A PRESENTATION FOR THE
THIRTEENTH ACTINIDE SEPARATION CONFERENCE
MAY 15-18, 1989
IDAHO FALLS, ID

Title:

EXPERIMENTAL FACILITIES FOR PYROCHEMICAL DEVELOPMENT AT THE SAVANNAH RIVER SITE* (U)

Author:

Tracy S. Rudisill
Westinghouse Savannah River Company
Savannah River Site
Aiken, SC 29808
(803) 725-2539

Abstract:

The Savannah River Site is installing a multifunctional Pyrochemical Development Laboratory (PDL) to pursue new technology for plutonium recovery. Many future plutonium scrap feed stocks cannot be efficiently processed in SRS facilities using aqueous flow sheets and existing equipment due to poor dissolution behavior or corrosive constituents. Phyrochemical treatment processes will be developed to convert these scraps into viable feedstocks for SRS processing. A technology data base will also be developed for pyrochemical process commonly used to recover plutonium from retired weapon components. The intent of all development programs is to integrate pyrochemical technology with the existing aqueous capabilities at SRS in way that maximizes plutonium recovery, minimize waste generation, and provides an essential contingency capacity for plutonium processing.

Five gloveboxes will be provided in the PDL. A stationary, resistance heated furnace will be located in each of two boxes. These furnaces will provide the PDL with the capability to develop flow sheets involving most pyrochemical operations. A third glovebox in the laboratory will be used for plutonium hydriding. Nondestructive analysis (NDA) instrumentation will be installed in a fourth. The furnace, hydriding, and NDA glovesboxes will be provided with high quality argon atmospheres. In order to maintain the purity, the fifth glovebox will serve the primary entrance, exit, and staging area for the glovebox line.

* This article was prepared in connection with work done under Contracts No DE-AC09-76SR00001 and DE-AC09-88SR18035 with the U. S. Department of Energy.

