

NEUTRON SCATTERING UPGRADES AT THE HIGH FLUX ISOTOPE REACTOR

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(Session 1A)



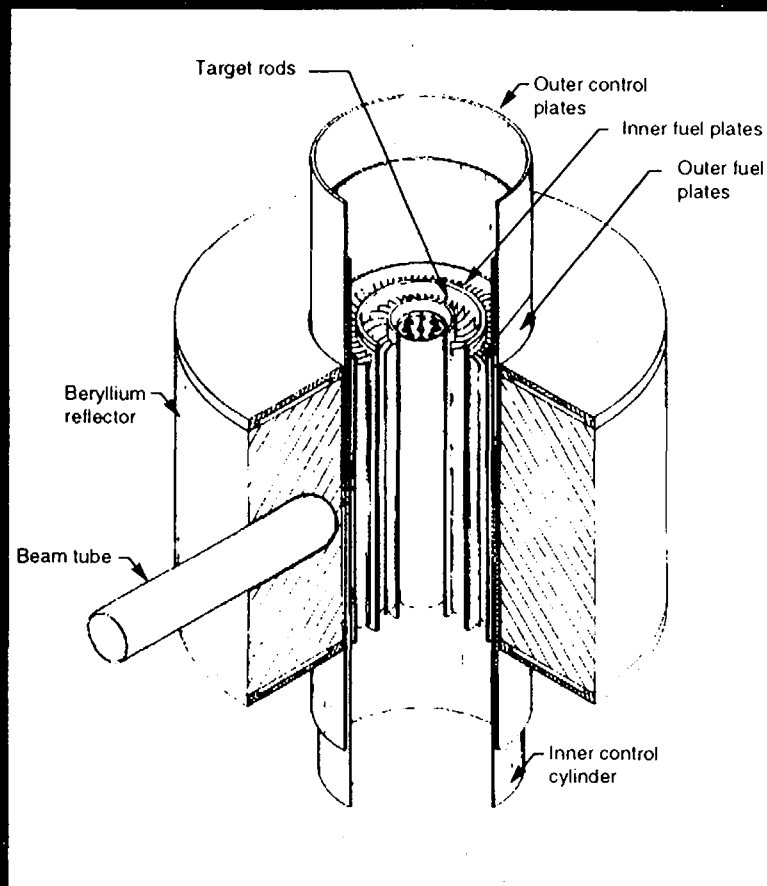
XA04C1712

Abstract

A program of upgrades at the High Flux Isotope Reactor (HFIR) is underway. Major components of the program are the enlargement of a tangential beam tube to accommodate installation of a supercritical hydrogen cold source (to be described in a separate presentation); installation of a guide system to carry cold neutrons into a new guide hall area; enlargement of the reactor's radial beam tube and installation of a supermirror thermal neutron guide system; and improvements to the geometry of the reactor's two remaining tangential tubes. Installation of the new equipment is planned to take place during the shutdown, scheduled to begin in late 1999, for replacement of the so-called permanent beryllium reflector. The reflector and other reactor internal components will be modified to accept larger beam tubes.

GTDA

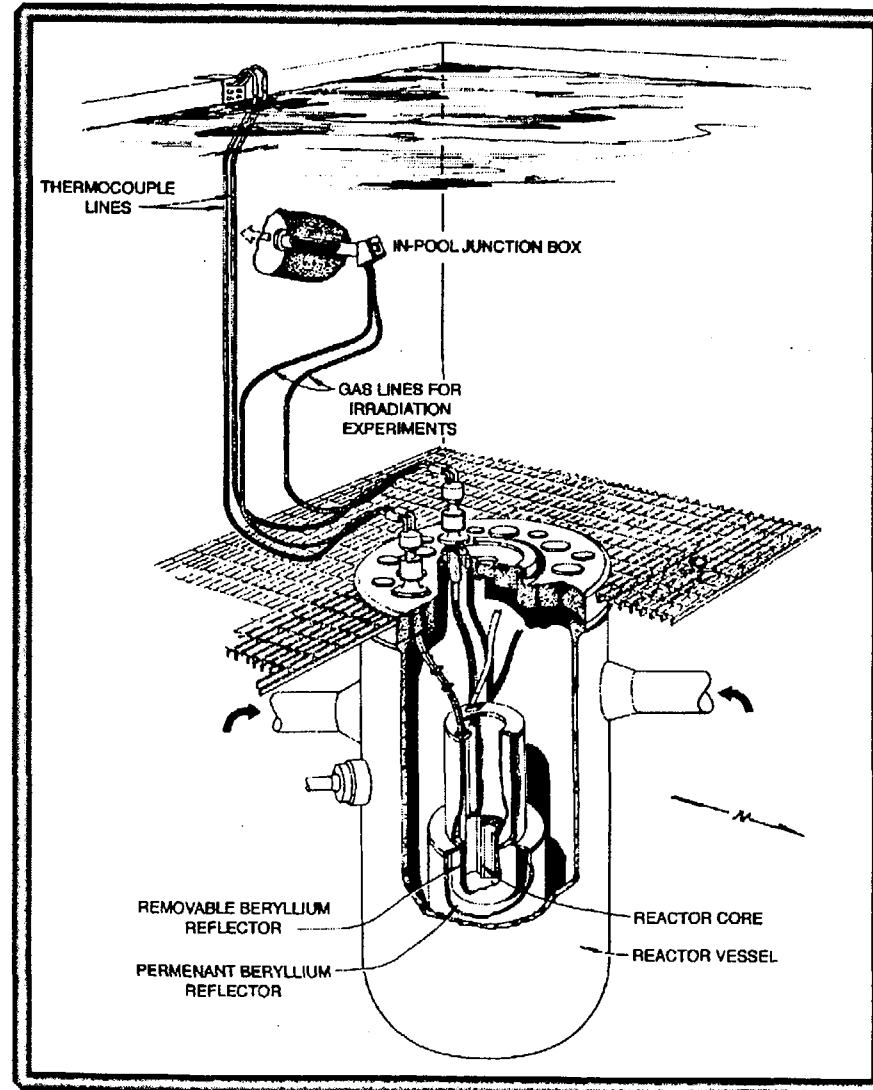
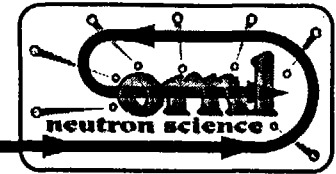
HFIR Was Designed to Produce the High Flux Needed for Transplutonium Isotope Production



