SAND2019-2523C

ENVIRONMENT SAFETY & HEALTH

Sandia National Laboratories Building 1090 Laboratory Modifications

PRESENTED BY

Mark B. Allen and Joseph Zigmond

Analytical Services, Org. 0642

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Radiation Protection Sample Diagnostics (RPSD) Mission Statement

Provide high quality on-site laboratory analysis services to Sandia and external partners in the areas of radiation detection and quantification, radiobioassay, radiochemistry and inorganic analytical chemistry.

Analytical Capabilities

- Liquid Scintillation Counting
- Gas Proportional Counting
- Gamma spectroscopy
- Whole Body Counting
- Alpha spectroscopy

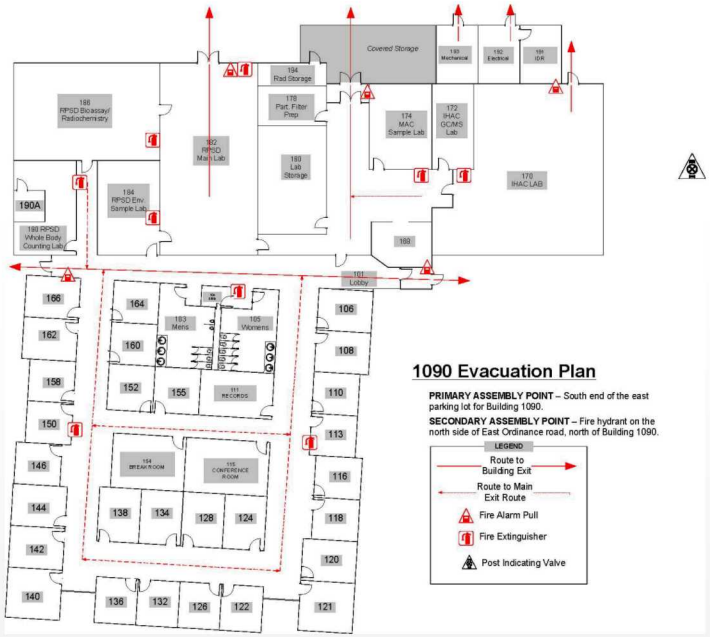
- ICP-MS, ICP-OES
- Flame Atomic Absorption
- Sample preparation facilities

ASP
ANALYTICAL SERVICES PROGRAM

Building Modifications—Initial Drivers

- ❑ Rush to re-locate to new facility
- ❑ Initial building design budget (2004)—$5M
  - Undersized, stainless steel ductwork.
  - Positive air pressure differential from lab spaces to office spaces.
  - Emergency evac plan—traffic flow toward the hazard.

- ❑ Energy audit (2009)—High power consumption due to undersized ductwork
  - New variable frequency drive to serve exhaust fans installed.
  - New stainless steel ductwork installed (correct size).
  - Energy use significantly reduced.



Building Modifications—More Drivers

- Extended power outages (2012)
  - Ventilation shuts down while acid digestions in process.
  - No emergency lighting in lab spaces.
- Stainless steel ductwork incompatible with acid digestions
  - Condensate collects in hoods.
    - Insufficient air flow.
  - Sub-optimal hood design.
  - Corrosion of control valves—leakage into ceiling spaces.

Laboratory Facility Upgrades

Goals:

- Replace corroded ductwork with PermaShield Pipe (PSP) fluoropolymer coated ductwork.
- Install new acid-compatible hoods.
- Consolidate digestion operations onto a dedicated exhaust fan.
- Provide backup power and lighting.
- Improve lab work flow/traffic patterns and evac routes.
- Re-purpose some under-utilized lab spaces.

