Steward Observatory
Safety Committee Meeting

Room N305 October 9, 2018
9:00 AM – 11:00 AM

SOSC Semi-Annual Meeting
AGENDA

9:00 am  Welcome and Safety Update
          Dale Webb, SOSC Safety Manager
          Mark Buglewicz, Assistant Director, Business Services

9:20 am  Summary of Air Quality Update for Steward Observatory,
          Lorraine Santiago-Aguayo, Industrial Hygienist, Risk Management Services
          Building Update, Bruce Overland, Assistant Director and Chris Kopach
          Assistant VP, Facilities Management

9:35 am  Ongoing Safety Processes at DKIST
          Kerry Gonzales, Project Manager, Technical, Steward Observatory

10:00 am Safety Awareness – Know the Patterns and Behaviors of Bees
          Pat McCracken, Jr. HTS Bees

10:30 am Review of MMTO Incident/Lessons Learned
          John Di Miceli, Engineer, MMTO
Welcome & Updates

➢ Safety Program Accomplishment

➢ Safety Management System Update

➢ Safety Improvements in 2017

➢ Update on UA Risk Management Fleet Policy Amendment

➢ The Bike Yard (Mark Buglewicz)

SOSC Semi-Annual Meeting
Accomplishments

- Safety Program Results 2006 to 2017:
  - 312 Inspections
  - 1127 Infractions Fixed
  - 120 Monthly Safety Meetings
  - 400 Action Items Solved
Accomplishments

- **Safety Management System Update**
  - 2006  14 Osha Accidents  164 Lost days
  - 2007  13
  - 2008  8
  - 2009  4
  - 2010  8
  - 2011  8  33
  - 2012  7  10
  - 2013  6
  - 2014  4
  - 2015  4
  - 2016  3
  - 2017  4  18

SOSC Semi-Annual Meeting
Accomplishments

• Safety Improvements in 2017
  • .5 Meter Telescope (3)
  • 12 Meter (5)
  • ITL (2)
  • Kitt Peak (2)
  • LBTO (24)
  • MGIO (6)
  • Mirror Lab (2)
  • MMTO (4)
  • Bigelow (4)
  • Mt Lemmon (6)
  • Sunnyside (1)
  • OSC Optics (3)
  • SMT (1)
  • Steward Observatory (5)
  • VATT (3)
Fleet Policy Update

- Operating University Vehicles and Mobile Devices:
  - Cell phones, tablets, 2-way radios, laptop computers are prohibited
  - Must use hand free device
  - Must be allowed for jurisdiction in which vehicle is operated.
  - Mountain top exemptions for 2-way radio use

- Review the Updated Policy: [https://risk.arizona.edu/fleetsafetypolicy-3#section3_1](https://risk.arizona.edu/fleetsafetypolicy-3#section3_1)
The Bike Yard

High Theft Area

Reduce Risk

Higher Visibility

SOSC Semi-Annual Meeting
The Bike Yard

Project will provide a secure enclosure with safety fencing and controlled access gates.

SOSC Semi-annual Meeting
Air Quality & Building Summary

- Summary of Air Quality Update for Steward Observatory
  Lorraine Santiago-Aguayo,
  Industrial Hygienist, Risk Management Services

- Summary of Building Updates
  Bruce Overland & Chris Kopach, Facilities Management
DKIST

Daniel K. Inouye Solar Telescope

Ongoing Safety Processes

Kerry Gonzales

www.nso.edu

SOSC Semi-Annual Meeting
Safety Awareness
Know the Patterns and Behaviors of Bees

Pat McCracken, Jr. HTS Bees

Got Bees on UA Property?
Call 621-3000
Lessons Learned
Review of MMTO Incident
John Di Miceli, Engineer MMTO

