OHIO HISTORIC INVENTORY

Ohio Historic Preservation Office
1985 Velma Avenue
Columbus, Ohio 43211
614/297-2470

OHIO HISTORICAL SOCIETY SINCE 1885

1. No.	2. County
CUY-4616-15	Cuyahoga

3. Location of Negatives
Gray & Pape, Inc.
Roll No. 4 **Frame** 6

4. Present Name(s) ☐ Coded
NASA Lewis Research Center Rocket Engine Complex

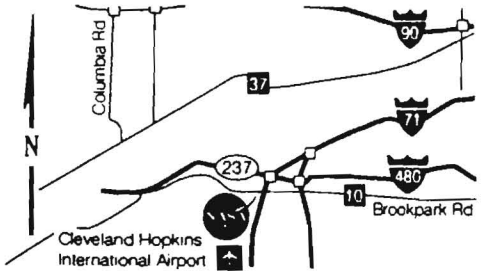
5. Historic or Other Name(s)
Building 202: Rocket Engine Test Facility

6. Specific Address or Location
Located at the southern end of Lower South Road, South Area

6a. Lot, Section or VMD

7. City or Village **If Rural, Township & Vicinity**
Cleveland

8. Site Plan with North Arrow



9. U.T.M. Reference
Quadrangle Name Lakewood
17 427,500.00 4,583,700.00
Zone **Easting** **Northing**

10. Site ☐ Structure ☐ Building ☒ Object ☐

11. On National Register? Yes ☒ No ☐
12 N.R. Potential? Yes ☐ No ☐
13. Part of Estab. Hist. Dist? Yes ☐ No ☒
14. District Potential? Yes ☒ No ☐

15. Name of Established District (N.R. or Local)

16. Thematic Association(s)
National aeronautic and space programs

17. Date(s) or Period
1955-56

17b. Alteration
1965, 1989

18. Style or Design ☐ High Style ☐ Elements

18a. Style of Addition or Elements(s)

19. Architect or Engineer

19a. Design Sources

20. Contractor or Builder
R. Hansen Construction Co., Cleveland, Ohio

21. Building Type or Plan

22. Original Use, if apparent
technical facility

23. Present Use
technical facility, mothballed

24. Ownership Public ☒ Private ☐

25. Owner's Name & Address, if known
United States of America
NASA Lewis Research Center
21000 Brookpark Road Cleveland, OH 44135

26. Property Acreage

27. Other Surveys in Which Included

28. No. of Stories 1.0

29. Basement? Yes ☒ No ☐

30. Foundation Material
concrete

31. Wall Construction
metal and fiberglass panels

32. Roof Type & Material
shed

33. No. of Bays Front Side

34. Exterior Wall

35. Plan Shape irregular

36. Changes (Explain in #42) Addition ☐ Altered ☒ Moved ☐

37. Window Types
☐ 6 over 6 ☐ 2 over 2 ☐ 4 over 4 ☒ Other

38. Building Dimensions 44' x 63'

39. Endangered By What? Yes ☒ No ☐
airport expansion

40. Chimney Placement

41. Distance from and Frontage on Road
Road is directly adjacent

42. Further Description of Important and Exterior Features (Continue on reverse if
Building 202, Rocket Engine Test Facility (RETF), is located in a ravine at the end of Lower South Road and below Fracture Mechanics Complex (CUY-4623-15). This ravine is reinforced on the east side by a concrete retaining wall beside which are dewars of liquid hydrogen. The south end of the complex is a storage area partially enclosed by corrugated plastic panels and profiled metal siding. The main building is rectangular in plan and is constructed of concrete, but partially clad with profiled metal siding. On the east facade of this (cont'd)

43. History and Significance (Continue on reverse if necessary)
The Lewis Research Center was established in 1941 as the Aircraft Engine Research Laboratory of the National Advisory Committee on Aeronautics. The AERL served as the propulsion research center of NACA until 1958 when the lab became part of the newly-formed National Aeronautics and Space Administration. As a part of this organization, the LeRC has continued its aeronautic research. (cont'd)

44. Description of Environment and Outbuildings (see #52)
The RETF is located at the southern end of Lower South Road. The facility sits in a ravine along Abram Creek. A heavily wooded area is located along the southwest and western sides of the facility.

45. Sources of Information
Plans of Buildings and Structures, NASA LeRC Real Property Records, NASA LeRC, Real Property Division

Overall Cultural Resource Reconnaissance Survey of NASA Lewis Research Center, Cleveland, Ohio. Gray & Pape, 1996 (Cont'd)

46. Prepared by
Debra A. McClane

47. Organization
Gray & Pape, Inc.

48. Date Recorded in Field
May, 1996

49. Revised by **50a. Date**

50b. Reviewed by

1. No CUY-4616-15
2 County Cuyahoga
4,5 Present or Historic Name NASA Lewis Research Center Rocket Engine Complex
6. Specific Address or Location Southern end of lower South Rd., South Area

51. Condition of Property

- ☐ Excellent
- ☒ Good/Fair
- ☐ Deteriorated
- ☐ Ruin
- ☐ Destroyed/Burned

Date

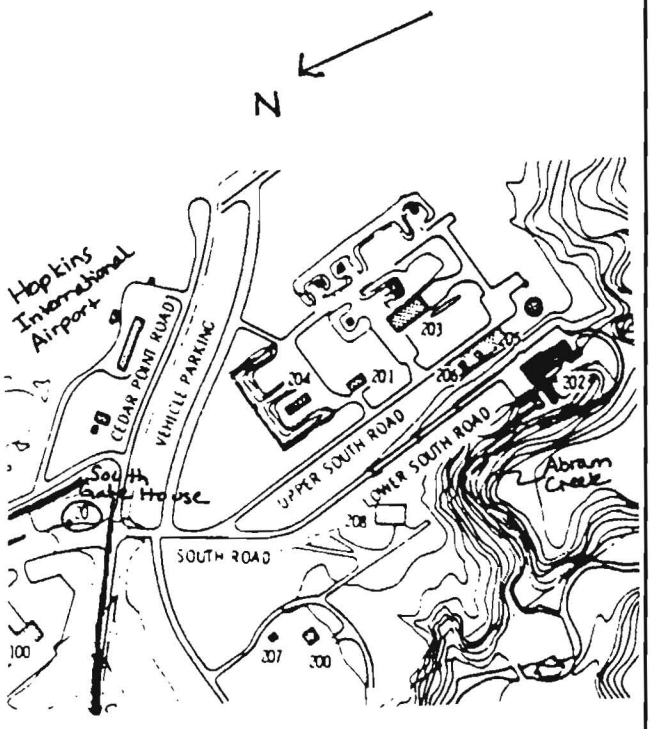
52. Historic Outbuildings and Dependencies
Barn Type(s)

Corn Crib or Shed ☐	Smoke House ☐	Privy ☐
Summer Kitchen ☐	Spring House ☐	Garage ☐
Silo ☐	Ice House ☐	
	Designed landscape ☐	

53. Affiliated OAI Site and multiple

Archaeological Features:	Observed	Expected on Basis of Archival Research
Well		
Privy		
Cistern		
Foundation		
Structural Rubble		
Formal Trash Dump		
Other		

54. Farmstead Plan



42. (Cont'd)

building there is a large roll-up door that gives access to test units by way of a monorail system. A covered entryway leads into the service area of this building.

