ADDENDUM 1 TO:

ANALYSES

OF

THE ADEQUACY

OF THE

DAVIS-BESSE NUCLEAR POWER STATION

ONSITE ELECTRICAL

AUXILIARY DISTRIBUTION

POWER SYSTEM

VOLTAGES

Prepared
in
Response
to the
Nuclear Regulatory Commission
Request for Additional Information
of
November 14, 1980

December 30, 1980

Table of Contents

Responses	Questions 1, 2, 3
Appendix B	Case Numbering System (Revised 12/30/80)
Figure 1	Davis-Besse Nuclear Power Station Single Line Diagram
Figure 5 (Sheets 1, 2)	Davis-Besse Nuclear Power Station Graph of Safety Related 4160 V Bus Voltage Versus Case Numbers (Revised 12/30/80)
Figure 6 (Sheets 1, 2)	Davis-Besse Nuclear Power Station Graph of Safety Related 480 V Bus Voltage Versus Case Numbers (Revised 12/30/80)
Case Numbers: 11022, 11122, 11222	Graphs of Bus Voltage Versus Grid Voltage

Question 1: The intent of Guideline 3 (Ref. 1) is that the analysis should include the effects of starting large non-Class 1E loads under worst case conditions, including all Class 1E equipment running, and determine if all Class 1E equipment will operate within their required operating voltage range and that separation from offsite power sources will not occur due to operation of the undervoltage relays. In your analysis (Ref. 2), does the full auxiliary electrical load used in the analysis of starting the reactor coolant pump and condensate pump include fully loaded Class 1E buses? If not, you are requested to provide this analysis.

Response: The analyses sent in our October 9, 1979 letter did not include cases in which a reactor coolant pump or condensate pump was started with all Class 1E loads running. These cases are included herein and are numbered 11122 and 11222 (see revised Appendix B for explanation of case numbering). The onsite distribution conditions represented in case numbers with a 11... prefix were shown in the analyses to be the most severe for voltage drop.

Also included are the bus voltages for full load conditions plus fully loaded Class 1E buses (Case 11022).

The analyses show that the transient voltage dips caused by starting a reactor coolant pump or condensate pump do not fall below the voltage values needed by the Class 1E equipment to traverse the transient (see revised Figures 5 and 6). Class 1E equipment is not required to actuate during the transient since all Class 1E loads are running in these cases.

The steady state analysis (Case 11022) shows that the voltage on the Class 1E 4160V bus does not drop below the 90% relay setting during the worst operating conditions of full auxiliary load and full Class 1E load.

Question 2: The single line diagram included in Reference 2 does not indicate any non-Class 1E 4160 volt buses. However, Reference 2 states that the analyses were performed starting the largest 4.0 kV motor (condensate pump). What is the source of power for 4.0 kV condensate pump motor?

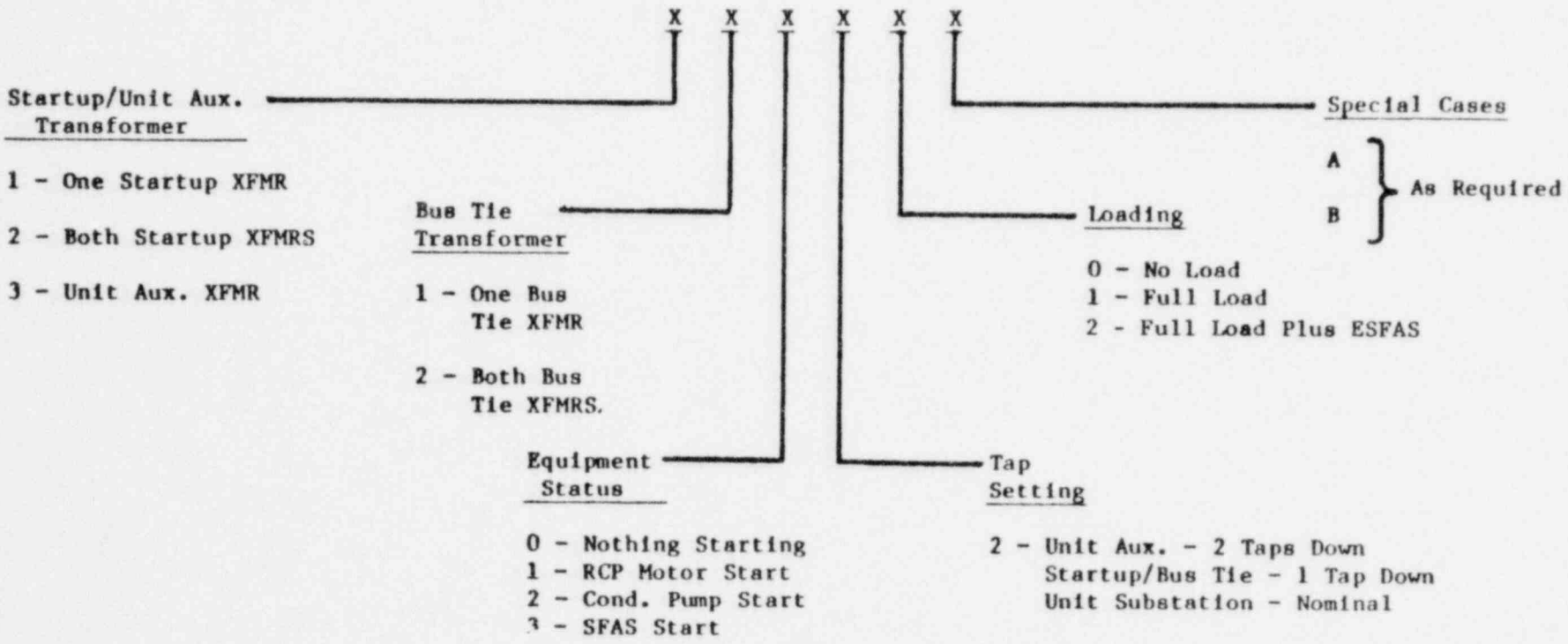
Response: On the single line diagram (Figure 1) included in our report, the non-Class 1E 4160 volt buses are numbered "C2" and "D2". Only the portion of the single line that is inside the dotted lines is Class 1E.