THIRTEENTH ACTINIDE SEPARATION CONFERENCE

MAY 15-18, 1989

IDAHO FALLS, IDAHO

EXPERIMENTAL FACILITIES FOR PYROCHEMICAL DEVELOPMENT AT THE SAVANNAH RIVER SITE

TRACY S. RUDISILL

WSRC-RP-89-87

OBJECTIVE

INTEGRATE PYROCHEMICAL PROCESSING TECHNOLOGY WITH EXISTING CAPABILITIES

IN A WAY THAT

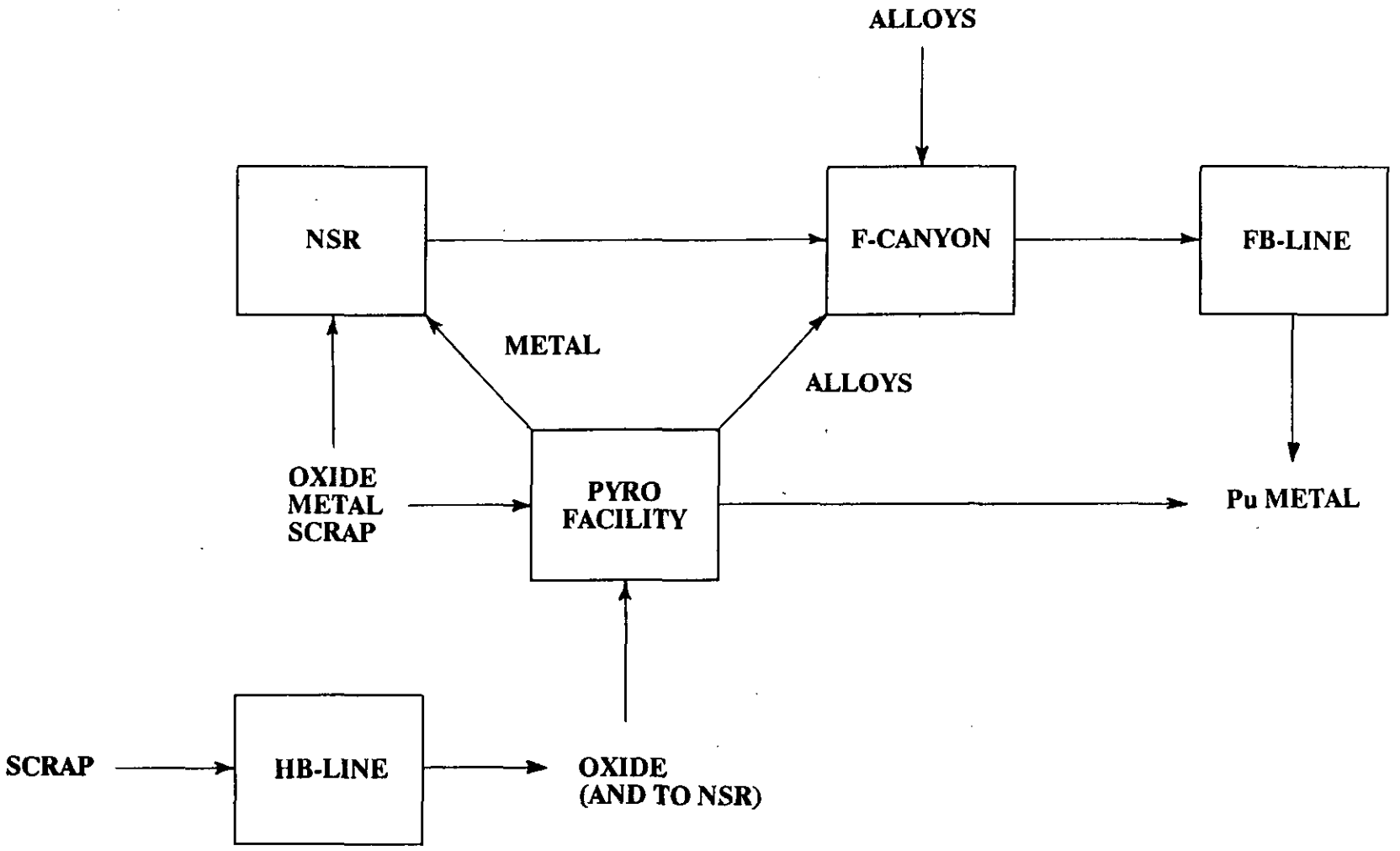
MAXIMIZES PLUTONIUM RECOVERY, MINIMIZES WASTE GENERATION, AND PROVIDES AN ESSENTIAL CONTINGENCY CAPABILITY FOR PLUTONIUM PROCESSING

