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September 22, 1982

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

Subject: Byron Station Units 1 and 2
Braidwood Station Units 1 and 2
Locked Rotor and Shaft Break
Transierts
NRC Docket Nos. 50-454, 50-455,
50-456, and 50-457

References (a): June 7, 1982, letter from
T. R. Tramm to H. R. Denton.

(b): July 20, 1982, letter from
T. R. Tramm to H. R. Denton.

Dear Mr. Denton:

This is to provide additional information regarding reactor coolant pump locked rotor and shaft break transients at Byron and Braidwood stations. Review of this information should close Confirmatory Issue 34 of the Byron SER.

References (a) and (b) provided our basis for concluding that the turbine trip associated with a locked rotor of broken shaft transient would not compromise the stability of the Commonwealth Edison grid. Reference (b) provided grid response predictions for unit trips at Byron and an actual grid response history for a trip of both Zion units. The grid response calculations have been repeated for Braidwood and are enclosed.

The computer simulation assumed a Braidwood unit tripped while carrying full load. A large model of the interconnected utility systems was used for the study. Only one Braidwood unit was assumed to be operating at the time of the trip. The transient response of the frequency and voltage at the Braidwood 345kV bus was obtained and is shown on the attached figures. The results indicate that the unit trip causes a relatively minor transient disturbance on the bulk power system. This is borne out by actual system operating experience where unit trips occur regularly with little impact on the electrical system.

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Figure 1 shows the calculated frequency transient at the Braidwood 345kV bus following the unit trip. The frequency initially drops rapidly to about 59.96 Hz due to the sudden overload on the system. The subsequent partial recovery of frequency up to one second can be attributed to some relief of the overload due to slightly reduced voltages. Beyond one second governor and tie-line frequency control actions will begin to come into effect to allow the frequency to recover to 60Hz. These control actions are not included in the computer model and the frequency beyond one second is shown dashed on the exhibit.

Figure 2 shows the calculated transient voltage at the Braidwood 345 kV bus following the unit trip. The maximum excursion is less than 3% and the voltage recovers in several seconds to a steady state value about 0.5% lower than that before the trip. The voltage recovery is due to the automatic regulator action of other units on the system.

Please direct further questions regarding this matter to this office.

One signed original and fifteen copies of this letter and the enclosed figures are provided for your review.