- Compact core — high power density
- Flux trap design
- World's highest thermal flux (2.5×10^{15} N/cm² · s)
- Beam intensities among world's highest
- Concentric cylinders
 - Target
 - Fuel
 - Control elements
 - Reflector

ORNL

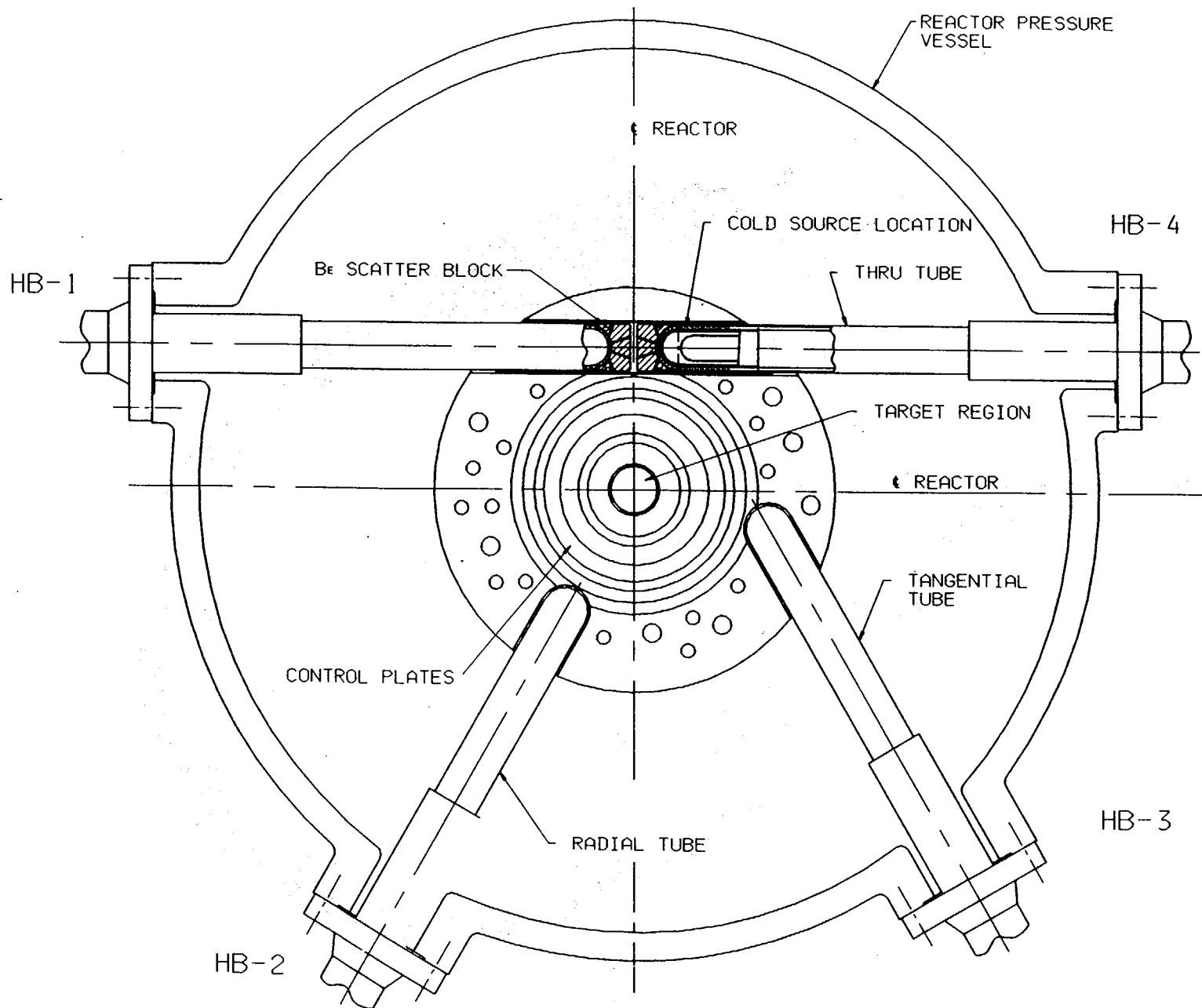
HFIR - Installation Of Irradiation Experiments



