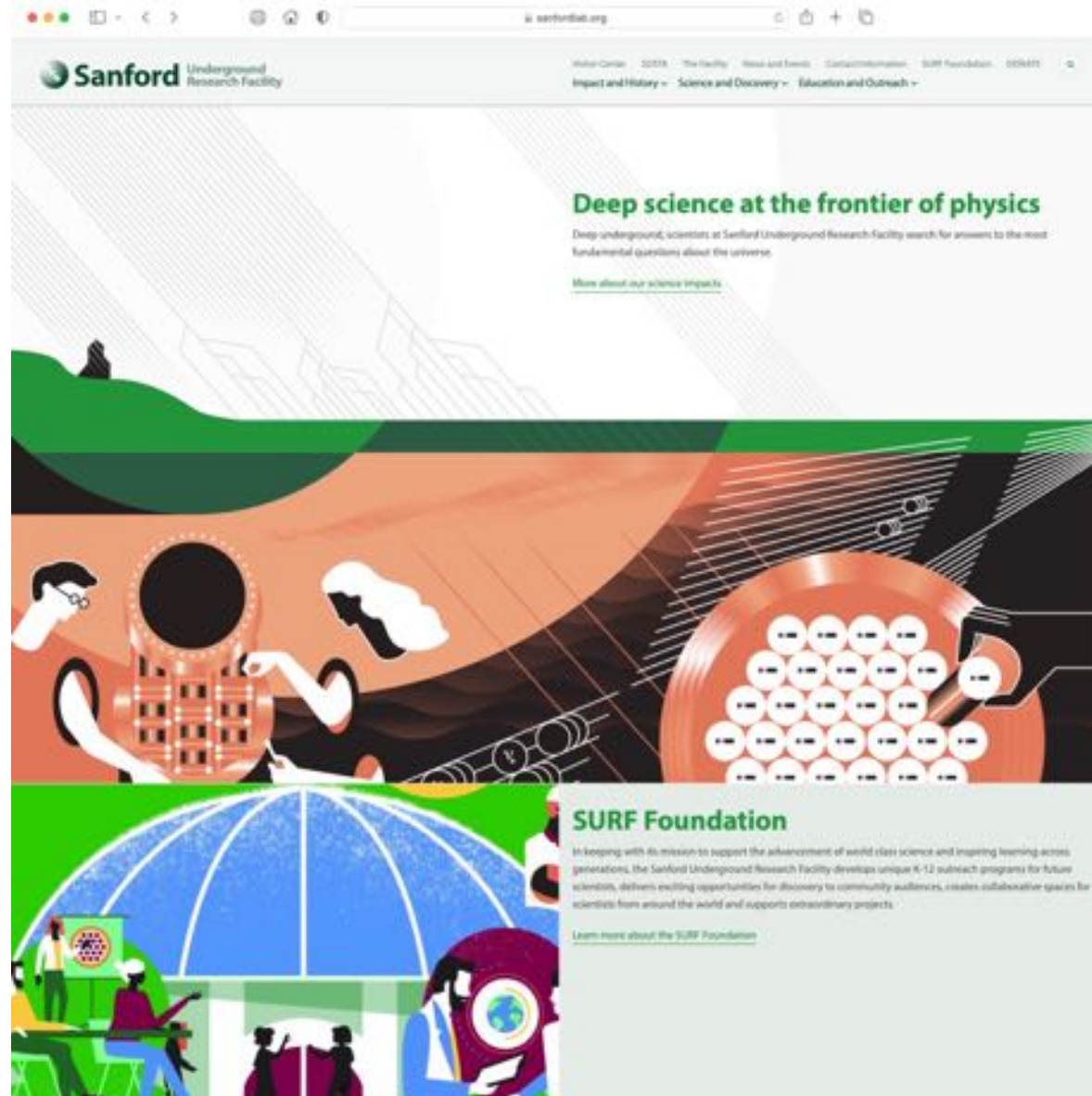
Sanford

Underground Research Facility

South Dakota Science and Technology Authority

Getting Started with a Project at SURF

<https://www.sanfordlab.org>



Getting Started with a Project at SURF

<https://www.sanfordlab.org/researchers/proposal-guidelines>

Resources for researchers

Lab access and training

► Proposal Guidelines

Upcoming workshops and meetings

Science Liaison Office

SURF User Association

Proposal Guidelines

All proposals must follow these guidelines

We are excited at Sanford Lab to contribute to cutting-edge science by providing the best environment for experiments that require unique underground facilities. We are glad to work with you to get your experiment running. To begin the process of approval and installation, follow the steps in the order listed below:

1. Read the [Experiment Implementation Program](#).
2. Read the [Experiment Integration and Support](#) document.
3. Complete a draft of the [Experiment Planning Statement](#) describing your project.
4. [Contact](#) the SURF Science Director.
5. Complete the [Memorandum of Understanding \(MOU\)](#). The MOU references the SURF [waiver](#) required for underground access, the SURF [ESH Manual](#) and the SURF [Publication Policy](#).

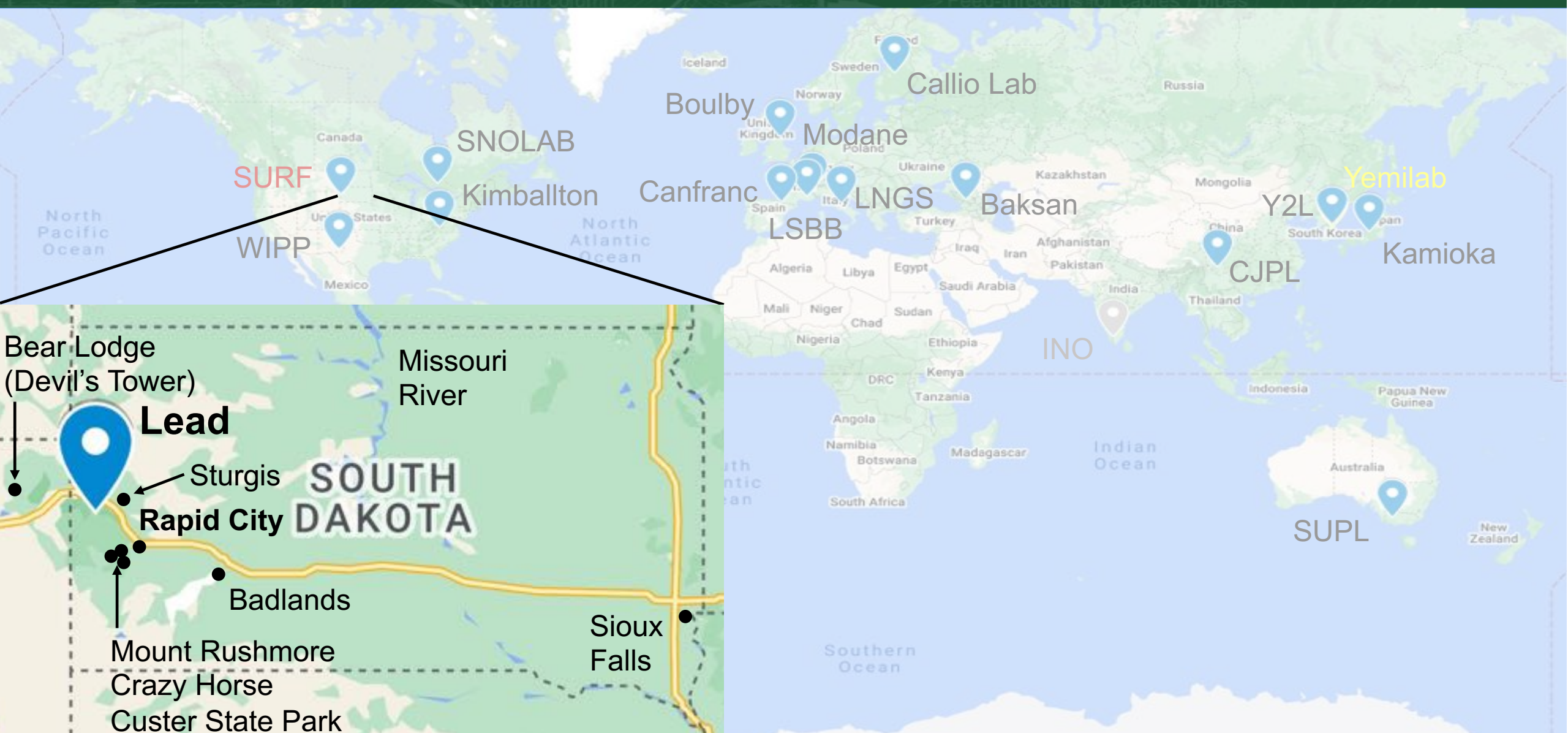
Sanford Underground Research Facility

Where in the world is SURF? <https://sanfordlab.org/facility/directions>

The screenshot shows a web browser window displaying the Sanford Underground Research Facility website. The page title is "Directions and Weather" and the subtitle is "Directions, weather and travel information." The main content area features a section for "Current weather conditions at the Yates Complex:" with a weather icon and a link for "detailed weather data." Below this is a map titled "Directions to Sanford Underground Research Facility" showing a route from Rapid City, South Dakota, to the facility. The map includes labels for "Lead Deadwood High School" and "Deadwood Outdoor Rentals." The left sidebar contains a "The Facility" menu with items like "Directions and Weather," "Visitor Information," "The Ross Shaft," "The Yates Shaft—primary access," "Waste Water Treatment Plant," "The Davis Campus," "Sanford Lab Homestake Visitor Center," and "Sanford Science Education Center." The top navigation bar includes links for "Water Center," "SOCTA," "The Facility," "News and Events," "Contact Information," "SURF Foundation," "DONATE," "Impact and History," "Science and Discovery," and "Education and Outreach."

Sanford Underground Research Facility

Where in the world is SURF? You could be here!



Sanford Underground Research Facility

Visitor Information: <https://sanfordlab.org/facility/visitor-information>

The screenshot shows a web browser window displaying the Sanford Underground Research Facility website. The page title is "Sanford Underground Research Facility" and the URL is "sanfordlab.org/facility/visitor-information". The navigation menu includes "Visitor Center", "SDSTA", "The Facility", "News and Events", "Contact Information", "SURF Foundation", and "SDSMF". The main content area is titled "Visitor information" and includes sections for "The Facility", "General visitor information", "Sponsors", "For visitors attending meetings", "SDSTA/SURF contractors", "Fermilab/LBNF contractors", and "Public tours".

The Facility
Directions and Weather
Visitor information
The Ross Shaft
The Yates Shaft—primary access
Waste Water Treatment Plant
The Davis Campus
Sanford Lab Homestake Visitor Center
Sanford Science Education Center

Visitor information

Primary access to South Dakota Science and Technology Authority/Sanford Underground Research Facility (SDSTA/SURF) is via E. Summit Street to the Yates Complex. [Click here for directions.](#) (Your GPS may misguide you.)

General visitor information

- All visitors must make an appointment with a sponsor prior to arrival.
- Appointments are verified upon arriving at the Yates or Ross Gate.
- Parking and check in information will be provided by Security at the Yates or Ross Gate.
- A valid government issued I.D. (such as a driver's license or military I.D.) is required to check in.
- Non-U.S. citizens must present a valid passport or Permanent Resident Card to Front Desk staff in the Administration Building.

Sponsors are SURF personnel that include SDSTA employees, project and experiment managers, or users who serve as a point of contact for individuals, groups or agencies visiting SURF. The sponsor is the host and responsible party for visitors during their time on site.

For visitors attending meetings

- When attending a meeting at the Yates Complex (Administration Building or Education & Outreach Building), stop at the Yates Main Gate/Guard House to acknowledge your arrival. You will be directed to check in either at the Yates Administration Building Front Desk or sign in at the meeting location. If you are issued a visitor card, turn it in before you leave.
- When attending a meeting at the Ross Complex, STOP at the Ross Main Gate. If there is no staff present, please do not enter. Call your sponsor.

SDSTA/SURF contractors

Construction contractors must contact their sponsor prior to arriving at the lab.

Fermilab/LBNF contractors

You must complete the FNAL ID process, prior to arriving at SURF. [Click here for LBNF contractor information.](#)

Call (605) 722-8650 for more information.

Public tours

The Sanford Underground Research Facility does not provide public tours. However, the [Sanford Lab Homestake Visitor Center](#), 340 West Main Street in Lead (at the Open Cut), offers trolley tours of Lead, a drive through our surface campus and a guided visit to the Yates Shaft Restroom. Trolley tours are available May through October, weather permitting. For more information, contact the Sanford Lab Homestake Visitor Center at (605) 584-3115.

For other site visits or presentations, contact the communications office.

Getting Started with a Project at SURF

Going Underground



Name: _____
Affiliation: _____
Date: _____

South Dakota Science and Technology Authority
Sanford Underground Research Facility (SURF)

ACKNOWLEDGEMENT OF RISK

In consideration for being permitted to enter upon the property of the South Dakota Science and Technology Authority (referred to in this document as the "Authority") located in and near Lead, South Dakota, including both the surface property and the underground workings and facilities owned by the Authority (referred to in this document as the "Authority's Surface Property" or the "Authority's Underground Property" and collectively, the "Authority's Property"), which permission was granted at my request, I do hereby voluntarily and knowingly state, declare and agree as follows:



Name: _____

RELEASE, AGREEMENT NOT TO SUE AND WAIVER

In consideration for being permitted to enter upon the property of the South Dakota Science and Technology Authority (referred to in this document as the "Authority") located in and near Lead, South Dakota, including both the surface property and the underground workings and facilities owned by the Authority (referred to in this document as the "Authority's Surface Property" or the "Authority's Underground Property" and collectively, the "Authority's Property"), which permission was granted at my request, I do hereby voluntarily and knowingly state, declare and agree as follows:

(Initial) _____ 1. I have today been provided and have read and signed a form entitled "ACKNOWLEDGEMENT OF RISK," which describes in general terms the numerous apparent and unapparent risks of serious personal injury, death, or damage to my property, which exists on and in both the Authority's Surface Property, and the Authority's Underground Property.

(Initial) _____ 2. Being fully aware of the risks as described in the accompanying "ACKNOWLEDGEMENT OF RISK," I do hereby voluntarily, freely, and unconditionally release and agree not to sue the following persons and entities for my damage to my health, personal injury, death and/or damage to my property in way associated with my entry, presence or activities upon, in, or around the Authority's Surface Property and/or the Authority's Underground Property, and I further hereby waive any such claims I may have against the following persons and entities. This release, agreement not to sue and waiver is given in favor of the following persons and entities:

(Initial) _____ (a). The State of South Dakota and its elected representatives and officers, selected officers, employees, agents consultants and representatives; and

(Initial) _____ (b). The South Dakota Science and Technology Authority and its officers, directors, employees, agents, consultants and representatives, and any visitor, contractor, consultant, or any other person (natural or otherwise) that the South Dakota Science and Technology Authority directs to, invites or permits upon, or authorizes to use the Authority's Property and its or their agents, representatives, consultants, lessees, licensees, and invitees; and

(Initial) _____ (c). Barrick Gold Corporation; any person, partnership, joint venture, corporation, or any other form of enterprise which directly or indirectly controls, is controlled by or is under common control with Barrick Gold Corporation; any officer, director, employee, agent or consultant of Barrick Gold Corporation; and any visitor, contractor, consultant, or any other person (natural or otherwise) that Barrick Gold Corporation directs to, invites, or permits upon or

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A hard copy of this document may not be the correct version to utilize. The correct version is always the version contained within the SURF document management system. DocShare: <https://docs.sandofsb.org>

Issuing Department: EHS
Approved: EHS

IMS/ISO Awareness

Rev. 02
QA/QC-(2000-A)-189764
G58-SO IMS Training Information

SDSTA has an Integrated Management System (IMS) inclusive of ISO 9001, 14001 & 45001 requirements.

SDSTA's Integrated Management System includes an IMS policy and scope, which are posted within the Administrative Building and can be found in DocShare at:

<https://docs.sandofsb.org/docshare/show/Get/Document-173288-IMSM-GA-528-001-173288%20Policy%20Scope.pdf>

SDSTA IMS Policy:

The South Dakota Science and Technology Authority (SDSTA) owns and operates the Sanford Underground Research Facility (SURF). SURF is a world-leading facility dedicated to the advancement of underground scientific research and education. SDSTA is committed to quality, environmental, and occupational health and safety delivered through an integrated approach to the fulfillment of Federal, State and Local requirements.

SDSTA IMS Scope:

It is the intent of Top Management to establish a system that will drive consistency, customer satisfaction and continual improvement. Documentation to support the system shall be created and will continue to be improved upon as we strive to meet customer and organizational needs. Top Management implements and maintains the Integrated Management System to ensure effectiveness and compliance to the requirements of ISO 9001:2015, ISO 14001:2015, AND ISO 45001:2018 standards.

SDSTA has developed relevant IMS Quality Objectives, Environmental Objectives, Occupational Health and Safety Objectives, and respective commitments to obtain these objectives which are posted within the Administrative Building and can be found in DocShare at:

<https://docs.sandofsb.org/docshare/show/Get/Document-186922-IMSM-OF-626-001-173288%20Quality%20Objectives%20Commitment%20OC%20E%20O%20Y2022%20-%20Signed.pdf>

Quality Objective:

1. Convert current SDSTA documents into "Controlled Documents" with correct IMS formatting.
2. Manage the CCR process to ensure the on-time CCR approval of controlled documents in accordance with the DCCS.

Environmental Objective:

1. Reduce energy needed to run the WWTP (CY 2021 vs. CY 2022)
2. Comply with SD Surface Water Discharge Permit-NPDES Permit SD 0000043 Effluent limitation, monitoring requirements and reporting obligations
3. Minimize reportable (External) spills or unauthorized releases at the facility

Occupational Health and Safety Objective:

1. Reduce Days Away Restricted or Transferred (DART) injuries and illnesses
2. Establish a controlled process for management walk-downs

Your contribution to SDSTA's effective IMS includes reporting hazards and risks related to quality issues, environmental issues, and occupational health and safety issues as they are found or arise, which improves SDSTA's quality, environmental and occupational health and safety performance and aids in SDSTA's commitment to meet customer requirements, compliance obligations and legal requirements.