INCENTIVES

INCREASE NSR, F-CANYON, HB-LINE FLEXIBILITY

SUPPLEMENT FB-LINE PRODUCTION

ESTABLISH TECHNOLOGY FOR SITE RETURN PROCESSING AT SRS



PYROCHEMICAL PROCESSING AT SRS

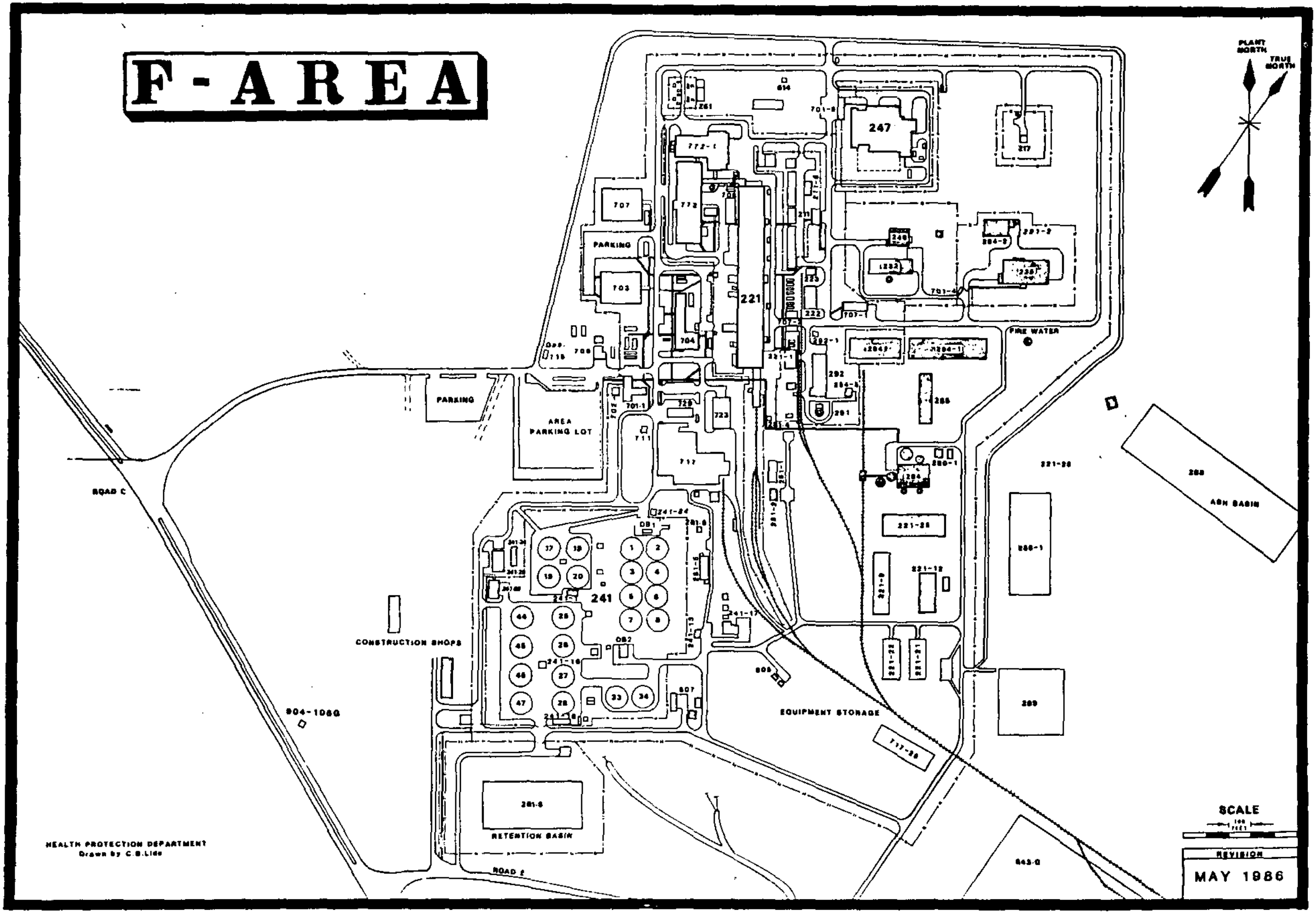
PYROCHEMICAL DEVELOPMENT LABORATORY

LOCATED IN BUILDING 235-F

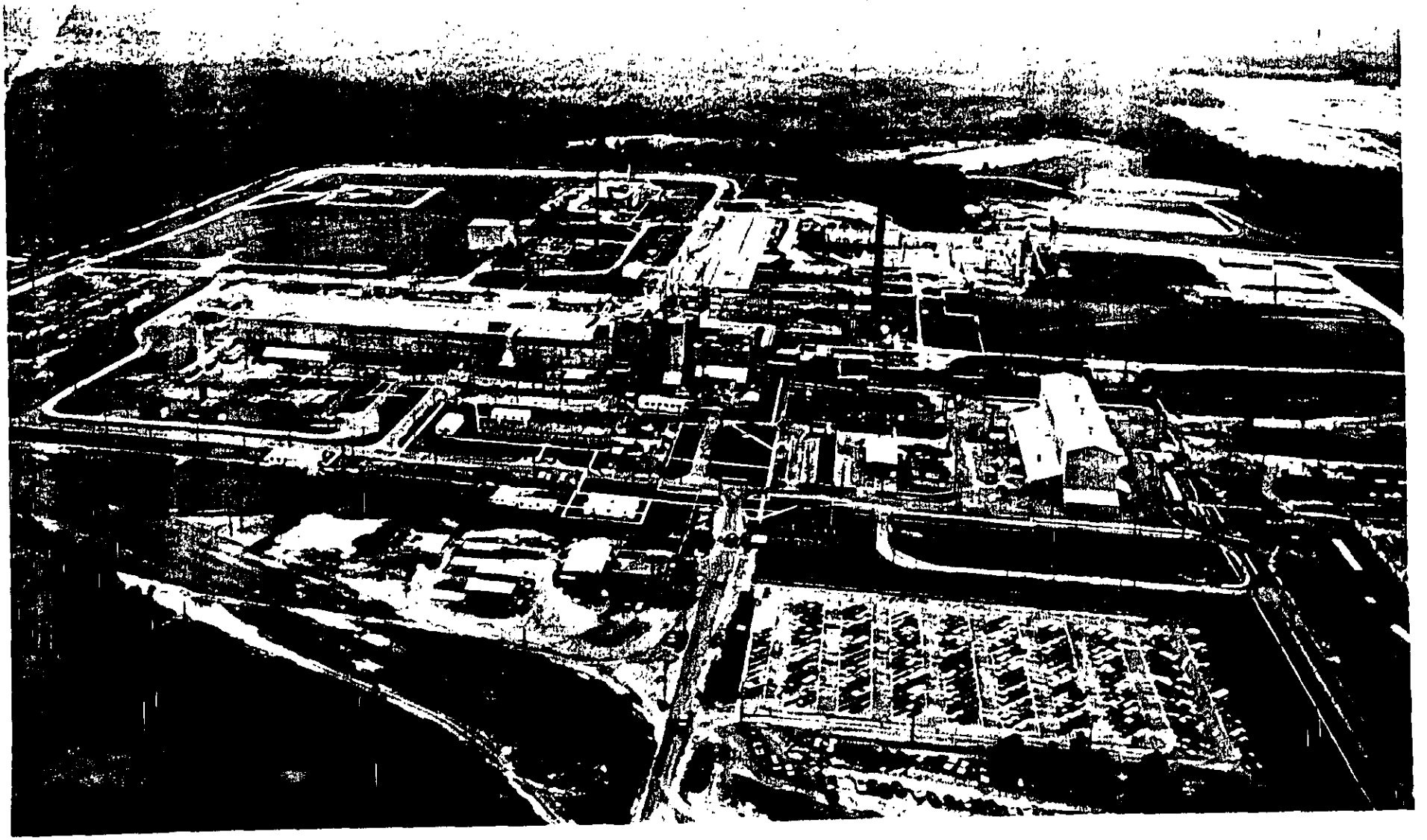
UP TO FULL-SCALE DEVELOPMENT CAPABILITIES

FIVE GLOVEBOXES

SALT PREPARATION FACILITIES



F - AREA
PLANT NORTH
TRUE NORTH
247
217
221
772
772-1
707
703
704
PARKING
AREA PARKING LOT
723
717
711
701-1
702
261
614
701-8
701-4
701-1
222
223
292
291
281-1
221-1
FIRE WATER
221-26
288
ASH BASIN
288-1
221-25
221-12
221-8
221-21
221-22
289
717-26
EQUIPMENT STORAGE
805
807
241
DB1
DB2
241-17
241-16
241-24
CONSTRUCTION SHOPS
904-106G
ROAD C
ROAD E
281-6
RETENTION BASIN
643-G
SCALE
REVISION
MAY 1986
HEALTH PROTECTION DEPARTMENT
Drawn by C.B.Lide



DESIGN AND CONSTRUCTION

BASIS: LLNL METAL PRODUCTION LINE
LANL TA-55
RFP BUILDINGS 776 AND 779

ARCHITECHTURAL ENGINEER:

