Administrative Details

Dinner tonight (~$25 per person) at Anh Hong
Headcount and Vegetarian Menus

Meeting Minutes: Chao Zhang, Angela Chiller
All talks in pdf version: please give to Keenan Thomas

They will be posted in a wiki link

Why we are holding our meeting here!

Forecast for Northern Black Hills: Northwest winds 5 to 15 mph. Wind chill readings 10 below to zero.
Winter Weather Advisory in effect until 1 PM MDT Friday...

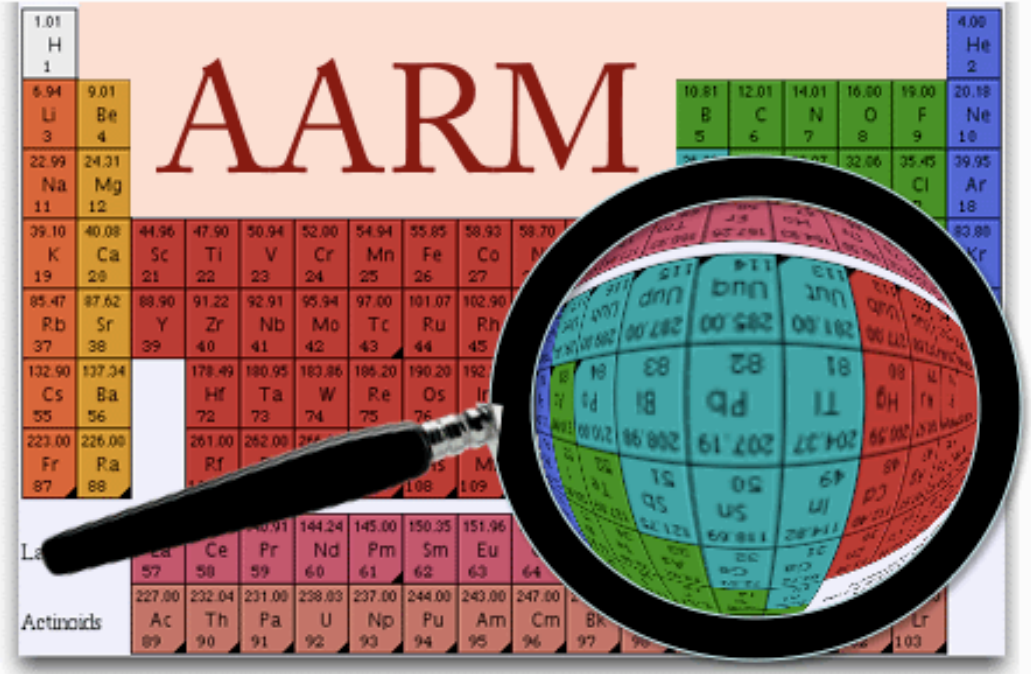
Assay and Acquisition of Radiopure Materials

Principle Investigators

Priscilla Cushman (University of Minnesota)
Dongming Mei (University of South Dakota)
Kara Keeter (Black Hills State University)
Richard Schnee (Syracuse University)

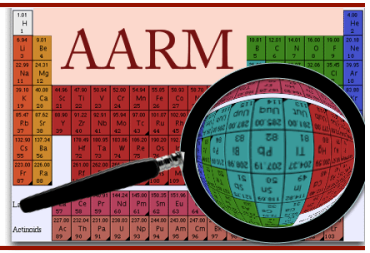
Engineering Consortium

CNA Consulting Engineers (Lee Petersen)
Dunham Associates
Miller Dunwiddie Architecture, Inc



- Characterize radon, neutron, gamma, and alpha/beta backgrounds at Homestake
- Develop a conceptual design for a common, dedicated facility for low background counting and other assay techniques.
- Assist where appropriate in the creation of common infrastructure required to perform low background experiments.
- Perform targeted R&D for ultra-sensitive screening and water shielding

