

WESTINGHOUSE  
ELECTRIC CORPORATION



TESTING REACTOR

April 4, 1960

P.O. BOX 1075  
PITTSBURGH 30, PA.

WTR-TO-R752

Mr. H. L. Price, Director  
Division of Licensing and Regulation  
U. S. Atomic Energy Commission  
Washington 25, D. C.

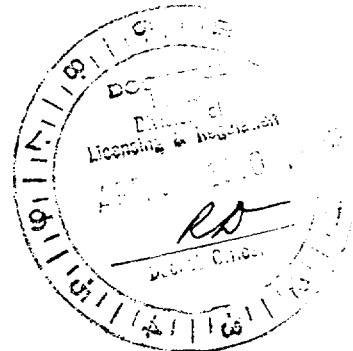
Dear Sir:

Pursuant to the requirements of the WTR Emergency Procedures, there is attached a report dealing with an incident involving the release of radioactivity at the WTR Site which was previously summarized in a telegram of this date to the New York Operations Office.

Very truly yours,

E. T. Morris  
Manager  
Westinghouse Testing Reactor

ETM/RBR/mlc



YOU CAN BE SURE ... IF IT'S Westinghouse

A/15

April 4, 1960

REPORT OF INCIDENT  
WESTINGHOUSE TESTING REACTOR

INTRODUCTION

High activity in the primary coolant and high radiation levels on the site caused shutdown of the WTR and evacuation of the site at approximately 8:50 p.m. on April 3, 1960. Indications are that the high levels were caused by fuel element failure.

Total activity released to the atmosphere, averaged over a 24-hour period, was estimated at  $1.0 \times 10^{-8}$   $\mu\text{c}/\text{ml}$  of air, which is approximately ten times the maximum permissible breathing zone's concentration. No air-borne activity was detectable at the perimeter of the WTR property.

The maximum exposure of any person was less than the permissible weekly exposure levels.

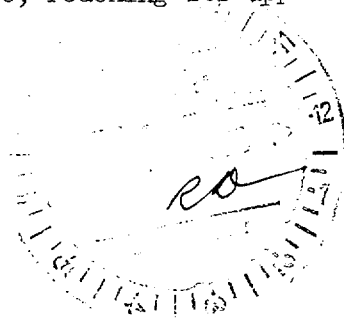
DESCRIPTION

The reactor had been operating in steady state for approximately 30 hours at 40 megawatts with a primary coolant flow of 15,000 gpm. In preparation for carrying out some reduced flow experiments, the reactor power was reduced to 30 megawatts at 7:00 p.m., April 3, 1960, and appropriate scrams and cutbacks reset to permit experiments at a flow of 5,000 gpm. During the experiment it was intended to raise the power level gradually, with continuous monitoring of the bubble equipment, until a power level of 45 megawatts was reached or until boiling was observed, (positive and negative "spikes" appearing on the power range chart at 7:50 p.m. were induced in the process of resetting cutback points).

At approximately 7:55 p.m., the reactor flow was reduced gradually to 5,250 gpm. Continuous readings were being obtained on data logger charts from two instrumented fuel elements, one of which had been equipped with four thermocouples used during previous runs and the other having six new thermocouples installed for this run. Readings from the previously installed thermocouples had been believed to be erroneous and were therefore disregarded for this run. Readings from the newly installed fuel element thermocouples were in line with predictions, were believed to be reading normally and showed good correspondence.

At 8:20 p.m., the reactor power was increased to 37 megawatts (calculated thermal). During a period of operation at this power, the instrumented fuel element thermocouples were read and the temperatures indicated were in line with expectations. At approximately 8:33 the power demand was adjusted to raise the power to 40 megawatts.

At 8:35 p.m. the power level commenced dropping rapidly, going down to 17 megawatts over a period of about two minutes for no apparent reason. During this period control rod No. 9 started out continuously on automatic, reaching its upper limit.



Control was switched to rod No. 8 and then to No. 1. The power continued dropping and each of the three safety rods was then moved out two percent in travel, one at a time. On reaching approximately 17 megawatts, the power ceased dropping and started recovering on approximately a 60-second period or greater. The power returned to approximately 38 megawatts (indicated).

At 8:40 p.m. the demineralized water monitoring station alarmed. Within about one minute, the hot cell radiation monitor alarm sounded and the head tank monitor followed almost immediately. The power demand was lowered to 15 megawatts and then manually cutback. At 8:44 the reactor was manually scrammed when other radiation monitoring instruments showed high readings.

ACTION TAKEN

Securing Plant and Evacuation. Immediately following scram, request for evacuation of the reactor top was initiated on the Femco system. As all radiation monitoring instruments continued rising, the signal for general evacuation was sounded. Operations' and Health Physics' personnel remained a short time to secure plant and continue survey but were also ordered to leave the plant when levels continued rising rapidly. One Health Physics' person remained on continuous duty using self-reading dosimeters to limit his exposure. The assembly point was the guardhouse at the entrance to the WTR property but was changed to Seubert house, approximately one-third of a mile southeast, as radiation levels continued to rise.

The primary coolant system was left in operation and high pressure loop No. 1 was placed on cool down; the reactor shell ventilation system switched to recirculate when activated by stack and reactor monitors for gas and particulate material. The surge tank vent blower was left running to prevent possible blowback of fission material into the process area and was turned off at sometime between 9:00 and 9:15 p.m. At that time the primary coolant system was also placed on shutdown flow.

AREA SURVEYS

Three groups with instruments started immediate surveys of the site and surrounding countryside. One group drove northward toward Madison with air sampler and a Geiger counter, another westward toward Yukon via a dirt road opposite the WTR site. A third group drove southward and eastward toward New Stanton. These initial surveys resulted in the following measurements.