UNITED ENGINEERS & CONSTRUCTORS
STEARNS CATALYTIC DIVISION

CONSTRUCTOR: SRS CONSTRUCTION

LABORATORY CAPABILITIES

MOLTEN SALT PROCESSING

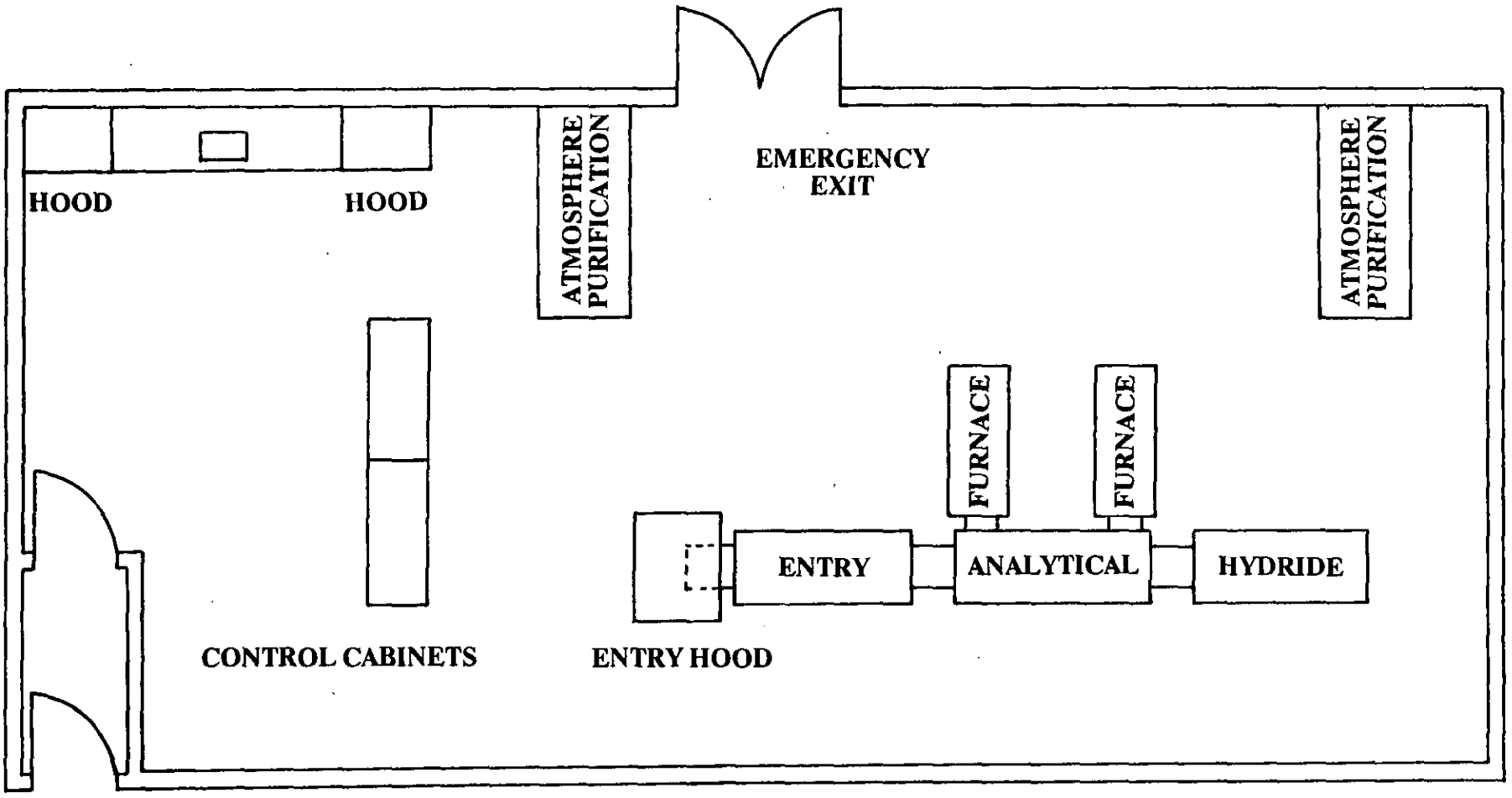
- o DOR, MSE, ER, SALT SCRUB, ETC.
- o RESIDUE RECOVERY

