ITA Experimental Process

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Accelerator Readiness Review for the 400 MeV Test Area

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Overview

At an R&D facility every experiment is likely to be unique in some way. Procedures have been developed to safely approve and operate experiments in an adaptable experimental environment.

- Experimental approval process (Technical Scope of Work)
  - New administrative controls to ensure there is no isotope production
- Safety training
- Experiment installation
- Operational Readiness Clearance
- Experiment operations
- Decommissioning and methodology for storing and retrieving samples

ITA Coordination

Evan Niner (FTBF Deputy Manager) and Mandy Kiburg (FTBF Manager) serve as the primary interface between experiments and facility.

-- Adopting organizational structure and roles in place at FTBF

Pre-arrival contact – Each group will be assigned a point-of-contact for pre-arrival activities such as completing the TSW, shipping arrangements, badging and training, general questions.

ITA Coordinator – 2 week rotation coordinating on-site active experiments. Duties include user orientation and installation assistance, ORC coordination, communication with the MCR, facilitating sample retrieval and storage.

Proposing a Technical Scope of Work

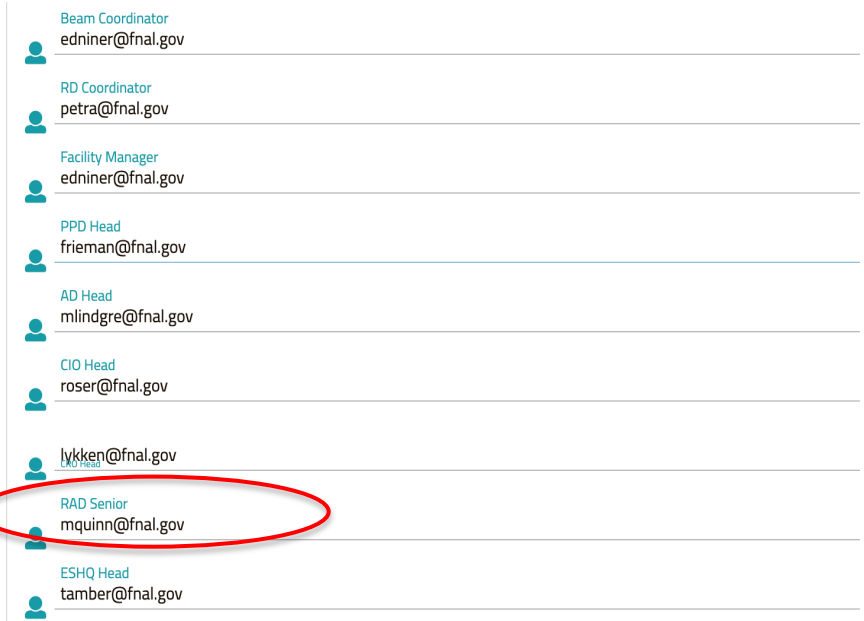
Potential users contact the ITA coordinator to develop a TSW. Proposals reviewed by assigned RSO and beamline physicist. **A user group will fill out a TSW or TSW addendum (both require full signature list) for each request for beam time.**