SOSC Semi-Annual Meeting
<table>
<thead>
<tr>
<th>NAME</th>
<th>WORK GROUP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Karen Kenagy</td>
<td>REC Murray Lab</td>
</tr>
<tr>
<td>Jim Grantham</td>
<td>MT OPS</td>
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<tr>
<td>Dale A. Well</td>
<td>S0</td>
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<td>Linda Warren</td>
<td>ML</td>
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<td>Paul Gabor</td>
<td>Vatican Obs</td>
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<td>Carmen Otto</td>
<td>ETS</td>
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<td>Cory Knop</td>
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<td>Mark Berndt</td>
<td>S0/30/Dir</td>
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<td>Lorraine Santiago</td>
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<td>Mario Rascon</td>
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<td>ARO</td>
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<td>Mike Thomas</td>
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<td>Chris Kromea</td>
<td>FM</td>
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<td>Louis Roche</td>
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<td>Alan Strauss</td>
<td>MASC</td>
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<td>David Carroll</td>
<td>LBTO</td>
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<tr>
<td>TARAS GOLODA</td>
<td>EAT</td>
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<tr>
<td>Kerry Grunwald</td>
<td>ETS</td>
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<td>Steve M. Kittery</td>
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<td>Pat McCracken</td>
<td>HIS BEES</td>
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<tr>
<td>Matt Rademacher</td>
<td>Sound</td>
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<td>STEVE HOLLAND</td>
<td>VARS</td>
</tr>
<tr>
<td>Teresa Lappin</td>
<td>ITL</td>
</tr>
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</table>
Steward Observatory Safety Committee
April 10\textsuperscript{th}, 2018

Update on Indoor Air Quality Issues
Historic Review of IAQ Issues in Building 65

- History of sewer odors, chemical odors, reports of mold growth and occupants experiencing health problems in the building
- Steps taken to isolate and exhaust sewer odors and modify HVAC balance of mechanical rooms, and update HVAC exhaust in the machine shop
- IAQ Assessment by ATC Environmental Consultants
- Building Systems Assessment by GLHN
- FM Actions to Prevent Rainwater Intrusion
- HVAC Terminal Unit (Mixing Box) replacements
- Deep Cleaning and Analytical Testing in Targeted Areas – SWHC/WT
- Roof Repair, Cleaning, and Testing in the Annex – Bldg 64
Recent Actions

• Four quarterly environmental sampling events scheduled
• Testing performed by RMS, includes swabs and air samples, analysis by Quantitative Polymerase Chain Reaction (qPCR)
• Testing coupled with visual inspection to look for moisture problems
• Schedule intended to evaluate IAQ impacts from seasonal variations

• Q1 – June 28, 2017
• Q2 – October 12, 2017
• Q3 – February 21, 2018
• Q4 – July 2018
Interpreting Test Results

- qPCR analysis identifies individual mold species in samples
- Environmental Relative Moldiness Index (ERMI) – looks at a panel of 36 mold species which are typically found in mold-impacted buildings
- ERMI divides mold species into Groups I and II
  - Group I – 26 mold species commonly associated with water damage
  - Group 2 – 10 mold species common to indoor environments
- ERMI score is derived by comparing the logarithmic concentration difference in Group 1 and Group 2 mold species
- Scoring is only performed on surface swab samples, not air samples
- Score is being used as a screening tool to evaluate changes over time

<table>
<thead>
<tr>
<th>ERMI Score</th>
<th>Level or Risk</th>
<th>Likelihood of Mold Problem</th>
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</thead>
<tbody>
<tr>
<td>-10 to -4</td>
<td>Level 1</td>
<td>Lowest</td>
</tr>
<tr>
<td>-4 to 0</td>
<td>Level 2</td>
<td>Lower</td>
</tr>
<tr>
<td>0 to 5</td>
<td>Level 3</td>
<td>Moderate</td>
</tr>
<tr>
<td>5 to 20</td>
<td>Level 4</td>
<td>High</td>
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</table>
Q1 results

• Q1 – four species identified
  • Aureobasidium pollulans (Group 1)
  • Cladosporum sphareospermum (Group 1)
  • Aspergillus niger (Group 1)
  • Cladosporum cladosporioides I (Group 2)

• ERMI scores for surface swabs were 3.1, 2.6, 3.4, 0.8 for areas tested. Scores of 0-5 are Level 3 or moderate likelihood of mold issue

• Air sample results were generally low values and unremarkable

• Visual inspection identified some water damaged ceiling tiles, which were scheduled for replacement
Q2 results

• Q2 – nine species identified
  • Group 1 - Aureobasidium pollulans, Cladosporum sphærospernum,
    Aspergillus niger, Aspergillus flavus, Eurotium amstelodami, Aspergillus
    ochraceus, and Penicillium spinulosum
  • Group 2 – Cladosporum cladosporoides I, Cladosporum cladosporoides II
• ERMI scores for surface swabs were 10.6, 1.5, 4.8, 1.2, 12.3, -1.0, 6.2 for
  indoor areas tested. Increases likely attributable to monsoon moisture and
  higher humidity
• Air sample results were again generally unremarkable
• Visual inspection verified replacement of previously identified water
  damaged ceiling tiles. No leaks or new water damage noted
Q3 results

- Q3 – 11 species identified
  - Group 2 organisms identified: Cladosporum cladosporoides I, Cladosporum cladosporoides II, Alternaria Alternata, and Penicillium chrysogenum.

