

Glenn Research Center Cyclotron Background and Status

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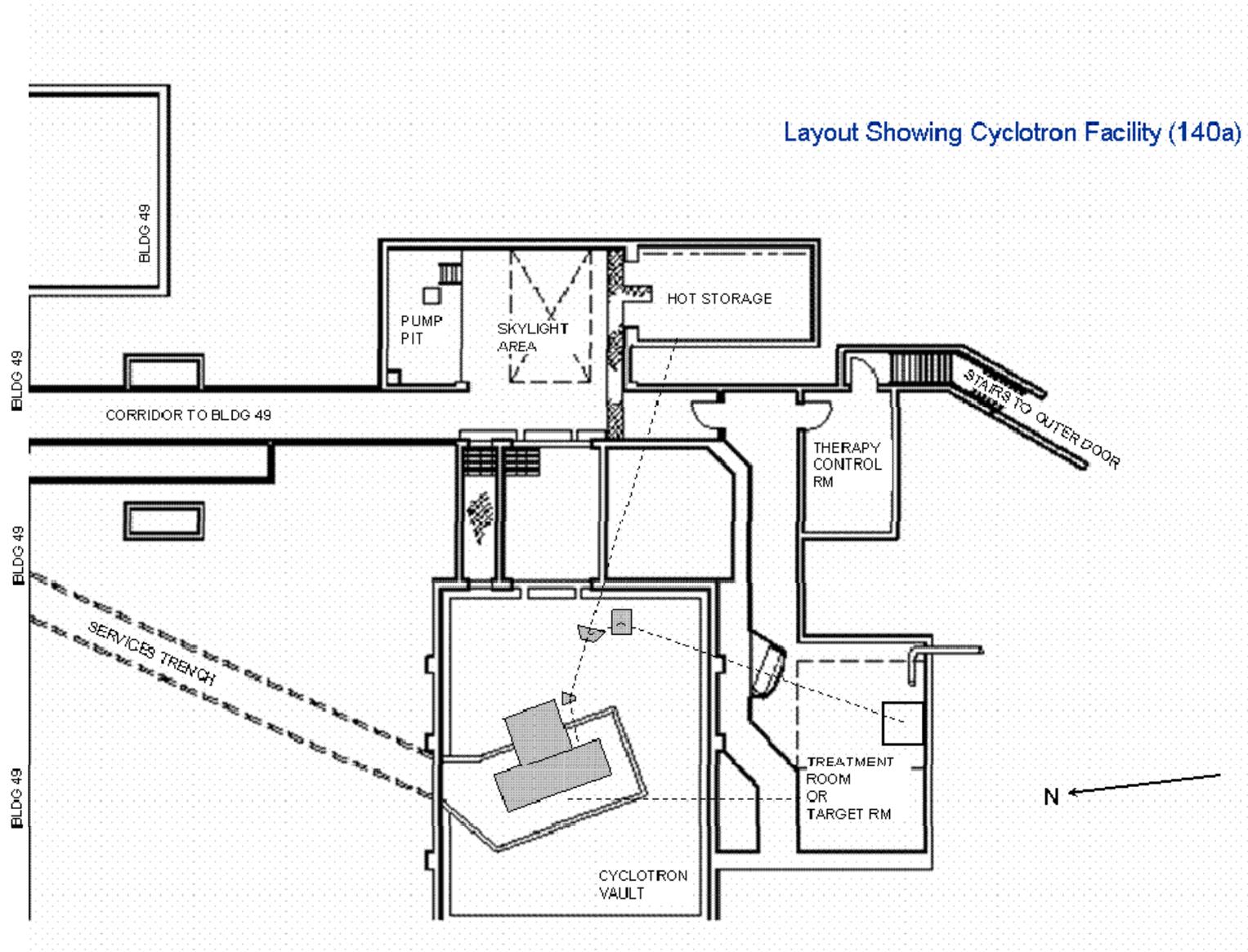


Cyclotron Background

- The Glenn Research Center's Cyclotron is located in the southern portion of the GRC Lewis Field campus.
- Construction completed in 1955
- Operated until 1980 by NASA, used to expose various materials to energized streams of subatomic particles to determine the effects of radiation exposure.
- Operated under a Space Act Agreement with the Cleveland Clinic from 1980 to 1990 for medical research.
- Facility has been in a shutdown mode since 1990.



