

June 2, 2021



TO: Distribution  
FROM: M. Quinn  
SUBJECT: Radiation Safety Subcommittee Meeting of June 2, 2021

MEMBERS (P=Present, A=Absent):

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

### New Business

1. **Nevis Blocks** – Lab received funding to dispose of Nevis blocks. Eric McHugh leading from ESH side. Issues: blocks were activated before coming to Fermilab and are a mashup of miscellaneous materials within the blocks (and blocks don't appear to be consistent with one another). Won't be able to use survey & clearance process to survey exterior of blocks to clear them (which is possible for volume activated material activated at Fermilab). Also IH concerns with disassembly of blocks, which contain lead, etc. From survey standpoing, easiest to dispose of as radioactive waste. Would need to look into how to determine mixed vs. radioactive waste. Matt/Eric working with FESS.

### Old Business Carried Forward

2. **AD controls upgrade workshop to take place in May.** Several goals identified: Configuration Management Program, ODH, tritium evaporators, data acquisition, etc. Maddie presenting Friday 6/4, and will send presentation slides to RSSC.
3. **DOE RPP Review Ongoing** –Final report received, Fermilab will need to do a causal analysis and extent of conditions review of the two L1 findings, and then develop a corrective action plan (CAP) for all findings. DOE O 458.1 cross-walk review is ongoing, and will roll into CAP. Action Items already identified include: creation of ERPP, Environmental ALARA statement, survey & clearance document, RP Notes for dose rate to contamination and anticipated radionuclides/survey requirements. Details being worked on now. Also performing a Dose Rate to Contamination study to aid in Process Knowledge, RP Notes and other documentation.
4. **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.

April – no update.

Wayne: did comparison between RP Note 78 and calcs from Microshield. Did calcs for uniform distributions for Cu, Al, and Fe. Some difference between old worksheet and RP Note 78. Slightly different attenuation coefficients. Energies are averaged in worksheet. RP Note is averaged. Specific recommendations are hoped for by the beginning of June.

June – W. Schmitt reminded group that the Note is sound, but the spreadsheet needs review/update. Conservative, so no impending issues. More updates for next week.

5. **MTA** – MTA post-commissioning review complete, provided useful Lessons Learned. M Quinn wondering who will capture Lessons Learned into the LL database. M. Schoell will follow up with AD for LL and Recommendations.

June update: In early May, worker reported contamination on their hands. ITA irradiation paused for investigation. Looking into materials used, beam incident on material, material damage thresholds, etc. to determine if material and/or beam needs to be limited in certain circumstances. RPO developing new procedures for pre-irradiation review and post-irradiation surveys/verification before resuming.

During ITA pause, MTA and Linac were able to implement long pulse train and reach higher beam intensity. Part two of the Shielding verification study was performed. Study confirmed shielding adequate, MTA able to run at full Operating Limit when beam resumes.

6. **FOX** – M. Zientarski reported that FOX discussions have ramped up, due to new request from new Quantum Computing Lab (QCL). Attempting to coordinate RPCF efforts and other Lab resources for PIP-II IT (and the test cave that the enclosure will become when PIP-II IT is complete) and QCL.

RPCF has also switched to “production mode” to accommodate requests.

Working on FOXes on two fronts: QCL needed two. Built and commissioned one new one for QCL. Other possibilities include additional FOXes for PIP-II. This might influence the development of a new FOX.

June – no new activity. Waiting for response from PIP-II after providing them with cost estimates.

7. **RPCF** – M. Zientarski reported Low Level Facility source projector replacement work went smoothly. Work took under half a day. Currently recharacterizing facility. Once complete, will resume dosimetry spiking and other activities.

Electronic dosimeters are still being evaluated. Have samples from multiple vendors, and were able to perform some tests before shutting down the cave for the source reload. Looking at software for both units, and will meet with RPO again soon.

Tritium Monitor – RPCF looking at tritium monitor and discrepancy between calibration checks with two sources.

8. **Outdoor Hazard Assessment** – M. Schoell reported previously 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)

April – Teams spreadsheet was sent to RSSC. Please review and add comments as appropriate. Matt will follow up with Maddie about this.

June – Reminder to please fill out spreadsheet in Teams. Seems link sent was for SharePoint and not Teams.