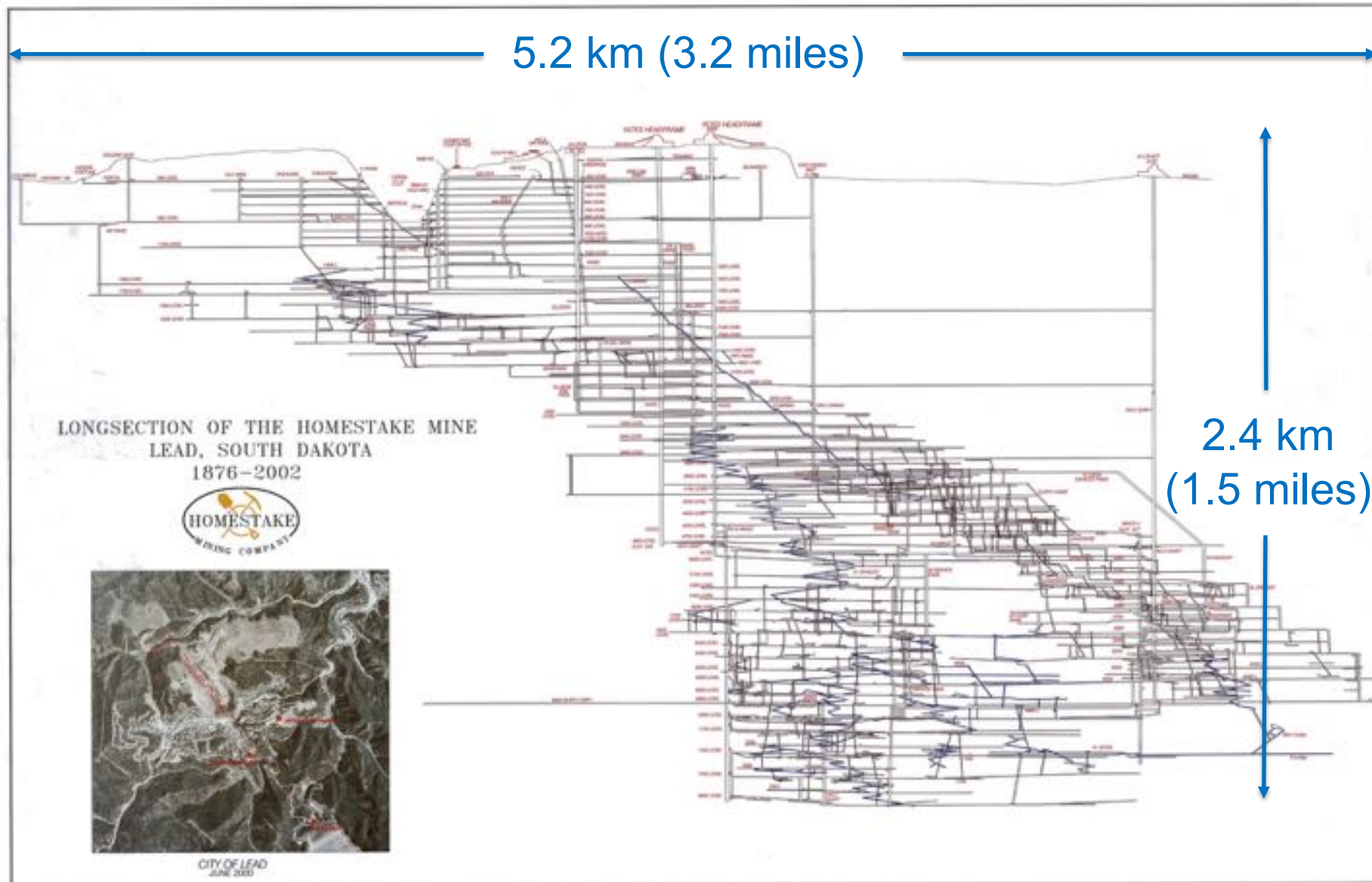
Cultural Awareness

Surface Safety

Underground Safety

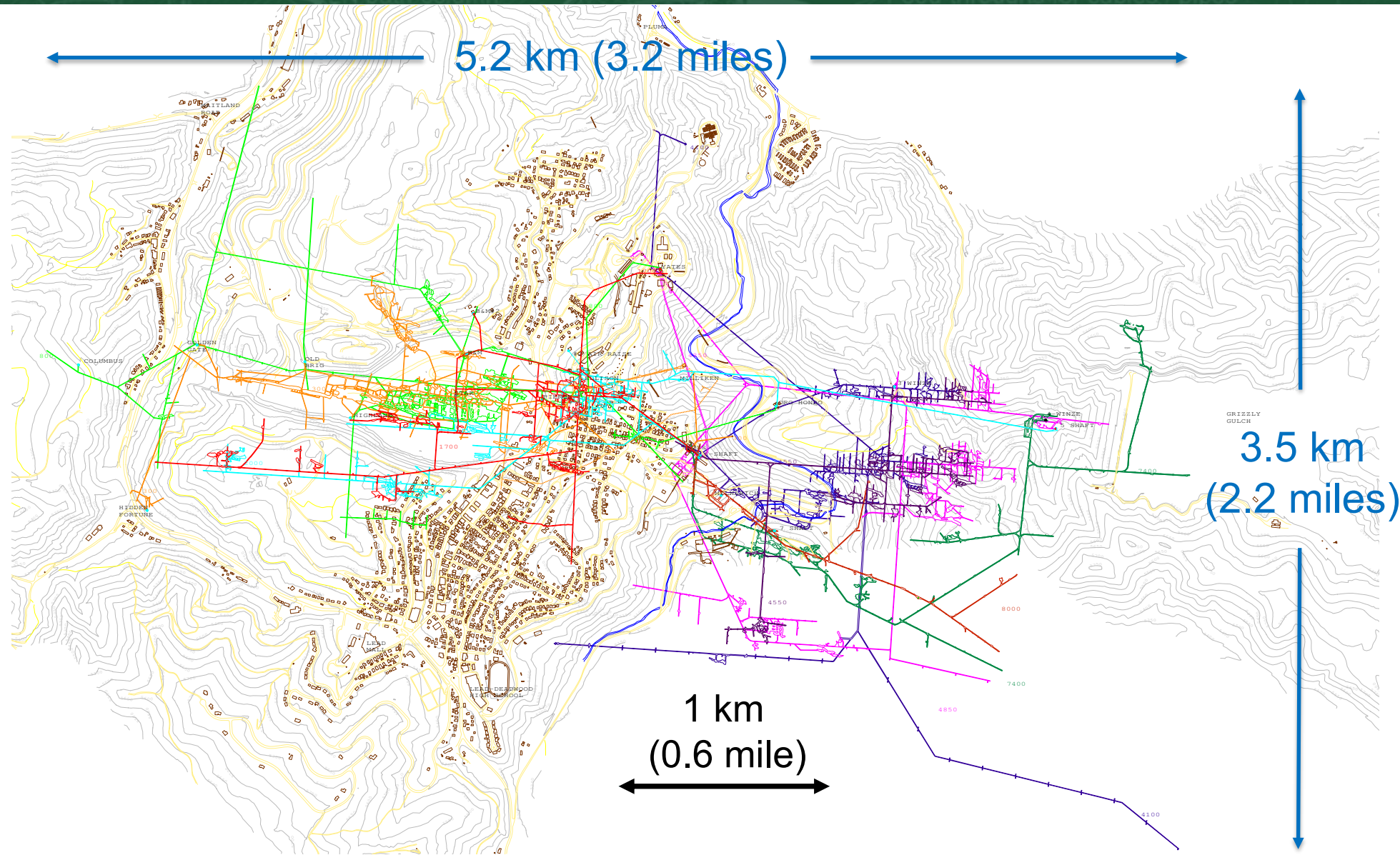
SURF Underground Lab Geography

Significant underground footprint for science



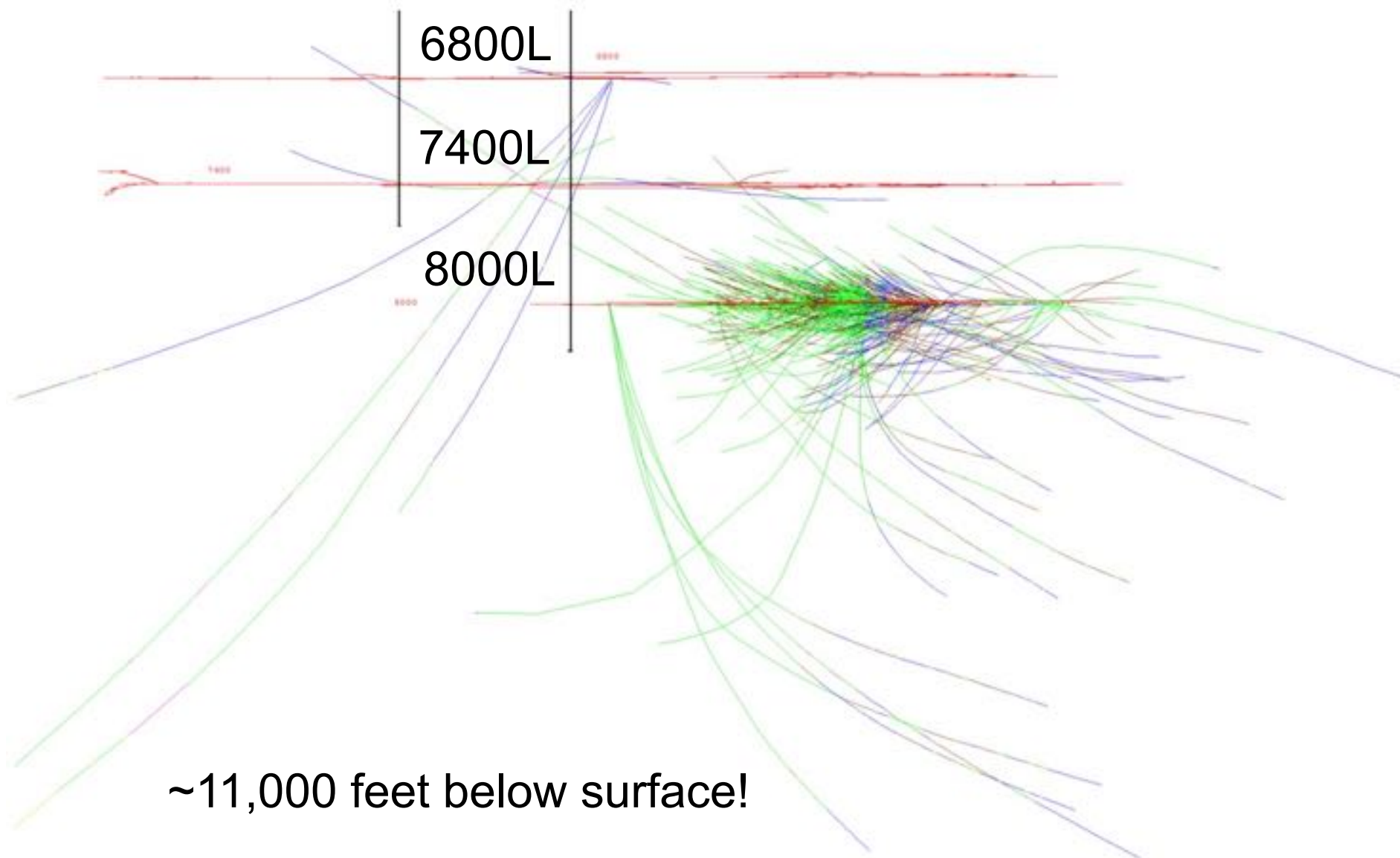
SURF Underground Lab Geography

Significant underground science footprint



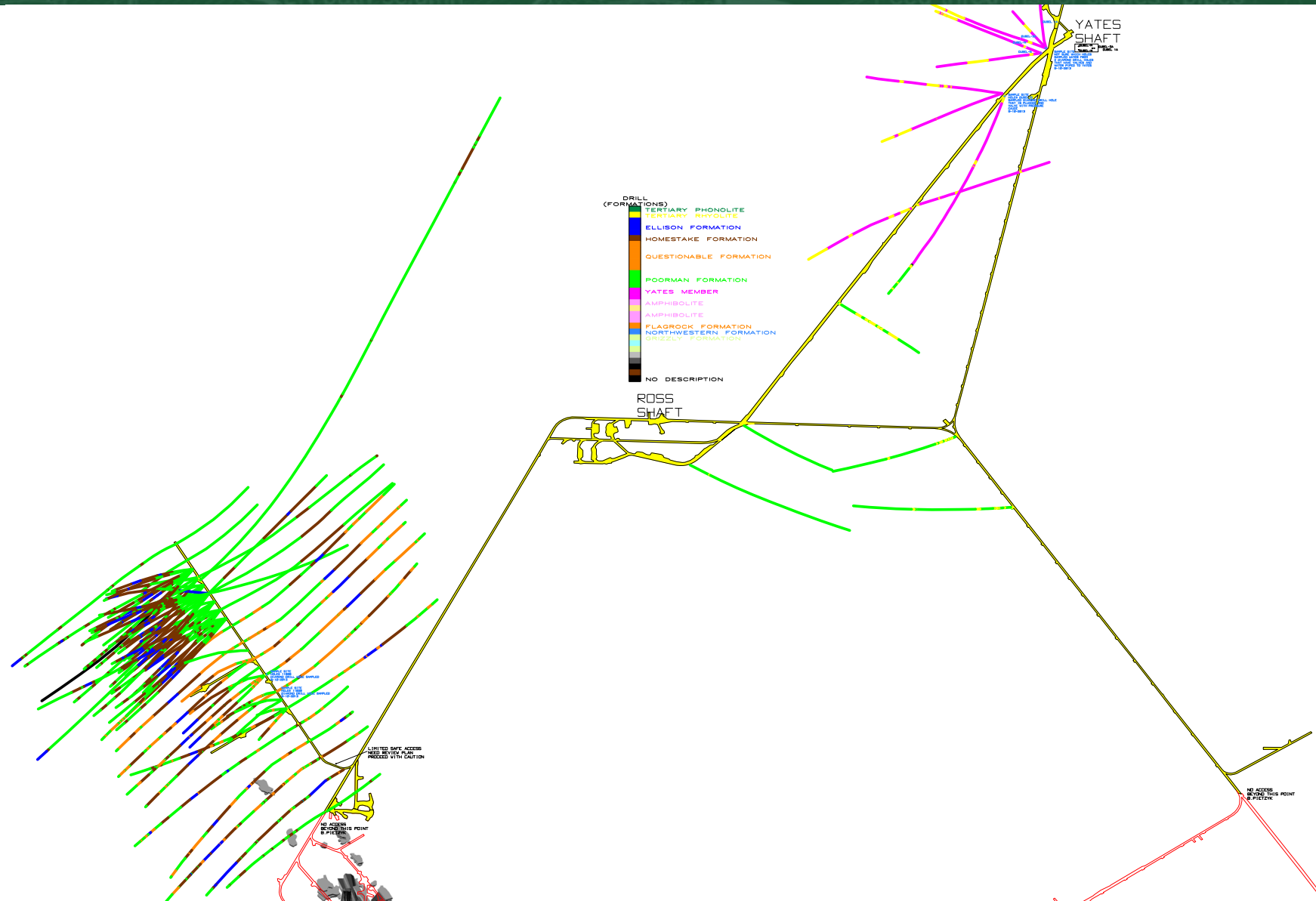
SURF Underground Lab Geography

Future Possibilities to Access Existing Deep Holes?



SURF Underground Lab Geography

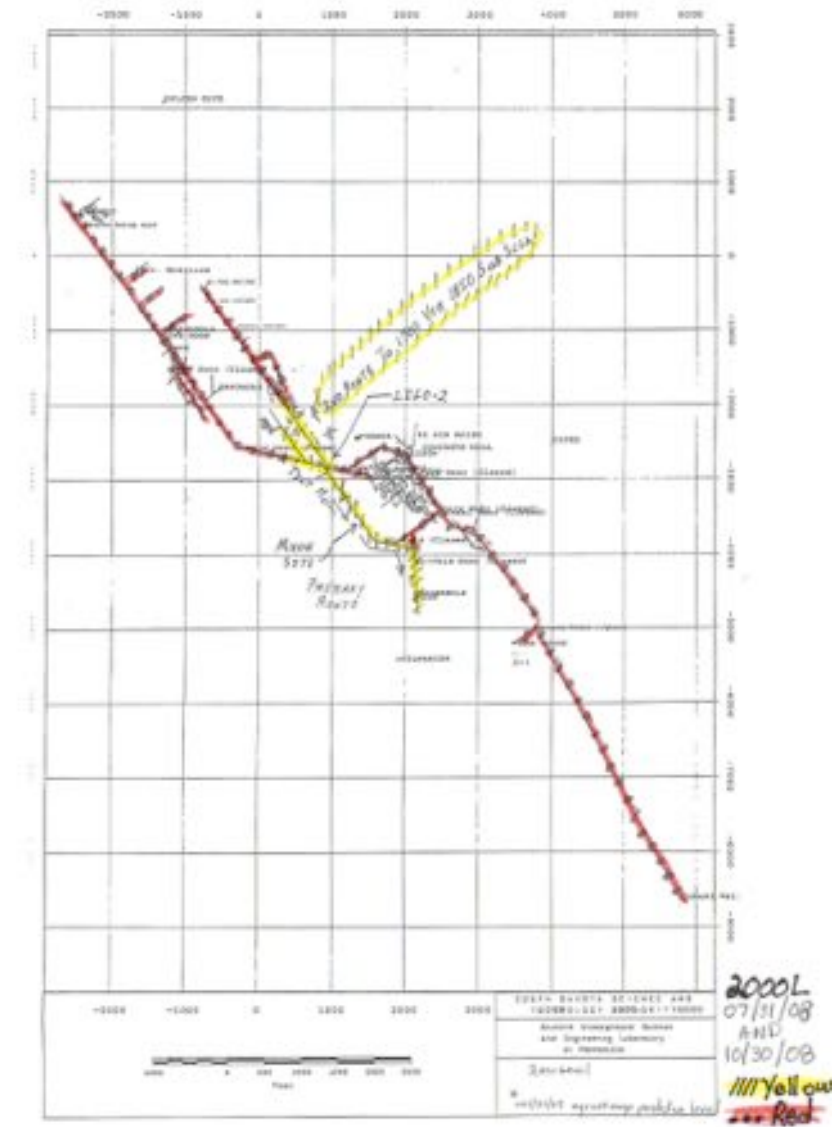
4850L Drill Holes with Geology and Stopes



Getting Started with a Project at SURF

FAQ

- Can I go wherever I want to underground?
 - No, only a relatively small portion of the underground space is being maintained for safe access (~20 km).
- Can I access every underground level?
 - No, some levels may not be safe to access at this time.
- Can I just show up at the Lab once my paperwork is completed?
 - No, we need to coordinate your visit with other activities and plan logistics to meet your needs:
 - Maximum underground occupancy = 144 people (all levels)
 - Maximum cage load = 30 people
 - Set cage schedule: Down = 6:30, 7:00, 7:30, 11:30 AM; Up = 11:45 AM, 4:00, 4:30, 5:00 PM (evening and graveyard shifts possible)
- Can I go underground by myself?
 - No, an experienced Guide is necessary to ensure a safe visit; ratios depend on area (6:1, 12:1, 1 per Lab).



SURF Experiment Implementation Program

Identify interfaces and hazards within approval framework

- <https://www.sanfordlab.org/researchers/proposal-guidelines>
- **Project Documentation**
 - Expression of Interest, incl support letters
 - Experiment Planning Statement
 - Memorandum of Understanding (space commitment)
 - Access: Request form, risk waiver, insurance
 - Services Agreement(s), if applicable
 - General Services Agreement: Who provides what and who pays
 - Contract(s): Specific expenses, direct use of SURF staff
 - Experiment Decommissioning Plan
- **Environment, Safety & Health**
 - Hazard Analysis: Assessments/analyses, procedures, testing/certifications
 - Inventories: Chemical, electrical, hoisting & rigging, pressure, rad materials
 - Training: Sanford Lab modules, Expt training plan (incl equivalences), records
- **Reviews** (Commensurate with hazards)
 - Facility, walk-through inspections, monitoring, readiness reviews (safety, ops)
- **Authorization**
 - Work planning & controls (procedure reviews/approvals, release), Science/ESH + Subject Matter Experts
 - Authorization To Proceed for significant installation and associated significant hazards

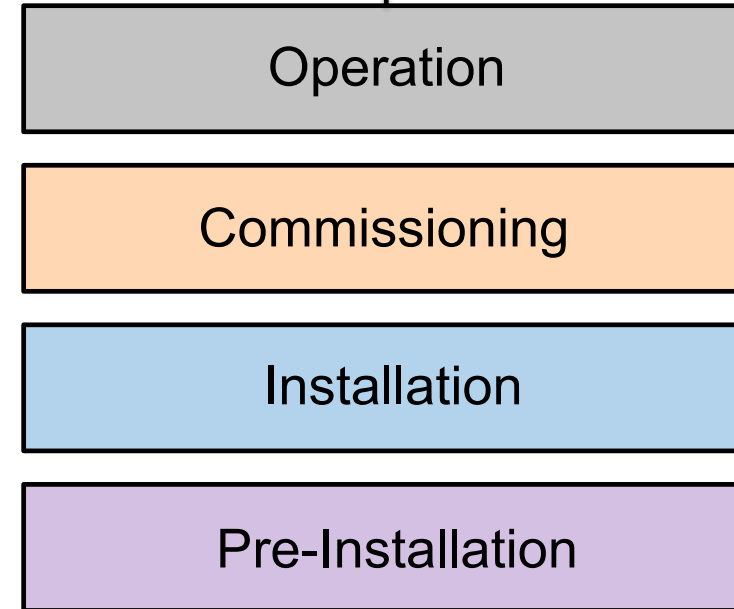
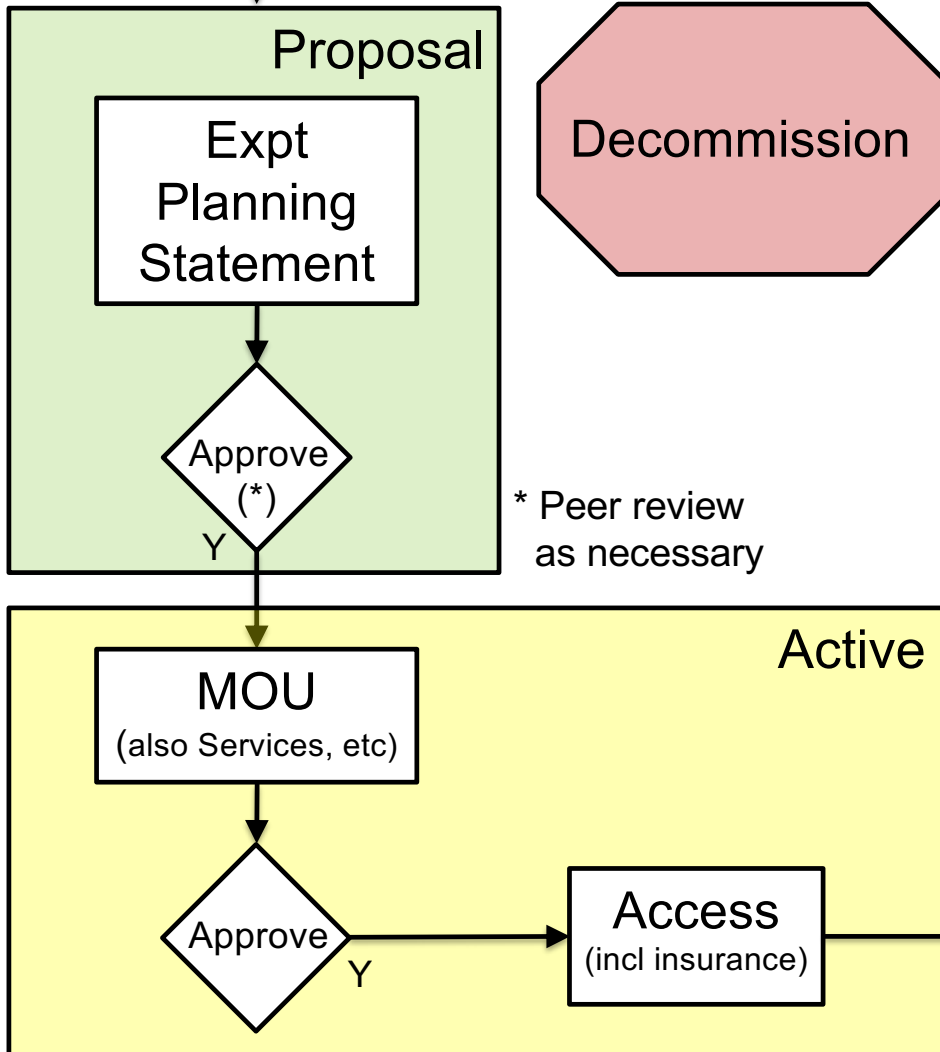
The screenshot displays the Sanford Lab website's 'Proposal Guidelines' page. The page is titled 'Proposal Guidelines' and includes a navigation menu at the top with links for 'Home', 'About Us', 'The Facility', 'News and Events', and 'Contact Information'. The main content area features a 'Resources for researchers' sidebar with links to 'Lab access and training', 'Proposal Guidelines', 'Upcoming workshops and meetings', 'Science Liaison Office', and 'SURF User Association'. The main text states that all proposals must follow these guidelines and provides a list of five steps: 1. Read the Experiment Implementation Program, 2. Read the Experiment Integration and Support document, 3. Complete a draft of the Experiment Planning Statement, 4. Contact the SURF Science Director, and 5. Complete the Memorandum of Understanding (MOU). Below this, there is a 'Document and contact information' section with a table of documents for download, including 'Experiment Implementation Program', 'Experiment Integration and Support Standard', 'Experiment Planning Statement', 'MOU Template', 'Publication Policy', and 'Acknowledgment of Risk and Waiver (required for all underground access)'. The footer contains links for 'Sanford Underground Research Facility', 'Updates', and 'Resources for...'.