Very truly yours,

T. R. Tramm

T. R. Tramm
Nuclear Licensing Administrator

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Enclosure

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FIG. 1

FREQUENCY AT BRAIDWOOD 345 KV BUS
VS.
TIME FOR TRIP OF BRAIDWOOD UNIT

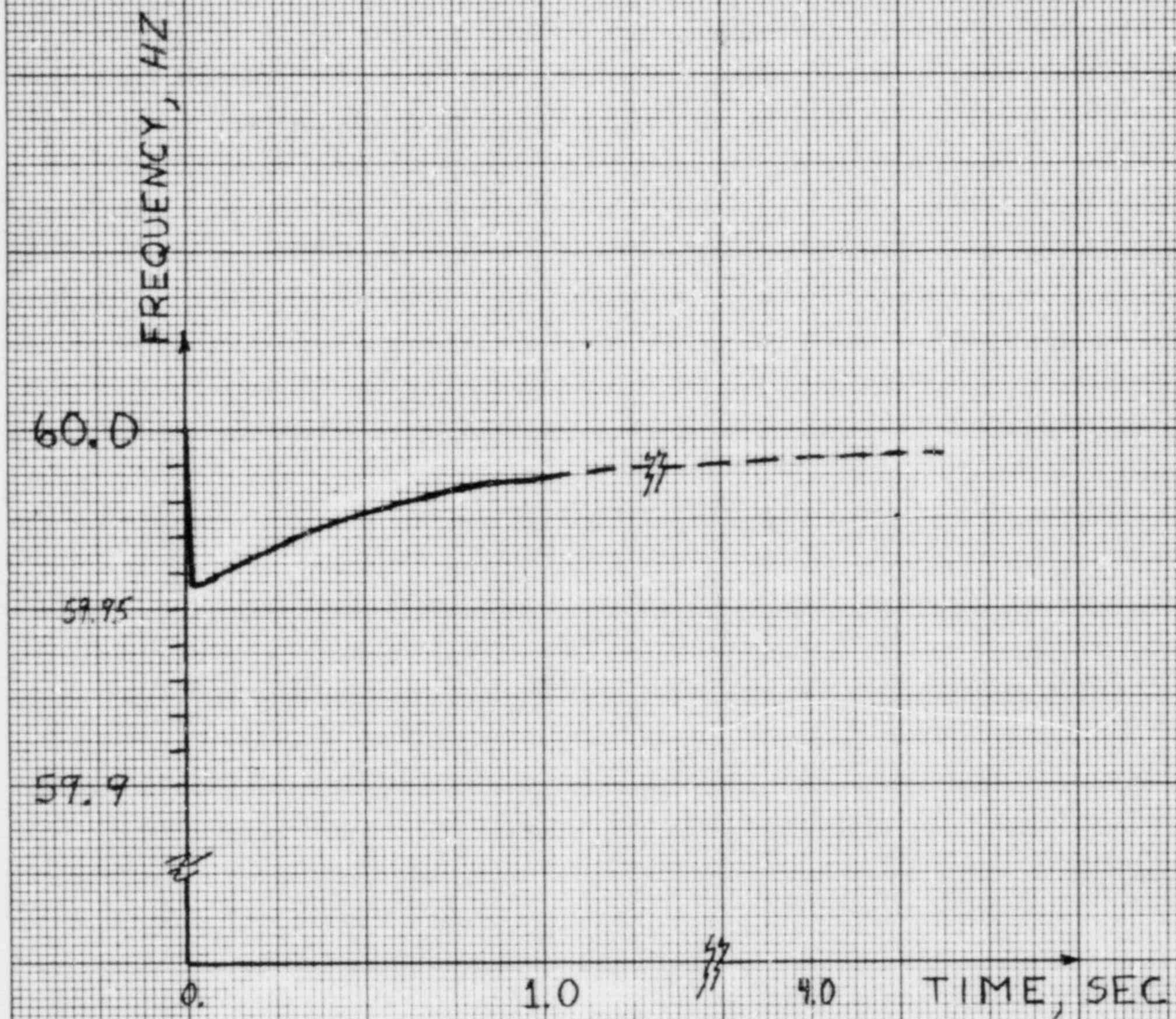

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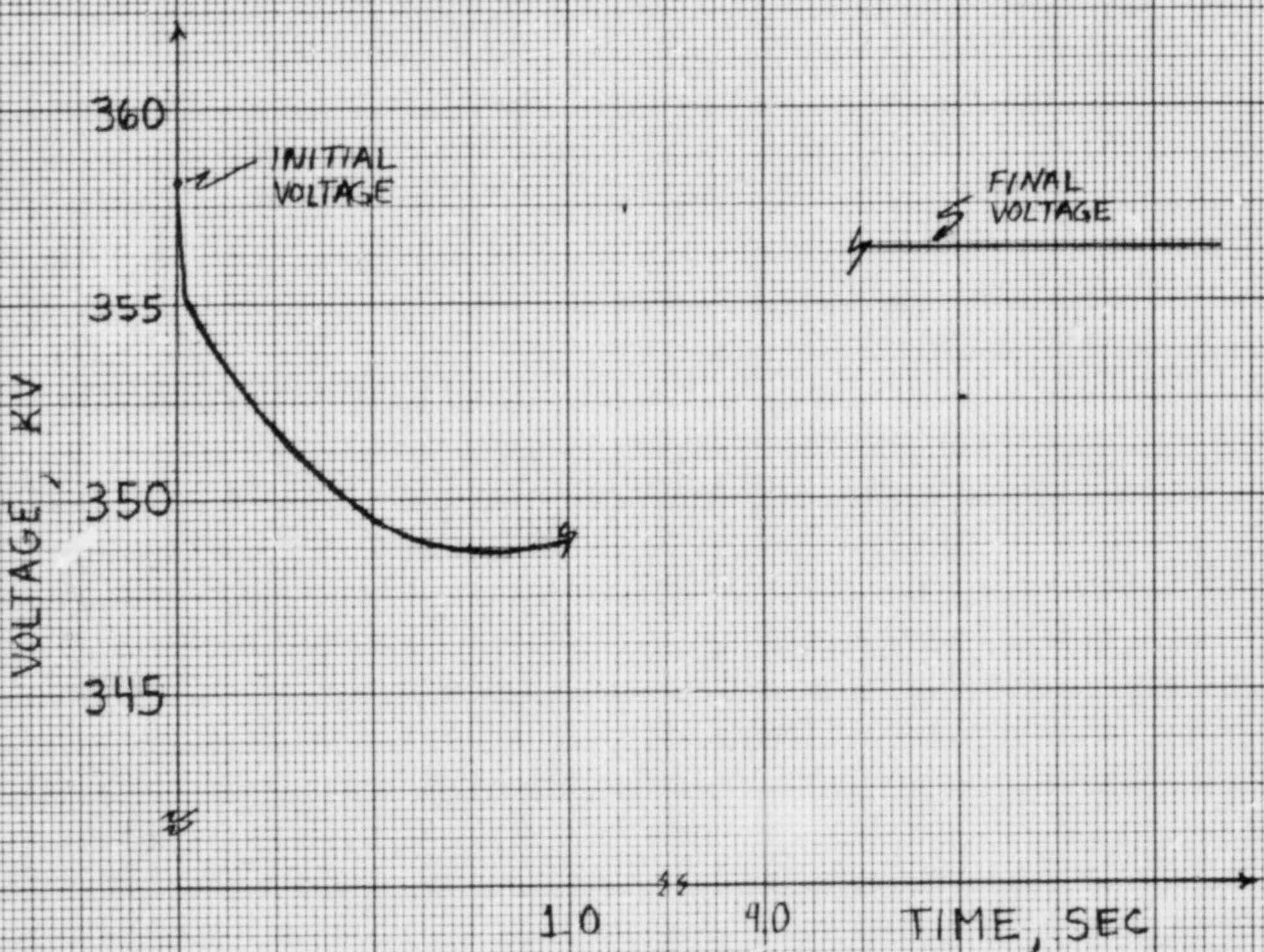
FIG. 2

VOLTAGE AT BRAIDWOOD
345 KV BUS VS. TIME
FOR TRIP OF BRAIDWOOD UNIT



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