FAARM vs AARM



AARM is the collaboration, which must have reps from the other ISE

1. New infrastructure requirements will include screening, etc.
2. Need better representation – contact all ISE

AARM should identify needs, but not necessarily fund

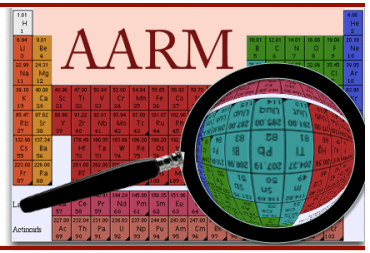
1. Surface facilities (NAA, ICPMS, …)
2. Radiochem labs, Pre-screeners
3. Electroforming needs beyond Majorana
4. Storage of materials underground
5. Exploration of crystal and detector fab underground

AARM is the global integration of low background needs with solutions

FAARM is the Physical Lab at the 4850 level with staff and screening

We have been given funding to do the engineering of FAARM,
but only so much of AARM as is necessary to design FAARM

New FAARM Design



Budget and Space available is smaller than expected.
Need to redesign with that in mind

Preserve the basic design components:

Clean Room environment for the whole FAARM

Common hydrogenous shielding with active muon veto for screeners

Inside Shield

Enough space & power for the screeners requested by the ISE

Additional shielding (much reduced) for sensitive screeners

An ultra-sensitive immersion screener (LS – modeled on Borexino CTF)

Outside Shield

Sample prep, storage, machining, assembly, offices

Maybe only 3 ISE will go forward. Are we DUSEL or are we ISE???

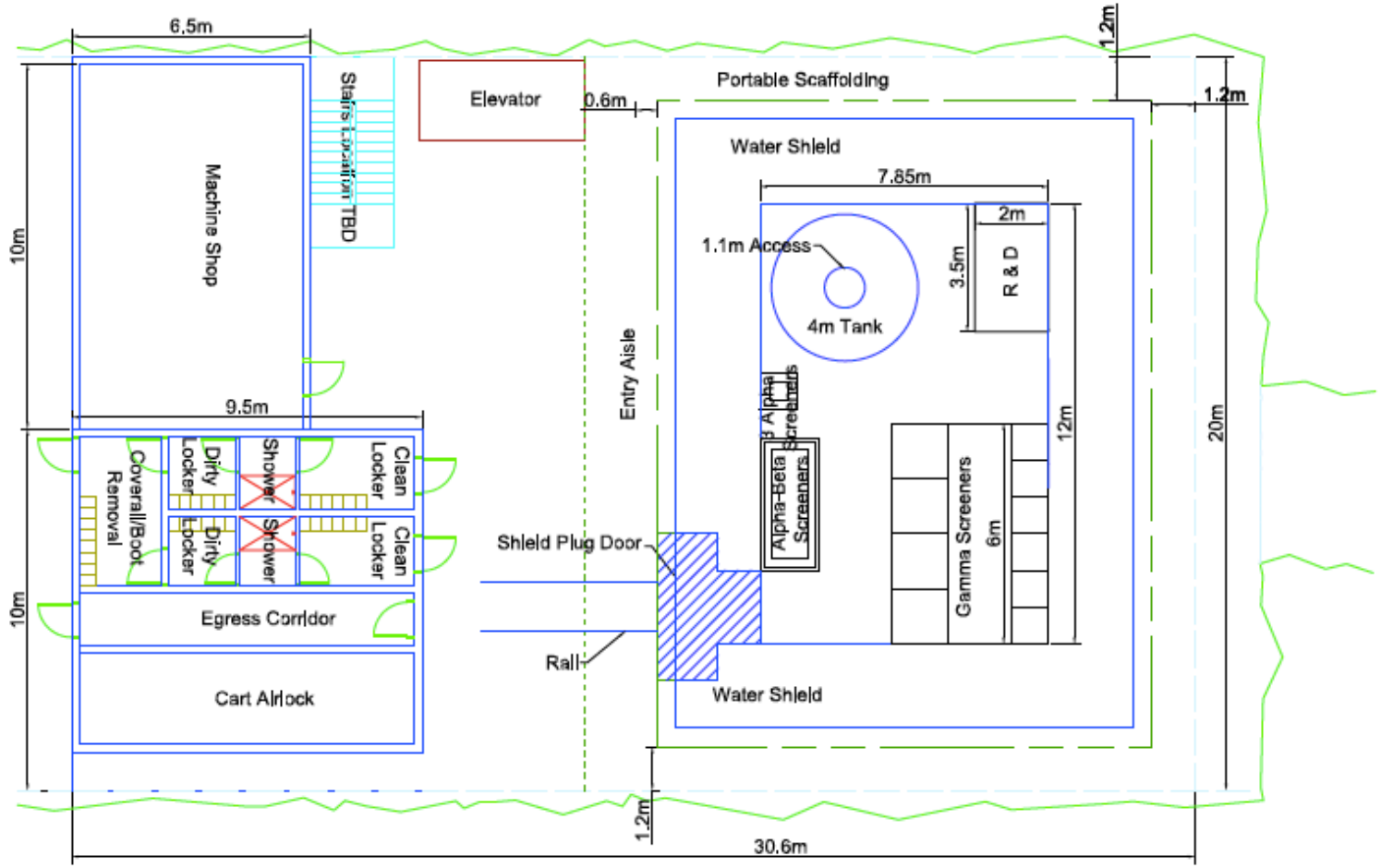
Danger! If we are perceived to take money away from other ISE, then

