James A. FitzPatrick
Nuclear Power Plant
P.O. Box 41
Lycoming, New York 13093
315 342-3840

New York Power Authority

William Fernandez II
Resident Manager

April 17, 1991
JAFP-91-0233

United States Nuclear Regulatory Commission
Document Control Desk
Mail Station P1-137
Washington, D.C. 20555

SUBJECT: DOCKET NO. 50-333
LICENSEE EVENT REPORT: 91-004-00
Unmonitored Radiation Release

Dear Sir:

This Licensee Event Report is submitted in accordance with 10 CFR 50.73(a)(2)(viii)(B).

Questions concerning this report may be addressed to Mr. Robert Baker at (315) 349-6939.

Very truly yours,

WILLIAM FERNANDEZ

WF:RB:lar

Enclosure

cc: USNRC, Region I
USNRC Resident Inspector
INPO Records Center
American Nuclear Insurers

Cert No P840796176

IE22

NRC Form 366 (9-83)

U.S. NUCLEAR REGULATORY COMMISSION
APPROVED OMB NO. 3150-0104
EXPIRES: 8/31/88

LICENSEE EVENT REPORT (LER)

FACILITY NAME (1)	DOCKET NUMBER (2)	PAGE (3)
JAMES A. FITZPATRICK NUCLEAR POWER PLANT	0 5 0 0 0 3 3 3	1 OF 0 17

TITLE (4) Radioactive Liquid Effluent Release in Excess of Two Times Maximum Permissible Concentration Due to Personnel Error, Deficiencies in Procedures, & Management of Eng.

EVENT DATE (5)			LER NUMBER (6)			REPORT DATE (7)			OTHER FACILITIES INVOLVED (8)	
MONTH	DAY	YEAR	YEAR	SEQUENTIAL NUMBER	REVISION NUMBER	MONTH	DAY	YEAR	FACILITY NAMES	DOCKET NUMBER(S)
0 3	1 8	9 1	9 1	— 0 0 4 —	0 0	0 4	1 7	9 1		0 5 0 0 0
										0 5 0 0 0

OPERATING MODE (9): N

POWER LEVEL (10): 0 0 2

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR §: (Check one or more of the following) (11)

[ ] 20.402(b)	[ ] 20.405(c)	[ ] 50.73(a)(2)(iv)	[ ] 73.71(b)
[ ] 20.405(a)(1)(i)	[ ] 50.36(c)(1)	[ ] 50.73(a)(2)(v)	[ ] 73.71(c)
[ ] 20.405(a)(1)(ii)	[ ] 50.36(c)(2)	[ ] 50.73(a)(2)(vii)	[ ] OTHER (Specify in Abstract below and in Text, NRC Form 366A)
[ ] 20.405(a)(1)(iii)	[ ] 50.73(a)(2)(i)	[ ] 50.73(a)(2)(viii)(A)	
[ ] 20.405(a)(1)(iv)	[ ] 50.73(a)(2)(ii)	[X] 50.73(a)(2)(viii)(B)	
[X] 20.405(a)(1)(v)	[ ] 50.73(a)(2)(iii)	[ ] 50.73(a)(2)(x)	

LICENSEE CONTACT FOR THIS LER (12)

NAME	TELEPHONE NUMBER	
	AREA CODE	
Robert Baker	3 1 5	3 4 9 – 6 9 3 9

COMPLETE ONE LINE FOR EACH COMPONENT FAILURE DESCRIBED IN THIS REPORT (13)

CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS	CAUSE	SYSTEM	COMPONENT	MANUFACTURER	REPORTABLE TO NPRDS

SUPPLEMENTAL REPORT EXPECTED (14)

[ ] YES (If yes, complete EXPECTED SUBMISSION DATE) [X] NO

EXPECTED SUBMISSION DATE (15): MONTH / DAY / YEAR

ABSTRACT (Limit to 1400 spaces, i.e., approximately fifteen single-space typewritten lines) (16)

EIIS Codes are in []

An Unusual Event was declared at 1445 on 3/18/91 after the unmonitored release of radioactivity was detected outside the auxiliary boiler building. Contamination was detected on the ground, building walls, and roofs. Due to rain shower activity, rain water from contaminated building roofs drained to the storm drainage system, resulting in an unmonitored release into Lake Ontario. This event resulted from activities associated with the liquid radioactive waste concentrator [WD]. The concentrator waste line was plugged and operators were performing troubleshooting activities to clear the line. Steam from the auxiliary boiler [SA] provides process steam to the waste concentrator and the condensate is returned to the boiler. Due to inappropriate actions by the operators, the condensate return became contaminated with radioactive concentrated waste. The radioactive waste escaped with the venting steam via the atmospheric vent on the auxiliary boiler roof. At approximately 1315 the vent was closed, which terminated the source of unmonitored release. The storm drainage system was blocked at 1939, terminating the unmonitored release to Lake Ontario. Activities during and after the Unusual Event involved preventing continued release to the environment, clean-up, decontamination, root cause of the event, and an assessment and accounting of radioactivity released during the event.

