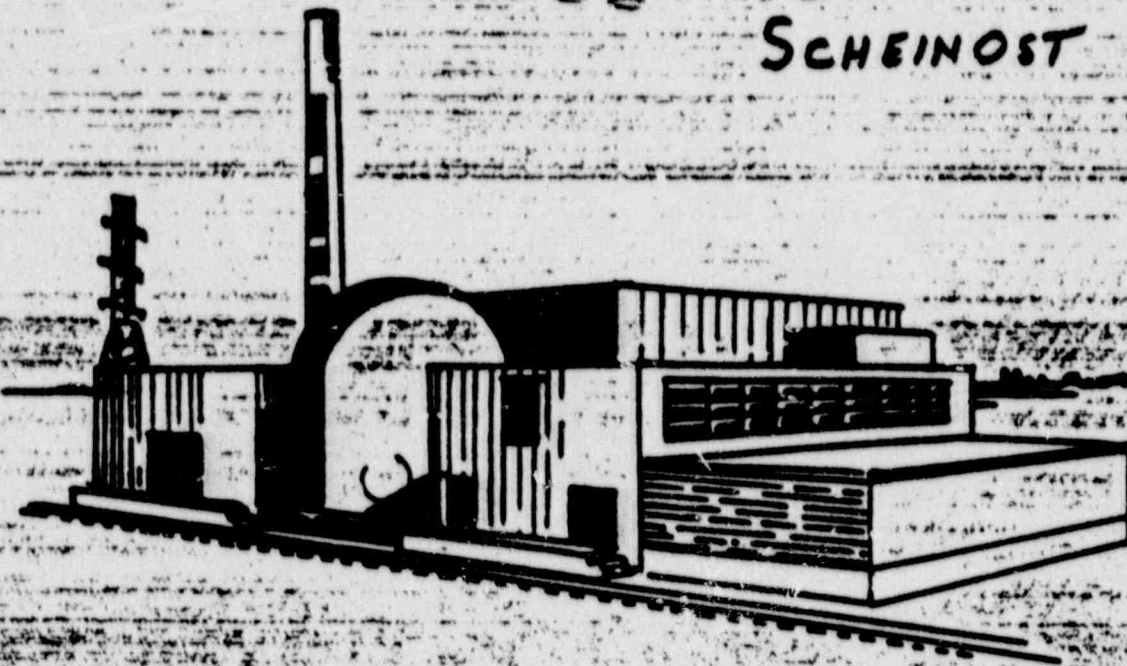


**SCHEINOST**



## **Pathfinder Generating Plant**

**SIOUX FALLS, SOUTH DAKOTA**

**REPORT TO UNITED STATES ATOMIC ENERGY COMMISSION**

**DIVISION OF REACTOR LICENSING**

**LICENSE NO. DPR-11**

**SIX-MONTH OPERATING REPORT NO. 8**

**PLANT OPERATING EXPERIENCE**

**NOVEMBER 14, 1969 to MAY 14, 1970**

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PDR ADOCK 05000130  
P PDR

110-46  
(9-64)

UNITED STATES ATOMIC ENERGY COMMISSION  
REGULATORY MAIL AND RECORDS SECTION  
report

Your  letter,  application, dated May 22, 1970

Re: Six Month Operating Report No. 8

including enclosures .....  
is acknowledged and has been assigned:

Docket No. 50-130 ..... of CONTROL No. ....

Please refer to the above number(s) in future correspondence.

Date Received: June 12, 1970

*This is an acknowledgment form only.  
It is not a reply to your communication.*

NORTHERN STATES POWER COMPANY

PATHFINDER GENERATING PLANT

Six-Month Report No. 8

14 November 1969 to 14 May 1970

Prepared By

Northern States Power Company

22 May 1970

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## I. INTRODUCTION

Amendment No. 4 to Northern States Power Company's Provisional Facility License No. DPR-11 issued May 14, 1969 for the Pathfinder Generating Plant, requires Northern States to submit:

A report to the Director, Division of Reactor Licensing of the status of the deactivated Pathfinder facility, including the results of the surveys of radioactivity levels and the status of the special nuclear and byproduct materials stored on the Pathfinder nuclear reactor facility site. The first report shall be filed six months after issuance of this amended facility license and each six months thereafter until such time as NSP files with the Commission's Division of Reactor Licensing its plan for dismantling of the facility, pursuant to Section 50.82 of 10 CFR Part 50, and receives Commission approval thereof.