SURF Experiment Implementation Program

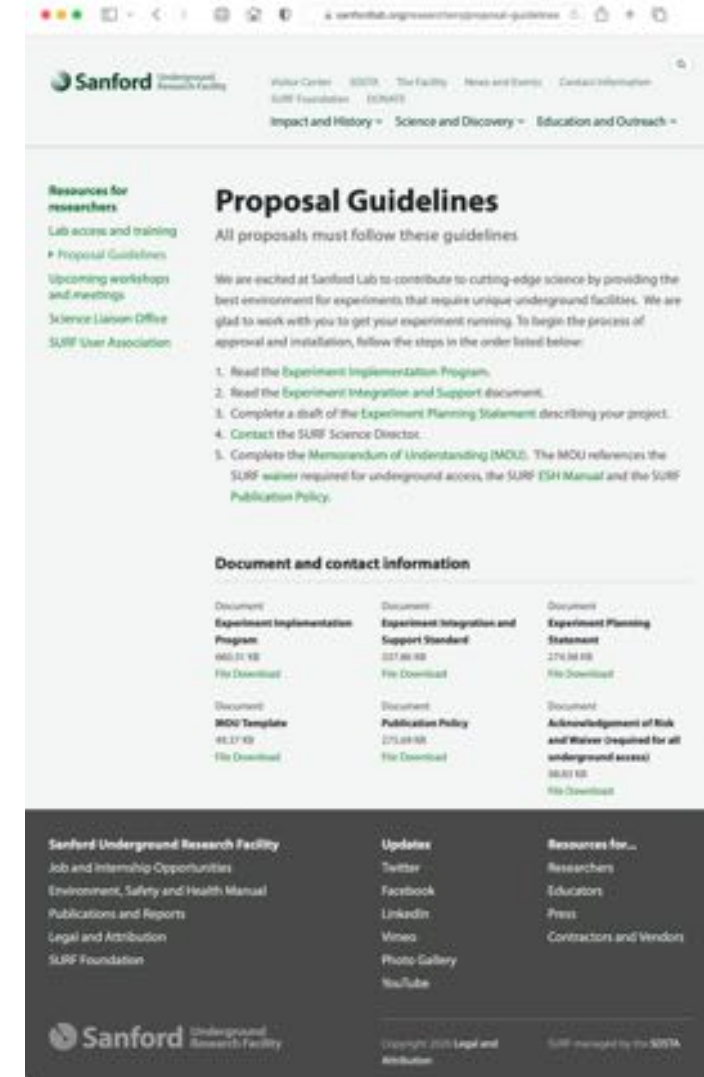
Identify interfaces and hazards within approval framework

<https://www.sanfordlab.org/researchers/proposal-guidelines>

Expt Concept



Commensurate with hazards. Installation & operation phases as necessary



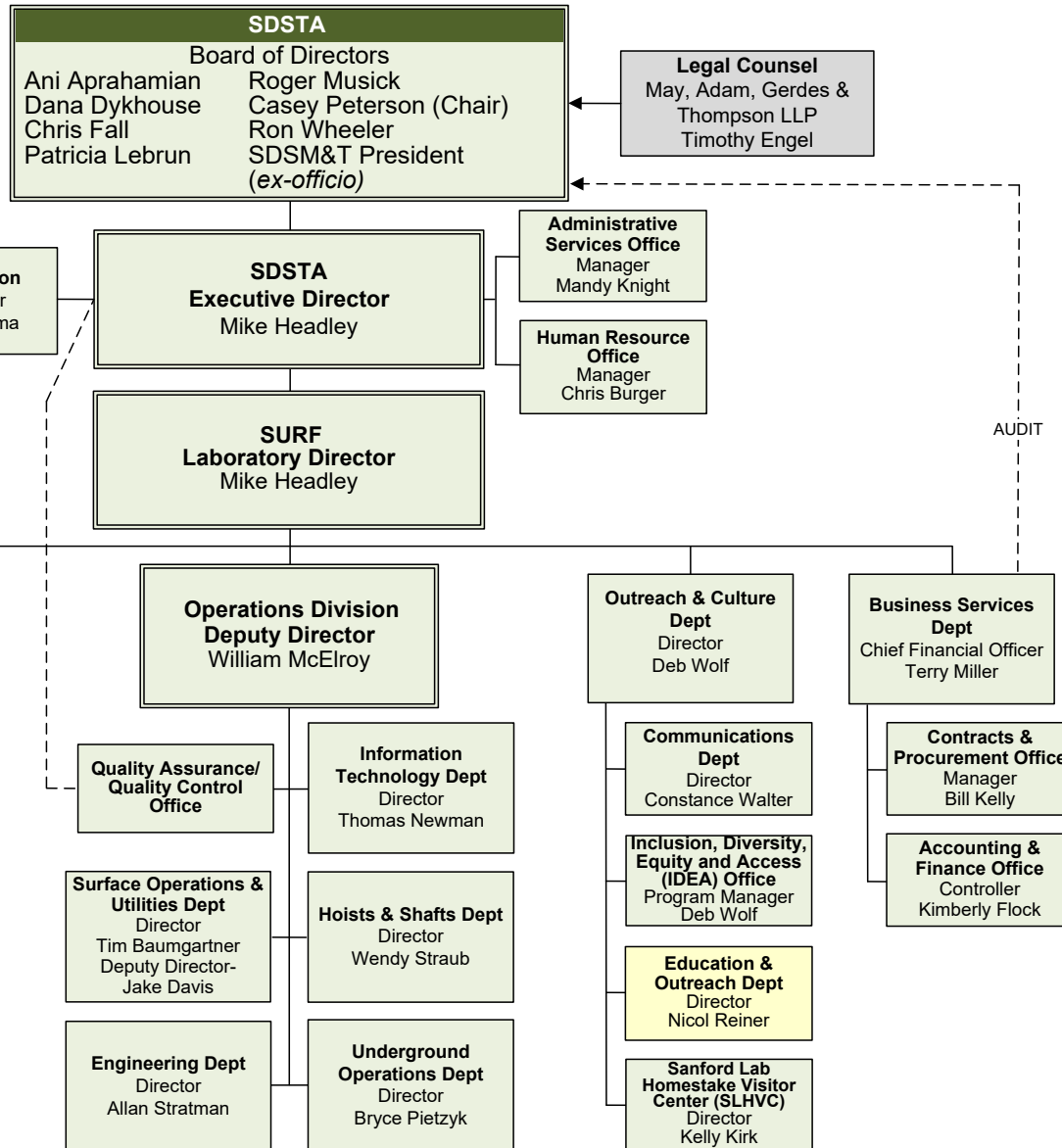
SURF Organization

Resources to advance world class science and inspire learning across generations



Institutional Key:

BHSU
CONTRACT
SDSTA



Staffing Area	FY22 FTE (%)	FY27 FTE (%)
Admin / Mgmt	21 (10%)	22 (10%)
Engineering	12 (6%)	13 (6%)
ESH	21 (10%)	21 (9%)
Outreach	20 (10%)	21 (9%)
Scientific	6 (3%)	11 (5%)
Technical / Operations	123 (61%)	137 (61%)
TOTAL	203	225

SURF Organization – Science Staffing

Resources to enable safe and successful implementation of experiments



Markus Horn (PhD)
Research Scientist
- Surface + UG Campuses

Charles Maupin (BSME, PE)
Expt Review Engineer
- Reviews, cryogen safety



Jaret Heise (PhD) – Director
- Manage dept and experiment implementation program



Mark Hanhardt (MS)
Expt Support Scientist
- Surface + UG Campuses



Gavin Cox (MS)
Expt Support Scientist
- LZ Operations



Robyn Varland - Lab Custodians (Surface + UG) - Melissa Johnston



Doug Tiedt (PhD)
Research Scientist
- Surface + UG Campuses

Julia Delgaudio (BS)
Expt Support Scientist
- LZ Operations



Experiment Implementation Program

Experiment Planning Statement: Two-way communication

1. Project Summary

- Discipline, description (purpose, scientific merit), IDEA, funding, personnel

2. Expt Equipment

- General + various categories (chemicals, radioactive materials, etc)

3. Experiment Area and Infrastructure Needs

- Location, space, site preparations/environment/(trip?), services, logistics
- Guidance on cage dimensions, some electrical

4. Hazards and Integrated Safety Management

- Table of potential risks, identifies special training or permit requirements

5. Personnel Access:

- Personnel schedule and access requirements as function of time (max/min)
- Guidance on standard cage times

6. Experiment Schedule

- Experiment schedule, incl phase such as installation, commissioning, ops

7. Experiment Operations

- What-If... scenarios (access, ventilation, water, power, cyber, excavation...)

8. Decommissioning

The image shows a screenshot of the SURF Experiment Planning Statement form. The form is titled "SURF Experiment Planning Statement" and is described as "An element of the SURF Experiment Implementation Program". It includes a title field for "Project Name", a status field with options for "Preliminary (Expression of Interest, Support Letter request)" and "Formal implementation request", and a date submitted field. The form also has a section for "1. Project Summary" with a discipline selection field (Biology, Chemistry, Engineering, Geology, Physics) and a "Project Description" section with a text area for providing a brief project description. There is also an "IDEA - Inclusion, Diversity, Equity and Access" section with a text area for describing project efforts and considerations. The form footer includes the SURF logo, the text "SURF Experiment Planning Statement", the revision date "09/16/2022", the superseded date "09/01/2021", a disclaimer about the current version being available via the SURF website, and the page number "Page 1".

Experiment Implementation Program

Experiment Planning Statement: Two-way communication

1. Project Summary

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7. Experiment Operations

- What-If... scenarios (access, ventilation, water, power, cyber, excavation...)

8. Decommissioning

9. SURF Review Section - to be completed by SURF personnel

Experiment Implementation Program Requirements: Additional documentation requirements:			
Required for All Experiments:	<input checked="" type="checkbox"/> Memorandum of Understanding (MOU)	<input checked="" type="checkbox"/> Insurance (general liability, Workers' Compensation)	
Services Agreements:	<input type="checkbox"/> General Services Agreement (GSA)	<input type="checkbox"/> Contract	
Environment, Safety & Health Requirements: Based on the information provided in the Experiment Planning Statement, the following training, inventories, ESH documents and reviews are warranted.			
Required for All Experiments:	<input checked="" type="checkbox"/> Procedure(s) (Job Hazard Analysis, Standard Operating Procedure, etc.)		
Minimum Training:	<input type="checkbox"/> Orientation (surface and/or underground)	<input type="checkbox"/> General Safety - Basic (and subsequent Annual Refresher Training (ART))	
Other Training:	<input type="checkbox"/> SURF: _____	<input type="checkbox"/> Non-SURF: _____	
Inventories:	<input type="checkbox"/> Chemicals <input type="checkbox"/> Electrical	<input type="checkbox"/> Hoisting & Rigging <input type="checkbox"/> Pressure Vessels <input type="checkbox"/> Radioactive Materials	
ESH Documents:	<input type="checkbox"/> Experiment Hazard Assessment Summary (EHAS), incl additional training	<input type="checkbox"/> Quantitative Analysis - Mechanical <input type="checkbox"/> Quantitative Analysis - ODH <input type="checkbox"/> Quantitative Analysis - Pressure	
Reviews:	<input type="checkbox"/> Walk-through Inspection(s)	<input type="checkbox"/> Readiness Review(s)	
SURF Review			
SCIENCE	_____ Name _____	_____ Date _____	_____ Signature _____
ENVIRONMENT, SAFETY & HEALTH	_____ Name _____	_____ Date _____	_____ Signature _____
ENGINEERING	_____ Name _____	_____ Date _____	_____ Signature _____
INFORMATION TECHNOLOGY	_____ Name _____	_____ Date _____	_____ Signature _____
HOISTS AND SHAFTS	_____ Name _____	_____ Date _____	_____ Signature _____
SURFACE OPERATIONS & UTILITIES	_____ Name _____	_____ Date _____	_____ Signature _____
UNDERGROUND OPERATIONS	_____ Name _____	_____ Date _____	_____ Signature _____
Other Review (if applicable)			
_____ Group _____	_____ Name _____	_____ Date _____	_____ Signature _____
_____ Group _____	_____ Name _____	_____ Date _____	_____ Signature _____
SURF Acceptance			
SURF LABORATORY DIRECTOR	_____ Name _____	_____ Date _____	_____ Signature _____

SURF Experiment Planning Statement
Revised: 08/16/2022
Supersedes: 09/01/2021

A hard copy of this document may not be the version currently in effect. The current version is always available via the Sanford Underground Research Facility public website: <https://www.surf.fsu.edu/underground-research-facility>


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9. SURF Review

- MOU, insurance pre-checked
- ESH guidance
- SURF review, other review
- SURF Lab Director sign-off

SURF Experiment Implementation Program

Experiment Planning Statement – Expt/Facility Interfaces



SURF Experiment Planning Statement

An element of the SURF Experiment Implementation Program

Title: *Project Name* Date Submitted: mm/dd/yyyy

Status: Preliminary (Expression of Interest, Support Letter request) Formal implementation request

1. Project Summary:

Discipline: Biology Chemistry Engineering Geology Physics

Choose most applicable

Project Description:
Provide a brief project description, including purpose, scientific merit and scope. Add relevant citations or references as appropriate. If necessary, add additional space to this template.

IDEA – Inclusion, Diversity, Equity and Access:
SURF is committed to creating a culture that centers on inclusion, diversity, equity and access (IDEA); see <https://sanfordlab.org/sdsta/inclusion-diversity-equity-and-access>. It is critical that all partners and stakeholders embody SURF's commitment to IDEA as both a moral imperative and a necessary ingredient for a successful collaborative scientific environment. Describe project efforts and considerations in these areas.

SURF Experiment Planning Statement
Revised: 09/16/2022
Supersedes: 09/01/2021

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Page 1



EPS provides two-way communication:

- SURF needs expt details in several categories
- Facility details useful to expts

SURF Experiment Implementation Program

Experiment Planning Statement – Expt/Facility Interfaces

Funding Status:	
List funding sources (select all that apply), and indicate award durations as well as any pending proposals. If necessary, add additional space to this template.	
<input type="checkbox"/> DOE: Award No., duration	<input type="checkbox"/> Institutional: _____
<input type="checkbox"/> NSF: Award No., duration	<input type="checkbox"/> Other: _____
<input type="checkbox"/> Pending Proposal(s): Please add all relevant information.	

Personnel:	
List members associated with collaborating institutions, and indicate which institutions expect to have personnel participating in activities at SURF. If necessary, add additional space to this template.	
Institutional Personnel (including Position/Role)	Perform activities at SURF
Institution1: Person1 (faculty), Person2 (postdoc), Person3 (student), etc.	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No
	<input type="checkbox"/> Yes <input type="checkbox"/> No

SURF Experiment Planning Statement
 Revised: 09/16/2022
 Supersedes: 09/01/2021

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Page 2



EPS provides two-way communication:

- SURF needs expt details in several categories
- Facility details useful to expts

SURF Experiment Implementation Program

Experiment Planning Statement – Expt/Facility Interfaces

2. Experiment Equipment:

General Description:

Provide a description of equipment, systems and/or processes that will be used during the project at SURF. If necessary, add additional space to this template or provide separate documents.

General Equipment / Hardware Description:

Provide a list of equipment, parts and tools required to perform activities at SURF. Include pictures, diagrams and manuals (and/or links to these items) where appropriate. If necessary, add additional space to this template in this section or the categories below.

Name of equipment / part / tool	Dimensions	Mass	Detail / Notes
1			
2			
3			
4			
5			

Chemical Description:

List chemicals, including some detector components (e.g., crystals, gasses, scintillator, etc.) or hazardous materials (e.g., lead for shielding); flammability ratings are required for plastics. All chemicals must have a safety data sheet (SDS) and must be approved by SURF before they are brought onto SURF property. Note: the experiment is required to maintain an inventory of chemicals, including storage and usage locations as well as dates of arrival and departure from SURF.

Name of chemical (incl manufacturer if known)	Quantity	Detail / Notes (incl container type such as glass, flammability, etc.)	Waste Expected?
1			<input type="checkbox"/> Yes <input type="checkbox"/> No
2			<input type="checkbox"/> Yes <input type="checkbox"/> No
3			<input type="checkbox"/> Yes <input type="checkbox"/> No
4			<input type="checkbox"/> Yes <input type="checkbox"/> No
5			<input type="checkbox"/> Yes <input type="checkbox"/> No

SURF Experiment Planning Statement
Revised: 09/16/2022
Supersedes: 09/01/2021

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Page 3



EPS provides two-way communication:

- SURF needs expt details in several categories
- Facility details useful to expts

SURF Experiment Implementation Program

Experiment Planning Statement – Expt/Facility Interfaces

Electrical Equipment Description: List electrical equipment and associated specifications. Equipment should be approved by a nationally-recognized testing lab (NRTL). Low-smoke zero-halogen (LSZH) jacketed cables are required for underground use at SURF. Note: the experiment is required to maintain an inventory, including inspection dates.			
Name of electrical equipment / tool (incl manufacturer, model # if known)	Voltage (Volts)	Current (Amps)	Certifications (e.g. UL, CSA, etc.)
1			
2			
3			
4			
5			

Hoisting and Rigging Equipment Description: List hoisting & rigging equipment, including hoists, cranes as well as rigging gear such as slings and shackles, etc. Note: Experiment-owned hoisting and rigging equipment may need to be inspected on a regular basis, so the experiment is required to maintain an inventory.	
Name of hoisting & rigging equipment (incl manufacturer, model # if known)	Detail / Notes (incl manufacture / purchase date)
1	
2	
3	
4	
5	

Pressure Vessel Description: List pressure vessels. Note: Pressure vessels (including owned, leased and/or rented units) need to be inspected regularly, so the experiment is required to maintain an inventory.	
Name of pressure vessel equipment (incl manufacturer, model #, national board # if known)	Detail / Notes (incl manufacture / purchase date)
1	
2	
3	
4	
5	

Radioactive Material Description: List radioactive materials. Transportation of radioactive sources to or from SURF property must be coordinated with the SURF Radiation Safety Officer (RSO), and only individuals approved by the SURF RSO are authorized to handle radioactive materials on SURF property. Note that new radioactive sources may need to be added to the SURF NRC license, which can take up to 90 days. Note: the experiment is required to maintain an inventory.	
Name of radioactive material (incl isotope, manufacturer, activity if known)	Detail / Notes (incl purpose, physical description)
1	
2	
3	
4	
5	

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 Supersedes: 09/01/2021

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SURF Experiment Implementation Program

Experiment Planning Statement – Expt/Facility Interfaces

3. Experiment Area and Infrastructure Needs:

Location: Indicate preferred project site(s) from the main accessible underground elevations (feet below surface) and SURF facilities (underground and surface) listed below.		
<input type="checkbox"/> 300L	<input type="checkbox"/> 2000L	<input type="checkbox"/> 4850L
<input type="checkbox"/> 800L	<input type="checkbox"/> 4100L	<input type="checkbox"/> Davis Campus <input type="checkbox"/> Ross Campus <input type="checkbox"/> West Drift
<input type="checkbox"/> 1700L	<input type="checkbox"/> Not sure	<input type="checkbox"/> 17 Ledge <input type="checkbox"/> Other: _____
<input type="checkbox"/> Other Level(s): _____		<input type="checkbox"/> Surface <input type="checkbox"/> Surface Lab <input type="checkbox"/> Core Archive <input type="checkbox"/> Other: _____
Main site considerations: _____		<input type="checkbox"/> Site selection visit requested Proposed date: _____ Number of people: _____
Space: Provide information regarding the footprint of the experiment setup (including any height considerations). Also provide storage, staging and office needs. If warranted, add drawings and diagrams.		
		Storage: <input type="checkbox"/> N/A <input type="checkbox"/> Cold <input type="checkbox"/> Heated <input type="checkbox"/> Office space requested
		Staging: <input type="checkbox"/> N/A <input type="checkbox"/> Surface <input type="checkbox"/> UG <input type="checkbox"/> Other: _____
Site Preparations: Include any special project site requirements (some charges may apply). If necessary, add additional space to this template.		
		<input type="checkbox"/> No site preparations required <input type="checkbox"/> Cost estimate requested
		<input type="checkbox"/> Concrete (e.g. floor, pedestal, etc) <input type="checkbox"/> Site / equipment enclosure
		<input type="checkbox"/> Hoist <input type="checkbox"/> Drilling (holes, mounting, etc)
		<input type="checkbox"/> Water mgmt. (e.g. sump, pipe, filtration, etc) <input type="checkbox"/> Ground support (e.g. rock bolts, mesh)
		<input type="checkbox"/> Electrical / network <input type="checkbox"/> Other: _____
Site Environment: Indicate significant project sensitivities to various environmental parameters. If necessary, add additional space to this template.		
		<input type="checkbox"/> No significant environmental sensitivities
		<input type="checkbox"/> Temperature <input type="checkbox"/> Humidity Require range: _____ C Require range: _____ %
		<input type="checkbox"/> Dust <input type="checkbox"/> Pressure changes
		<input type="checkbox"/> Vibration (e.g. drilling, blasting) <input type="checkbox"/> Radiation (also radon)

