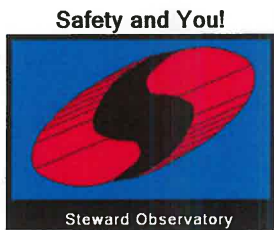


# **Steward Observatory Safety Committee Meeting**

**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**

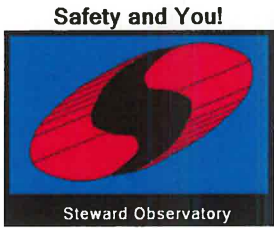
*Kerry Gonzales, Project Manager, Technical, Steward Observatory*

**10:00 am Safety Awareness – Know the Patterns and Behaviors of Bees**

*Pat McCracken, Jr. HTS Bees*

**10:30 am Review of MMT0 Incident/Lessons Learned**

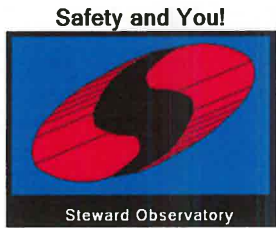
*John Di Miceli, Engineer, MMT0*



# 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)

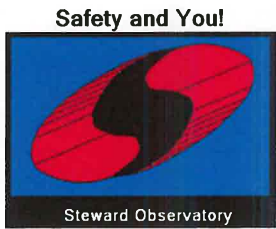


# Accomplishments



- **Safety Program Results 2006 to 2017:**

- 312 Inspections
- 1127 Infractions Fixed
- 120 Monthly Safety Meetings
- 400 Action Items Solved

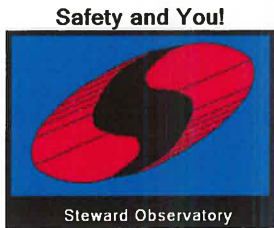


# Accomplishments



## • Safety Management System Update

• 2006	14 Osha Accidents	164 Lost days
• 2007	13	7
• 2008	8	0
• 2009	4	0
• 2010	8	6
• 2011	8	33
• 2012	7	10
• 2013	6	0
• 2014	4	0
• 2015	4	0
• 2016	3	0
• 2017	4	18

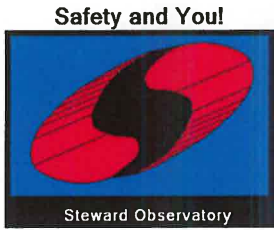


# Accomplishments



## • **Safety Improvements in 2017**

- .5 Meter Telescope (3)
- 12 Meter (5)
- ITL (2)
- Kitt Peak (2)
- LBTO (24)
- MGIO (6)
- Mirror Lab (2)
- MMT0 (4)
- Bigelow (4)
- Mt Lemmon (6)
- Sunnyside (1)
- OSC Optics (3)
- SMT (1)
- Steward Observatory (5)
- VATT (3)

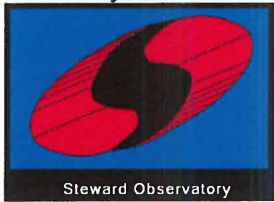


# Fleet Policy Update

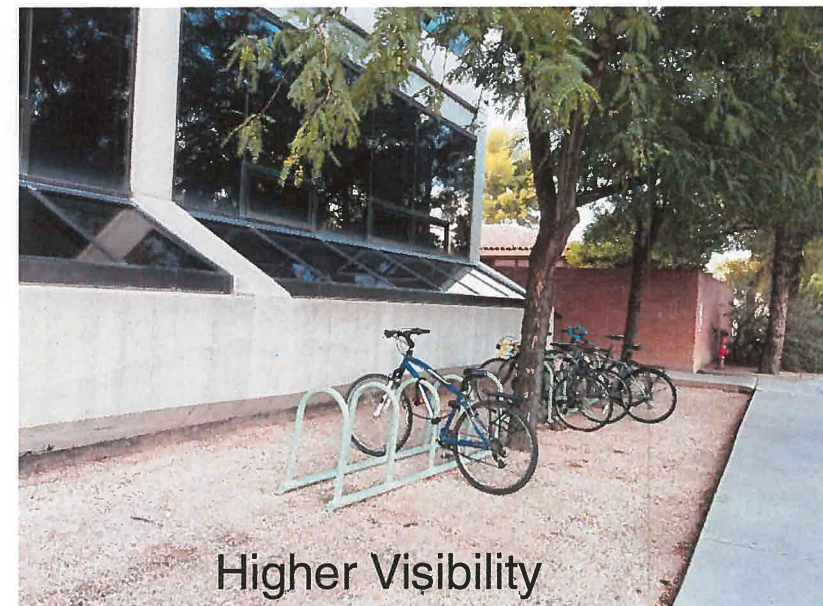
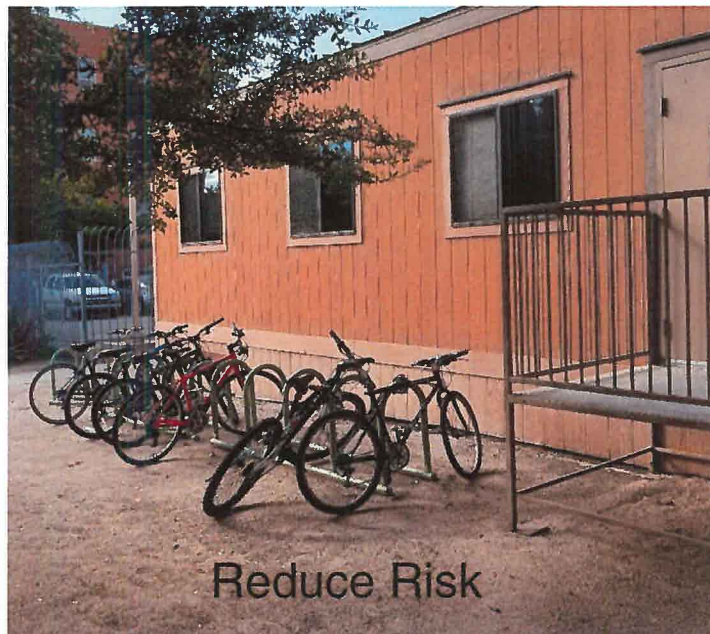


- **Operating University Vehicles and Mobile Devices:**
  - Cell phones, tablets, 2-way radios, laptop computers are prohibited
  - Must use hand free device
  - Must be allowed for jurisdiction in which vehicle is operated.
  - Mountain top exemptions for 2-way radio use
- **Review the Updated Policy:**  
[https://risk.arizona.edu/fleetsafetypolicy-3#section3\\_1](https://risk.arizona.edu/fleetsafetypolicy-3#section3_1)



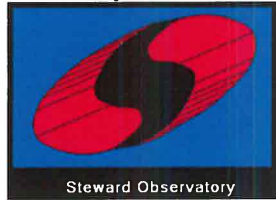


# The Bike Yard



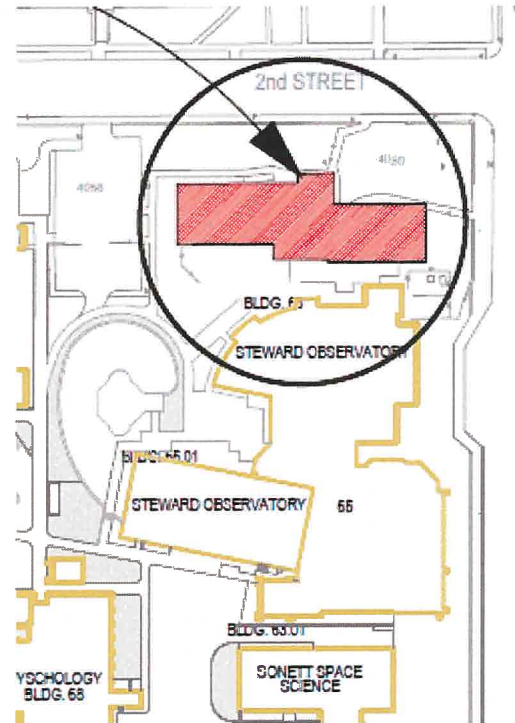


Safety and You!



