Argonne NATIONAL LABORATORY

The Joint ANL/FNAL Superconducting Cavity Surface Processing Facility (SCSPF)

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THE UNIVERSITY OF CHICAGO

Office of Science U.S. DEPARTMENT OF ENERGY

A U.S. Department of Energy laboratory managed by The University of Chicago

Purpose of the SCSPF

I. Provide ***local (ANL/FNAL) hands-on experience*** **with EP/BCP of ILC 9-cell cavities**

II. **Substantially expand the existing ANL/ILC-Americas cavity processing capability; EP and/or BCP multiple cavities per week**

III. **Focus on vendors/industrialization; contribute to R&D if needed**

(see "Kephart working group" document; Kephart_Working_Group.doc)

Scope of Activities

Single-cavity **chemical processing, HPR, clean assembly, (testing?)**

Not a cryomodule test or assembly area

Safety

FY06: 700 man-hours, $20 K M&S (>$100 K Total)

June 2006: Completed ANL Physics Division Safety Committee Review for Operations in the *ANL* portion of the SCSPF; 13 Committee members; 3+ scientists/engineers

Subject		*document*
Addendum to ANL/FNAL MOU (unsigned)		SCSPF_MOU.doc
Safety Analysis	Covering ANL & FNAL operations	SCSPF_SAR.doc
Training		SCSPF_Train.doc
Emergency Procedures		SCSPF_Emerg.doc
Hazards Analysis		SCSPF_HA.P03.doc
HF First Aid		HFfirstAid.ppt, HFfirstAid2.doc
Ventilation Analysis		Ventilation, Noise….pdf
ANL Chem. Procedures		SCSPF_ANL_Chem_Proc.doc
Checklists (EP, BCP, Parts etch, etc.)		SCSPF_ANL_BCPchecklist.doc

FY06-07 Program for ANL Portion of SCSPF

I. EP+light BCP of six ANL quarter-wave cavities

6 weeks in Sept/Oct of 2006

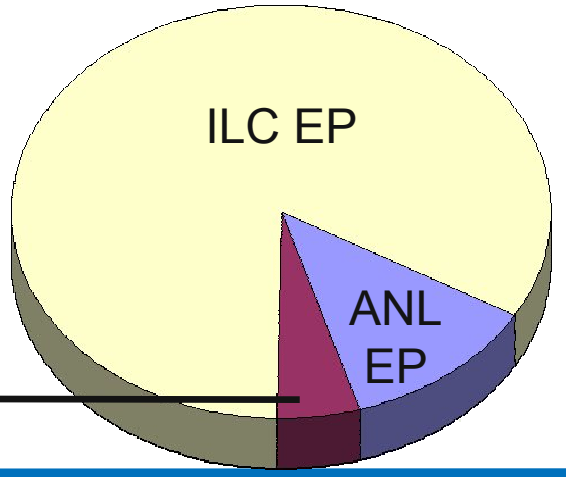
II. EP or BCP two prototype spoke cavities for HINS

2-3 weeks in FY07

III. Construct and commission 9-cell EP system; perform 18 EP procedures

9-10 months in FY07

FY06-07 Activities: ANL Portion of SCSPF



FY06-07 ILC SRF Program at ANL

Ongoing FY06 activities:

- ANL-FNAL-GDE MOU, including EP specification
- Engineering design of the physical EP apparatus
- Review design and initiate procurement

FY07 activities:

- Assemble and commission an EP system by the middle of FY07 (0.75 FTE, $65 K M&S)
- Electropolish ILC cavities in the second half of FY07 (0.75 FTE, $110 K for eighteen EP procedures)
- Design and construction of an HPR system at the joint facility for rinsing after EP (1 FTE, $200 K M&S)
- Interface with U.S. EP vendors/develop and optimize hardware suitable for large-scale EP (1 FTE)

