TVA

Tennessee Valley Authority, Post Office Box 2000, Decatur, Alabama 35609

O. J. "Ike" Zeringue
Vice President, Browns Ferry Operations

JAN 29 1992

U. . Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, D.C. 20555

Gentlemen:

In the Matter of	)	Docket Nos. 50-259
Tennessee Valley Authority	)	50-260
	)	50-296

BROWNS FERRY NUCLEAR PLANT (BFN) - UNITS 1, 2, AND 3 - COMPLETION PLAN FOR THE FUSE PROGRAM

Reference: Letter from TVA to NRC dated September 20, 1991, "Status and Schedule for Completion of Unit 2 Post-Restart Issues"

The purpose of this letter is to inform NRC of BFN's plans for the completion of the actions associated with the Unit 2 post-restart fuse program and the Units 1 and 3 program. In the reference letter, TVA stated that the following Unit 2 commitments were being evaluated:

1. BFN will remove the reference to amperage from the drawings and replace them with the identification from the fuse tabulation controlled document, prior to startup from the next refueling outage (cycle 6).

2. BFN will install permanent fuse labeling, prior to startup from the next refueling outage (cycle 6).

3. BFN, Nuclear Performance Plan, Volume 3 Long-term Commitment No. 99(1)-2, Page No. III-71 - Long-term post-restart fuse substitution corrective actions will include completing the fuse tabulation to include non-restart fuses required to assure protection of equipment and personnel and removing fuse data reflected on schematic and connection diagrams for all fuses controlled by the fuse tabulation.

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This evaluation has been completed and TVA has determined that commitments 1 and 2 should be completed for Unit 2 1E fuses prior to startup from the cycle 6 refueling outage as previously committed. Since the restart fuse program addressed the circuits critical for safe shutdown of the unit, the completion of the fuse tabulation for non-restart fuses (commitment 3), while desirable, does not impact plant safety. Therefore, TVA proposes to include non-restart (non-1E) fuses on the fuse tabulation only on an as-needed basis and will devote its resources to the completion of the safety-related elements (commitments 1 and 2) of the fuse program. The fuse program for Units 1 and 3 will be completed prior to the restart of each respective unit and is similar to the Unit 2 program. A listing of the commitments made in this letter which will complete the fuse program for BFN are provided in Enclosure 1.

If there are any questions, please telephone Raul R. Baron, BFN Site Licensing Manager, at (205) 729-7566.

Sincerely,

O. J. Zeringue

O. J. Zeringue

Enclosure
cc (Enclosure):

NRC Resident Inspector
Browns Ferry Nuclear Plant
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101 Marietta Street, NW, Suite 2900
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ENCLOSURE 1

LISTING OF THE COMMITMENT MADE IN THIS LETTER

1. BFN will remove the reference to amperage from the drawings and replace them with the appropriate unique identifier for Unit 2 1E fuses. BFN will install permanent fuse labeling for Unit 2 1E fuses. These actions will be completed prior to startup from the next refueling outage (cycle 6).

2. For Units 1 and 3, the fuse program is similar to the Unit 2 program. BFN will remove the reference to amperage from the 1E and replace them with the appropriate unique identifier for 1E fuses. BFN will install permanent fuse labeling for restart fuses. These actions will be completed prior to restart of each respective unit.