# The Bike Yard

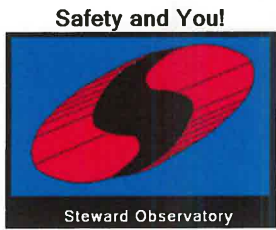
THE UNIVERSITY OF  
**ARIZONA**  
TUCSON ARIZONA



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



SOSC Semi-annual Meeting



# Air Quality & Building Summary



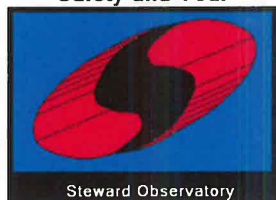
- **Summary of Air Quality Update for Steward Observatory**

*Lorraine Santiago-Aguayo,  
Industrial Hygienist, Risk Management Services*

- **Summary of Building Updates**

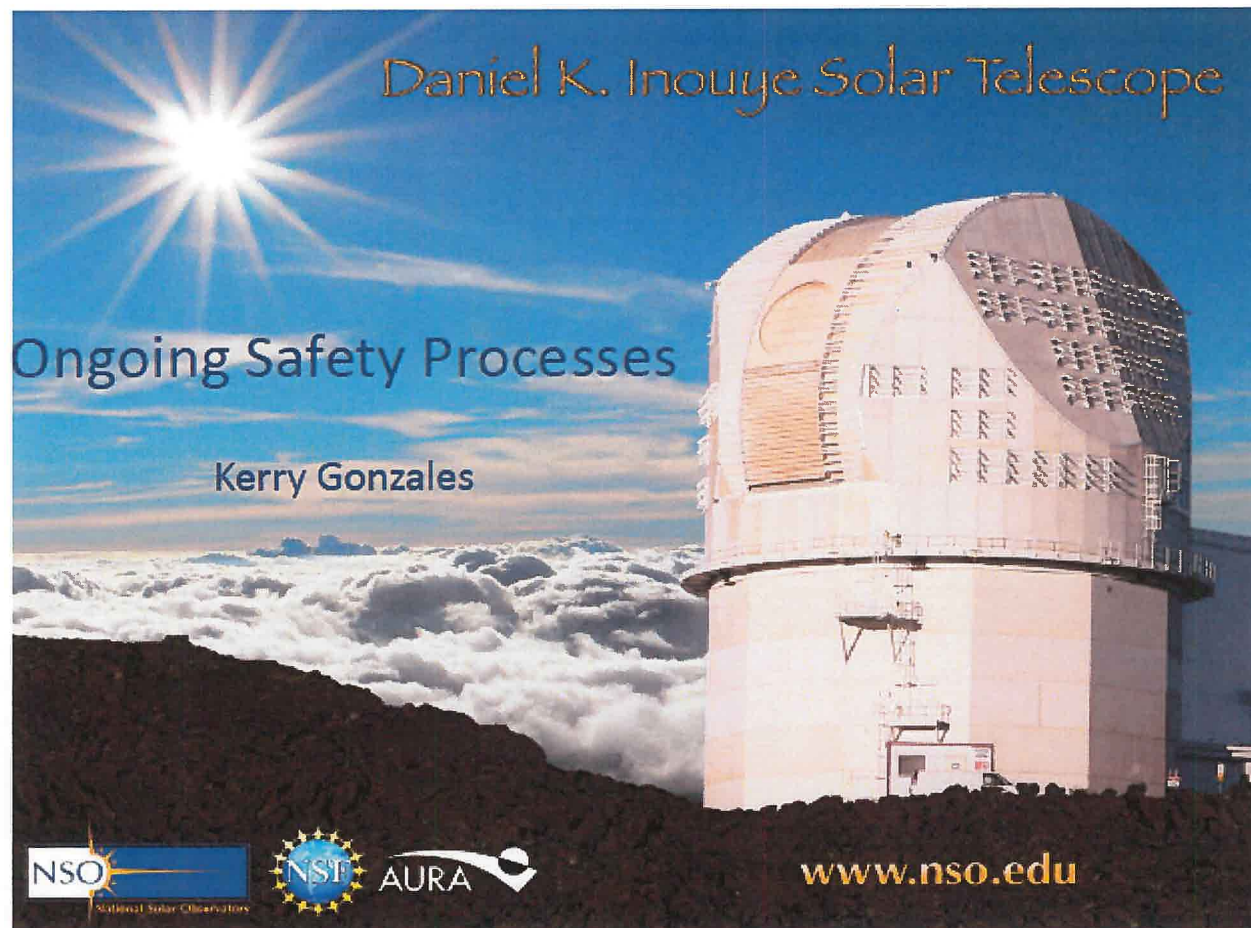
*Bruce Overland & Chris Kopach, Facilities  
Management*

Safety and You!



# DKIST

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**ARIZONA**  
TUCSON ARIZONA



Daniel K. Inouye Solar Telescope

Ongoing Safety Processes

Kerry Gonzales

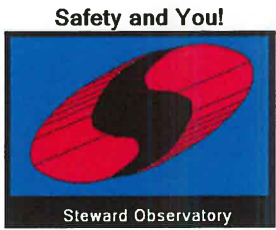
NSO National Solar Observatories

NSF AURA

[www.nso.edu](http://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



SOSC Semi-Annual Meeting

Safety and You!



# Lessons Learned

## Review of MMTO Incident

THE UNIVERSITY OF  
**ARIZONA**  
TUCSON ARIZONA

John Di Miceli, Engineer MMTO



Photo Emmalee Mauldin 4/4/2017

SOSC Semi-Annual Meeting

# STEWART OBSERVATORY SAFETY COMMITTEE

October 10, 2018  
ATTENDANCE SHEET

NAME	WORK GROUP
Karen Kenagy	RFC Mirror Lab
Jim GRANTHAM	MT OPS
Dale A. Webb	SD
Linda Warren	ML.
Paul Gabor	Vatican Obs
Carmen Otero	ETS
Cory Knop	MMT
John DiMiceli	MMT
MARIL BUBOWITZ	SOBO/Dir
Lorraine Santiago	PMS
MARIO RASCON	ETS
Alyson Ford	ARO
Frank S. Gacon	ETS
Jeff Uhl	ML
Paul January	Director's Office
✓	ETS
BRUCE M. OVERLAND	FM
Chris Kopach	FM
Leus Rocha	FM.
ALAN STRAUSS	MLSC
Dan Carroll	LBT0



# October 10, 2018 ATTENDANCE SHEET

**October 10, 2018**

## ATTENDANCE SHEET

ITL

Steward Observatory Safety Committee  
April 10<sup>th</sup> , 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

ERMI Score	Level or Risk	Likelihood of Mold Problem
-10 to -4	Level 1	Lowest
-4 to 0	Level 2	Lower
0 to 5	Level 3	Moderate
5 to 20	Level 4	High

## Q1 results

- Q1 – four species identified
  - Aureobasidium pollulans (Group 1)
  - Cladosporium sphareospermum (Group 1)
  - Aspergillus niger (Group 1)
  - Cladosporium 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*, *Cladosporium sphareospermum*, *Aspergillus niger*, *Aspergillus flavus*, *Eurotium amstelodami*, *Aspergillus ochraceus*, and *Penicillium spinulosum*
  - Group 2 – *Cladosporium cladosporoides* I, *Cladosporium 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 1 organisms identified: *Aureobasidium pollulans*, *Cladosporium sphareospermum*, *Aspergillus niger*, *Aspergillus fumigatus*, *Aspergillus versicolor* and *Aspergillus penicilloides*.
  - Group 2 organisms identified: *Cladosporium cladosporoides* I, *Cladosporium 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.