they will add their own screeners to their ISE

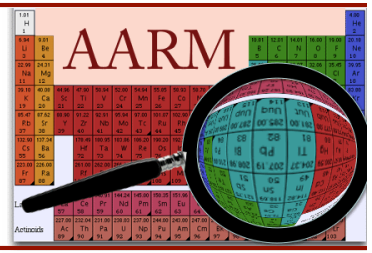
underestimate the cost, time, and throughput

New FAARM Design

(a recent drawing… still changing)



Collaboration Meeting: Purpose



Meet the March 31 deadline of a cost estimate

- Finalize our Design Concept
- Find and change major mistakes
- Cost it

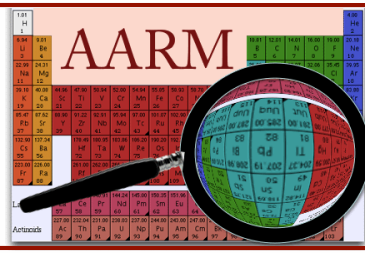
Gather information and ideas that will be incorporated in the next iteration

- General design comments
- Refine number and type of screener
- Define Room Shield technology (explore options, etc)
- Design concepts for the Immersion Tank

We cannot do this alone.

- Restructure our collaboration into working groups and identify more real collaborators

Working Groups become the Coordinating Principle - A wish list for groups… RECRUIT!



Hydrogenous Shield Design (Prisca)

DongMing Mei, Jeff Martoff, Lee Petersen, Bob Altes, …

Immersion Tank (Kara)

? Richard Ford, Frank Calaprice, Henning Back …

Screeners (DongMing)

Richard Schnee, Jodi Cooley, Tullis Onstott, Tom Kieft, Rob McTaggart …

Characterization (DongMing)

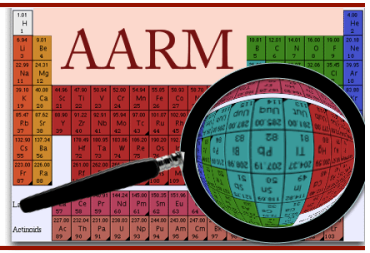
Prisca, Kara, Undergrads,

Engineering Integration (Lee)

PI's + Bob Altes, Steve Marks, YuenDat

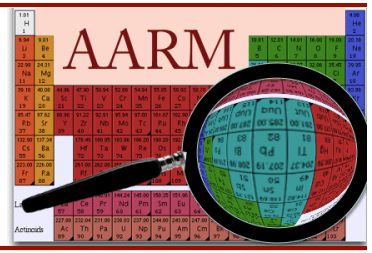
Apparently, we still have to make this case.

Why do we need a common Low Background Facility?



