

Some Supplementary Review Information for ARMs

General Information Regarding Radiological Areas

As a “class” of areas, Radiological Areas are designated in 10CFR835. This has a different meaning than our use of the designation – “Radiologically Controlled Area”. Radiological Areas include the following:

- Radiation Area
- High Radiation Area
- Contamination Area/High Contamination Area
- Airborne Radioactivity Area

Of these, ARMs are only responsible for posting and managing Radiation Areas. Discovery of, or suspicion that another radiological area exists should result in notification of RadCon.

The definition of and posting requirements for Radiation Areas are specified in 10CFR835. **No deviation from these requirements is permitted.** This means that a Radiation Area must be posted unless you have adequate direct control over entry to the area. Specifically, the §835 requirements for the posting include:

- Clear and conspicuous posting of signs
- Magenta or black on yellow radiation trefoil symbol, and the words “Caution, Radiation Area”

Posting may be excepted under the following condition:

- Areas may be excepted from the posting requirements of §835.603 for periods of less than 8 continuous hours when placed under continuous observation and control of an individual knowledgeable of, and empowered to implement, required access and exposure control measures [i.e., an ARM].

The above applies to accessible areas. If areas are inaccessible, they are not required to be posted.

Practical Implications of Above

- Remember, the definition of Radiation Area is: *radiation level above 5 mrem/hr at a point 30 cm (1 foot) from any surface from which radiation is emitted.*
- Use conservative measures when posting Radiation Areas – place boundaries as reasonably far beyond the actual point where the dose rate drops below 5 mrem/hr as practicable.
- Make sure signage has at least the minimum verbiage required.
- Failure to identify and properly post a Radiation Area (or other Radiological Area) is an infraction on 10CFR835. ARMs are directly responsible for meeting the regulatory requirements during performance of entry surveys.

Additional verbiage on signs is required by JLab procedures. In general, follow these guidelines.

- If 30 cm dose rate is < 25 mrem/hr, use “Contact RadCon Prior to Entry” insert.
 - Conditional insert “Walkthrough Permitted” can be used
- If 30 cm dose rate > 25 mrem/hr, use “RWP Required for Entry” insert.

RCAs

The designation “Radiologically Controlled Area” – RCA, is a JLab-specific posting, and is implemented for purposes of administering our radiological program (threshold for training and dosimetry requirements, etc.). Some flexibility exists (with RadCon manager concurrence) in posting of RCAs, based on occupancy and other issues. The default definition is any area in which a person might be expected to exceed 100 mrem in a year. We implement this based on the assumption of 40 hours/week occupancy. Essentially all areas in which ARMs perform surveys should already be posted as RCAs.

RWPs

RWPs are “written work authorizations” for purposes of compliance with §835. The regulation says the following: *Written authorizations shall be required to control entry into and perform work within radiological areas. These authorizations shall specify radiation protection measures commensurate with the existing and potential hazards.*

This means that all entry to Radiation Areas requires an RWP. Remember that you are on an RWP that specifically allows you to enter and survey within Radiation Areas. However, you are not authorized to enter High Radiation Areas. One reason this restriction is in place is that you must also have self-reading dosimetry for entry to HRAs.

Question: when you post a Radiation Area as “Walkthrough Permitted” (see page 1), why is this not a violation of §835, regarding written work authorization?

Answer: the general access RWP provides written authorization for entry to the enclosure for general work, inspections, etc., and specifies commensurate protection measures. The combination of that RWP, RadWorker training, work-area familiarization training, and the specific instruction on the sign allowing “walkthrough” is sufficient authorization for the particular task - “passing through”.

General Information About Survey Documentation

This is a compilation of material that has been distributed before, with some updates.

Survey maps are (1) the record of the survey event and (2) the tool for communicating radiological conditions in an area to people who are working there. **Neatness counts.** A survey sheet which leaves a reader unsure of the nature of the radiological environment is not worth the time you spend to do it. If necessary, you can always re-copy the survey when you return from the field. The information needs to be legible and clear. Boundaries need to be clear. The extent of the survey (for partial surveys) needs to be clearly shown.

Some recurring issues with survey records

1. The presence of dashed lines indicating posted areas, but nothing showing what kind of area it is. In some cases, abbreviations are used, but the abbreviations are not explained. All full surveys are expected to have all posted areas indicated and labeled (this is not critical for partial surveys). If you want to use abbreviations, that is fine, but please use a legend. The latest sheets have some pre-designated ones.

