Safety Planning

IceCube Upgrade NSF Re-Baseline Review
April 26-28, 2022

Mike Zernick

1.1.3 / Quality & Safety Management

IceCube Upgrade Safety Planning

Mike Zernick BIO

- IceCube Upgrade Quality & Safety Manager:11/18/2018 to present
- IceCube Gen 1 Quality & Safety Manager: 09/07/2004-03/25/2011
- 7 Deployments to the South Pole
- 30 years experience in Quality Management
  - ISO-9001:2015
- 25 years experience in Safety Management
  - ISO-14001:2008
- Graduated from the University of Notre Dame
- Married to the Same Woman for 34 years.
  - 3 Great daughters

Common ASC & IceCube Upgrade Safety Procedures

Through a joint effort between ASC and the IceCube Upgrade, common procedures are being developed to streamline efforts and to enhance communication at Pole and up North.

- A Fatigue Management Program has already been developed.
- Other Safety Programs to be addressed this season are:
  - Stop Work Process
  - Fire Prevention Process
  - Emergency Response
  - Antarctic Shipping Procedure
- Getting on the same page with the processes enhances the Teamwork effort at the Pole.

IceCube Upgrade Safety Plans-(Cont) 23-24

- We continue to strive to make IceCube Safety everyone's responsibility at the Pole and across the Project.
- Incident Reporting has been effective in the Upgrade!
  - People continue to pay attention to what they are doing.
  - Still some IR's show inattentiveness causing hiccoughs.
- SafeStart Training
  - Emphasis: Keep Your Head in the GAME! (eyes/mind on task)
  - Refresher SafeStart course this summer.
  - PY4 Winter overs received SafeStart Training
- Advanced Safety Audits Summer and through the Pole Season, throughout the Project.
- Review of Safety Manual and EHWD Procedures
- Process & Equipment Hazard's Analysis Review
- OSHA prescribed Training: Fall Protection/LOTO/Confined Space/Lifting Techniques
- Red Cross First Aid/CPR/ AED Training
- Hazardous Energy Training as required: Electrical Hazards, Welding, Burner, Rigging.
- ASC/Upgrade Fatigue Management Training
- Prevent All Foreseeable Injuries!

IceCube Upgrade Safety Plans-(Cont)

- We continue to strive to make IceCube Safety everyone's responsibility across the Project.
- Incident Reporting has been effective in the Upgrade!
    - People continue to pay attention to what they are doing.
- SafeStart Training
    - Emphasis: Keep Your Head in the GAME! (eyes/mind on task)
        - Monthly Safety Meetings
        - Weekly Safety Updates
    - QA & Safety Mgr. to get certified to teach SafeStart NOW.
    - Refresher SafeStart course this summer.
    - PY4 Winter overs received SafeStart Training. PY5 WOs will receive.
- Advanced Safety Audits this Summer and through the Pole Season, throughout the Project.
- Review of Safety Manual and EHWD Procedures
- Process & Equipment Hazard's Analysis Review
- OSHA prescribed Training: Fall Protection/LOTO & Arc Flash/Lifting Techniques
- Red Cross First Aid/CPR/ AED Training
- Hazardous Energy Training as required: Electrical Hazards, Rigging.
- ASC/Upgrade Fatigue Management Training
- Prevent All Foreseeable Injuries!

Annual Polar Safety Activities (23/24)

Task #	Task type	Task	IceCube / ASC
1	Preparation / Setup	**Drill Equipment/ Process Start-Up Safety Check**	IceCube
2	Preparation / Setup	**Check and Weigh Fire Extinguishers**	ASC
3	Preparation / Setup	**Fire Team Walk-through**	ASC/IceCube
4	Preparation / Setup	**E-Stop Testing**	IceCube
5	Preparation / Setup	**Smoke/CO Monitor testing**	IceCube
6	Preparation / Setup	**Mass Casualty Drill**	ASC/IceCube
7	Preparation / Setup	**Check GFCI outlets.**	IceCube
8	Preparation / Setup	**Inspect Slings/ Fall Protection Harnesses**	IceCube
9	Shutdown	**Drill Equipment/ Process Winterization Safety Check**	IceCube

Metrics: 21/22

- Lost Time Injuries = 0
- OSHA Reportable Injuries = 0
  - Reportable: any injury requiring more than basic first aid treatment.
  - Visiting the Doctor, even if the Doctor just looks at injury, counts as reportable
- Near Misses = 1

Incident Reporting (19/20)

- 1920-1: An individual goes off on their own to work.
  - Dangerous Act: violates policy of communication with COMMs, taking a radio, and using the "Buddy System."
- 1920-2: A winch was being used to deploy equipment down a hole. The cable hadn't been re-wound correctly, leaving a gap.
  - No one recognized this as a problem. Hence, the process required an extra 5 hours of time to retrieve the equipment out of the hole.
- 1920-3: A nut had fallen loose from the speed control knob on the winch.
  - No one paid attention to it. This inattentiveness caused a problem with the speed of the cable when deploying equipment.
- 1920-4: An icy build-up within the cable sheave on the winch was cutting into the deployment cable.
  - Deployment had to be stopped in order to save the equipment from potential loss.

Incident Reporting (19/20) cont.

- 1920-5: An ASC heavy equipment crew was excavating near a wind turbine, damaging an IceCube fiber-optic cable and an ARA high power cable.
  - There was a lack of communication between ASC and IceCube as to the presence of the cables.
- 1920-6: An individual made contact with live ELV (Extra Low Voltage) wires in the ICL during a live system debugging.
  - This incident occurred due to inattentiveness and a lack of a procedure for debugging a live system.