The test cells are located on the north end of the complex and are double height spaces. A shed roof covers the cell and large overhead doors are located on the east and west and are opened during testing. The RETF consists of two major buildings and several support services buildings. Test Stand A, located at the north end of the complex, was designed for sea-level testing of vertically mounted rocket engines into an exhaust gas muffler and scrubber system for high energy and toxic propellants. This test stand has the capability of testing thrust levels (cont'd)

43. (Cont'd)

while also advancing technologies in aerospace propulsion, and space flight systems.

The RETF was listed as a National Historic Landmark in 1984 as part of the National Park Service's Man in Space thematic nomination. Building 202 and Building 100, formerly the Rocket Operations Building (CUY-4611-15), were listed as an integrated, stand-alone test facility that is nationally significant for its contribution in the development of the lightweight, regeneratively cooled hydrogen engine. The facility was also used in the development of engines for the Centaur and Saturn rockets and the engines currently used on the Space Shuttle. The facility tested full-scale hydrogen-fluorine and hydrogen-oxygen rocket thrust chambers. Due to the dangers involved in storing cryogenic liquid propellants, the complex was constructed in a deep ravine in the South Area of the LeRC.

For a more complete discussion of the historical significance of the RETF, see the Man in Space National Historic Landmark Thematic Nomination, 1984.

44. (Cont'd)

42. of up to 50,000 pounds. Test Stand B can test rocket engines mounted horizontally and exhausting into an exhaust diffuser, cooler, and nitrogen driven ejector system. This stand is used for altitude testing in a space environment.

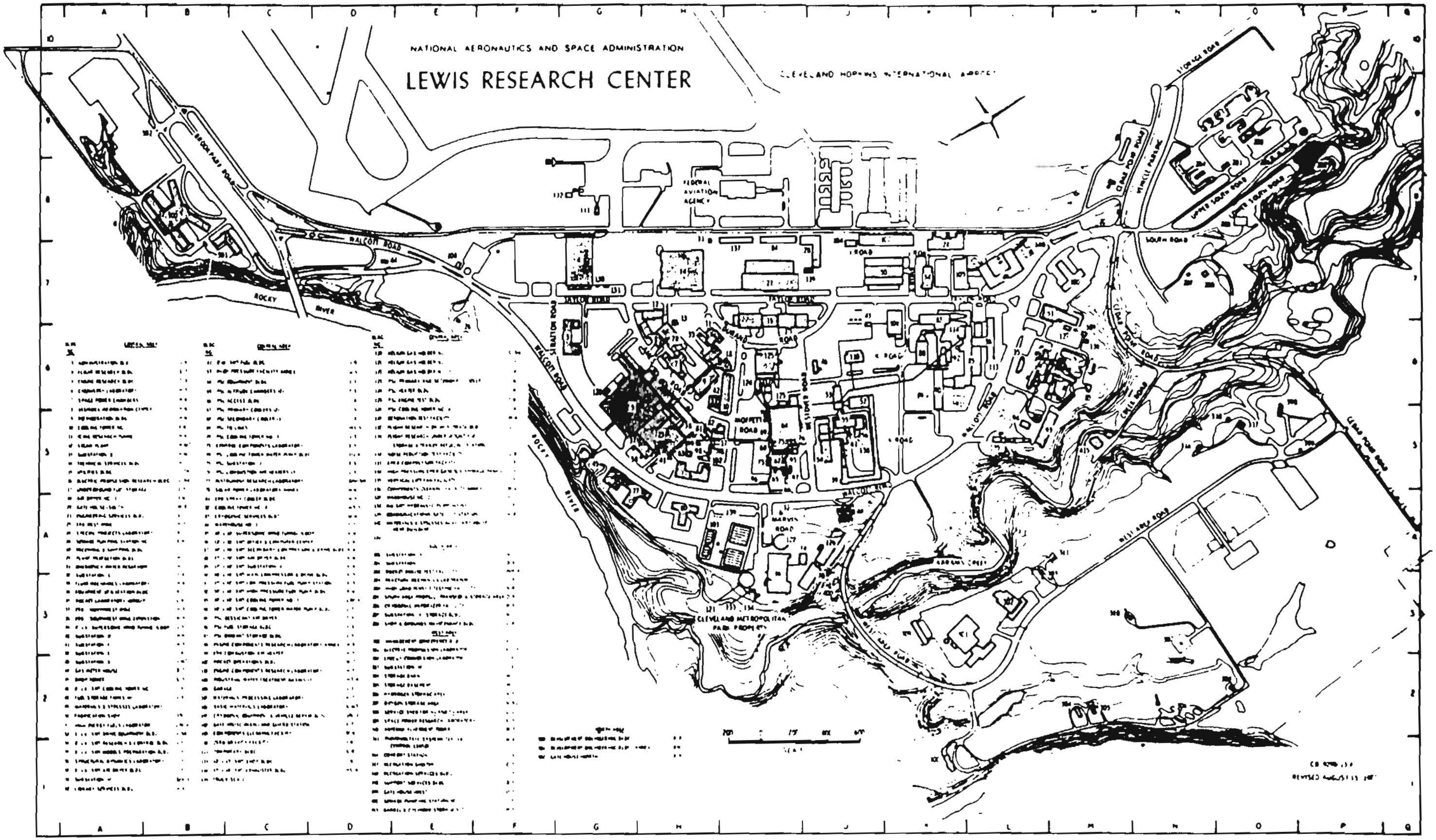
A system of steel grating catwalks is located on the west facade of the building. The scrubber tower and exhaust piping are located west of the building. Retention basins are located north of the test cells with a pump house to the west.

Several support and storage buildings are located around the RETF. A frame building with a gable roof is located southwest of the main complex by Abram Creek, which runs along the western edge of the facility. A concrete annex building with a shed roof is located north of the
test cell, which is equipped with several overhead doors. The concrete block observation building is located further to the north on a small rise. It is a concrete structure with a camera mounted on its roof. It is accessed by a set of metal steps leading from Lower South Road. There are
two-paned, fixed windows on the south facade and the building is accessed through a door on the north facade.

