**SURF Experiment Planning Statement**

An element of the SURF Experiment Implementation Program: <https://www.sanfordlab.org/researchers/proposal-guidelines>

**Title:** ***Project Name*** Submitted: **Feb 01, 2018**

1. **Project Summary:**

**Discipline:** [ ]  Biology [ ]  Chemistry [ ]  Engineering [ ]  Geology [ ]  Physics

Choose most applicable

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| **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. |
|  |
| **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. |
|  | [ ]  DOE: *Award No., duration* | [ ]  Institutional: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| [ ]  NSF: *Award No., duration* | [ ]  Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| [ ]  Pending Proposal(s): *Please add all relevant information.* |

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| **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 | [ ]  Yes [ ]  No |
|  | [ ]  Yes [ ]  No |
|  | [ ]  Yes [ ]  No |
|  | [ ]  Yes [ ]  No |

1. **Experiment Equipment:**

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| **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. |
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| **General Equipment / Hardware Description:**Provide a list of equipment, parts and tools required to perform activities at SURF. Include pictures, diagrams and manuals 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. 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, plastic, etc.)* |
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| **Electrical Equipment Description:**List electrical equipment and associated specifications. Equipment should be approved by a nationally-recognized testing lab (NRTL). **L**ow-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.)* |
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| 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 |  |  |
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| 5 |  |  |

1. **Experiment Area and Infrastructure Needs:**

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| **Location:**Indicate preferred project site(s) from the main accessible underground elevations (feet below surface) and SURF facilities listed below. |
| [ ]  300L | [ ]  2000L | [ ]  4850L [ ]  Davis Campus [ ]  Ross Campus [ ]  West Drift [ ]  17 Ledge (mainly biology) [ ]  Other: \_\_\_\_\_\_ | [ ]  Surface [ ]  Surface Lab [ ]  Core Archive [ ]  Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| [ ]  800L | [ ]  4100L |
| [ ]  1700L | [ ]  Other: \_\_\_\_\_\_ |
| **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: [ ]  N/A [ ]  Cold [ ]  Heated | [ ]  Office space requested |
| Staging: [ ]  N/A [ ]  Surface [ ]  UG | [ ]  Other: \_\_\_\_\_\_\_\_\_\_\_ |
| **Site Preparations:**Include any special project site requirements (some charges may apply). If necessary, add additional space to this template. |
|  | [ ]  No site preparations required | [ ]  Cost estimate requested |
| [ ]  Concrete (e.g. floor, pedestal, etc) | [ ]  Site / equipment enclosure |
| [ ]  Hoist | [ ]  Drilling (holes, mounting, etc) |
| [ ]  Water mgmt. (e.g. sump, pipe, filtration, etc) | [ ]  Ground support (e.g. rock bolts, mesh) |
| [ ]  Electrical / network | [ ]  Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |
| **Site Environment:**Indicate significant project sensitivities to various environmental parameters. If necessary, add additional space to this template. |
|  | [ ]  No significant environmental sensitivities |
| [ ]  Temperature | [ ]  Humidity |
| [ ]  Dust | [ ]  Pressure changes |
| [ ]  Vibration (e.g. drilling, blasting) | [ ]  Radiation (also radon) |