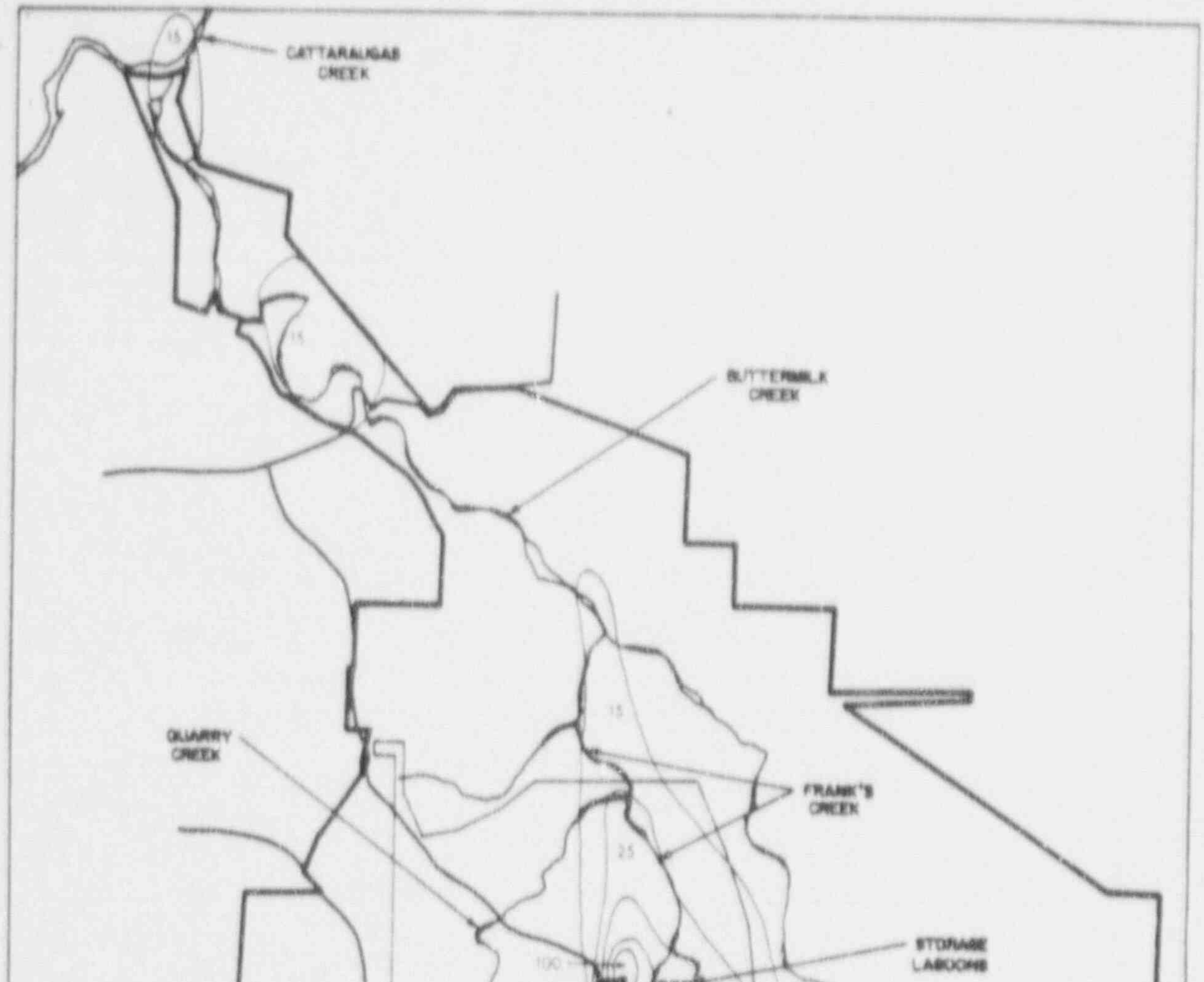

Fig. 2.4. Isoexposure map of NFS, West Valley properties, 1968.