Project Cost: $845K
Construction Timeline: 4 months

Project in Progress

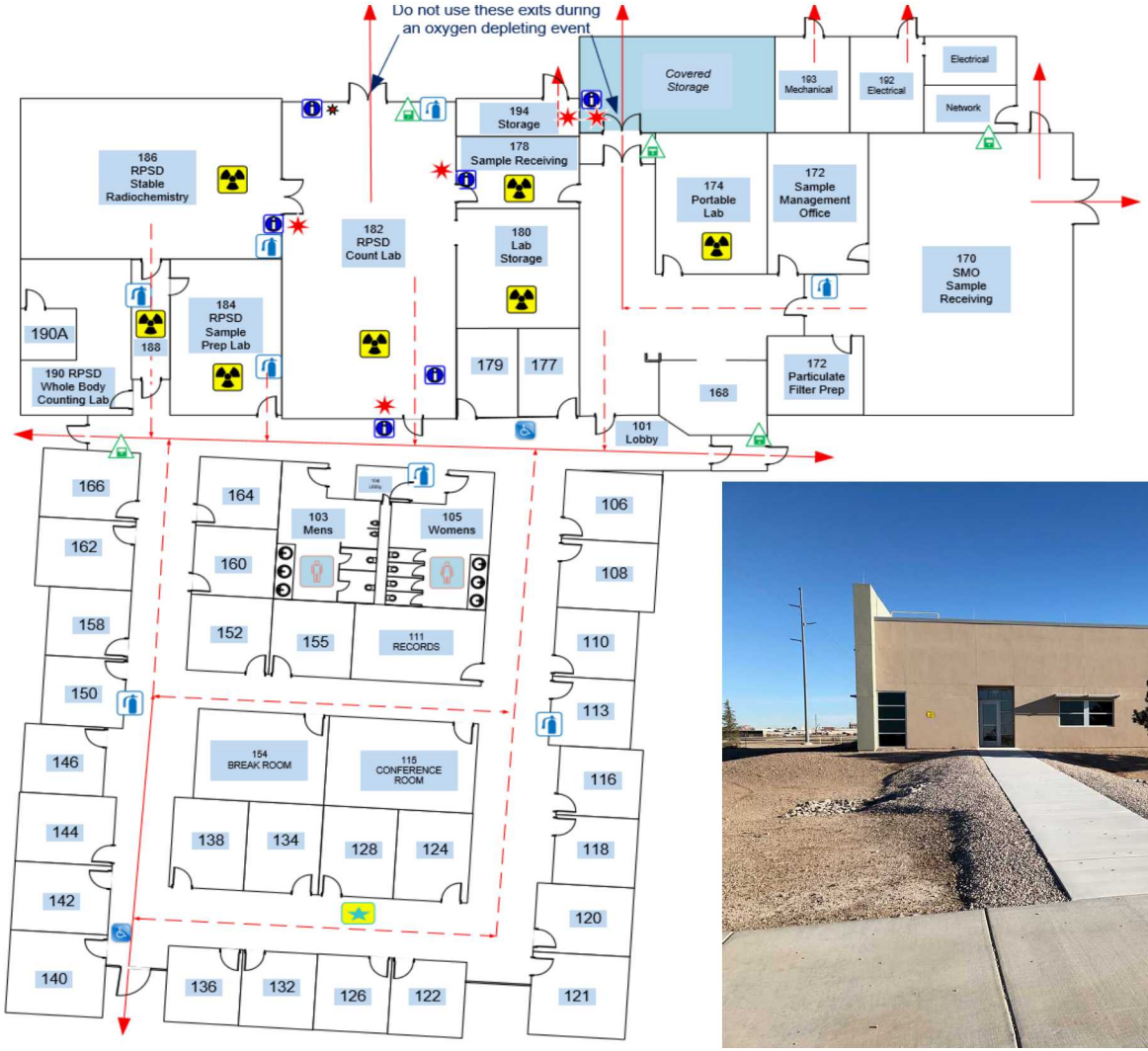
Removing old ducts and HEPA filters

Lab space to be re-purposed

Re-plumbing shower drain

New PSP ductwork

Revised Floorplan



Issues Encountered During Recent Building Mods

- ❑ Vastly underestimated resources needed to support the project
  - One lab POC to interface with designers and construction contractors.
  - Many competing routine and non-routine laboratory operations and projects.
- ❑ Rad and chemical D&D required contractors with Rad Worker-II training
  - Initial subcontractor team did not have training.
- ❑ Unforeseen hazards/issues
  - Mice in the ceilings
  - Removal of flooring—increased background in adjacent lab count room
- ❑ Lots and lots of paperwork (pre- and post-construction)
  - Hazard analyses, safety documents, updates to permits, etc.
- ❑ New firewall design issues identified
  - Identified from newly installed differential pressure monitors.
  - Positive pressure from laboratory space to office space during windy conditions.