ERMI Score	Level or Risk	Likelihood of Mold Problem
-10 to -4	Level 1	Lowest
-4 to 0	Level 2	Lower
0 to 5	Level 3	Moderate
5 to 20	Level 4	High

### Q3 results: Focus/Problematic Areas

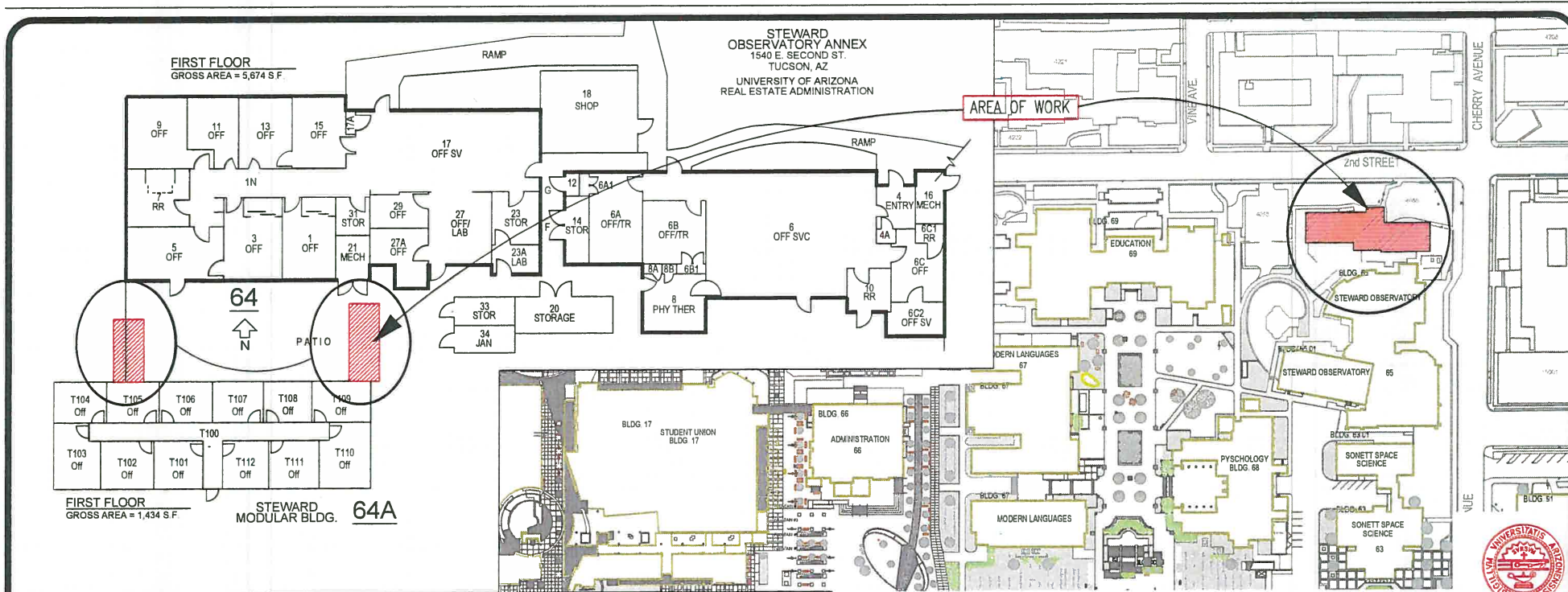
- Room 358 fallen ceiling tile with visible black patch and room 359 results presented higher results than Q2 and than the outdoors.
  - No sign of water intrusion, smell or other stained ceiling tiles
- Room 466/468/470 (new target area)
  - Room 468 was thoroughly cleaned when first reported
  - Sampled 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*, *Cladosporium sphareospermum*, *Aspergillus niger*, *Wallemia sebi*, *Eurotium Amstelodami*, *Chaemotium globosum*.
  - Group 2 organisms identified: *Cladosporium 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 3<sup>rd</sup> floor hallway, and Room 470.
  - The results for the outside swab was 3.6 (higher than the 3<sup>rd</sup> 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



DISABILITY RESOURCE CENTER-APPROVAL

PLANNING DESIGN & CONSTRUCTION-APPROVAL

**CODES:**

\*ALL WORK SHALL BE IN COMPLIANCE WITH THE FOLLOWING CODES AND STANDARDS:  
 2012 INTERNATIONAL FIRE CODE  
 2012 INTERNATIONAL BUILDING CODE  
 2012 INTERNATIONAL MECHANICAL CODE  
 2012 INTERNATIONAL PLUMBING CODE  
 2012 INTERNATIONAL FUEL GAS CODE  
 2011 NATIONAL ELECTRICAL CODE (NFPA 70)

OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS 29 CFR 1910, 1919.146 CONFINED SPACES STANDARD 1926.

ACCESSIBILITY GUIDELINES--IN ADDITION TO ANY REQUIREMENTS IN THE ABOVE LISTED CODES:  
 GOVERNING REGULATION: DEPARTMENT OF JUSTICE'S TITLE 2 REGULATION 28 CFR PART 35 AND TITLE 3 REGULATION 28 CFR PART 36.

AMERICAN WITH DISABILITIES ACT & ARCHITECTURAL BARRIERS ACT ACCESSIBILITY GUIDELINES DATED JULY 23, 2004 BY THE UNITED STATES ACCESS BOARD.

UNIVERSITY OF ARIZONA DESIGN & SPECIFICATIONS STANDARDS

AND WORK SHALL NOT BE IN VIOLATION OF ANY FEDERAL OR STATE LAW OR STATUTE."

**SHEET INDEX:**

SH. 1 - GENERAL INFO/CODES  
 SH. 2 - EXISTING/NEW SITE PLAN  
 SH. 3 - ELEVATION/DETAILS

TOTAL BLDG. SQUARE FOOTAGE: 5,674 SF  
 TOTAL FLOOR AREA SQUARE FOOTAGE: 5,674 SF  
 TOTAL WORK CONSTRUCTION AREA SQUARE FOOTAGE: 100 SF

**OWNER:**

THE UNIVERSITY OF ARIZONA  
 ARIZONA BOARD OF REGENTS  
 2020 N. CENTRAL AVENUE  
 PHOENIX, AZ. 85004-4593  
 PHONE 602-229-2500

UOFA RISK MANAGEMENT SERVICES  
 FIRE MARSHAL STAMP OF APPROVAL

**GENERAL INFO & CODES**

THE UNIVERSITY OF ARIZONA-TUCSON, AZ.  
 STEWARD OBSERVATORY ANNEX BLDG. 64  
 1540 E 2ND STREET. INSTALL 3 NEW  
 MAN GATES WITHIN BLDG. HALL COMPLEX  
 ONE ON THE NORTH, ONE SOUTH, AND  
 ONE SOUTHWEST.

UOFA FACILITIES MGMT. RENOVATION SVCS.  
 1610 N. VINE AVENUE TUCSON, AZ.  
 (520)626-3002(OFFICE), 621-2912(FAX)  
 DRAWN BY R.G.

