

TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE
37401



March 15, 1974

Mr. Don Knuth
Directorate of Regulatory Operations
U.S. Atomic Energy Commission
Washington, DC 20545

Dear Mr. Knuth:

On February 13, 1974, eleven individuals at Browns Ferry Nuclear Plant unit 1 were exposed to airborne radioactivity. The indications that no limit was exceeded are circumstantial; therefore, we are submitting the following report in accordance with 10 CFR 20, Section 20.405(a)(1).

The reactor was at atmospheric pressure, water temperature was below the boiling point, and the reactor vessel head vent was open. Maintenance employees had removed a main steam relief valve for replacement. A special work permit which specified working conditions and protective requirements had been issued as required by plant procedures. Radiological conditions in the work area around the relief valves at the start of work were:

Radiation dose rates - 10-20 mRem/hr

Radioactive contamination - less than 1000 dpm/100 cm²

Airborne radioactivity - 1.54×10^{-10} uCi/cc

A health physics technician was assigned to the drywell area exclusively. The technician was either in the drywell or at the entrance area. He was monitoring all employees and equipment exiting the drywell. The drywell constant air monitor (CAM) was nearby. Before 2 p.m., approximately 20 individuals had entered and left the drywell and had been surveyed; no contamination had been found.

At approximately 2:20 p.m., five men left the drywell after having worked on another job in an area with levels of contamination up to 6500 cpm/100 cm². A survey of these employees indicated two people that had facial contamination. All five individuals were sent to the health physics laboratory for further survey and decontamination. The health physics technician stationed at the drywell accompanied these individuals to the health physics laboratory to assist in decontamination. It should be noted that it was felt at the time that the facial contamination was due to possible touching of the face with contaminated gloves. It was then determined that three individuals had nasal contamination.

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Mr. Don Knuth
March 15, 1974

When nasal contamination was found, the health physics technician returned to the drywell access area. At this time, approximately 3 p.m., nine maintenance employees were exiting the drywell claiming that the open relief valve header had started to issue steam. Eight of these individuals had entered the drywell at approximately 2:45 p.m. and proceeded to the relief valve area. The ninth man entered a few minutes later and was just starting up the stairs when the others were leaving. The eight men who had been near the open relief valve header had external and nasal contamination. The ninth man did not. Maximum external contamination, detected by a pancake cube GM detector, was 1500 dpm; and the maximum nasal smear, taken with a damp cotton swab, was 7000 dpm.

All contaminated employees were decontaminated. External body surfaces were washed with soap and water. Nasal contamination was removed by blowing the nose and the use of cotton swabs.

Further investigation revealed that the drywell CAM had not alarmed at any time although there had been an increase from 250 cpm to 3000 cpm on the particulate channel only from approximately 2:50 p.m. to 3:05 p.m. with no further deposition after 3:05 p.m. An analysis of the filter on February 14 calculated back to the sample time of 2 p.m. on February 13 indicated the following isotopes and concentrations:

Isotope	Sample Time Activity (uCi/cc)
Tc-99M	1.98×10^{-10}
Cr-51	8.158×10^{-10}
Sb-122	9.588×10^{-11}
W-187	1.813×10^{-10}
Zr-95	7.404×10^{-10}
Xb-95	5.144×10^{-10}
Co-58	5.633×10^{-10}
Mn-54	1.00×10^{-10}
Fe-59	2.145×10^{-10}
Zn-65	6.726×10^{-10}
Co-60	1.695×10^{-10}
Sb-124	9.162×10^{-11}

Total calculated activity was 3.89×10^{-9} uCi/cc for approximately 15 minutes. Our worst case of maximum permissible concentration (MPC) is 3×10^{-9} uCi/cc for 40 hours a week.

A health physics technician entered the drywell at approximately 3:10 p.m. to pull an air sample. This sample was taken near the open relief valve header with vapor issuing. The result of this air sample was 6.93×10^{-10} uCi/cc. Another air sample taken at 4:45 p.m. showed a concentration of 1.51×10^{-10} uCi/cc.

Mr. Don Knuth
March 15, 1974

The mobile whole body counter was brought to Browns Ferry on February 14, and all eleven individuals that had nasal contaminations were counted. Three individuals were found to have detectable internal deposition of radioactive material. The maximum total dose due to internal deposition was 6.6 mRem.

It is believed that a flow disturbance resulting from an unplanned reactor recirculating water pump trip caused the airborne radioactivity.

To prevent recurrence, the procedure for removal of these valves was revised to include additional safety features. Whenever the relief valves are removed such that the reactor primary system is open, the following conditions will be in force:

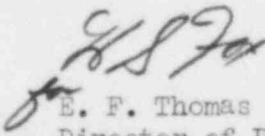
1. Negative pressure will be maintained in the reactor vessel by the mechanical vacuum pumps.
2. All reactor operations affecting water level or water flow shall be stabilized.
3. Direct telephone communications shall be established between the unit control room and personnel in the drywell.
4. Respirators, approved by health physics, will be available for each man working in the drywell.

In addition, blank flanges shall be installed to close the primary system as rapidly as possible.

We are enclosing an information sheet on the employees exposed to airborne radioactivity as described in this report.

Very truly yours,

TENNESSEE VALLEY AUTHORITY


E. F. Thomas
Director of Power Production

Enclosure
CC: (see page 4)

Mr. Don Knuth
March 15, 1974

CC (Enclosure):

Mr. Norman C. Moseley, Director
Region II Regulatory Operations Office, USAEC
230 Peachtree Street, NW., Suite 818
Atlanta, Georgia 30303

Enclosure to Report Concerning
February 13, 1974, Browns Ferry Nuclear Plant
Exposure to Airborne Radioactivity

The following employees were exposed to airborne radioactivity as described in the report.

<u>Name</u>	<u>Social Security No.</u>	<u>Birth Date</u>
J. D. Weaver	415-74-8363	7/4/47
C. M. McPeters	417-46-5050	1/28/31
R. N. Herz	349-28-4188	8/22/38
D. B. Stanford	421-54-2862	12/26/39
J. L. Ridgeway	316-44-7335	12/23/46
A. Wood	423-16-9663	6/21/21
J. Watson	401-62-9405	5/28/45
W. F. Campbell	424-18-1149	9/6/22
L. F. Bassham	219-20-7728	2/19/23
H. P. Todd	381-30-5126	5/20/28
E. Beddingfield	422-20-9987	7/8/26

The following three employees were the only individuals that received detectable internal deposition of radioactive material.

<u>Name</u>	<u>Calculated exposure due to internal deposition</u>
W. F. Campbell	6.6 mRem
J. L. Ridgeway	6.5 mRem
D. B. Stanford	less than 0.1 mRem

These exposure records have been placed in the individual's dosimetry record.

ML:CHB
3/7/74