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PLANT NAME: Oconee #3

ENCLOSURES:

REPORT: Re Safety Guide 20 entitled "Reactor Vessel Internals Inspection following Hot Functional Testing."

FOR ACTION/INFORMATION 9-25-74 ehf

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DUKE POWER COMPANY
POWER BUILDING
422 SOUTH CHURCH STREET, CHARLOTTE, N. C. 28201

A. C. THIES
SENIOR VICE PRESIDENT
PRODUCTION AND TRANSMISSION

P. O. BOX 2178

September 20, 1974

Mr. Angelo Giambusso
Deputy Director for Reactor Projects
Directorate of Licensing
Office of Regulation
U. S. Atomic Energy Commission
Washington, D. C. 20545

Re: Oconee Nuclear Station
Unit 3
Docket No. 50-287

Dear Mr. Giambusso:

Transmitted herewith are three copies of a report entitled, "Reactor Vessel Internals Inspection Following Hot Functional Testing." This report, and the inspection discussed therein, are in response to the recommendations of Safety Guide 20.

Very truly yours,

A. C. Thies

A. C. Thies

ACT:vr

Enclosures

DUKE POWER COMPANY

OCONEE NUCLEAR STATION
UNIT 3

Docket No. 50-287

REACTOR VESSEL INTERNALS INSPECTION FOLLOWING HOT FUNCTIONAL TESTING

September 20, 1974

1.0 INTRODUCTION

This report presents information requested by the Atomic Energy Commission Safety Guide 20, with regard to the Oconee Nuclear Station, Unit 3, reactor vessel internals. The prototype design for the Oconee 3 reactor vessel internals was the Oconee 1 internals. A comprehensive report on vibration measurement results for these prototype internals was submitted to the AEC in April, 1973, as Topical Report BAW-10039, "Prototype Vibration Measurement Results for B&W's 177-Fuel-Assembly, Two-Loop Plant." This Topical Report was incorporated into the Oconee Final Safety Analysis Report by reference by Revision 28, May 1, 1973.

2.0 SUMMARY

Hot Functional Testing of Oconee Nuclear Station, Unit 3, was conducted from May 28, 1974 through June 27, 1974. During this period, greater than 300 hours were accumulated at flow conditions, i.e., two or more reactor coolant pumps operating. Consequently, the thermal shield, which had the lowest measured structural frequency (12 Hz), was subjected to more than 10^7 cycles under these conditions.

Following the conclusion of Oconee 3 Hot Functional Testing, the reactor internals were removed from the vessel and a post-test inspection program was implemented. The purpose of this program was to visually inspect major internals, surfaces, and/or parts for any indications of distress, loose parts, cracking, fretting or distortion as a result of Hot Functional Testing. It was determined that the reactor internals sustained no structural damage due to Hot Functional Testing and that no deterioration had occurred that might affect the structural integrity of the internals.

3.0 DESCRIPTION OF PROGRAM

The reactor internals support the core, maintain fuel assembly alignment, limit fuel assembly movement and maintain control rod assembly guide tube alignment between fuel assemblies and control rod drives. They also direct the flow of reactor coolant, provide gamma and neutron shielding, provide guides for incore instrumentation between the reactor vessel lower head and the fuel assemblies, support the surveillance specimen assemblies in the annulus between the thermal shield and the reactor vessel wall and support the internals vent valves. The general arrangement of the internals is shown in Figure 1.

The internals components include the plenum assembly and the core support assembly. The plenum assembly consists of the plenum cover, upper grid, control rod assembly guide tube assemblies and a flanged plenum cylinder with openings for reactor coolant outlet flow. The core support assembly includes the core support shield, vent valves, core barrel, lower grid, flow distributor, incore instrument guide tubes, thermal shield and surveillance specimen holder tubes.

Following Hot Functional Testing, the reactor vessel internals were visually inspected for any indications of distress, loose parts, cracking, fretting or distortion. Items checked to assure the structural integrity of the internals included the following:

(a) The plenum cover for weld integrity.

(b) The control rod guide tube assembly to plenum cover welds for integrity.

(c) The bolted joints between the control rod guide tube assemblies and the upper grid for loose or broken bolts and for lock weld integrity.

(d) The bolted joint between the upper grid and the plenum cylinder for loose or broken bolts and for lock weld integrity.

(e) The control rod guide tube assemblies for weld integrity.

(f) The internals vent valves for free operation.

(g) The surveillance specimen holder tubes for free rotation.

(h) The bolted joint between the core support shield and the core barrel for loose or broken bolts and for lock weld integrity.

(i) The core support shield for weld integrity.

