Isotope Production Opportunities at H-Canyon

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DOE-SR

Program Changes at SRS

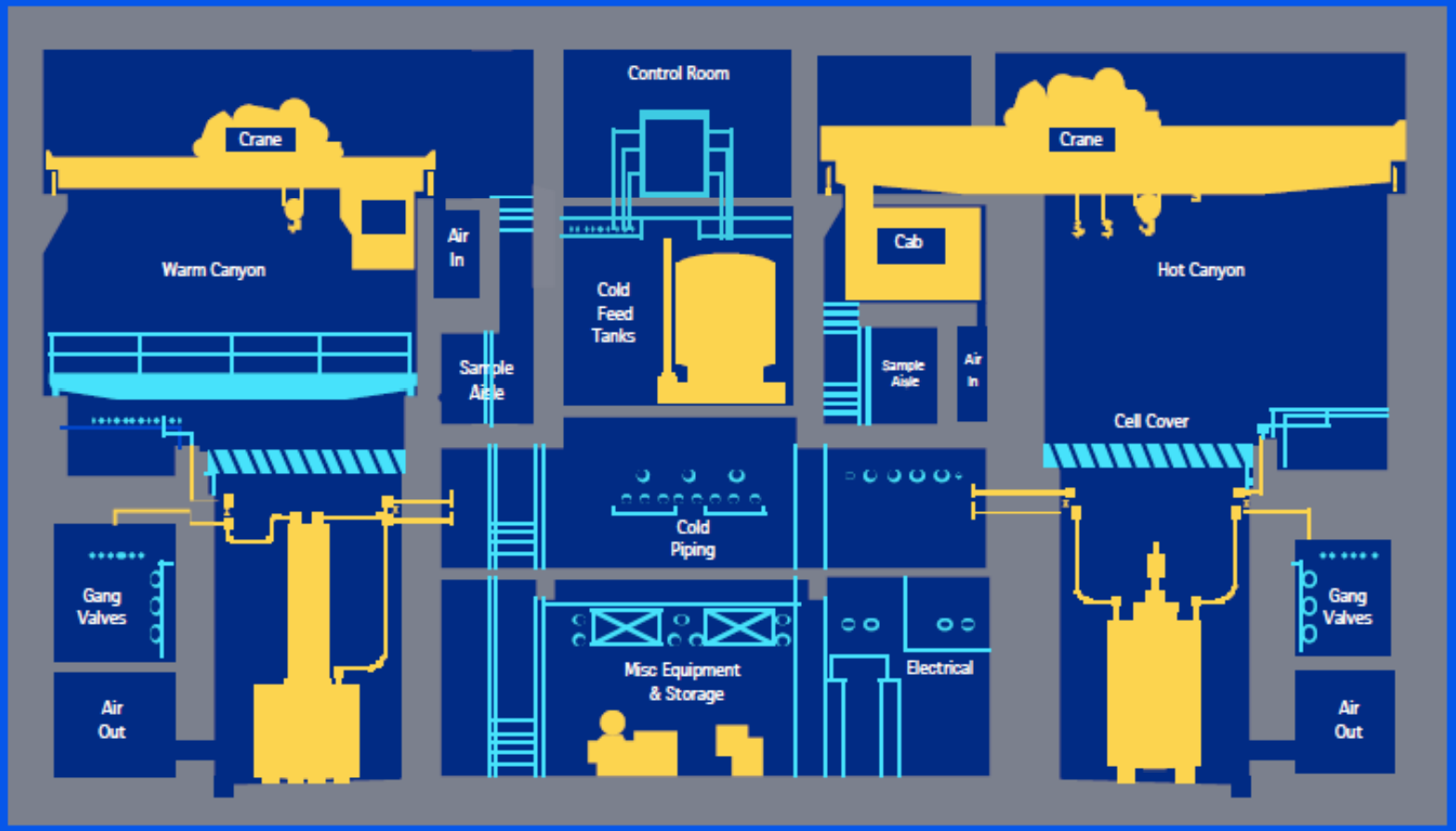
- H-Canyon and HB-Line remain operational
- Base Cost covered by DOE-EM
  - Incremental costs for special missions
- H-Canyon capacity/capability underutilized
  - Available space and spare equipment
- HB-Line capacity/capability underutilized
  - Available space and spare equipment