- ERMI scores for surface swabs were -2.0, 4.7, 0, -9.7, -0.9, **12.8**, -10.3, **1.3**, 2.3, -5.1, for indoor areas tested. Decreases in every area except for room 359 and 358 ceiling tile. The results for the outside swab was -7.5.

- Air sample results
  - Room N-134: Higher counts of Aureobasidium pollulans than outside.

- Visual inspection verified replacement of previously identified water damaged ceiling tiles. Some of them were not replaced, but they were immediately reported and action was taken.

- New leaks or missed stained ceiling tiles in rooms N-122, 364, and 360. They were investigated, taken care of and replaced.

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</table>
Q3 results: Focus/Problematic Areas

- Room 358 fallen ceiling tile with visible black patch and room 359 results presented higher results than Q2 and than the outdoors.
  - No sign of water intrusion, smell or other stained ceiling tiles
- Room 466/468/470 (new target area)
  - Room 468 was thoroughly cleaned when first reported
  - Sampled again
  - Lower Result than outside mold swab and lower result than when sampled in 2017
Remediation Efforts

• Room 358, 359 and 360
  • Mixing Boxes, ductwork, ceiling tiles were removed
  • All 3 rooms were deeply cleaned.
  • Mixing Boxes, ductwork and ceiling tiles were replaced
  • Sampled again to see how conditions changed
    • Performed air and swab sample to confirm.
Q4 Results

• Q4 – 8 species identified
  • Group 1 organisms identified: Aureobasidium pollulans, Cladosporum sphareospermum, Aspergillus niger, Wallemia sebi, Eurotium Amstelodami, Chaemotium globosum.
  • Group 2 organisms identified: Cladosporum cladosporoides I and Mucor racemosus.
  • ERMI scores for surface swabs were 4.9, 2.5, -1.9,-2.6, 3.6, 0.8, -2.7, 0, -1.8, 2.6, 5.3
  • Decreases in every area except for the 3rd floor hallway, and Room 470.
  • The results for the outside swab was 3.6 (higher than the 3rd round).

• Air sample results
  • We noticed a general decrease in the quantity of organisms found in this event when compared to the past events.
  • Aspergillus niger was found in air samples outside the building. Same species found in Room 470 in high quantities.

• Visual inspection verified replacement of previously identified water damaged ceiling tiles.

• Large amount of stained ceiling tiles in Room 168. Replaced
DEMO STARTE. NOTES:

1. INSTALL NEW WROUGHT IRON FENCING HERE, FENCING TO BE:
   - 2"x4" STEEL POSTS (HEIGHT WILL VARY, SEE ELEVATIONS).
   - 2"x2" STEEL HORIZONTAL SPANS.
   - 1x1" STEEL PICKETS SET @ 5" OC.

2. INSTALL NEW WROUGHT IRON DOOR HERE, DOOR TO BE:
   - 2x2" STEEL FRAMING.
   - 1x1" STEEL PICKETS SET @ 5" OC.
   - ADD HANDLE LEVER LOCKSET TO DOOR.
   - ADD WIRE MESH BLOCK AROUND DOOR HANDLE.
   - DOOR WILL BE 3'-0" WIDE.

EXISTING/New SITE PLAN

SCALE: 1/8" = 1'
WHAT TO DO IF YOU FIND BEES ON YOUR PROPERTY

1. STAY AWAY FROM ALL HONEY BEE SWARMS AND COLONIES.

2. GET AWAY FROM BEES AS QUICKLY AS POSSIBLE.

3. WHILE RUNNING AWAY PROTECT YOUR FACE AND EYES AS MUCH AS POSSIBLE.

4. TAKE SHELTER IN AN ENCLOSED AREA SUCH AS A CAR, TRUCK OR BUILDING.

5. CALL A LOCAL BEEKEEPER, PEST CONTROL COMPANY, OR LOCAL COOPERATIVE EXTENSION AGENT FOR ASSISTANCE.

6. DO NOT HIDE IN WATER OR THICK BRUSH.

7. DO NOT STAND STILL AND SWAT AT BEES; RAPID MOVEMENTS WILL CAUSE THEM TO STING.

WHAT TO DO IF STUNG

1. GET AWAY FROM BEES AS QUICKLY AS POSSIBLE. GO TO A SAFE AREA AWAY FROM THE BEES SUCH AS INSIDE A CAR, TRUCK OR BUILDING.