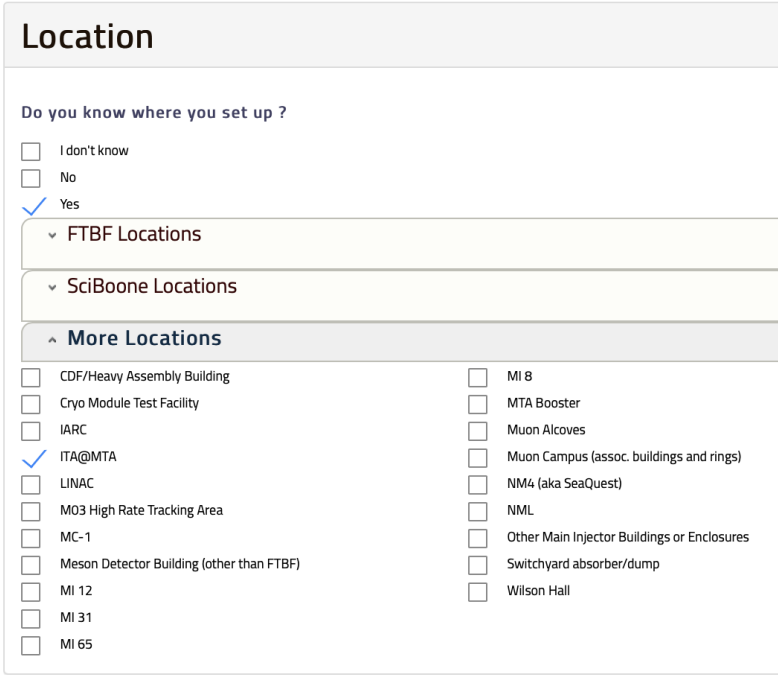
Each TSW will address the following:

- Dimensions and composition of each sample to be placed in the beam
- Target fluence of each sample
- Identifiable hazards in accordance with the SAD
- Required facility infrastructure (cooling, cabling, motion tables, access to counting house, any equipment in beam enclosure requiring shielding, etc)
- Special considerations after exposure to beam (how quickly does the sample need to be placed in a freezer to mitigate annealing? Any urgent shipping? etc)
- Intended purpose of samples after exposure to beam, both onsite and offsite
- Shipping address and radioactive materials license for destination institution

Proposing a Technical Scope of Work

TSW submitted to signatories for approval. **New signature line added to workflow for all Beam TSWs for the Senior Radiation Safety Officer to ensure there is no isotope production.**





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Online Sample Catalogue

Porting IRRAD Data Manager (IDM) web-based sample management tool developed at CERN over to ITA.

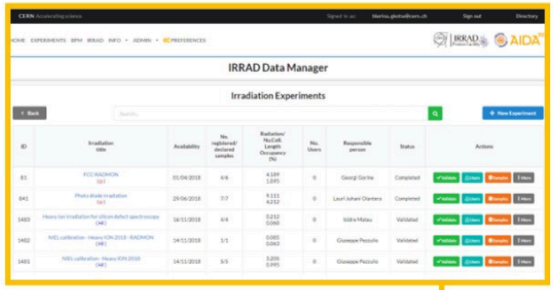
Tool provides interface for users to register sample materials and dimensions, associate dosimetry, track custody, and more.

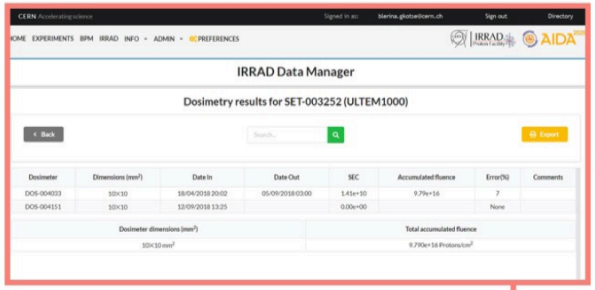
Many potential ITA users already make use of this tool at the CERN facility.

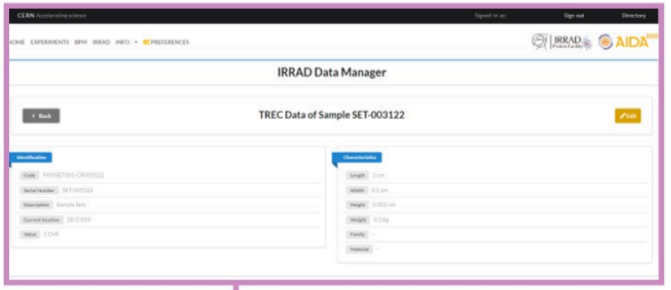
Database backend in place to allow ITA staff to register samples now. Webserver being created to go live for user interaction in the Fall.

Primary role of IDM is for users and ITA staff to track activities and view sample results in a web portal and searchable database, collaborate with other groups. This tool does not replace the TSW documentation or the survey form associated with each sample.