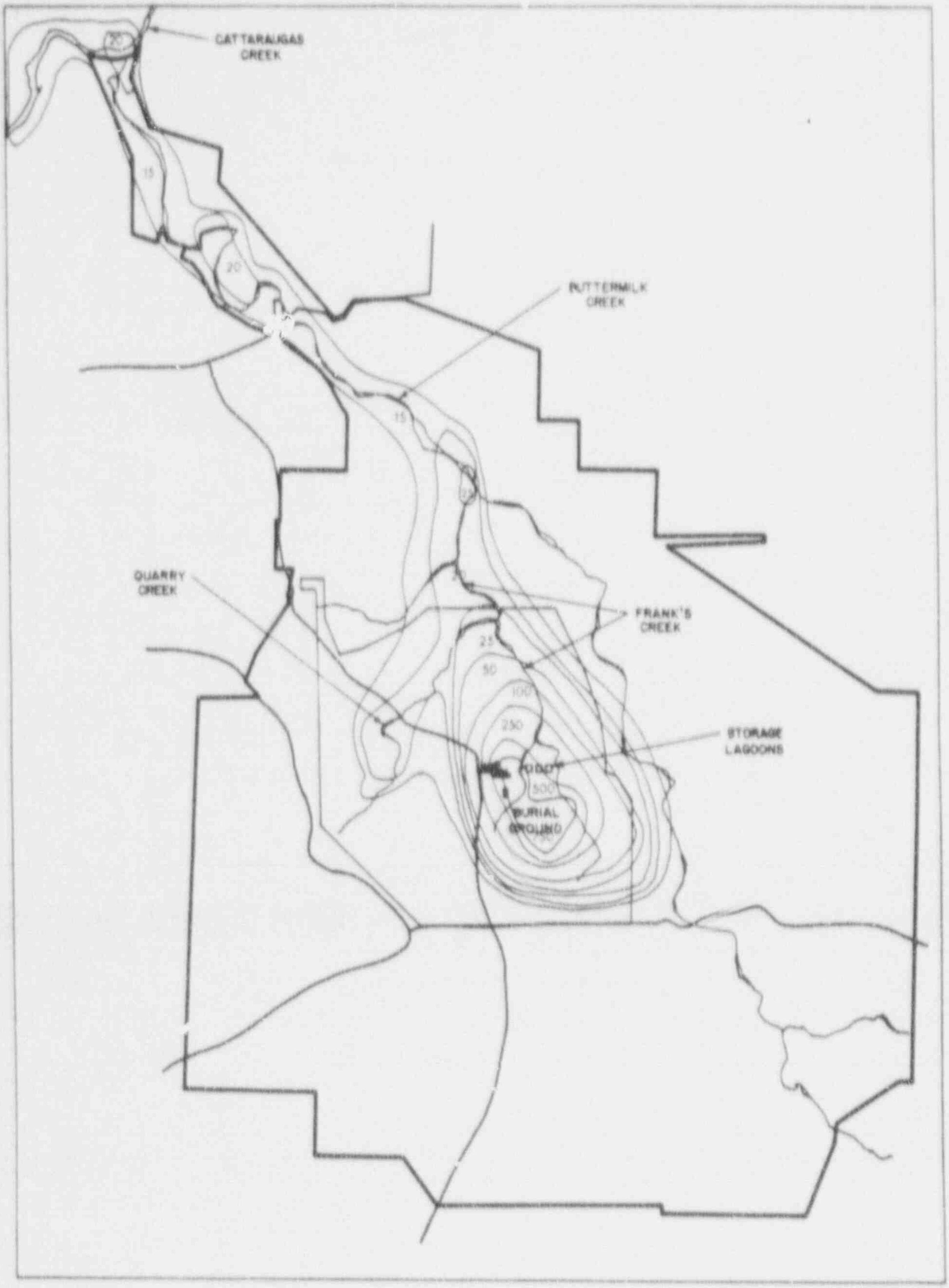

Fig. 2.5. Isoexposure map of NFS, West Valley properties, 1969.

recordings of radar altitude (i.e., ground clearance) and gross γ count rate, as a function of aircraft position, clearly show count rate maxima when crossing rivers downstream from NFS. River crossings are located at minima in absolute terrain altitude, i.e., at maxima in ground clearance. Typical plots of this type are shown in Figs. 2.6 and 2.7, for 1969 flight paths that crossed Frank's and Buttermilk Creeks, and the plots show sharp increases in the count rate over the streams. Similar crossings of Buttermilk Creek upstream from the plant revealed no increase in the background radiation level.

The flight paths along the downstream waterways were sufficiently far from the buildings and burial grounds, so that the γ-ray spectra were not influenced by pickup of radiation emanating from within the primary fenced boundary. The 1969 γ-ray spectra from flight paths along Frank's and Buttermilk Creeks are shown in Figs. 2.8 and 2.9, respectively. Photopeaks at 0.66 ± 0.02 MeV (^{137}Cs) and 0.79 ± 0.02 (^{134}Cs) are clearly present in both spectra. Identification of the photopeaks as cesium radiation is unambiguous, in spite of the nearly similar photopeak energies of ^{106}Ru-^{106}Rh (0.622 MeV) and ^{95}Zr-^{95}Nb (0.724 and 0.756 MeV), owing to the 0.02-MeV spectral resolution of the detectors.

Other investigators[5,6] have studied water samples from Frank's Creek and Buttermilk Creek. They substantiate the conclusion that ^{137}Cs and ^{134}Cs are major contributors to the γ-ray emissions of the radioactive materials in the water. However, they also report other nuclides, including ^{106}Ru-^{106}Rh and ^{95}Zr-^{95}Nb, in concentrations that are below the sensitivity threshold of the ARMS detectors when in the presence of the observed nuclide concentrations. They also report the presence of other nuclides, including ^{90}Sr, which emit no penetrating γ-rays and therefore cannot be detected from the aircraft.

Based upon equations in Appendix A the concentration of the observed radioactive materials at ground level can be derived from the increase in the gross γ count rate if one knows the source geometry. Since the data so strongly demonstrate that the increased activity is concentrated in or around the waterways the source geometry can be approximated by a ribbon-like shape of infinite length, whose width is approximately that of the creek or brook. From U. S. Geological Survey maps and aerial photographs the widths of the various waterways were determined to be about 25 ft for Frank's Creek, 100 ft for Buttermilk Creek, and 200 ft for Cattaraugas Creek. Over Frank's Creek the gross γ count rate increases were about 4000 cps, while over Buttermilk Creek they were as high as 5000 cps. (The background-radiation counting rate was ~2000 cps for the limited area surveys.) The increases over Cattaraugas Creek were only a few hundred cps and are discussed separately below.