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| **Services:** List requirements. Include a description of any other facility support requested. Costs of providing some services may be passed on to the experiment. |
| [ ]  No Services Required | [ ]  Power*(provide detail in separate table below)* | [ ]  IT Services*(provide detail in separate table below)* |
| [ ]  Compressed Air*(detail pressure required)* | [ ]  Compressed Gases*(detail cylinder size, quantity and expected usage)* | [ ]  Cryogens*(detail vessel size, quantity and expected usage)* |
| [ ]  Water*(detail quantity and quality)* | [ ]  Other Services / Consumables*(list items and frequency)* |  |
| **Electrical Service:**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. |
|  | Electrical service: [ ]  No [ ]  Yes *(Note: SURF provides)* [ ]  120 V: # circuits: \_\_\_\_\_\_ # outlets: \_\_\_\_\_\_ at \_\_\_\_\_\_ amps [ ]  208 V: # circuits: \_\_\_\_\_\_ # outlets: \_\_\_\_\_\_ at \_\_\_\_\_\_ amps [ ]  480 V: # circuits: \_\_\_\_\_\_ # outlets: \_\_\_\_\_\_ at \_\_\_\_\_\_ amps |
| Other: *(Note: Expt provides)* Extensions cords: [ ]  No [ ]  Yes Quantity: \_\_\_\_\_\_\_\_\_ Power strips: [ ]  No [ ]  Yes Quantity: \_\_\_\_\_\_\_\_\_ UPS: [ ]  No [ ]  Yes Quantity: \_\_\_\_\_\_\_\_\_ |
| **Information Technology Service:**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. |
|  | Network service: [ ]  No [ ]  Yes *(Note: SURF provides)* Network type: [ ]  Wired, # ports \_\_\_\_\_ [ ]  Wireless, # connections \_\_\_\_\_ Network access: [ ]  Onsite [ ]  Offsite (requires VPN, static IP) Network minimum data transfer bandwidth: \_\_\_\_\_\_\_\_\_\_\_ Mbps |
| Computer resources: [ ]  No [ ]  Yes *(Note: Experiment provides)* Computer type: [ ]  Laptop, #\_\_\_\_\_\_ [ ]  Desktop/server, # \_\_\_\_\_\_ Computer location: [ ]  Expt site [ ]  Surface (e.g., IT Server Room) |
| Other service / resources: [ ]  Phone *(SURF provided)* [ ]  Timing *(Expt provided)* [ ]  Other: \_\_\_\_\_\_\_\_\_\_\_\_ |
| **Equipment Logistics:**Describe how materials will arrive at SURF and associated logistics for transportation and handling at SURF. Highlight large, heavy, or sensitive/high-value items from the equipment list in Section 1.Large items must be transported by SURF personnel via rail. There may be restrictions on the numbers of loads that can be moved underground on a given day. Note: The Yates South Cage has the following maximum dimensions: width = 54 3/4”, length = 151 3/8”, height = 101 1/2”; maximum load weight = 10,000 lbs (some options exist to lower items that exceed the nominal cage specifications). |
|  | Delivery to SURF: [ ]  Expt personnel [ ]  Mail / courier [ ]  Freight |
| Equipment Packaging: [ ]  Palletized [ ]  Crated (wood) [ ]  Boxed (cardboard) |
| Handling at SURF: [ ]  Forklift (surface and/or UG) [ ]  Rail transport (UG) [ ]  Dolly / cart / wagon (surface and/or UG)  [ ]  Staging for assembly / system checkout (surface and/or UG) [ ]  Hoisting required, max mass: \_\_\_\_\_\_\_\_\_ tons [ ]  Sensitive / high-value transport *(special form required)* [ ]  Other: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

1. **Hazards and Integrated Safety Management (ISM)**

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| **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. |
| [ ]  Fall exposures > 4 feet (> 6 feet construction)\* | [ ]  Working above others | [ ]  Ladder use | [ ]  Scaffold use | [ ]  Scaffold erection\* | [ ]  Confined space entry\* |
| [ ]  Heavy equipment operation (e.g. crane, excavator, etc.)\* | [ ]  Fork lift operations / powered industrial trucks\* | [ ]  Hoisting & rigging\* | [ ]  Boom lift operations | [ ]  Electrical equipment maintenance (if > 50 V may req. training) | [ ]  Lockout / tagout (LOTO) activities\* |
| [ ]  Rotating equipment | [ ]  High noise levels | [ ]  Waste generation (may req. training) | [ ]  Discharges to sanitary system | [ ]  Potential impact to storm water / UG water | [ ]  Potential spill to environment |
| [ ]  Air emissions (incl. equipment/generators) | [ ]  General demolition | [ ]  Trenching / excavation | [ ]  Excessive dust | [ ]  Potential silica exposure\* | [ ]  Potential asbestos exposure\* |
| [ ]  Chemical use (req. safety data sheet, may req. training) | [ ]  Pressurized air/fluids & compressed gases\* & vacuum | [ ]  Cryogens\* | [ ]  Potential oxygen deficiency (ODH)\* | [ ]  Lead (Pb) work\* | [ ]  Use of refrigerants (req. safety data sheet) |
| [ ]  Radiation – ionizing (incl exempt-quantity, may req. amendment)\* | [ ]  Radiation – nonionizing (e.g. lasers, RF)\* | [ ]  Biological hazards (e.g. animal/insect bites/stings, mold, etc.) | [ ]  Installation of power – temporary or permanent\* | [ ]  Welding / cutting / brazing (req. permit)\* | [ ]  Fire / explosion / extreme temperature (req. permit / fire watch)\* |
| [ ]  Ergonomics (lifting > 50 lbs, etc.) | [ ]  Soldering (permit not req.) | [ ]  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | [ ]  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | [ ]  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | [ ]  \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

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

1. **Personnel Access Requirements**

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| **Personnel Schedule:**List expected onsite experiment personnel as function of time and project phase, including maximum and minimum numbers. |
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| **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 5:30pm [Up]; options for evening shifts are also available: 3:45pm [Down], 11:45pm [Up] and 11:30pm [Down], 7:30am [Up]. UG access is 4 days per week (alternating Mon-Thu, Tue-Fri). Additional access guidelines may apply. |
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1. **Experiment Schedule**