Question 3: The Guidelines (Ref. 1) request that the analyses include the voltages at the terminals of each safety load. You state that the analyses are a function of bus voltage, not motor base voltage. Provide equipment terminal voltages.

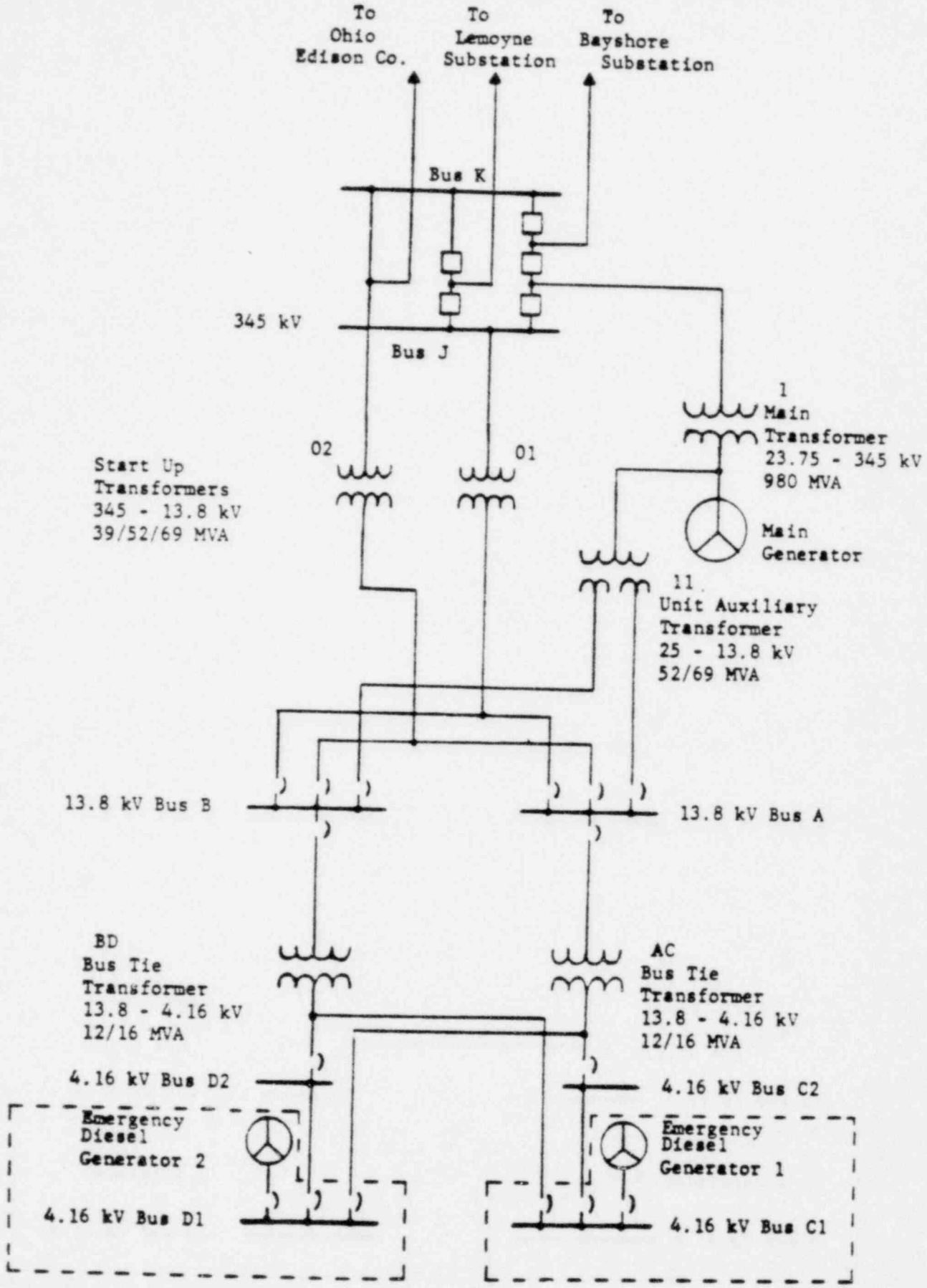
Response: The analyses were done based on the assumption that cable voltage drops are negligible. Therefore, equipment terminal voltage equals bus voltage.

