



STATE OF MINNESOTA

OFFICE OF THE ATTORNEY GENERAL

ST. PAUL 55155

HUBERT H. HUMPHREY, III
ATTORNEY GENERAL

2072
ADDRESS REPLY TO:
1100 BREMER TOWER
SEVENTH PL. AND MINNESOTA ST.
ST. PAUL, MN 55101
TELEPHONE: (612) 296-9612

February 9, 1990

Mr. Timothy E. Johnson
U.S. Nuclear Regulatory Commission
One White Flint North
Washington, DC 20555

Re: Northern States Power Company
Pathfinder Atomic Power Plant
Decommissioning Proposal

Dear Mr. Johnson:

I represent the Minnesota Department of Public Service, a state agency which appears in rate case proceedings before the Minnesota Public Utilities Commission. The Department is aware that you are currently investigating Northern States Power Company's application for decommissioning the Pathfinder Atomic Power Plant. Coincidentally, the Minnesota Department of Public Service is currently investigating a rate increase proposal which includes a request for funds for decommissioning Pathfinder.

Last week, in the course of discovery proceedings in the pending Northern States Power Company rate case, we obtained copies of the enclosed documents. The documents consist of the general description of Pathfinder, Six-Month Operating Reports Nos. 1 through 9, and the Pathfinder Final Status Report. Upon review, it appears that these documents were originally filed with the Atomic Energy Commission at Argonne, Illinois. Our research indicates that these particular documents are not currently in the Pathfinder file in the NRC's Public Document Room. Consequently, we believe that these documents may be helpful to the NRC in making its determination on NSP's pending application.

I hope that this is of assistance. If you have any questions, please call me at the telephone number below.

Sincerely,

Mary Jo Murray

MARY JO MURRAY
Special Assistant
Attorney General

Telephone: 612/296-8115

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Enclosures

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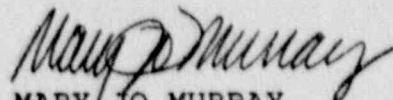
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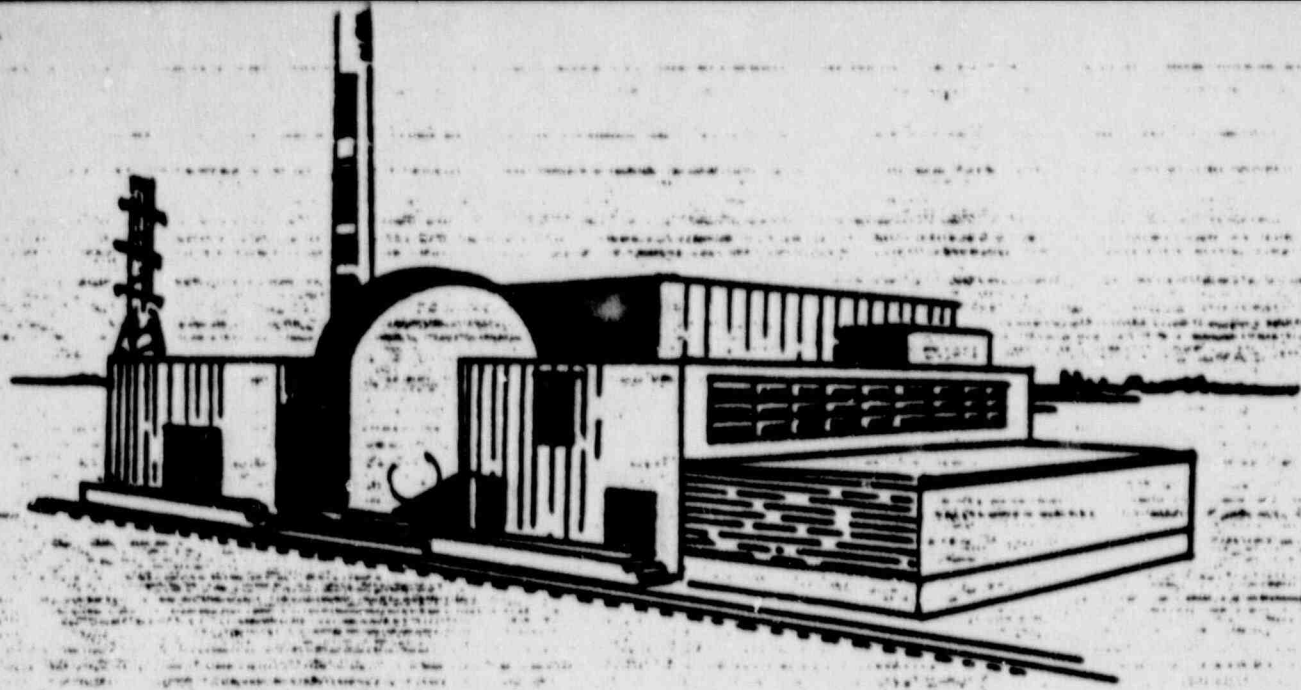
Telephone: 612/296-8115