- Cost effective sharing of resources, close to experiments
- Unified scheduling tools and infrastructure will streamline counting and match users to the sensitivity and modality needed.
- Common materials database and shared experience
- Electronics pool, code repository, unified analysis system
- Expert Technicians and Training center
  can become a center for new R&D in screening and assay
  develops new field of low background techniques
- Large enough to include on site clean machine shop, chemical services, radon-free storage and assembly areas, common shielding and shielding elements available

There is an alternative model
Requires Scheduling and Integration Tools



Enter into agreements with Gran Sasso and Modane

- *Buy dedicated screeners housed there*
- *Pay into a common fund*
- *Pay-as-you-go User*

Build up existing US Labs

- *Kimballton*
- *Soudan*
- *WIPP*

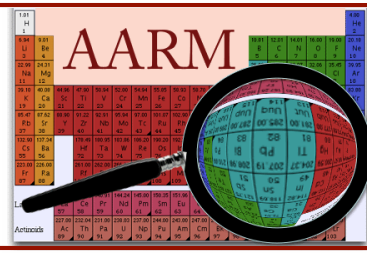
New techniques supplement counting

- *Mass Spec, chemical, etc.*

If DUSEL doesn't provide space and NSF doesn't provide funding

- Then this is the outcome and we should plan soon.

Collaboration Meeting: Agenda



9 – 11 General schedules and goals (FAARM, DUSEL, S4 Process)

11 -1 Characterization of Backgrounds, Radon, Materials
Lunch

*** *Change in schedule: Tullis Onstott: Bio, Geo needs*

2 – 4:30 Creating a Shielded Room (water shields and engineering)

4:30 – 7 Immersion Tank concepts
Group Dinner

9 – 11 Screeners

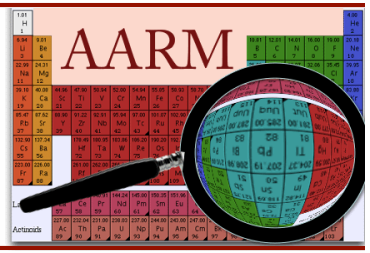
11 – 12 Auxiliary Services, Surface Bldg, Other techniques

12 – 1 Bio, Geo needs (moved). Organization of a user facility
Box Lunches: Conclusions and Action Items.

Afternoon free to work on action items and network on costs.

Milestones for the AARM Cooperative Agreement

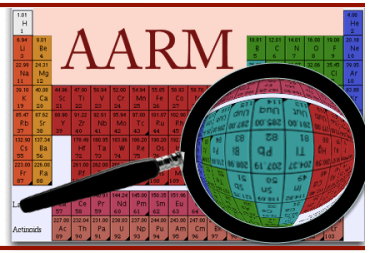
Site Characterization and Simulation Studies



12 month Milestones	24 month Milestones	36 month Milestones
Collate previous measurements, (radon variations, neutron and gamma fluxes and rock radioisotope information) Prepare site characterization database and begin targeted measurements.	Characterize site: Measure radon, n,γ at all accessible levels Host ILIAS measurement team and cross correlate with their measurements Determine minimum acceptable radon levels for screening, storage, and experiments.	Finish site characterization Establish joint backgrounds working group with new European infrastructures organization. Conceptual plan for radon mitigation
Setup site-specific n,γ GEANT4 MC of water shield and rock (SD and UM) Study immersion tank parameters Optical properties, H2O and LS purity (BHSU)	Optimize external water shield thickness, radiopurity of structural members (SD and UM) Define immersion tank properties decide between H2O and LS, active vs passive, size and number of ports	Conceptual design of the surrounding water shield Conceptual design of the ultra-sensitive immersion tank

Milestones for the AARM Cooperative Agreement

Determining the parameters of the FAARM



12 month Milestones	24 month Milestones	36 month Milestones
Determine experimental needs and sensitivities of S4 groups as well as possible synergies from outside physics	Decide on number, type and sensitivity of screeners to be located inside the FAARM Preliminary simulations of backgrounds for beta screening. Define type and amount of additional shielding needed for individual screeners based on simulations and requirements Determine footprint of auxiliary services, such as a clean machine shop, material storage, the water purification plant, sample preparation and wet chemistry labs	Determine placement of the alpha, beta, and gamma screeners within the FAARM Finish simulations of backgrounds for beta screening Design of additional shielding configurations for screeners based on the sensitivities required for each screener. Conceptual design of the FAARM infrastructure