Public Service Company of Colorado
5909 East 38th Avenue, Denver, Colorado, 80207

June 7, 1982
Fort St. Vrain
Unit No. 1
P-82184
FSV-13

Mr. George Kuzmycz, Project Manager
Special Projects Branch
Division of Project Management
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D.C. 20555

Docket No. 50-267

Subject: Electrical Power Systems

Reference: P-82169 (Brey to Kuzmycz dated May 28, 1982)

Dear Mr. Kuzmycz:

The purpose of this letter is as follows:

1) To supply ATTACHMENT 4 of P-82169

2) To provide an update to page 6 of P-82169, ATTACHMENT 2.

If you have any questions concerning this matter do not hesitate to call.

Very truly yours,

Lawrence Brey

H. L. Brey, Manager
Nuclear Engineering Division

HLB/MEN:pa

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ATTACHMENT 4

Documentation of Voltage Studies

The primary purpose of ATTACHMENT 4 is to document Voltage Studies performed on the electrical system of FSV. This attachment closely correlates with ATTACHMENT 2 previously provided by letter P-82169 dated May 28, 1982.

The following discussion provides clarification to ATTACHMENT 2 open items:

ITEM 1 - ATTACHMENT 2, Page 2 - Analytical Verification of the Capabilities of the Fort St. Vrain Distribution system When Powered from Offsite Sources:

Item 1 - PSC Discussion

Figures 5 and 6 provide data from the analytical studies for the high and low voltage situations.

ITEM 2 - ATTACHMENT 2, Page 4 - Assumptions Regarding Analysis:

Item 2 - PSC Discussion

1) Low grid and high grid situation were analyzed

2) Onsite power was assumed to be unavailable.

3) Starting of large non-safety related motor at low grid voltage was assumed.

4) Unit trip and unit startup were considered to represent identical load situations. (Because non-safety related equipment is being utilized for cooling during this hypothetical situation.

ITEM 3 - ATTACHMENT 2, Page 5

For each event analyzed, the maximum load necessitated by the event and the mode of operation of the plant at the time of the event should be assumed in addition to all loads caused by expected automatic actions and manual action permitted by administrative procedure.

Item 3 - PSC Discussion

For the low grid voltage case the manual starting of the 4500 HP Boiler Feedpump was assumed. Approximately the same loads will be in service regardless of whether the proposed start occurs during routine plant startup or if the start occurs following a unit trip.

ITEM 4 - ATTACHMENT 2 Page 6

The voltage analysis should include documentation for each condition analyzed of the voltage at the input and output of each transformer and at each intermediate bus between the connection to the offsite circuit and the terminals of each safety load.

Item 4 - PSC Discussion

Figures 5 and 6 provide this information for the safety-related buses. High and low voltage situations are presented.

CONCLUSIONS

Low Voltage Case

No equipment will be damaged or will fail to operate as a result of this hypothetical situation.

High Voltage Case

No equipment will be damaged or will fail to operate as a result of this hypothetical situation.