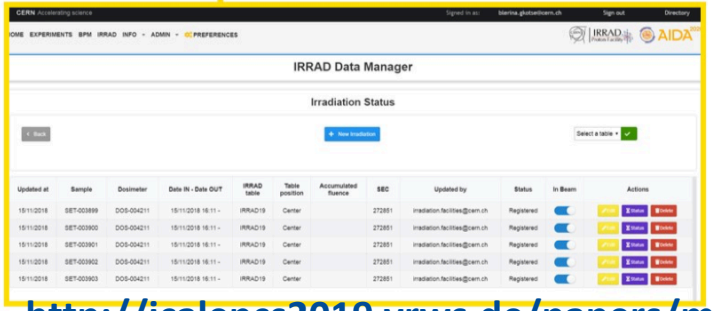
Sample Registration

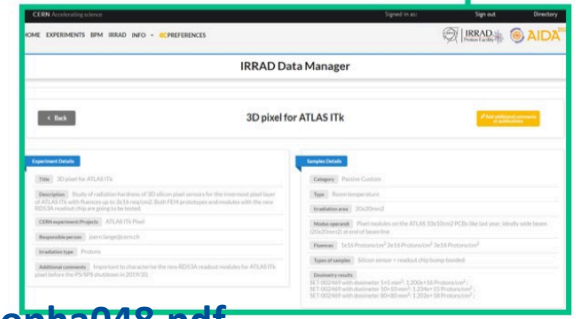






Registration → Planning → Follow-up → Dosimetry Results → Traceability → History





http://icalepcs2019.vrws.de/papers/mopha048.pdf

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Facility Hazard Awareness Training

MTA Hazard Awareness training [FN000690/CR/01] has been updated to remove non-existent hazards and address the new nature of the beam enclosure and counting house.

-- This training is a requirement in the keylogger to receive an MTA enclosure key.

Each experiments spokesperson will supply a list of users coming on-site to the ITA pre-arrival contact in advance of the beam run. The ITA contact will update all ITNAs and verify training. All users in the counting house or beam enclosure will take MTA Hazard training.