2. PULL OR SCRAPE STINGS FROM SKIN AS SOON AS POSSIBLE. MOST VENOM IS RELEASED WITHIN 1 MINUTE.

3. WASH STUNG AREAS WITH SOAP AND WATER LIKE ANY OTHER WOUND TO PREVENT INFECTION.

4. APPLY ICE TO RELIEVE PAIN AND SWELLING.

5. SEEK MEDICAL ATTENTION:
   - IF BREATHING IS DIFFICULT,
   - IF STUNG MANY TIMES, OR
   - IF ALLERGIC TO BEE STINGS.
BEE SAFE!

Protect yourself, your family, home and property from honey bees.

AFRICANIZED AND EUROPEAN HONEY BEES

Africanized honey bees are well established in the wild population of honey bees in Texas. The Africanized bee is a hybrid (mixture) of African and European honey bee subspecies. Both are not native to the Americas. As a hybrid the Africanized bee appears identical to European honey bees. Individual foraging European and Africanized bees are highly unlikely to sting. A swarm rarely stings people when in flight or temporarily at rest. However, established Africanized colonies are more highly defensive toward perceived predators than European colonies.

SIMILARITIES

- Look the same
- Protect their nests from predators by stinging

- An individual bee can sting only once and then dies
- Have the same kind of venom
- Pollinate flowers, produce honey and wax

AFRICANIZED BEES

- Respond quickly to disturbances by people and animals 50 feet or more from the nest.
- Sense vibrations from power equipment 100 feet or more from the nest.
- Sting in large numbers.
- Will chase an enemy up to a ¼ mile or more.
- Have a higher rate of reproduction (swarm more frequently).
- Nest in smaller cavities and sometimes underground (e.g. water meters and animal burrows).

POTENTIAL NESTING SITES

Bees will choose a nesting site in many places where people may disturb them. Nesting cavities may include: buckets, cans, empty boxes, old tires, or any container ranging in volume from as little as 2 to 10 gallons and more. Bees will also choose infrequently used vehicles,
lumber piles, holes and cavities in fences, trees, and the ground, in sheds, garages, and other outbuildings between walls or in the open, low decks or spaces under buildings. REMOVE POTENTIAL NEST SITES AROUND BUILDINGS.

Call an exterminator if you find bees on your property. Do not attempt to exterminate them yourself.

GENERAL PRECAUTIONS

- Listen for buzzing and look for bees entering or leaving the same area indicating a nest or swarm of bees.
- Carefully enter sheds and outbuildings where bees may nest.
- Examine work areas prior to using noisy power equipment such as lawn mowers, weed cutters, and chain saws.
- Examine areas for bees before tying up or penning pets and livestock.
- Watch for bees when outdoors.
- Never disturb a swarm or colony of bees – contact a pest control company or your local Cooperative Extension Agent.
- Teach children to be caution around and respectful to all bees.
- If you know you are allergic to bee stings check with your doctor about a sting kit.
- Have a bee safety plan in place for your family.

BEE PROOFING YOUR BUILDINGS AND YARD

- Remove potential nesting sites.
- Inspect outside walls and eves of your house and other buildings.
- Seal opening greater than 1/8-inch in walls, around chimneys, plumbing, and other openings.
- Install screens (1/8-inch hardware cloth) over rain spouts, vents, cavities of trees and fence posts, water meter/utility boxes, etc.
- From spring through the fall inspect once or twice per week for bee activity around your house and yard.

WHAT TO DO IF STUNG

1. GET AWAY FROM BEES AS QUICKLY AS POSSIBLE. GO TO A SAFE AREA AWAY FROM THE BEES SUCH AS INSIDE A CAR, TRUCK OR BUILDING.
2. PULL OR SCRAPE STINGS FROM SKIN AS SOON AS POSSIBLE. MOST VENOM IS RELEASE
Incident summary:
- On June 29th at approximately 10am, our Smithsonian instrument specialist Marc Lacasse was working around the loading dock finishing up filling liquid nitrogen dewars. At some point he fell (about 34") off the loading dock onto the steel plate of the lift below. At the time another Smithsonian staff member was working on the other end of the parking lot, heard the fall and asked for help over the radio. When I was notified I requested for 911 to be called and went out to the parking lot to find Marc lying on his back, unconscious. The Smithsonian employee, who was a former EMT was holding c-spine precautions and requesting help. The scene was checked for anything that could be dangerous, namely Dewar issues/safety concerns. During the scene size-up it was determined a rapid evacuation was required based on the lack of consciousness and severity of the injury. This was relayed to the person calling 911. An ambulance was put on route immediately but more information was needed to obtain a helicopter. Marc was examined, packaged on a backboard, put in a stokes basket, and transported to the ridge helipad. We were about a half mile from the ridge when the helicopter was heard entering the area. Marc was handed over to the flight crew and vital signs and a brief history were given to the crew from what information we knew as a group. We did not know about allergies or medications. As the helicopter was leaving we heard that the ambulance was about at km 10 which is halfway up the mountain and still 7 km away from the ridge.