(j) The core support assembly guide blocks for weld integrity.

(k) The incore instrument nozzles for distortion.

(l) The incore instrument guide tubes to flow distributor welds for integrity.

(m) The lower grid and flow distributor for weld integrity.

Typical items checked for signs of fretting or surface damage included:

(a) The internals vent valves seats.

(b) The face seals of the 36" reactor vessel outlets.

(c) The control rod guide tube assemblies.

(d) The plenum assembly key ways.

(e) The core support assembly key ways.

(f) The core support assembly guide blocks.

(g) The reactor vessel guide lugs.

In addition to the above inspections, examinations were also made to determine if there were any loose or foreign objects within the reactor vessel. In particular, these included a check of the interior of the reactor vessel lower head and a check of the interior of the plenum assembly.

The various inspections performed were similar in type and extent to those performed on the Unit 1 and Unit 2 internals following Hot Functional Testing of each unit.

4.0 DESCRIPTION OF RESULTS

The post-Hot Functional Testing inspection of the Oconee 3 reactor vessel internals revealed no indications of structural integrity degradation. No loose or broken bolts or cracked or broken welds were observed. No significant indications of fretting or surface damage were noted.

The following foreign material was found in the bottom of the reactor vessel and removed: tape, plastic, wood, and metal band. None of these were identified as part of the Reactor Coolant System or internals.

In general, the reactor internals sustained no structural damage due to Hot Functional Testing and no deterioration occurred that might affect the structural integrity of the internals.