EIIS Codes are in []

Description

On March 18, 1991 the plant was in the start-up mode, preparing to return to service from a 9-day maintenance outage. At 1445 an Unusual Event was declared due to the unmonitored release of radioactivity from the atmospheric steam vent on the auxiliary boiler B [SA]. The normally clean steam in the auxiliary boiler was contaminated from activities associated with the operation of the liquid radioactive waste concentrator [WD]. The waste concentrator is an evaporative type water recovery system which uses process steam to drive the system. Simplified flow diagrams of the concentrator are attached (see Attachments 1 and 2).

On the morning of March 18, 1991 at approximately 0800 operators were attempting to unplug the batch line (drain line) of concentrator B. The atmospheric vent on auxiliary boiler B was opened to increase steam load on the boiler. At light boiler loading, firing is unstable, and the boiler trips off line with changes in steam load. The batch process (which drains concentrated liquor from the concentrator to a holding tank for processing and off-site disposal) would cause changes in steam load on the boiler and the operators wanted to avoid the undesirable boiler trips and associated thermal cycles.

The batch line had been plugged for several days. Due to the outage and other operational considerations, no earlier attempt was made to unplug the line. Because of the backlog of water to be processed, the high density of the liquor in the concentrator, and the uncertainty of proceeding with the plant start-up to the point when the nuclear steam reboiler would be available, the Operations staff decided to unplug the batch line. At approximately 0800 a normal batching was attempted which was unsuccessful. Normal concentrator operation is automatic except batching which is a manual operation.

A troubleshooting plan for unplugging the batch line was discussed by the Operations staff and implemented. The liquor feed to the concentrator was secured. A steam flush line (refractometer flush) and sparger line were opened to the bottom of the concentrator. This allowed some of the process steam from the auxiliary boiler which was flowing to the shell side of the concentrator heat exchanger to be diverted. The refractometer flush is connected downstream of the steam flow control valve to the heat exchanger. It is important to note that the open flush line provides a direct connection between the radioactive concentrated waste and the clean steam supplied to the heat exchanger. The purpose of opening the spargerline was to agitate the waste in the bottom of the concentrator and thus free the plugged line. Because steam continued to flow to the heat exchanger shell side while the liquor feed was secured, the level in the concentrator

began to decrease due to boil-off. At 0845 the steam flow control valve closed automatically due to low level and steam was shut off to both the heat exchanger and the flush line. Operating procedures require that the condensate receiver tank drain valve be opened and condensate pumps secured in response to shutdown of the steam supply. The condensate receiver tank receives the condensed steam from the concentrator heat exchanger. This action was not accomplished (A). The concentrator was refilled with concentrator shell wash (cold water). The cold water quenched the steam in the heat exchanger, creating a vacuum in the shell side (steam side) of the tube bundle. Radioactive concentrated waste was drawn by the vacuum into the shell side of the heat exchanger through the flush line. At approximately 0850 the steam flow control valve opened automatically when concentrator level was restored by the addition of concentrator shell wash water.

The concentrated radioactive waste in the shell side of the heat exchanger was flushed to the condensate receiver tank. A conductivity alarm resulted from the high conductivity concentrated waste in the condensate line to the condensate receiver tank, which required operator action in accordance with an annunciator response procedure. The required actions to open the receiver tank drain valve, secure the condensate pumps, notify the shift supervisor, and request chemistry samples were not carried out (A).

At approximately 1000 the condensate receiver tank now containing a quantity of the concentrated radioactive waste was automatically pumped to auxiliary boiler B. The unmonitored release of radioactivity is believed to have begun between 1015 and 1030 as the radioactive water was boiled and vented through the atmospheric vent.

The waste concentrator batch line was still plugged. A new troubleshooting plan was discussed and implemented. This plan connected condensate transfer system by use of a hose and steam pressure to the batch line. At approximately 1150 concentrator level increased, indicating that the batch line was freed. Condensate transfer and steam were secured to the batch line, and the batching process began. At 1200 the steam supply was again automatically shut off on low concentrator level. Again, the operators failed to open the condensate receiver tank drain valve and secure the condensate pumps as required (A). The concentrator was refilled with demineralized water, which quenched the steam in the normally clean steam side of the heat exchanger, creating a vacuum. More concentrated radioactive waste was drawn into the heat exchanger through the refractometer and sparger lines valve which had been left open by the operators. When level in the concentrator returned to normal, the steam valve opened automatically. Steam was admitted to the heat exchanger and the radioactive waste was flushed to the condensate receiver tank. Again the operators failed to take the appropriate action in response to the conductivity alarms. They

failed to open the condensate receiver tank drain valve, secure the condensate pumps, notify the shift supervisor, and request a chemistry sample (A). Some radioactive material may have been pumped to the auxiliary boiler. However, because the concentrator was batched again, only about five to ten minutes of pumping action would have occurred. At about this time the operators recognized that the condensate pumps were running and the condensate drain valve was not opened. The appropriate actions were carried out, terminating additional radioactive contamination of the boiler. The radwaste operator requested that the auxiliary boiler vent be closed at about 1300 because the batching of the concentrator was completed and the concentrator was ready for normal operation. The auxiliary boiler atmospheric vent was closed at 1315 which terminated the source of the unmonitored release.