Cyclotron Background





Cyclotron Background



View of Machine From NE Corner as Enter Cyclotron Vault



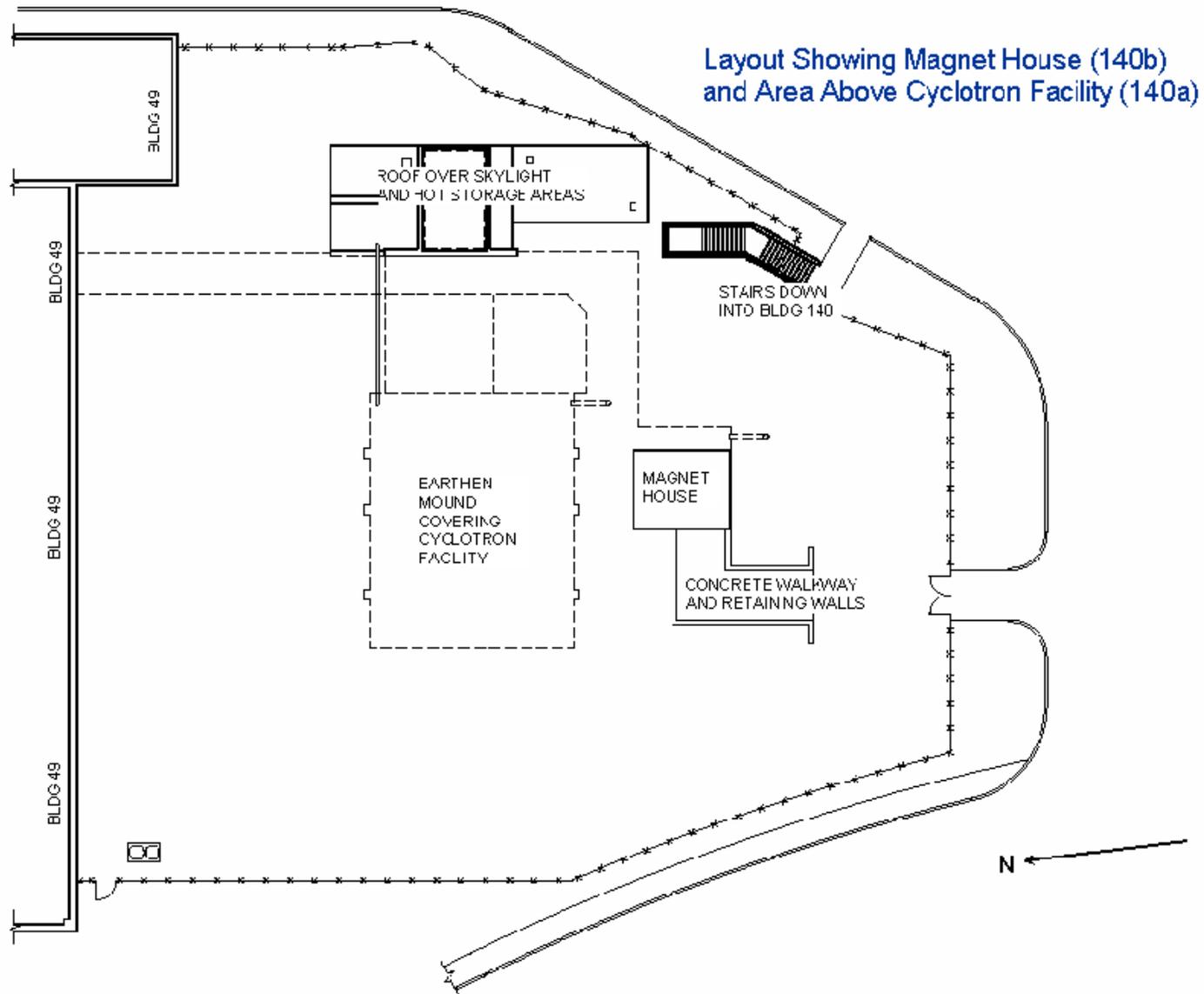
View of Machine From W-side of Cyclotron Vault