Incident Reporting (19/20) cont.

- 1920-7: A Scintillator fiber optic cable was damaged while excavating, using hands and plastic shovels.
  - The diggers used too much force in excavating the cable. (Lack of procedure)
  - Will develop a procedure for excavating delicate equipment.
- 1920-8: While cabling the IacACT telescope, the operators broke a connector while trying to install the power cable.
  - An incorrect connector was installed to mate with the power cable connector. The operator tried to force the connectors together. The power connector broke while trying to be mated with the wrong connector.
  - The proper mating connector will be identified and used top replace the incorrect connector.

IceCube Upgrade

NSF

Incident Reporting (20/21)

- Report 1920-09: "287 Loader Issue: Soil in Internal Drive Compartment,"
  - A McMurdo Vehicle Maintenance Facility (VMF) technician discovered non-native soil inside the 287B, which was shipped from the Northern Hemisphere. The soil was removed and properly disposed of.
    - While the shipment of non-sterile and non-native soil to Antarctica was not deliberate; it is agreed that we could do more to make sure that this soil is not unintentionally shipped to Antarctica in the future.
  - Neither IceCube Upgrade nor their contractor, Fabick CAT, understood the degree to which the 287B needed to be cleaned to meet both New Zealand's and Antarctica's biosecurity standards. Pre-shipment cleanliness inspection processes where not incorporated into logistics procedures.
  - The Upgrade has acquired the New Zealand Shipping Guide, along with their Shipping Checklist. The Upgrade Shipping Procedure has been revised to include a thorough equipment cleanliness inspection prior to shipment.
  - The Upgrade Shipping Procedure will be shared with ASC towards creation of common procedures.

Incident Reporting 20/21 (cont.)

- Report 1920-10: Winter Over Back Strain
  - A Winter over was attempting to lift a DOM Hub in the ICL, when he slightly strained his back.
  - Winter Over Management had ASC Safety review proper lifting techniques with the WO, and they are looking into the procurement of a small lifting device to aid the team in lifting items.

Advanced Safety Auditing

- Continuous Assessments all Season
- Maximum assessments planned
  - Auditors look for "Eyes on task/Mind on Task" scenarios.
  - Drill Camp and other areas
    - HPP, MHP,SES
- Interesting Notes:
  - Assessments were typically well-received during the Upgrade.
  - Hazards abound, but People are aware and trigger.
  - People typically do not work in "Harm's Way."
  - Proper PPE and tooling was typically in use.
  - Generally People felt safe.
- ASC Safety people have been invited to participate in these audits.

On-Ice Safety Hierarchy

- On-Ice Lead/ Safety Manager
  - Safety Lead- Drilling
    - Shift Leads
    - Deputy Shift Leads
  - Safety Lead- Deployment
  - Safety Lead- ICL
  - Safety Lead-Other

Shift Leads/Deputy Shift Leads

- Model for Safe Behavior/ Support of Safety effort
- Support weekly scheduled Safety "Walk-Through" Assessments and write report.
- Write Incident Reports for areas of responsibility as required
- Conduct weekly Safety Action Meetings in own areas and take minutes.
- Initiate Safety Contacts as required

Safety Contact

- You see someone behaving in an Unsafe manner.
  - Encounter must be a positive experience to work
    - Calmly get their attention
    - Compliment them on safe behavior demonstrated
    - Discuss the Unsafe Behavior
      - You are trying to convince someone to change their behavior
      - What's the downside for them (consequences)
      - Cite from personal experience if possible.
    - Attempt to get agreement to work safely
    - Discuss other Safety Issues
    - Thank them for their time
      - At least they are thinking about the issue
      - This discussion is "Off the Record."

Safety Next Steps

- We feel that the IceCube Upgrade Safety/Training Plan has proven to sustain the Safety Levels attained in GEN1.
  - Drillers/Deployers will get a new SafeStart course: Aug. 2023 w/ refresher at Pole
  - Hazards Analyses will be reviewed with Drillers/Deployers: Aug. 2023
  - Incident Reports will be reviewed in 08/23 and annually. (Including GEN1)
  - Common Procedures for common Safety Activities between IceCube Upgrade and ASC
  - South Pole:
    - Orientation and refreshers for all
      - Shift Hand-Offs
      - All hands Meetings!
      - Safety Audits
    - Revamp Safety Messaging System at Pole
      - In conjunction with ASC Safety Engineer
      - No more OSHA rhetoric
      - Timely SafeStart messages: Eyes on Task/Mind on Task et al.
        - SafeStart Training for WOs. (08/22)
    - The simple plan is "business as usual"---picking up where we left off in 19/20.
- GOAL: Increased Safety Awareness/Eliminate COMPLACENCY

IceCube Personnel

- Everyone is accountable for the safe performance of their duties and the safe operations within their areas
  - Initiate Safety Contacts as required
  - Report any unsafe condition noticed

SAFESTART™

These four states...

- ❑ **Rushing**
- ❑ **Frustration**
- ❑ **Fatigue**
- ❑ **Complacency**

can cause or contribute to these critical errors ...

- ❑ **Eyes not on Task**
- ❑ **Mind not on Task**
- ❑ **Line-of-Fire**
- ❑ **Balance/Traction/Grip**

...which increase the risk of injury.

Backup

Initial Environmental Evaluation (IEE)

- The IEE was completed and signed-off by the NSF: 11/26/2019
  - Good cooperation between ASC, IceCube, and the NSF to complete task in Fall.
  - IceCube Upgrade o develop a Cargo/Equipment Retro-Plan for end of Upgrade Drilling
    - The NSF wants to be advised of the plan when it is ready.