MJM:lri.BF4

Enclosures

AN EQUAL OPPORTUNITY EMPLOYER





Pathfinder Atomic Power Plant
INCORPORATING INTEGRAL NUCLEAR SUPERHEAT
SIOUX FALLS, SOUTH DAKOTA

*PATHFINDER GENERATING
PLANT
General Description And
History*

NSP
NORTHERN STATES POWER COMPANY

PATHFINDER GENERATING PLANT

General Description and History

PATHFINDER GENERATING
PLANT
General Description And
History

I. Pathfinder History

In 1957, NSP and Allis-Chalmers Manufacturing Company entered into a contract whereby A-C was to construct a boiling water reactor nuclear power plant. The fuel was to be aluminum clad with zircaloy cladding as a backup if the aluminum did not prove to be feasible. A-C started design of the plant on this basis. In 1958, A-C made a feasibility study of incorporating an integral nuclear superheater in the design. A-C proposed that this could be added without extending the original startup date of June, 1962. On this basis, NSP and the AEC agreed to the change in design with the AEC providing the additional research and development funds.

NSP requested an AEC construction permit in March of 1959. Site preparation started in July of 1959 and the final construction permit was issued May 12, 1960.

As a result of test work performed by A-C, it was apparent that aluminum cladding for the boiler fuel would not meet the requirements. In mid-1960, the aluminum clad plans were dropped and a design incorporating zircaloy-2 cladding was used. Metals and Controls Company was given the boiler fuel contract in the last quarter of 1960. M&C fabricated the boiler fuel and delivered the elements during the summer and fall of 1963.

The superheater was to be a stainless steel clad cermet with fully enriched fuel. In June of 1960, the Martin Company was awarded a contract for a two phase program to study fabricating the superheater fuel elements. Phase A was set up to refine the then current fabrication techniques and fabricate several cermet tubes to Pathfinder specifications. Under Phase B, Martin Company was to develop methods of assembling the tubes into fuel assemblies. Late in 1961, Phase C was added to the program. Phase C was to develop techniques for production fabrication of the superheater fuel elements. Martin Company completed Phase C in October of 1962 and was awarded the contract to fabricate the elements for Pathfinder.

Early in 1962, investigation by the AEC cast doubt on the suitability of type 300 series stainless steel in the superheater environment. This required added testing and development work before the superheater fuel elements could be fabricated. As a result of this testing, and fabrication difficulties, Martin Company did not deliver the superheater fuel elements until the first quarter, 1964.

On June 12, 1962, NSP requested an operating license. A one megawatt thermal operating license was issued in March of 1964, and critical operations of the reactor started. Work then proceeded to prepare the plant for full power operation and licensing. A complete safety system revision was required

and in July 1965, the reactor was shut down and an extensive change in the control system was made. This work was completed in late November, 1965. A full power license was issued on December 2, 1965. At this time, the containment vessel leak rate did not meet technical specification limitations. There was high leakage through the main steam isolation valve. This was repaired and critical operations were resumed on February 23, 1966.

Reactor testing and power escalation continued through the summer of 1967. On September 16, 1967 a separation of one of the main condenser tubes occurred. Inspections of the reactor and associated equipment were conducted during the shutdown. The inspections revealed that the steam separators in the reactor vessel had failed during operation. To facilitate the inspections the reactor fuel was removed from the vessel and placed in storage in the fuel handling building.

