

NARRATIVE SUMMARY
NRC DOCKET 50-321
OPERATION LICENSE DPR-57
EDWIN I. HATCH NUCLEAR PLANT - UNIT 1
NONROUTINE RADIOLOGICAL ENVIRONMENTAL OPERATING REPORT
ANOMALOUS MEASUREMENT REPORT

Pursuant to Section 3.2 and 5.7.2 of the Environmental Technical Specifications (ETS), Appendix B of the Operating License, this nonroutine report describes the elevated tritium concentrations in ground water samples collected from two locations within the protected area. These concentrations exceed the reporting level of 3×10^4 pCi/l specified in Table 3.2-2 of the ETS.

17
1X10⁵ PC/L
A sample taken from Piezometer No. P17B on December 1, 1978, showed a level of 2.6×10^5 pCi/l. After receiving the laboratory report from this sample, a new sample was collected on January 24, 1979, to confirm this elevated level. Confirmation was established on March 12 by receipt of the lab report for the January sample; the concentration was 1.7×10^5 pCi/l.

Piezometer No. P17B is a well about 13 feet deep which is located adjacent to the SE corner of the Diesel Generator Building. The laboratory results of the previous samples at this location (all in 1978) were 8.5×10^2 , 7.9×10^3 and 1.1×10^4 pCi/l for collections on 6/18, 8/8 and 8/31, respectively. The laboratory results for samples collected on 2/16/79 and 3/13/79 have not yet been received.

17
1X10⁵ PC/L
The second location from which ground water was collected with elevated concentrations of tritium was Piezometer No. P16. This well is also about 13 feet deep; it is adjacent to the south side of the condensate storage tank (CST). The laboratory results received on March 12, for a sample collected on January 26, 1979, showed a concentration of 1.4×10^5 pCi/l. Previous samples (all in 1978) were 1.4×10^5 , 1.6×10^5 , and 1.5×10^5 pCi/l for collections on 6/18, 8/8, and 8/31, respectively. The laboratory results for samples collected on 2/14/79 and 3/9/79 have not yet been received.

These previous elevated levels were not reported since there were no reporting levels for radiological environmental samples prior to an amendment to the ETS on November 16, 1978. This amendment also eliminated the requirement of sampling for ground water. Prior to this amendment quarterly sampling was required only in the event of an accident or unusual circumstance; the ETS specified sampling from a background station, a well at Deen's Landing 2 miles upstream, and from an on-site control station, the subsurface drainage ditch. This subsurface drainage network encircles the plant yard and has two outfalls from which samples are collected; its purpose is to control the water level in the unconfined ground water table.

The U. S. Department of the Interior in their comments dated June 28, 1979, stated: "NO RADIOACTIVITY OTHER THAN H-3 HAS BEEN IDENTIFIED IN SAMPLES TAKEN FROM PIEZOMETER NO. 16. ADDITIONAL SAMPLE WELLS HAVE BEEN DRILLED ON SITE. MANY DRY - SAMPLE OF DIRT REVEALS

NO RADIOACTIVITY ABOVE BKG.

SAMPLES OF H₂O - NO ACTIVITY ABOVE BKG.

17 ADDITIONAL ARE TO BE DRILLED.

SAMPLES OF ON-SITE WELL WATER USED FOR DRINKING - NO RADIOACTIVITY ABOVE BKG.

[WELL 102-120' DEEP]

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1977 on the Draft Environmental Statement (DES) for the Hatch Nuclear Plant Unit 2 suggested ground water sampling of the minor confined aquifer which underlies the plant. Consequently in the 4th quarter of 1977, samples were collected from three piezometer wells which have depths on the order of 80 feet. Samples from one of these wells, N7A which is adjacent to the south side of the CST, showed a level of 1.6×10^5 pCi/l; samples from the other two wells showed the tritium levels to be less than the lower limit of detection (about 10^2 pCi/l). Also in the 4th quarter of 1977 the sample from the north outfall of the subsurface drainage ditch showed a level of 9.5×10^2 pCi/l. As explained in the Annual Environmental Surveillance Report for Calendar Year 1977, these two readings were a matter of concern since the previous maximum reading was 2.4×10^2 pCi/l. When additional samples collected at N7A in February and May of 1978 showed the level to be consistent, it was decided to sample the unconfined water table.