Although the source of the release had been terminated, an unmonitored release to Lake Ontario was in progress. The contaminated steam from the vent was swept by the wind and the turbulence around the building depositing contamination on the roofs, vertical building surfaces, and the grounds. Light rain showered on the roofs and ran off via roof drains. The roof drains on some roofs are collected and piped to the storm drainage system which drains to the lake. An unmonitored release of radioactive material to Lake Ontario occurred via this system.

Discovery and Compensatory Actions

Outside of the radwaste building, the following events occurred which led to the discovery of the release. At 1044 the control room computer and annunciator alarmed for the control room ventilation supply radiation monitor. The monitor indicated 2000-3000 cpm (normal was about 100 cpm). In accordance with the annunciator response procedure, the control room and relay room ventilation systems were placed in the isolation mode. The Technical Support Center ventilation system was started. Radiation Protection personnel were requested to survey and obtain air samples. A survey of the control room and the area surrounding the control room ventilation supply radiation monitor was conducted. Readings in the area of the radiation monitor were 20-300 micro-R per hour. Readings in the control room were normal. Air samples in the control room and the control room ventilation supply near the radiation monitor showed no detectable airborne radioactivity. These results were reported to the control room as normal at 1105. The survey in the area of the radiation monitor was not immediately compared to baseline background surveys which showed 5-10 micro-R per hour. The result of the surveys led the Operations staff to believe that an equipment problem existed. They initiated a work request for investigation by the Instrument and Controls Department. The ventilation systems remained isolated.

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TEXT (If more space is required, use additional NRC Form 366A's) (17)

On the morning of the event, a truckload of freshly laundered protective clothing arrived and was unloaded approximately 100 yards north of the vent for the auxiliary boiler. When personnel performing this task exited the restricted area between 1100 and 1130, four individuals caused the portal monitor to alarm. Subsequent frisking determined that each individual had detectable but less than recordable levels of contamination on their coats. Follow-up surveys were immediately initiated which resulted in the discovery of two externally contaminated empty 55-gallon barrels. These barrels were located in the work area just inside the turbine building near the overhead door. The laundry truck and all other areas inside and outside the turbine building were determined to be free of contamination. Because the barrels originally contained contaminated equipment, the Radiation Protection personnel initially thought that the barrels were the source of contamination on the individuals who had initially alarmed the portal monitors. The barrels were roped off and posted to isolate them from other individuals in the area while investigation continued. This activity occurred at about 1200.

At 1315 an auxiliary operator closed the auxiliary boiler atmospheric steam vent. As he exited the restricted area, he also alarmed the portal monitor. The operator's shoe was contaminated to 1200 cpm. Radiation Protection personnel immediately restricted access in the hallway to the restricted area exit and to the auxiliary boiler room. They then began a comprehensive smear survey area-by-area that resulted in the discovery of a contaminated puddle of water inside the boiler room. The water originated from a small packing leak on the auxiliary boiler atmospheric vent isolation valve which the operators had closed. At the same time, a survey outside the auxiliary boiler building near the boiler room access doors indicated high levels of contamination on the ground. These initial surveys were completed about 1345. Radiation Protection management, the Shift Supervisor, and senior plant management were informed of the developing situation as follow-up surveys were begun outside. As out-of-doors survey information became available, the large extent of contamination became apparent. An Unusual Event was declared at 1445 based upon plant conditions that warranted increased awareness on the part of the plant operating staff.

Upon declaration of an Unusual Event, the Technical Support Center (TSC) was activated to aid in communications and management of the emergency. By 1500 the auxiliary boilers were shutdown and being cooled down. Protective tagging was hung on the atmospheric vent (closed at 1315) to establish administrative control of this release path. Surveys outside the plant established that contamination was present on the roadways that run parallel to the east and west sides of the plant inside the protected areas. These roadways were blocked to restrict pedestrian and vehicular traffic. Surveys of personnel and vehicles that might have been exposed to the release were initiated (no further personnel contaminations were discovered). The

recall of three vehicles that had left the site during the morning was initiated (these were later found free of contamination). Personnel movement outside the plant was restricted until the results of surveys were known and egress routes could be established. Attachment 3 is a simplified site map showing the extent and magnitude of contamination. Except for the auxiliary boiler room and the two empty barrels in the turbine building, no contamination was spread to accessible areas inside the buildings. At approximately 1605 the Operations Support Center was also activated to assist in the response. Personnel access to and from the site was halted for several hours to better control movement of personnel.