FLUX AT VARIOUS RESEARCH REACTORS

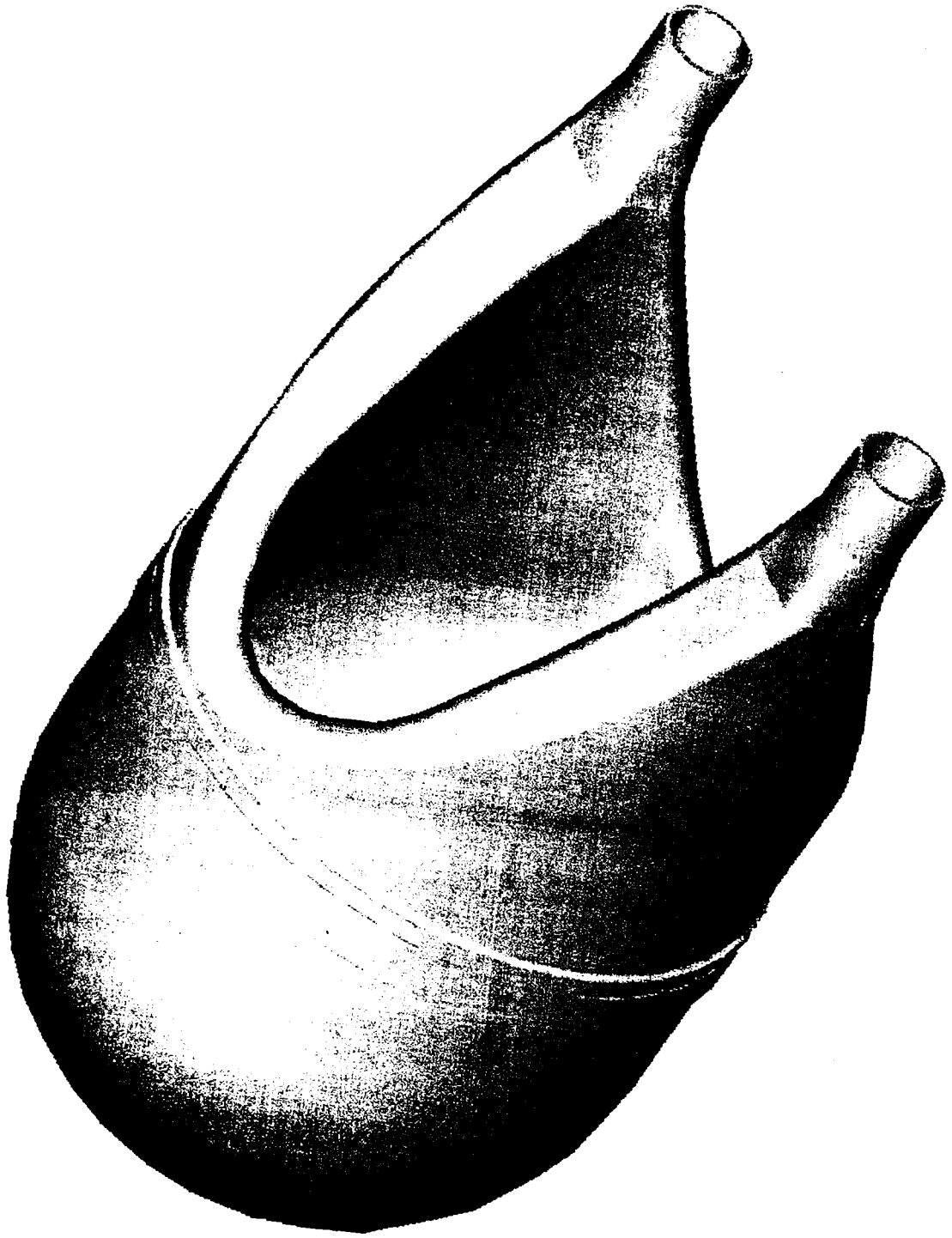
Facility name		Peak thermal flux outside core, $10^{14} \text{ cm}^{-2} \cdot \text{s}^{-1}$
HFIR	Oak Ridge	12 (@ 85 MW, 14 @ 100 MW)
ILL	Grenoble	13
SM-3	Russia	10
HFBR	BNL	11 (@ 60 MW)
BR-2	Belgium	9
ATR	Idaho	8.5
PIK ^a	Russia	13