<u>Location</u>	<u>Reading</u>
WREC	> 20 mr per hr (G)
Northside perimeter	< 2 mr per hr
Seubert and Fabian houses	Background
Yukon	Background
Route 71 at bridge - Sewickley Creek	Background

Readings at the main road directly in front of the site were as follows:

<u>Time</u>	<u>Reading</u>
Immediately following incident	> 20 mr per hr
9:20 p.m.	6 mr per hr
12:05 a.m. (4/4)	5 mr per hr
1:05 a.m.	3.5 mr per hr.

By 9:20 p.m. on April 3, air sampling stations had been established at the guard-house, reactor 16-foot level, reactor top, process area east side and approximately two or three general outside site locations. In addition, seven fall-out samplers which ring the site and which had just been replaced, are being collected.

Preliminary indications are that no detectable contamination has escaped the site. A later, more detailed report on findings will include a tabulation of readings and analyses from both of these sources.

#### PERSONNEL SURVEYS

Following the establishment of headquarters at the Seubert house, personnel monitoring stations were established at both the Seubert and Fabian houses, and clothing and cars of all off-going shift personnel were surveyed before these people left for home. A bio-assay program was commenced immediately with the collection of urine specimens and nasal swipes from all personnel who had been on the site or who were coming on. Special arrangements were provided to have the analytical results available as quickly as possible.

Radiation levels had decreased to the point that personnel began moving back into certain areas of the plant, (including the main office building), at about 2:30 a.m. Nonessential personnel were either contacted by telephone or stopped at the gate and sent home on their arrival Monday morning, April 4. Contractor people were also excluded. All other persons signed in and were issued pencils and film badges immediately upon their arrival. Site monitoring and smear surveys are continuing.

#### REPAIR

Action to clean up the primary system has been initiated. Following sufficient reduction in radiation levels, the reactor head will be removed and the core top examined carefully to determine whether any evidence of flow blockage in fuel channels may exist. All fuel will then be removed and stored in the individual fuel storage tubes provided in the canal. A simple system which will permit sampling and monitoring the water in each of these tubes will be used to determine which element or elements may have failed, if this information is not obvious when the fuel is removed. Detailed hot cell examination of suspected elements will be carried out.

Because the plant was to have commenced a scheduled shutdown at 12:01 a.m. on April 4 for substantial plant modifications, it is not planned to bring the reactor back into operation for at least five weeks. It is estimated, however, that the particular incident described in this report would not of itself have been responsible for a shutdown of more than five days.

#### CONCLUSIONS

High radiation levels at the WTR site have caused reactor shutdown and a short site evacuation. Probable cause is the failure of one or more fuel elements. Surveys which have been carried out indicate no detectable contamination outside the WTR site. Maximum personnel exposure is less than the permissible weekly exposure level. A brief report by wire was submitted April 4, 1960. The present report will be followed by a more detailed summary of findings when survey analyses are in and the plant has been examined more closely.

  
Roger B. Rice  
Manager, Technical Operations

**TWX INCOMING**

C-233

DOCKET NO.

50-22  
Journal File of

1960 APR 4 PM 3 50

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U.S. ATOMIC ENERGY COMM.

WESTINGHOUSE ATO MIC POWER DEPT PGH PA VAL PA 505 4-4 GOOD AFTERNOON  
MR LYALL JOHNSON CIEF LICENSING BRANCH  
DIVISION OF LICENSING AND REGULATION

U S A E C WASHINGTON D C

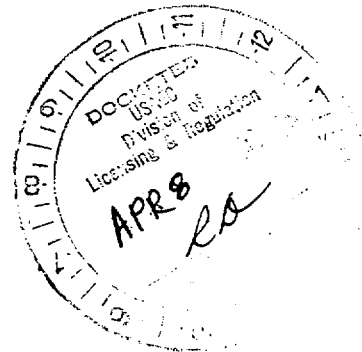
AT 8.40 PM, APRIL 3, 1960 THERE WAS A RELEASE OF FISSIONABLE MATERIALS TO THE PRIMARY COOLANT OF THE WTR PROBABLY CAUSED BY RUPTURE OF A FUEL ELEMENT. THE REACTOR WAS SHUT DOWN AT ~~1XXX~~ 8.42 PM AND ALL PERSONNEL EXCEPT ONE HEALTH PHYSICIST EVACUATED IMMEDIATELY. ESTIMATED MIXED FISSION PRODUCT FROM HEAD TANK AT AN ELEVATION OF 250 FEET WAS 1.0 X 10 TO THE MINUS 8 MICROCURIES PER MILLILITER OF AIR AVERAGED OVER A 24 HOUR PERIOD. THIS IS APPROXIMATELY 10 TIMES PERMISSABLE BREATHING ZONE CONCENTRATION AT THE PERIMETER OF WTR PROPERTY THERE WAS NO DETECTABLE AIRBORNE ACTIVITY. THE MAXIMUM EXPOSURE OF WTR PERSONNEL AS A RESULT OF THE INCICXXX INCIDENT WAS LESS THAN THE PERMISSABLE WEEKLY EXPOSURE LEVEL. IT IS ESTIMATED THAT THE INCIDENT WOULD RESULT IN THE REACTOR BEING INOPERATIVE FOR 6 DAYS WERE IT SCHEDULED TO OPERATE. HOWEVER, A NORMAL SHUTDOWN FOR 34 DAYS TO PERMIT EQUIPMENT INSTALLATION WAS SCHEDULED TO START AT 12.01 AM ~~XXXX~~ APRIL 4 AND CONTINUE UNTIL 12.01 AM MAY 9.

E T MORRIS MANAGER WTR PROJECT

END OR GA PLS

REC OK TU END GC

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**TWX INCOMING**

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