Following discovery of the contaminated puddle in the auxiliary boiler room, a sample of the B auxiliary boiler was taken at 1430 indicating 3.4xE-2 microcuries per milliliter. To assess if a release to the storm drain system had occurred, a sample was taken at 1445 of the auxiliary boiler floor drain oil separator. No detectable radioactivity was found leading investigators to believe that the contamination was contained. To confirm this and because of the extensive outside contamination, a sample was drawn at the lakeshore at the west storm drain outfall at 1620. This sample contained 4.6xE-3 microcuries per milliliter. This is 64.6 times Maximum Permissible Concentration (MPC) in 10CFR20, Appendix B, Table II, Column 2. The flow rate was not quantified during this sample, but was observed to be similar to the backup sample obtained next. An immediate back-up sample was obtained at 1700 to verify the initial sample. The results indicated 1.92E-4 microcuries per milliliter at a measured flow rate of 18 gpm. This is 2.68 times MPC. A third sample was obtained at 1910 indicating 1.57E-4 microcuries per milliliter, 2.15 times MPC. At 1940 inflatable plugs were installed to block flow at the west storm drain outfall. This terminated the liquid release to Lake Ontario.

The east storm drain outfall was sampled and found to be slightly radioactive at 9.7E-6 microcuries per milliliter, 0.12 times MPC. Inflatable plugs were also installed in the east storm drain outfall at 2030 to assure no release from this pathway.

During the day of March 18, 1991 the reactor had been maintained stable in the start-up mode at 500 psig reactor pressure. At 1750 the decision was made to commence a normal shutdown as soon as the manpower in the Operations Department permitted. At 1900 the shutdown began. All control rods were inserted by 2359, and the reactor was in the cold condition at 0520 on March 19, 1991.

Meanwhile, surveys and other compensatory actions were being performed to assess the extent of contamination and minimize its spread. The drainage to the reactor building perimeter sump was determined to be free of radioactivity. At 1928 on March 18, 1991 the perimeter pumps were secured and the outlet of one pump diverted under the controls of

a temporary modification from the west storm drain system to another drainage area. This significantly reduced the input of rain water to the west storm drain system. At 2200 on March 18, 1991, an effort was started to cover the administration building roof which was the most highly contaminated area. This effort was to minimize the spread of contamination from the rain and wind. In addition, surveys of building ventilation intakes were conducted. Ventilation systems for the administration building and motor generator set building were secured due to the contamination discovered at the intakes. The area under the west storm drain outfall was covered with plastic to minimize the spread of contamination from the outfall rocks to the lake. An area was cleared in the Interim Radwaste Storage Building to provide temporary storage for equipment stored near enough to the auxiliary boiler atmosphere vent to have become contaminated.

Arrangements were made with Niagara Mohawk Power Corporation for the use of a portable filter and demineralizer system to process contaminated storm drain water. Storm drain water was pumped from a convenient manhole to several radwaste liners. Once the portable processing system was made operational at 2145 on March 19, 1991, the water was processed, sampled, and then discharged to the discharge canal, the normal plant discharge path. Several large tanks and bladders were brought to the site over the next few days to provide a surge volume in the event that the rainfall exceeded processing capabilities. In addition, to further control and reduce the amount of rain water contaminated by the roofs and ground, the west storm drain system was sampled and segregated such that contaminated portions were isolated and non-contaminated portions were rerouted. These changes to the system were controlled by temporary modification procedures. Contaminated soil and stone was covered with plastic to minimize the leaching of contamination deeper into the ground. Run-off from the plastic was collected and processed using the portable filtering system described earlier.

The intake to the instrument and breathing air compressors is located about 50 yards downwind of the auxiliary boiler atmospheric vent. Breathing air was not being used at the time of the event. Its use was immediately prohibited upon discovery of the contamination outside the boiler room. Surveys showed contamination on the interior of the three compressor intake pipes for a distance of about one foot. These areas were decontaminated successfully. The restriction on the use of breathing air was lifted on March 28, 1991.

Survey teams were established and dispatched to determine the extent of onsite as well as offsite radioactive contamination. Since the prevailing winds were from the southeast, survey teams directed their first efforts to the northwest perimeter of the site toward the Lake Ontario shoreline and the adjacent Nine Mile Point Nuclear Station (NMPNS). Health physics personnel from the NMPNS assisted in performing surveys of the site boundary and major buildings outside

the security fence (e.g., Training Building). Air samples and direct radiation measurements indicated no radioactivity in excess of background levels outside of the security fence.