Areas where we were lucky:
- Conditions were borderline for helicopter flight. If it was any hotter that day they would not have been able to fly. It would have taken significantly more time to rendezvous with the ambulance and get to the UMC trauma center.

- Someone was in the parking lot when the event occurred and heard the fall. It could have been much worse if nobody was there.

- Since it was an instrument change day there were many people on the summit including all of the currently trained first responders

- One of the MMT employees had a cousin on Tubac fire who he was able to communicate with to get the medevac team our weather information

Areas where things went well for us:
- We were able to rapidly assess the situation and get the required help. The patient arrived at UMC within a few minutes over an hour from when the incident initially occurred
- Due to our previous training and available equipment it was possible to safely package Marc and transport him to the ridge.

- Informal training and verbal planning in the past made decisions easier to make. Something as simple as spending a half hour in the parking lot testing which common vehicles our Stokes basket fit into allowed us to not have to figure it out during the incident.

- Having training beyond the standard first aid/CPR/AED for our remote location.

**Learned lessons and action items:**

- Modify the dewar filling procedure on MMT loading dock. Decrease the need to be standing near the edge of the loading dock during routine tasks.

- Modify instrument procedures so that no single person is in charge of a lengthy cooldown process with little to no rest.

- Begin collection of some voluntary medical information: Age, allergies, medications, pertinent medical history. This is to be kept as a paper copy, on site, in the supervisor's office.

- Upgrade the trauma bag and available equipment on site. Items to facilitate keeping a good airway, major bleeding control, and items to collect good vitals, within our scope of practice as well as a form to fill out to easily record vitals, and pertinent information (SOAP note). We've also added helicopter LZ PPE.

- Written plans for transport from various areas of the observatory to the ridge (main landing site), basecamp (secondary landing site) or somewhere in between (meeting an ambulance crew).

- Remember how to call 911 from our site. Call is routed to UA dispatch, inform them we are at the MMT observatory in the Santa Rita mountains and request to be transferred to Tubac fire/EMS.

- We now know what information if we think helicopter evacuation is required: Location, approximate elevation, current site temperature, approximate patient weight. Because of our remote location it is possible for one of us who do not have advanced medical certifications to make the rapid evacuation requests.

- Continued training for first responders on the summit to practice scene safety, patient assessment, leadership roles, and treatment plans.
Daniel K. Inouye Solar Telescope

Ongoing Safety Processes

Kerry Gonzales

www.nso.edu
Agenda

• Safety processes
  – Hazard assessments
  – Emergency preparedness
  – Ongoing safety

• Incidents

• Program development

DKIST SR 24-25 Oct 2017
## Hazard assessment

### Hazard identification and mitigation – MIL-STD-882D

<table>
<thead>
<tr>
<th>Subsystem: M1 Washing &amp; CO₂ Cleaning</th>
<th>Hazard Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subsys Item</strong></td>
<td><strong>Hazard</strong></td>
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<tr>
<td>Genie Z-45/25J</td>
<td>Exceeding weight limit of equipment</td>
</tr>
<tr>
<td>Genie Z-45/25J</td>
<td>Collision</td>
</tr>
<tr>
<td>Genie Z-45/25J</td>
<td>Collision</td>
</tr>
<tr>
<td>Genie Z-45/25J</td>
<td>Fall hazard</td>
</tr>
<tr>
<td>CO₂ wand system</td>
<td>Equipment damage</td>
</tr>
<tr>
<td>Wet wash system &amp; Genie</td>
<td>Damage to M1</td>
</tr>
<tr>
<td>Wet wash system &amp; Genie</td>
<td>Damage to equipment, e.g., GOS</td>
</tr>
<tr>
<td>CO₂ wand system</td>
<td>Personnel injury</td>
</tr>
<tr>
<td>CO₂ wand system</td>
<td>Personnel injury</td>
</tr>
<tr>
<td>CO₂ wand system</td>
<td>Personnel injury</td>
</tr>
</tbody>
</table>
Hazard Analysis Team (HAT)