The decision was made in the fall of 1968 not to return the Pathfinder Plant to nuclear operation, but it was essential to have the electrical capacity at Pathfinder available to meet system demands during the summer of 1969. The repairs and retrofitting required to return to nuclear operation could not be completed in the time available. Therefore, the decision was made to isolate the reactor from the steam cycle equipment

and replace the reactor with three fossil fueled boilers.

II. Ownership

Pathfinder is owned and operated solely by Northern States Power Company. The U S Atomic Energy Commission, Central Utilities Power Associates (CUAPA), and NSP were sponsors of the nuclear research and development programs associated with Pathfinder.

The CUAPA members are:

- Interstate Power Company
- Iowa Power and Light Company
- Iowa Southern Utilities Company
- Madison Gas and Electric Company
- Northwestern Public Service Company
- Otter Tail Power Company
- St Joseph Light and Power Company
- Wisconsin Public Service Corporation

III. General Description

Pathfinder is located 3½ miles northeast of the city limits of Sioux Falls, Minnehaha County, South Dakota. The City of Sioux Falls, with a 1960 census population of 65,466, is by far the largest center of population near Pathfinder.

The site covers approximately 1,200 acres of land. The land in the general area is sparsely populated and consists mainly of farm and meadow land. The site is fenced and no trespassing signs are maintained to restrict the public from the 1,200 acre exclusion area. The land in this area is not being farmed at the present but some hay is harvested within the exclusion area.

The plant operating area is completely enclosed by a chain link fence with controlled access. This area is designated as the restricted area. The restricted area includes a substation, fuel handling building, reactor building, turbine buildings, administration buildings, water treatment building, two parking lots, a cooling tower and a fire pump house.

A more detailed facility description is available in the Pathfinder Atomic Power Plant Safeguards Report, ACNP-5905, submitted to the Atomic Energy Commission as Part II of the license application under Docket No 50-130 dated January 15, 1962.

IV. Conversion

The basic concept of the Pathfinder conversion was to isolate the reactor and supply the turbine with steam from three fossil fueled boilers. The main steam line and the feedwater line were cut on the turbine building side of the reactor building penetrations. The open ends of these pipes were closed with welded steel caps.

The steam cycle equipment in the turbine building is being modified to be compatible with the fossil fueled boilers. Of the four stage heaters, the two highest pressure heaters are being removed from the system. One of them is being replaced with a deaerating heater in the new boiler building. The

second heater is being replaced with a heater with a higher pressure rating. A new feedwater line is being installed from the highest pressure heater to the new boilers. A new main steam line is being installed from the new boilers to the old main steam line. The connection between the new and old steam lines will be made just ahead of the stop valves at the turbine.

V. Decontamination

The original radiation surveys indicated approximately 33 curies of activated corrosion products. This activity has been identified as primarily zinc-65. The remainder, less than 1% of the total activity, has been identified as cobalt-60 and manganese-54. There are no identifiable quantities of fission products in the system.

The above activity existed in the piping and equipment to be used in the converted plant before any removal effort had begun. The decontamination program began with the turbine, condenser and hotwell. These components were washed with inhibited phosphoric acid, passivated with dilute citric acid, and finally rinsed with water. A similar three step approach was used to clean the two low pressure heaters which will remain in service.

The two highest pressure heaters and much of the piping associated with reactor operation were removed from the system.

All of this material except one of the unused heaters were disposed of off-site. The remaining heater will be capped and stored in-place. The piping was removed to reduce the total inventory of activated corrosion products and to facilitate the installation of new piping for the converted system.

