



July 7, 2021

TO: Distribution
FROM: M. Quinn
SUBJECT: Radiation Safety Subcommittee Meeting of July 7, 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	P	J. Scott	A
J. Compton	P	D. Hockin	A	D. Reitzner	A	K. Vaziri	A
J. Fulgham	P	R. Madiar	P	B. Russell	A	M. Zientarski	P
K. Gollwitzer	P	S. McGimpsey	A	W. Schmitt	P		

New Business

- Unauthorized Movement of Radiological Postings** – Continuing to come across issues of non-RPO personnel moving radiological postings. Recently someone in MINOS told Ben/Rachel that they moved the new Contamination Area posting "so that they can do work" Need to add slide/comment in both GERT and RW that tampering/moving radiological postings is only permitted to radiation safety personnel. Suggest also sending lab-wide message.

K. Graden commented that this is already included in the training, but will review and confirm. Will ensure “don’t move or tamper with postings” in addition to “obey postings”.

M. Quinn recommended adding something to Practical Factors as well to reiterate.

Once trainings have been tweaked, agree that message to individuals with GERT/RW-C(V)/RW-PF (either required, or up-to-day) mentioning recent issues and reminding of rules. Gets the message out now rather than waiting for people to renew training. K. Graden will work with Training Group to get message out, consistent with what’s in the training.

Curious what general expectation is for other safety signage, not just for radiological signs.

- Be-7** – Accelerator community discussed potential for complex-wide relief for Be-7 Appendix D values. Raising limit to detectable limit on frisker, based on potential risk of isotope compared to other isotopes. Accelerator program folks in DOE seem interested in looking into getting this implemented, will need to work with DOE colleagues from occupational radiation protection portion of DOE. This potential is in early discussion.

JLab utilizes 30,000 limit (30x Appendix D value), and took ~1 year to go from formal request to approval. Unclear if complex-wide initiative would be faster or slower.

This potential is in early discussion. Stay tuned.

- 3. DOE Revised DCS Effluent Values** – New STD-1196-2021 revision came out today (7/7/2021). Will need to review in more detail. Appears that the tritium values was raised from 1,900 pCi/mL to 2,600 pCi/mL.

This will benefit analysis for groundwater, etc. for future Shielding Assessments.

- 4. NTSB Flood** – Water inside NTSB found in rails/switchgear, did not impact radioactive material. Still understanding how system is setup and how alarms/alerts are setup. Further discussion needed between RPO and FESS to ensure system setup appropriately and alarms setup such that correct personnel are notified.

M. Quinn recommended looking into this for other facilities as well to ensure full understanding for all facilities. Facilities include: NTSB, CZero, etc.

Keep this item on ongoing business to stay up-to-date on.

Old Business Carried Forward

- 5. Nevis Blocks** – Project ongoing. Project team starting to write request or proposal to have contractor come on site and manage the disposal and/or disassembly of blocks. Early in the process, work ongoing.
- 6. 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. Nothing new. But session at Accelerator Safety Workshop in October will have related session. Item will be removed from minutes.
- 7. DOE RPP Review Ongoing** – Causal Analysis & Extent of Conditions performed for the two Level 1 Findings and submitted to FSO 7/2/2021. Next step is creating a Corrective Action Plan for all Findings, due to FSO 7/30/2021. Currently in the middle of full crosswalk of DOE O 458.1, with a number of Action Items already identified. Approximately 2/3 done with crosswalk.

Other activities being done in parallel:

- technical basis document for IFB surveys. Waiting for some simulation information, stay tuned.
 - Dose rate to contamination study. Will point to Process Knowledge for impacted material from RMAs/CAs. Note – RAF turn around time is lengthy (order of months) so will take some time for results to come back.
- 8. 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.

July – no significant progress. Did receive comments on confusion for using spreadsheet. Goal is to create new spreadsheet to implement RP Note formula. (Or possibly implement new process.) Reminder that RP Note 78 predicts expected activity in rad waste barrels based on exterior dose rate surveys. There was concern brought up to take a look and ensure spreadsheet/formula are doing what we expect them to be doing.

9. **MTA** –ITA procedures implemented to review material & beam fluence prior to irradiation and confirmation post-irradiation. Updates implemented and were able to run final CMS and ATLAS experiments before shutdown.