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SURF Experiment Implementation Program

Experiment Planning Statement – Expt/Facility Interfaces



EPS provides two-way communication:

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Services:		
<i>List requirements. Include a description of any other facility support requested. Costs of providing some services may be passed on to the experiment.</i>		
<input type="checkbox"/> No Services Required	<input type="checkbox"/> Power <i>(provide detail in separate table below)</i>	<input type="checkbox"/> IT Services <i>(provide detail in separate table below)</i>
<input type="checkbox"/> Compressed Air <i>(detail pressure and duration required)</i>	<input type="checkbox"/> Compressed Gases <i>(detail cylinder size, quantity and expected usage)</i>	<input type="checkbox"/> Cryogenics <i>(detail vessel size, quantity and expected usage)</i>
<input type="checkbox"/> Water <i>(detail quantity and quality)</i>	<input type="checkbox"/> Transportation of Hazardous Items, incl chemicals <i>(detail items and expected frequency)</i>	<input type="checkbox"/> Material Assays <i>(provide # samples and sensitivity required)</i>
<input type="checkbox"/> Other Services <i>(list items and relevant details):</i> _____		
Electrical Service:		
<i>Provide information regarding required electrical service based on the equipment and associated power requirements listed in Section 2. SURF provides necessary electrical connections (some charges may apply). SURF can provide 3-phase power: 480V / 208 V / 120 V (a transformer may be required for other voltages). If extension cords are necessary, use heavy-duty or extra heavy-duty 12 AWG (minimum); GFCI also required. Experiment provides conditioned or UPS backup power (several power blips occur per year due to weather). If necessary, add additional space to this template.</i>		
		Electrical service: <input type="checkbox"/> No <input type="checkbox"/> Yes <i>(Note: SURF provides)</i>
		<input type="checkbox"/> 120 V: # circuits: _____ # outlets: _____ at _____ amps
		<input type="checkbox"/> 208 V: # circuits: _____ # outlets: _____ at _____ amps
		<input type="checkbox"/> 480 V: # circuits: _____ # outlets: _____ at _____ amps
		Other: <i>(Note: Expt provides)</i>
		Extensions cords: <input type="checkbox"/> No <input type="checkbox"/> Yes Quantity: _____
		Power strips: <input type="checkbox"/> No <input type="checkbox"/> Yes Quantity: _____
		UPS: <input type="checkbox"/> No <input type="checkbox"/> Yes Quantity: _____
Information Technology Service:		
<i>Provide information regarding network and computer resources (below, check all that apply). Where indicated below, provide estimates of quantities. SURF provides necessary network hardware (some charges may apply) so that it can manage and maintain the equipment. Experiments provide their own computer resources (for servers in the SURF IT Server Room, there are specification guidelines). If necessary, add additional space to this template.</i>		
		Network service: <input type="checkbox"/> No <input type="checkbox"/> Yes <i>(Note: SURF provides)</i>
		Network type: <input type="checkbox"/> Wired, # ports _____ <input type="checkbox"/> Wireless, # connections _____
		Network access: <input type="checkbox"/> Onsite <input type="checkbox"/> Offsite (requires VPN, static IP)
		Network minimum data transfer bandwidth: _____ Mbps
		Computer resources: <input type="checkbox"/> No <input type="checkbox"/> Yes <i>(Note: Experiment provides)</i>
		Computer type: <input type="checkbox"/> Laptop, # _____ <input type="checkbox"/> Desktop/server, # _____
		Computer location: <input type="checkbox"/> Expt site <input type="checkbox"/> Surface (e.g., IT Server Room)
		Other service / resources:
		<input type="checkbox"/> Phone <i>(SURF provided)</i> <input type="checkbox"/> Timing <i>(Expt provided)</i> <input type="checkbox"/> Other: _____

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SURF Experiment Implementation Program

Experiment Planning Statement – Expt/Facility Interfaces

Equipment Logistics:

Describe how materials will arrive at SURF and associated logistics for transportation and handling. Highlight large, heavy, or sensitive/high-value items from the equipment list in Section 2. Items are transported underground (cage) and on the level (rail) by SURF personnel. Estimate # loads; shipments up/down will be coordinated with SURF (restrictions may apply). Note: Yates South Cage max cargo dimensions: 139 cm (W), 377 cm (L), 258 cm (H); max load weight = 4808 kg (same max capacity as SURF forklifts); options exist for items that exceed nominal dimensions (up to 732 cm, 4536 kg).

Delivery to SURF:	<input type="checkbox"/> Expt personnel	<input type="checkbox"/> Mail / courier	<input type="checkbox"/> Freight
Equipment Packaging:	<input type="checkbox"/> Palletized	<input type="checkbox"/> Crated (wood)	<input type="checkbox"/> Boxed (cardboard)
Handling at SURF:	<input type="checkbox"/> Expt personnel (i.e., hand-carry or backpack) <input type="checkbox"/> Forklift (surface and/or UG) <input type="checkbox"/> Rail transport (UG), incl staging on rail truck(s) on surface <input type="checkbox"/> Dolly / cart / wagon (surface and/or UG) <input type="checkbox"/> Staging for assembly / system checkout (surface and/or UG) <input type="checkbox"/> Hoisting required, max mass: _____ tons (surface and/or UG) <input type="checkbox"/> Sensitive / high-value transport (<i>special form required</i>)		

4. Hazards and Integrated Safety Management (ISM)

Potential Hazards & Risk Assessment:

Check experiment-related hazards. Note that most activities require a separate written Hazard Analysis. For experiments with significant or numerous hazards, an Experiment Hazard Assessment Summary (EHAS), quantitative analyses, walk-through inspections and readiness reviews may be required. The experiment is required to manage (and may need to provide some) training for collaboration personnel.

<input type="checkbox"/> Fall exposures > 4 feet*	<input type="checkbox"/> Working above others	<input type="checkbox"/> Ladder use	<input type="checkbox"/> Scaffold use	<input type="checkbox"/> Scaffold erection*	<input type="checkbox"/> Confined space entry*
<input type="checkbox"/> Heavy equipment operation (e.g. crane, excavator, etc.)*	<input type="checkbox"/> Fork lift operations / powered industrial trucks*	<input type="checkbox"/> Hoisting & rigging*	<input type="checkbox"/> Boom lift operations	<input type="checkbox"/> Electrical equipment maintenance (if > 50 V may req. training)	<input type="checkbox"/> Lockout / tagout (LOTO) activities*
<input type="checkbox"/> Rotating equipment	<input type="checkbox"/> High noise levels	<input type="checkbox"/> Waste generation (may req. training)	<input type="checkbox"/> Discharges to sanitary system	<input type="checkbox"/> Potential impact to storm water / UG water	<input type="checkbox"/> Potential spill to environment
<input type="checkbox"/> Air emissions (incl. equipment/generators)	<input type="checkbox"/> General demolition	<input type="checkbox"/> Trenching / excavation	<input type="checkbox"/> Excessive dust	<input type="checkbox"/> Potential silica exposure*	<input type="checkbox"/> Potential asbestos exposure*
<input type="checkbox"/> Chemical use (req. safety data sheet, may req. training)	<input type="checkbox"/> Pressurized air/fluids & compressed gases* & vacuum	<input type="checkbox"/> Cryogenics*	<input type="checkbox"/> Potential oxygen deficiency (ODH)*	<input type="checkbox"/> Lead (Pb) work*	<input type="checkbox"/> Use of refrigerants (req. safety data sheet)
<input type="checkbox"/> Radiation – ionizing (incl. exempt-quantity, may req. amendment)*	<input type="checkbox"/> Radiation – nonionizing (e.g. lasers, RF)*	<input type="checkbox"/> Biological hazards (e.g. animal/insect bites/stings, mold, etc.)	<input type="checkbox"/> Installation of power – temporary or permanent*	<input type="checkbox"/> Welding / cutting / brazing (req. permit)*	<input type="checkbox"/> Fire / explosion / extreme temperature (req. permit / fire watch)*
<input type="checkbox"/> Ergonomics (lifting > 50 lbs, etc.)	<input type="checkbox"/> Soldering (permit not req.)	<input type="checkbox"/> Work in hot/humid environment	<input type="checkbox"/> Cord-and-plug tools	<input type="checkbox"/> Limited/impaired communication	<input type="checkbox"/> _____

*Denotes Special Training, Permit and/or Competent Person required

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The Sanford Underground Research Facility
Department of Energy, Office of Science

Document ID: SURF-EP-001
Version: 1.0
Date: 09/16/2022

Sanford
Underground
Research
Facility



SCIENCE

EXPERIMENT IMPLEMENTATION PROGRAM

Document 34479
Version 5
October 5, 2018

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EPS provides two-way communication:

- SURF needs expt details in several categories
- Facility details useful to expts

SURF Experiment Implementation Program

Experiment Planning Statement – Expt/Facility Interfaces

5. Personnel Access Requirements

Personnel Schedule:

List expected onsite experiment personnel as function of time and project phase, including maximum and minimum numbers.

Personnel Access:

List number of onsite work hours expected per day and per week (steady-state and maximum, underground and surface). Personnel require a badge when on SURF property (training is required before a personal badge is issued). Standard underground access via the Yates shaft for day shift is as follows: 6:30am, 7am, 7:30am, 11:30am [Down]; 11:45am, 4pm, 4:30pm and 5pm [Up]. Standard Yates Shaft UG access is 4 days per week (alternating Mon-Thu, Tue-Fri); access via the Ross Shaft may be coordinated (with access up to 6 days per week). Limited periods of 24-hour coverage up to 7 days per week with shifts up to 12.5 hours can be accommodated (shifts beyond 12.5 hours in duration are managed under the SURF fatigue management policy). Additional access guidelines may apply.

6. Experiment Schedule

Experiment Schedule:

Provide a schedule of experiment activities, including different phases of the project such as installation, commissioning, operation and decommissioning. If necessary, add additional space to this template.

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SURF Experiment Implementation Program

Experiment Planning Statement – Expt/Facility Interfaces

7. Experiment Operations

What-if... Scenarios:

List results and consequences to experiment and any mitigation measures that are planned or that are being considered.

Topic Area	What if...	Result / Consequences (List different scenarios if applicable)	N/A
Access	What if access to experiment equipment was restricted for longer than one day?		<input type="checkbox"/>
Ventilation	What if the laboratory temperature rose above or fell below the specified limits?		<input type="checkbox"/>
	What if the laboratory humidity rose above or fell below the specified limits?		<input type="checkbox"/>
	What if the laboratory exhaust system went down?		<input type="checkbox"/>
Water	What if purified water became unavailable?		<input type="checkbox"/>
	What if chilled water became unavailable?		<input type="checkbox"/>
	What if potable water became unavailable?		<input type="checkbox"/>
	What if industrial water became unavailable?		<input type="checkbox"/>
	What if the fire water system was triggered and fire water/mist came in contact with your experiment?		<input type="checkbox"/>
	What if fire water/mist did not activate when needed?		<input type="checkbox"/>
	What if there was a water leak within the laboratory?		<input type="checkbox"/>
Water Inflows	What if the laboratory began filling with water because of a catastrophic water inflow (storm) event?		<input type="checkbox"/>
Water	What if the waste water collection system inside the laboratory overflowed because pumps weren't working?		<input type="checkbox"/>
Compressed Air	What if the compressed air system provided by the facility became unavailable?		<input type="checkbox"/>
Power	What if normal power goes down? Would your experiment be damaged if it was unpowered for an extended period of time?		<input type="checkbox"/>
	What if standby power generators ran out of power (nominally for fire & life safety), assuming normal power is still down? (96 hours of standby is the requirement)		<input type="checkbox"/>
	What if power quality fluctuated outside of specified limits: voltage drop, harmonic distortion, etc.?		<input type="checkbox"/>
	What if the experiment-provided UPS fails?		<input type="checkbox"/>

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SURF Experiment Implementation Program

Experiment Planning Statement – Expt/Facility Interfaces



Topic Area	What if...	Result / Consequences (List different scenarios if applicable)	N/A
Electromagnetic Interference (EMI)	What if EMI became unacceptable?		<input type="checkbox"/>
Cyberinfrastructure	What if network connections outside of the laboratory became disabled?		<input type="checkbox"/>
	What if network connections inside of the laboratory became disabled?		<input type="checkbox"/>
	What if connection to external data processing became unavailable?		<input type="checkbox"/>
	What if connection to internal data processing became unavailable?		<input type="checkbox"/>
	What if network time protocol (NTP) was unavailable?		<input type="checkbox"/>
Transportation	What if material handling systems were unavailable (rail cars, hoists/cranes, etc.)?		<input type="checkbox"/>
	What if material handling systems became disabled while in transport? (for example, cryogenics in transport on rail cars)		<input type="checkbox"/>
Fire & Life Safety	What if an evacuation was conducted due to a hazardous event (e.g., fire)? Describe situations where you would keep the experiment running or shut it down?		<input type="checkbox"/>
Excavation	What if there was excessive disturbance of the experiment due to blasting/excavation activities nearby?		<input type="checkbox"/>
	What if geotechnical repairs needed to be made to the rock structure above or near the experiment?		<input type="checkbox"/>
Other	What if...? <i>Name scenario critical to the experiment.</i>		<input type="checkbox"/>

8. Decommissioning Plan

Decommissioning Plan:

Provide initial details regarding how the experiment will be decommissioned. If necessary, add additional space to this template.

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SURF Experiment Implementation Program

Experiment Planning Statement – Expt/Facility Interfaces



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9. SURF Review Section – to be completed by SURF personnel

Experiment Implementation Program Requirements:
Additional documentation requirements.

Required for All Experiments: Memorandum of Understanding (MOU) Insurance (general liability, Workers' Compensation)
 Services Agreements: General Services Agreement (GSA) Contract

Environment, Safety & Health Requirements:
Based on the information provided in the Experiment Planning Statement, the following training, inventories, ESH documents and reviews are warranted.

Required for All Experiments: Procedure(s) (Job Hazard Analysis, Standard Operating Procedure, etc.)

Minimum Training: Orientation (surface and/or underground) General Safety – Basic (and subsequent Annual Refresher Training (ART))
 Other Training: SURF: _____ Non-SURF: _____

Inventories: Chemicals Electrical Hoisting & Rigging Pressure Vessels Radioactive Materials
 ESH Documents: Experiment Hazard Assessment Summary (EHAS), incl additional training Quantitative Analysis – Mechanical Quantitative Analysis – ODH Quantitative Analysis – Pressure
 Reviews: Walk-through Inspection(s) Readiness Review(s)

SURF Review

SCIENCE	_____	_____	_____
	Name	Date	Signature
ENVIRONMENT, SAFETY & HEALTH	_____	_____	_____
	Name	Date	Signature
ENGINEERING	_____	_____	_____
	Name	Date	Signature
INFORMATION TECHNOLOGY	_____	_____	_____
	Name	Date	Signature
HOISTS AND SHAFTS	_____	_____	_____
	Name	Date	Signature
SURFACE OPERATIONS & UTILITIES	_____	_____	_____
	Name	Date	Signature
UNDERGROUND OPERATIONS	_____	_____	_____
	Name	Date	Signature

Other Review (If applicable)

_____	_____	_____	_____
Group	Name	Date	Signature
_____	_____	_____	_____
Group	Name	Date	Signature

SURF Acceptance

SURF LABORATORY DIRECTOR	_____	_____	_____
	Name	Date	Signature

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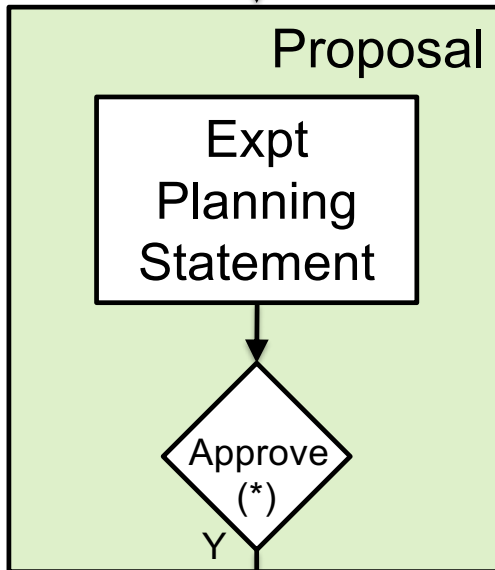
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SURF Experiment Implementation Program

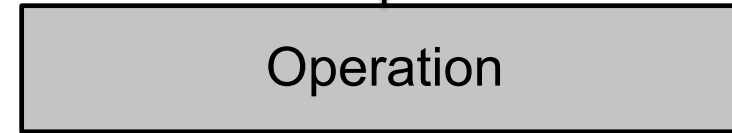
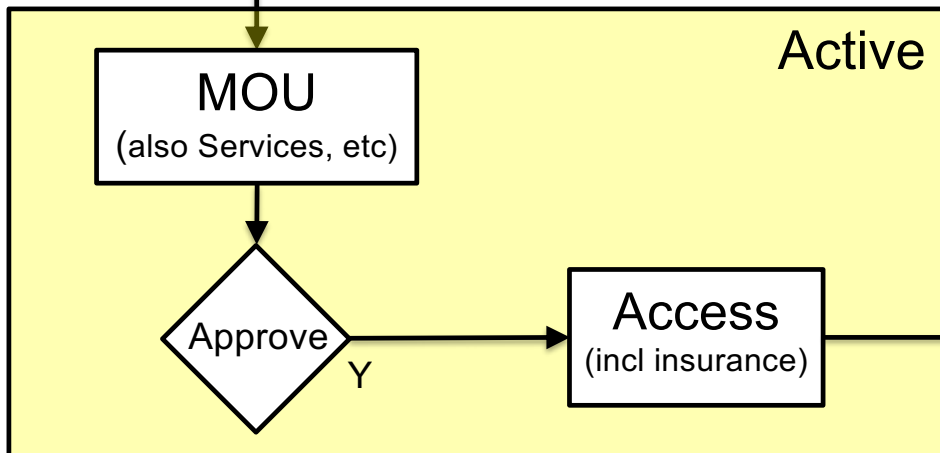
Identify interfaces and hazards within approval framework

<https://www.sanfordlab.org/researchers/proposal-guidelines>

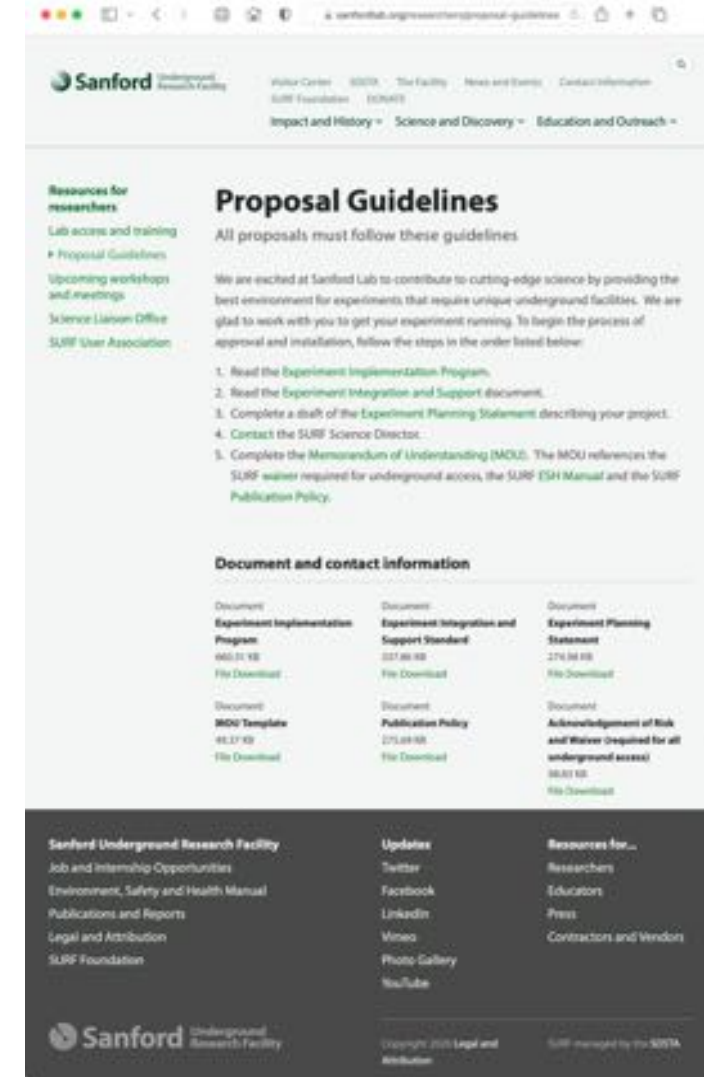
Expt Concept



* Peer review as necessary



Commensurate with hazards. Installation & operation phases as necessary



SURF Experiment Implementation Program

Memorandum of Understanding

General:

- **Administrative:** Personnel, finances, space, communication equipment, insurance, acknowledgement of risk and release, documentation and publications; also general provisions
- **Environment, Safety & Health:** SURF ESH Manual, SURF makes final decision for safety protocols/requirements for activities on SURF property
- **Decommissioning:** General removal and restoration
- **Project Description:** High-level description of project/expt, collaboration, schedule
- **Lab and Expt Responsibilities:** ESH; Access, Material Handling and Operations; Physical Infrastructure
- MOU document is **formal allocation of space**, review every 5 years (at least). Occupancy of shared laboratory space(s) coordinated by SURF.