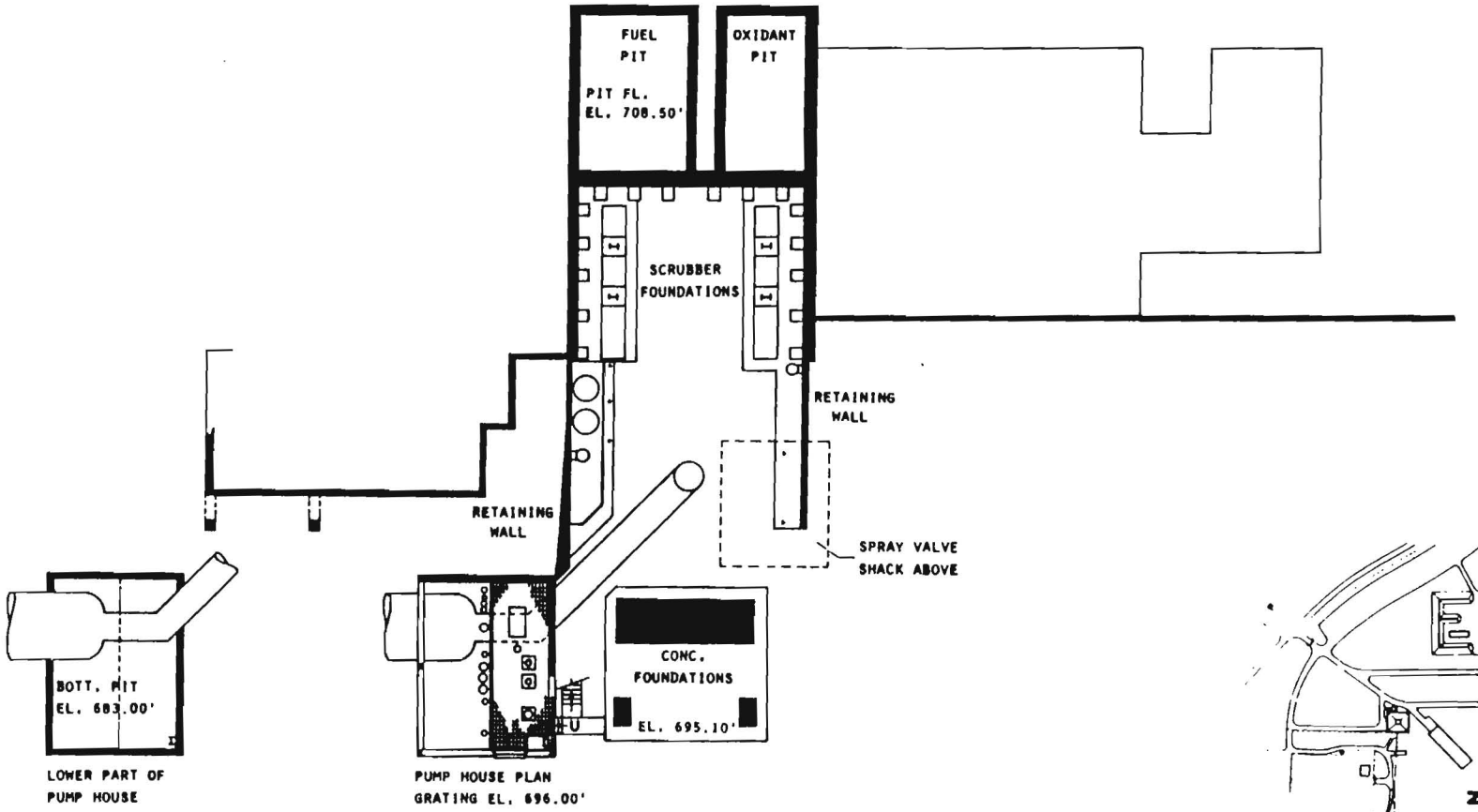
In 1965-66, additions were constructed on the first and basement floors, resulting in a 2,000 square foot increase in area. The facility was modified in 1984 for testing of extremely large area ratio nozzles. In 1989, a modification to the RETF rehabilitated the existing shop space and
added 200 square feet of new areas to create a new control room, as well as modifying the existing utilities and offices. In April 1996, the RETF was identified in the NASA Zero Base Review for closure in that fiscal year. Currently, the facility stands in an "inactive-mothballed" status, as opposed to the category of "inactive-abandoned," which is synonymous with "demolition." As part of its management policy for the facility, the Aerospace Technology Facilities Division has determined that "relatively small and portable components and items such as valves, tranducers, spare parts, instrumentation, etc. will be made available to LeRC facilities and programs." Larger items are to be retained at the facility until the facility is listed as "inactive-abandoned."

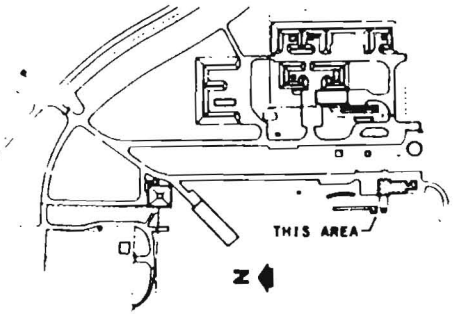
45. "Man in Space" National Historic Landmark Thematic Nomination, Harry Butowsky, 1984. Copy on file at Ohio State Historic Preservation Office, Columbus, Ohio.

Engines and Innovation: Lewis Laboratory and American Propulsion Technology, Virginia P. Dawson, 199. The NASA History Series, Office of Management, Scientific and Technical Information Division, Washington, D.C.


NATIONAL AERONAUTICS AND SPACE ADMINISTRATION
LEWIS RESEARCH CENTER
CLEVELAND HOPKINS INTERNATIONAL AIRPORT
FEDERAL AVIATION AGENCY
WALCOTT ROAD
TAYLOR ROAD
ROCKY RIVER
MOFFETT ROAD
CLEVELAND METROPOLITAN PARK PROPERTY
SOUTH ROAD
CEDAR POINT ROAD
WEST AREA ROAD