2. On partial surveys, always put a reason for the access and indicate the work area clearly on the map. Some survey maps may not contain blank spaces for "reason", but you should write it in. The reason should indicate roughly what equipment was worked on and what the extent of the work was, for instance "diagnose Q1 magnet power supply". That comment, along with graphic indication on the map of the areas surveyed and entered, provides a reasonably complete picture.
3. Lack of clarity regarding whether the boundaries are properly placed. Sometimes it is difficult to clearly show the readings at boundaries or inside the boundary due to space limitations. We have seen surveys that show '5' just outside a posted Radiation Area. This indicates an improperly posted area (only allowable if it's an escorted survey). If necessary, use some kind of indicator with a footnote to provide explanation if there isn't enough room. It's especially important to be clear if there is a condition that is unusual.
4. No survey data within posted areas, and no contact dose rates. Important points:
 - Particularly in the case of a full survey, it is important to show data within the posted areas, and some indication at the boundaries that the posting is appropriate to the conditions.
 - Just showing a boundary with no information does not imply that the boundary conditions are correct.
 - Providing data within posted areas gives us the information necessary for follow-up surveys or guidance to workers.
 - If someone has a need to enter the area for a short period, if there's no information on the survey, another survey will have to be done - this slows down work and is not ALARA.
 - Use the guidance in the ARM training guide for when to obtain contact dose rates and dose rates inside posted areas.
 - At least one data point - contact and whole body - in each posted area (including High Radiation Areas) needs to be shown on a full survey to verify that the postings are correct and the area doesn't exceed levels for physical controls (remember, HRA data is to be obtained from outside the area).
 - If you can't reach what you think might be the highest dose rates due to the presence of a High Radiation Area boundary, call RadCon immediately to have them finish the survey, or keep the area in Controlled Access and do partial surveys for entry.
5. Use of the "highest area posting and whole body dose rate" box. This has been revised to include only one entry. Appropriate entry would be – HRA, 140 mrem/hr, or Rad Area, 50 mrem/h. We are looking for "at a glance" highest whole body dose information. If the highest dose rate is in a Radiation Area, but there is a posted High Radiation Area in the region (and it has lower readings), then just put in the dose rate from the Radiation Area.

Issues Regarding FEL Surveys

We continue to see some problems with surveys in the FEL vault. These involve not only the survey sheets, but the physical condition of posted areas.

1. Double-posting of RCAs. Do not post RCAs within the vault. The vault is an RCA at all times, and whole body dose rates below 5 mrem/hr do not require any additional postings or boundaries.

2. We have noted signage that is incomplete, does not meet basic requirements in §835, or is unclear as to what the posting level is.
3. Boundary roping that is not robust enough to ensure that the boundary is properly defined.
4. Use of the “exclusion area” at the back of the vault. We have noted on several occasions after a full survey to Restricted Access that the signs have not been reconfigured, or that some but not all the signs were changed, etc. During Rapid Access of the vault, this area should not be entered. Only upon a survey can persons make entry to this zone. At that time, if it is a full survey, the posting level of the area needs to be coordinated with FEL operations. If the vault is staying in Controlled Access, and the status might go back to Beam Permit, the exclusion zone should remain posted. If the vault is going to Restricted Access, the exclusion zone should be de-posted. More specifics can be found here <http://www.jlab.org/accel/RadCon/Surveys/FELrapidaccess.pdf>

NOTE: As of this writing, the FEL is being expanded to operate a UV beamline. The Rapid Access probes have been reconfigured to provide more coverage of the area. During the transition, we are evaluating the sensitivity of the system in the new configuration. The Rapid Access system should not to be used for entries – i.e. all entries require a survey. FEL Operations is implementing this requirement.

Physical Boundaries/Posting

We have augmented access to materials such as signs, ropes, etc. in most of the accelerator enclosure areas. The halls have cabinets with posting/roping materials, and both hall A and C are continuing to assist and improve provisions for rope boundary flexibility. In general, keep the following in mind:

- Don't rope to anything that moves – in the halls, there are rope reels and magnetic rope terminations so that you can apply a “break-away” connection if you must hook to a spectrometer.
- Make sure you use an adequate number of signs, post all access approaches to an area (for instance, if the Radiation Area is in the overhead, post access points at floor height, and give instructions on the nature of the area on the posting.
- Avoid hand written inserts if possible.

FAQs

There have been questions from time to time as to whether an ARM can conduct certain surveys. Here is a list of common questions:

- Can an ARM de-post a Radiation Area?

Yes. Assuming you can conduct a survey thorough enough to verify the absence of the condition. But it may be more efficient in many cases to leave it posted if you have reason to believe the condition will reappear shortly.

- Can an ARM de-post High Radiation Areas?

No. This is mainly a matter of consistency. Since ARMs are not allowed to routinely post HRAs, they should not de-post them either. Call RadCon on-call for assistance (case-basis approval may be given).

- Can an ARM conduct the beamline surveys necessary in Hall B and FEL in the event hands-on beamline work is to be conducted during a Controlled Access (during a "Rapid Access "entry)?

Yes. There is no reason an ARM can't assess these work areas. The same limitations as normal apply - if a Radiation Area or hot spot is found, the same triggers apply.

- Can an ARM conduct the area survey needed if the Rapid Access system beacon is on in hall B or FEL?

Yes.

- Can an ARM conduct surveys for disassembly of controlled shielding configurations?

Yes, if approved by RadCon. RadCon must check the configuration after the shielding is restored.