SRS H-Area Facilities

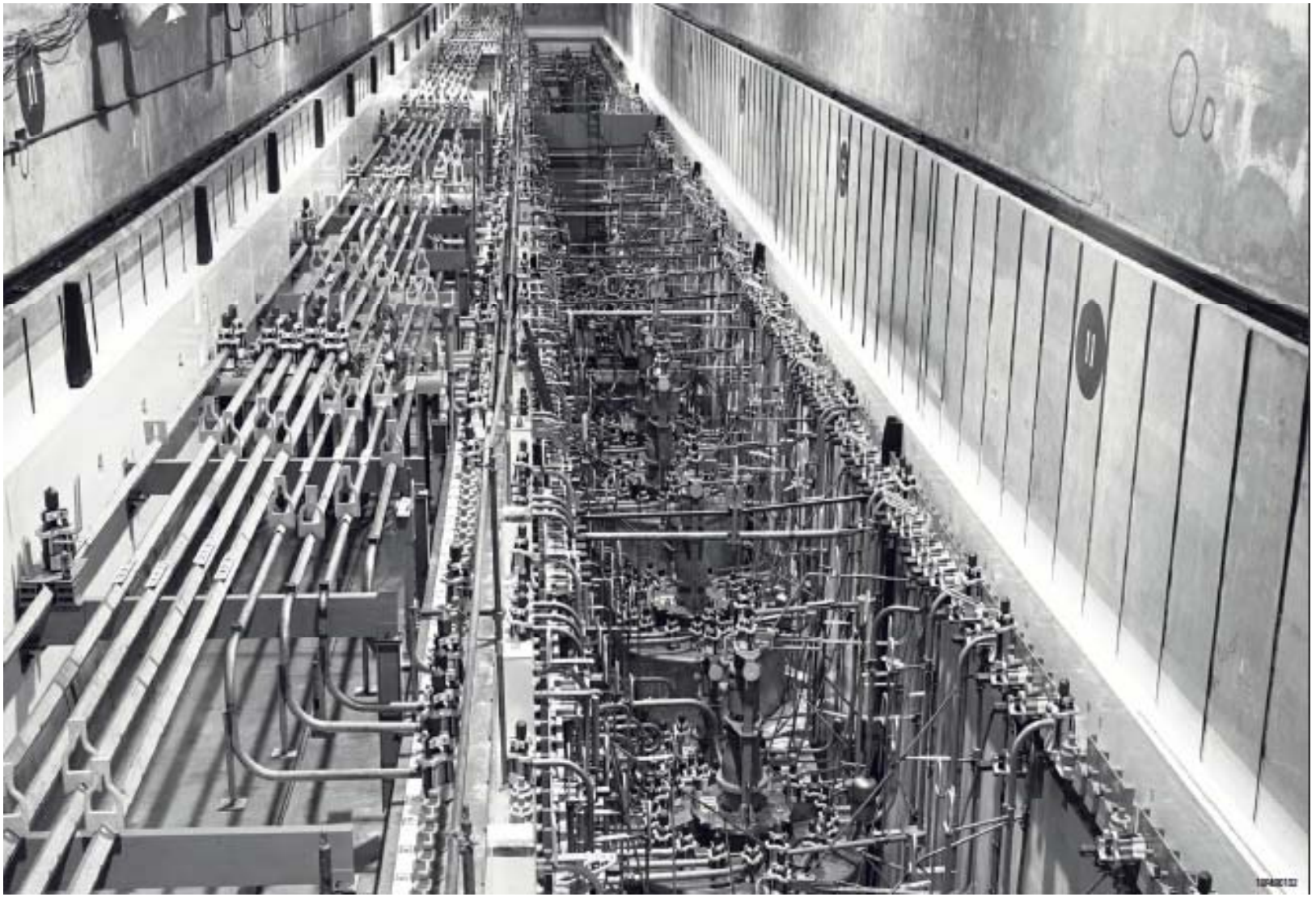
- H-Canyon
  - Remote operations
  - Heavily shielded
  - Sand Filter ventilation
  - Highly flexible process operations
- HB-Line
  - Glovebox operations, three process lines
    - Phase I – Dissolving
    - Phase II – Neptunium/Plutonium Oxide Process
    - Phase III – Shielded Pu-238 Oxide Process
- Site Laboratories
- Integrated High Level Waste process