LZ Specific (for example):

- **LZ Space Allocation:** Surface Lab, Surface Storage Facility (Foundry), 4850L Davis Campus
- **LZ Infrastructure and Xenon Procurement:** Design, construction mods for surface + underground, 1.5M L Xe
- **Initial Decommissioning Plan:** Some resources, schedule
- **Lab and Expt Responsibilities:** Electrical Safety (LBNL electrical safety program, inspections incl conditional, some arc flash), Pressure Safety (LBNL PUB 3000)



SURF Experiment Implementation Program

Memorandum of Understanding – Space, insurance, publications, media, etc

MEMORANDUM OF UNDERSTANDING
MOU - <Project Name>

BETWEEN

SOUTH DAKOTA SCIENCE AND TECHNOLOGY AUTHORITY
(Operator of the Sanford Underground Research Facility)

AND

<Name>, <Affiliation> Spokesperson or Principal Investigator

Concerning the <Project Name> Project

This Memorandum of Understanding (MOU) is entered into by and between the **South Dakota Science and Technology Authority (SDSTA)**, which operates the Sanford Underground Research Facility (referred to as the Sanford Laboratory), and **<Name>, <Affiliation>**, who represents the body of the Project collaborators, see Attachment I, (the Collaboration) in this MOU with SDSTA.

Purpose

The purpose of this MOU is to document a good faith effort and agreement on the part of both Parties concerning the Project.

The SDSTA and the Sanford Laboratory enter into this Memorandum of Understanding for the above-named Project (representing the Collaboration) to establish the initial expectations and resources for this research program at the Sanford Laboratory.

Scope

The following items identify the activities covered by this MOU. Specific documents for each activity shall be generated, reviewed and approved as appropriate prior to commencement of the activity. Areas requiring such special documentation will be identified in this MOU.

The Parties have reached the following understanding:

1.0 Administrative

1.1 Personnel:

1.1.1 The Collaboration will provide the Sanford Laboratory's Science Director with a list of personnel expected to participate in the experiment and who may be spending time at the Sanford Laboratory site (Collaborators). The Collaboration will provide updates prior to the initial visit of new project personnel, as appropriate.

1.1.2 A representative from each participating Project Institution will agree in writing that Collaborators from his/her institution will abide by the terms in this MOU. An example is provided as Attachment II.

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6.7 The Parties may discontinue their cooperation under this MOU at any time by mutual consent set out in writing.

6.8 A Party that wishes to discontinue its participation in this MOU should endeavor to provide at least ninety (90) days written notice to the other Party.

6.9 This MOU shall take effect upon the signature of the last Party to sign the MOU.

Signed:

Mike Hendley
Executive Director
South Dakota Science and Technology Authority Date _____

<Authorized Project Signer>
<Signer Title>
<Institution> Date _____

MOU signed by lead institution/PI on behalf of collaboration. MOU Acknowledgement signed by all institutions with personnel at SURF



SURF Experiment Implementation Program

Memorandum of Understanding – Space, insurance, publications, media, etc

MOU – *[Project Name]* Template Revision: (02/12/2021)
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ATTACHMENT I—The Project

A. **Project Goals:**
<1-2 paragraphs, indicate previous activity as appropriate>

B. **Space:**
<Indicate specific areas of beneficial use and/or occupancy proposed by the Project>

C. **Collaboration Participation:**

1. **Personnel List:**
<List name, institutional affiliation and position for each project participant, list documents relevant to Collaboration membership and its governance>

2. **Start Date and Duration of the Program:**
<Indicate the anticipated start date and duration of the Project, including previous milestones as appropriate. If the Project is phased, indicate the dates for each phase. Dates beyond the scope of this document can be included for informational purposes, but this distinction should be made clear>

3. **Scientific Review:**
<List relevant Project reviews that have either been completed or that are anticipated>

4. **Funding Status:**
<List sources and status of current funding and/or pending proposals>

5. **Approval of Project:**

The Collaboration recognizes that SDSTA requires safety and engineering reviews and approvals of all project elements before granting Authorization to Proceed. The requirements for these reviews are contained in SURF procedures. Authorization to Proceed will be obtained prior to commencement of onsite activities by the Collaboration.

Concurrent with agreement of this MOU, and correlated with the state of maturity of designs, SDSTA will call for internal and/or external reviews of safety and hazard-identification and mitigation plans, and where necessary engineering reviews of components.

Once the MOU has been executed, technical and safety reviews may be called for each stage of the project. When reviews and corrective actions have been completed, then Authorization to Proceed will be issued for that stage of the project.

MOU – *[Project Name]* Template Revision: (02/12/2021)
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ATTACHMENT II—MOU Acknowledgement (Example)

I have read and understood the Memorandum of Understanding between the South Dakota Science and Technology Authority and the Project and agree to abide by all applicable requirements while working at SURF.

I further acknowledge that all Collaborators of my institution are aware of the applicable requirements while working at SURF.

 Institution Rep Institution Signature Date

ATTACHMENT III—Insurance Requirements

As required by the Property Donation Agreement between the Barrick Gold Corporation and the South Dakota Science and Technology Authority (SDSTA), as well as the requirements of agencies providing support for Sanford Underground Research Facility (SURF) operations, Project collaborators will comply with the requirements listed below:

A. **Minimum Insurance:** Prior to commencement of work, the Project Sponsor will procure and maintain the following insurance:

1. **General liability insurance.** Such insurance shall name as additional insureds: Barrick Gold Corporation, Homestake Mining Company of California, and the Affiliates of Barrick and Homestake and each of its and their representatives (collectively, the "Homestake Indemnified Parties"); the South Dakota Science and Technology Authority, its officers, agents, employees and representatives; and the United States Government. All additional insureds coverage must include current and completed operations. In cases when adding additional insureds is prohibited, those specific institutions participating in the Project may request a language waiver from SDSTA.
2. **Business automobile liability insurance.** Such insurance shall include coverage for owned, non-owned and hired automobiles.
3. **Workers' compensation insurance** as required by South Dakota law.

B. **Special Provisions Applicable to All Coverages:** Self-insured retentions and/or deductibles greater than \$50,000.00 must be declared and approved by the Authority.

C. **Special Provisions Applicable to the Commercial General Liability Insurance and Equivalent Self-Insurance:**

1. Provide contractual liability coverage at least as broad as Insurance Services Office (ISO) form CG 00-01 12 07, or its equivalent.
2. Waive the insurer's right of subrogation against the Homestake Indemnified Parties.
3. State that it is primary and non-contributory and shall apply without consideration for other policies carried by the Homestake Indemnified Parties.
4. Include a provision that the insurer will not raise any coverage defense based on the statutory immunity of the State of South Dakota, the South Dakota Science and Technology Authority, or the Homestake Indemnified Parties.

The Sanford Underground Research Facility
 EXPEDIMENT IMPLEMENTATION PROGRAM

Document 34478
 Version 5
 October 8, 2018

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SURF Experiment Implementation Program

Publication Policy – SURF acknowledgments, etc



The purpose of this policy is twofold:

1. To establish high standards of excellence for publications by encouraging appropriate review for all scientific, technical and engineering publications related to Sanford Underground Research Facility (SURF) research and technical activities prior to publication; and
2. To ensure SURF is notified of all publications that are based on work performed in whole, or in part, at SURF.

A. Applicability

This policy concerns collaborating partners ("Users"), employees, contractors and visitors working at or with SURF.

This policy applies to all publications that are based on work performed in whole, or in part, at SURF. For the purposes of this policy, the term "Publication" means any document (in whatever form) such as abstracts, manuscripts and technical papers printed in a professional journal, popular periodical, published as a book or portion of a book (including electronic versions) and is made available to the public. The term includes materials subject to patents or copyrights.

B. Responsibilities

The SDSTA is not responsible for the validity, opinions, findings, conclusions or methods of the research performed by Users at SURF.

Prior to the publication of any work resulting from the research performed at SURF, it is the responsibility of the author(s), or other person(s) responsible for the content of the publication and/or those who originated or developed the content, to ensure that:

1. All requirements of any relevant investigator institution's review processes are met.
2. Findings adhere to scientific community standards of ethics and values.
3. All requirements of any applicable funding agencies are met.



4. The publication contains the appropriate credits, oral acknowledgements, legal disclaimers and patent or copyright notices.
5. The publication complies with all applicable patent, copyright, intellectual property, and other applicable laws, as well as the requirements of the User's Memorandum of Understanding with the South Dakota Science and Technology Authority.

C. Acknowledgements

To the extent possible, publications must contain the appropriate acknowledgement, including the funding source(s); the DOE or other agency contract number; any applicable facility (non-DOE or non-NSF contract number); and/or a disclaimer must appear in the publication of any material whether copyrighted or not, based on or developed under the project, as follows:

1. Credit line for publications with restricted word counts:

This material is based upon work supported by the U.S. Department of Energy, Office of Science, Office of High Energy Physics; (or list other funding agencies and supporting institutions) and resources of the Sanford Underground Research Facility (SURF), which is a federally sponsored research facility under Award Number DE-SC0020216.

2. Full credit line for research developed with DOE funding (no restricted word count): Note that acknowledgement of the DOE should always include two levels of organization, such as "the Office of Science of the Department of Energy":

The research supporting this work took place in whole or in part at the Sanford Underground Research Facility (SURF) in Lead, South Dakota. Funding for this work is supported by the U.S. Department of Energy, Office of Science, Office of High Energy Physics under Contract Number [INSERT CONTRACT NUMBERS]. This research was also supported by [INSERT FUNDING AGENCIES AND GRANT/CONTRACT NUMBERS HERE]. The assistance of SURF and its personnel in providing physical access and general logistical and technical support is acknowledged.

3. Disclaimer:

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, makes any warranty, express or implied, or assumes any legal



liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

4. Oral acknowledgements—Funding agency support and contributions of SURF should also be acknowledged during all news media interviews including popular media such as radio, television and news magazines as well as during presentations of papers at conferences, seminars, colloquia, public outreach presentations, workshops or other proceedings.

Publications produced as a result of research conducted at SURF are one of the measures of the lab's success. Authors can help by notifying SURF of new publications.

SURF will make every effort to make publications available through the [SURF website](#). For publications that are not available in the public domain (i.e., published in a journal or other publication with copyright restrictions), the abstract of the publication with information concerning where the full publication can be obtained will be provided through the SURF website.

SURF Governance

Informs SURF ESH Manual

- **Intergovernmental Agreement (IA)** created in 2011 between SDSTA and state of South Dakota **Office of Risk Management (ORM)** for worker health and safety oversight at SURF:
 - Roles & responsibilities, incl site inspections and enforcement authority
 - Agreement on specific regulations, codes and standards that best support safe operations at SURF
 - Reviewed and approved annually
- **Key IA regulations include:**
 - **OSHA:** General worker health (1910) and safety and construction activities (1926)
 - **MSHA:** Shaft and hoisting operations, ventilation, ground control (30 CFR Part 57), diesel particulate (Part 7)
 - **NFPA:** Electrical (70E), fire alarm (72), life safety (101), etc
 - **NEPA:** (10 CFR 1021)
 - **DANR:** South Dakota Dept of Agriculture and Natural Resources oversees environmental regulation compliance, also ionizing radiation-producing machine registration
 - **City of Lead** is AHJ for building, fire and life safety codes
- **NRC** regulates radioactive material
 - License since 2013, amended 2018 for broad scope

INTERGOVERNMENTAL AGREEMENT
BETWEEN THE
BUREAU OF ADMINISTRATION,
OFFICE OF RISK MANAGEMENT
OF THE STATE OF SOUTH DAKOTA
AND THE
SOUTH DAKOTA SCIENCE AND TECHNOLOGY AUTHORITY

This INTERGOVERNMENTAL AGREEMENT (“AGREEMENT”) is made and effective the 1st day of July, 2017, between the South Dakota Bureau of Administration, Office of Risk Management, 1429 E. Sioux Avenue, Pierre, South Dakota 57501 (“ORM”), and the South Dakota Science and Technology Authority, 630 E. Summit, Lead, South Dakota, 57754 (“SDSTA”) pursuant to SDCL Ch. 1-24 and in particular SDCL 1-24-8.

Introduction and Purpose

The State of South Dakota established SDSTA to facilitate the development of the former Homestake gold mine into an underground science laboratory (“the Sanford Laboratory”) and to lead the operation of the Sanford Laboratory. The mission of the SDSTA is “to enable compelling underground, multidisciplinary research in a safe work environment and to inspire and educate through science, technology, and engineering.”

When operating as an active mine, the Homestake gold mine was regulated by the U.S. Mine Safety and Health Administration (“MSHA”) and the South Dakota Department of Environment and Natural Resources (“DENR”). SDSTA received title to the Homestake site in 2006 from Homestake Mining Company of California after the 2003 closure of the mining facility.

MSHA and DENR continued to administer and enforce safety and environmental programs until 2008, at which time the SDSTA sought to clarify MSHA’s regulatory role. MSHA determined at that time it no longer had regulatory jurisdiction over the safety and health operations at the Homestake site due to the completion of mining reclamation and the new function of the site.

The U.S. Occupational Safety and Health Administration’s (“OSHA”) 29 CFR 1926¹ and 29 CFR 1910² are considered the most applicable of the available standards for safety and health for most activities conducted in support of the development of the underground laboratory. MSHA’s 30 CFR³ standards are employed as a best practice for underground activities when the OSHA standards do not sufficiently address a given hazard.

Although OSHA standards are being applied to the work conducted at the Sanford Laboratory, OSHA does not have jurisdictional authority for enforcement of those regulations because SDSTA is for the purposes of OSHA standards and regulation a “political subdivision”

¹ Title 29 Code of Federal Regulations Part 1926, “Safety and Health Regulations for Construction”

² Title 29 Code of Federal Regulations Part 1910, “Occupational Safety and Health Standards”

³ Title 30 Code of Federal Regulations Parts 1 -199, “Mineral Resources”

SURF Experiment Implementation Program

General Services Agreement

General:

- **Lab/Experiment Responsibilities:** Costs and effort associated with equip & materials (incl consumables), delivery/ transport, maintenance, monitoring, inspections and oversight. Generally, facility mods billed on cost-recovery basis
- **Elements:** Communication/IT, electrical inspections, chemical/hazardous waste, industrial hygiene, pressure systems, gases & cryogenes, radiation safety (incl dosimetry), hoisting & rigging, transportation, storage, procurement, PPE, access, cleaning, utilities/services
- **Fees:** Indirect rate (57.9%), fee structure for proprietary users based on annual SURF budget and average basic researcher access
- **Renewal:** Annually, some in conjunction with associated (but separate) subcontracts

LZ Specific (for example):

- **Facilities:** Surface Lab (+ RRS, water system), Surface Storage (Foundry), Davis Campus (+ water system)
- **Cleanroom Cleaning:** Dedicated 0.5 day/week
- **Electrical Inspections:** Per LZ MOU
- **Xenon:** Nominal return 2027

General Services Agreement: FY22 (October 1, 2021 - September 30, 2022)

This document establishes the General Services Agreement for the period October 1, 2021 through September 30, 2022 between the South Dakota Science and Technology Authority (SDSTA), operator of the Sanford Underground Research Facility (SURF) and the LUX-ZEPLIN (LZ) Collaboration (Experiment). For reference, the initial expectations and resources required for the project are outlined in a Memorandum of Understanding (MOU)-20150101-Rev2.

The SDSTA overhead rate projected for the agreement period is 57.9% and will be applied to all allowable costs as required by 2 CFR Part 225. The rate of indirect charges is formally reviewed on an annual basis and established using an audit process. The Experiment will be notified of any rate change. Due to the process of establishing the rate, the final overhead rate may not be available at the time of billing, in which case retroactive adjustments may be applied to future billing.

The services described herein will be provided by the SDSTA, subject to the availability of funding. This document may be modified by the mutual consent of the SDSTA and the LZ Collaboration.

I. General	SDSTA	Experiment
General Facility	For all phases of an Experiment, maintain safe access, including ventilation and decontamination (and associated utilities) as appropriate.	
Support	Nominal level of engineering, scientific and operations support for Experiment implementation.	Costs for dedicated use of SDSTA staff.
Communication Equipment	Equipment, maintenance and management of: <ul style="list-style-type: none">• Network switches.• Standard VoIP phones and similar devices.• Wireless access point(s).	<ul style="list-style-type: none">• Intercom system(s).• Conferencing phones or systems.• Internal cabling from Experiment equipment.
IT Resources	<ul style="list-style-type: none">• Space in environmentally controlled rooms for Experiment-associated equipment.• Assistance to integrate LZ-specific equipment into the SURF network.• Some training.• Inspections and maintenance of Experiment network fibers.	<ul style="list-style-type: none">• Rack equipment including rails, installation including any electrical work.• All cabling including ethernet.• All CPU's and primary storage.• All uninterruptible power supplies.• Backup system, media, quality assurance, reboots, etc.• Experiment system maintenance, including security patches.

Page 3 of 9

GSA general aspects incorporated in Experiment Integration & Support document

Experiment Implementation Program – Future DOE User Facility User Agreement (similar to existing SURF MOU & GSA docs)

DOE template promotes best practices in agreement composition and consistency across user facilities:

- Facilities and Scope of Work
- Term of Agreement (5 years for some)
- Cost, Billing and Payment of Expenses
- Admission Requirements
- Property and Materials
- Scheduling
- Indemnity and Liability
- Patent Rights
- Rights in Technical Data
- Lab Site Access, Safety and Health
- Personnel Relationships
- Export Controls
- Publications
- Disputes
- Conflict of Terms
- Termination

Non-Proprietary User Agreement
BETWEEN

Leland Stanford, Jr., University ("CONTRACTOR")
National Accelerator Laboratory (hereinafter "Laboratory")
Department of Energy ("DOE") Contract No. DE-AC02-76-SF00515
AND
[Redacted]
[Redacted] ("USER Institution")

CONTRACTOR and USER are collectively, "the Parties")

Contractor may be transferred to and shall apply to contractor continuing the operation of the DOE Non-Proprietary User Agreement.

SCOPE OF WORK

Contractor shall be responsible to employees, consultants and representatives of USER certain Laboratory Non-Proprietary User Facilities, which may include certain Laboratory equipment, materials, with or without Laboratory scientist personnel, as described in the experiment proposal accepted and conducted at the Laboratory. Additional future experiments referencing this Agreement may be conducted at the Laboratory and purposes during the term of this Agreement. Each accepted and approved experiment proposal shall be considered to be part of this Agreement. Each accepted and approved experiment proposal shall be considered to be part of this Agreement. Each accepted and approved experiment proposal shall be considered to be part of this Agreement.

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AGREEMENT

This Agreement shall be effective as of the date on which it is signed by the last of the Parties. In accordance with the terms herein, this Agreement shall have effect as of the date on which it is signed by the last of the Parties. The agreement can be renewed for additional terms.

NP/ 10/13/2009

FOR THE CONTRACTOR: Stanford University

BY: Arab Amil
Authorized Stanford/SLAC Officer

SIGNATURE: [Redacted]

TITLE: VUE Center Coordinator
SLAC National Accelerator Laboratory

DATE: [Redacted]

FOR THE USER:

BY: [Redacted]
(Name of Authorized Officer, typed)

SIGNATURE: [Redacted]

TITLE: [Redacted]

DATE: [Redacted]

ADDRESS: [Redacted]

TELEPHONE: [Redacted]

EMAIL: [Redacted]

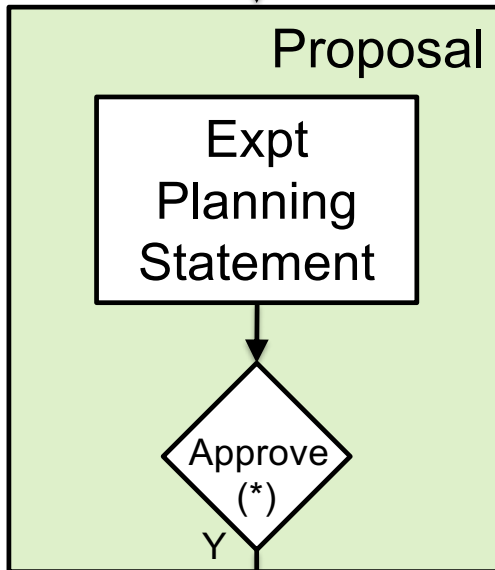
Non-proprietary User Agreement example (SLAC)