FY08-09 ILC SRF Program at ANL

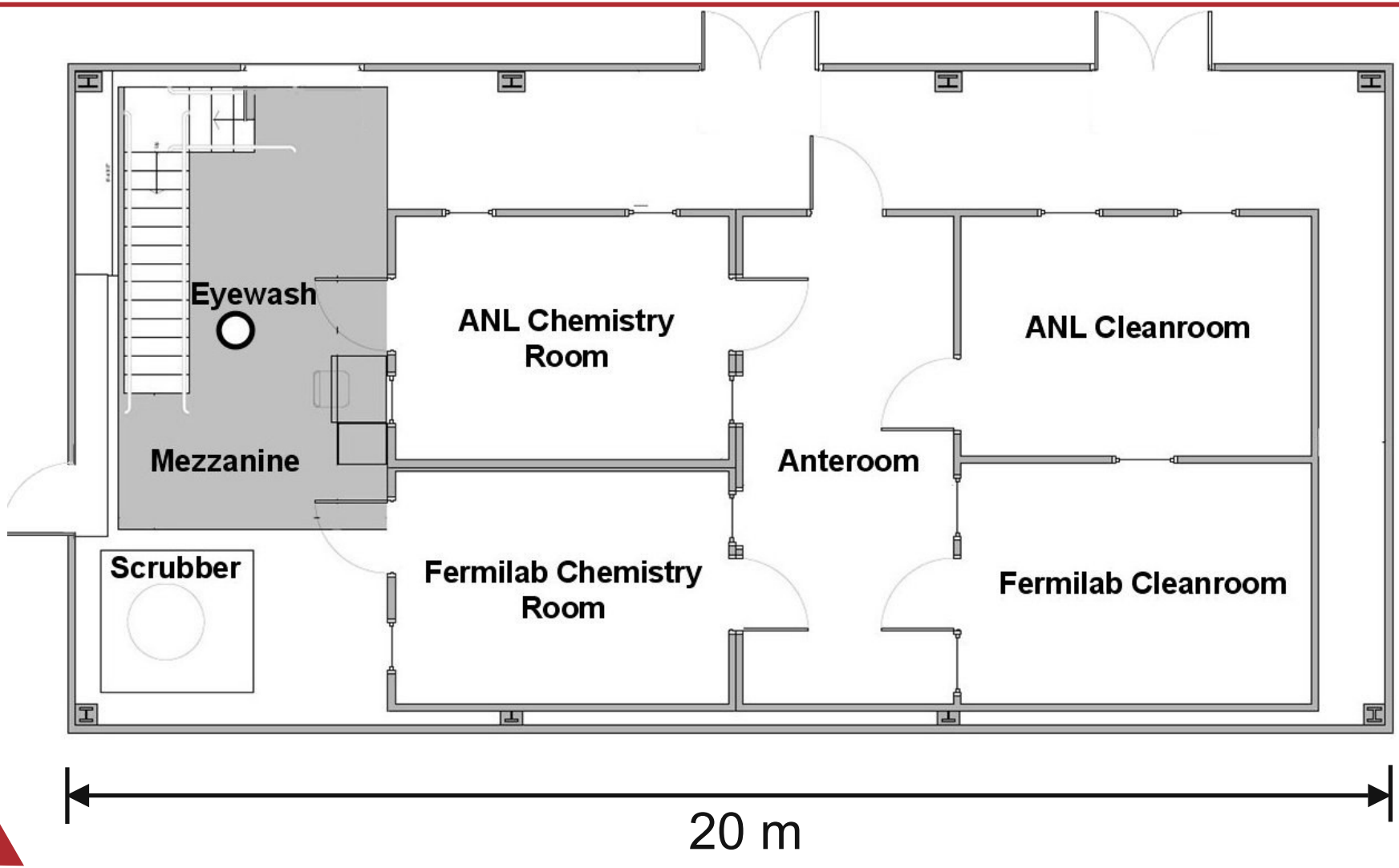
Proposed FY08 activities:

- **Electropolish 12 ILC cavities assuming 5 EP procedures/cavity (1.5 FTE, $225 K M&S)**
- **Installation of a PLC-based control system for EP (1 FTE, $75 K)**
- **Interface with U.S. EP vendors/develop and optimize hardware suitable for large-scale EP (1 FTE)**

Proposed FY09 activities:

