

## IceCube Upgrade Project Review

March 17, 2020

### Answers to questions:

**1. Provide a list of the Drill Leader's tasks (which the Project Manager has been covering), and the delineation of responsibilities across other positions for the balance. All other positions?**

While Level 2 drill manager recruitment is in progress, the duties have been temporarily carried out by the project manager (Farshid Feyzi) and drill systems engineer (Terry Benson). The sharing of tasks is as outlined below:

Feyzi:

- Overall project management at Level 2 in accordance with Project Execution Plan
- Participation in the Technical Board and Change Control Board
- Interfaces with other WBS Level 2 managers and project office
- Overall communication with ASC and strategic planning
- Reports on schedule, cost, analysis of EVMS variances

Benson:

- Technical management of L3 activities
- Management of interfaces at L3
- Chairing all drill activity technical meetings
- Making all technical decisions in consultation with PM and other Level 2 leads
- Management of major procurements
- Interfaces with ASC on technical level and cargo planning
- On-ice activity planning
- Report on earned value at L3

The duties above and the sharing of duties do not have an impact on other positions and do not require additional duties to be performed by others.

**2. Describe any potential effects of current "double-duty" positions on the project's progress – e.g., the PM has two L2 duties; other positions if any.**

The project manager has been the Level 2 manager for the project office. The addition of Level 2 duties for the drill project manager on a temporary basis have not had a significant impact on the project. The drill systems engineer has been assigned the majority of the drill project manager duties that need ongoing attention. The drill systems engineer worked closely with the departing drill project manager prior to his departure to ensure planning, reporting, and oversight responsibilities were understood.

**3. Describe the desktop procedures for the Project's Control Activities (e.g., documentation location, chance request forms, approval chain, etc.).**

Project control activities are carried out via and are documented in a SharePoint collaborative environment. Documents are located and controlled in SharePoint as defined in the Configuration

Management Plan. All technical documentation are controlled by the technical coordinator and the project engineer.

Change request forms are also located in SharePoint and their approval is managed through this system. The approval chain for the change request is as defined in the Configuration Management Plan. As per this plan, there are three classes of change requests, which require three levels of approval. The record of approval is documented in the change request form. The project quality and safety manager is designated by the project manager to control and document the change requests.

- 4. Provide an inventory of the project equipment/property currently left in McMurdo (which will then be shipped to South Pole in 2020/21). This should include a brief description of the “property transfer” process to/under the WIPAC’s Guardianship, followed by the UW Central Property Office acceptance of this guardianship. With this, UW would need to verify the transferred property’s condition and timing of the assessment (I.e., from the past or upcoming), and the assigned project’s contact person who will be responsible for the equipment shipping to South Pole next season... this person should be the Project’s interface for working with the assigned ASC cargo coordinator for all upcoming seasons.**

The following items are at McMurdo Station and need to be transported to the South Pole in 2020/2021 season.

- Generator #1
- Generator #2
- Generator #3
- Fuel Day Tank
- Generator Hoods
- Independent Firn Drill
- Independent Firn Drill Sheave
- Independent Firn Drill Head
- Compact track loader (287B Skid Steer)

The following items are also at McMurdo Station and need to be transported to the South Pole in the 2021-2022 season. Consideration should be given to transporting as many as possible in the 2020-2021 season.

- 20' Container (empty)
- Heating Plant Unit #1
- Heating Plant Unit #2
- Reel Container Unit
- Two flatracks

Custodianship of above items, as well as all other drill items at the South Pole, will be transferred to UW–Madison and will be controlled through UW–Madison property control. Condition of the equipment was assessed during the 2019-2020 season and is documented in project files. The condition

documents will be integrated with property control documents. The point of contact will be the Level 2 implementation manager. At this time, the point of contact is the drill systems engineer.

**Answers to questions that were asked during the review:**

**5. When do we need the results of the GPR survey for Upgrade? It is estimated that they will be ready in August; is that OK? Have we looked at the GPR results from Gen1?**

The results should ideally be available in June of 2020. This will allow us to verify hole locations and confirm lengths of surface cables and locations of surface junction boxes.

Surface cable production will occur in winter 2020-2021, so August results from the GPR are okay as long as the basic ICL entry plan is not affected. Further slippage in the GPR results could impact the project schedule.

The GPR survey from Gen1 was taken into account when deciding Upgrade hole locations. We will study it again. The GPR for the Upgrade is higher resolution and is needed to finalize hole locations.

**6. What is the relationship between Upgrade Calibration and M&O calibration?**

Our ongoing studies of the ice in Gen1/M&O have driven our plans for devices in the Upgrade. The Upgrade will fund a postdoc in years 4 and 5 of the project to organize the calibration runs and data collection. The ongoing hardware work on upgrade calibration is funded by the in-kind contributions of the respective institutions that are responsible for those devices. Software and simulation work is done by a combination of personnel (mostly students) funded by the institutions responsible for the calibration devices and people who are doing calibration studies in Gen1. The calibration constants generated by the Upgrade will be incorporated into data analysis for the whole IceCube detector following the completion of the project. All calibration hardware will be controlled by the same experiment control system that controls all IceCube modules, and all Upgrade data, including calibration data, will be collected by the same data acquisition system that collects all IceCube data.

**7. What are the makeup of drill team and installation team during the 22/23 season?**

The drill team will be made up of 30 drillers, 10 drillers per shift, working in three shifts. Operations will be continuous with one day off per week, nominally. The drill systems will stay on during the off day overseen by a skeleton crew.

There will be a lead driller, who is also shift one lead, and two other shift leads. Each shift will also have a deputy lead who also serves as the shift safety officer. The overall crew will be a mix of experienced drillers paid on the project plus contributed drillers from within the collaboration. We have started recruiting contributed drillers to begin training early on. Most of the project drillers will be recruited from PSL engineers, technicians, and drillers already working year-round on Upgrade drill activities. Specialized expertise includes (but is not limited to) mechanical engineering, electrical engineering, and technical work in electrical, generator and diesel fields.

The installation team size and expertise is still being developed. The current plan is to have 10 people on-site dedicated to installation, working in two shifts of five members per shift. Each installation team will be supplemented by three members of the drill team, who will be cross trained as installers and will also participate in installation activities.