SURF Experiment Implementation Program

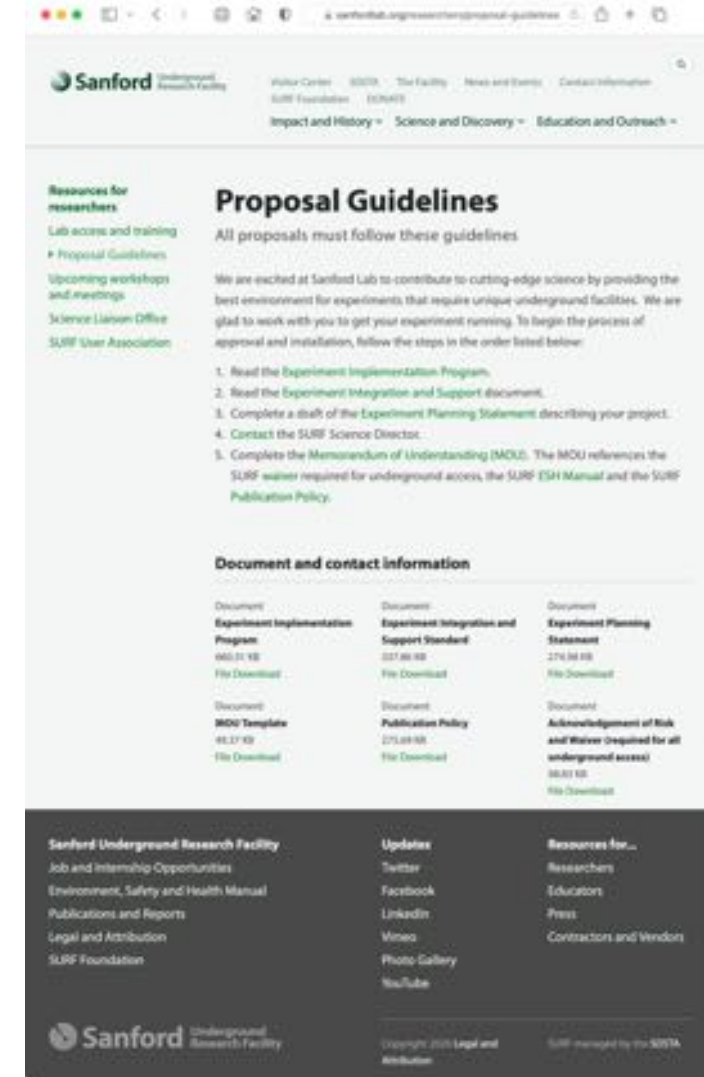
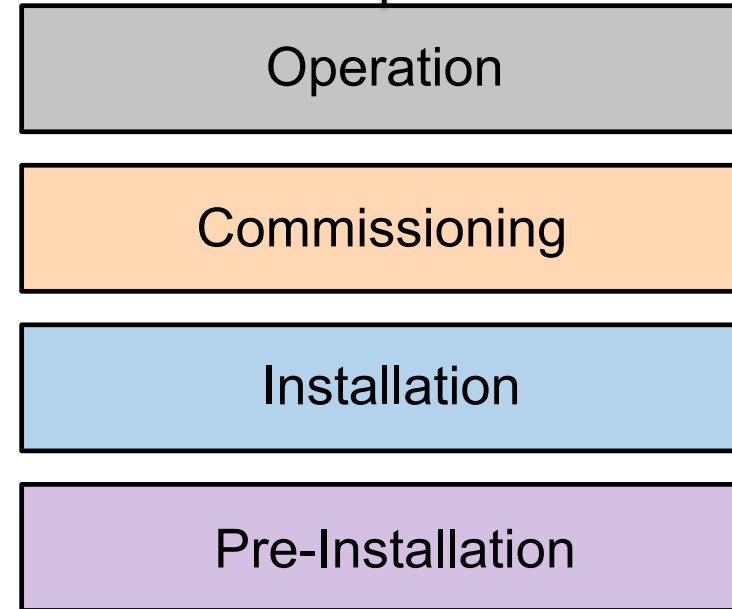
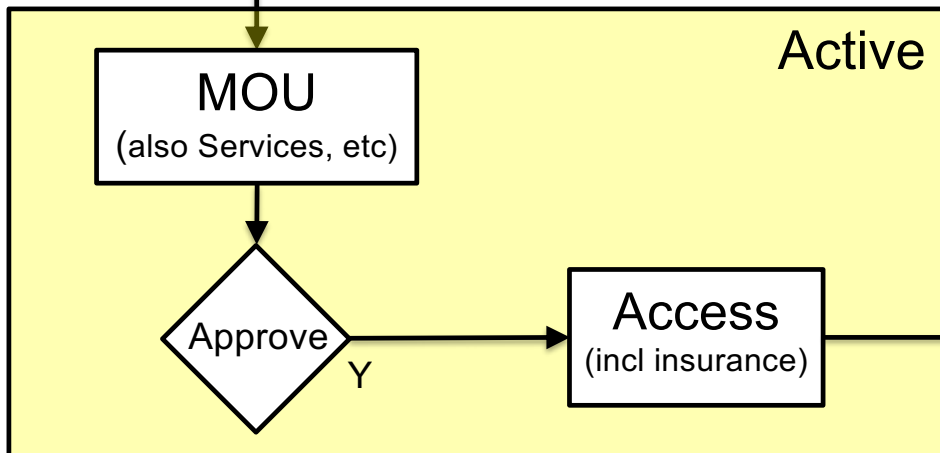
Identify interfaces and hazards within approval framework

<https://www.sanfordlab.org/researchers/proposal-guidelines>

Expt Concept



* Peer review as necessary



Experiment Implementation Program

Access: User Request Form (submitted via DocuShare by Sponsor)

Not Secure — docs.sanfordlab.org/cfide/user_request.cfm

Sanford
Underground Research Facility

SOSTA/Science/Contractor
10-12-2020 04:40 PM

New Access Request

First Name*	<input type="text"/>	Last Name*	<input type="text"/>	Middle Initial	<input type="text"/>
Institution*	<input type="text"/>	Project*	<input type="text"/>	Start Date*	<input type="text"/>
Phone*	<input type="text"/>	Email*	<input type="text"/>	Sponsor*	Jaret Heise
Job Title	<input type="text"/>	Term Date	<input type="text"/>		

Country of Citizenship* Birth* Visual Completion:

Additional Contact Information

Supervisor Name:	<input type="text"/>	Supervisor Phone:	<input type="text"/>	Supervisor Email:	<input type="text"/>
Emergency Name:	<input type="text"/>	Emergency Phone:	<input type="text"/>	New Badge*	<input type="text"/>

Resource Allocation

Deadline*	<input type="text" value="No"/>	VPS*	<input type="text" value="No"/>	Work Location*	<input type="text" value="Offsite Only"/>	Initial Brew*	<input type="text" value="No"/>
Is your work location onsite and more than jobs:	<input type="text" value="No"/>	Date Onsite:	<input type="text"/>	PPH*	<input type="text" value="No"/>		

Comments/Additional Information

Training requests sent to ESEI (*those who have taken GSB can complete ART and not re-take GSB)

Training	Site Specific	Task Specific
<input type="checkbox"/> Video-Cultural and/or Safety	<input type="checkbox"/> Devs	<input type="checkbox"/> P6
<input type="checkbox"/> Surface Orientation	<input type="checkbox"/> Box	<input type="checkbox"/> Radiation
<input type="checkbox"/> Underground Orientation	<input type="checkbox"/> Sewall	<input type="checkbox"/> Fall Protection
<input type="checkbox"/> General Safety Basic* <input type="text"/>	<input type="checkbox"/> Surface Lab	<input type="checkbox"/> Oxygenics
<input type="checkbox"/> Annual Refresher Training	<input type="checkbox"/> Machine Shop	<input type="checkbox"/> LOTO
<input type="checkbox"/> Guide	<input type="checkbox"/> Lower Priority	
<input type="checkbox"/> Waiver	<input type="checkbox"/> Motor Repair	
<input type="checkbox"/> Unrestricted Access	<input type="checkbox"/> U/G Non-Laboratory	
<input type="checkbox"/> Guide Trainer		

Request Account | Next Step: Science Director Approval, SOSTA/Contractor requests sent to IT/ESEI

Experiment Implementation Program

Access: Insurance

- Insurance (liability, auto, Workers' Compensation) required by Barrick/Homestake Property Donation Agreement
 - Amounts typically \$1M, can vary by risk: higher for construction (say \$5M), some academic institutional carry less and we can usually accommodate if risk is low
- Formal insurance language captured in MOU (all institutions required to acknowledge MOU, incl awareness of insurance requirements)
 - Commercial and self-insurance acceptable
 - Separate memo available to facilitate communications
- Waivers are possible (also mentioned in MOU), SDSTA carries extra insurance in case of gaps for higher-risk groups
 - Some institutions (incl US) have policies that do not allow additional insureds (i.e., other entities making a claim on their insurance policy)
 - Some (non-US) institutions do not have insurance



630 E. Summit St. Lead, SD 57754

March 3, 2020

Subject: SURF experiment collaborator insurance requirements

To Whom It May Concern,

SDSTA insurance requirements for research groups at SURF are included in the Memorandum of Understanding (MOU) that is signed with SDSTA on behalf of the experiment or project. For an experiment consisting of multiple collaborating institutions, the MOU directs representatives from collaborating institutions to sign a document acknowledging the MOU (including the insurance requirements).

While SURF experiments or projects may choose to formalize collaboration relationships using a subcontract, SDSTA does not require that insurance requirements for non-construction (low-risk) work scope be explicitly included in the subcontract language. The MOU with SDSTA and the associated acknowledgements are sufficient.

Note that typical levels of insurance coverage for non-construction (low-risk) activities include:

- \$1M general liability
- \$1M auto
- Workers Compensation coverage meeting the requirements of South Dakota law.

Sincerely,

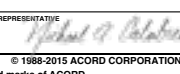
Matt Symonds
Business Services & Contracts Manager
Sanford Underground Research Facility

Certificate of insurance
(each institution with
personnel at SURF)

Experiment Implementation Program

Access: Insurance

- Insurance (liability, auto, Workers' Compensation) required by Barrick/Homestake Property Donation Agreement
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 - Some (non-US) institutions do not have insurance

ACORD		CERTIFICATE OF LIABILITY INSURANCE		DATE (MM/DD/YYYY)			
				4/14/2021			
<p>THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.</p> <p>IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).</p>							
PRODUCER Lockton Companies 1185 Avenue of the Americas, Suite 2010 New York NY 10036 646-572-7300		CONTACT NAME: ADDRESS: INSURER(S) AFFORDING COVERAGE:					
INSURED 1437521 Brookhaven Science Associates Building 400B Upton NY 11973		INSURER A: National Union Fire Ins Co Pitts, PA 19445 INSURER B: All Insurance Company 19399 INSURER C: New Hampshire Insurance Company 23841 INSURER D: INSURER E: INSURER F:					
COVERAGES		CERTIFICATE NUMBER: 17482833	REVISION NUMBER: XXXXXXXX				
<p>THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.</p>							
CLASS	TYPE OF INSURANCE	AGENCY	POLICY NUMBER	POLICY EFF. DATE	POLICY EXP. DATE	COVERAGE	LIMITS
A	COMMERCIAL GENERAL LIABILITY <input checked="" type="checkbox"/> CLAIMS MADE <input checked="" type="checkbox"/> OCCUR	Y N	39801297	1/1/2021	1/1/2022	EACH OCCURRENCE DAMAGE TO RENTED PREMISES (Per occurrence) MED EXP (Any one person) PERSONAL & ADV INJURY GENERAL AGGREGATE PRODUCTS - COMP/OP AGG	\$ 5,000,000 \$ 1,000,000 \$ Not Applicable \$ 5,000,000 \$ 5,000,000 \$ Included
A	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> NON-OWNED AUTOS ONLY <input type="checkbox"/> AUTOS ONLY	Y N	4888819	1/1/2021	1/1/2022	SCHEDULED SINGLE LIMIT (Per accident) BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)	\$ 5,000,000 \$ XXXXXXXX \$ XXXXXXXX \$ XXXXXXXX
A	UMBRELLA LIAB EXCESS LIAB <input checked="" type="checkbox"/> DEF <input checked="" type="checkbox"/> RETENTION \$ 10,000	N N	0311-1059	1/1/2021	1/1/2022	EACH OCCURRENCE AGGREGATE	\$ 10,000,000 \$ 10,000,000 \$ XXXXXXXX
B	WORKERS COMPENSATION AND EMPLOYERS LIABILITY (Mandatory in NY) (If yes, describe nature of operations below)	Y/N	8240134(NY,CT,DC,MD,IL,VA) 8240135(MA,ND,OH,WA,WY)	1/1/2021	1/1/2022	E.L. DISEASE - EA EMPLOYEE E.L. DISEASE - POLICY LIMIT	\$ 1,000,000 \$ 1,000,000
DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required) Barrick Gold Corporation, Homestake Mining Company of California, and the Affiliates of Barrick and Homestake and each of its and their representatives; the South Dakota Science and Technology Authority, its officers, agents, employees and representatives; and the United States Government are included as additional insureds as required by written contract.							
CERTIFICATE HOLDER		CANCELLATION					
17482833 Evidence of Insurance		SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE, THE NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE 					
ACORD 25 (2016/03)		© 1988-2015 ACORD CORPORATION. All rights reserved. The ACORD name and logo are registered marks of ACORD					

Certificate of insurance (each institution with personnel at SURF)

Experiment Implementation Program

Access: Insurance

- Insurance (liability, auto, Workers' Compensation) required by Barrick/Homestake Property Donation Agreement
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 - Some institutions (incl US) have policies that do not allow additional insureds (i.e., other entities making a claim on their insurance policy)
 - Some (non-US) institutions do not have insurance

CERTIFICATE OF COVERAGE
THE PUBLIC ENTITY POOL FOR LIABILITY (PEPL FUND®)

South Dakota Office of Risk Management Phone 605.773.5879
1429 East Sioux Ave Fax 605.773.5888
Pierre, SD 57501


Covered Party: EMPLOYEES OF THE STATE OF SOUTH DAKOTA

Certificate Holder: SDSTA
630 E. Summit St.
Lead, SD 57734

This Certificate Issued Regarding:
For South Dakota School of Mines and
Technology personnel to conduct
research and educational activities at
the Sanford Underground Research
Facility.

**THIS CERTIFIES THE PEPL FUND PROVIDES
THE FOLLOWING COVERAGES:**

TYPE OF COVERAGE	EXPIRATION DATE	LIMITS (PER OCCURRENCE)
General Liability	06/30/2022	\$1,000,000.00
Automobile Liability	06/30/2022	\$1,000,000.00

Authorized Representative:  Date: 06/28/2021

*The PEPL Fund is a liability pool established under SDCC 3-22. All coverage certified hereunder is subject to limitations, terms and conditions of the Participation Agreement between PEPL and the State of South Dakota. For questions, call PEPL's Executive Director at (605) 773-5879.

Certificate of insurance
(each institution with
personnel at SURF)

Experiment Implementation Program

Access: Insurance

- Insurance (liability, auto, Workers' Compensation) required by Barrick/Homestake Property Donation Agreement
 - Amounts typically \$1M, can vary by risk: higher for construction (say \$5M), some academic institutional carry less and we can usually accommodate if risk is low
- Formal insurance language captured in MOU (all institutions required to acknowledge MOU, incl awareness of insurance requirements)
 - Commercial and self-insurance acceptable
 - Separate memo available to facilitate communications
- Waivers are possible (also mentioned in MOU), SDSTA carries extra insurance in case of gaps for higher-risk groups
 - Some institutions (incl US) have policies that do not allow additional insureds (i.e., other entities making a claim on their insurance policy)
 - Some (non-US) institutions do not have insurance

MUTSAERTS

Certificate of Insurance

This is to certify that we, Mutsaerts B.V. and Chubb European Group SE, have effected the following liability insurance:

Policy number	CA252430
Insured	Stirling Cryogenics B.V.
Activities	Owner/operator of a business engaged in the design, manufacture, sale and repair of products, supplies and machinery for liquefaction, re-liquefaction, transport and storage of liquefied gases, as well as the provision of technical and other services in the cryogenic and related fields. (as per policy)
Limits of liability	€ 10.000.000,- any one claim and € 10.000.000,- aggregate per annum
Conditions	According to policy wording NBA2014 including all applicable special conditions and endorsements
Territory	The whole world including USA/Canada
Period	From 01-01-2022 until 01-01-2023 with tacit renewal for 12 months
Insurer	Chubb European Group SE
Broker	Mutsaerts B.V.

This certificate is subject to the terms, conditions and limitations of policy number CA252430 issued in the Dutch language. In the event of claims or disputes the policy wording, terms and conditions, will be binding.

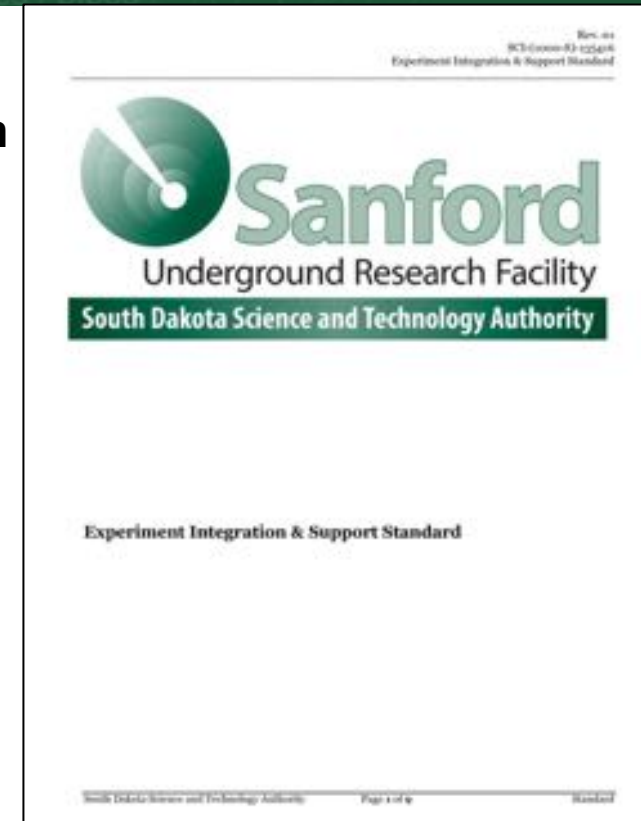
Mutsaerts B.V.,
Tilburg, 08-02-2022

Certificate of insurance
(each institution with
personnel at SURF)

Experiment Integration & Support

Overview

- **General:**
 - In partnership with research groups, SDSTA aims to maintain a robust **organization with resources** to promote **safe and successful** experiment operations at SURF
- **Responsibilities:**
 - **Experiment Point of Contact:** Science dept representative assigned to assist in navigating the experiment implementation process and help identify points of contact within other SURF departments as needed
 - **Radiation/Experiment Health & Safety Manager:** ESH dept point of contact for expt groups (+ support by others)
 - Operations support for access and facilities (incl engineering, electrical, IT, maintenance, etc)
- **Other Elements:**
 - **Support:** Formalize basic experiment support (DOE guidance) and consolidate generic “general services” from GSA (which then focuses on experiment-specific items)
 - **Facility access:** Typical schedules, facility guides, emergency access
 - **Planning & Communication:** Shipping & transport, work planning, shift reports, incident reports, evacuation drills



Experiment Integration & Support

DOE Cooperative Agreement Guidance

- **Basic Support for Non-Proprietary Experiments:**

- General terms:

- Provision of useable underground space that includes ventilation, power, water pumping;
 - Volume of underground space should be appropriate to scientific need;
 - Access to the underground for the installation, operation, decommissioning of experiments;
 - Communication and networking services;
 - Scientific and engineering liaison with users needed to help them meet the unique environment of SURF; and
 - Provision of usable above ground laboratory and setup space to prepare experiments.
- Needs beyond basic support billed on cost-recovery basis (via contract or GSA)

- **Full Cost Recovery for Proprietary Experiments:**

- Fee structure based on SURF budget (surface / UG) relative to non-proprietary researcher access & space footprint (updated annually, via contract or GSA):
 1. **Project access** (per experiment person, per hour, based on location)
 2. **SURF personnel** acting on behalf of a project (per SURF person, per hour)
 3. **Space occupancy and operations** (monthly, based on annual budget and location)
- Unattended operation: cost recovery based on space occupancy, specific support by SURF personnel
- No equipment installed: cost recovery based on access, specific support by SURF personnel

Experiment Integration & Support

Integration

- **Communication:** Communication to all stakeholders, incl Project Team, website, All Hands meetings
- **Science Integration Meeting:**
 - Weekly meeting with Expt and SURF reps to plan upcoming activities, coordinate schedules, identify required resources and resolve conflicts
 - Compile information from daily shift reports submitted by all expts (incl suggestions, observations, acts of safety, etc)
 - Subcommittees as required (e.g., cleanliness, radiation)
- **Lab Coordinator:**
 - Science dept representative assigned to act in a coordination role to facilitate access to facility resources as well as perform facility oversight for experiment activities
 - Laboratory Coordinators are present on a regular basis at facilities where the activities of one group may impact another group such as at the main underground campuses
 - Host daily 4850L coordination meetings for multiple cage times
- **Experiment Point of Contact:**
 - Science dept representative assigned to assist in navigating the experiment implementation process and help identify points of contact within other Sanford Lab departments as needed
 - ESH point of contact for experiment groups is Radiation/Experiment Health & Safety Manager
- **SURF-Experiment Management Meetings:**
 - Regular meetings held between facility management (including the Science, Laboratory and Executive Directors) and experiment management/PIs identify and resolve any critical issues
 - SURF User Association: annual general meetings + quarterly Executive Committee meetings

Experiment Integration & Support

Responsibilities and expectations for SURF and Experiment

Rev. 01

SCI-(1000-A)-123456

Experiment Integration & Support Attachment B

SDSTA will provide the general services listed below to all experiments, subject to the availability of funding. As indicated above, full cost recovery is required for proprietary groups. Special services may be documented separately in a Service Agreement.

1. General	SDSTA	Experiment
General Facility	For all phases of an Experiment, maintain safe access, including ventilation and dewatering (and associated utilities) as appropriate.	
Support	Nominal level of engineering, scientific and operations support for Experiment implementation.	Costs for dedicated use of SDSTA staff.
Communication Equipment	Equipment, maintenance, costs, and management of nominal needs for: <ul style="list-style-type: none"> • Network switches. • Standard VoIP phones and similar devices. • Wireless access point(s). 	<ul style="list-style-type: none"> • Costs for IT equipment above nominal level provided by SDSTA. • Intercom system(s). • Conferencing phones or systems. • Internal cabling from Experiment equipment.
IT Resources	<ul style="list-style-type: none"> • Space in environmentally controlled room for Experiment-maintained equipment. • Some training. 	<ul style="list-style-type: none"> • Rack: equipment including rails, installation including any electrical costs. • All cabling including ethernet. • All CPUs and primary storage. • All uninterruptable power supplies. • Backup system: media, quality assurance, restorations. • Experiment system maintenance, including security patches.
Electrical Equipment	<ul style="list-style-type: none"> • Perform inspections of electrical equipment. 	<ul style="list-style-type: none"> • Costs associated with receiving or shipping.

