

November 3, 2021



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

MEMBERS (P=Present, A=Absent):

S. Borton	A	K. Graden	P	D. Newhart	A	M. Schoell, Deputy Chair	A
N. Chelidze	A	D. Hahn	P	M. Quinn, Chair	P	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	P	S. McGimpsey	P	W. Schmitt	P		

### New Business

1. Material Release and Clearance – W. Schmitt reported that a Technical Basis Document is being written for release of metals for new release and clearance program. The TBD is out for review now. Fermilab will be conducting surveys with new release criteria when document is approved. Analysts are suitable, but Friskers will need more survey time for these surveys.

### Old Business Carried Forward

2. New position filled in RPS for the ERPP program position. H. Hall will be invited to November meeting.
3. New RCT position is filled by K. Rehr-Scarriot.
4. **NW Blocks Excavation for LBNF** – Rachel was wondering if the blocks being excavated from the NW beamline are planned to go through release & clearance process and have that information documented. J. Fulgham commented that blocks and soil are surveyed as they're excavated. Will use MMR in the future when blocks are moved to final location.

R. Madiar wondering how it's documented on what is determined for survey needs through this process.

M. Quinn commented that documentation of information for the full process (i.e., material was here for this purpose for this time, excavated with these surveys, and moved here for this purpose, etc.) would be beneficial for future release & clearance of the material.

RPO will look into best options for archiving this information.

November – Not a lot of new information this month.

5. **Maddie away on maternity leave** – Maddie will be away on maternity leave starting next month, expected out through end of 2021. Matt will be acting RPO Department Head.
6. **DOE O 420.2c Rewrite** – M. Quinn and R. Madiar commented that the updated Order, 420.2D, has been issued for comments from the various Labs.
7. **Unauthorized work in High Radiation Area within MI-30** - FESS performed relamping work in the MI-30 collimator region, posted as a HRA, without RSO approval. Investigation ongoing, but has highlighted deficiencies in Work Planning & Control practices (especially cross divisions/groups) and opportunities to improve radiological postings (language and locations). RPO working on plan for configuration and control updates, noting that more may come at the conclusion of the investigation. S. McGimpsey part of the investigation team, nearly finished with interviews. S. McGimpsey reminded that upon initial notification of the work, dose estimates was 10 mrem per person, pocket dosimeters showed 9 mrem per person, and dosimetry badges were processed and confirmed to be < 10 mrem. M. Schoell mentioned changes that are planned include physical barriers, either locked gates or accordion gates, RWP updates, updates to Opening Up surveys especially during long duration shutdowns, and associated training needs.

ESH issued work stop for work in or work generating HRAs, without SRSO approval. SRSO has approved work such as RPCF instrument calibration, radiography, etc. on a case-by-case basis. Other work in enclosures with local HRA requires RSO approval after review of IMPACT, ensuring no work in HRAs. This process has been working well. Also looking into implementing an escort program for any non-familiar person access, and installing gates around the HRAs.

An HPI was initiated, and later expanded, to look into the incident as well as the WPC process, particularly for cross D/Ss.

October – S. McGimpsey stated at the HPI review has been completed and report was entered into to iTrack (Review #54826). M. Quinn stated most findings involve communication issues with respect to work planning processes. S. McGimpsey will present an overview of the report next month.

November – S. McGimpsey reported that the HPI investigation to review the incident is complete. Dosimetry badges showed no measureable doses. HPI revealed lack of communication between AD Shutdown Coordinator and FESS task manager. Many opportunities for improvement have been identified as a result of the HPI review. Review and corrective actions are entered into iTrack. A corrective action plan has been entered into iTrack and persons assigned are working on corrective action responses. Due dates are in iTrack. AD has been working on a guide program for persons who don't enter enclosures very often. These persons will have an AD guide escort these individuals to the enclosure and will review relevant safety concerns for that particular space.

8. **NM2 Enclosure Door Found Unlocked** – B. Russel commented that E. Schlatter was performing an HPI on the incident.

November – M. Quinn stated that HPI is completed. Several opportunities for improvement were identified. A few corrective actions may be to implement alarms and look at physical locking mechanisms and possibly changing them out with self-latching mechanisms.

