Skill of the Craft for Users at E949 at C-A

March 2001

Introduction

Many of the tasks necessary to maintain, repair, and debug E949 detector will be carried out by Physicists (Ph.D. and graduate students) and technicians. Much of this work is deemed to be within the "skill of the craft" for physicists, and as such does not require additional work planning or work permits. The purpose of this document is to define which sorts of tasks fall within this "skill of the craft" for physicists.
The E949 experiments, a continuation of E787, at the AGS. The detector is scheduled to be ready to take data simultaneous with RHIC running in 2001.

The following requirements apply to all personnel working at the experiment:

- No one person is allowed to perform tasks alone (two person rule) if covered by section one of this procedure or enhanced work planning when working on the experimental floor performing detector replacements / up-grades / repairs.
- All work will be performed by authorized and appropriately trained personnel listed on a published roster maintained by the experiment.
- If tasks are not listed as "skill of the craft", consultation is required with a *Work Control Coordinator*, to evaluate the task.

1. Detector Replacement / Up-Grade/ Repair

The skill-of-the-craft jobs to be performed are:

1. Observe the transport of completed counter assemblies on Al channel from Physics to AGS. Authorized Riggers shall perform this task.
2. Unload counters from truck to table with AGS overhead crane.
3. Remove stainless-steel support boxes for counter from detector.
4. Align a specially made counter support structure with the counter in detector.
5. Remove counter by sliding counter assembly from the detector onto the special support structure.
6. Lift counter using the powered hoist onto a table.
7. Store old counter on top of AGS shielding using AGS overhead crane. Authorized Riggers shall perform this task.
8. Drill and tap two 8-32 holes and add shims to the support structure in detector.

9. Align the special support structure with support in detector.
10. Load new counter to the support structure with the powered hoist.
11. Insert by sliding the new counter into the detector.
12. Re-install support boxes.

The work is done in height from about 5 ft. to 11 ft. on the hydraulic platform. The platform shall incorporate fall protection.

2. Electrical

Work on electrical devices is deemed low hazard skill of the craft* if:

- **AC or DC Voltage less than or equal to 50V;**
  Less than 10 mA of available current or
  Incapable of an instantaneous release of 10 joules or more of energy

* Injury is possible from flash hazards and non-electrical secondary effects. High voltage sources with fault currents less than 10ma and less than 10 joules of available energy are considered Low Hazard Operation (e.g. ion pump power supplies)

Examples of tasks allowed under this definition include:

- removing and replacing electronic modules in VME, NIM, Fast bus, and CAMAC crates.
- connecting and disconnecting front panel cables (lemo, BNC, etc.) from electronics modules.
- Instruments, detectors, and data acquisition systems may be tested and analyzed using conventional diagnostic equipment such as digital multimeters, oscilloscopes, network analzers, etc.
- using a multimeter to measure voltages of less than 50 V on typical PMT supplies (N.B. typical maximum currents for PMT supplies are ~2.5 mA).
- using logic analyzers to debug circuit boards.
- using Multimeters to check various currents and voltages on circuit boards.
- Using a computer (connecting and disconnecting computer to electrical outlet, connecting and disconnecting peripheral equipment to computer, turning on and off, etc.).

Examples of tasks which are **<u>not allowed</u>** under this definition include:

- working with 110, 208, or 480 V AC line power sources.
- working with exposed leads from the TPC and FTPC Low voltage power supplies.
- measuring the output of the PMT High Voltage supply (Voltages greater than 50 V, or with current greater than 10 mA.) with a hand held multimeter.
- Any work on magnet DC power buss or buss covers.

3. Mechanical

Movement of mechanical equipment around the E949 complex is allowed if:

- **No objects greater than 50 kg (110 lbs.) is to be lifted by hand**
- **The lifting of objects greater than 20 (45 lbs.) kg is done by two persons.**

Examples of tasks allowed under this definition include:

- moving computers around the facility.
- removing crates from electronics racks (once they have been unplugged).
- carrying diagnostic equipment (multimeters, oscilloscopes, logic analyzers, etc.) around the facility.
- Use of portable mechanical lift (i.e. foot operated lift for installing LV power supplies).
- Use of approved scaffolding. Scaffolding must be preapproved by C-A ESHQ, and appropriate fall protection must be incorporated in elevation above 6 feet.
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Examples of tasks **<u>not allowed</u>** under this definition:

- operation of building cranes.
- operation of forklift.
- operation of manlifts or working on scaffolding without proper training.
- use of rigging equipment (e.g. come-alongs, etc.) for vertical lifts.
- use of bench mounted power tools.

Only safety rated ladders are to be used, and a second person must be present for working on a ladder at heights above 1.2 meters (4 feet) or must be present during the tie off procedure.

4. Radiological Work

<u>All radiological work requires a Radiation Work Permit (RWP).</u>

- Routine skill of the craft work in radiation areas at C-A may be performed under standing RWP C-A 00-01 and EWP SS 00-001S.
- Radiological work in High Radiation areas or work exceeding the scope of the standing permit requires a specific RWP for the job. The C-A FS Representative will assist in the generation of the specific RWP.
- All workers in radiological areas shall have appropriate laboratory and department training.

5. Waste Management

All waste materials generated shall be properly disposed of as per C-A Department's and Laboratory's requirements.

- Report all spills or releases of any potentially activated or hazardous materials immediately to the MCR and C-A ESHQ Division Head.
- Disposal of all Beryllium used in the experiment shall be the responsibility of the experimental collaboration. Inventory of Beryllium components are required by the C-A Department.
- Ultimate disposition of test components, assemblies, and peripheral equipment associated with the experiment are the responsibility of the experimental collaboration.
- The C-A Environmental Coordinator (Joel Scott x 7520) can consulted in the removal of waste.

6. Emergency Response

A designated <u>Shift Leader</u> shall be responsible for communicating emergency conditions and alarms to C-A support personnel as well as to Laboratory Emergency Services.

- The E949 shift shall be familiar with C-A OPM 3.0.
- Experimental shift personnel shall be trained in the experiment's Standard Operating Procedures (SOPs) for emergency response.

- SOPs shall be available to all experimental personnel.

7. Work other than skill of the craft for a physicist

Any tasks which do not fall within the definitions given above for skill of the craft either:

- require approved procedures, and the individual(s) performing the task have been trained, and are documented as trained, in the procedure.
- require further work planning. For E949 this work planning is performed by the *Experimental Spokesperson.*

Experimental Spokesperson: **S. Kettell**

Liaison Physicist: **I. Chiang**

Liaison Engineer: **D. Phillips**

Work Control Coordinator: **S. Kettell**

Att: Appendix A