APPENDIX B

CASE NUMBERING SYSTEM



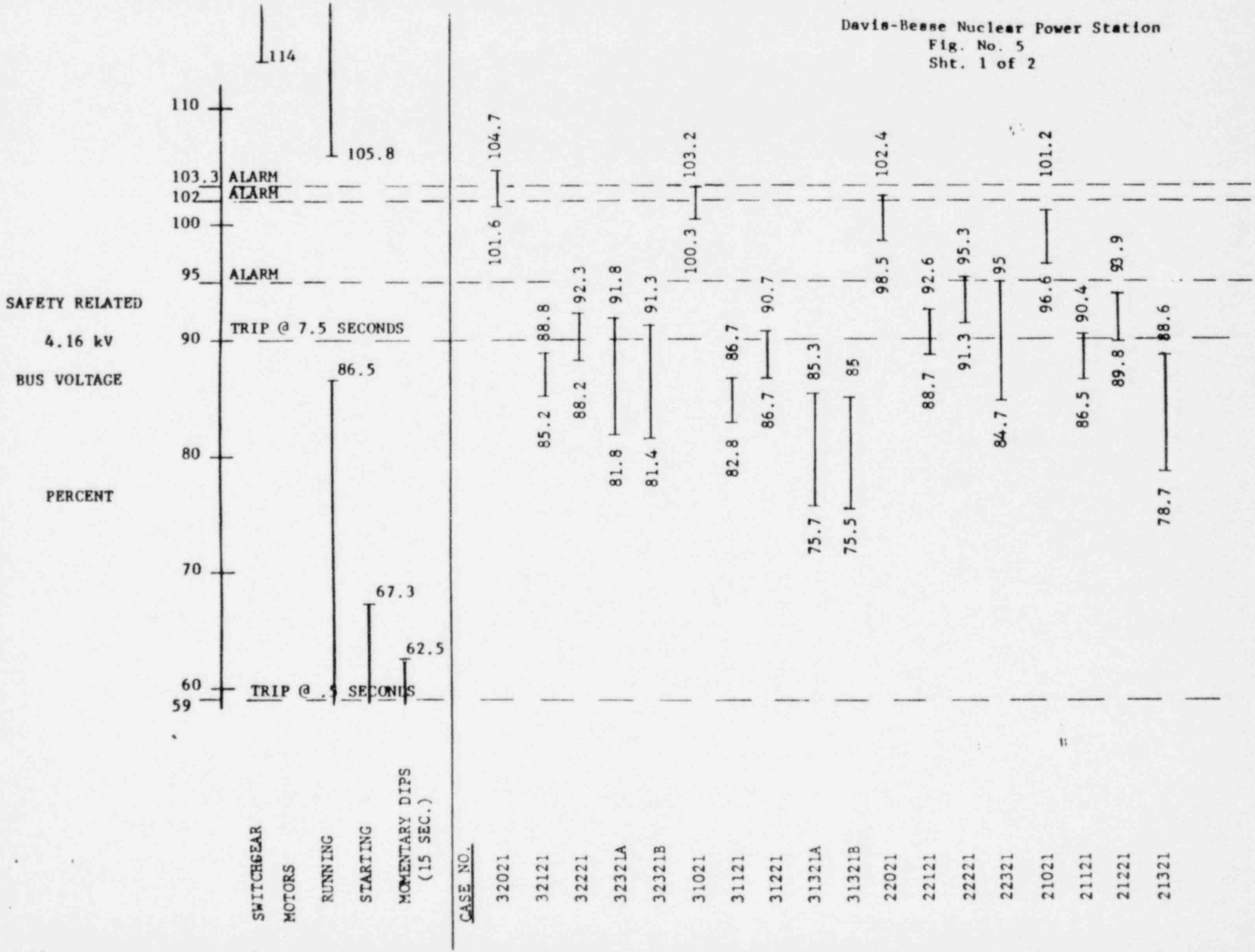
Revised 12/30/80