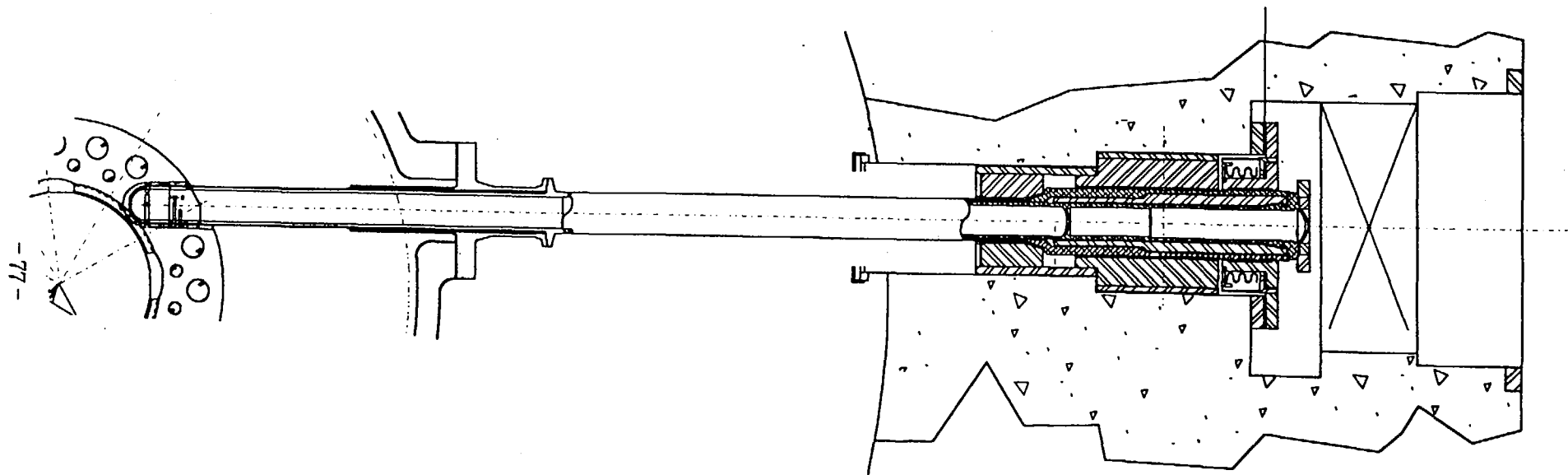
^aIn construction.