Changes to the licensed facility are made in accordance with the provisions of Section 50.59 10 CFR 50 which permits changes provided the change does not involve a change in the Technical Specifications or an unreviewed safety question. The licensee is required to report such changes to the Commission.

## II. REPORT SUMMARY

This six-month report (NSP 7001) summarizes Pathfinder operations for the second six-month period since issuance of the amended Provisional Facility License.

Status of the deactivated Pathfinder facility is essentially as reported in the last six-month report (NSP 6902). Reactor components remain unbolted in the reactor vessel with the exception of the demister and vessel head. These two items are stored on the shield pool floor.

All irradiated sections of source rods are in a handling basket hung on the holddown assembly in the reactor vessel. The beryllium annuli for the neutron source combinations are empty.

All fuel element shipments during this period were made without incident. Surveillance of the fossil fueled steam cycle shows low radioactivity and radiation levels. No detectable radioactivity was discovered in off-gas or during equipment venting. Low levels of radioactivity in blowdown are collected and handled as liquid waste.

Remaining nuclear fuel was shipped from the Pathfinder site during this period. The last shipment of irradiated boiler fuel assemblies was made to Nuclear Fuel Services (this was detailed in the last six-month report) and four shipments of Core 1 superheater fuel assemblies were made to the Idaho Chemical Processing Plant.

### III. CHEMISTRY AND RADIATION EXPERIENCE

#### A. Surveys of Radioactivity Levels

Special radiation surveys of contaminated equipment conducted on a monthly basis revealed the following results:

	<u>Range mR/hr</u>
#11 Boiler	0.05 - 0.16
#12 Boiler	0.02 - 0.40
#13 Boiler	0.04 - 0.55
Deaerator	0.01 - 0.40
Steam Line (boiler building)	0.02 - 0.07
Steam Line (turbine building)	0.6 - 1.8
Feedwater Heaters	0.1 - 2.5
Steam Inlet Lines (turbine governor valves to turbine)	0.4 - 9.0
Condenser Motwell	1.0 - 3.5

Routine radiation surveys found three high radiation areas. They were the reactor building, the pools cleanup system, and the waste storage yard. The reactor building is a high radiation area due to trapped radioactivity in the water column piping and temporarily stored contaminated valves on the operating floor. The highest radiation level in the reactor building is 500 mR/hr. The pools cleanup area periodically is a high radiation area due to radioactivity in the coolers, filters, and demineralizers. The highest radiation level there was 4.4 R/hr. The waste storage yard contains solid waste in 55-gallon drums which read greater than 100 mR/hr. All these areas are controlled as required by 10 CFR 20.

#### B. Status of Byproduct Material

Listed on Tables 1 and 2 is the byproduct material stored on site. This includes the material covered under the Part 30 license and the material covered under the Part 50 license.

#### C. Radiochemistry

Weekly analysis of boiler water, feedwater, and main steam condensate showed radioactivity levels from  $<10^{-8}$  uCi/ml to  $1.6 \times 10^{-6}$  uCi/ml. Analysis of the boiler steam showed radioactivity levels from  $<10^{-8}$  uCi/ml to  $6.8 \times 10^{-7}$  uCi/ml. The majority of all the analyses showed radioactivity less than  $1 \times 10^{-7}$  uCi/ml. Approximately 90% of the radioactivity is Zn-65 and 10% is Co-60. All liquid is retained in holdup tanks and released under controlled conditions.

#### D. Health Physics

Radiation exposures during the reporting period were minor. The highest individual exposure for a two-week period was 40 mRem.

## E. Routine Radioactivity Releases

### 1. Liquid released to the Big Sioux River.

<u>Month</u>	<u>**Activity (uCi)</u>	<u>***Average Concentration (uCi/ml)</u>	<u>*Fraction of MPC</u>
November	$7.54 \times 10^3$	$4.06 \times 10^{-8}$	0.0013
December	$2.24 \times 10^4$	$9.75 \times 10^{-8}$	0.0032
January	$1.27 \times 10^4$	$4.94 \times 10^{-8}$	0.0016
February	$1.57 \times 10^3$	$8.35 \times 10^{-9}$	0.0003
March	$1.30 \times 10^3$	$1.12 \times 10^{-8}$	0.0004
April	$1.19 \times 10^3$	$1.56 \times 10^{-8}$	0.0005

\* MPC of  $3 \times 10^{-5}$  uCi/ml based on most restrictive isotope identified by routine gamma spectrometry analysis.

\*\* The activity was determined by gross beta times a correction factor for Zn-65. The efficiency for counting Zn-65 with our counter is less than that of a mixture of fission products.