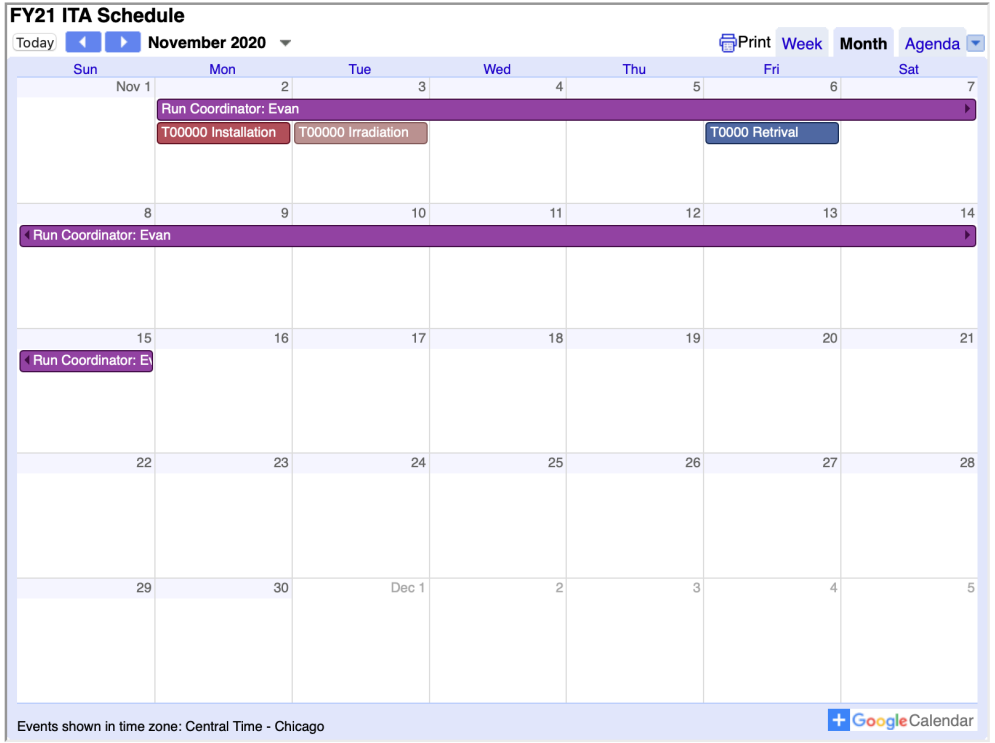
Weekly Schedule

Nominal week, subject to beam availability and specific user requirements, https://ita.fnal.gov/fy21-ita-schedule/

Monday: Experimental installation and ORC

Tuesday: Run beam

Friday: Retrieve samples from beam for storage and remove experiment



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Installation Activities: Counting house

Users accessing the counting house will need GERT training and the MTA Hazard awareness. An AC4 key is checked out from the MCR for access, not needed for each member of the group.

Upon arrival the ITA coordinator will orient a user group to the counting house and experimental enclosure and review the rules, installation plan, and any questions.

Users may install any electronics needed in the User Electronics Rack and connect to patch panels running to the enclosure. Setup computing.

There is a separate electronics rack containing AD Wire Chamber instrumentation and foil drive control. Users have no direct access to any AD controls or consoles in the counting house and cannot influence the beam.

Installation Activities: Enclosure

Users accessing the beam enclosure will need Radiological Worker Classroom and Practical Factors training, Controlled Access training, and the MTA Hazard awareness. An enclosure enter key is issued by the MCR following standard procedures.

--All installation takes place under supervised access.

Users may install any electronics needed in the available electronics rack and run cabling.

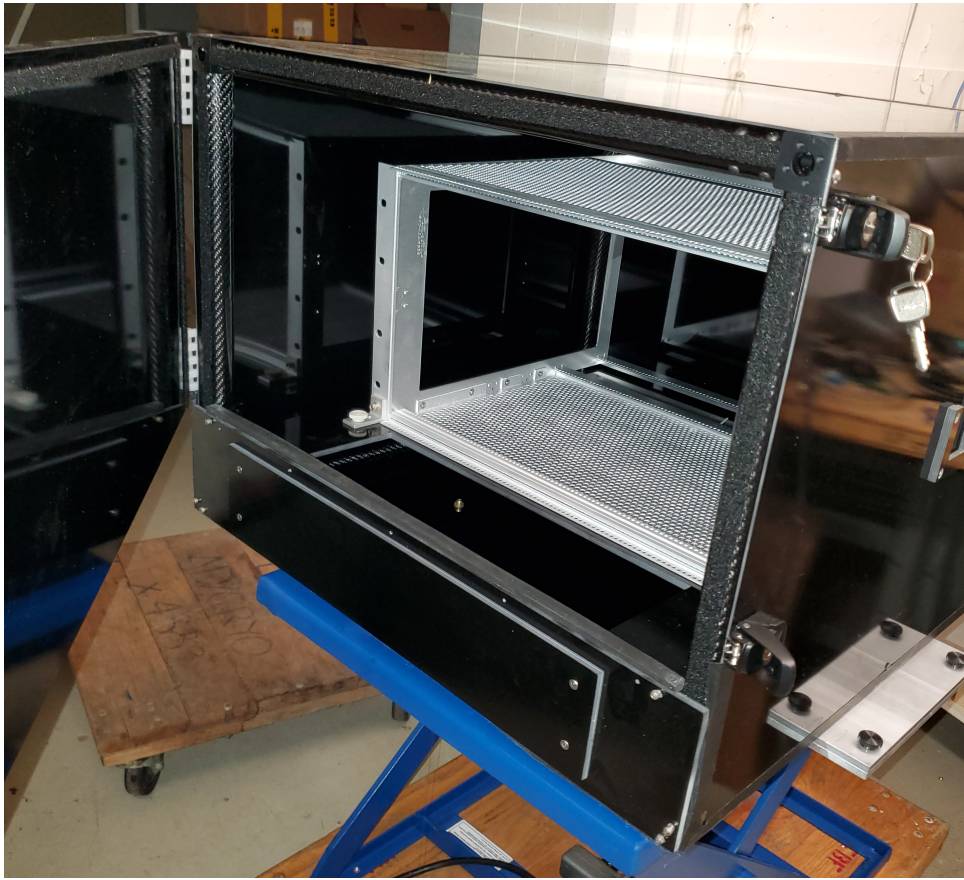
Users will not perform any activities on the front porch or inside the experimental cave without an RCT present. Users will communicate these needs to the ITA coordinator who will arrange for RCT coverage.