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PROPOSED HFIR COLD SOURCE

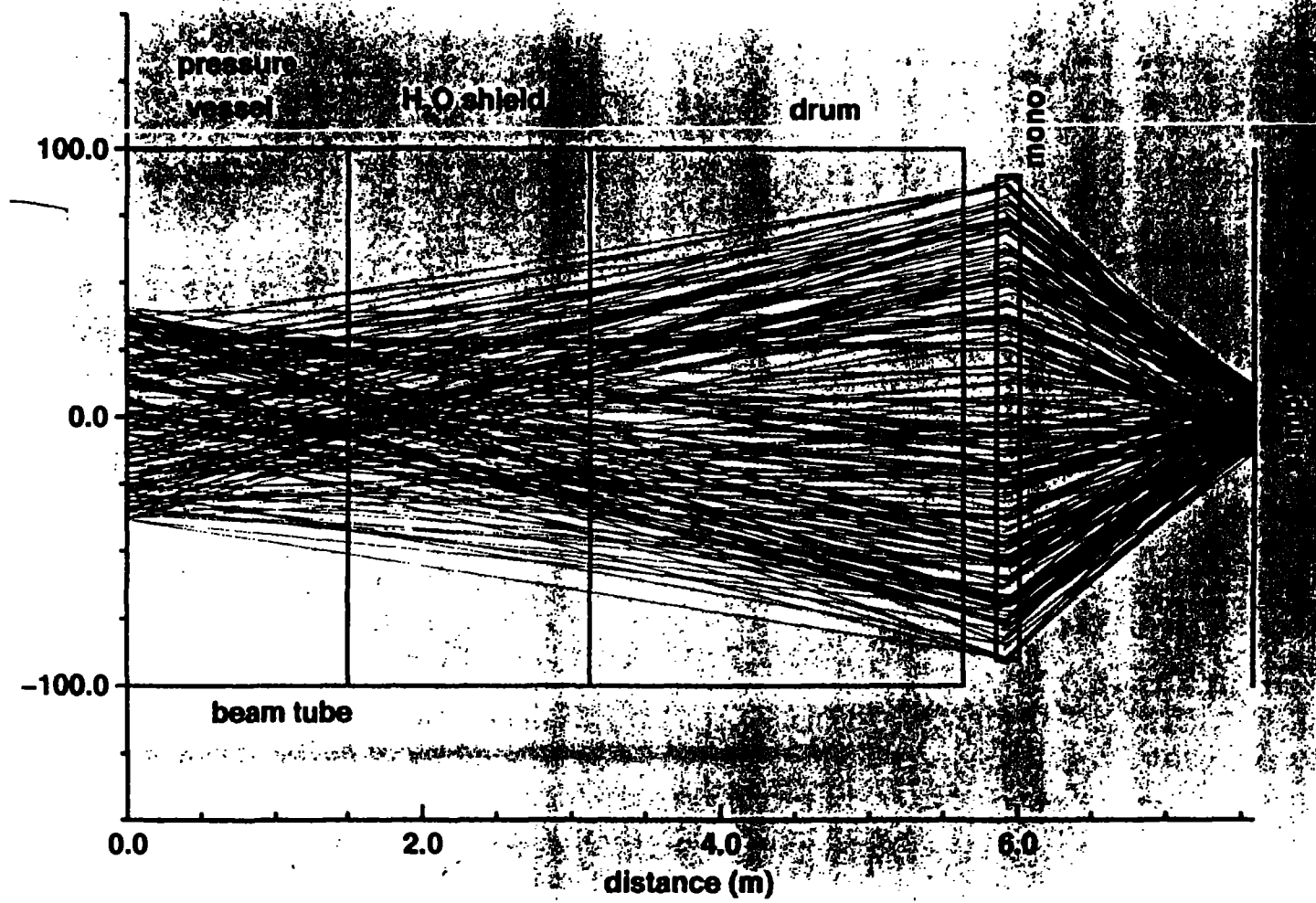


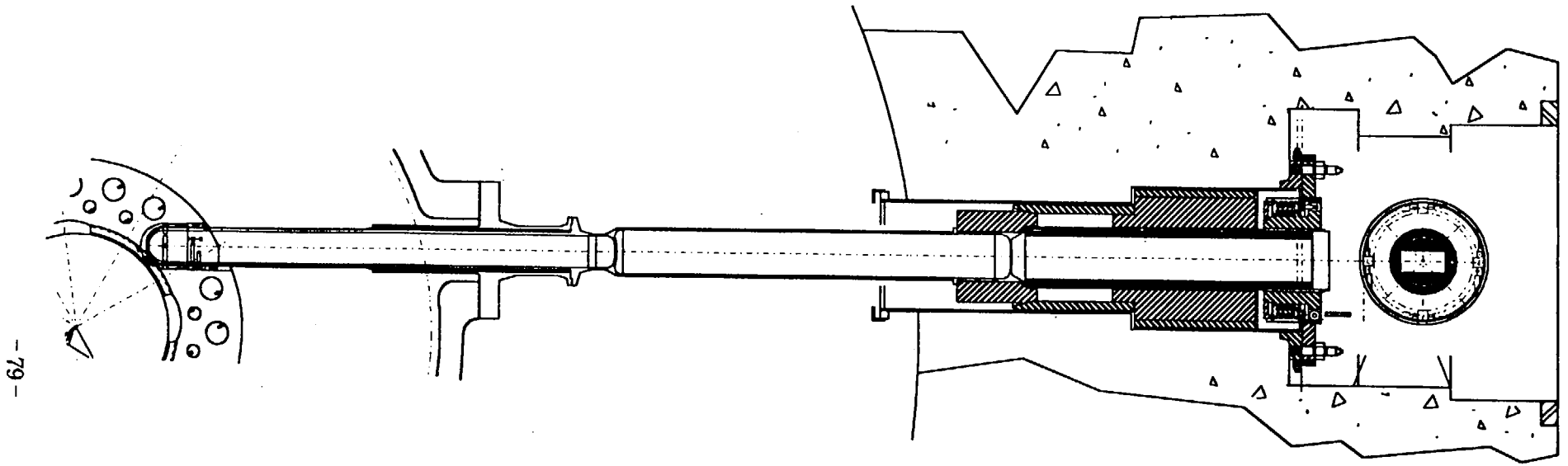


EXISTING HB-3

Ray Diagram (200mm Beam Tube)