IV. Operation

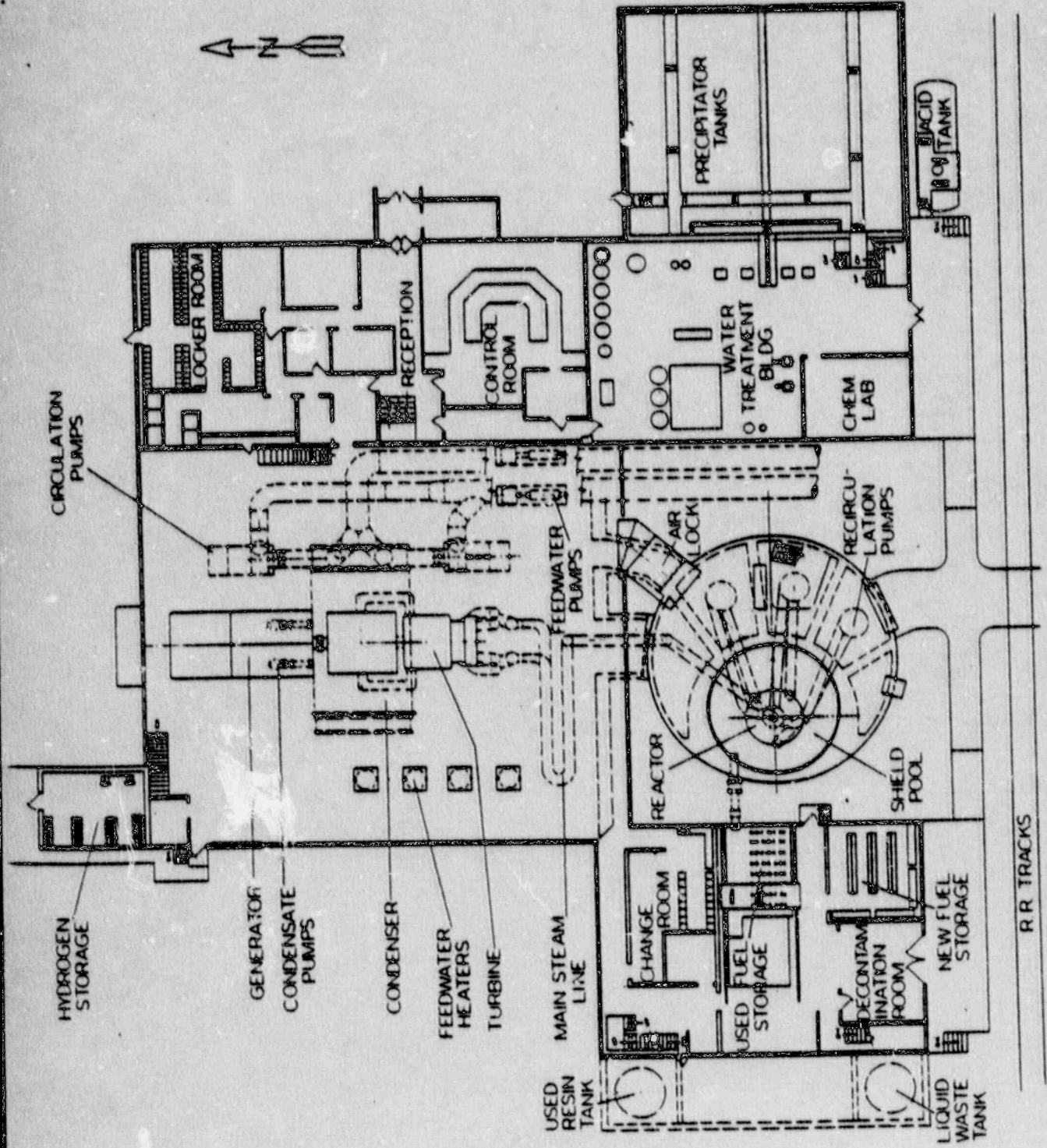
Figure II is a floor plan of the reactor facility and associated systems. Figure III is the same floor plan with the addition of the added or modified facilities.

The converted system will be operated as a conventional steam plant except that all the liquid drained or blown down from the boilers will be processed in the existing liquid waste processing and disposal system. The liquid will be piped directly from the new boiler building to the radioactive waste tanks in the fuel handling building with no provision for direct discharge. The boiler water will be sampled and analyzed for radioactivity routinely. The activity will be controlled by adding demineralized water to the boilers and blowing down water with radioactive material to the processing facilities. If the activity level in the system increases by some mechanism such as concentration in the boiler drums to a level where it would present a hazard to the public if an accident should occur the plant will be shut down.

The attached Safety Analysis documents the considerations given to hypothetical accidents and infrequent incidents associated with plant operation. The analysis is based on the entire 33 curies originally in the system. This was done to take a conservative approach. Any activity removed from the system will reduce the situation.