Experiment Integration & Support

Shipping Forms (Incoming and Outgoing)

The image shows a Google Forms interface for the Sanford Underground Research Facility. The form is titled "SURF Incoming Shipping Information" and includes the Sanford logo and facility name. It provides instructions for shipping and lists contact information for the facility. The form contains several sections for user input:

- From where does the shipment originate? *** (Text field)
- To whom is the package addressed? *** (Text field)
- Please list the package contents *** (Text field)
- Please give the approximate package dimensions and weight. *** (Text field)
- Electrical items** (Section header)
- Does the shipment contain any non-battery-powered electrical items? *** (Radio buttons for Yes/No)
- Has an institutional inspection been performed on the electrical items before shipping? If so, please list the institution that performed the inspection.** (Text field)
- Tracking number** (Text field)
- Please give the approximate arrival date *** (Date field)
- Where should the package be delivered? *** (Radio button list: Hold at Warehouse, Davis Campus @ 4850L, Ross Campus @ 4850L, EGS/SIGMA-V @ 4850L, EGS/SIGMA-V @ 4100L, Surface Lab, Lower Foundry, Admin Building, Motor Repair Shop, Sawmill, Other)
- Special handling instructions** (Checkboxes: Fragile, Open in cleanroom environment only, Temperature sensitive - Keep warm, Humidity/Moisture sensitive - Keep dry, Keep upright, Other)

At the bottom, there is a "Submit" button and a "Clear form" link. The footer of the form includes the text "Never submit passwords through Google Forms." and a link to "This content is neither owned nor endorsed by Google. Report Abuse - Terms of Service - Privacy Policy".

Experiment Integration & Support

High-Value Equipment Handling Form, Enhanced Coordination



High-Value Equipment Handling Form

This form is intended to formalize expectations for handling high-value items and may be used by all Sanford Laboratory personnel as well as contractors and science collaborators.

Experiment Information:

Expt Name:	Contact Name:	Contact Phone Number:
Science Dept Contact/Phone:	Operations Dept Contact/Phone:	

High-Value Equipment:

Equipment Description (incl weight):		
Special Precautions:		
Equipment <u>Pick Up</u> Location:	Expt Rep Required to be Present? <input type="checkbox"/> Yes <input type="checkbox"/> No	(Expt Rep Initials)
Equipment <u>Delivery</u> Location:	Expt Rep Required to be Present? <input type="checkbox"/> Yes <input type="checkbox"/> No	(Expt Rep Initials)
Additional Comments:		

Equipment Preparation (Packing, Staging, Etc):

Packing (Name, Organization, Date, Description):			
Equipment Staging Status (on ground, on rail vehicle, etc):			
Equipment Ready For Transport:	(Expt Rep Initials)	Date	Time

Pre-Transport Preparations:

Packing appears adequate and in good condition:	<input type="checkbox"/> Yes	(SURF Rep Initials)	<input type="checkbox"/> No	(SURF Rep Initials)
JHA/Transport Procedure:	<input type="checkbox"/> No	<input type="checkbox"/> Yes	Comment:	
Special Rigging for Transport:	<input type="checkbox"/> Yes	(if yes explain) <input type="checkbox"/> No		
Planned Route (path description, shaft, etc):				
Pre-Transport Inspection Comments (eg., track/switch inspections, etc):				
Transportation Equipment:				

Transportation & Handling:

Procedure based on Operations Procedure: SOP-0026 Transporting Personnel & Material in Underground Levels and Ramps	
Transport Personnel Name:	
Special Precautions:	
Planned Pick Up Date/Time:	Planned Delivery Date/Time:
Actual Pick Up Date/Time:	Actual Delivery Date/Time:
In case of unusual circumstances – IMMEDIATELY call your supervisor, the Science Contact or the Expt Contact	

Equipment Handling Plan Acceptance:

Experiment Rep (signature):
SURF Rep (signature):

Document-82438
 Revised: (08/17/2016)
 Supersedes: (03/20/2012)

A hard copy of this document may not be the version currently in effect. The current version is always the version contained within Sanford Lab's document management system, DocuShare (<https://docs.sanfordlab.org>).

Experiment Integration & Support

Yates Manifest (Load/Shipment Management)

Sanford Underground Research Facility
DocuShare

< April 2017 >

	S	M	T	W	T	F	S
W 26		27	28	29	30	31	1
W 2		3	4	5	6	7	8
W 9		10	11	12	13	14	15
W 16		17	18	19	20	21	22
W 23		24	25	26	27	28	29
W 30		1	2	3	4	5	6

Yates Shaft Manifest Schedule [List Report](#) | [Print](#) | [Reports](#)

1) Click on an available time to create a new material move request in the Yates Shaft.
 2) Your request will change to a pending status until approved. Your status will then change to Scheduled.
 All approval and request steps will be communicated through automated emails.

Dates with this color represent available times:

Times with this color represent small loads (<= 5k) that have multiple loads available for the same time:

Cage Dimensions 54.75" wide x 120" long x 108" high
 Unavailable = Not an available time.

Start Date: End Date:

ID	Time	Status	From	To	Material Type	Requester	Special Conditions
	12:00 AM	Unavailable					
	12:30 AM	Unavailable					
	01:00 AM	Unavailable					
	01:30 AM	Unavailable					
	02:00 AM	Unavailable					
	02:30 AM	Unavailable					
	03:00 AM	Unavailable					
	03:30 AM	Unavailable					
	04:00 AM	Unavailable					
	04:30 AM	Unavailable					
	05:00 AM	Unavailable					
	05:30 AM	Unavailable					
	06:00 AM	Unavailable					
	06:30 AM	Unavailable					
	07:00 AM	Unavailable					
	07:30 AM	Unavailable					
6603	08:00 AM	Scheduled 1/2-UP	4850	Surface	LN	Cabot-Ann Christofferson	Hoist LN yellow top dewar
	08:00 AM	Available 1/2-UP					
	08:00 AM	Available-Down					
6573	08:30 AM	Scheduled 1/2-DOWN	Surface	4850	LN	Cabot-Ann Christofferson	Lower LN yellow top dewar
	08:30 AM	Available 1/2-Down					
8246	08:30 AM	Scheduled-UP	4850	Surface	Other	Dick Goetz	porta-pots
8483	09:00 AM	Scheduled-DOWN	Surface	4850	Supplies/Materials	Dick Goetz	Duane's toolbox
8250	09:00 AM	Scheduled-UP	4850	Surface	Supplies/Materials	Dick Goetz	garbage
	09:30 AM	Available					
	10:00 AM	Available					

Experiment Integration & Support

Trip Action Plan (UG + Cage Occupancy)

Trip Plan Start Date: 2017-04-12

End Date: 2017-04-12

PDE

04-12-2017

Time Down	06:30:AM	07:00:AM	07:30:AM	Spec:AM	11:30:AM	Spec:PM	03:45:PM	04:15:PM	05:15:PM	11:30:PM
CASPAR	0	0	3	0	0	0	0	0	0	0
EO	0	0	0	0	0	0	0	0	0	0
MJD	0	0	2	0	1	0	0	0	0	0
Other	0	0	1	0	0	0	0	0	0	0
SDSTA	5	4	0	1	6	6	0	0	0	0
SIGMA-V	0	0	0	0	10	13	0	0	0	3
TAP Total(28 Max per Cage)	5	4	6	1	17	19	0	0	0	3
TAP Total UG(67 Max)	5	9	15	16	32	46	28	25	16	0

4850L Ross Campus (ID:8200); Last Update:04-12-2017 (Include in List Report) [Clone](#)

SIGMA-V site-selection trip

4850L (West Drift near KISMET site, East Drift; also 17 Ledge as time allows) followed by 4100L

Request cage up to the 4100 Level at 2:30 pm.

Walk to KISMET site via West Drift; motor requested from Governor's Corner to 17 Ledge then back to Yates Shaft

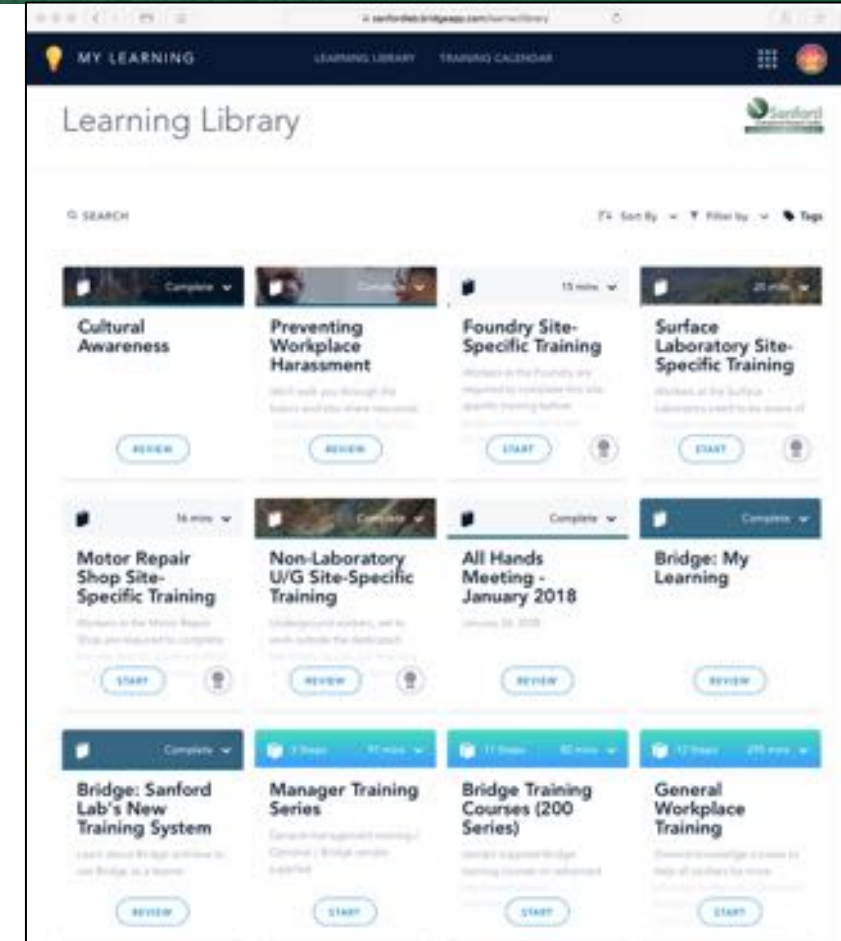
Name	Guide	Affiliation	Time Down	Time Up
Keefner John		SDSTA	11:30:AM	Spec:AM
Bill Roggenthen	Guide	SIGMA-V	11:30:AM	Spec:PM
Bryce Pietzyk	Guide	SDSTA	11:30:AM	Spec:PM
David Vardiman	Guide	SDSTA	11:30:AM	Spec:PM
Doug Blankenship		SIGMA-V	11:30:AM	Spec:PM
Hunter Knox		SIGMA-V	11:30:AM	Spec:PM
Jaret Heise		SDSTA	11:30:AM	Spec:PM
Joe Morris		SIGMA-V	11:30:AM	Spec:PM
Jonathan Ajo-Franklin		SIGMA-V	11:30:AM	Spec:PM
Markus Horn		SDSTA	11:30:AM	Spec:PM
Megan Smith		SIGMA-V	11:30:AM	Spec:PM
Pat Dobson		SIGMA-V	11:30:AM	Spec:PM
Tim Baumgartner	Guide	SDSTA	11:30:AM	Spec:PM
Tim Johnson		SIGMA-V	11:30:AM	Spec:PM
Tim Kneafsey		SIGMA-V	11:30:AM	Spec:PM
Tom Doe		SIGMA-V	11:30:AM	Spec:PM
Hai Huang		SIGMA-V	11:30:PM	Spec:PM
Mark White		SIGMA-V	11:30:PM	Spec:PM
Paul Schwering		SIGMA-V	11:30:PM	Spec:PM

Time Down	06:30:AM	07:00:AM	07:30:AM	Spec:AM	11:30:AM	Spec:PM	03:45:PM	04:15:PM	05:15:PM	11:30:PM
CASPAR	0	0	3	0	0	0	0	0	0	0
EO	0	0	0	0	0	0	0	0	0	0
MJD	0	0	2	0	1	0	0	0	0	0
Other	0	0	1	0	0	0	0	0	0	0
SDSTA	5	4	0	1	6	6	0	0	0	0
SIGMA-V	0	0	0	0	10	13	0	0	0	3
TAP Total (28 Max per Cage)	5	4	6	1	17	19	0	0	0	3
TAP Total UG(67 Max)	5	9	15	16	32	46	28	25	16	0
TAP Total UG(67+5 Emergency)	10	14	20	21	37	51	33	30	21	5

Time Up	06:45:AM	07:15:AM	07:45:AM	Spec:AM	11:45:AM	Spec:PM	04:00:PM	04:30:PM	05:30:PM	11:45:PM
CASPAR	0	0	0	0	3	0	0	0	0	0
EO	0	0	0	0	0	0	0	0	0	0
MJD	0	0	0	0	0	0	0	3	0	0
Other	0	0	0	0	1	0	0	0	0	0
SDSTA	0	0	0	1	1	5	3	6	6	0
SIGMA-V	0	0	0	0	0	13	0	0	13	0
TAP Total(28 Max per Cage)	0	0	0	1	5	18	3	9	19	0

Experiment Integration & Support Training

- **General Safety – Basic Training (~4 hrs; Zoom possible)**
 - Researchers are “Lab Workers” in SURF Training policy
 - In-person class offered 2x monthly (see public website for schedule), possible flexibility in dates
 - Allowance for < 40 hrs per year on property
- **Site-Specific Training (most online Bridge)**
 - General surface and underground (video)
 - Area-specific (e.g., 4850L Davis Campus, Surface Lab, Sawmill, Foundry, etc)
- **Task-Specific Training**
 - Procedures (Job Briefing Attendance)
 - Hazard training (e.g., chemical, electrical, pressure, cryogen, radiation, etc)
 - On-the-Job training, SURF/Expt (eg., hoisting & rigging)
- **Refresher Training (most online Bridge)**
 - SURF: Refresher training required for GSB (i.e., Annual Refresher Training) and area-specific (laboratory, oxygen deficiency hazard, SCSR, etc)
 - Expt training may have required refresh frequency
- **Record Keeping (online Bridge)**
 - SURF database for SURF-administered training
 - Experiment-managed training matrices capture SURF training + Experiment training



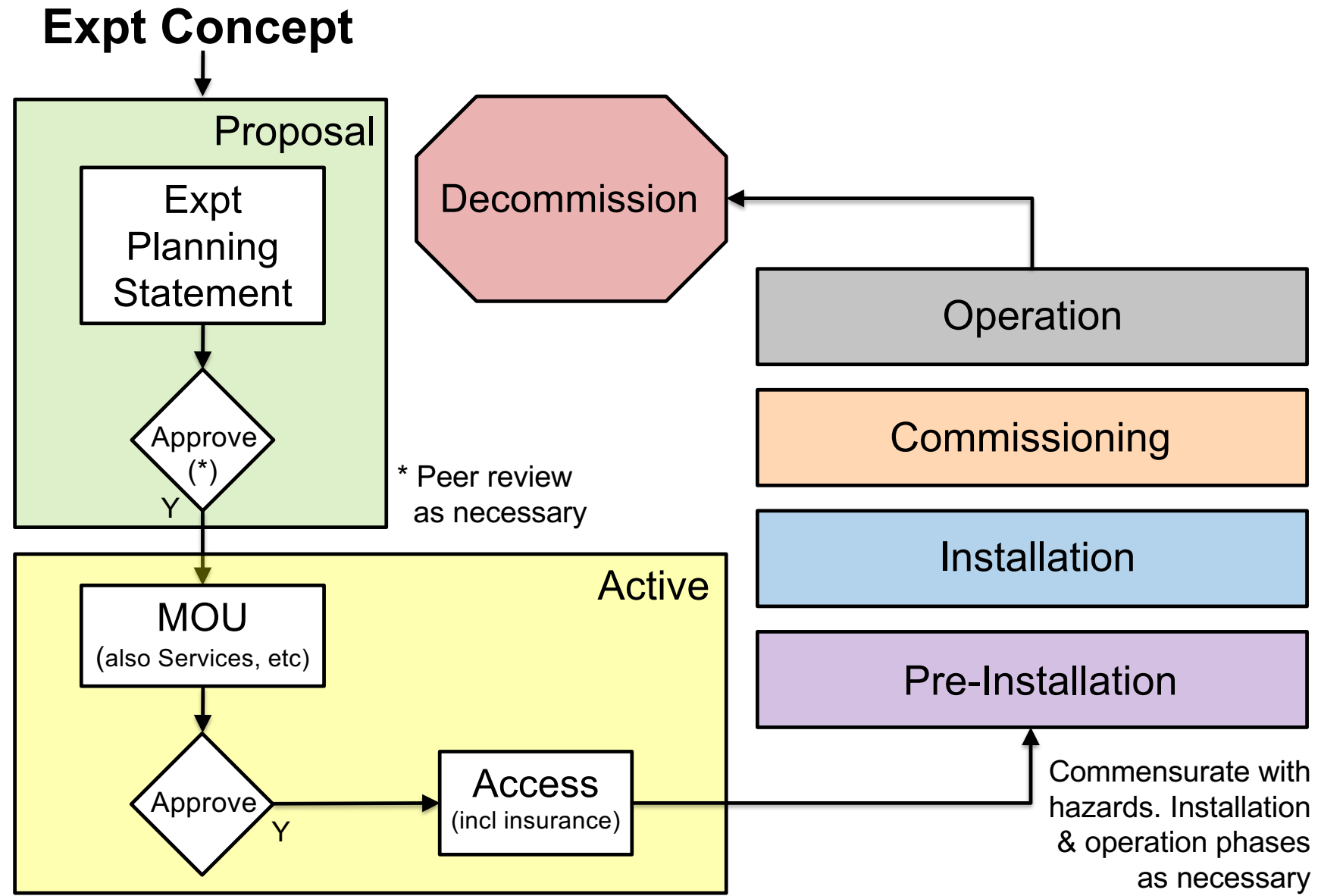
Experiment Integration & Support

Desk space for researchers (now open cubicles)



SURF Experiment Implementation Program

Process Flow Chart



SURF Experiment Implementation Program

Process Flow Chart – Ideas for Graphic in Progress (Comments Welcome!)

1. Experiment Proposal

Experiment Planning Statment
Approved (Y/N)



1

2. Active

Submit MOU
MOU Approved (Y/N)
Access Allowed
Installation
Low Hazard Analysis



2

3. Pre-installation

Training Documentation
Inventories
Active
Facility and Readiness Reviews
Hazard Analysis



3

Authorization
to
Proceed



4

4. Installation

Authorization
to
Proceed



5

5. Commissioning

Active
Inventories
Hazard Analysis
Training
Operations Review

Authorization
to
Proceed



6

6. Operation

Active
Inventories
Training
Hazard Analysis
Reviews



7

7. Decomissioning

Active
Inventories
Training
Hazard Analysis
Inventories
Decomissioning Plan



Summary

- SURF direct DOE funding helps science
 - Funding both for SURF operations and infrastructure promotes reliability
 - SURF has DOE mandate to support experiments with basic level of support
- SURF processes ensure world-class service to the UG science community:
 - SURF Experiment Implementation Program: Identifies interfaces and hazards within an approval framework commensurate with experiment hazards
 - SURF Experiment Integration & Support: Partnership with experiments and leveraging organization resources to promote safe and successful experiment operations at SURF
 - SURF processes ensure facilities meet demands of experiments
- SURF has proven track record of enabling experiments to deliver high-impact science

Sanford Underground Research Facility

Thank You!



SURF Supports Science

Variety of resources to ensure safe and successful science

- **Science**

- Main point of contact for researchers, coordinate and marshal Lab resources to meet expt needs
- Oversight of expt implementation process, scientific/technical expt support (collab members, LBC ops)

- **Operations**

- Maintain infrastructure and access to surface and underground facilities, incl hoists, shafts, drifts, services (power, network, etc); also experiment site preparation
- Transportation of personnel and materials: 24-hr access as needed, typically 10-20 ppl/day for science

- **Environment, Safety & Health (and Security)**

- Manage Safety Manual, incl policies, forms (e.g., oxygen deficiency, hazard analysis/WPC, etc)
- Safety resource (e.g., reviews, training, monitoring, waste, radiation, record keeping, ERT); prox access

- **Engineering**

- Participate in understanding expt requirements, oversight of lab development, contract management, engineering support for Operations (access and maintenance)
- Assessments (incl equip design/certifications, ODH), system process design and troubleshooting

- **Admin / Business Services / Finance / IT**

- User access & support (incl badging, event planning), contracts/rebilling, shipping/receiving, procurement, IT support (VPN, document mgmt, network data/phone), training accounts

- **Communications / Education & Outreach**

- Interface with media and other groups, coordinate public meetings, outreach showcasing research/ scientists at local, state and national levels (e.g., Neutrino Day), student internships (incl Science interns)

SURF Science Support – Work Planning & Controls

Performing Work at SURF

- **SURF Work Planning & Controls (WPC)**

- SURF ESH Manual via public website (<https://www.sanfordlab.org/esh>), also DocuShare.
- WPC is systematic process for completing tasks safely and efficiently (applies to all):
 - Identify scope of work and methods for performing work
 - Hazard analysis and work authorization
 - Pre-job briefing and work release

- **Hazard Analysis**

- For all tasks, identify work requirements and corresponding hazards and mitigations.
- Written procedure required if task involves **2 or more low-risk hazards** or **1 or more high-risk hazards** (see chapter appendix for table). *Most tasks require written procedures.*
- SURF has JHA/SOP forms, other procedure formats allowed subject to SURF acceptance.
- Some level of detail necessary to identify hazards, commensurate with complexity of task.