NASA LEWIS RESEARCH CENTER
CLEVELAND, OHIO





KEY PLAN

N

SUB-BASEMENT PLAN
REF. DWG. NO. CD-101146

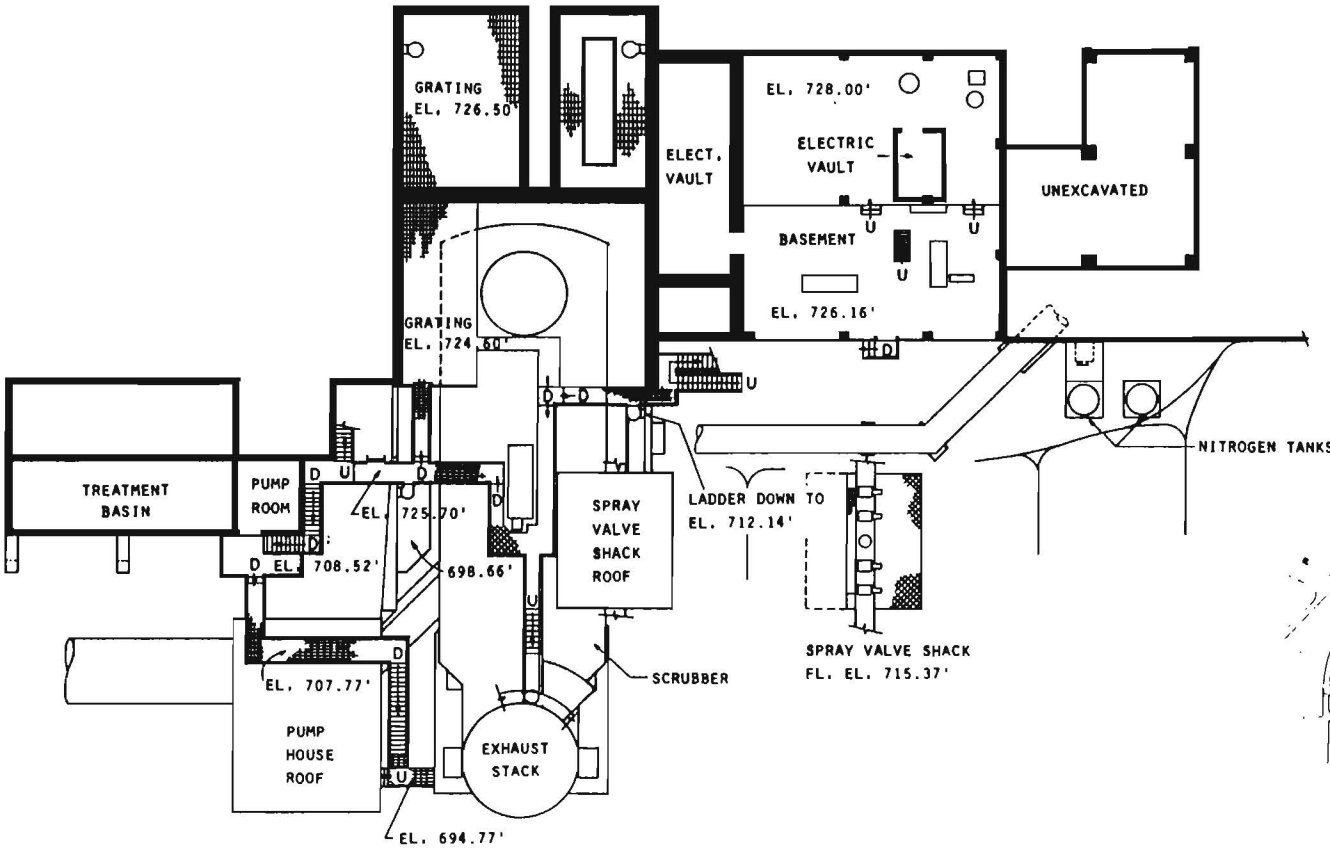
ROCKET ENGINE TEST FACILITY

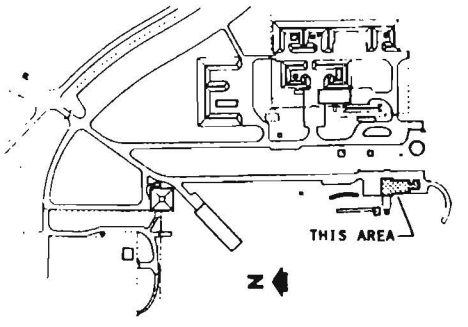
BUILDING NO.
202

( ) AREA, SQ. FT.

16 0 16 32
SCALE 1/32"=1'-0"