- Platform lift doors automatic closure scenarios
- Global Interlock Controller reset and trap key use cases
- No night shift personnel during the operational phase
- Remote operations
- Coudé rotator hazardous area access
- Instrument cyro-cooler installation design
- White light, near infrared and UV exposure hazards
- Primary Mirror Stripping and Recoating

DKIST SR 24-25 Oct 2017
### JOB HAZARD ANALYSIS (JHA) FORM

For more details please see Job Hazard Analysis Guide.pdf - http://www.noao.edu/noaso/local/safety/

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<th>Title of Job or Task</th>
<th>Wiper Pulling</th>
<th>JHA Number</th>
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<tr>
<td>Date Completed</td>
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<td>Revision</td>
<td>New</td>
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<tr>
<td>Person Completing JHA</td>
<td>S. Shimko</td>
<td>Person(s) Assistance with this JHA</td>
<td>G. Candido</td>
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<tr>
<td>Location/Facility</td>
<td>DKIST</td>
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#### Recommended Personal Protective Equipment (PPE)

<table>
<thead>
<tr>
<th>PPE Category</th>
<th>Head Protection</th>
<th>Eye Protection</th>
<th>Hand and Body Protection</th>
<th>Fall Protection</th>
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<tr>
<td>Use</td>
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<td>X</td>
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</table>

#### Things to Consider

- Do employees know how to do the job?
- What are the hazards? Include people and equipment.
- How can hazards or accidents occur?
- How can injuries or accidents be prevented?
- Are there obvious unsafe conditions?
- Are special tools needed?
- Do people need personal protective equipment?
- How would we rescue people if something went wrong?
- Do we have the equipment to rescue?

#### Use these designations in the "Hazards Present" column:

- SB = Struck by
- CI = Caught in
- FB = Fall from a height
- CB = Contact By
- SA = Struck Against
- OA = Overexertion
- RE = Repetitive Motion
- E = Exposure to Chemicals, Noise, Vibration, Radiation

##### BASIC JOB STEPS

<table>
<thead>
<tr>
<th>STEPS</th>
<th>HAZARDS PRESENT IN EACH JOB STEP</th>
<th>CORRECT AND SAFE PROCEDURES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction site work</td>
<td>Construction hazards: struck by, caught in, caught between, contact with, fall to same level.</td>
<td>Construction site PPE, eye protection, head protection, foot protection, hi-vis. Attend PoD to know restricted areas and hazards.</td>
</tr>
<tr>
<td>Low voltage wire pull</td>
<td>Excess cable pulled into cabinets - tripping hazards.</td>
<td>Coil up, secure and/or run cable up and over decoy to get off of the floor and out of the way.</td>
</tr>
<tr>
<td>Stripping cable</td>
<td>Cut from knife slipping.</td>
<td>Wear properly fitting gloves andNever cut against your hand. Always slice with knife away from body. Use cable stripping tools when available.</td>
</tr>
<tr>
<td>Pulling through tunnel</td>
<td>Confined personnel in confined spaces.</td>
<td>Make sure all workers entering tunnel are properly trained and certified. Make sure all pre-entry procedures are followed.</td>
</tr>
<tr>
<td>Pulling rope or rigging in tunnel</td>
<td></td>
<td>Ensure ladder for entrance are stable and in good condition. Maintain these point contact while climbing. Never carry tools or materials while climbing, use ropes.</td>
</tr>
</tbody>
</table>

DKIST SR 24-25 Oct 2017
Emergency response

- Sustainment of equipment and protocols
- Developing rescue plans
- Procuring and training on rescue equipment
Emergency planning

- Maui Fire Department
  - Expanding our coordination to additional battalions and search and rescue
- Additional Medic crew visited during x-wide transport
  - 4 crews total
  - First aid, AED and CPR training
  - EMR training

DKIST SR 24-25 Oct 2017
Severe weather

- Lightning

When Thunder Roars, Go Indoors!

STOP all activities.
Seek shelter in a substantial building or hard-topped vehicle.
Wait 30 minutes after the storm to resume activities.