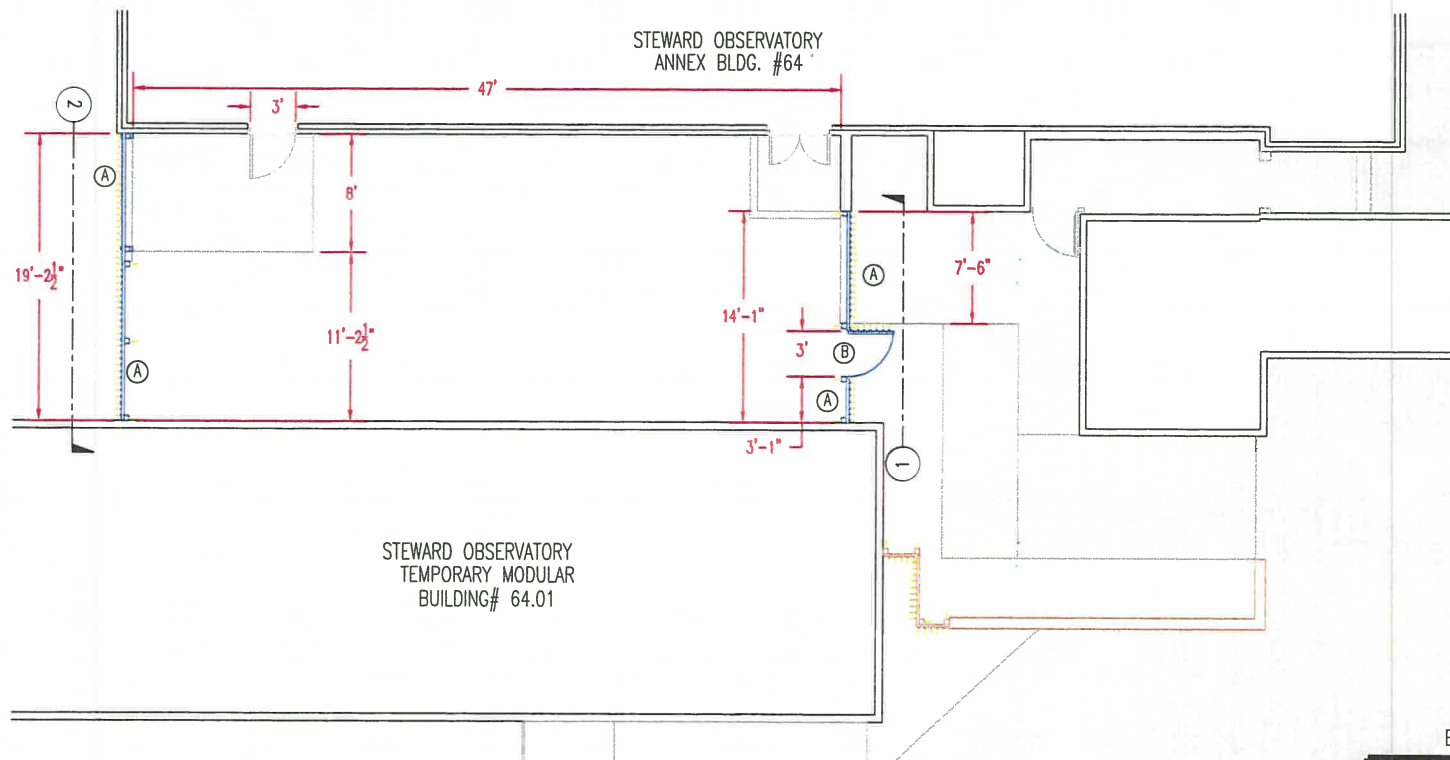
JOB# 29679

DATE: 06/26/2018

SCALE: NOT TO SCALE

1  
 1 OF 3





# DEMOLITION NOTES:

- (A) INSTALL NEW WROUGHT IRON FENCING HERE, FENCING TO BE:
- 4"x4" STEEL POSTS(HEIGHT WILL VARY, SEE ELEVATIONS)...
  - 2"x2" STEEL HORIZONTAL SPANS...
  - 1"x1" STEEL PICKETS SET @5"O.C...
- (B) INSTALL NEW WROUGHT IRON DOOR HERE, DOOR TO BE:
- 2"x2" STEEL FRAMING...
  - 1"x1" STEEL PICKETS SET @5"O.C...
  - 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'



EXISTING/NEW SITE PLAN

THE UNIVERSITY OF ARIZONA-TUCSON, AZ.  
STEWARD OBSERVATORY ANNEX BLDG. 64  
1540 E 2ND STREET. INSTALL 3 NEW  
MAN GATES WITHIN BLDG. HALL COMPLEX  
ONE ON THE NORTH, ONE SOUTH, AND  
ONE SOUTHWEST.

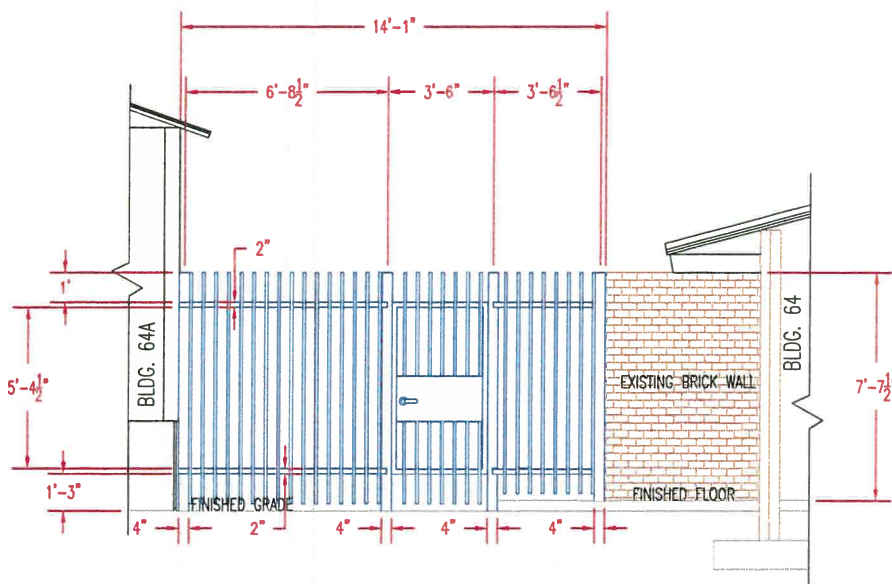
UOFA FACILITIES MGMT. RENOVATION SVCS.  
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DRAWN BY R.G.

JOB# 29679

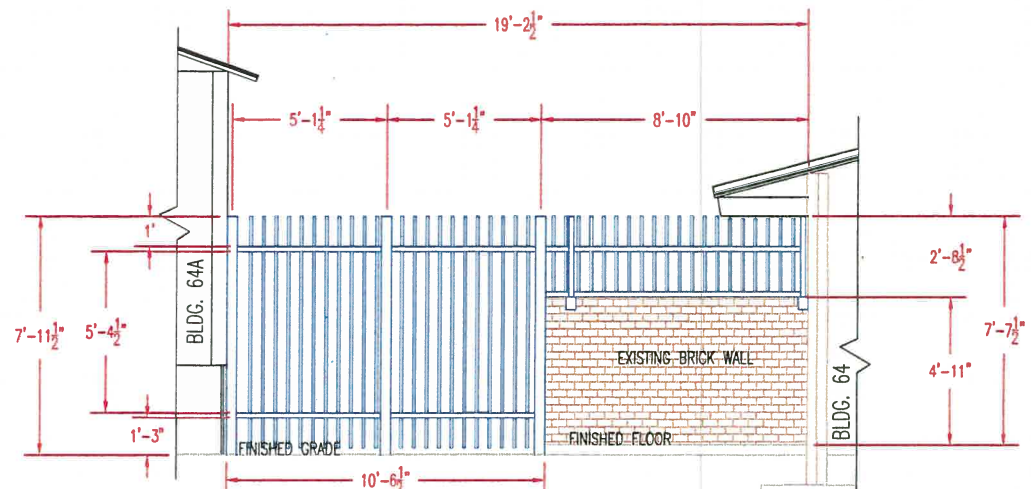
DATE: 06/26/2018

SCALE: 1/8" = 1'

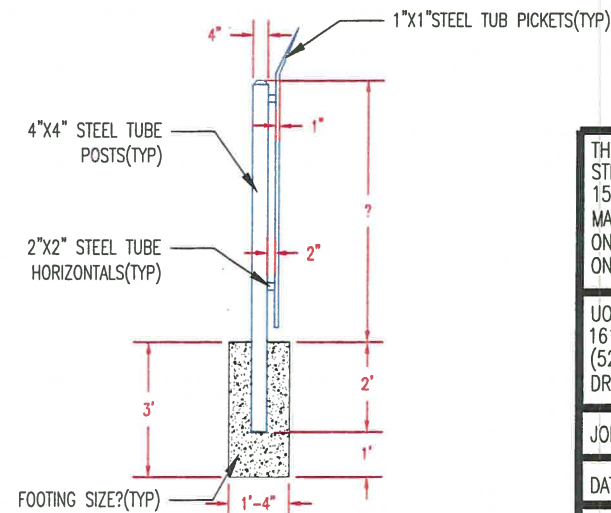
2  
2 OF 3



① ELEVATION LOOKING WEST  
SCALE: 1/4" = 1'



② ELEVATION LOOKING WEST  
SCALE: 1/4" = 1'



#### ELEVATIONS/DETAILS

THE UNIVERSITY OF ARIZONA-TUCSON, AZ.  
STEWART OBSERVATORY ANNEX BLDG. 64  
1540 E 2ND STREET. INSTALL 3 NEW  
MAN GATES WITHIN BLDG. HALL COMPLEX  
ONE ON THE NORTH, ONE SOUTH, AND  
ONE SOUTHWEST.

