

March 3, 2021



TO: Distribution
FROM: M. Quinn
SUBJECT: Radiation Safety Subcommittee Meeting of March 3, 2021

MEMBERS (P=Present, A=Absent):

S. Borton	A	K. Graden	P	D. Newhart	P	J. Scott	A
N. Chelidze	A	D. Hahn	P	M. Quinn, Chair	P	K. Vaziri	P
J. Compton	A	D. Hockin	A	D. Reitzner	P	M. Zientarski	P
J. Fulgham	P	R. Madiar	A	W. Schmitt	P		
K. Gollwitzer	A	S. McGimpsey	P	M. Schoell, Deputy Chair	P		

Others Present: L. Regar

New Business

- RP Note 78** – W. Schmitt reported that when doing shielding calculations for TSIB, used MicroShield. In the process needed to do a dose rate to activity conversion, and used RP Note 78 that describes activity expected for rad waste barrels based on dose rate. Used the rad waste barrel spreadsheet and came up with different values. May be worth revisiting RP Note 78 and benchmarking with MicroShield to see if the same results/answers are produced for the similar geometries.

K. Vaziri noted that calculations in the RP Note are very rigorous. So if results are different, will need to understand which is “correct” before making updates.

W. Schmitt will start looking at updating this RP Note.

K. Vaziri noted that for TSIB specifically, they will have multiple samples with multiple isotopes, which may cause issues when using the RP Note spreadsheet. Kamran and Wayne will discuss this further.

M. Quinn agrees that this is a good idea. The RP Note is likely good as is, but will be useful to have other methods for doing these calculations for varying geometries. Matt, Kamra, Kathy, Wayne and Sue will discuss this further.

- MTA** – S. McGimpsey reported that MTA has started running beam to experiment samples in ITA. During access (February 22nd) to retrieve copper foils to understand dose to samples, found hot spot (170 mR/hr) and contamination (7,000 cpm on the frisker) on beam pipe. Hot spot and contamination were not expected. Area posted as High Radiation Area, Contamination Area, No Access without RSO approval. RCTs were able to decontaminate the beam pipe.

AD has been working on understanding cause of hot spot. Believe it was caused by a power supply failure for the last bending magnet. Think this issue has been resolved.

Still have issues with beam profile monitor, and experimenters not fully understanding the beam their samples are seeing. This is currently being worked on. Once this is understood, copper foils and/or pin diodes will be reinstalled to re-confirm they are seeing beam where they expect to see it before installing experiment samples. Also looking into beam spot size to see if it could be larger than it currently is.

Once both the power supply issue and beam profile issue are both resolved, and experimenters are confident in monitoring the beam their samples are seeing, ITA experimental runs will resume. Radiation surveys will continue.

M. Quinn wondering if we have a process to ensure all stakeholders agree that we're satisfied with the results of the diagnosis efforts and are ready to resume ITA experimental runs. Would like to ensure a method for either ensuring the power supply doesn't fail again, or else be notified if/when it fails again. Would also like to ensure that experimenters are satisfied. May be worth ensuring we (Fermilab) can say that beam equipment will work properly such that we don't damage experimenter equipment.

3. **FOX** – M. Zientarski reported that he will be meeting with French collaborators to determine need for x-ray detection of the cavities. RPCF will support increased x-ray detection around site by use of a new version of the FOX. Will ramp up this project work, in parallel with the OWL project, to “future proof” instrument design.

Old Business Carried Forward

4. **RSO Position is Filled** – M. Schoell reported that the open RSO position has been filled. Ben Russell started March 1st, and will start coming on site March 8th.
5. **RPCF** – M. Zientarski reported that they are working on taking advantage of the “lull” in instruments due for calibration in April (due to mass calibration from last year due to COVID) to rearrange calibrations to better suit RPCF.
6. **Outdoor Hazard Assessment** – M. Schoell reported that the Outdoor Hazard Assessment team is now at the point to do “boots on the ground” assessment and document specific potential hazards on a Teams spreadsheet. Many of our potential hazards are tracked through various programs, and can likely be filled out without need for “boots on the ground”. M. Schoell will share a Teams spreadsheet to everyone, please start filling out specifics you are aware of. Please note in the comments column what program this is being already being tracked/monitored through.