Sample installation 1

Users or facility staff will mount sample devices into a card cage box in the counting house.

One box currently available with 20 slots to hold samples mounted on PCB boards 11.02”x9.19”x0.1”

Additional holders, such as a cold box, planned as requested by users.



Sample installation 2

RCTs will install the sample box (or equivalent) in the experimental cave.

Samples can be delivered into the cave via the overhead trolley or situated on the front porch.

Front porch use expected for at least first several months. Motion table designed to mount on porch and accept box. Other mounts possible.

Operational Readiness Clearance

Each time an approved test beam experiment sets up in the beamline it must obtain an Operational Readiness Clearance (ORC) before the apparatus can be operated with beam. This consists of an inspection of the equipment (in the beam enclosure) by a committee including the AD Division Safety Officer, assigned RSOs, and other SMEs as needed. FESM 2005

After the ORC the experiment must be approved by the review committee and then signatures are obtained by the ITA coordinator, AD Safety Officer, RPO Department Head, AD Operations Department Head, and AD Head.

Experiment Operations

The ITA coordinator will communicate to the MCR ORC approved experiments who may request beam.

-- Initially beam requests will be scheduled with the beamline physicist to ensure coverage to operate the beam.

The experiment will conduct their beam run, monitoring either from the ITA counting house or remotely depending on the nature of the experiment. The monitoring location will be documented in the ORC.

In the event that a controlled access is needed during beam operations the experiment will communicate this request to the ITA Coordinator. The ITA coordinator will relay this request to the MCR. **All controlled accesses require RSO permission.** If the access involves work in the shielding cave/front porch then RCT coverage is also required.

End of Run

After completion of the beam request there will be a cool-off period as specified by the RSO before configuring the enclosure for supervised access.

RCTs will remove all equipment from the shielding cave/front porch and facilitate storage/transportation.

Users will cleanup and remove other equipment from the counting house and beam enclosure. All equipment exiting the beam enclosure will be surveyed.

Plans for samples after irradiation are defined in the TSW. Changes to the use plan and final shipping destination will require review by the ITA coordinator and assigned RSO with an addendum to the TSW.

Sample Storage/Movement

Path 0: TSW must include material composition, irradiation plan, activation products, radioactive materials license and which path equipment will be following after irradiation.