REACTOR VESSEL AND INTERNALS ARRANGEMENT

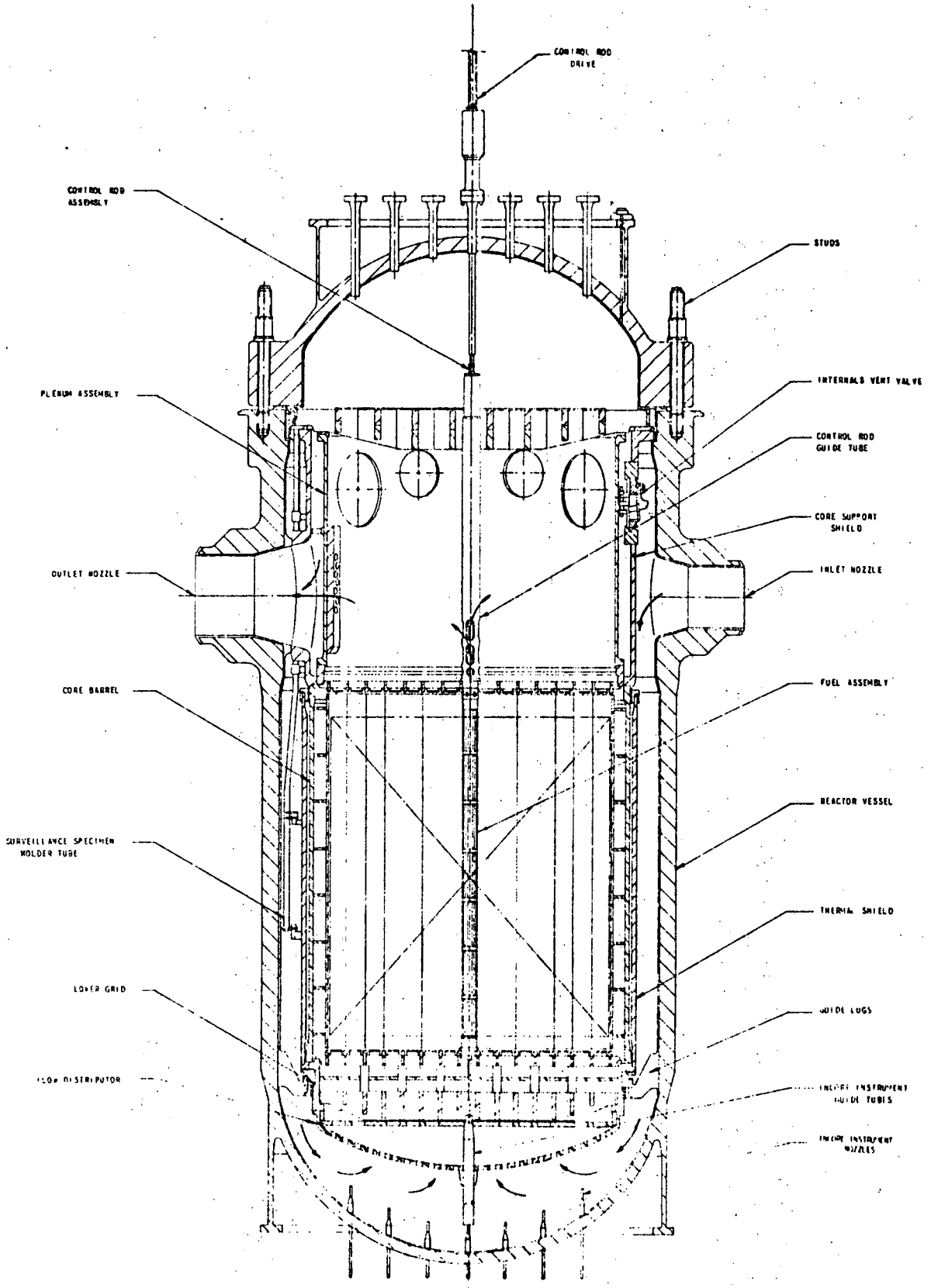

Figure 1

D U K E P O W E R C O M P A N Y

OCONEE NUCLEAR STATION
UNIT 3

Docket No. 50-287

REACTOR VESSEL INTERNALS INSPECTION FOLLOWING HOT FUNCTIONAL TESTING

September 20, 1974

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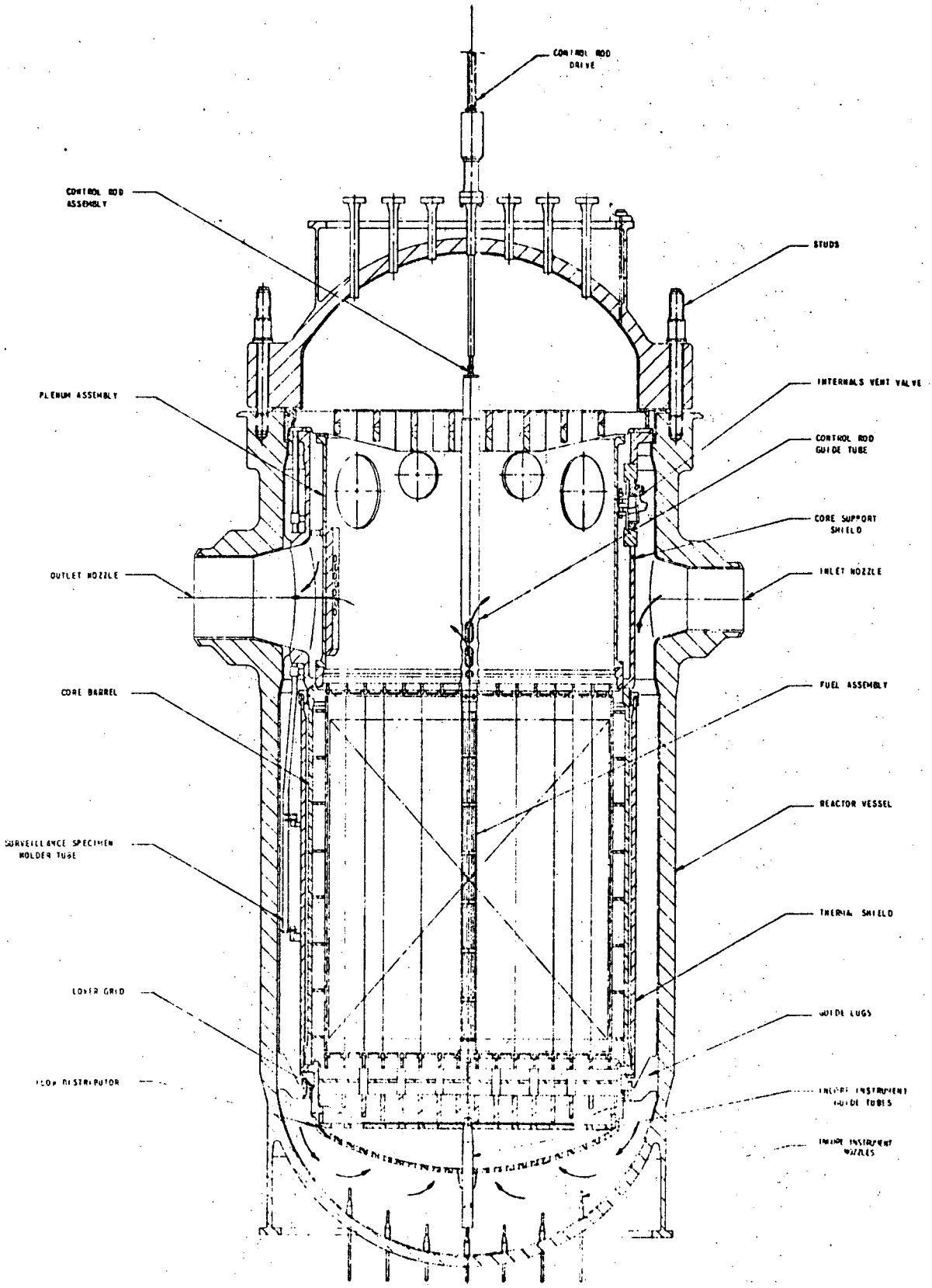