UOFA FACILITIES MGMT. RENOVATION SVCS.  
1610 N. VINE AVENUE TUCSON, AZ.  
(520)626-3002(OFFICE), 621-2912(FAX)  
DRAWN BY R.G.

JOB# 29679

DATE: 06/26/2018

SCALE: VARIES SEE PLAN

3

3 OF 3

Print this guide and keep it on your fridge.

## BEE SAFE QUICK GUIDE

### 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.

[BACK TO HONEYBEE.TAMU.EDU](http://BACK.TO.HONEYBEE.TAMU.EDU)



PRINT THIS LIST [PDF]

## 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 1/4 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 eaves 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 YOU FIND BEES ON YOUR PROPERTY**

- STAY AWAY FROM ALL HONEY BEE SWARMS AND COLONIES.
- GET AWAY FROM BEES

**AS QUICKLY AS POSSIBLE.**

- **WHILE RUNNING AWAY PROTECT YOUR FACE AND EYES AS MUCH AS POSSIBLE.**
- **TAKE SHELTER IN AN ENCLOSED AREA SUCH AS A CAR, TRUCK OR BUILDING.**
- **CALL A LOCAL BEEKEEPER, PEST CONTROL COMPANY, OR LOCAL COOPERATIVE EXTENSION AGENT FOR ASSISTANCE.**
- **DO NOT HIDE IN WATER OR THICK BRUSH.**
- **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 RELEASE**

MMT Summer Medical Incident Discussion  
Steward Safety Meeting  
John Di Miceli 10/9/18

**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

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**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 supervisors 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 someplace 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 rolls, and treatment plans

# Daniel K. Inouye Solar Telescope

## Ongoing Safety Processes

Kerry Gonzales



[www.nso.edu](http://www.nso.edu)

# Agenda

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- Safety processes
  - Hazard assessments
  - Emergency preparedness
  - Ongoing safety
- Incidents
- Program development



# Hazard assessment

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

Subsystem: M1 Washing & CO <sub>2</sub> Cleaning						Hazard Analysis						
No.	System Item	Hazard	Causes	Effects	Phase(s)	Risk MIL-STD-882D			ANSI_RIA_R15.06-1999 (R2009) Prior to safeguard selection			
						IMRI	Value	Cat.	Severity S1 or S2	Exposure E1 or E2	Avoidance (Speed) (Blind Spots) (Environment) A1 or A2	Risk Category \$9.5
1	Genie Z-45/25J	Exceeding weight limit of equipment	Two workers and a CO <sub>2</sub> tank is heavier than 440 lbs. (with aircraft protection package)	Damage to telescope Structure and the Genie.	IT&C, MAINT	3-C	11	Med.				Training, or the tel
2	Genie Z-45/25J	Collision	Running Genie into telescope	Damage to telescope Structure and the Genie.	IT&C,	3-A	7	Ser.				Training, specific c
3	Genie Z-45/25J	Collision	Running Genie into telescope	Damage to telescope Structure and the Genie.	MAINT	3-B	9	Ser.				Training, specific c
4	Genie Z-45/25J	Fall hazard	Personnel falls out of lift because the CO <sub>2</sub> wand is too short	Injury	IT&C, MAINT	1-C	4	High				Proper w
5	CO <sub>2</sub> wand system	Equipment damage	Static buildup from CO <sub>2</sub> snow	Static discharge, damage to electronics	IT&C, MAINT	4-A	13	Med.				Ground s
6	Wet wash system & Genie	Damage to M1	Can't get close enough to the mirror and a tech reaching the sponge out on a wand is insufficiently gentle due to lack of control.	Mirror coating scratch, requiring recoat before low scatter observations.	IT&C	3-C	11	Med.				Design a personne not a "ha be accoun the cost
7	Wet wash system & Genie	Damage to equipment, e.g., GOS	Uncontrolled splash due to long reach and / or liquid containment failure.	Electronic racks, GOS, gets wet or sensitive optics are contaminated	IT&C, MAINT	3-B	9	Ser.				Cover the This is be M3) in th
8	CO <sub>2</sub> wand system	Personnel injury	Coming in contact with very cold surfaces	Frostbite	IT&C, MAINT	3-C	11	Med.				PPE (glo
8	CO <sub>2</sub> wand system	Personnel injury	Storing CO <sub>2</sub> sources in a confined space	Oxygen deprivation	OPS, IT&C, MAINT	1-D	8	Ser.				Follow st confined
9	CO <sub>2</sub> wand system	Personnel injury	Shear valve off of CO <sub>2</sub> cylinder	Heavy projectile collides with equipment or	OPS, IT&C, MAINT	1-D	8	Ser.				Follow st transport

# Hazard Analysis Team (HAT)

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- 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

# Job hazard analysis

JOB HAZARD ANALYSIS (JHA) FORM					
For more details please see Job Hazard Analysis Guide.pdf - <a href="http://www.nso.edu/noao/local/safety/">http://www.nso.edu/noao/local/safety/</a>					
Title of Job or Task: Wirer Pulling			JHA Number: 020		
Date Completed: 5/17/2017			Revision: New		
Person Completing this JHA: S. Shimko			Person(s) Assisting with this JHA: G Candido		
Location/Facility: DKIST					
Recommended Personal Protective Equipment (PPE)					
Use the personal protective equipment hazard assessment form as a guide - <a href="http://www.nso.edu/noao/local/safety/">http://www.nso.edu/noao/local/safety/</a>					
Head Protection	X	Eye Protection	X	Hand and Body Protection	X
Foot Protection	X	Hearing Protection		Respiratory Protection	
				Other PPE	
Things to consider					
Do employees know how to do the job?			What are the hazards? Include people and equipment.		
How can injuries 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 to Below	CBY - Contacted By		
SA - Struck Against	CB - Caught Between	FS - Fall at the Same Level	CO - Caught On		
CW - Contact With	O - Overexertion or Repetitive Motion	E - Exposure to Chemicals, Noise, Vibration, Radiation			
BASIC JOB STEPS	HAZARDS PRESENT IN EACH JOB STEP		CORRECT AND SAFE PROCEDURES		
Construction site work	Construction hazards; struck by, caught in, caught between, contact with, fall to same level.		Construction site PPE, eye protection, head protection, foot protection, hi-vis. Attend PoD to know restricted areas and hazards.		
Low voltage wire pull	Excess cable pulled into cabinets - tripping hazards.		Coil up, secure and/or run cable up and over doors to get off of the floor and out of the way.		
	Pinched fingers when feeding cable into conduit.		When pulling coordinate work and communicate clearly. Wear gloves and keep hands back from conduit entrance.		
Stripping cable	Cuts from knife slipping.		Wear properly fitting gloves and never cut against your hand. Always slice with knife away from body. Use cable stripping tools when available.		
Pulling through tunnel	Untrained personnel in confined spaces.		Make sure all workers entering tunnel are properly trained and certified. Make sure all pre-entry procedures are followed.		
	Falling from ladders when entering or exiting tunnel.		Ensure ladders for entrance are stable and in good condition. Maintain three point contact while climbing. Never carry tools or materials while climbing, use ropes.		
	Pulling rope or rigging failing in tunnel creating overhead hazard.		Monitor pull from above whenever possible. Avoid standing beneath equipment when under tension.		