Abbreviated list of potential hazards below, please see previous meeting minutes for full list.

- Posted Radiation Areas & Posted High Radiation Areas around accelerator enclosures
- Radioactive Material
 - Permanent outdoor storage places
 - PW5 is 4ft fence, locked at all times, uses padlock
 - FESS Site 39, locked unless Fermilab person actively working
 - Behind MAB, locked 8ft CA/RMA fenced area
 - Site 40, not-locked 8ft CA/RMA fenced area
 - Railhead, locked 8ft fence when Railhead personnel not present, unlocked with Railhead personnel there

- Temporary outdoor storage of rad. Material (mainly shielding blocks being transported for installation) - CA/RMA posted ropes/stanchions
- Nuclear Material
 - Outdoor storage behind DAB, DZero test cryostat – locked 8ft fence
 - D2 gas cylinders within fenced portion of Railhead
- Outdoor chipmunks with checksources
 - Some outside that are outside of fences, but within doghouses
 - May have temporary chipmunks not within a doghouse
- Skyshine/Air emissions
 - Evaluated in Shielding Assessments
- Dose from Beam
 - Evaluated in Shielding Assessments
 - Currently working on beam-on surveys for all beamlines
 - Also expanding area monitoring program to monitor outdoor/publically accessible locations
- Weather station (North end of site, East of FAST) (no potential harm to personnel, but could be susceptible to tampering)

7. **Review “JULIE Excavation Waiver Prohibited Zone” Map in GIS** – M. Schoell reported a recent event at MC7 where minor excavation (< 6 inches) was done outside of the MC7 enclosure to aid in shielding block installation, however no JULIE was submitted. Beam was off during the time and no required shielding was impacted. FESS is performing an HPI. However it did bring up the question about when do we (radiation safety) need to see a JULIE (for which areas as well as for which type of activity).

There is currently a map on the GIS website (<https://fess-app.fnal.gov/app/JsViewers/faces/fermilabViewer.xhtml>) showing “Prohibited Excavation Waiver Areas”, indicating areas that are required to have a JULIE before work. This area has been reviewed by RSSC, and ensures RP review of planned excavation activities. Please take a look and review the map. **Let us know if any updates are needed by February meeting.**

Feb meeting – W. Schmitt reported that the map looks relatively unchanged, no updates needed.

We’ve also been asked by the DSOs to clarify what activities we are concerned about and need to be part of the review/approval process within this “area” (i.e., excavation of soil, excavation of parking lots, excavation of gravel, drilling into walls/floors/ceilings, etc.), and why it’s necessary (i.e., to ensure beam is off for affected areas, to ensure required shielding is returned before beam operations, to ensure survey of potentially activated soil, to ensure survey of potentially activated facility/infrastructure, etc.). They’ve asked that we provide ½-1 page memo/description to the DSOs so they can pass along to Task Managers/Construction Coordinators, Building Managers, etc. See initial thoughts below, **please review and send additional comments by February meeting, we will finalize memo/description for DSOs at February meeting.**

Feb meeting – no update. (see list below)

In addition, they've asked that we review FESHM 7030 (Excavation) and 7040 (Concrete Cutting/Coring) for any necessary updates from radiological perspective. Are any changes necessary for FRCM as well? **Please review FESHM chapters and have comments ready by February meeting.**

Feb meeting – W. Schmitt noted that previous incidents (i.e., IERC moving markings, MI JULIE submitted months before the work started and work was stopped because people forgot that JULIE had been done) have occurred because of some confusion on how long JULIES are valid for. May need more clarification how long JULIES are valid, or when it becomes expired – some time expectation where a new/updated JULIE is required. It's noted that per FESHM 7030, TM/CCs have 7 days within the approvals to do work and "can extend the JULIE as long as they need to", but nothing written as to how to show (confirm and notify) that the JULIE has been extended.