\*\*\* The average concentration is that which was released from the plant without taking credit for dilution in the river

### 2. Gaseous Releases

Stack gas and particulate monitors detected no radioactivity above background. Off-gas did not contain detectable levels of radioactivity during plant operation with fossil fuel fired boilers.

## F. Radioactive Shipments

There were five fuel shipments made during this reporting period as described in Section IV of this report.

No offsite shipments of solid radioactive waste for burial occurred during this reporting period.

## G. Radiation Incidents

There were no radiation incidents during this reporting period.

## H. Offsite Monitoring

Environmental data collected during this reporting period showed no increase or unusual deviations. Air sampled continuously at Pathfinder, Sioux Falls and Vermillion showed less than  $1.0 \text{ pCi/m}^3$ . All fallout pot samples were normal. There were no significant differences in water samples measured upstream or downstream from the effluent ditch. All environmental film badges showed no detectable radiation exposures.

IV. STATUS OF SPECIAL NUCLEAR MATERIAL

A. Current Status

All remaining fuel assemblies were shipped from Pathfinder during this reporting period. This totaled five shipments, one of ten irradiated boiler fuel assemblies to Nuclear Fuel Services and four shipments of Core I superheater assemblies to the Idaho Chemical Processing Plant.

Two pellet standards for the LESH prototype superheater assemblies were sent to the Pennsylvania State University on January 29, 1970. All of the LESH assemblies had been sent during the previous report period.

The three PuBe sources are still on site. The one-curie source will be sent to NSP's Monticello Nuclear Generating Plant. Disposition of the two six-curie sources is undetermined at this time.

The remaining SNM on site consists of three fission chambers, four sets of in-core flux detectors and approximately 1800 pieces of U-Al flux wire. The fission chambers and one flux detector will eventually be sent to NSP's Prairie Island Nuclear Generating Plant. The remaining items will be buried with other nuclear waste.

B. Fuel Shipments

1. Core I Boiler Fuel

The ten remaining irradiated boiler assemblies (3.2 w/o initial enrichment) were shipped to Nuclear Fuel Services in West Valley, New York on November 17. Although not in the previous report period, the shipment was detailed in the last six-month report.

2. Core I Superheater Fuel (HESH)

All Core I superheater fuel assemblies were sent to the Idaho Chemical Processing Plant near Idaho Falls, Idaho. Shipments were made as listed:

<u>Shipping Date</u>	<u>Shipment</u>
January 2, 1970	90 irradiated and 6 unirradiated assemblies
January 12, 1970	112 irradiated assemblies
January 19, 1970	112 irradiated assemblies
January 29, 1970	97 irradiated assemblies

Loading of the superheater fuel assemblies into the ATCOR Modified VNDB Shipping Cask, Serial Number LS-6000-1 was



authorized by License SNM-1133, Amendment No. 71-1. Department of Transportation Fourth Revised Special Permit No. 5805 authorized transport of the loaded cask. All shipments were transported by Tri-State Motor Transit Company of Joplin, Missouri.

V. PERSONNEL AND FACILITY CHANGES

The Pathfinder plant technical and supervisory staff organization remained essentially as reported in the last six-month report. Mr. R. L. Scheinost, staff engineer and holder of senior operator license, replaced Mr. W. T. Gleason as Pathfinder Supervisory Engineer on 1 February 1970. Mr. E. L. Watzl, health physics supervisor, was transferred to the Prairie Island plant on 1 February 1970. Mr. E. W. Kruse and Mr. R. S. Holth, licensed operators, were transferred to the Prairie Island plant on 15 February 1970.

A change in the physical layout of the security fence was made in November 1969. The Operations Committee members concluded that this facility modification is the prerogative of the license holder under the provisions of 10 CFR 50.59 since it was determined that a Tech Spec change was not required and there was no unreviewed safety question involved.