H-Canyon/HB-Line

SRS Canyon Cross Section



H-Canyon Sections/Cells



HB-Line Structure

Typical HB-Line Glovebox

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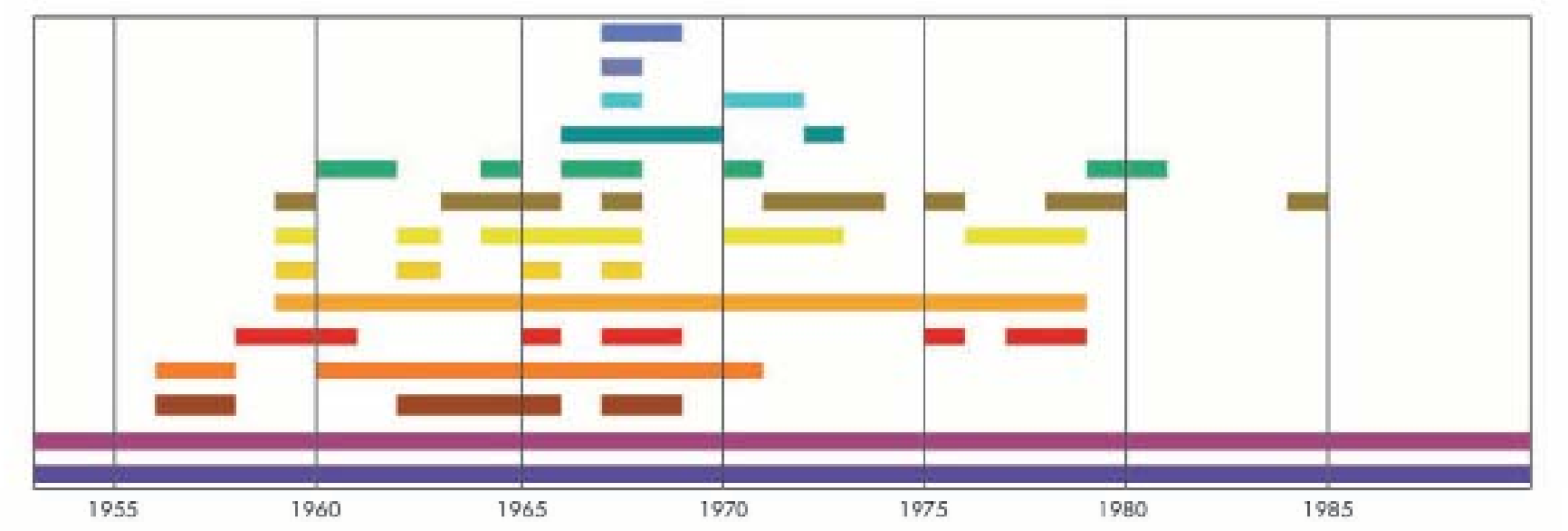
Past SRS Isotope Production