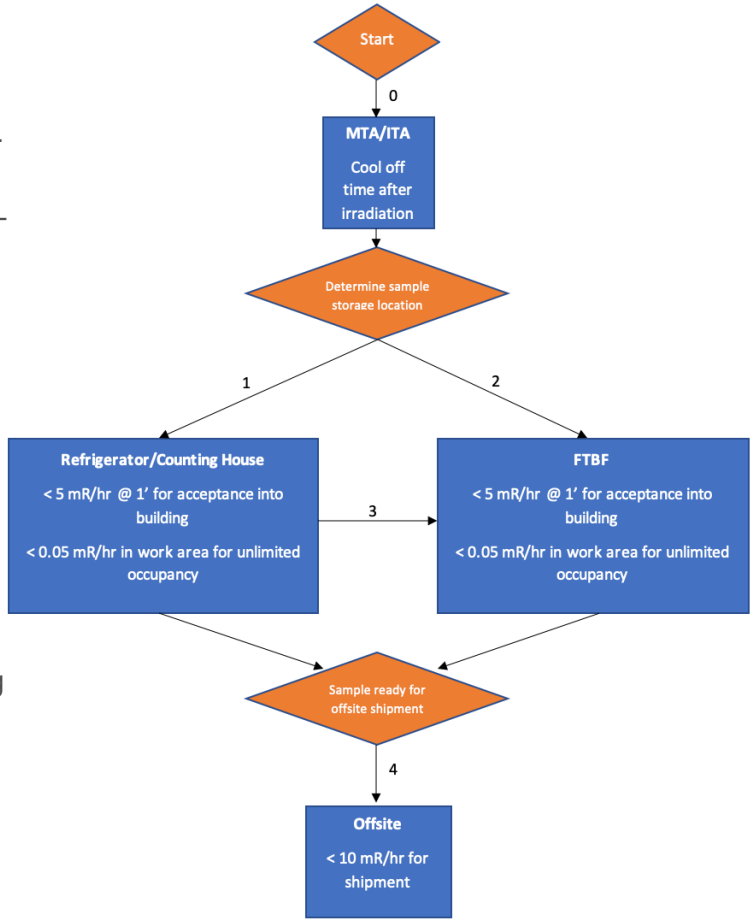
Path 1: Dose rate needs to be less then 5 mR/hr on the outside of the shielded freezer – dose rates need to be less than 0.05 mR/hr for unlimited occupancy in work area. Consideration for next incoming group. RCT coverage

Path 2: Unshielded dose rate needs to be less then 5 mR/hr for acceptance directly into FTBF. All offices spaces need to be maintained at 0.05 mR/hr. Standard MMR.

Path 3: Same requirements as path 2.

Path 4: Dose rate needs to be less then 10 mR/hr to minimize both cost and DOT restrictions in shipping. Some institutions, depending on their radioactive materials license, may require isotope characterization if equipment is still radioactive. May need to store onsite until activation products have decayed away, if this is unknown. Shipping out of country will need more considerations.

Sample survey form (see slides 19-20 of the the **Safety Systems & Radiological Protection** presentation) will track the samples and be associated with the TSW. The ITA coordinator and RSO will sign off on the final shipment offsite of samples in accordance with the TSW.



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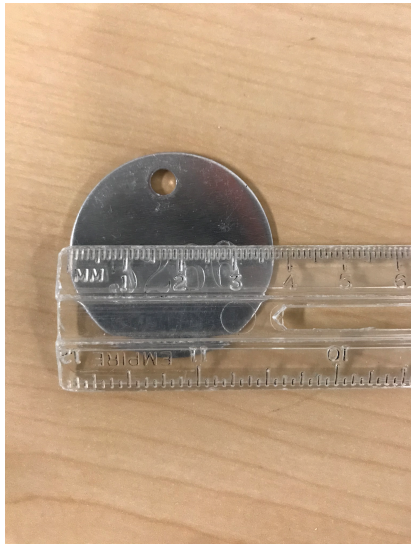
ITA Counting House Freezer

Unistrut shielding frame door controlled by RSO lock.

Dosimetry

Aluminum tags will be available to users to place with their samples for dosimetry as requested in the TSW/ORC process.

These will be counted at the Radionuclide Analysis Facility (RAF) and results provided to the user.



Conclusions

We have a set of procedures in place to review experiments at proposal (TSW) and installation (ORC) to ensure they are compliant with the SAD chapter and all safety policies and that the facility is not used for isotope production.

We have defined roles for users, ITA coordinators, RSOs, and RCTs to safely install, operate, and store samples placed in the beam.

We have tools to track samples that pass through this facility at all steps onsite and control offsite shipments.

We are ready to accept user experiments at the ITA. Initial facility infrastructure is in place to mount and monitor samples in the beam. Going forward, infrastructure will adapt or expand as identified in TSWs and in compliance with associated ORCs.

Questions and Comments