M. Quinn noted that JULIES are supposed to go into IMPACT. That should help somewhat for people looking at IMPACT for WPC for other jobs.

W. Schmitt commented that it would be ideal to have something explicit in 7030 that says "if a permit is x months old, a new one needs to be generated".

- Excavation
 - Soil
 - Parking Lots
 - Gravel
 - Any excavation of any material within the "Prohibited Excavation Waiver Area" requires JULIE to be submitted to allow for radiation safety review to determine if excavation will potentially impact berm and/or required shielding. If berm is impacted, beam to the affected area must be configuration controlled off by the RSO prior to the start of work, and the berm confirmed restored by the RSO at the end of the work prior to resuming beam operations. Depending on the size and scale of the excavation, confirmation may be done visually by the RSO or may warrant a topographic survey performed by the Alignment Group. If excavation will impact required shielding, the soil will be required to be surveyed by RCTs to determine if it's activated. If the soil is activated, excavation personnel may need full Radiological Worker training and equipment may need to be decontaminated. If excavation impacts required shielding and the soil is not planned to be replaced, it must remain on site.
- Facilities (drilling walls/floors/ceiling, removal of metals/infrastructure)
 - Posted CA/RMA
 - For facilities only posted as CA/RMA, no rad restrictions apply.
 - Posted RA/EA
 - For areas where beam is present (EA/RA), infrastructure and facility equipment has the potential for activation and/or contamination. JULIES should be performed for this work in these areas to ensure radiation safety review and approval. Material should be surveyed by RCTs prior to work, and prior to disposal (using the MMR process). Metals may be subject to the

metals recycling suspension, and should be reviewed on a case-by-case basis by the RSO.

- NOTE: MT6.1, MT6.2, MC7, NM4 and MC-1 Hall are posted EAs in addition to CA/RMA. These enclosures would fall into this category, requiring radiation safety review of all facility work (drilling walls/floors/ceilings, removal of metals/infrastructure).

No progress. Will schedule meeting with subset of RSSC and DSOs to further discuss.

8. **Target Service Integration Building** – M. Schoell reported that the project is working towards awarding a contract to an AE firm. There is progress being made on the workflow document, which will include activity/contamination limits (based on whole body, extremity and internal dose potential). There remains concerns in FSO on material & contamination controls, which will be addressed once the workflow document is further refined and available to share.

M. Quinn mentioned that the upcoming DOE O 420.2c rewrite, there's discussion on including Hazard Category 3 limitations on what is able to continue to be covered by DOE O 420.2c. So there may be a need for additional inventory of activated material in this space. We currently do inventory for radioactive sources, but not for activated material. Will need to see what ends up in the updated Order.

9. **DUNE** – K. Graden reported meeting with D. Newhart and collaborators on planned sources: Am-241, Cf-252 & Bi-207. All well below nuclear material accountability thresholds, and can be managed under the Radioactive Source program.

M. Quinn reported that it was brought up that DUNE will need to use instrumentation for surveys (of sources, neutron generator, etc.) that will need to be calibrated. Will need to discuss/determine how to handle this calibration (send to vendor, return to Fermilab, etc.). Instruments would be similar to what's currently used at Fermilab, but will be needed in South Dakota.

M. Quinn also noted that we'll have to think about plan for if/when we find activated material (outside of sources) or contamination at SURF.