NASA LEWIS RESEARCH CENTER
CLEVELAND, OHIO





KEY PLAN

BASEMENT FLOOR PLAN
REF. DWG. NO. CD-101146

ROCKET ENGINE TEST FACILITY

BUILDING NO.
202

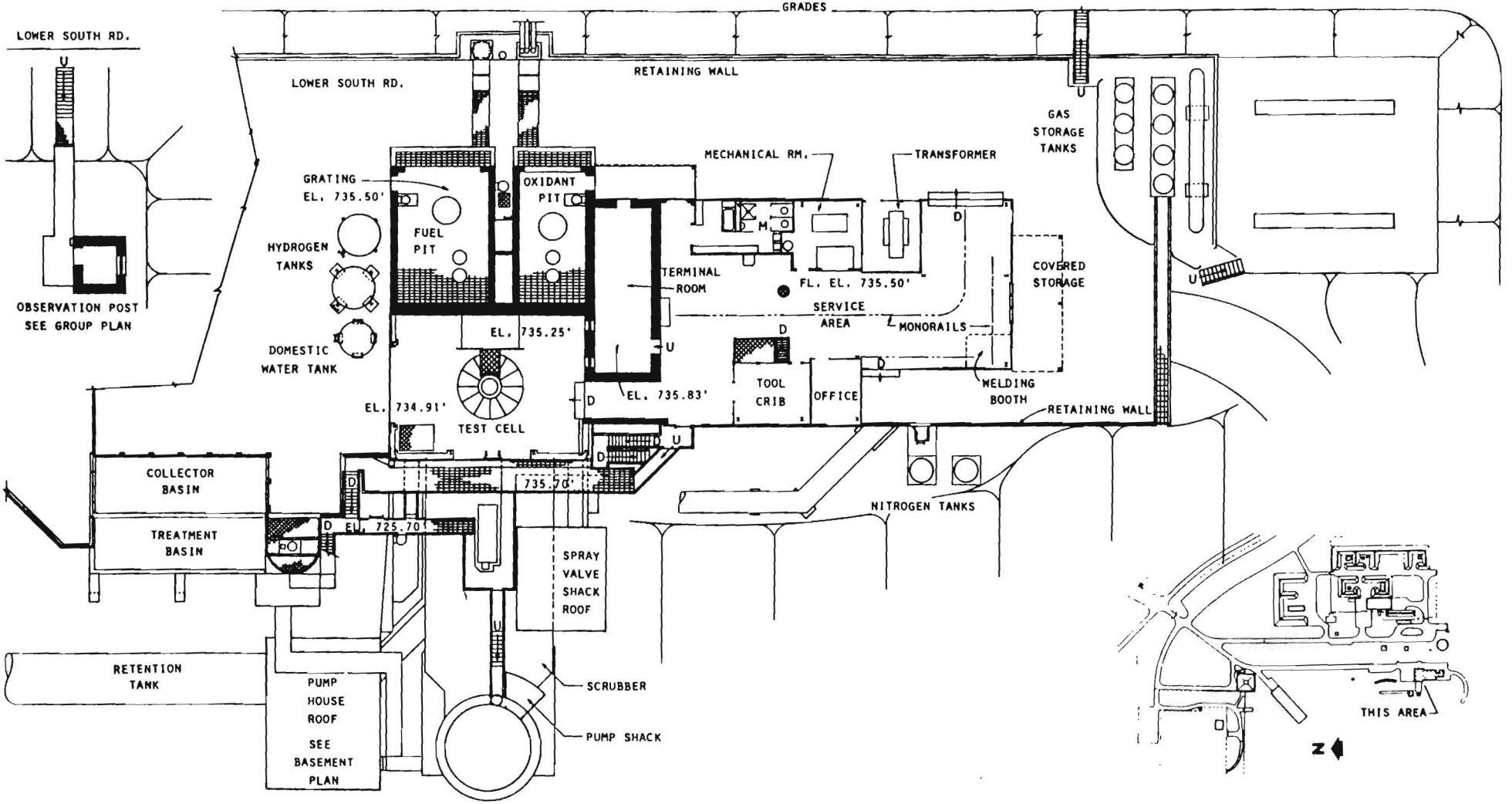
N

( ) AREA, SQ. FT.

16 0 16 32
SCALE 1/32"=1'-0"

REVISED JULY 1978

NASA LEWIS RESEARCH CENTER
CLEVELAND, OHIO



FIRST FLOOR PLAN
REF. DWG. NO. CE-101340 & CD-101102

ROCKET ENGINE TEST FACILITY

BUILDING NO.
202

( ) AREA, SQ. FT.

16 0 16 32
SCALE 1/32"-1'-0"

NASA Lewis Research Center Rocket Engine Test Facility
Building 202
Laser Prints Courtesy of NASA Lewis Research Center Imaging Technology Center

1. C-85-7963, c.1970
   View looking south down Lower South Road at the Rocket Engine Test Facility complex. Note steps to control room in right foreground.

2. C-45652, n.d.
   Rear view looking east at Rocket Engine Test Facility. South Area Propellant Storage and Transfer area is located on the rise in the background.

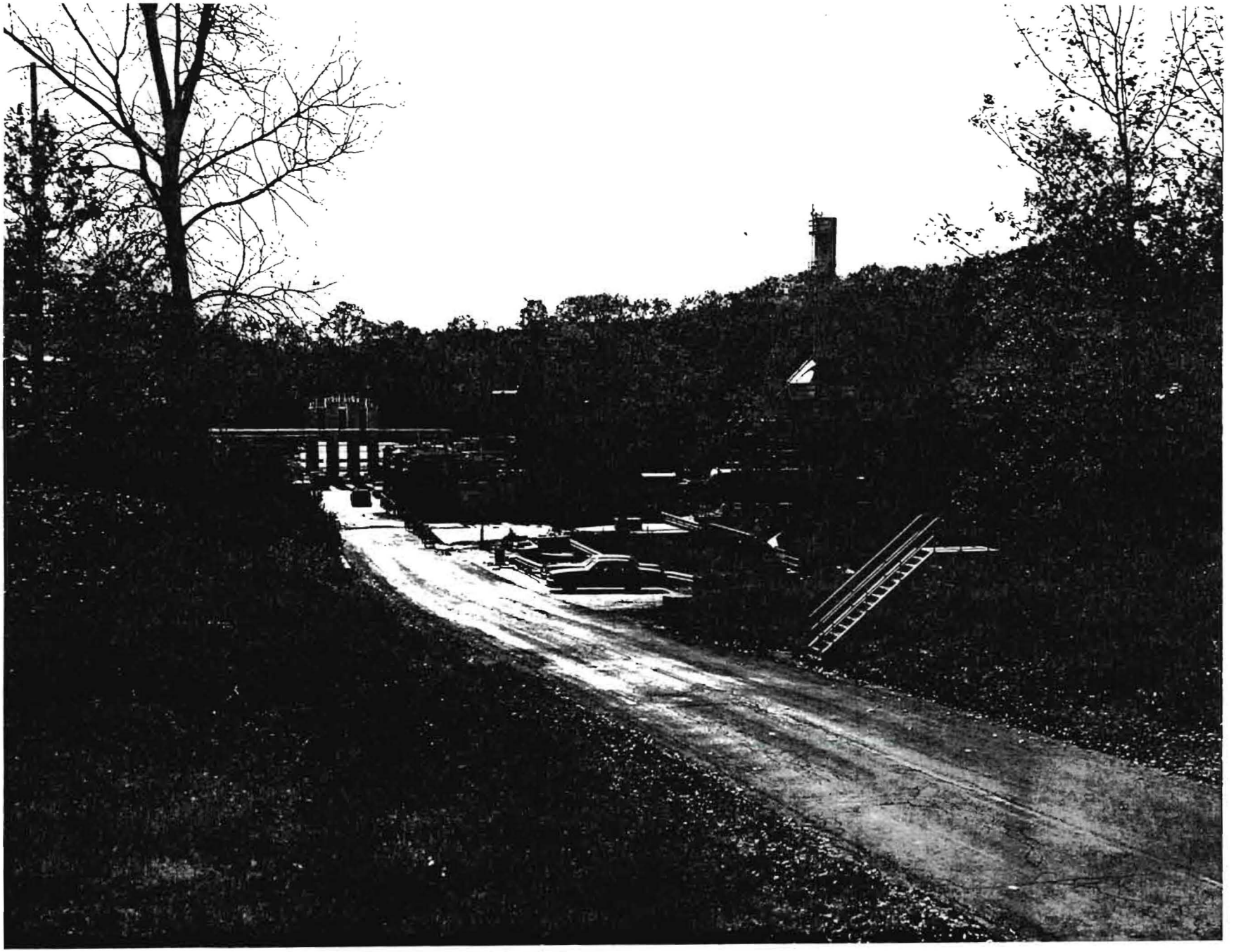
3. C-83-2643, 1983
   Photograph of rocket engine in test cell.