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| **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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1. **Experiment Operations**

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| **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? |  | [ ]  |
| Ventilation | What if the laboratory temperature rose above or fell below the specified limits?  |  | [ ]  |
|  | What if the laboratory humidity rose above or fell below the specified limits? |  | [ ]  |
|  | What if the exhaust system went down?  |  | [ ]  |
| Water | What if purified water became unavailable? |  | [ ]  |
|  | What if chilled water became unavailable? |  | [ ]  |
|  | What if potable water became unavailable? |  | [ ]  |
|  | What if industrial water became unavailable? |  | [ ]  |
|  | What if the fire water system was triggered and fire water or mist water came in contact with your experiment? |  | [ ]  |
|  | What if fire water/mist water did not activate when needed? |  | [ ]  |
|  | What if there was a water pipe leak within the laboratory? |  | [ ]  |
| Water Inflows | What if the laboratory began filling with water because of a catastrophic water inflow (storm) event?  |  | [ ]  |
| Water | What if the waste water collection system inside the laboratory overflowed because pumps weren't working? |  | [ ]  |
| Compressed Air | What if the compressed air system provided by the facility became unavailable? |  | [ ]  |
| Power | What if normal power goes down? Would your experiment be damaged if it were down for an extended period of time? |  | [ ]  |
|  | What if standby power generators ran out of power, assuming normal power is still down?  (96 hours of standby is the requirement) |  | [ ]  |
| *Topic Area* | *What if…* | *Result / Consequences (List different scenarios if applicable)* | N/A |
| Power – cont. | What if power quality fluctuated outside of specified limits (voltage drop, harmonic distortion, power factor, etc.)? |  | [ ]  |
|  | What if the experiment-provided UPS fails? |  | [ ]  |
| Electromagnetic Interference (EMI) | What if EMI became unacceptable? |  | [ ]  |
| Cyberinfrastructure | What if connection to external data networks became unavailable? |  | [ ]  |
|  | What if network connections outside of the laboratory became disabled? |  | [ ]  |
|  | What if NTP were unavailable? |  | [ ]  |
| Transportation | What if material handling systems were unavailable (rail cars, cranes, etc.)? |  | [ ]  |
|  | What if material handling systems became disabled while in transport? (for example, cryogens in transport on rail cars) |  | [ ]  |
| FLS | What if an evacuation was conducted due to a hazardous event, such as fire? Describe situations where you would you keep the experiment running or shut it down? |  | [ ]  |
| Excavation | What if there was excessive disturbance of the experiment due to blasting and excavation activities nearby? |  | [ ]  |
|  | What if geotechnical repairs needed to be made to the rock structure above or near the experiment? |  | [ ]  |
| Other | What if…? *Name scenario critical to the experiment.* |  | [ ]  |

1. **Decommissioning Plan**

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| **Decommissioning Plan:**Provide initial details regarding how the experiment will be decommissioned. If necessary, add additional space to this template. |
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1. **SURF Review Section – to be completed by SURF personnel**

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| **Experiment Implementation Program Requirements:**Additional documentation requirements. |
| Required for All Experiments: [x]  Memorandum of Understanding (MOU) [x]  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: [x]  Procedure(s) (Job Hazard Analysis, Standard Operating Procedure, etc.)Minimum Training: [ ]  Orientation (surface and/or UG) [ ]  General Safety – Basic (and subsequent Annual Refresher Training (ART))Other Training: [ ]  SURF: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ [ ]  Non-SURF: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Inventories: [ ]  Chemicals [ ]  Electrical [ ]  Hoisting & Rigging [ ]  Pressure Vessels [ ]  Radioactive MaterialsESH Documents: [ ]  Expt Hazard Assessment [ ]  Quantitative [ ]  Quantitative [ ]  Quantitative Summary (EHAS), incl additional training Analysis – Mechanical Analysis – ODH Analysis – PressureReviews: [ ]  Walk-through Inspection(s) [ ]  Readiness Review(s) |
| **SURF Review**  |
| **SURF ENVIRONMENT, SAFETY & HEALTH** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Name | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Signature |
| **SURF ENGINEERING** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Name | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Signature |
| **SURF FACILITY INFRASTRUCTURE** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Name | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Signature |
| **SURF UNDERGROUND ACCESS** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Name | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Signature |
| **SURF SCIENCE** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Name | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Signature |
| **SURF Acceptance**  |
| **SURF LABORATORY DIRECTOR** | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Name | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Date | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_Signature |