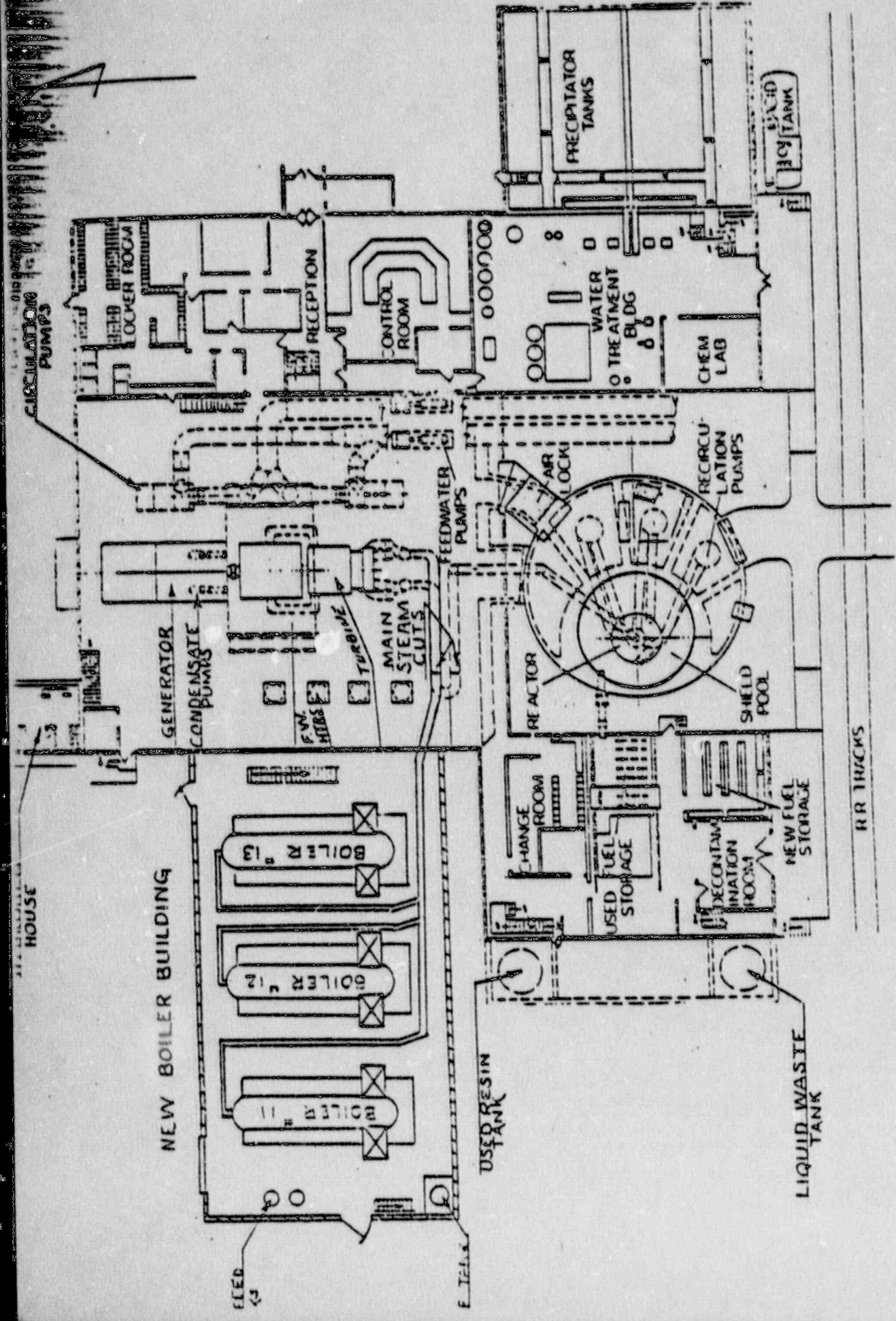
Should a release of radioactive material actually occur the emergency plan generated for reactor operation would be put into effect. A copy of this plan is attached to this submittal.