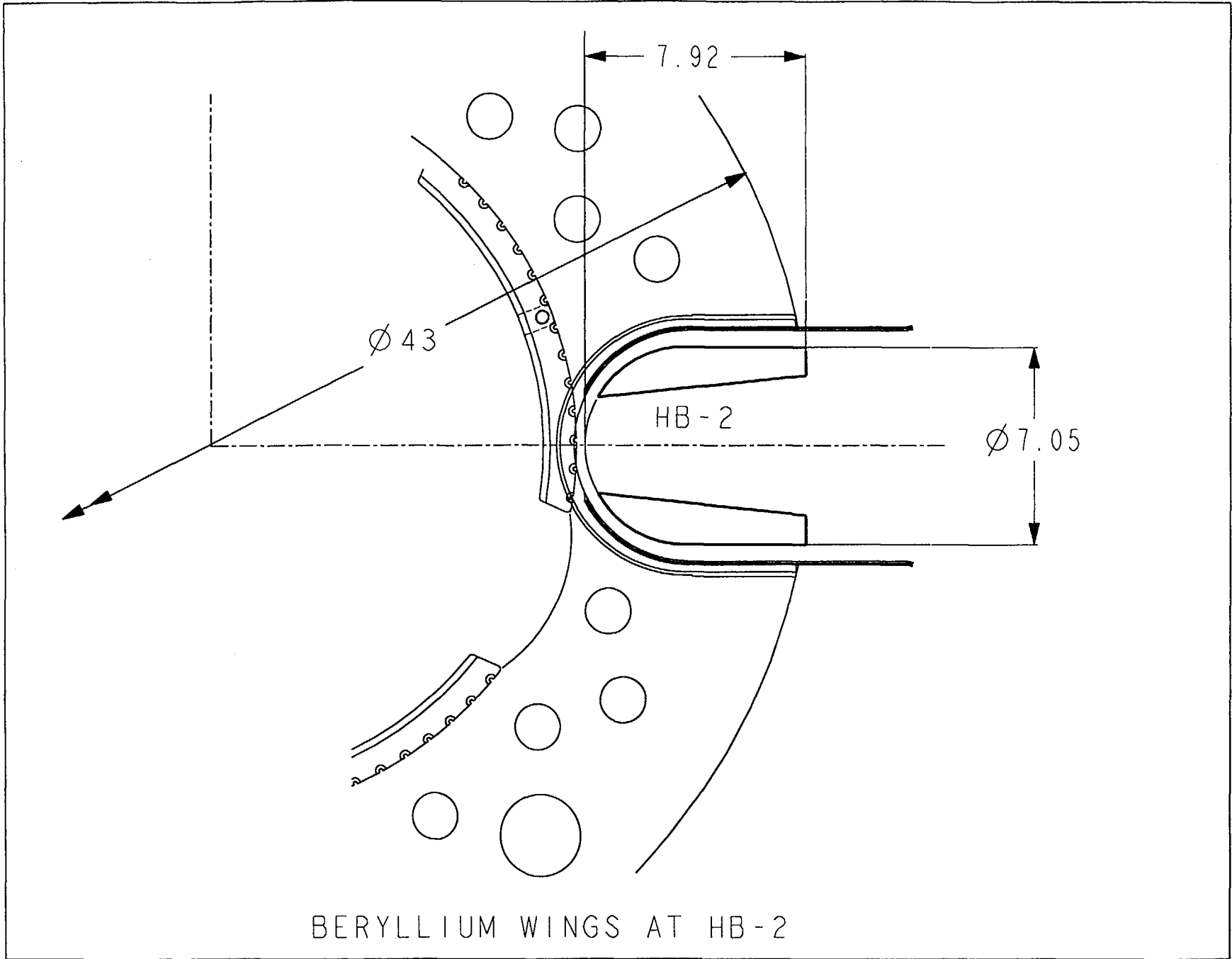
Vertical (25.4x25.4 mm sample aperture)