View of Beam Path from Atop Machine



Cyclotron Background





NRC Involvement

- GRC has an NRC 'Byproduct Material' license which allows for the possession and use of various radioactive materials and sources in support of research and development.
- The NRC's oversight role of radioactive materials increased with the "Energy Policy Act of 2005" which was intended to gain greater control of byproduct material.
 - Effective 11/07, the Act changed the definition of 'byproduct material' to include all material activated by the cyclotron, whether intentionally or not.
- As a result, GRC has notified the NRC of the cyclotron's presence and is moving forward with amending its radioactive materials license and will be providing the NRC with a plan for decommissioning the site.



Decommissioning

- The overall goal is to clean the site to a level that allows the termination of the NRC license and the unrestricted future use of the formerly licensed site.
- Decommissioning a nuclear facility is performed in several steps:
 - Step 1 – Characterization
 - Step 2 – Decontamination
 - Step 3 – Final Status Survey



Decommissioning – Step #1

- Characterization – A well thought out physical sampling campaign, based on a Historical Site Assessment, interviewing past operators, review of operating logs and procedures, and any other information that will help uncover the locations of potentially contaminated or activated material.
 - The first step in this effort is to draft a written plan that lays out the sequence of actions to be taken.
 - Ultimate activity is the actual sampling effort in the cyclotron area to determine exactly what radioactive isotopes are present, where they are, and at what concentrations.
 - Sampling includes direct instrument readings, core bores, and analysis of samples of various surfaces throughout the facility.



Decommissioning – Step #2

- Decommissioning Plan – With the knowledge gained from the characterization, specifically the nature and extent of the material that must be removed, a plan can be developed to do the necessary clean up.
 - Key decisions to be laid out in the plan include the overall approach (decontaminate vs. rip and ship), decommissioning technologies to be used, the identification and volume estimates of various waste streams (Class A,B,C Low Level Rad Waste, Mixed Waste, asbestos, lead, others), and the ultimate disposition pathway for each waste stream.
 - All of this information is necessary to put together a meaningful cost estimate.
 - Decommissioning Plan is reviewed and approved by the NRC.



Decommissioning – Step #3

- Final Status Survey Plan – This document will develop the required clean up levels, in accordance with a standard, regulatorily accepted protocol (MARSSIM) and dose analysis computer code (RESRAD). It will also detail how the achievement of the clean up levels will be demonstrated and documented.
 - Clean up levels developed concurrently with the Decommissioning Plan
 - MARSSIM has several scenarios – most appropriate for the cyclotron would be the “Building Reuse Scenario” - it will result in clean up goals that are less stringent than the “Resident Farmer Scenario”
 - FSS conducted as the final step after clean up
 - Following successful FSS and license termination the former location of the cyclotron may be released for any desired reuse.
 - FSS Plan is reviewed and approved by the NRC.



Nominal Schedule

- The NRC wants to see progress on the decommissioning of the cyclotron, but is reasonable in its expectations. A plan that extends over several years will be acceptable, as long as there continues to be progress.
- A possible schedule might be as follows:
 - FY 2009 – Develop Characterization Plan
 - FY 2010 - Conduct Characterization
 - FY 2011 – Prepare Decommissioning Plan and FSS Plan
 - FY 2012 – 2013 – Conduct Decommissioning and FSS



Leveraging off the PBRF Decommissioning

- NASA GRC is currently decommissioning the NRC licensed Plum Brook Reactor Facility (PBRF). There are several ways the cyclotron project could leverage off of the reactor project:
 - Knowledgeable personnel at PBRF, both Civil Servant and Contractor, who can support the cyclotron project's start part time and eventually shift over to full time to staff as the reactor project winds down and the cyclotron ramps up.
 - The PBRF and cyclotron decommissioning efforts would have the same NRC inspectors, so there are good working relationships already in place.
 - Existing radiological analytical lab on-site at Plum Brook can perform analysis of characterization samples from the cyclotron saving significant off site lab costs.
 - Existing written procedures, in such areas as radiological control, waste management and disposal, and FSS can be easily adapted for use at the cyclotron (hit the ground running)