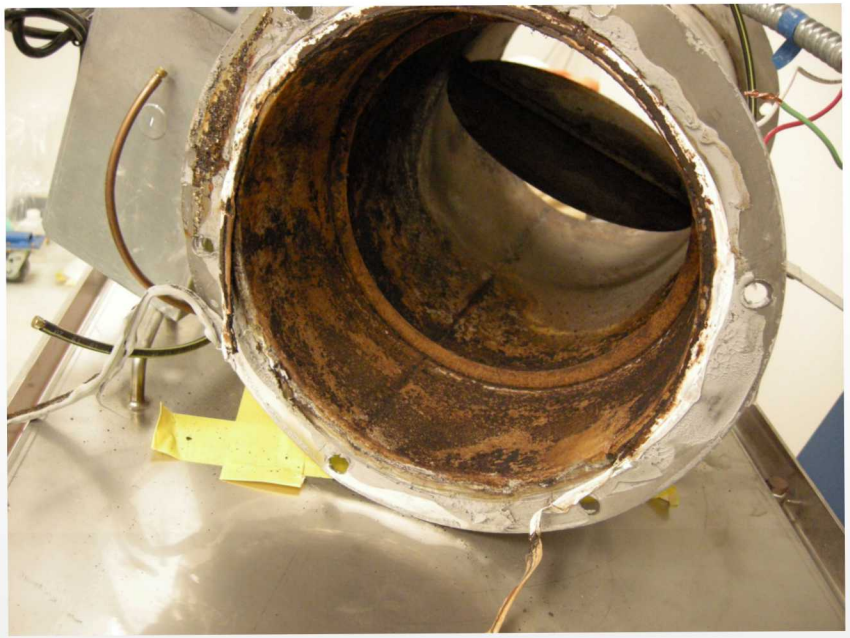
Lessons Learned

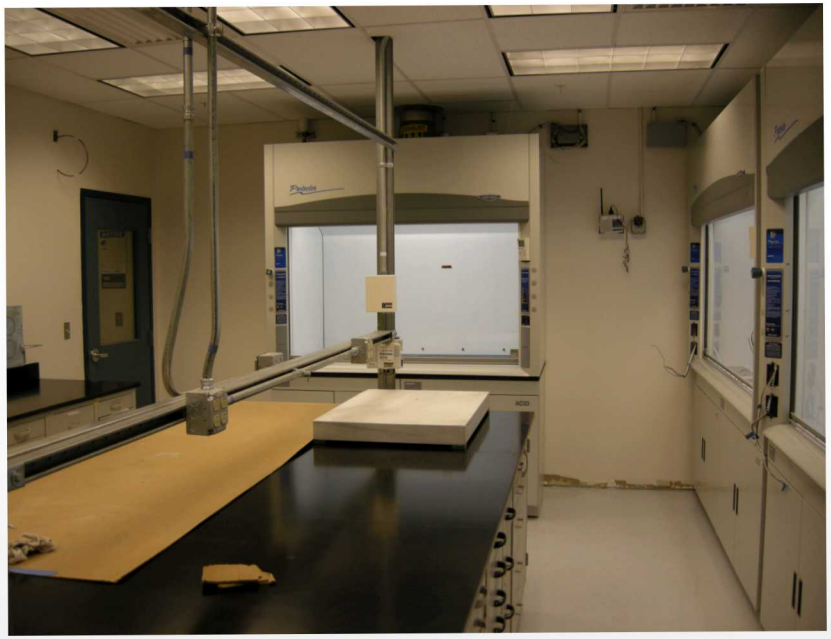
- ❑ Insist on a design firm with experience in designing analytical lab spaces.
- ❑ Consider independent review of design plans by consultant.
- ❑ Match hoods and ducting materials to be compatible with chemical and radiological needs.
- ❑ Consider emergency lighting & backup power options.
- ❑ Involve Radiation Protection and Industrial Hygiene early in design and work planning process.
- ❑ Need frequent update meetings during construction phase to plan around lab operations.

Lessons Learned

- ❑ Need access control for contractors into radiological areas during construction phase.
- ❑ Consider new traffic routes and how they will impact workflow.
- ❑ Consider emergency evacuation routes and options.
- ❑ Plan for how doorways are going to used (i.e. if equipment is to be moved through doors, plan for larger than standard openings).
- ❑ Evaluate need for windows on doors and door type (i.e. crash bars, size).
- ❑ Evaluate the need for differential pressure monitors in critical areas.
- ❑ Consider an independent post-construction evaluation.
- ❑ Need plan for storing construction designs, documents, plans, photos for future reference.

Questions?





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