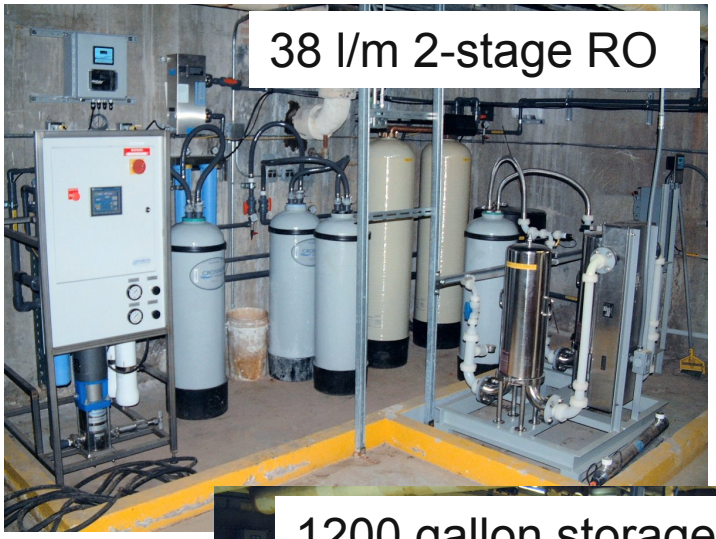
- **Electropolish 50 ILC cavities with up to 5 procedures/cavity (4 FTE, $750 K M&S)**
- **Operations of an HPR system at the joint facility for rinsing after EP (1 FTE, $50 K M&S)**
- **Interface with U.S. EP vendors/develop and optimize hardware suitable for large-scale EP (1 FTE)**

SCSPF Layout
Location: Argonne Building 208

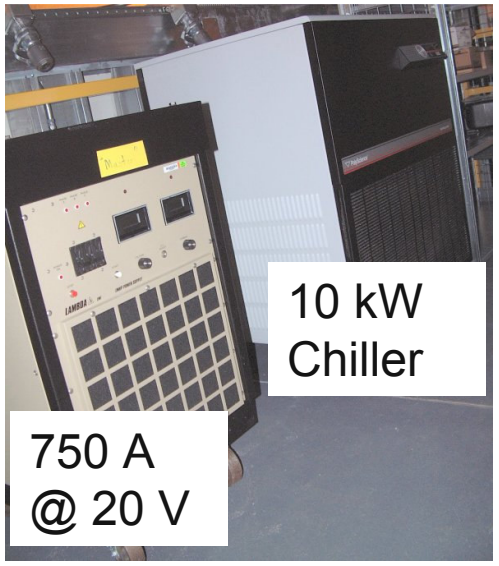


ANL/FNAL (New) Shared Infrastructure

Air Scrubber ($100 K)



DI Water System ($50 K)



Chiller/EP Supply ($25 K)

ANL/FNAL Shared antechamber - class 1000

(value ~$100 K)

ANL Chemistry Room – Oct. 2005

(showing multi-use infrastructure for EP/BCP)