DKIST SR 24-25 Oct 2017
Ongoing safety processes

- POD – Plan of the Day
  - PoD Flow down notes in use by safety
  - Serial processing with each group
  - Stretch and bend

- Continuous improvement of safety processes
  - Daily / weekly / monthly - inspections
  - Safety Health Environment report log
  - DKIST Workgroup safety
    - Treat like “contractors”
    - FTS, Site and Buildings, TMA, IT&C, Cleaning
    - Change to new functional workgroups as needed

DKIST SR 24-25 Oct 2017
Plan of the Day

POD Flow Down Notes

- Changing workgroups
- Revised from lessons learned

DKIST Plan of the Day - Flow Down Notes

- Contractors / Supervision / Activities / Safety Issues / Permits
- DMW Cage, K. F. lift use.
- Lighting, conduit, electrical, and hanging panels.
- Safety issues / permits.

- Sun 23 Jan
- Cleaning, conduit, electrical, and hanging panels.
- DMW Cage, K. F. lift use.
- Lighting, conduit, electrical, and hanging panels.

- Other: Solar oil, batteries, and safety issues.

Restrict / Coord. / Conflicts / Change
- Telescope level
- Enclosure (improvement)
- Weather / Wind
- Deliveries / Tours
- Plan of the Day reminders

- Look Ahead
- Water tanker delivery
- Tuesday, 23 Jan
- Make sure equipment is secure to use.

- Lessons learned
- New workers / late worker / visitors / sign in
- 30yd. tank / horizontal control survey
- New tools / subcontractors up later
- Safety / Wind / Look ahead
- Improvement needed / thank you
- Stretch and Bend / OSHA workers

Kulia Ika Na’u

Day of week and date:

DKIST SR 24-25 Oct 2017
Daily-Weekly Reporting

DTKIST STS 24-25 Oct 2017

DKIST Weekly Safety and Health Report – 08/27/2017

Incident Types               No.  Notes
OSHA Recordable - Work Related Injury / Illness       0
OSHA – Days Away from Work / Restricted / Transferred (DART)  0
First Aid Incidents          0
Near Misses                  0
Property Damage              0
Spills                       0

Project Safety Activities
Safety Orientation Completed 3  DURST trap cleaner
Safety Tee Box / Activity Hazard Analysis / Similar Activities 1  Lightning
Safety Inspections / Observations Completed 5
Safety Recognitions          0
Disciplinary Actions         0
Medical, Fire and Other Emergencies 0
HOSI Visits                  0
HOSI Citations               0

Notes, Corrective Actions and Improvement Initiatives (name, status, estimated completion date)

DKIST, STS - Fall protection - Scaffolding - Daily inspection of scaffolding not completed. Worker counseled. Inspection requirement reiterated in the PoP - Corrected, closed
DKIST, Site and Buildings - Fire Prevention - Combustible material stored under stairway, materials removed. Stairway handrail requirements reiterated at PoP - Corrected, closed
DKIST, Site and Buildings - Fire prevention - Hot work - Performing hot work without permit. Worker counseled and permit requirement reiterated to all workers at PoP - Corrected, closed
DKIST, Site and Buildings - Fire prevention - Flammable materials - Empty flammable liquid cans discarded in rag bin. Returned proper disposal at PoP - Corrected, closed
DKIST, Site and Buildings - Equipment operation - Forklift - Forklift with forks left up, corrected on the spec. Requirement reiterated at PoP - Corrected, closed
DKIST, Site and Buildings - PPE - High visibility - Worker did not have PPE on, Corrected on spot - Closed
## DKIST Safety Report Log