10. **2021 10 CFR 835 Triennial** – M. Quinn reported that the review will be on Sections B, F, G and K, and the review team has been established: Dianne, Kathy G, Mark, Lisa, Dave. Will have kickoff meeting in April at the earliest, due to increased workload for reviewers in the early spring.
11. **Electronic Dosimeters** –M. Zientarski reported reaching out to vendors to get some "hands on" experience with the dosimeters and software before recommending devices. Will involve RCTs as well.
12. **RPCF Source Replacement** – M. Zientarski reported that he's received approval from CSO to put the vendor on the essentials list, and is now working with Legal to vet the vendor and get them on the list. Ideally would like to do this work in April. Looking into adding camera to allow remote monitoring of the work to aid in social distancing.

13. **DOE O 435 Added to Prime Contract** – L. Regar reported that the implementation plan has been sent to FSO for their review, waiting for response.
14. **Eating/Drinking Near Source Boxes** – M. Schoell reported that this effort is still ongoing. AD DSO will be asking AD Department Heads to help look into this, along with eating/drinking near other industrial work spaces. Working with them to brainstorm reconfiguration from that standpoint. It was also noted that the vending machines have been moved.

R. Madiar reported that ANL forbids eating/drinking in RMA, which is above 10CFR835 requirements.

No update in March meeting.

M. Quinn reported that it could appear easy to “fix” the problem, but it will be very extensive. So the more information we can gather on the extent of the fix, compared to the potential risk of leaving spaces as is, will aid in this effort.

15. **Dose to Public FSO Concerns** – Post-start recommendation from FSO with approval of ASE Rev 12 (MTA revision) highlighted FSO concerns about FNAL use of occupancy factors when calculating potential dose to the public. Recommended controls be put in place for any areas of concern when removing occupancy factor. Recommendation also mentions external DOE review. This stemmed from the DOE looking at Fermilab’s site accessibility.

As the Fermilab site is closed to the general public, the otherwise publicly accessible areas of the site that could exceed public dose restrictions (if not for occupancy adjustment) do not represent a public risk. Prior to Fermilab allowing public access to the site, the areas that would then be publicly accessible, that could exceed public dose restrictions (if not for occupancy adjustment), must be posted as restricted to Fermilab workers unless a subsequent DOE external review proposes alternative expectations that are subsequently accepted by the FSO Manager.

M. Schoell reported that the report is done and found no areas accessible to the public that could be above 100 mrem in a year. A few recommendations from the report including more area monitor locations for continuous monitoring, etc. M. Schoell will send the report to RSSC. It can also be found [here](#).

M. Quinn has action item for RPS – look into how we expect LCW/water systems to change with increased beam power. W. Schmitt will look into, but noted that there are chipmunks in a few LCW rooms. If scaling linearly, there could be issues for Muon Campus areas, which have locations already found to be > 100 mrem in a year. J. Fulgham reminded that when beam is increased for Mu2e, they will no longer be targeting in AP-0, so may not be an issue. W. Schmitt suggested modeling, and will look into it.

16. **NEXUS DD Neutron Generator** – D. Hahn reported that it’s been removed from the Mu2e pit. The generator is moved to Lab G and the deuterium bottle is at Site 40. D. Hahn also reported that this is good because Mu2e DT Neutron Generator may be delivered soon.

No update.

17. **Safety Assessment Document review** – No update.

18. **Accelerator Readiness** – No update.

19. **Contamination in Enclosures** – No update.

20. **SARP** – No update.

ALARA Topics

21. none

Operations

J. Compton reported that Ops is delivering beam as requested, and is helping the MTA beam loss diagnosis.

PLACE AND DATE FOR THE NEXT MEETING: THE NEXT MEETING WILL BE ON APRIL 7, 2021 AT 2:00 PM CENTRAL VIA ZOOM (MEETING INFORMATION WITHIN OUTLOOK CALENDAR EVENT).

FY2021 Minutes: ESH DocDB 6112

Distribution via E-Mail–

Amber Kenney – Chief Safety Officer	Subcommittee Members
Eric McHugh	Bridget Iverson
Raymond Lewis	Nicole Gee
Others Present	
RPO Department	