Figure 1

D U K E P O W E R C O M P A N Y

OCONEE NUCLEAR STATION
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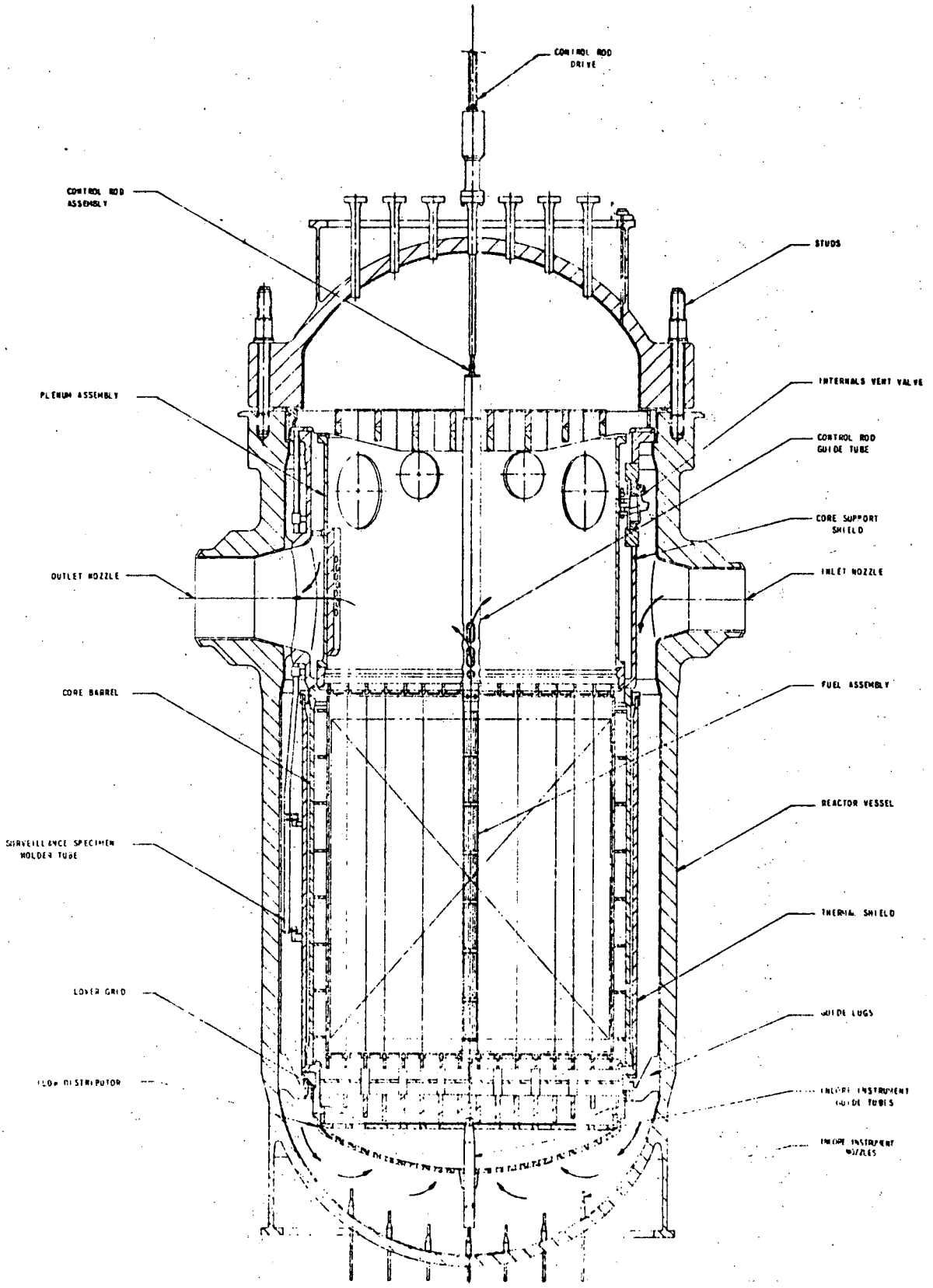

Figure 1