TABLE I

Summary of Radioactivity on Site

<u>Reactor Building</u>	<u>Curies</u>
Boiler Shroud	9250
Grid Plate	11.5
Superheater Structure	11000
Boiler Boxes	22
Steam Dryer	0.13
Steam Separators	550
Holddown	330
Boiler Control Rods	364.0
Vessel Walls	3.13
Separator Support Shelf	4.5
Feedwater Ring	0.03
Neutron Windows	68
Ion Chambers	243
Superheater Control Rods	1.3
Pumps and Recirculation Lines	1.02
	<u>21848.61</u>
 <u>Fuel Handling Building</u>	
Spent Resin Tank	10
Purification Coolers and Pipes	0.12
Flash Tank	0.09
Other Tanks	0.03
Storage Pool	1
Other Sources	0.13
	<u>11.37</u>
 <u>Turbine and Boiler Building</u>	
Turbine	0.06
Condenser	0.12
Heaters (including deaerator)	0.18
Hydrogen Cooler	0.06
Steam Line (including inlet leads)	0.06
Condensate Pipe	0.06
Boilers	0.01
	<u>0.55</u>

Total estimated activity on site: 21860.53 curies

TABLE 2

## Source Inventory

Source	Source Description	Assay Date	Activity on Assay Date (uCi)	Date of Receipt	Activity on Date of Receipt (uCi)	Amount of Original Assay Used (uCi)	Buildup or Decay Factor	Activity on Date of Inventory (uCi)	Location
uBe	1" x 12" Cylinder	7/31/64	$5.98 \times 10^6$	8/15/64	$5.98 \times 10^6$	---	1.00	$5.98 \times 10^6$	Source Room
uBe	1" x 12" Cylinder	11/16/62	$6.00 \times 10^6$	11/16/62	$6 \times 10^6$	---	1.00	$6.00 \times 10^6$	Source Room
uBe	Cylinder	11/12/62	$1.00 \times 10^6$	11/16/62	$1 \times 10^6$	---	1.00	$1.00 \times 10^6$	Source Room
Total PuBe on site = $1.298 \times 10^{+1}$ Ci									
b-124	2½" x 18" Rod	2/28/65	$6.06 \times 10^9$	3/24/65	$4.60 \times 10^9$	---	*0.182	7.50	Reactor Vessel
b-124	2½" x 18" Rod	9/26/65	$4.62 \times 10^9$	10/31/65	$3.10 \times 10^9$	---	0.182	$6.88 \times 10^{+1}$	Reactor Vessel
b-124	2½" x 18" Rod	9/26/65	$9.18 \times 10^9$	9/12/66	$8.70 \times 10^9$	---	0.182	$4.10 \times 10^5$	Reactor Vessel
*Decay factor determined from date of last inventory									
Total Sb-124 on site = $4.10 \times 10^5$ uCi									
Co-60	¼" x 11/16" Cylinder	12/14/62	$1.01 \times 10^4$	12/21/62	$1.01 \times 10^4$	---	0.3876	$3.91 \times 10^3$	Source Room
Co-60	¼" x 11/16" Cylinder	12/14/62	$1.00 \times 10^5$	12/21/62	$1.00 \times 10^5$	---	0.3876	$3.88 \times 10^4$	Source Room

Total Co-60 on site =  $4.27 \times 10^{+1}$  mCi

TABLE 2

(Continued)

Source	Source Description	Assay Date	Activity on Assay Date (uCi)	Date of Receipt	Activity on Date of Receipt (uCi)	Amount of Original Assay Used (uCi)	Buildup or Decay Factor	Activity on Date of Inventory (uCi)	Location
Am-241	1" Disk	1/24/63	$1.82 \times 10^{-3}$	1963	$1.83 \times 10^{-3}$	---	1.00	$1.83 \times 10^{-3}$	Count Room
Total Am-241 on site = $1.83 \times 10^{-3}$ uCi									
Sr-90	Liquid (500 cc Reagent Bottle)	6/23/61	2.15	11/21/62	2.07	$9.91 \times 10^{-1}$	0.8033	$9.31 \times 10^{-1}$	Source Room
Total Sr-90 on site = $9.31 \times 10^{-1}$ uCi									
Zn-65	Liquid (100 cc Flask)			10/30/67	9.25	5.24	0.0935	$3.75 \times 10^{-1}$	Source Room
Total Zn-65 on site = $3.75 \times 10^{-1}$ uCi									
Cs-137	Liquid (50cc Flask)	8/8/62	$1.39 \times 10^{+2}$	1/1/63	$1.39 \times 10^{+2}$	$9.63 \times 10^{+1}$	0.8332	$3.56 \times 10^{+1}$	Source Room
Cs-137	Liquid (500cc Reagent Bottle)	8/8/62	2.79	1/1/63	2.76	$1.158 \times 10^{-1}$	0.8332	2.23	Source Room
Cs-137	1/4" Copper Tube	8/8/62	2.79	3/14/64	2.69	---	0.8332	2.32	Turb Bldg Vent Duct
Total Cs-137 on site = $4.02 \times 10^{+1}$ uCi									