HYDRIDING/DEHYDRIDING

NONDESTRUCTIVE ANALYSIS

SALT PREPARATION

- o DRYING
- o HYDROCHLORINATION



PYROCHEMICAL DEVELOPMENT LABORATORY

PYROCHEMICAL FACILITIES

FURNACE GLOVEBOXES

- o STATIONARY FURNACE

HYDRIDING GLOVEBOX

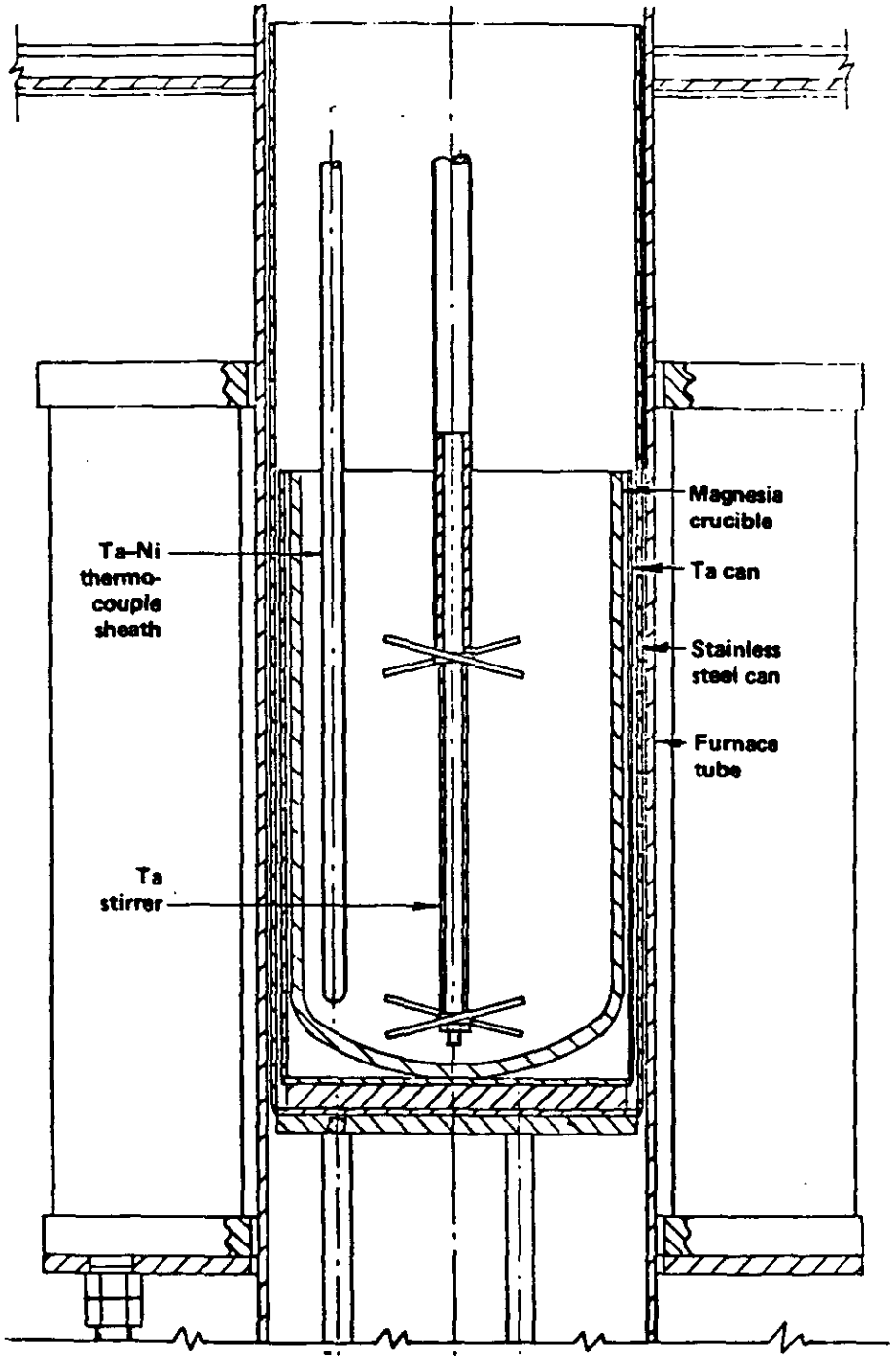
- o HYDRIDING CHAMBER
- o DEHYDRIDING FURNACE