The source dimensions, the increase in gross γ count rate, the effective initial γ-ray energy (0.66 MeV), and the equations in Appendix A were used to calculate the surface concentration of cesium to be about 70 $\mu Ci/m^2$ along Frank's Creek and as high as 20 $\mu Ci/m^2$ along Buttermilk Creek. If the radioactive material is assumed to be uniformly dissolved or suspended in the water the inferred volume concentrations of cesium are approximately 6×10^{-10} Ci/cc and 2×10^{-10} Ci/cc, respectively, as determined by dividing the surface concentrations by the 12-cm mean free path of a 0.66 MeV γ-ray in water.

The on-site measurements by the other investigators[5,6], however, showed a cesium concentration in Buttermilk Creek of about 1.0×10^{-13} Ci/cc, which is about three orders of magnitude lower than our inferred volume concentration. From this difference, we conclude that what we observe cannot be coming from radioactive material dissolved or suspended in the water.

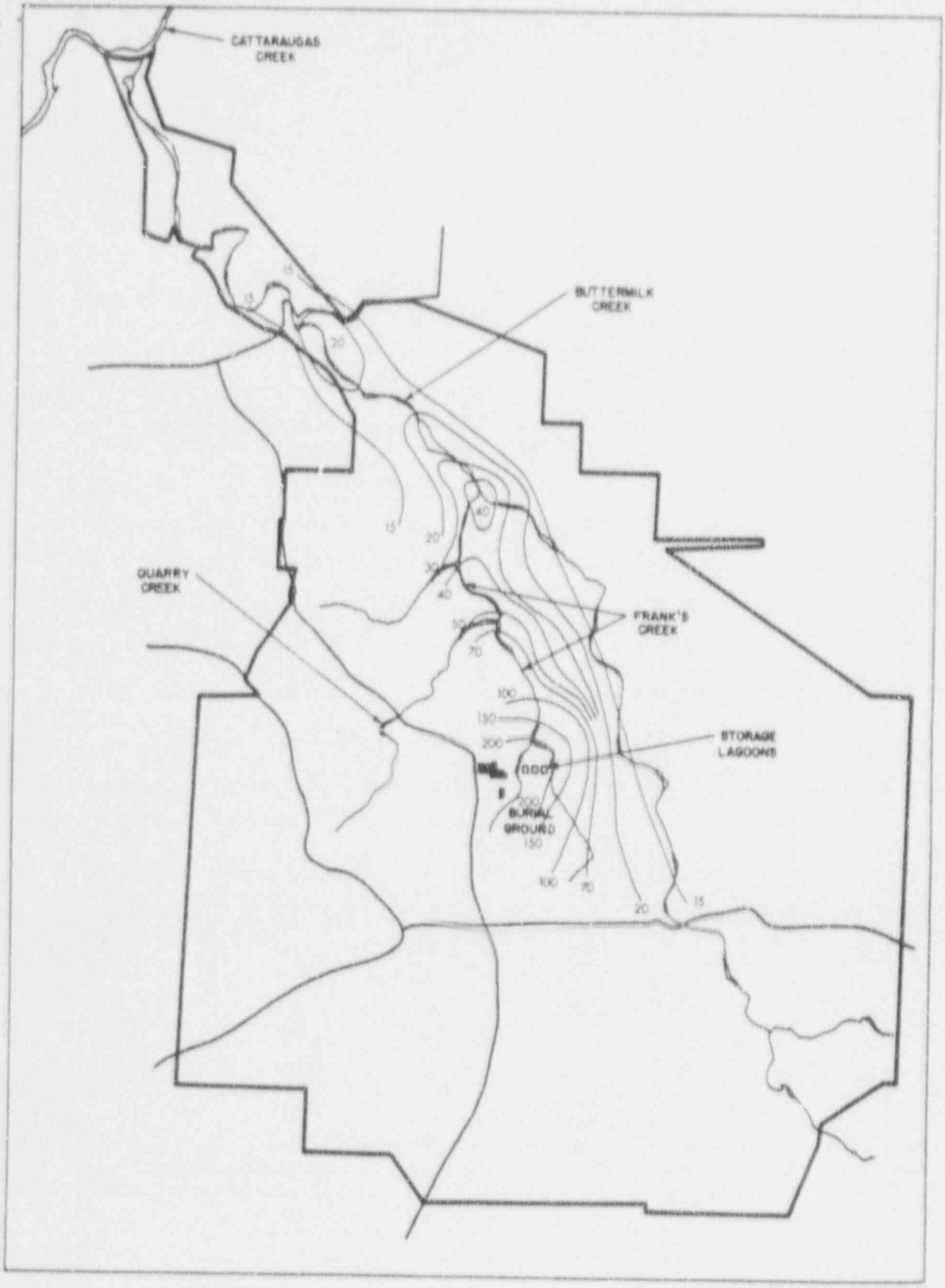

Fig. 4.1. Partial isoexposure contours derived from preliminary data of an ARMS survey flown in autumn 1970.