# Emergency response

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



# Emergency planning

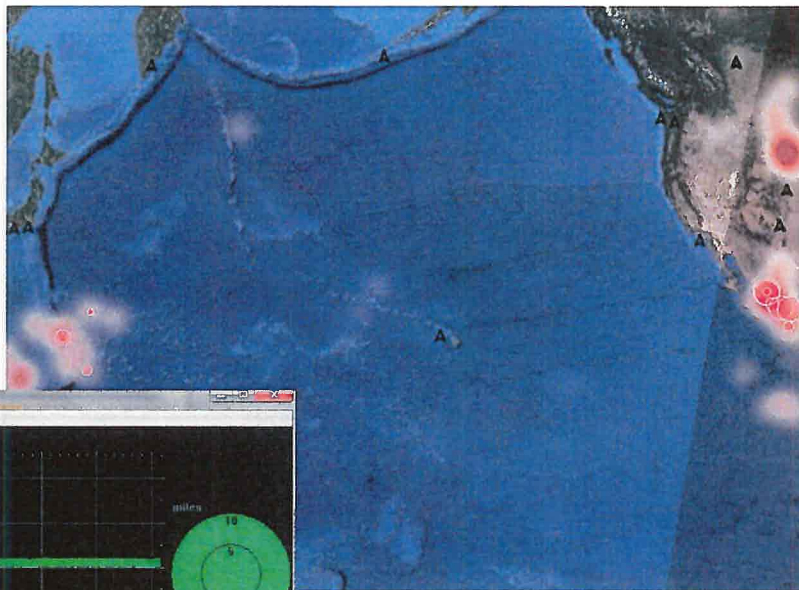
- Maui Fire Department
  - Expanding our coordination to additional battalions and search and rescue
- Additional Medic crew visited during x-wide transport
  - 4 crews total
  - First aid, AED and CPR training
  - EMR training





# 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.



[www.lightningsafety.noaa.gov](http://www.lightningsafety.noaa.gov)



# Ongoing safety processes

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- 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

# Plan of the Day

## POD Flow Down Notes

- Changing workgroups
- Revised from lessons learned

DKIST Plan of the Day - Flow Down Notes		Date
Contractors / Supervision / Activities / Safety Issues / Permits		08/23/17
DuWatts Lights + generator v.t. Ground floor + Mezz fire alarm panels. No live work	S&B Coude level P lift use Cleaning coude level + hanging panel. FTS inventory (AI) Clean	
FTS Coude level inner outer pier H.W big air handlers + inside outside v.t. Bldg AHU movement prep	Glendori, mendori, chuck	
TMA P. lift use a.m. cable pulling + pipe work	Paint 3 new cleaners (need orientation). Cleaning + Prepping floors IT&C lighting work. Mech room has lighting switch now. Vertical cabling mezz/ground/ computer room.	
★ Other Shell Telles oil at Reber needs to be storage inside in a cabinet - not on ground	Monday has cabling crew w/ Shawn. HW-HotWork/MechPm-S&OMechanicsPm, UB-UbityBuild UT-UbityTunnel, S&P-Ship&Reclwr, Lila-Plow/PlatformLit MachShop-MachineShop, MezzLevel2, CoudeLevel3 UL-UbityLevel4, EngCWeEndCableWraptLevel5, TL-TeleLevel	
Restrict / Coord. / Conflicts / Change	Weather / Wind	
★ Telescope level	Sunny windy	
★ Enclosure (movement)	Deliveries / Tours	
★ Cable wrap (Alarms sounding)	None	
Plan of the Day reminders	Look Ahead	
✓ Supervisors plan today / Look ahead	Water tanker delivery Thursday 8/24/17	
✓ Restricted Areas / Conflicts / Coord.	30yd trash bin Friday 8/25/17	
✓ Critical Lifts / Lifts / Cert. Rigger / Road Closure	internet outages due to cabling	
✓ Platform lift / Oper / Consolidate load	Lessons learned	
✓ Confined Space Entry / Insp. / Test	Make sure tools are secure to base ie drill press to table (not wood planks)	
✓ Hot Work Weld / Cut / Grind - Flam Liquid use	Sign off scaffold tag every day before use	
✓ Fall Arrest Tie off proper anchor	Drill Press need securing-Utility level	
✓ Inspect Aerial Lift / Fork lift / Scaffolds-Assembly		
✓ Electrical Live work - Permits		
✓ New Workers / Late worker / Visitors / Sign in		
✓ Deliveries / Sub contractors up later		
✓ Weather / Wind / Look ahead		
✓ Safety lessons learned / Safety issues		
✓ Improvement needed / Thank you		
✓ Stretch and Bend / Observe workers		
KŪLIA I KA NU'U		
Day of week and Date: Wed 8/23/17		08/17/17 #12



10/2/17 SITE INSPECTION — Checklist and Report Time: 0945/1340

Inspector: [Signature] Description of Job Site and Equipment Inspected

Names of Contractors or Subcontractors: DuWatts  
 Names of Job Site Supervisors: Herman Corpio  
 Names of On-site Safety Supervisors: Same

DuWatts: S+B  
 DuWatts: TMA  
 DuWatts: JTL  
 DuWatts: FTS

Herman Corpio  
 Paul Jaffar  
 Erik Gorman  
 Cissela Galapon

G. Condito  
 " "  
 " "

FOR EACH ITEM LISTED BELOW CHECK THE APPROPRIATE BOX AND COMPLETE AS FOLLOWS  
 \* = IN COMPLIANCE (C)  
 X = NOT IN COMPLIANCE (NO DATE CORRECTED)  
 NA = NOT APPLICABLE TO WORK SITE

COS = CORRECTED ON THE SPOT  
 O = OPEN (TRACKED ON HAZARD LIST)  
 NC = NOT CHECKED

PROTECTIVE EQUIPMENT AND FIRST AID		
A. PERSONAL PROTECTIVE EQUIP.	C/NA	NO-DATE-CORRECTED
Hard Hats: Eye Prot. / Ear Prot.		
1. Fall Prot. / Hand Prot. / First Aid		
2. Respiratory Protection		
3. Clothing (Ht. Prot. / Cold / Sun)		
4. Handcuffs / Armbands / Bandages		
5. Other (Specify)		
C. Other (Specify)		
PHYSICAL AND ELECTRICAL HAZARDS AND SAFEGUARDS		
D. ON SITE AND PUBLIC PROTECTION	C/NA	NO-DATE-CORRECTED
1. Construction / Fences / Pipes		
2. Emergency Equip. / Machine Alarms		
3. Construction / Safety Signs		
4. Construction / Barriers / Signs		
5. Other (Specify)		
6. Fall Protection / Connected Areas		
7. Unfenced Structure / Ventilation / Fencing		
8. Drains / Sewers / Excavations		
9. Workers Control of Equipment		
E. HOUSEKEEPING	C/NA	NO-DATE-CORRECTED
1. Falls and Steep Descent		
2. Piling / Stacking / Stairways		
3. Drains / Sewers / Excavations		
4. Other (Specify)		
F. ELECTRICAL	C/NA	NO-DATE-CORRECTED
1. Lighting / Grounding		
2. Cables / Poles and Headlights		
3. Other (Specify)		
4. Other (Specify)		
TOOLS AND EQUIPMENT		
G. TOOLS	C/NA	NO-DATE-CORRECTED
1. General / Ladders		
2. General / Power Tools		
3. General / Insulated / Confined Space		
4. General / Other (Specify)		
H. HANDLING AND COVERS	C/NA	NO-DATE-CORRECTED
1. Handling / Wind / Rain / Snow		
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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 Hits	0	
Property Damage	0	
Spills	0	
<b>Project Safety Activities</b>		
Safety Orientations Completed	3	DKIST temp cleaners
Safety Tool 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	
HIOSH Visits	0	
<b>HIO SH Citations</b>		
Serious	0	
Repeat	0	
Willful	0	
<b>Notes, Corrective Actions and Improvement Initiatives (name, status, estimated completion date)</b>		
DKIST, FTS - Fall protection - Scaffolding - Daily inspection of scaffolding not completed. Worker counseled. Inspection requirement reiterated in the PoD - Corrected, closed		
DKIST, Site and Buildings - Fire prevention - Combustible material stored under scaffolding, materials removed. Stairway housekeeping requirements reiterated at PoD - Corrected, closed		
DKIST, Site and Buildings - Fire prevention - Hot work - Performing hot work without permit. Worker counseled and permits requirement reiterated to all workers at PoD - Corrected, closed		
DKIST, TMA - Tools - Drill press not secured to base - Corrected, closed		
DKIST, Site and Buildings - Fire prevention - Flammable materials - Empty flammable liquid cans discarded in rag bin. Reiterated proper disposal at PoD - Corrected, closed		
DKIST, Site and Buildings - Equipment operation - Forklift - Parked with forks left up, corrected on the spot. Requirement reiterated at PoD - Corrected, closed		
DKIST, Site and Buildings - PPE - High visibility - Worker did not have hi-viz on, Corrected on spot - closed		