4. C-45870, n.d.
   Interior view of test cell with rear doors open.

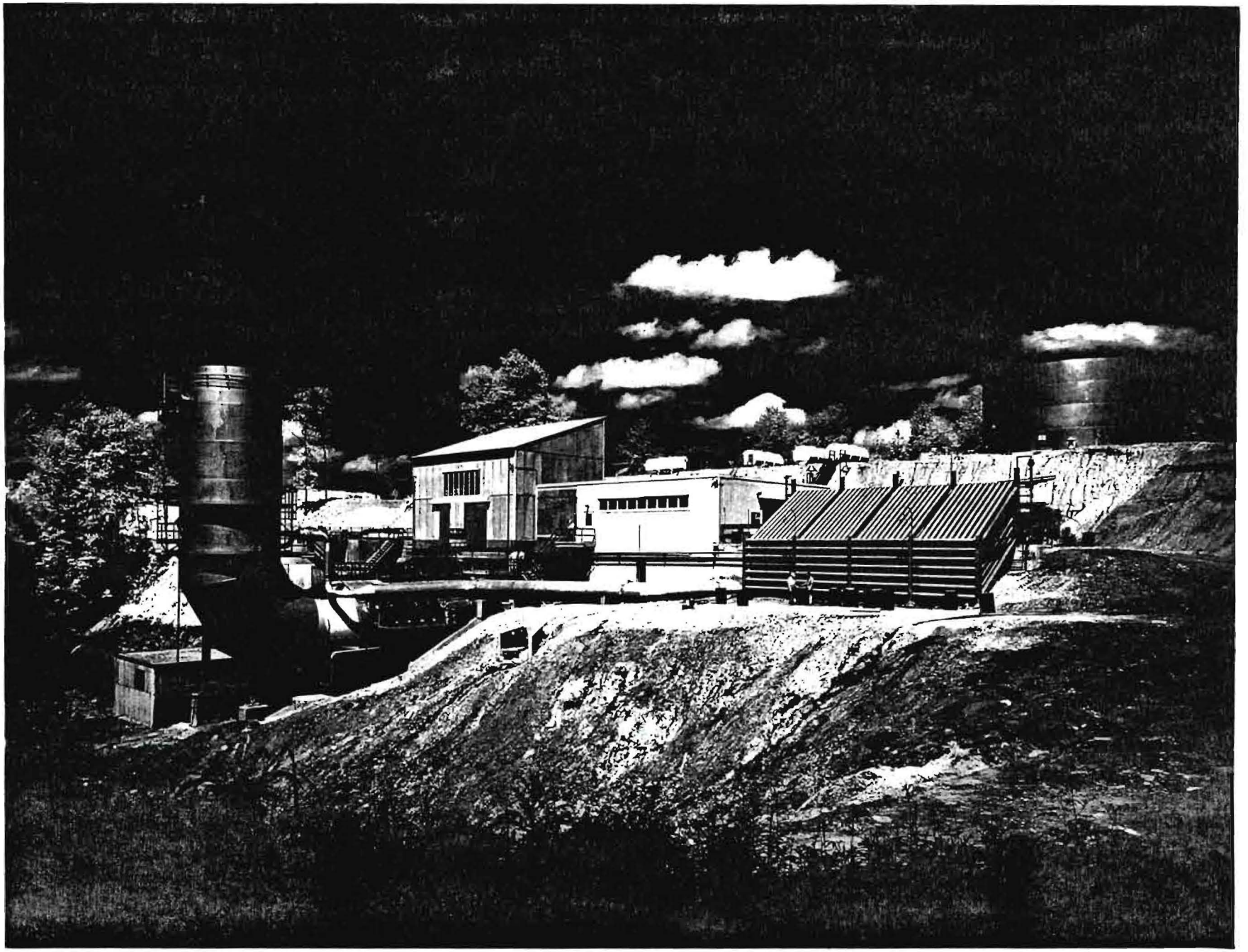
5. C-85-2371, 1983
   View of rocket engine mounted horizontally in test cell.