Be-7 found in beam pipe and cave, unrelated to experimental equipment. Area posted locally. Also extent of conditions study performed during shutdown opening up survey – other air gaps wiped and submitted for RAF analysis. If Be-7 found in other areas, will need to look into programmatic changes to control/monitor areas similarly for all machines.

10. **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.

11. **RPCF** – M. Zientarski reported Low Level Facility source projector replacement work went smoothly. However, levels post-work were off – don’t have low enough activity source for some low-level calibration. Working on re-recharacterizing caves. Issue only impacts calibration of the

MicroRem. Still able to perform high dose-rate calibrations. JL Shephard will procure new source of appropriate activity for further replacement to ensure we get requested activity. No significant impacts, but will be “closed” for a few weeks for future replacement work and re-characterization.

M. Quinn asked if JL Shephard gave explanation as to why we did not receive initially requested activity level. M. Zientarski noted that their process involves using source with higher activity and then attenuating down to requested activity. Our source request was lower than what they had available, so they planned to use higher activity source and attenuate. However, not enough physical space for enough material to attenuate down to our requested level.

12. Outdoor Hazard Assessment – Spreadsheet updated with bulleted information below. Outdoor Hazards Assessment team will review. Stay tuned.

- 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)

13. Review “JULIE Excavation Waiver Prohibited Zone” Map in GIS – Continuing to field questions about “JULIE Excavation Waiver Prohibited Zone” and answering that they’re good.

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).

July – continuing to reiterate accuracy of “JULIE waiver prohibited zone” boundaries when asked.

Additional update: Recent sawcutting incident – during JULIE review process, identified a “no excavation” boundary beyond which beam to the affected areas must be ensured off prior to excavation work. Subcontractor performed sawcutting activity beyond the “no excavation” postings, unaware that sawcutting fell with the Lab’s definition of excavation. USID performed to confirm no required shielding was impacted.

14. **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.

Work/hazards/mitigations/building design spreadsheet

Internal dosimetry/1027 analysis

Continuing to finalize High Bay design to get better understanding of budget to look at Hot Lab in more detail

15. **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.

D. Newhart working with K. Graden and M. Vincent for performing dosimetry background study and implementation of rad program.

16. **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.

17. **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.

July - No additional progress, will be evaluated as part of Dose Rate -> Contamination Study. Will utilize wipe results from study to analyze for potential internal uptake.

R. Madiar wondering what actions have been or will be taken while waiting for wipe analysis. J. Fulgham & M. Schoell – Snoop surveys include wipes in Controlled Area/Radioactive Material

Areas, and indicate no contamination found in these areas. Wipes from Dose Rate -> Contamination Study wipes will add to this Process Knowledge.

R. Madiar expressed continued concern for continuing to allowing eating/drinking in RMAs.

M. Quinn commented that even if this was not identified as a Finding from the RPP review, it should be addressed as part of the CAP.

- 18. 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. Readings are consistent with background in publically accessible areas.

July – 2021Q2 dosimeters are in the process of being swapped out for 2021Q3 dosimeters. 2021Q2 dosimeters should be sent to Landauer later this week, with results back in ~a month.

- 19. Neutron Generator** –

July – D. Hahn reported that StarFire received their approval to ship to Fermilab in a few weeks.

Separately, D. Hahn reported that another group that is slated to do an experiment at ITA and submitted a request (to Mu2e) to use the DT generator at MTA and perform acceptance test there before used by Mu2e. Information overheard during unrelated meeting. No RPO individuals aware of this request. D. Hahn will ask F. Porter to contact RPO.

- 20. Safety Assessment Document review** – M. Schoell reported that the SBN, Proton and TeV chapters have gone through initial review, and a few questions have been sent back to authors. Once updates received, these three chapters will be sent to the SAD Review Subcommittee for review later this week/early next week, and inclusion in SAD Rev 22. Still waiting on updated chapters for SY120 and NM for SpinQuest updates for later SAD revision.

No new update.

21. **Accelerator Readiness** – No update.

22. **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. Controlls will be looked at again in light of the findings and recommendations of the recent DOE RPP review.

July – 30 day decon continued. Wipe analysis given higher priority at RAF, no instances of contamination going above Appendix D values. Shutdown decon performed, starting to receive results for review.

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

ALARA Topics

24. none

Operations

Machine running normally. All machines but Linac and FAST off for shutdown. Linac will turn off next week.

PLACE AND DATE FOR THE NEXT MEETING: THE NEXT MEETING WILL BE ON AUGUST 4, 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	