# Safety log

DKIST Safety Report Log						
Date	Company / Group	Safety Category 1	Safety Category 2	Issue Include Safety / Env. Recognitions; Incident / Injury / Near hit (Description – Injury - Lost time / Damage - Root causes - Corrective actions)	Status Supervisor notified, open, PoD item, corrected	
8/17/2017	DKIST, FTS	Emergency	Egress	Exit door partially blocked, corrected. Requirement reiterated at PoD.	Corrected, closed	1
8/17/2017	DKIST, FTS	Scaffold		Scaffolding not inspected and tagged. Safety immediately inspected and properly tagged.	Corrected, closed	1
8/22/2017	DKIST, FTS	Fall protection	Scaffolding	Daily inspection of scaffolding not completed. Worker counseled. Inspection requirement reiterated in the PoD.	Corrected, closed	
8/22/2017	DKIST, Site and Buildings	Fire prevention		Combustible material stored under stairway, materials moved. Stair housekeeping requirement reiterated at PoD.	Corrected, closed	1
8/22/2017	DKIST, Site and Buildings	Fire prevention	Hot work	Performing hot work without permit. Worker counseled and hot work permits requirement reiterated to all workers at PoD	Corrected, closed	1
8/22/2017	DKIST, TMA	Tools		Drill press not secured to base.	Corrected, closed	1
8/22/2017	Site wide	Safety training	Toolbox talk	Lightning safety		
8/23/2017	DKIST, Site and Buildings	Fire prevention	Flammable materials	Empty flammable liquid cans discarded in rag bin. Reiterated proper disposal at PoD.	Corrected, closed	
8/25/2017	DKIST, Site and Buildings	Equipment operation	Forklift	Forklift left with forks up, corrected on the spot. Requirement reiterated at PoD.	Corrected, closed	
8/25/2017	DKIST, Site and Buildings	PPE	High visibility	Worker did not have hi-viz on, Corrected on spot.	Corrected, closed	1
8/28/2017	DuWatts	Electrical		Material storage in front of large electrical panels S&O by tunnel. Corrected on the spot.	Closed	
8/28/2017	DKIST, FTS	Fall protection	Scaffolding	Wrong type of inspection tag used on incomplete scaffolds. Corrected on the spot. Requirement reiterated at PoD.	Corrected, closed	
8/28/2017	DKIST, FTS	Fall protection		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.	open	
8/28/2017	DKIST, IT&C	First aid		Small hand cut, pulling cable with no gloves on. Gloves procured.	Corrected, closed	1

DKIST SR 24-25 Oct 2017



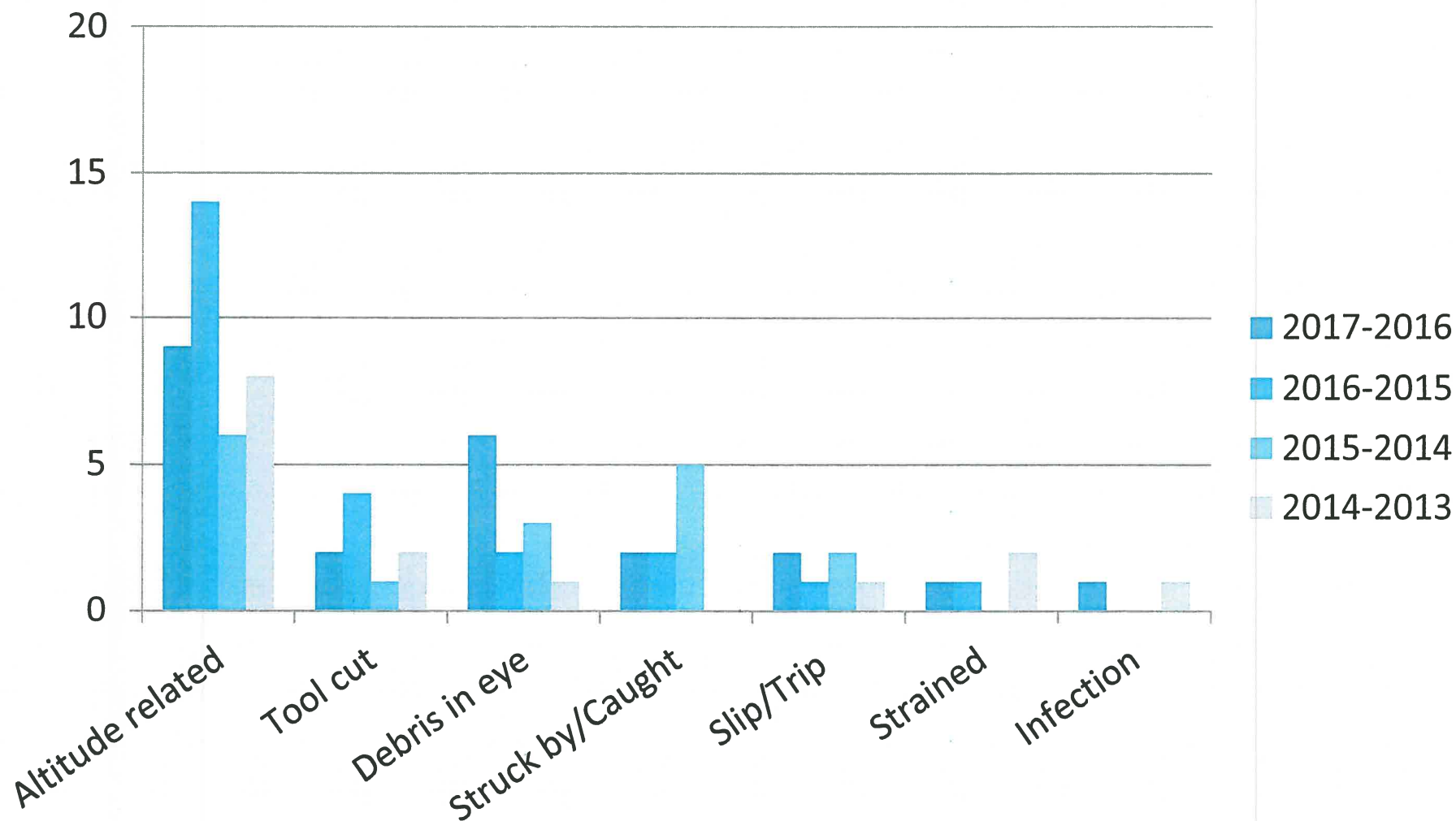
# Monthly Checklist

- Includes all supply and work area inspections
- Transition to maintenance tasks
- Continuing into operations phase