The NRC responded to the event by establishing an Augmented Inspection Team (AIT). The AIT arrived on site late in the evening of March 18, 1991. The Mobile Measurements Laboratory was set up on site on March 19, 1991. In addition to performing split samples to confirm NYPA results, the team assisted NYPA staff when counting backlogs were high. The Augmented Inspection Team monitored NYPA response and recover efforts through March 27, 1991 and documented the results in Inspection Report 91-80.

On the morning of March 20, 1991 a Radiological Assessment Plan (RAP) and a recovery plan were developed to characterize further the magnitude of the release and to determine any environmental impact. Where appropriate, the RAP used normal sampling points specified in the Radiological Effluent Technical Specifications (RETS). Water samples from the City of Oswego, the nearest drinking water source, were taken and analyzed daily for a period of ten days. Shoreline and bottom sediment samples were collected as soon as weather conditions permitted. Gill nets used to gather game fish specimens were set and collected weekly. Intake traveling screen impingement was collected when available and analyzed daily. Environmental thermoluminescent dosimeters and air samples (TLD) were collected at the end of the calendar quarter (March 28, 1991). Offsite environmental air samples were collected on March 19th and onsite environmental air samples were collected on March 20th. None of these samples showed detectable concentrations of radioactive material associated with this event.

The RAP also included detailed onsite surveys that included soil samples, surface water samples in drainage ditches, direct radiation measurements with pressurized ionization chambers (micro-R measurements) and smear surveys for removable contamination. Whole body counts were performed on over 200 site personnel and were made available to anyone who requested one. None of these showed any internal contamination of personnel.

The recovery plan addressed each of the major decontamination and waste processing problems that existed. Teams were formed to address each problem area. The methodology for addressing each problem was selected and goals were established. The tasks were tracked and coordinated from this point onward by the normal plant work planning organizations.

When the Radiological Assessment Plan and the recovery plan were implemented and the plant in a stable condition, the Unusual Event was terminated on March 20, 1991 at 1045.

Cause

A human performance evaluation of the operation of the concentrator was conducted following the event. Six inappropriate actions (personnel errors) Cause Code (A) were identified. The two troubleshooting plans were not conducted in accordance with existing plant procedures. The required response by operators was not performed on four separate occasions during the operation of the concentrator. The operators failed to carry out the required actions of the operating procedure or the annunciator response procedure.

The design of the steam supply to the waste concentrator contains an error in piping arrangement. Manufacturer's drawings of the waste concentrator show the flush line to the refractometer connected upstream of the steam flow control valve, 20FCV-106. The original design from the architect engineer has the flush line installed downstream of the flow control valve. This error was not discovered until this event. This incorrect piping arrangement establishes the flow path for the siphoning situation discussed earlier. Refer to Attachment 1 and 2 for a basic sketch of the waste concentrator.

In addition, the design of the auxiliary steam condensate collection equipment is weak Cause Code [E]. The design relies heavily on manual action to assure that any leakage of radioactive material to the clean condensate side of the system is isolated from return to the auxiliary boiler. The conductivity of the steam/water mixture that is exiting the waste concentrator tube bundle is indicated and alarmed in the radwaste control room. Conductivity varies depending upon the source of the heating steam (reboiler or auxiliary boiler) and frequently spikes resulting in alarms when the waste concentrator operates in other than the steady state mode. Operators are required to adjust the alarm setpoint slightly higher than the steady state value. Conductivity alarms are frequent. The annunciator unit is located in a nest of other alarms that are frequently activated. The result is that it can be easily mistaken for another alarm condition. When the conductivity alarm occurs, the operator must take manual action to divert the condensate from the auxiliary boiler. Otherwise the potentially contaminated water is automatically pumped to the auxiliary boiler room. Modifications were recommended in 1975 to improve this situation. These modifications were extensive and difficult to engineer. They remain pending at this time, having been deferred Cause Code [E] due to their high cost, high radiation exposure, and the higher priority on the Authority to implement other chemistry-related and radwaste modifications.

Other Problems Discovered During the Event Investigation

The potential existed to discover the unmonitored release at 1044 when the control room ventilation system high radiation alarm occurred. This did not occur because of the lack of readily available normal

background survey readings in the area of the radiation monitor for comparison and also because of some miscommunication between operators and radiation protection personnel.

The procedures for operating the waste concentrators were identified during the biennial procedure review in December 1987 as having deficiencies Cause Code [D] that prevented their use as written. However, procedure changes were not implemented to correct these deficiencies. Although the operating procedure contained steps and cautions concerning the batching process and actions that would have prevented the auxiliary boiler contamination, the procedures were indeed weak, and not containing adequate detail. They did not address methods for freeing a plugged batch line.

Management expectations for procedure development and use during evolutions that are not routine or simple were misinterpreted by the supervisor involved in the evolution. As a result, the evolution was carried out under verbal direction. The urgency of the situation was not sufficient to warrant this approach instead of the development of a written procedure.