9. **Review “JULIE Excavation Waiver Prohibited Zone” Map in GIS** – M. Schoell previously 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 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).

April – Discussions with RPO/DSO/SSS have started. No final decision yet. Matt will follow up with Maddie on this. W. Schmitt suggests that the current waiver lines on the current map are well drawn and should be minimally affected by this process.

June – current system seems best route. FESS has recently asked for relief for minor jobs (i.e., work on potholes on Discovery Rd.) but not able to give blanket waivers as requested because not all areas are the same (i.e., part of Discovery Rd has parts that are close to the Meson beamline).

**10. Target Service Integration Building** – M. Schoell reported that there was a review on the Hot Lab plan from other Hot Lab SMEs. The review went well and the reviewers felt we were far along in the planning for this facility, particularly the risks and mitigations. Some recommendations mentioned in the informal closeout come from work at Hot Cells in nuclear facilities, beyond the

scope of the work we'll be doing at TSIB, so will need to be sure that if they're adopted that they're best practices rather than requirements for operating TSIB.

The workflow draft document has been completed. Some more information is needed (i.e., actual numbers for various limits, clarification on who writes procedures, etc.). Work on this project is ongoing.

TSIB working with firm for building design/construction.

Rachel mentioned that during the 420 rewrite, certain parts of isotope facilities after irradiation is completed are no longer covered by 420. But so far looks like Hot Cell work for accelerator/target R&D would still be covered by 420. Rachel will continue to share updates.

11. **DUNE** – M. Quinn reported a meeting between RPO, FSO, DUNE and DOE HQ to discuss plans for source use at DUNE. RPO will create “implementation” document for resource (personnel, equipment, etc.) needs for propping up source program at South Dakota. Work on this is still ongoing. D. Newhart reported still working with RP to understand “implementation plan” document. Current plan is to have this provided from RP to DUNE by June 18.
12. **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 once the ongoing DOE RPP review concludes. DOE review felt that 2020 assessment lacked specific LOIs for reviewers that were not health physicists. Possibilities include writing more specific LOIs or going with external reviewers.

Kathy reported no kickoff meeting yet.

13. **Eating/Drinking Near Source Boxes** – M. Schoell reported that RPO members are in the process of doing walkthroughs of various areas to identify where eating/drinking equipment are found. Complete with going through the AD Footprint areas and moving on to other areas that both allow radioactive material and also contain offices/break rooms/etc.

M. Quinn reported in March 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.

No additional progress, will be evaluated as part of Dose Rate -> Contamination Study

14. **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](#).

J. Fulgham reported that the 2020Q4 results have been received and is currently working on the report. Maps of the dosimeter locations are also being generated and updated.

Maddie/Joel reported results received for 2021Q1, no issues.

- 15. Neutron Generator** – D. Hahn reported that the NEXUS DD Neutron Generator has 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. No updates.

Dee – Mu2e DT Neutron Generator still at vendor. They're waiting on state/federal licensing. Not waiting for anything from Fermilab. No estimate on timing.

- 16. Safety Assessment Document review** – M. Schoell reported that various chapters (SBN, NM, SY120, Proton & TeV) will be coming out for review in the next month or so.

No new update.

- 17. Accelerator Readiness** – No update.

- 18. Contamination in Enclosures** – S. McGimpsey will give presentation at May meeting to go over what has been done so far, where we are today, and what we plan to do moving forward. A Collimation Task Force has been created, and will help facilitate communication and discussion. Have decided that we will decontaminate the MI-30 aisle every four weeks to allow the aisle to be down-posted and allow cart access and not require additional layer of PPE. Will continue to do contamination surveys and work with machines to correlate with beam information to see if trends can be identified. Surveys continue in conjunction with the newly created Collimation Task force. Controls will be looked at again in light of the findings and recommendations of the recent DOE RPP review.

- 19. SARP** – Nothing on SARPs platter. Next likely would be preliminary Shielding Assessment for PIP-II.

## ALARA Topics

- 20.** none

## Operations

*Minutes of Radiation Safety Subcommittee Meeting June 2, 2021*

Machine running normally. Laser notcher issues over the weekend, so had to reduce intensity. Laser notcher up and running again, back to normal intensity.

Recommend taking wipes around Booster laser notcher

**PLACE AND DATE FOR THE NEXT MEETING: THE NEXT MEETING WILL BE ON JULY 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	