- **Work Authorization**

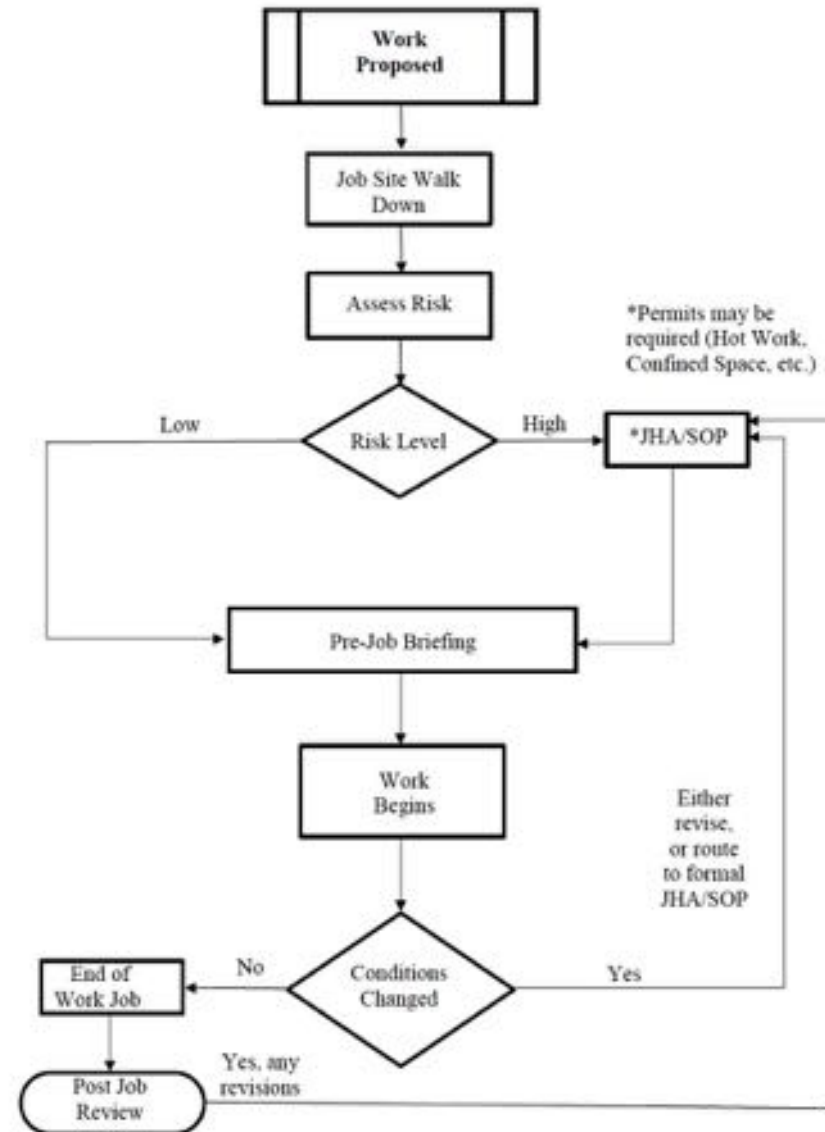
- All written Experiment procedures are reviewed by **ESH, Author/Owner, Science Dept & Experiment representative**; Science Dept will coordinate reviews by additional Subject Matter Experts as applicable (ESH, Engineering, Operations, et al.).
- SURF & Experiment signatures authorize procedure to be performed by qualified workers.

- **Work Release**

- Pre-job briefing required for all tasks: **verbal** for tasks with low-risk hazards not requiring written procedure; **written** Toolbox Talk form for tasks requiring written procedure.
- Experiment signature on Toolbox Talk form releases authorized procedure to be performed by individuals who have reviewed the procedure and have necessary training, permits, etc.
- SURF has Toolbox Talk form, other formats allowed subject to SURF acceptance.

SURF Science Support – Work Planning & Controls

Performing Work at SURF



SURF Experiment Implementation Program

Experiment Planning Statement – Expt/Facility Interfaces

9. SURF Review Section – to be completed by SURF personnel

Experiment Implementation Program Requirements:
Additional documentation requirements.

Required for All Experiments: Memorandum of Understanding (MOU) Insurance (general liability, Workers' Compensation)

Services Agreements: General Services Agreement (GSA) Contract

Environment, Safety & Health Requirements:
Based on the information provided in the Experiment Planning Statement, the following training, inventories, ESH documents and reviews are warranted.

Required for All Experiments: Procedure(s) (Job Hazard Analysis, Standard Operating Procedure, etc.)

Minimum Training: Orientation (surface and/or underground) General Safety – Basic (and subsequent Annual Refresher Training (ART))

Other Training: SURF: _____ Non-SURF: _____

Inventories: Chemicals Electrical Hoisting & Rigging Pressure Vessels Radioactive Materials

ESH Documents: Experiment Hazard Assessment Summary (EHAS), incl additional training Quantitative Analysis – Mechanical Quantitative Analysis – ODH Quantitative Analysis – Pressure

Reviews: Walk-through Inspection(s) Readiness Review(s)

SURF Review

SCIENCE	Name	Date	Signature
	_____	_____	_____
ENVIRONMENT, SAFETY & HEALTH	Name	Date	Signature
	_____	_____	_____
ENGINEERING	Name	Date	Signature
	_____	_____	_____
INFORMATION TECHNOLOGY	Name	Date	Signature
	_____	_____	_____
HOISTS AND SHAFTS	Name	Date	Signature
	_____	_____	_____
SURFACE OPERATIONS & UTILITIES	Name	Date	Signature
	_____	_____	_____
UNDERGROUND OPERATIONS	Name	Date	Signature
	_____	_____	_____

Other Review (If applicable)

Group	Name	Date	Signature
	_____	_____	_____
	_____	_____	_____

SURF Acceptance

SURF LABORATORY DIRECTOR _____ _____ _____
Name Date Signature

Page 9 Page 5 Page 1



- EPS provides two-way communication:**
- SURF needs expt details in several categories
 - Facility details useful to expts

SURF Experiment Implementation Program

Memorandum of Understanding – Space, insurance, pubs, media, etc

MOU – *[Project Name]*
Page 8 of 12

Template Revision: (02/12/2021)
Supersedes: (09/16/2020)

- D. Notice of Cancellation or Material Change in Coverage/Condition: The Project Sponsor must provide 30 days' notice of cancellation/material change.
- E. Evidence of Insurance: Prior to commencement of work, the Project Sponsor shall furnish the South Dakota Science and Technology Authority with certificates evidencing compliance with the insurance requirements above.
- F. Acceptability of Insurers: Insurance shall be placed with insurers acceptable to the South Dakota Science and Technology Authority. Acceptable insurance coverage may be provided by a commercial carrier or through self-insurance or an acceptable assumption of risk.
- G. Subcontractors (where applicable): Project Sponsor shall require subcontractors to provide general liability insurance and business automobile liability insurance that complies with the requirements stated herein.

ATTACHMENT IV—Environment, Safety and Health

A. SDSTA will provide:

1. A safe working environment in which the Collaboration may conduct its experimental and operational activities while onsite at SURF.
2. Life safety and emergency response, as follows:
 - i. Ready access to maintained first aid kits.
 - ii. Personal Protective Equipment (PPE) related to underground safety and training for its proper use. Specialized PPE for experiment-related processes will be provided by the Collaboration but will be approved by SDSTA.
 - iii. Secondary egress maintained compliant with applicable requirements.
 - iv. An Emergency Response Team staffed to respond 24/7.
 - v. Clear instructions for proper response by all personnel to emergency situations.
3. In the event of personal injury, provide transportation to the surface and to a local health provider.
4. Information related to the hazards of working in the applicable SURF locations. This will be partially completed through site access training; however, SDSTA will also provide information as needed for planning purposes.
5. Basic environmental monitoring instrumentation for underground areas, and limited capabilities for additional workplace monitoring (e.g. lead smearing and analysis). Costs associated with providing this service must be negotiated between the Parties in a separate agreement.
6. Personnel to inspect and test hoisting and rigging equipment. Cost associated with providing this service must be negotiated between the Parties in a separate agreement.
7. Arrangements for regular pressure vessel inspections. Costs associated with providing this service must be negotiated between the Parties in a separate agreement.

MOU – *[Project Name]*
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8. All personnel working onsite must complete training specified by SDSTA. Some training may be provided by SDSTA at no cost to Project personnel.
- B. The Collaboration will:
1. Abide by all of the regulations and operational requirements developed by SDSTA while on SDSTA property.
 2. Notify SDSTA in the event of a chemical spill. SDSTA will be responsible for providing further notifications, if warranted. The Collaboration will provide spill kits and other supplies necessary to respond to spills of the materials stored and used in project-related laboratories and storage spaces. The Collaboration will assure their project personnel are appropriately trained to respond to spills.
 3. Notify SDSTA in the event of a spill or dispersal of cryogenic fluids. The Collaboration will assure and document that their project personnel are appropriately trained to respond to such spills or events.
 4. Require all personnel present on SDSTA property to be subject to SDSTA safety training requirements, including site-specific training and annual refresher training.
 5. Develop hazards analyses for review by SDSTA personnel. Costs associated with mitigation of the hazards (e.g. ventilation for cryogenic boil-off or fume hood exhaust) will be negotiated prior to the introduction of the new hazard in a separate agreement.
 6. Maintain, and update as necessary, an inventory of hazardous materials to be brought onto SDSTA property and will receive authorization from SDSTA prior to materials being shipped to the site. This includes the following:
 - i. Providing current Safety Data Sheet (SDS) information to SDSTA concurrently with the inventory list, and
 - ii. Developing hazard-communication and chemical-hygiene programs in compliance with SURF requirements.
 7. Comply with SURF radiation safety program, including coordinating transportation of radioactive materials to and from SURF, maintaining appropriate inventories and developing appropriate procedures as required by SDSTA.
 8. Maintain, and update as necessary, an inventory of electrical equipment and follow the requirements of SURF electrical safety program.
 9. Maintain, and update as necessary, an inventory of pressure vessels.
 10. Maintain, and update as necessary, an inventory of hoisting and rigging equipment.
- C. Waste Handling:
- The Collaboration is responsible for the management of the wastes at the Project site. Management includes transfer from experimental containers, containment, neutralization, and temporary storage at the site of generation.

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EXPERIMENT IMPLEMENTATION PROGRAM

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SURF Experiment Implementation Program

Memorandum of Understanding – Space, insurance, pubs, media, etc

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SDSTA is responsible for the transfer of the wastes from the Project site to the surface, temporary storage and disposal.

Any commitment of funds addressing waste handling will be the subject of a separate agreement to be negotiated between the Parties.

ATTACHMENT V--Access, Material Handling and Operations

A. SDSTA will provide:

1. Upon completion of the initial training requirements, a picture ID badge will be issued by SDSTA and shall be worn at all times by the person to whom it is issued while on SDSTA property (including surface and underground).
2. A limited shuttle service for personnel transportation on surface.
3. Coordination of transport of material through SDSTA personnel on surface.
4. Assistance with transportation and assembly of equipment both above ground and underground will be coordinated, as well as ongoing operations and maintenance support that might be provided by SDSTA in support of the Project.
5. Design or other specialized support services for the Collaboration on an appropriate no-charge basis.
6. List of cage sites and compartment/station clearances (for material to be slung below cages).
7. Processing of receipt of Collaboration material shipments and delivery to appropriate site.
 - i. A list will be supplied by the project for all materials brought onsite by members of the Collaboration or by shipping companies.
 - ii. The Collaboration recognizes that hazardous materials must be transported properly to the site.
 - iii. SDSTA has the right to refuse materials to be brought onto the site, or to mandate special handling, storage or security measures as appropriate for materials where this is deemed necessary by SDSTA.

B. The Collaboration will:

1. Keep SDSTA personnel away of the location of all onsite Collaboration personnel.
 - i. Collaboration personnel will check-in as required (e.g., reception at Administration building) or identify themselves on rosters.
2. Follow the facility access policy, including the brass tag procedures for work underground. Collaboration personnel will not be allowed underground without the appropriate SDSTA-approved guides.
3. Drive vehicles (owned, non-owned or hired) within on-site right-of-ways identified by SDSTA and shall park vehicles only in authorized parking spots on surface.

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4. Underground. The Collaboration will recognize that unlimited and on-request access to underground areas is not possible.
 - i. Cage access and times will be scheduled to best handle the needs of the construction and maintenance crews and Collaboration personnel.
 - ii. Specialized Collaboration needs for personnel or equipment transportation at underground levels will be requested, based on schedule and equipment availability.
 - iii. Transport of material will be coordinated through SDSTA personnel.
5. Inform SDSTA of any materials being brought on to SDSTA property as well as any materials being shipped to or from the site.
6. Distribute an inventory list of high-value or controlled property to SDSTA personnel.
7. Provide SDSTA with a list of consumables required by the Project, including inventories, and needed reserves to prevent damage to the experiment by un-replenished depletions.
 - i. Agreement will be reached between the Parties as to the costs for acquisition of consumables, and for the logistics, schedule and costs for delivery of these materials to the Project site(s) in a separate agreement, as necessary.

ATTACHMENT VI--Physical Infrastructure

A. SDSTA will provide:

1. Adequate sanitary facilities as close as practical to the experimental areas:
 - i. Portable toilets are located in many locations according to need and availability.

B. The Collaboration will:

1. Provide SDSTA with a list of the anticipated instrumentation and equipment to be installed and the proposed location(s).
2. Provide SDSTA with a list of the amount of underground space required for the Project including the dimensions of caverns.
 - i. This list will cover the environmental requirements including depth, ventilation (special needs for hazard mitigation or emergency situations), power (voltage, current, consequences of power interruption), lighting, cleanliness, water.
3. Provide SDSTA with a list of requirements for communications and data-flow from underground, and for wider distribution, including bandwidth and specific hardware needs.
4. Develop their own strategies for reducing radon in the actual experimental enclosures to levels acceptable to the Project.
5. Provide an itemized list of special equipment required for conduct of Project, such as water purification, special cleanrooms, etc.

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1. The Parties agree that responsibilities and costs associated with operation and maintenance of these systems will be negotiated in a separate agreement.

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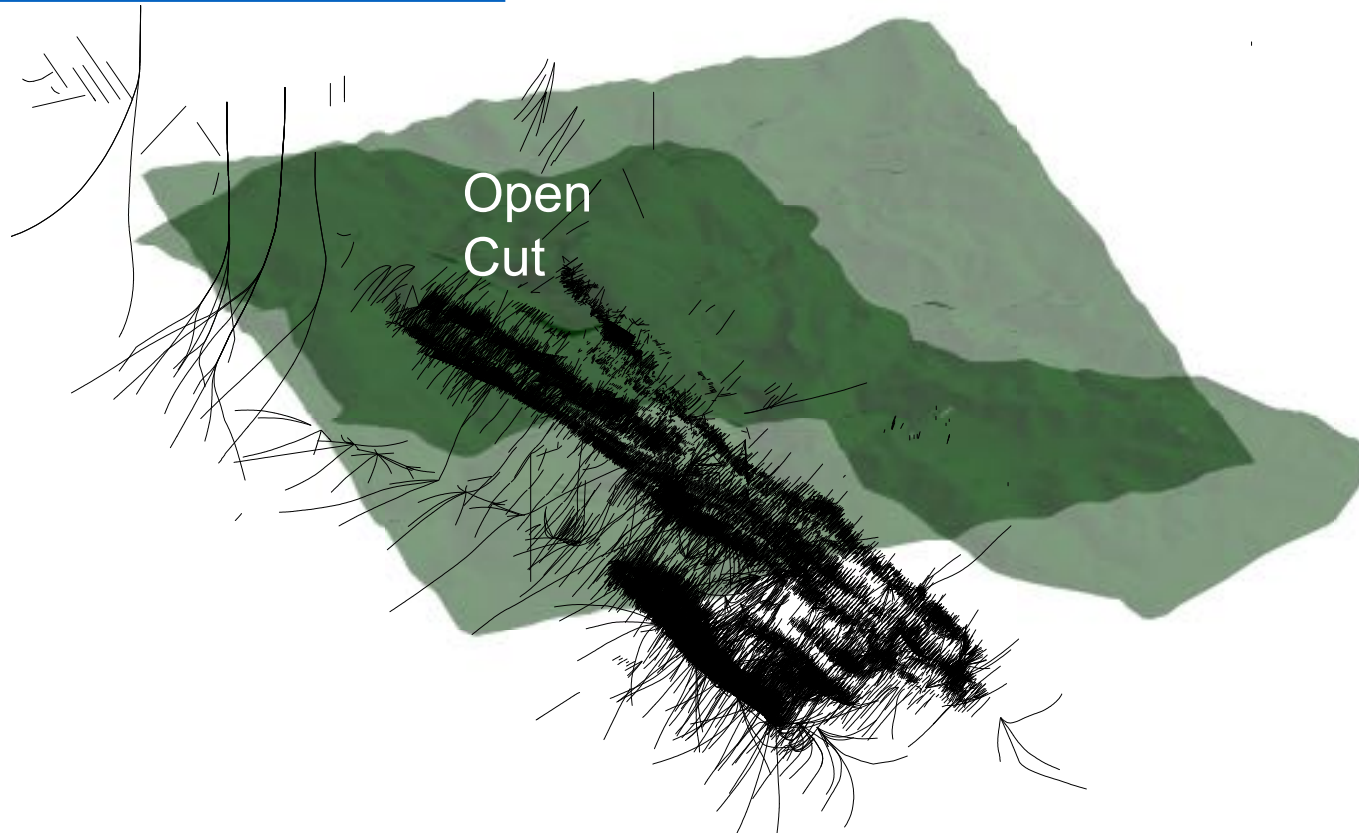
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SURF Science Opportunities – Drill Core

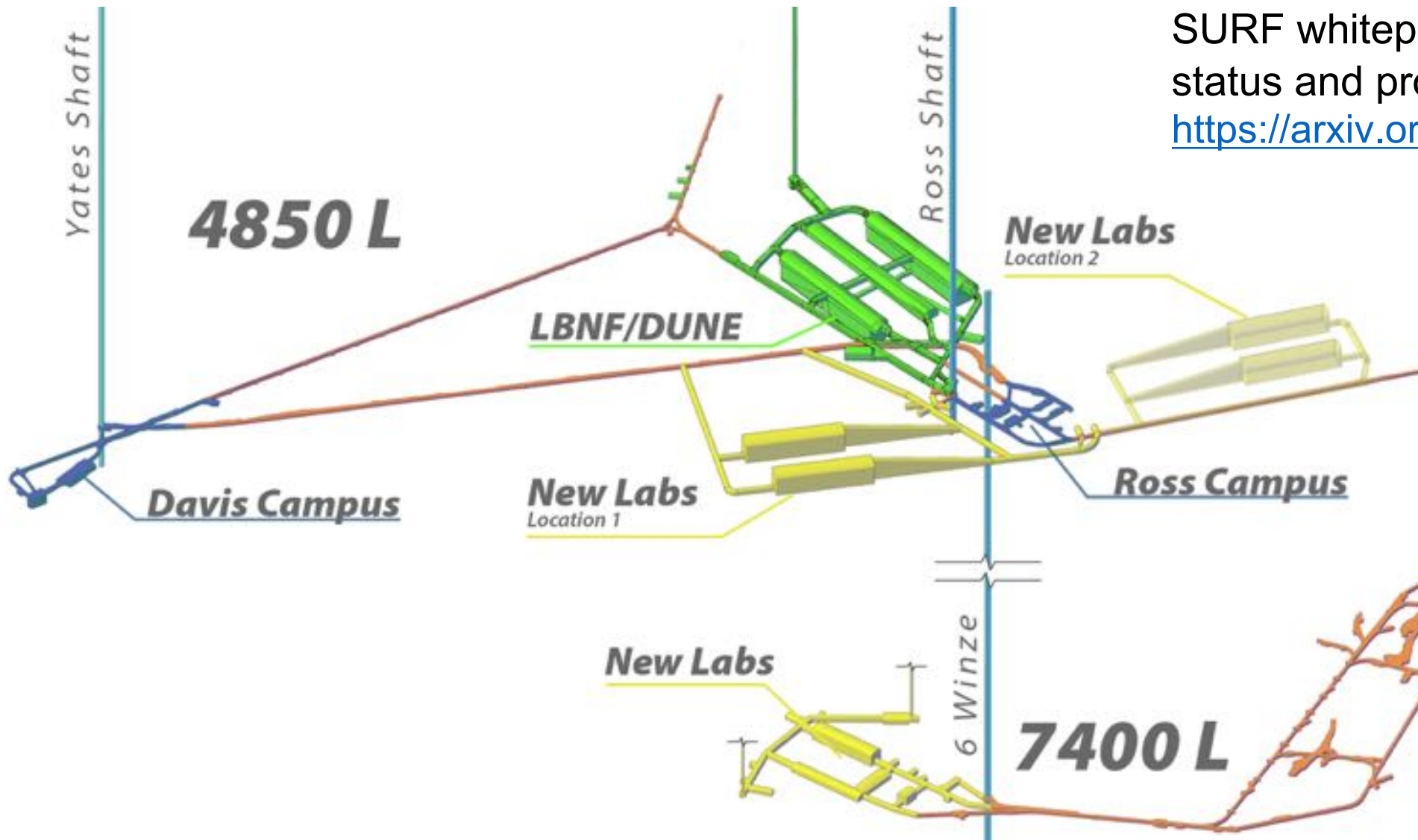
Core repository

- Total of 27,870 drill holes (+ others) on Homestake property
- Portion of core retained and donated to SDSTA: 39,760 boxes of core for 2,688 drill holes (91 km!), SDGS initial help with stewardship
- SDGS database with 58,000+ entries, representing 1,740 drill holes:
<http://cf.sddenr.net/homestake/>



SURF Current & Future Underground Facilities

Strategic plan incl additional 4850L labs + deeper access



SURF whitepaper describing current status and proposed future facilities:

<https://arxiv.org/abs/2203.08293>