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PATHEONER PLANT - PLAN VIEW

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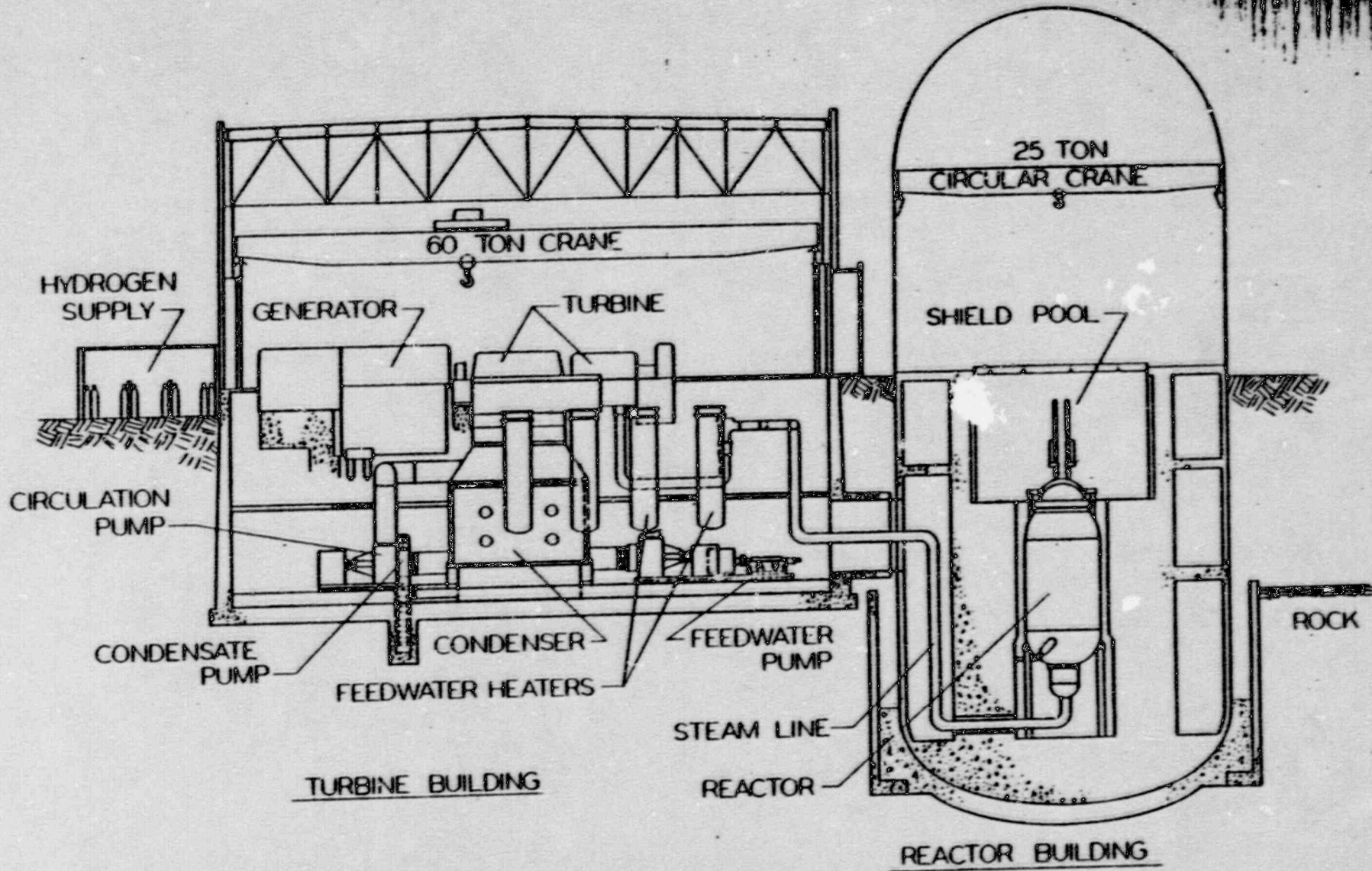


PATHFINDER PLANT - NEW PLAN VIEW

Fig 3

PATHFINDER PLANT - WEST ELEVATION

FIG. IV



PATHFINDER PLANT - WEST ELEVATION