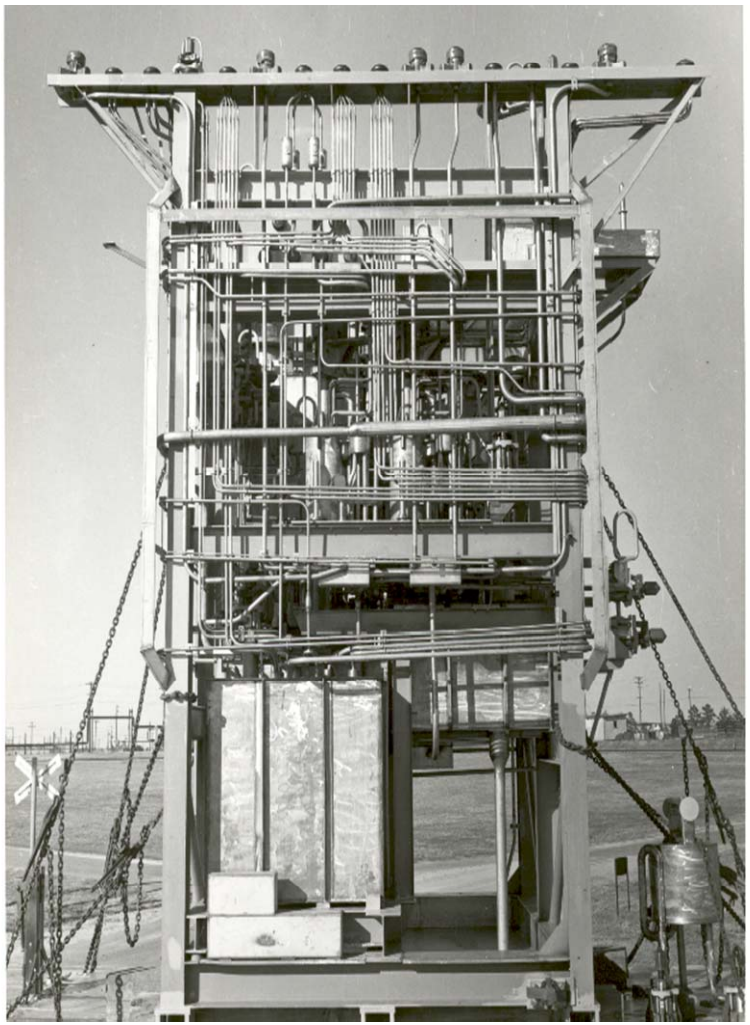
Heavy Elements Stored At SRS

- **Plutonium (includes Pu-244)**
- **Americium**
- **Curium**
- **Californium**
- Uranium
- Thorium