<table>
<thead>
<tr>
<th>Date</th>
<th>Company / Group</th>
<th>Safety Category 1</th>
<th>Safety Category 2</th>
<th>Issue</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>8/17/2017</td>
<td>DKIST, FTS</td>
<td>Emergency</td>
<td>Egress</td>
<td>Exit door partially blocked, corrected. Requirement reiterated at PoD.</td>
<td>Corrected, closed</td>
</tr>
<tr>
<td>8/17/2017</td>
<td>DKIST, FTS</td>
<td>Scaffold</td>
<td></td>
<td>Scaffolding not inspected and tagged. Safety immediately inspected and properly tagged.</td>
<td>Corrected, closed</td>
</tr>
<tr>
<td>8/22/2017</td>
<td>DKIST, FTS</td>
<td>Fall protection</td>
<td>Scaffolding</td>
<td>Daily inspection of scaffolding not completed. Worker counseled. Inspection requirement reiterated at PoD.</td>
<td>Corrected, closed</td>
</tr>
<tr>
<td>8/22/2017</td>
<td>DKIST, Site and Buildings</td>
<td>Fire prevention</td>
<td></td>
<td>Combustible material stored under stairway, materials moved. Stair housekeeping requirement reiterated at PoD.</td>
<td>Corrected, closed</td>
</tr>
<tr>
<td>8/22/2017</td>
<td>DKIST, Site and Buildings</td>
<td>Fire prevention</td>
<td>Hot work</td>
<td>Performing hot work without permit. Worker counseled and hot work permits requirement reiterated to all workers at PoD</td>
<td>Corrected, closed</td>
</tr>
<tr>
<td>8/22/2017</td>
<td>DKIST, TMA</td>
<td>Tools</td>
<td></td>
<td>Drill press not secured to base.</td>
<td>Corrected, closed</td>
</tr>
<tr>
<td>8/22/2017</td>
<td>Site wide</td>
<td>Safety training</td>
<td>Toolbox talk</td>
<td>Lightning safety</td>
<td>Corrected, closed</td>
</tr>
<tr>
<td>8/23/2017</td>
<td>DKIST, Site and Buildings</td>
<td>Fire prevention</td>
<td>Flammable materials</td>
<td>Empty flammable liquid cans discarded in rag bin. Reiterated proper disposal at PoD.</td>
<td>Corrected, closed</td>
</tr>
<tr>
<td>8/25/2017</td>
<td>DKIST, Site and Buildings</td>
<td>Equipment operation</td>
<td>Forklift</td>
<td>Forklift left with forks up, corrected on the spot. Requirement reiterated at PoD.</td>
<td>Corrected, closed</td>
</tr>
<tr>
<td>8/25/2017</td>
<td>DKIST, Site and Buildings</td>
<td>PPE</td>
<td>High visibility</td>
<td>Worker did not have hi-viz on. Corrected on spot.</td>
<td>Corrected, closed</td>
</tr>
<tr>
<td>8/28/2017</td>
<td>DKIST, FTS</td>
<td>Fall protection</td>
<td>Scaffolding</td>
<td>Wrong type of inspection tag used on incomplete scaffold. Corrected on the spot. Requirement reiterated at PoD.</td>
<td>Corrected, closed</td>
</tr>
<tr>
<td>8/28/2017</td>
<td>DKIST, FTS</td>
<td>Fall protection</td>
<td></td>
<td>Fall hazard not barricaded or marked and hazard creation not communicated clearly in the PoD. Corrected on the spot. Requirements to be reiterated at PoD.</td>
<td>open</td>
</tr>
</tbody>
</table>

DKIST SR 24-25 Oct 2017
Monthly Checklist

- Includes all supply and work area inspections
- Transition to maintenance tasks
- Continuing into operations phase
Incidents (first aid and recordable) by “review year”

- Altitude related
- Tool cut
- Debris in eye
- Struck by/Caught
- Slip/Trip
- Strained
- Infection

DKIST SR 24-25 Oct 2017
Incident review

- Improvements needed
  - Fall protection
    - Improved, needs constant vigilance
  - PPE use consistency
    - Improved, needs constant vigilance
  - Equipment inspections
  - Supervisor modeling and enforcing safe behavior
    - Needs sustainment
- Good practices
  - Tool box talks, stretch and bend, fatigue monitoring

DKIST SR 24-25 Oct 2017
Leading indicators

- 26 worker Safety Recognition awards
- 48 tool box training events
- 69 workers received safety training
  - Safety and Environmental, New employee site safety, First aid/AED/CPR

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety Recognition awards</td>
<td>26</td>
<td>29</td>
<td>45</td>
</tr>
<tr>
<td>Tool box training events</td>
<td>48</td>
<td>53</td>
<td>48</td>
</tr>
<tr>
<td>Worker Safety training</td>
<td>69</td>
<td>86</td>
<td>78</td>
</tr>
</tbody>
</table>

DKIST SR 24-25 Oct 2017
Safety Program Development

- Lockout Tagout (LOTO) Policy SAF-0009
- General Safety and Laboratory Policies SAF-0013
  - Visiting scientist and engineer (VSE) safety guidelines and checklist
- General Shop, Industrial Trucks, Aerial Lifts and Lifting Equipment Safety Program SAF-0015
- Confined Space program SAF-0004 and training materials
  - Utility tunnel entry log and new confined spaces
- Hazardous Material and Hazardous Waste Management Program, SPEC-0035

DKIST SR 24-25 Oct 2017
New confined spaces

14.3 Appendix 3: Confined Space Locations DKIST

Confined Space Entry Safety Program
New training

- Certified aerial lift and rough terrain forklift train the trainer
- Overhead crane operator, qualified rigger
- Qualified Electrical Worker (QEW) program and training
- Respiratory evaluation and training

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