It is questionable that the ground water samples gathered at Pl7B and Pl6 should be considered as environmental samples due to their remoteness from unrestricted areas; thus there is considerable doubt that the nonroutine reporting requirements of Sections 3.2 and 5.7.2 of the ETS are applicable in this case.

The maximum environmental impact of these elevated tritium levels in ground water may be assessed as the dose to a hypothetical individual who regularly drinks this water where it enters the unrestricted area, that is, from the outfalls of the subsurface drainage ditch. The highest quarterly average concentration from the outfalls during 1978 was 1.8×10^3 pCi/l and the annual average concentration was 7.4×10^2 pCi/l. Using the assumptions and constants from Regulatory Guide 1.109 Revision 1, these constants translate to whole body and organ doses of 0.046 mrem for the maximum quarter and 0.077 mrem for the year. The dose limits from Appendix I to 10 CFR 50 for liquid effluents are 1.5 mrem whole body and 5 mrem organ for any quarter, and 3 mrem whole body and 10 mrem organ for the year. The MPC for tritium in unrestricted areas as given in 10 CFR 20 is 3×10^6 pCi/l.

The cause of the elevated tritium levels in samples collected from Piezometer No. Pl7B is believed to have been found. During construction a temporary line carried nitrogen to the feedwater heaters from a tank in the yard which was located adjacent to Piezometer No. Pl7B. Afterwards the tank in the yard was removed leaving a buried open line about 8 inches below yard grade. The heater end of this temporary line was not removed after the tests were completed. The presence of the line went undetected until the events of March 20 led to its discovery.

On March 20, 1979, water was observed to be flowing out of the ground near Piezometer Pl7B from this spot to a height of from one to two inches. Water would flow for around 10

seconds, then stop for perhaps 5 minutes or so. This cyclic phenomenon occurred several times over a few hours. Water samples from the flow and mud samples on the ground at this spot were collected. Gamma scans of these samples show Xe 133 - 2.45 E-4 uc/ml , Xe 133m - 7.23 E-6 uc/ml , Xe 135 - 5.90 E-5 uc/ml and Kr-85m - 1.68 E-6 uc/ml in the water and Cs 134 - 1.34 E-5 uc/gm , Cs 137 - 1.51 E-5 uc/gm , Co 58 - 1.11 E-6 uc/gm , Zn 65 - 9.65 E-7 uc/gm , Co 60 - $1.88 \times 10^{-6} \text{ uc/gm}$, Ba La 140 - 4.51 E-7 uc/gm , Xe 133 - 4.98 E-6 uc/gm , Xe 135 - 6.87 E-7 uc/gm isotopes in the soil. The laboratory results of a tritium analysis is not yet available. A check of the valve on this temporary nitrogen line at the feed water heater on March 21, 1979, showed the valve to have been partially open. This valve was promptly closed. The open end of this temporary nitrogen line was unearthed on March 22, 1979. The line lies horizontal pointing north. There was no measurable activity in the soil beyond 2 feet from the pipe's end. The contaminated soil was placed in drums for shipment to a licensed burial ground. The open end of this temporary line was capped off. The line was also broken by removing a pipe coupling in the line inside the turbine building and capping the line.

The frequency of sampling has been increased at Pl7B to monitor the tritium level closely now that the probable tritium source to this area has been eliminated. During the forthcoming shutdown of Unit 1 scheduled to begin in late April or early May of 1979, it is planned to disconnect this temporary nitrogen line from the feedwater heater and cap-off the connection.

An investigation of the elevated tritium levels in the piezometer wells has been in progress for some months. The underground piping systems which carry high tritium levels have been identified. Some of these piping systems have been hydroed to some extent; but the results of the hydro do not positively confirm or exclude leakage to the ground from these systems. Dr. James R. Wallace, a Professional Engineer and Chief Hydrologist for Law Engineering Testing Company of Atlanta, Georgia has been engaged as a consultant in planning and implementing this investigation. A study of the piping diagrams, ground water levels and tritium levels is in progress to determine seepage paths to the source where tritium is entering the ground. Additional surface borings are being considered; the location and the priority for these borings are being determined. The gamma levels in the soil and ground water from these new borings may be indications of the proximity of any tritium source other than the one found at Piezometer Pl7B.

xc: U. S. Nuclear Regulatory Commission
Office of Nuclear Reactor Regulation
ATTN: Director of Regulation
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