NRC Bulletin 80-10 addresses a similar occurrence. During the Authority's review of this bulletin, the potential problem with the steam supply to the waste concentrator was not discovered. In addition, the response to the NRC was brief and sketchy making it difficult to assess the depth of review that occurred.

Analysis

This event is reported under the provisions of 10CFR50.73(a)(2)(viii)(B) as a liquid effluent release that exceeded two times the limiting combined Maximum Permissible Concentration (MPC) specified in 10CFR20, Appendix B, Table II, Column 2 at the point of entry into the receiving water (Lake Ontario). In particular, the maximum concentration of gamma emitting nuclides measured in the effluent of the site storm drain located outside the restricted area at the point of entry of this effluent into Lake Ontario may have had a total of 64.6 times the MPC values listed in Appendix B, Table II, Column 2 of 10CFR20.

The total activity released from the west storm drain to Lake Ontario before the flow was stopped is calculated to be approximately 0.03 curies based on gamma isotopic analysis and flow measurements of the storm drain water. Estimated total flow from the west storm drain was 6,000 gallons.

The total radioactivity found deposited on contaminated surfaces and in the storm drain system was calculated to be approximately 0.42 curies based on radiological survey results. The total radioactivity released from the boiler steam vent was calculated to be approximately

0.56 curies based on concentrator sample results, boiler system sample results, and steam vent flow recordings. The difference between the calculated valves is not significant because of uncertainties in the actual volume of concentrated waste transferred to the auxiliary boiler and the uncertainty in the radiological sampling and survey techniques.

The calculated dose due to this release is 5.71E-2 mrem to the whole body and 1.18E-1 mrem to the liver. The release of radioactive liquid was stopped by plugging the west storm drain. The first quarter 1991 cumulative dose contribution from all other liquid effluents was 9.4E-5 mrem to the whole body and 1.56E-4 mrem to the liver. The total cumulative dose for the first quarter of 1991 including normal and this unplanned release, is 5.71E-2 mrem to the whole body and 1.18E-1 mrem to the liver.

Corrective Actions

Immediate Corrective Actions:

1. An Unusual Event was declared and the emergency facilities were activated to manage the emergency.

2. Radiological surveys were conducted to determine the extent of radiological contamination. Contaminated surfaces were smeared and soil and water samples were collected for analysis.

3. The source of the release was secured. The auxiliary boiler system and waste concentrator were shutdown, isolated, and placed under administrative control by tagging to prevent further spread of contamination.

4. The storm drainage system was plugged at the point of discharge into the lake to prevent any additional release into Lake Ontario.

5. An investigation into the cause of the event commenced.

6. An assessment of the amount of unmonitored radioactivity released from the auxiliary boiler vent and estimate of the quantity of radioactivity released to the lake commenced.

7. Reactor start-up was terminated and the reactor placed in the cold condition.

Short-Term Corrective Actions:

1. Contaminated surfaces (roofs and grounds) were covered with reinforced plastic covers to mitigate the spread of contamination.

2. Roof drains connected to the storm drainage system were plugged.

3. A temporary demineralizer was set up to process contaminated water from the roof drains and the storm drainage system.

4. Roof drains to the storm drainage system were disconnected and routed to temporary tanks for processing through the temporary demineralizer before discharge.

5. Storm drains and manholes were pumped to temporary tanks for processing through the temporary demineralizer before discharge.

6. A recovery plan was developed.

Corrective Actions Associated With The Recovery Plan:

The goal of the plan was the restoration of contaminated buildings, grounds, equipment, and the storm drainage system to pre-event conditions. To achieve this goal project managers were assigned to manage defined tasks.

1. Storm Drainage System

   Approximately 800 feet of drainage pipe and two manholes were contaminated. The pipe and manholes were dewatered and decontamination continues to pre-event conditions so the normal drainage can be discharged to the lake.

2. Outfall

   This is the point of storm drainage system discharge into Lake Ontario. The area will be decontaminated to unrestricted area release limits.

3. Vertical Building Surfaces and Transformers

   Strippable coating, are being used on vertical walls. Station transformers are being wiped down to unrestricted area release limits.

4. Roof Decontamination

   Loose materials (mostly stones) that are contaminated to a level greater than unrestricted area release limits are being removed. Additional decontamination may require removal of roofing materials if unrestricted area release limits cannot be achieved.

Radioactive Water Processing of Storm Drainage Water

Storm drainage water and the roof drains are being collected and processed. Water is being sampled for radioactivity before release to the lake. A temporary water treatment system has been set up consisting of filters and deep bed demineralizers.

Ground Cover

Contaminated ground cover is being surveyed and then removed to a diked and covered area provided for secure storage until future disposal.

Radwaste Radioactive Water Processing

A temporary water treatment and filtration system has been set up to process plant system drains and sumps that were processed by the waste concentrator.

