NSF safety workshop 2009
Introduction

An external panel of health and International safety experts conducted a review of safety programs at the Atacama Large Millimeter Array (ALMA) at its Operations Support Facility (OSF-9500ft) and Array Operations Site (AOS-16500ft) located outside San Pedro de Atacama, Chile in early October 2008. The review was performed at the request of the ALMA Board to inform the Board and funding agencies of the status of ALMA safety policies and procedures.
ALMA safety feedback

- External Safety reviewers comments and recommendations
- POST External review actions
A - Line-management Safety Ownership

1. Lead by example: periodically bring top ALMA management to the field to inquire about safety directly with workers.

a). Safety is now a standard item (the first one) on the monthly JAO Management Team meeting agenda

b) A JAO Safety Committee has been created comprising all department managers and Site- IPT managers

c) Safety has become an integral part of the performance goals for all managers.

d) All managers are asked yearly to provide an overview of the safety activities by their teams

e) A safety seminar has been held with managers and supervisors to highlight their role and responsibilities.

f) The managers have been asked to play a proactive role
2 Augment the ALMA Safety Training
   a) A basic video safety training is under process. It is being shown to all visitors and newcomers at the entrance to the site.
   b) The comprehensive safety training sessions take place every Monday and Thursday
   c) The specific trainings like high altitude, use of oxygen by car drivers, and other specific safety trainings are given on a day to day basis.
   d) All staff will get a yearly safety training update
   e) All staff will get a yearly safety training update.
A - Line-management Safety Ownership

3 Stress the ALMA Safety Policy Statement by posting it prominently in public areas, ALMA and contractor vehicles, in dormitories, and in handouts for all trainings.

Response:

• This information has been posted inside each dormitory. Emergency phone numbers have been displayed on phones at the site

• Director’s safety statement was published on the JAO internal newsletter, on the Safety training, on the ALMA Safety manual and posted on safety boards.
4. Integrate safety accountability into annual management and worker performance evaluations.

**Response:**

Safety accountability has been put into the yearly goals for performance evaluation of all the managers.
B.1 Spread widely and clearly ALMA’s safety belt policy with bumper stickers and postings in public areas.

a) Board signs have been posted
b) Instructions are reviewed and posted inside the ALMA shuttle
c) Penalties are applied
B.2 Use admonishments from all levels of management to make it acceptable to bring shame to those driving and riding without belts.

Response:

Managers have been requested to check the use of safety belts themselves and report non-compliance to the Safety office. Safety sends reprimands to offenders, copying supervisors and the Director.
B  Transportation and Material Handling

B.3 Add more thorough mechanical checks of contractor vehicles by Security, and make drivers uncomfortable in inadequate vehicles.

Response:

ALMA will begin its own car inspection, checking ALMA and contractors’ cars.
B.4 Install automatic lane-and speed-warning devices as is practical.

Response:
Comprehensive road signs have been purchased and installed. Lane warning has been installed on minibuses for the public roads. Automatic speed detection and displays for the ALMA roads are being purchased.
B Transportation and Material Handling

B.5 Require brightly colored vests for vulnerable workers. (Supplemental recommendation: Seek advice from existing local industries heavily involved in earthmoving.)

**Response:**
This action has been implemented.
B.6 Continue with great diligence the outsourced driver-safety training program, especially for new workers.

Response:

A professional driver employee shall train all authorized drivers. An internal license will be issued. External expert advice has been requested to establish optimum speed limits for each stretch of the road. Once they are established, these new limits will be posted.
C.1 Have ALMA contract administrators maintain a visible presence at contractor worksites and categorically promote safety there, thereby showing active attention to safety and easing some of the burden on ALMA Safety Office personnel.

Response: ALMA Safety Officer is meeting regularly with the contractors’ safety officers on all safety matters including this one. Weekly and daily inspections are carried out and contractor’s safety officers’ activities are noted. ALMA Manager and Supervisor seminar will help in this direction as well.
C.2 Have ALMA contract administrators consult with ALMA Safety Officers concerning necessary coverage and expertise of contractor middle managers and safety personnel to ensure adequate safety resources on each job.