9. **Communication of Radiological Posting/Configuration Changes** –Suggest memorializing this as part of the RPO Posting Procedure (ESH-RPO-POST-01).

Who to send to:

- DSO
- Area Manager/Machine Owner
- Building Manager
- RPO
- SRSO
- CSO
- AD Ops Dept Head
- FESS Ops Dept Head

Additional suggestions: Fire Department, Security.

M. Quinn will follow-up with J. Niehoff to get suggestions from him on how best to communicate with these groups.

November – K. Graden will update posting procedure to include a Communication of Radiological Postings section.

10. **Multiple Sump Issues Lately** –

- **NTSB** – 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.

August – alarms implemented for outdoor sump. However there are three sumps inside NTSB that are not capable of implementing alarms. Will need to understand long-term solution to incorporate alarms.

J. Fulgham commented that updates have been made to the pumps at NTSB.

1. FESS has stated that they changed the parameters on the stormwater lift station north of TSB so it will now alarm if the pumps motor do not run.
2. The discharge pipe for the sump at the north end of NTSB has been repaired and unblocked.
3. Temporary power has been installed to the second pump in the main sump at NTSB yet it is still locked out.
4. Meeting the electrical design engineer and the electrical contractor to look at running a new permanent power line to the second pump this afternoon.
5. Need to figure out how to confirm set points and alarms that are installed.

November - sump work in north end of tunnel, work on sump at south end of tunnel and one pump in main sump is working, but other one isn't working. The recent rain resulted in no issues which is good news.

- **Mu2e Sump Issues** – sump stopped working, causing groundwater to continue rising in the sump pit and flooded the whole Mu2e pit/lower level. No alarms received, again notices by personnel walking into the space and discovering it. Pit planned to house the DT generator, and had previously housed the DD generator, flooded. Samples taken to ensure below tritium limit prior to pumping. Sump and alarm issues need to be fixed before DT generator installed, and also fixed to ensure it doesn't happen when Production Solenoid/target installed and beam operations begin/Remote Handling Room work begins.

D. Hahn noted that Mu2e is currently working on updating alarms and notifications in FIRUS. Also noted that with all pumps on the same circuit, when one pump shorted out it shorted all. Mu2e is also working on separate circuits. J. Fulgham noted that METASYS was on the same circuit as well, so when power was lost it was also lost to the notification system. This is being looked into as well.

- **Groundwater in MI-40 Lower Level** – Info as of 7/22 ~9:45am:

Scheduled power outage yesterday. Ops monitored sump prior to power outage to ensure it was back to normal pumping following the rain from last week. Everything looked good so proceeded with the outage. Once outage was complete, Ops checked for sump alarms to point to potential issue coming back up and found none.

~2:40 there was a FIRUS alarm for the high water level. This was not given/seen by the MCR. (This was identified later by looking at the alarm history after being called by Comm Center later in the evening.)

~11:30pm Comm Center called MCR/others about the MI-40 high water level alarm. Sue gave permission for Ops to investigate, but not step in any water. Ops found water in the lower level, but found no issues with the sump itself. The pump was working at the time, and there was no evidence that water overflowed from the pit into the hallway (the water in the pit was at the very bottom, the ledge between the pit and the hallway was dry, the confined space sticker on the lip was also dry, no water lines, etc.). They reset the alarm locally. See eLog entry: [199369](#).

Looking at the datalogger, it appears that the pump had never stopped working. Current guess is that the power outage caused a glitch in the alarm itself.

Water in the area appear to be groundwater seeping in through the walls/floors, separate from the sump.

~8am RCTs entered under Job-Specific RWP and took a sample of the water and will submit to RAF. Currently have a fan in place to help air circulation and evaporation. Contamination Area postings added to ensure all water is within posted space.

Remaining questions/follow-up:

- What caused the alarm if the pump was working properly

- Where the alarm was issued. Since it wasn't seen in the MCR.
- When dispatch received the alarm. (Appears to be ~9hrs between alarm and calls, unclear why.)
- Re-look at options for barriers between Absorber area and the rest of the lower level to ensure water doesn't flow into/out of posted Absorber Area.