Supplemental Boilers

Two package steam boilers, one for domestic hot water and building heating, and the second for the containment nitrogen vaporizer have been temporarily installed.

Miscellaneous Decontamination

Intake ventilation ducts and plant air compressor intake piping have been decontaminated. Materials such as cable reels and conduit contaminated by the event have been relocated inside a secure area and is being decontaminated.

<u>Other Corrective Action</u>

A review of radwaste operating procedures has been conducted for technical content and compliance with administrative procedure writer's guide. Temporary changes were made to ensure currently conducted evolutions with remaining systems can be performed. Administrative changes will be accomplished by revisions.

Management expectation regarding the use of operating procedures was reaffirmed to operating personnel via memorandum and discussion.

Personnel directly involved in the event have been reassigned to other areas of responsibilities at the plant. At the present time licensed operators have been assigned duties for radwaste operations.

Management has issued a memorandum to operating staff addressing elements of good logkeeping.

Outstanding work orders and modifications have been reviewed to determine if other circumstances existed that could potentially result in loss of control of radioactive material. All potential problems were corrected or compensatory actions were implemented.

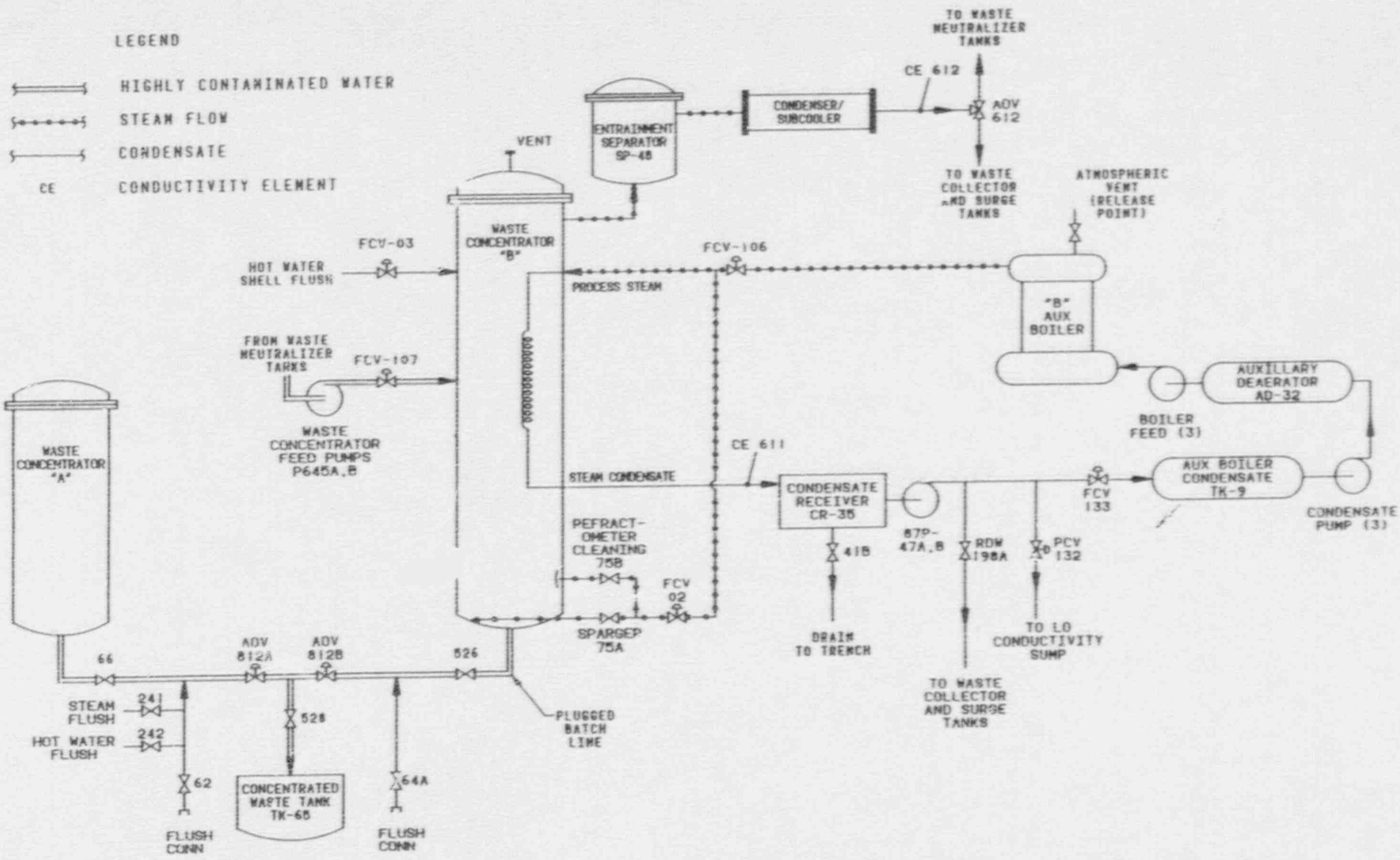
The actions required by I&E Bulletin 80-10 will be readdressed. The review will be completed by April 30, 1991.