6. C-74433
   Schematic drawing of the Rocket Engine Test Facility.

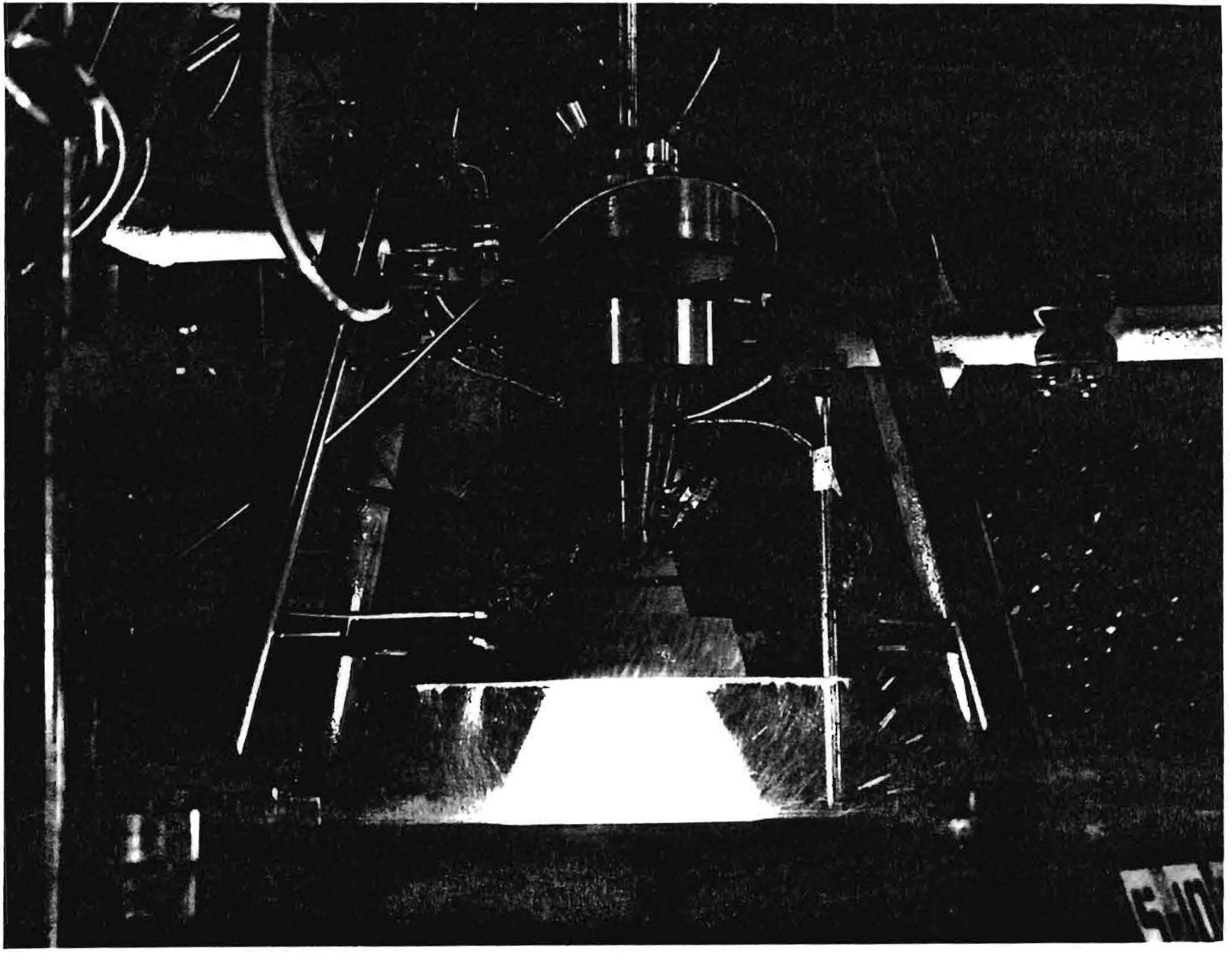
NASA
C-85-7963



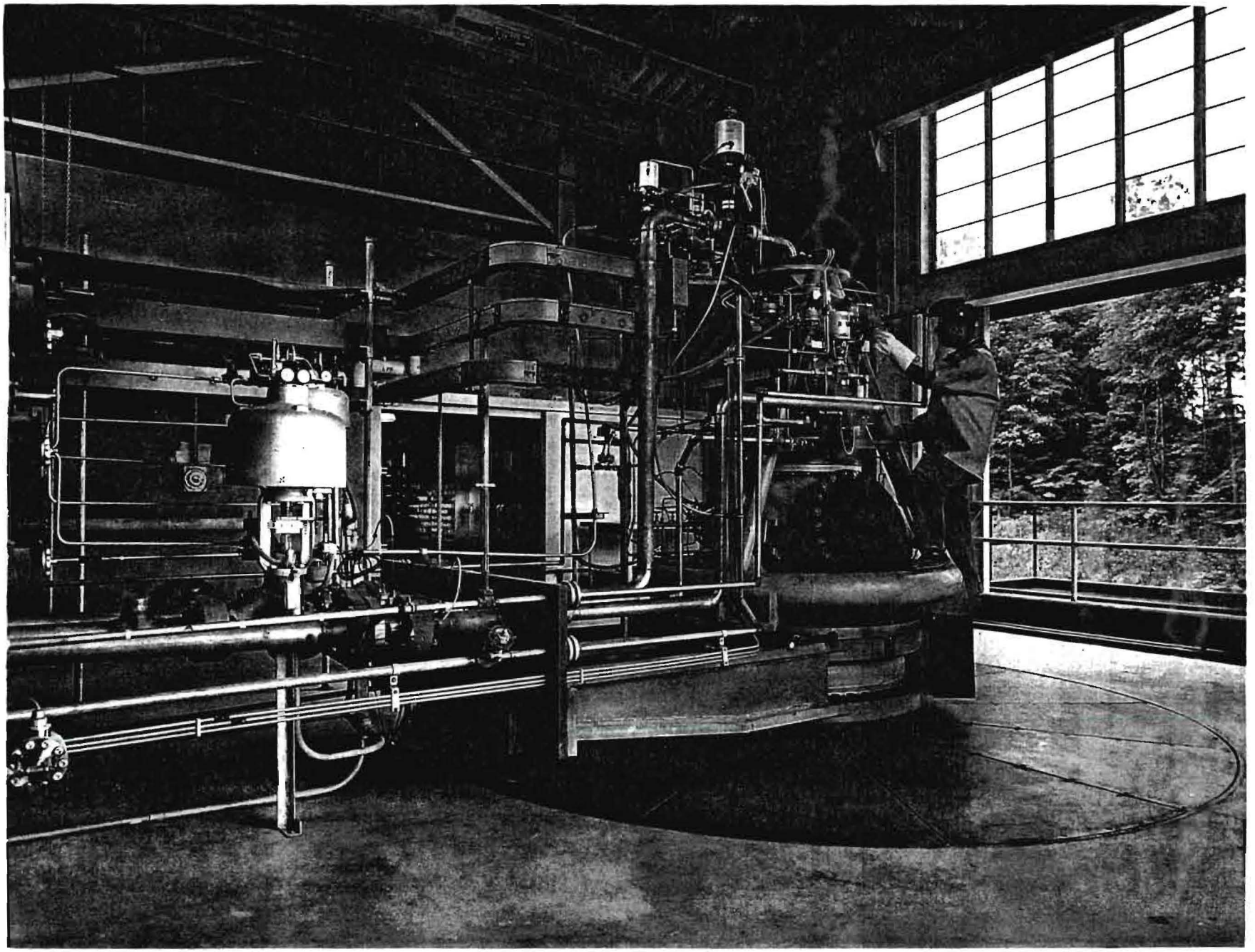
NASA
C-45652



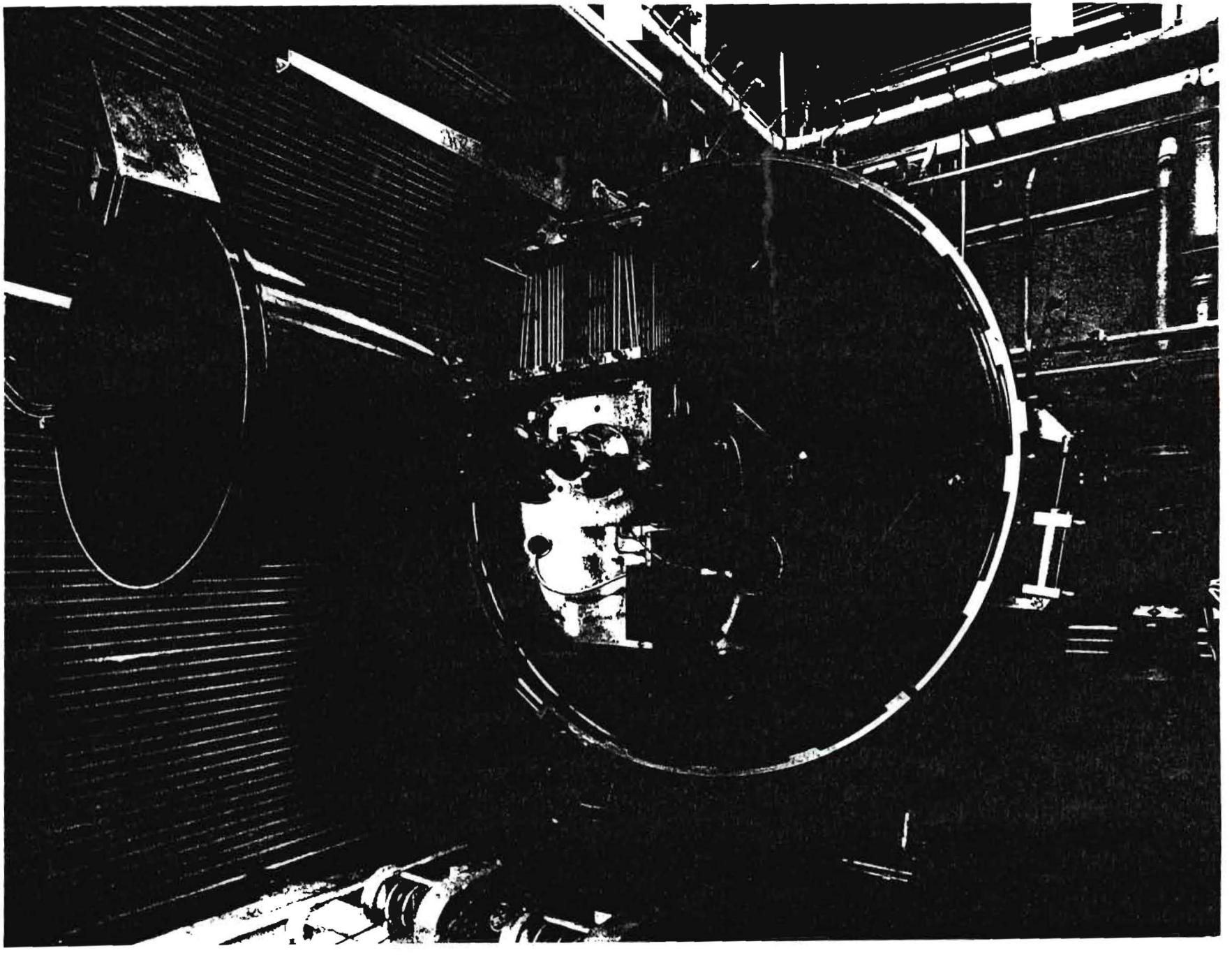
C-83-2643



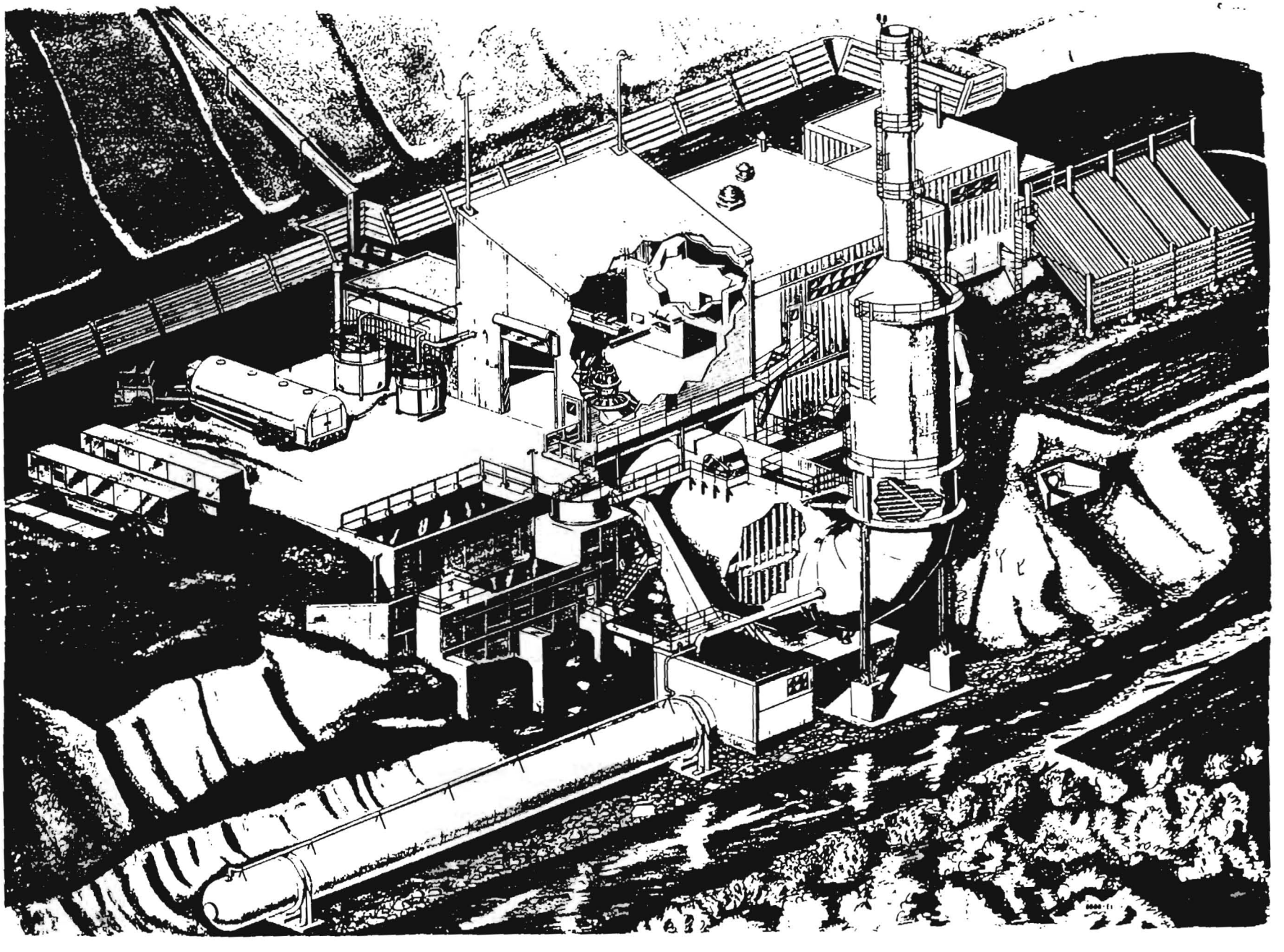
NASA
C-45870



NASA
C-85-2371



NASA
C-74433



INTEROFFICE MEMORANDUM

Date: 1/10/02
From: Rich Kalynchuk
Dept: 0540 MS 6-4
Tel. No: 433-8620

TO: DANIEL WHITE

CC: MICHAEL BLOTZER
JOSEPH MORRIS
KEVIN COLEMAN
BONITA SMITH

SUBJECT: OHIO HISTORIC INVENTORY FORMS

In 1996, Gray and Pape, Inc. performed a cultural resources survey at Lewis Research Center. One of their work products was the recordation of all known buildings and structures on Ohio Historic Inventory (OHI) forms. Not every building and structure has its own OHI form. Buildings and structures that form a complex have been consolidated.

All of the forms have been scanned into portable document format and recorded onto the attached CD. Some of the pages are tilted and some of the photographs did not get optimum exposure. As a consequence, the images on the disk are recommended for use only at GRC. If you need high quality images of any of the files, please contact me.

Please note that NASA has not officially accepted these forms.

My thanks to Sandra Jacobson of IDI for linking the forms in the Table of Contents.