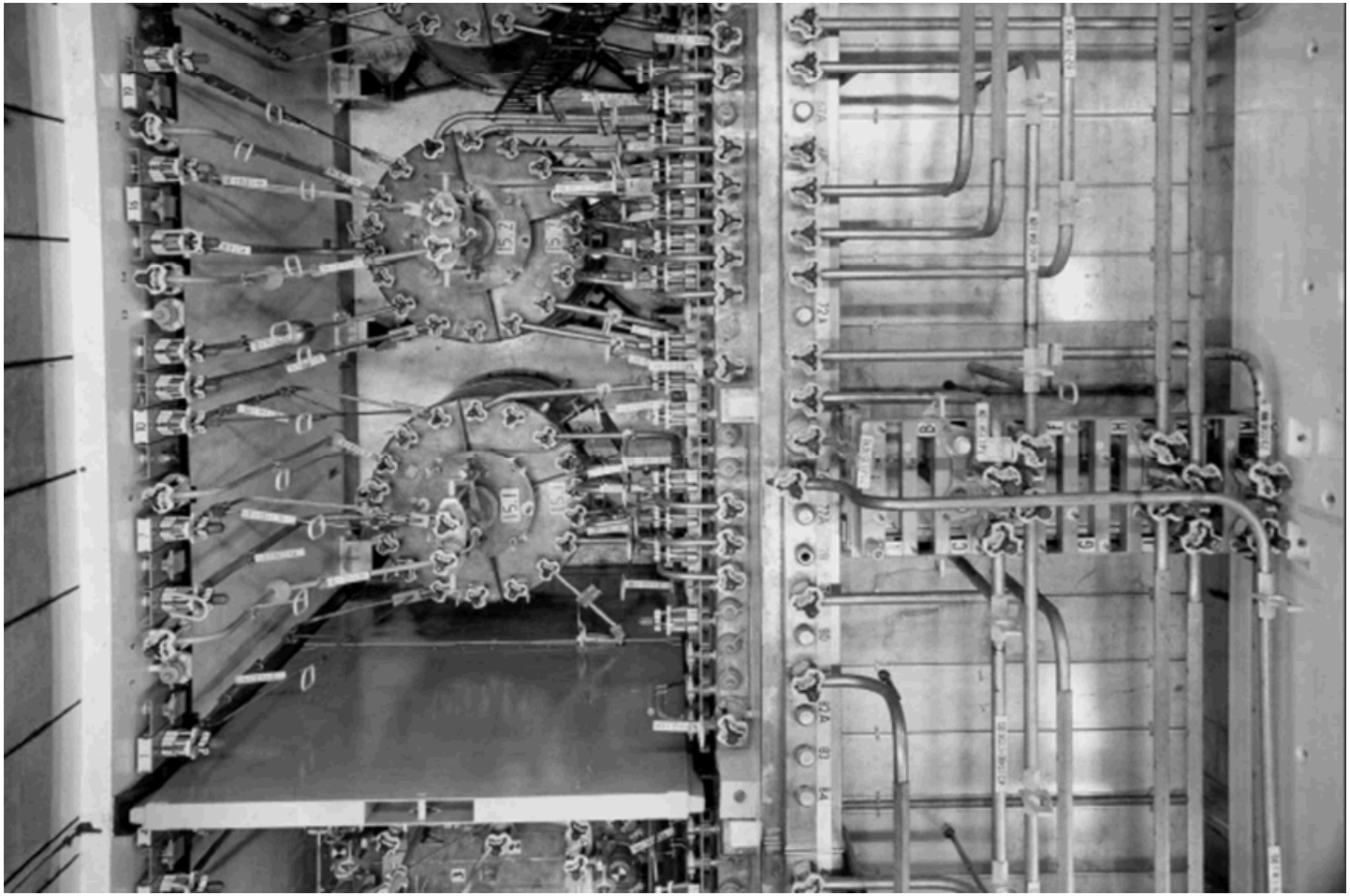
Plutonium

- Pu – Weapons Grade to Fuel Grade –
  - Significant Inventory
    - Disposition Paths – MOX & WIPP
- Pu-244 – ~20 grams
  - Currently stored in 65 Mark 18A targets in L-Basin
- Pu-238 Mission Capable
  - Purification of scrap (similar to CASSINI mission)
  - Irradiated Np Target processing Pu-238 Recovery ("Frames" Process, picture follows)

Pu-238 “Frame” Process



H-Canyon Cell



Americium-241

- H Area facilities will be processing aged weapons-grade plutonium to provide as feed to Mixed Oxide Fuel Fabrication Facility beginning in 2012 ramping up to a production rate of 1MT/yr by 2015
- The waste stream will contain Am-241 which could be recovered
- Waste stream from preparing Pu is currently slated to be disposed in the SRS liquid waste system
- Could Increase the Am-241 throughput opportunity by processing higher isotopic fuel-grade Pu materials currently stored at SRS.
- Utilizes current process facility capability
  - Minor mods to HBL Phase II
    - Ion exchange and Pu oxide process
  - Restart of HBL-Phase III cabinets for Am-241
    - Shielded glovebox designed for Pu-238 oxide process
  - H-Canyon tank and transfer tank

Plutonium-244

- 65 Mark 18A's
  - Pu-242 targets for transplutonium isotopes
  - ~20 grams Pu-244 in ~300 grams Pu
  - Aluminum, Fission Products, Am, Cm, Cf
- Dissolve in H-Canyon
- Separate and Recover Pu-244 in H-Canyon
- Laboratory Pu oxide preparation

Americium, Curium, Californium

- Combination of elements/isotopes
  - Mark 18A residuals
  - Americium Oxide Target Slugs
  - Curium Oxide Target Slugs
  - Mark 51 (Americium/Curium Target
  - Cf sources
  - Am sources
- Remote recovery in H-Canyon via Ion Exchange with further purification/refinement elsewhere
- Challenge to covert solution to a suitable form for shipment