An engineering study is in progress on the radioactive waste concentrator and the auxiliary boiler.

The Operations Department's Department Standing Orders were revised to provide instructions for developing a temporary operating procedures to provide operators a simplified method for generating a written procedure. These instructions are intended for troubleshooting, post-work testing, and other activities not covered by existing procedures.

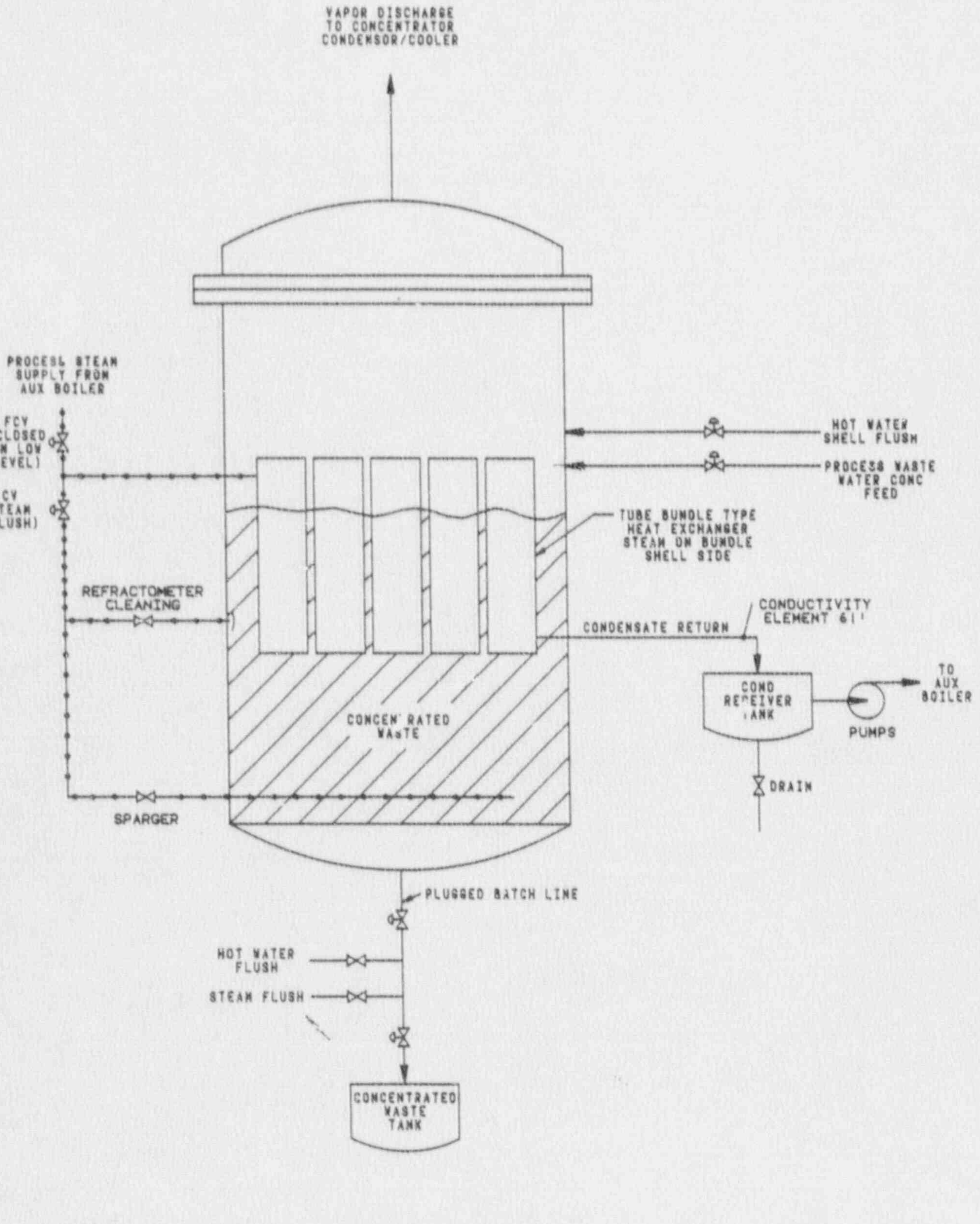
DOCKET # 50-333
LER-91-004-00

WASTE CONCENTRATOR TO AUXILIARY BOILER SIMPLIFIED FLOW DIAGRAM



ATTACHMENT # 1

DOCKET # 50-333
LER-91-004-00
WASTE CONCENTRATOR B
SIMPLIFIED FLOW DIAGRAM



DOCKET NO. 50-333
LER 91-004-00

ATTACHMENT 3