M. Quinn suggested bring this up as a possible tripartite. If that doesn't happen, RSSC should look into this in more detail.

September: this topic was not selected as a tripartite. This issue should remain as a focus topic for RSSC. M. Quinn will discuss this with A. Kenney about who best to ask to lead this effort.

- 11. Unauthorized Movement of Radiological Postings** – M. Schoell will follow up with K. Graden on original drafted message about tampering with radiological postings, and ensure it included any necessary information from the MI-30 incident and send out to Radiological Workers. K. Graden stated that email has been sent to 1800+ rad worker trained individuals and 2900+ GERT trained individuals.
- 12. 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.

August – no news. M. Quinn suggested removing from the running list, will bring back up when there is more discussion.

October – Accelerator Safety Workshop presentation was given addressing an exemption request for the 1,000 dpm to 30,000 dpm for Be-7. DOE folks indicated that they are open to receiving these requests. More facilities that submit the request, the better it will be to grant exemption. Fermilab will need to write up something for submission.

November – J. Fulgham reported on 25 person-mrem in MI-30 region.

- 13. 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.

W. Schmitt commented that the DCS numbers have been updated in the spreadsheets.

**14. Nevis Blocks** –M. Quinn commented that the work is still ongoing, and the Project is working on writing the project plan. More updates as this progresses.

**15. DOE RPP Review** – M. Quinn reported that the full Corrective Action Plan (CAP) was submitted to FSO. Program documentation is being worked on, and is awaiting some instrumentation simulations.

R. Madiar reminded that FSO is interested in the crosswalk assessment report as well, once that is finalized.

J. Fulgham reported that most sampling has been performed, just waiting for results. Results received so far showed no contamination found on material in RMAs that were adjacent to activated components.

November – DOE FSO will be sending Fermiab a letter with comments soon.

**16. 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.

August – W. Schmitt working on pulling in where information for the spreadsheet originated. Compared to RP Note 78 (which calculates a single number), the spreadsheet calculates a number and then uses it as the mean for a gaussian curve at the 95% confidence level, so introduces some error factor. The goal is to at least write more details for what the spreadsheet does and what it tells you to go with the spreadsheet and Note.

November – No update this month.

17. **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.

August – S. McGimpsey has gathered all results for samples that have been taken, working on compiling and writing a summary. Preliminary review indicates that G10 may not have been as big of a contributor as initial suspected. More review and determination of types of material that will be allowed, including material used for the box/holder.

September – J. Fulgham reported that they are investigating a new sample box that may improve air flow and cut back on potential Be-7 production.

October – S. McGimpsey presented *MTA Contamination Summary*. See attached slides.

November – S. McGimpsey reported that groups are scheduled and TSWs are being reviewed. Have not received wipe results back yet. M. Quinn reported that causal codes are being identified for the HPI. More formalization will likely be recommended.

18. **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.

November -

19. **RPCF** – M. Zientarski noted that backlog is less and electronic dosimetry requisition is in procurement. Will work with K. Graden to incorporate information into Rad Worker training.

New tritium source holder is being constructed and will be delivered to Site 40 for new tritium source. This new source is for portable tritium wipe counter. Source due to arrive in late October to early November. Source has not arrived as of this meeting.

November – M. Zientarski – getting ready for annual shutdown for re-characterization. Beginning internal reviews for OWL project soon.

20. **Outdoor Hazard Assessment** – M. Shchoell & K Graden commented that the RP list below was shared with the assessment team and are waiting to hear back from assessment committee.

November – K. Graden will check with R. Bushek on status of this review.

21. **Review “JULIE Excavation Waiver Prohibited Zone” Map in GIS** – M. Schoell commented that the sawcutting HPI is still ongoing. Other items from the discussion have been closed and will be removed from the minutes.

M. Quinn asked if HPI results could be added for completeness of the minutes before removing. Will follow up with E. Schlatter.