ANALYTICAL GLOVEBOX

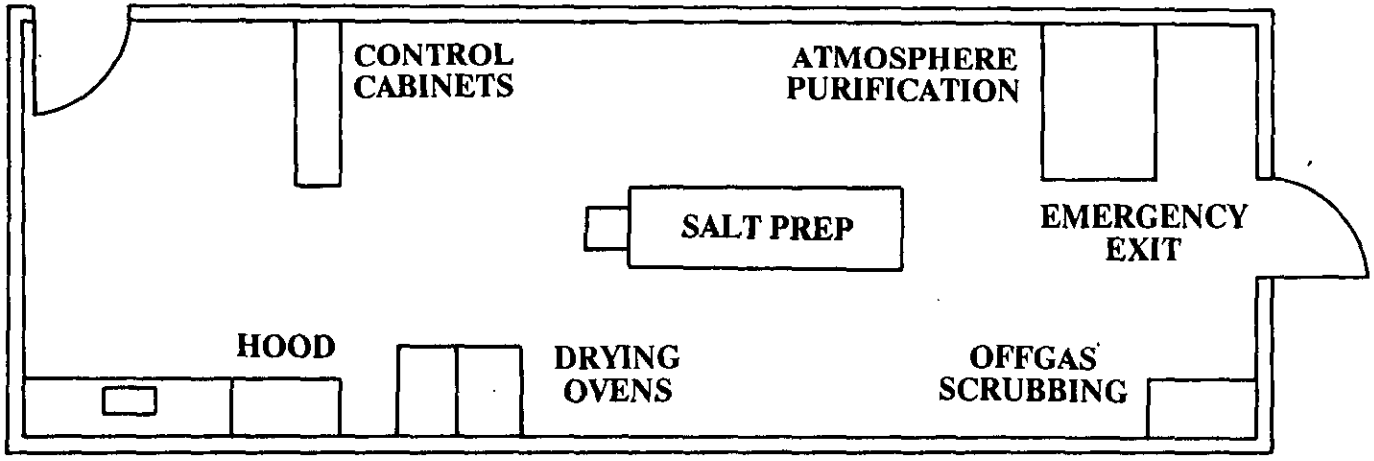
- o SEGMENTED GAMMA SCANNER
- o NEUTRON COINCIDENCE COUNTER
- o PLUTONIUM ISOTOPIC ANALYSIS SYSTEM

ENTRY GLOVEBOX

- o COMBUSTION FURNACE



STATIONARY FURNACE



SALT PREPARATION LABORATORY

SALT PREPARATION FACILITIES

VACUUM OVENS

NONRADIOACTIVE GLOVEBOX

- o STATIONARY FURNACE
- o SALT MOLD
- o SALT AND METAL STORAGE

PROJECT TIMING

BASIC DATA COMPLETION	2/88
ADVANCED FUNDING	2/89
PROJECT AUTHORIZATION	7/89
PHYSICAL COMPLETION	
o SALT PREPARATION LAB	4/90
o PYROCHEMICAL LAB	9/90