*Response:* This action has been implemented. For this purpose safety officers are checking invitation-to-tenders on safety rules before they go out.
C - Contractor Safety

C.3 Require the ALMA Safety Office to carefully review contractor investigation reports for completeness and applicability and reject inadequate reports.

Response:
This practice has been implemented and is ongoing.
C - Contractor Safety

C.4 Add an easily-found near-miss and lessons-learned SharePoint site or page to the ALMA web page. Make it clear that near-miss reporting will not end in retribution. Encourage use by all.

Response: An ALMA safety wiki page has been created. A posting board for this purpose has been installed at the OSF (ALMA’s & contractors’ and OSF/TB); near-miss events are extensively researched when reported. It is difficult to know whether all events are reported. The ones that are reported are dealt with in a positive way (no punishments).
D - Training

D.1 Prohibit any work at ALMA before receipt of ALMA Safety Training.

Response:
No work starts over 3000m before the safety training is done. New, video safety training will be given at the guard house at the ALMA road entrance. Video production is underway.
D - Training

D.2 Add explicit discussion and written handouts concerning ALMA’s safety belt policy to the ALMA Safety Training.

Response:
This action has been completed.
D - Training

D.3 Require either an acknowledgement of understanding or (preferably) a written examination of ALMA Safety Training trainees.

*Response:* Training efficiency tests have been prepared. A written test is in place.
D -Training

D.4 Display emergency telephone numbers (including mobile-phone numbers) more prominently in the ALMA Safety Training.

Response:

a) Stickers have been displayed inside all dormitories,

b) Highlighted in the Safety trainings

c) Pinpointed on the ALMA Safety manual and Safety booklet.
D - Training

• D.5 Require annual refresher ALMA Safety Training for ALMA employees and contractors.

Response: Annual safety training updates have been implemented
D - Training

- D.6 In addition to the handouts given at the ALMA Safety Training, distribute brief English and Spanish versions of an ALMA Safety Guide containing key safety, security, environmental, and emergency response information. (No energized electrical work! Pedestrians: stay on pathways! No elevated work without fall-protection! etc.)

Response: The bilingual pocket safety guide is in review process.
D - Training

• D.7 Display the ALMA Safety Policy Statement prominently at the beginning of the ALMA Safety Training.

Response: This action has been implemented
E.1 ALMA and its contractors should revisit a sample of LO/TO operations to assure that lockouts can be made remotely and that affected employees remain outside threat areas. (On antennas this may be accomplished through the extant blue-beacon system.)

Response:

Disabling the antenna drives can be made remotely. LO/TO has been updated inside the ALMA safety manual and commented during the safety training. Antenna maintenance and operation manuals describes the safe access procedures and the LO/TO process.
E - Control of Hazardous Energy

- **E.2** ALMA should address arc-flash hazards through compliance with NFPA 70E or another consensus standard.

*Response: This action has been completed.*
F - Other Topics

• **F.1. Stop-work Authority.** Amend the ALMA Safety Manual and Director’s Safety Policy Statement to extend stop-work authority to all working at ALMA.

• **Response:** This action has been completed.
• F.2. Fall Protection. The ALMA Safety Office should periodically review its fall-protection training for completeness, applicability, and efficacy.

• **Response:** This action has been completed, recorded and will be reviewed periodically.
F - Other Topics

F3. Safety Resources. Consider adding an electrical engineer and a safety deputy to J. Lassalle to the ALMA Safety Office staff.

Response: A recruitment action on-going to find a safety deputy. The process is not complete yet. There is no plan (yet) to hire an electrical engineer; DTS electrical expertise is available when needed.
F 4. Oxygen Bottle Instructions. Usage instructions on personal (disposable) oxygen bottles should be written in English and Spanish instead of currently in Korean, with information of oxygen quantity inside the bottle and/or a breathable time.

Response: Instructions about the use of oxygen bottles are directly given to the visitors or staff. English/Spanish labels are done.
F.6. Tap Water. Consider providing the ALMA camp with drinkable tap water by installing water-purification equipment into the tap water system. It is important to be able to consume abundant clean water to keep individuals healthy, and to prevent mountain sickness.

Response: Water bottles are always and abundantly available inside dorms, in the main office fridge, at the OSF-TF, etc.