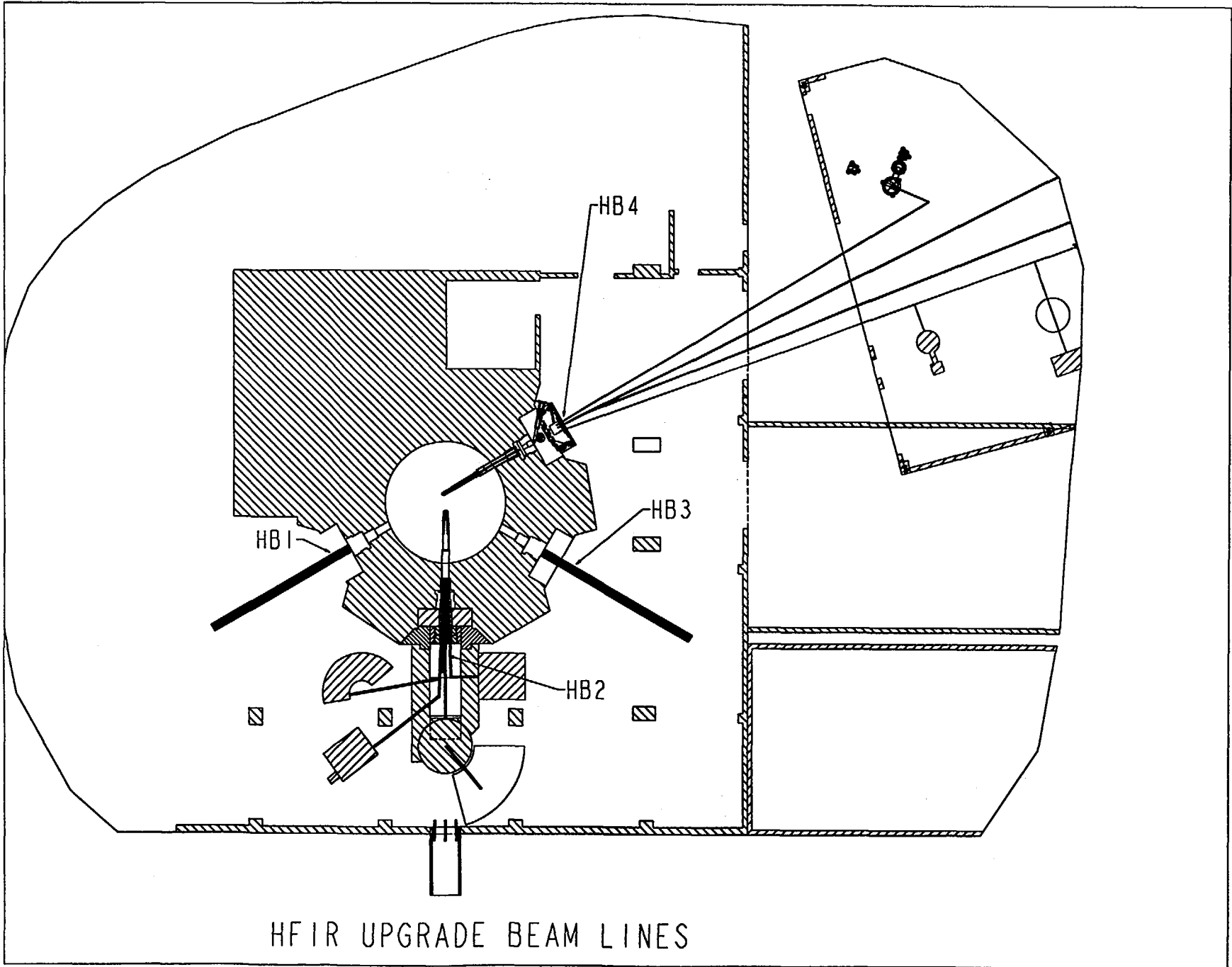


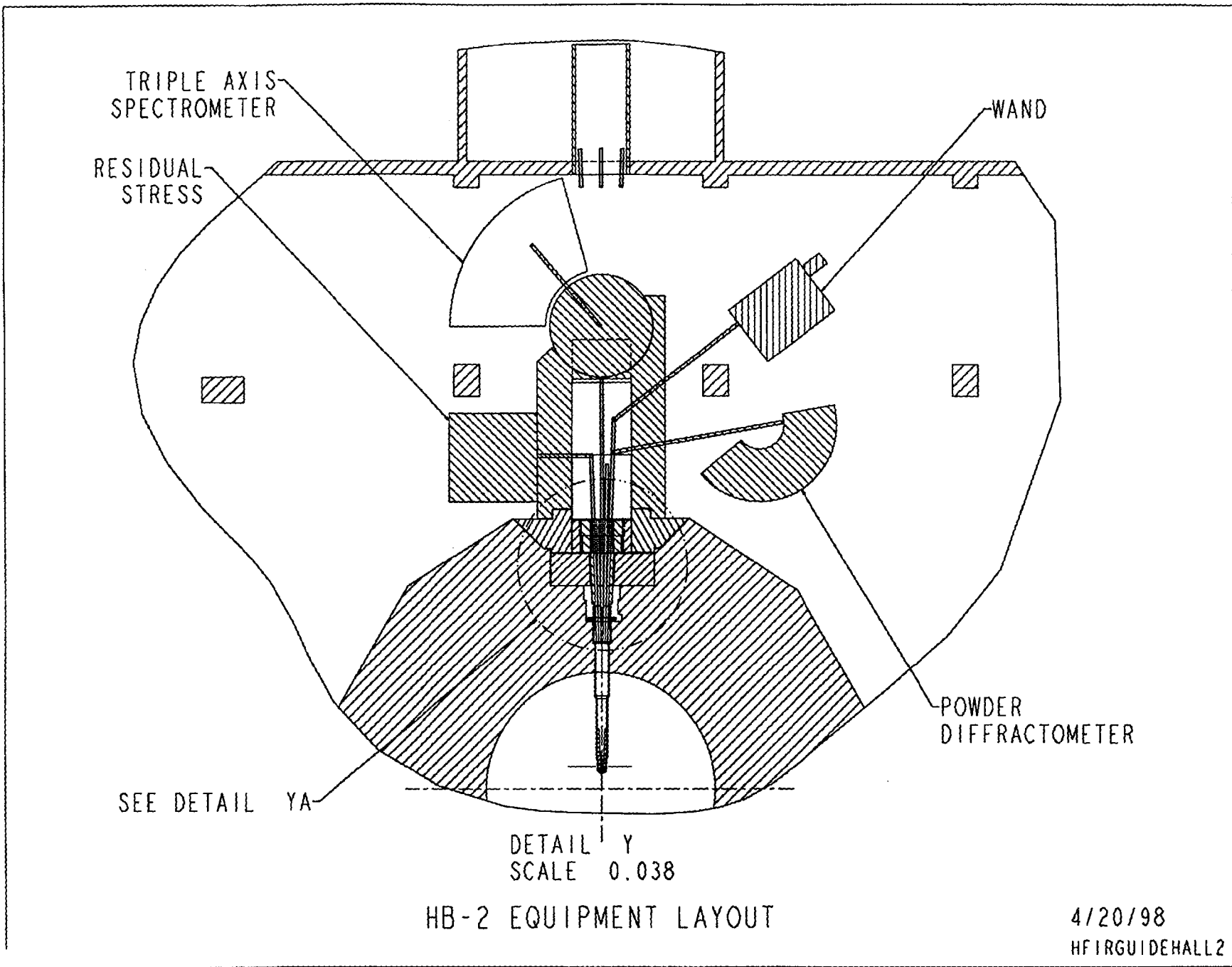
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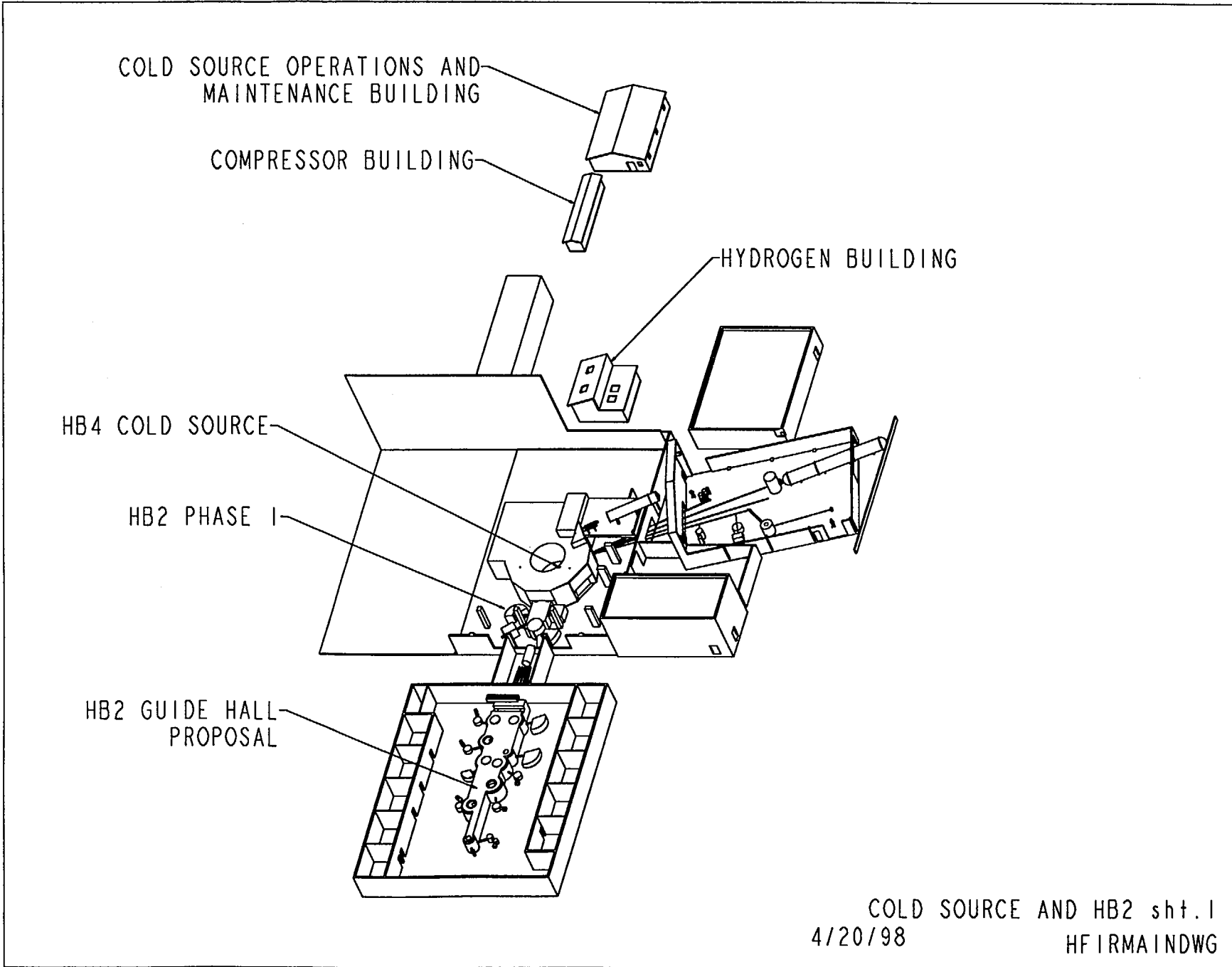
PROPOSED HB-3



BERYLLIUM WINGS AT HB-2







COLD SOURCE AND HB2 sht. 1
4/20/98 HFIRMAINDWG

STATUS

- Cold Source Project is ~60% complete
 - cryostat model built and proof tested
 - some system tests completed
 - refrigerator should be delivered this fall
- Request for bids on the Neutron Science Support building completed, awaiting DOE approval
- Bids have been received on the cold and thermal guide systems
 - presently under evaluation

Comparison of Pulsed and Steady State Neutron Sources