Complete Simulation using Water – July 2006

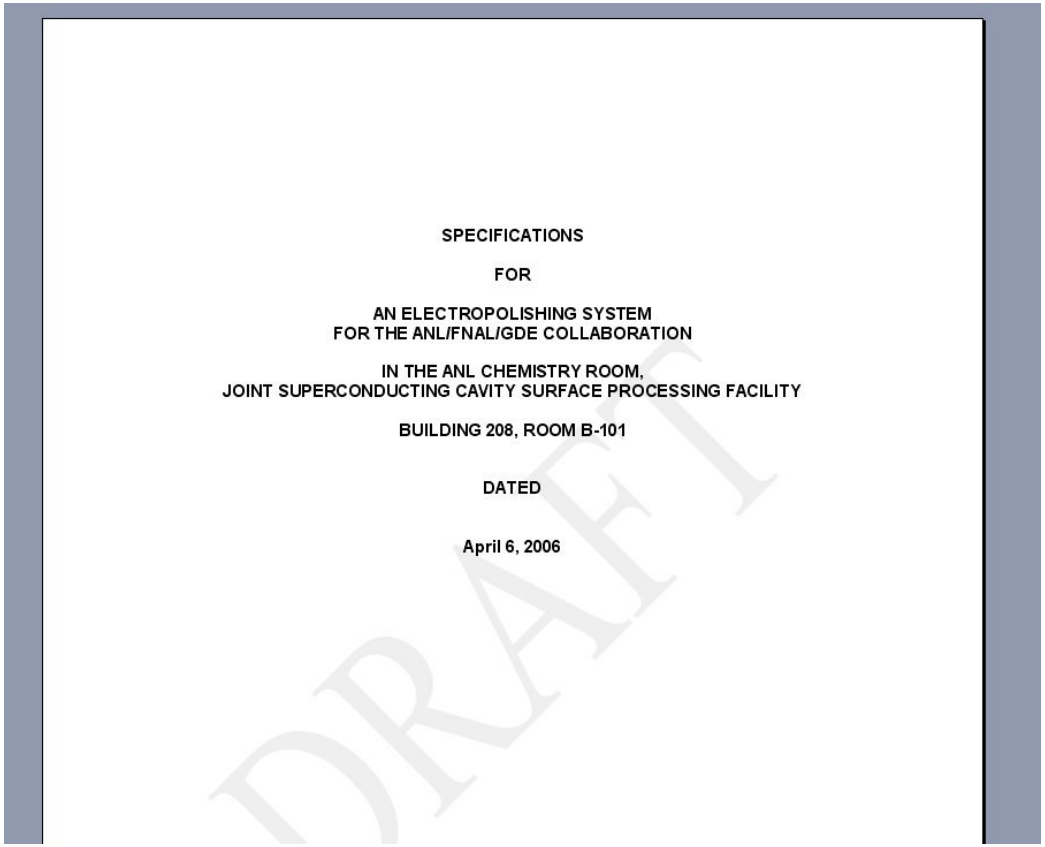
ANL ATLAS Upgrade Cavities for EP in Sept./Oct. 2006

An EP Specification for the ANL Portion of the SCSPF

4-page document based upon the parameters discussed at the TTC meeting December 5-7, 2005 at Frascati.

Features

I. **Horizontal EP**
II. **Direct Water Cooling of Cavity**
III. **Cleanable – no sulfur buildup**
IV. **Aluminum heat exchanger**
V. **Fast fill/empty**
VI. ***Direct experience for FNAL/ANL personnel***