ATTACHMENT 4
P-82169

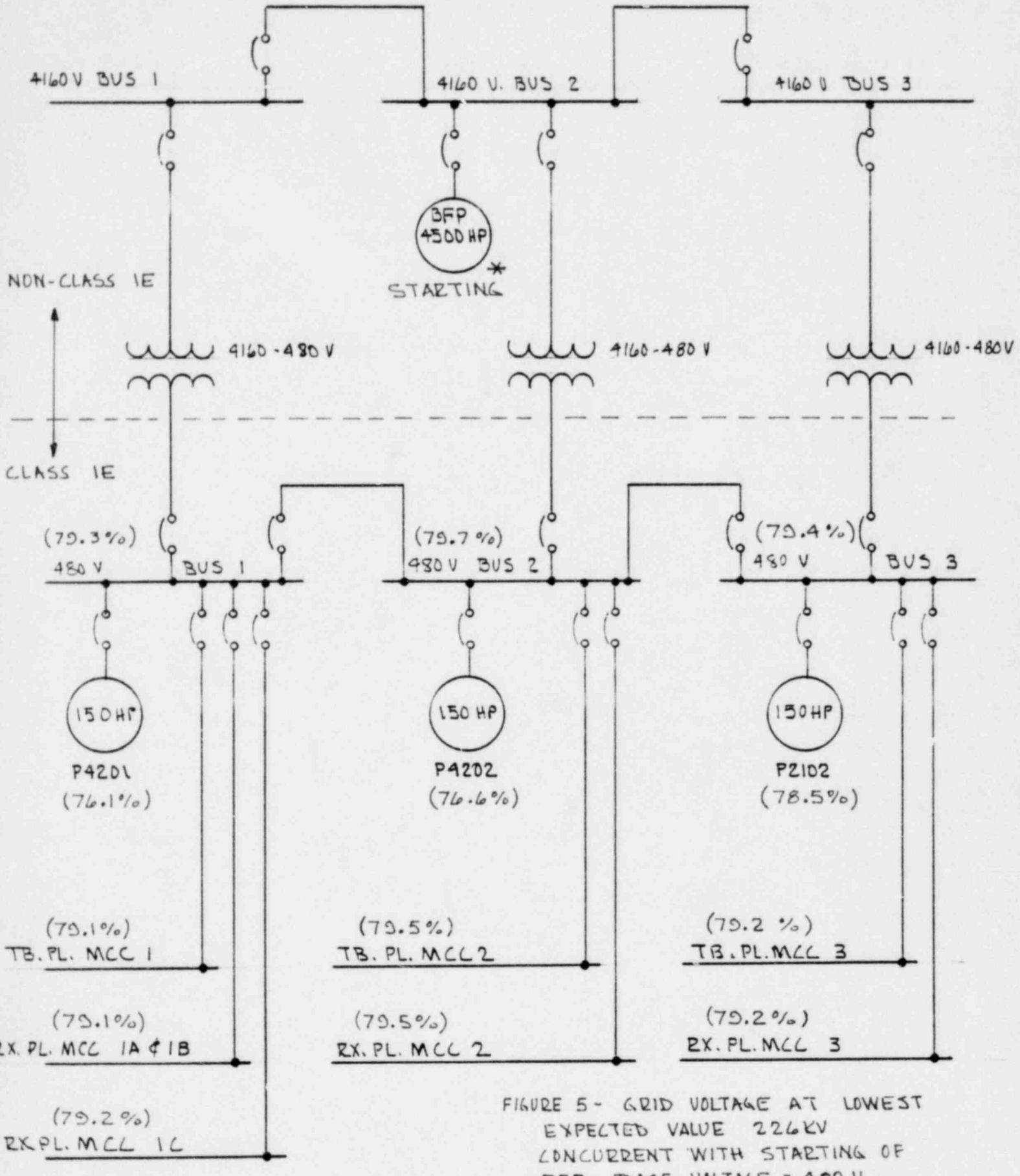

FIGURE 5 - GRID VOLTAGE AT LOWEST EXPECTED VALUE 226 KV CONCURRENT WITH STARTING OF BFP. BASE VOLTAGE = 480 V

* STARTING TIME APPROX. 5 SEC. VOLTAGE RECOVERS TO NORMAL AFTER THAT TIME PERIOD

ATTACHMENT 4
P82169

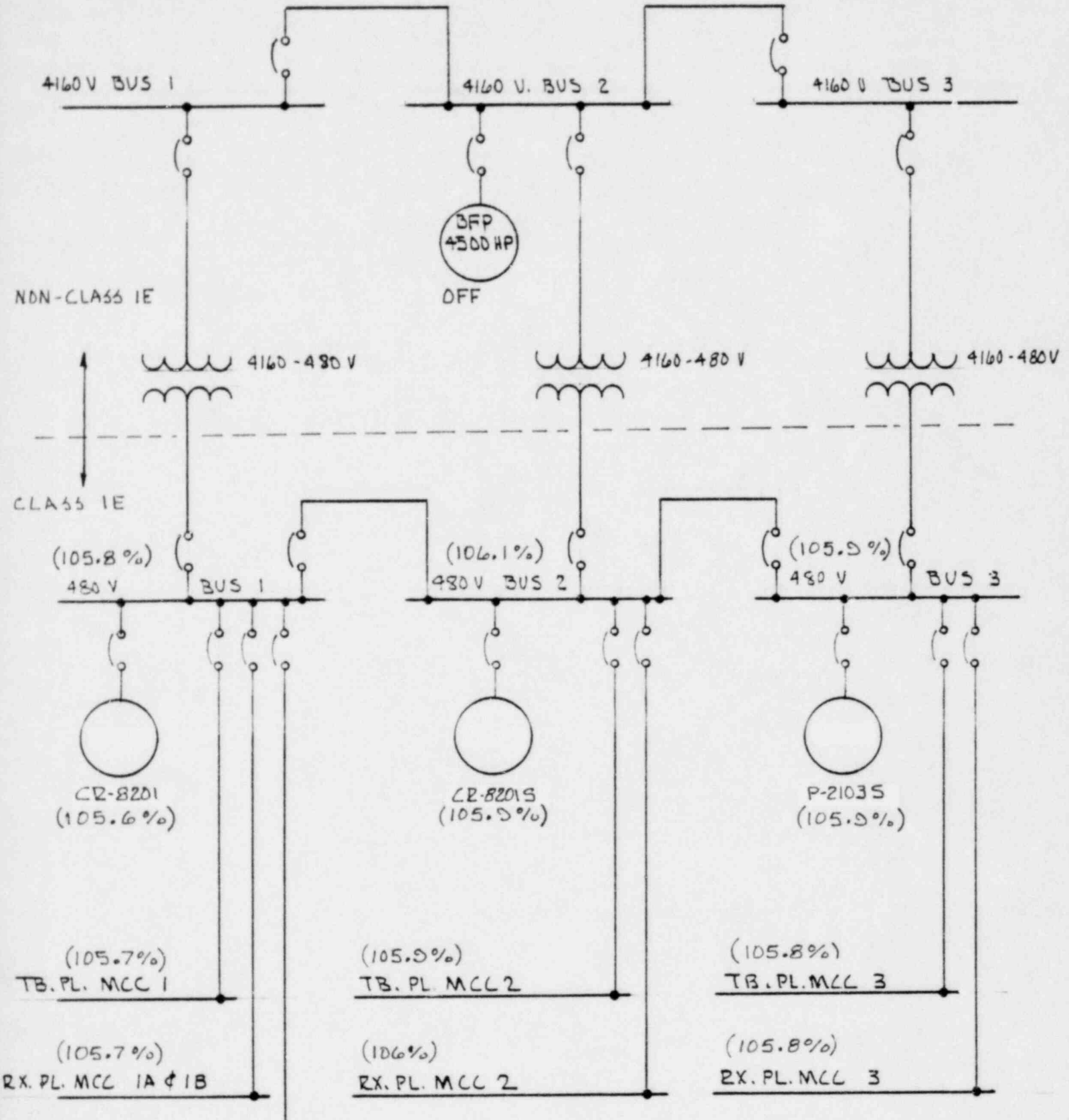

FIGURE 6 - GRID VOLTAGE AT HIGHEST EXPECTED VALUE 244 KV - MINIMAL PLANT LOADS OPERATING
BASE VOLTAGE = 480V.

NRC Guideline 6

The voltage at the terminals of each safety load should be calculated based on the above listed considerations and assumptions and based on the assumption that the grid voltage is at the "minimum expected value". The "minimum expected value" should be selected based on the least of the following:

a. The minimum steady-state voltage experienced at the connection to the offsite circuit.

b. The minimum voltage expected at the connection to the offsite circuit due to contingency plans which may result in reduced voltage from this grid.

c. The minimum predicted grid voltage from grid stability analysis. (e.g., load flow studies).

In the report to NRC on this matter the licensee should state planned actions, including any proposed "Limiting Conditions for Operation" for Technical Specifications, in response to experiencing voltage at the connection to the offsite circuit which is less than the "minimum expected value." A copy of the plant procedure in this regard should be provided.

PSC Discussion 6

The minimum expected grid voltage was based on the minimum experienced value.

NOMINAL GRID VOLTAGE	MAXIMUM EXPERIENCED GRID VOLTAGE	MINIMUM EXPERIENCED GRID VOLTAGE
230KV	244KV	226KV

As indicated previously, a draft Technical Specification, including LCO's will be submitted after it has received approval of the Fort St Vrain NFSC.

NRC Guideline 7

The voltage analysis should include documentation for each condition analyzed, of the voltage at the input and output of each transformer and at each intermediate bus between the connection to the offsite circuit and the terminals of each safety load.

PSC Discussion 7

The analysis is provided by ATTACHMENT 4.