22. **Target Service Integration Building** – An assessment of the anticipated isotopes compared to ALI and Hazard Category thresholds was submitted to FSO for review. R. Madiar commented that M. Quinn commented that there is a need to meet with R. Madiar to discuss questions/comments from FSOs review.

23. **DUNE** – D. Newhart has nothing to add for October.

24. **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: Diane, 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.

25. **Eating/Drinking Near Source Boxes** – M. Schoell reported that RPO has begun reviewing RMA facilities to determine where radioactive material is used and/or stored in relation to offices, eating/drinking areas to discuss with RPO for potential reconfiguration.

November – Priority one areas have been identified and are working on what changes need to be implemented. Still have a few priority one areas to review. Will probably downpost some areas. J. Fulgham and J. De La O have reviewed many areas and will be touring particular areas with A. Kenney. J. Fulgham shared RMA spreadsheet with group. Next steps will be to work with divisions/sections to consolidate materials and areas.

26. **Dose to Public FSO Concerns** – M. Quinn reported that OCSO and FSO met today to discuss the report. R. Verhaagen requested a field walkthrough of “Authorized Personnel” signage and the areas



around AP0/Main Injector where dose rates may be  $> 100$  mrem in a year for 24/7/365 occupancy. M. Quinn will schedule this walkthrough in the next few weeks.

27. **Neutron Generator** – August – recent sump pump failure in Mu2e caused flooding of the Mu2e lower level, including water in the neutron generator pit. Water sample was taken and found 6.6 pCi/mL tritium, below release limit.. Will need to look into solutions to ensure water does not flood pit in the future, when DT generator is in use.

September – D. Hahn reported that there has been some movement on the D-T generator, but nothing substantial yet.

B. Russel reported that he was notified today about the planned use of the D-D generator in the MINOS hall (which had been partially tested in the Mu2e pit in 2020). The group is hoping to begin operations in November, and is asking for what is still needed prior to operations. M. Quinn commented that they will need to meet requirements for a neutron generator in FRCM, at the least will need shielding that is reviewed and approved prior to use.

28. November – DT Mu2e and DD NEXUS Update - DD generator will be moved to NEXUS experiment in the MINOS tunnel soon. D. Hahn stated that DT generator for Mu2e will be arriving November 3 or 4 and will be located at Site 40 until it is ready for installation. B. Russell reported that they are working through R.P. Form #113 for this neutron generator.

29. **Safety Assessment Document review** – M. Schoell reported that the SBN, Proton and TeV Chapters are undergoing final review/comment resolution and should be out for D/S, CSO and Director approval as SAD Rev 22 soon. No ASE revisions required.

Upcoming: Still waiting on updated chapters for SY120 and NM for SpinQuest updates for later SAD revision. Proposed changes for MTA will require SAD changes (working on Shielding Assessment now), and unknown if this will need ASE change (only needed if ASE limit needs to be updated). FAST Proton injection will also require SAD update, which will require ASE update as well. No clear timeline for these three updates.

30. **Accelerator Readiness** – Potential for some expanded review, but likely not a full ARR, for upcoming NM/SpinQuest operation, due to extended time since last beam operations, MTA secondary beamline, and FAST proton injection.

31. **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.

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.

September – no update, shutdown took priority. Suggest following up with S. McGimpsey next month.

November - S. McGimpsey reported that she is reviewing decontamination results and verifying that the aisleway stays clear. J. Fulgham reported one spot in 8 GeV line is leaking and there is a bit of contamination in aisleway. M. Quinn suggested that S. McGimpsey provide a presentation to this group on this topic.

**32. SARP – Nothing on SARPs platter.**

November – Nothing to report.

**ALARA Topics**

**33. Nothing to report.**

**Operations**

Beam has started to some areas. Soon other parts of accelerator complex will be running beam soon.

November – Running beam to MTA and g-2. BNB down due to electrical panel and mice problem. BNB may be running again soon. NuMI was down this last weekend. Switchyard – magnet in enclosure C is broken. Today MI is in access and Booster group are doing studies.

**PLACE AND DATE FOR THE NEXT MEETING: THE NEXT MEETING WILL BE ON OCTOBER 6, 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	DSOs (esh_dso@fnal.gov)
RPO Department	