SPECIFICATIONS

FOR

AN ELECTROPOLISHING SYSTEM
FOR THE ANL/FNAL/GDE COLLABORATION

IN THE ANL CHEMISTRY ROOM,
JOINT SUPERCONDUCTING CAVITY SURFACE PROCESSING FACILITY

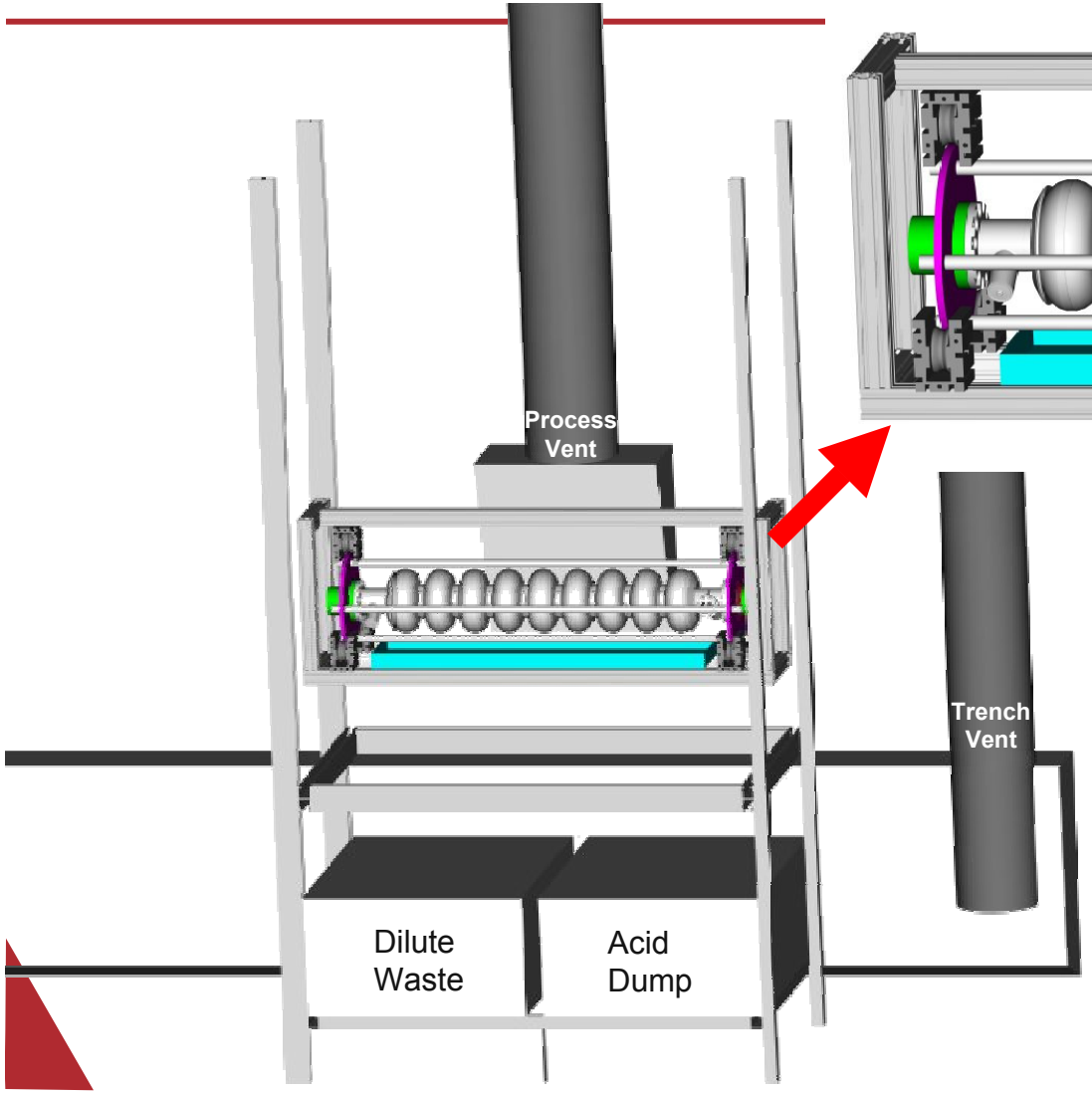
BUILDING 208, ROOM B-101

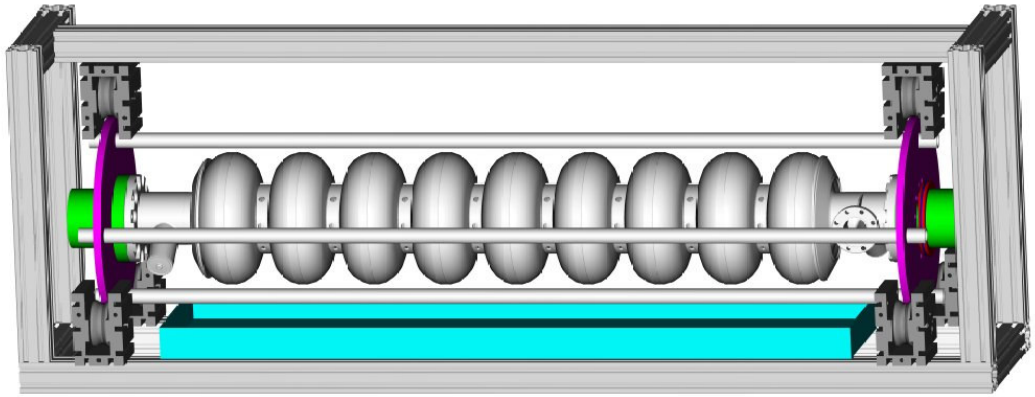
DATED

April 6, 2006

DRAFT

Horizontal EP at the SCSPF: Shown with existing vents/framework





Working On:

- Vertical loading cathode
- Direct water cooling
- Teflon lip seal for acid seal
- Manufactured electrical slip ring for electrical connection

Upcoming Activities

- **August 3-8:** Design review with DESY visitors for EP system in the ANL chemistry area
- **September 25-28:** TTC meeting at KEK; Design review will be arranged with KEK and DESY personnel