Getting started with Operational Readiness Clearances

Experiments in the Particle Physics and Neutrino Divisions of Fermilab require ESH&Q review to help ensure that all appropriate standards and requirements are met. The Operational Readiness Clearance (ORC) review process performs this review and grants final operational authority with an ORC or, as appropriate, partial ORC. Tests and R&D efforts may require ES&H reviews and ORC prior to start-up. The controlling document is PPD_ESH_006.

Extensive information about what safety requirements apply to any specific situation may be found in the Fermilab ES&H Manuals at http://esh.fnal.gov/xms/FESHM. In http://esh-docdb.fnal.gov/cgi-bin/ShowDocument?docid=3270 are several documents entitled "Helpful Hints About…" which informally discuss some of the more common issues that occur in the review of FTBF experiments.

The procedure begins by stating what type of hazards might exist with using a Hazard ID Checklist. This is Appendix I of the TSW; or you can get a copy directly from http://home.fnal.gov/~bellanto/work/ORC/.

In the case of a relatively small apparatus that has only custom electronics and HV hazards, you initiate the ORC process by sending an email to me at bellanto@fnal.gov. We do request the following info 2 weeks before you install, although sometimes we might deign to waive this requirement if our palms are appropriately greased. You need to include the following information:

1. Name and contact information for the representative who will be on hand for your experiment / facility / apparatus.
2. Where is the apparatus to be reviewed. We need to know two things. We need to know if the apparatus will be in a beamline, and we need to know where to find it so that we can look at it.
3. When it will be ready for inspection; more on this below.
4. What is to be reviewed, e.g. "A wire chamber, 2 CAMAC crates and a tokomak". A little history might be useful but is not the central thing, except possibly in regards to what parts of the apparatus may have been reviewed earlier and at what date.
5. Your Hazard Identification Checklist.
6. Please send us electrical documantation, as follows:
   a) Simplified (block) electrical diagram of entire installation,

including commercial components, with special emphasis on power handling issues. These must be of sufficient detail that reviewers can verify that you have observed good systems engineering practices and have used proper fusing, wire sizes and insulation, termination etc.

b) Line diagrams of custom manufactured circuitry or modifications of commercial components of similar detail.

An email to schedule the walkthrough is usually sent 2 days ahead of time and the time of the walkthrough itself is usually fixed 1 day ahead of time, based on responses to the first email. The experimenters or the FTBF coordinator must respond saying when the apparatus will be installed; we have to review what actually exists in the experiment, not what was originally intended to be in the experiment.

The walk through is conducted with the experimental representative, but depending on the situation it may be helpful to have (a) other experimenters and (b) a digital camera. The former is so that minor issues that arise can be addressed immediately without delaying the process. The latter is valuable in the case where an experiment plans to run, cease data taking, and then return to take more data. More on that below. The photos are intended to provide a careful check that the apparatus is indeed unchanged; if we know that the apparatus is unchanged the process is simplified.

In most cases, the walkthrough is a simple and straightforward affair. See Figure 1.

Cases with other hazards will be handled in different ways according to what issues there might be; many of these cases will have a longer lead time than the simple case above. Informal advisory pre-reviews can almost always be arranged. Pressure vessels have a detailed protocol, described in FESHM 5031; here and with other mechanical structures that merit engineering notes, the ORC committee will verify that they have been appropriately reviewed prior to the walk through. Flammable gas mixtures and materials are covered in the 6000 section of FESHM; provisions exist of course for the case where the test requires the installation of a radioactive source, which is different from the case of a temporary use of a source from the FTBF or other lab lockbox.

After the walk through (and any appropriate remediations are in place), the experimenter or the FTBF staff will have to get a sequence of sign-offs. Leave a copy of the signed-off sheet with the administrative staff of PPD there and please also send a copy to me via inter-office mail.

Figure 1. The ORC walkthrough is usually swift.

Regarding experiments that are returning after a hiatus, PPD_ESH_006 reads:

All new proposals, including significant modification to existing equipment, must be reviewed and approved for operation through the ORC process. Projects that have been previously approved but have been idle for greater than 60 days, must contact the ES&H Review Chair or Cryogenic Safety Panel Chair to determine whether another review is needed. The project will indicate, in writing, the end date of the previous run and any changes to the project. The respective chair will then communicate any findings or recommendation to operate to all signatories of the ORC document.

Normally, if there is no significant modification to the existing equipment, and less than 60 days have passed, a review is not required. I do ask to be informed, and also it might be than an informal advisory review is good practice.

The key thing here is that phrase "significant modification to existing equipment". If for example, your experiment has not changed in the sense that all you want is maybe a little bit more calibration data, but has changed in the sense that some power supply had to be replaced for some reason, then you do NOT have an unchanged experiment. Because while you, as an experimenter, might be concerned about the calibration of your dataset, it is the power supply that might catch fire! Reinstallation is also an opportunity to leave trip hazards or daisy chained power strips or other reintroduced hazards; so that might count as a significant modification, depending on how the deinstall was implemented.

Leo Bellantoni

Version of 15 July 2016