DKIST Safety / Equipment Inspection Checklist													Month/Year - July - 2016				
FIRST AID KITS																	
Week													Week				
LOCATION	NO.	1	2	3	4	5	INIT	LOCATION	NO.	1	2	3	4	5	INIT		
Columb Men out	13							PFA S&O 1 <sup>st</sup> floor	42								
Brett Trailer out	14							PFA S&O Mezz.	53								
Safety Trailer in	15							PFA S&O Cable wrap	44								
FIRE EXTINGUISHERS																	
LOCATION	NO.	LOCATION	NO.	LOCATION	NO.	LOCATION	NO.	LOCATION	NO.	LOCATION	NO.	LOCATION	NO.	LOCATION	NO.		
Reber Coudex out	01	Ice tank railing	11	FTS - pipe filter	45	Coude door	54										
Util Build 1st fl	02	Safety trailer in	12	FTS - G-shops	46	Tunnel	55										
Util Build 2nd fl	04	Pinax yard	05	FTS - UT lula	47	Tele level	56										
Cali trail in	07	PFA box Utility	03	FTS - SO 1 <sup>st</sup> flr	48	30lb by stair 1	57										
Cali trail out	08	PFA S&O 1 <sup>st</sup> flr	06	FTS - base yd	49	FTS welder	58										
Brett trail out	09	PFA Cable wrap	40			Coude wrap	59										
Brett trail in	10	PFA S&O mezz	43														
SPILL KITS																	
LOCATION	NO.	1	2	3	4	5	INIT	LOCATION	NO.	1	2	3	4	5	INIT		
Mezz level	74							SI - E side apron									
UT level	75							SI - S side apron									
Brett trailer outside	76							SI - On Crane									
Front of ST trailer	16							SI - Next to crane									
Blue ConEx storage	-																
LADDERS																	
LOC.	NO.	DATE	INIT	LOC.	NO.	DATE	INIT	LOC.	NO.	DATE	INIT	LOC.	NO.	DATE	INIT		
Step 12	24			Ext 20'	37			Step 8'	63			Ext 30'	72				
Step 10'	25			Step 6'	38			Ext 24'	64			Step 4'	75				
Step 8'	26	miss		Ext 20'	39			Step 8'	65								
Step 8'	27			Step 4'	40			Step 6'	66								
Ext 24'	28			Ext 20'	41	init		Step 6'	67								
Ext 24'	29			Step 12'	51			Step 10'	68								
Ext 28'	30			Step 8'	60			Step 6'	69								
Ext 32'	31			Step 6'	61			Step 10'	70								
Step 10'	33			Step 10'	62			Step 6'	71								
EMERGENCY EQUIPMENT																	
LOCATION	NO.	DATE	INIT	LOCATION	NO.	DATE	INIT	LOCATION	NO.	DATE	INIT	LOCATION	NO.	DATE	INIT		
AID and Oxygen - Safety				Utility level stair chair													
TEV baskets and gear				Utility box, AID and O2	32												
Tunnel hoist and basket				Eye Rinse Box - UT level	52												
HAZMAT STORAGE																	
LOCATION	NO.	DATE	INIT	LOCATION	NO.	DATE	INIT	LOCATION	NO.	DATE	INIT	LOCATION	NO.	DATE	INIT		
Zodiacal Flam locker				Steeftach Fuel drums													
Reber Blue ConEx				Steeftach welding gases													
1 of 2 Baker-Nolan Fuel tank				Flamm locker - ice tank													
55 gal drum Spill cone				Flamm Locker - FTS													

05 July 2016

## Incidents (first aid and recordable) by “review year”



DKIST SR 24-25 Oct 2017

# Incident review

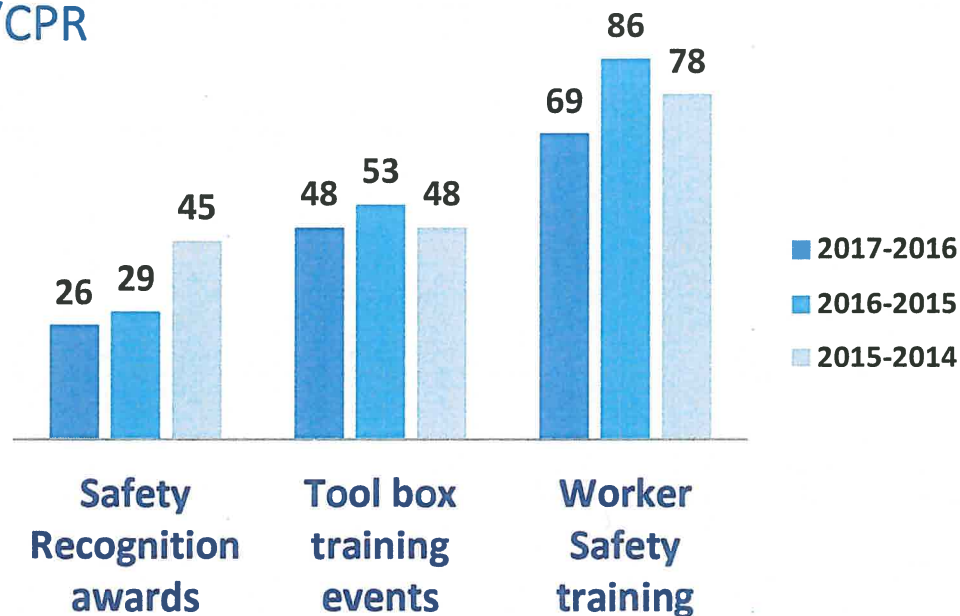
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- Improvements needed
  - Fall protection
    - Improved, needs constant vigilance
  - PPE use consistency
    - Improved, needs constant vigilance
  - Equipment inspections
  - Supervisor modeling and enforcing safe behavior
    - Needs sustainment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



# 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



# Safety Program Development

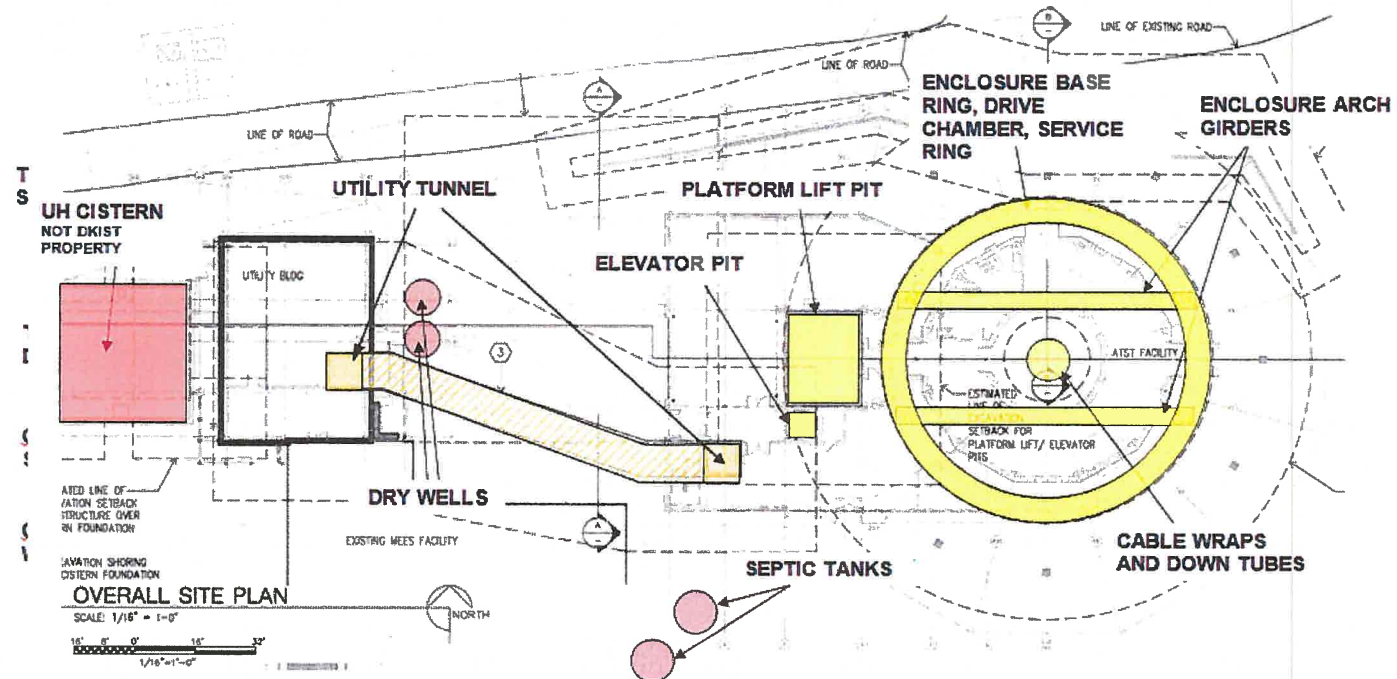
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- Lockout Tagout (LOTO) Policy SAF-0009
- General Safety and Laboratory Policies SAF-0013
  - Visiting scientist and engineer (VSE) safety guidelines and checklist
- General Shop, Industrial Trucks, Aerial Lifts and Lifting Equipment Safety Program 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

# New confined spaces

Confined Space Entry Safety Program

## 14.3 APPENDIX 3: CONFINED SPACE LOCATIONS DKIST





# 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