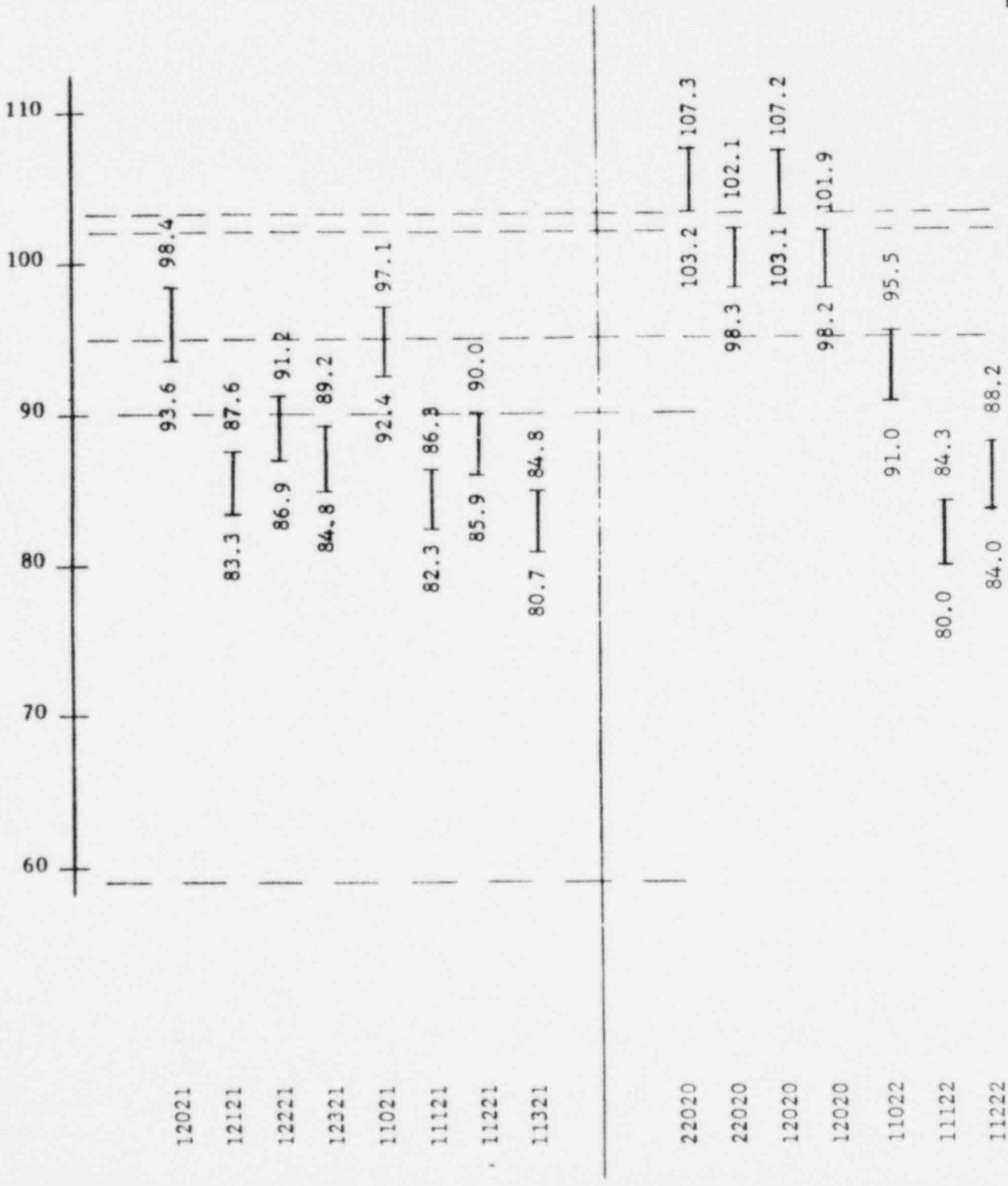
Davis-Besse Nuclear Power Station
Figure No. 1

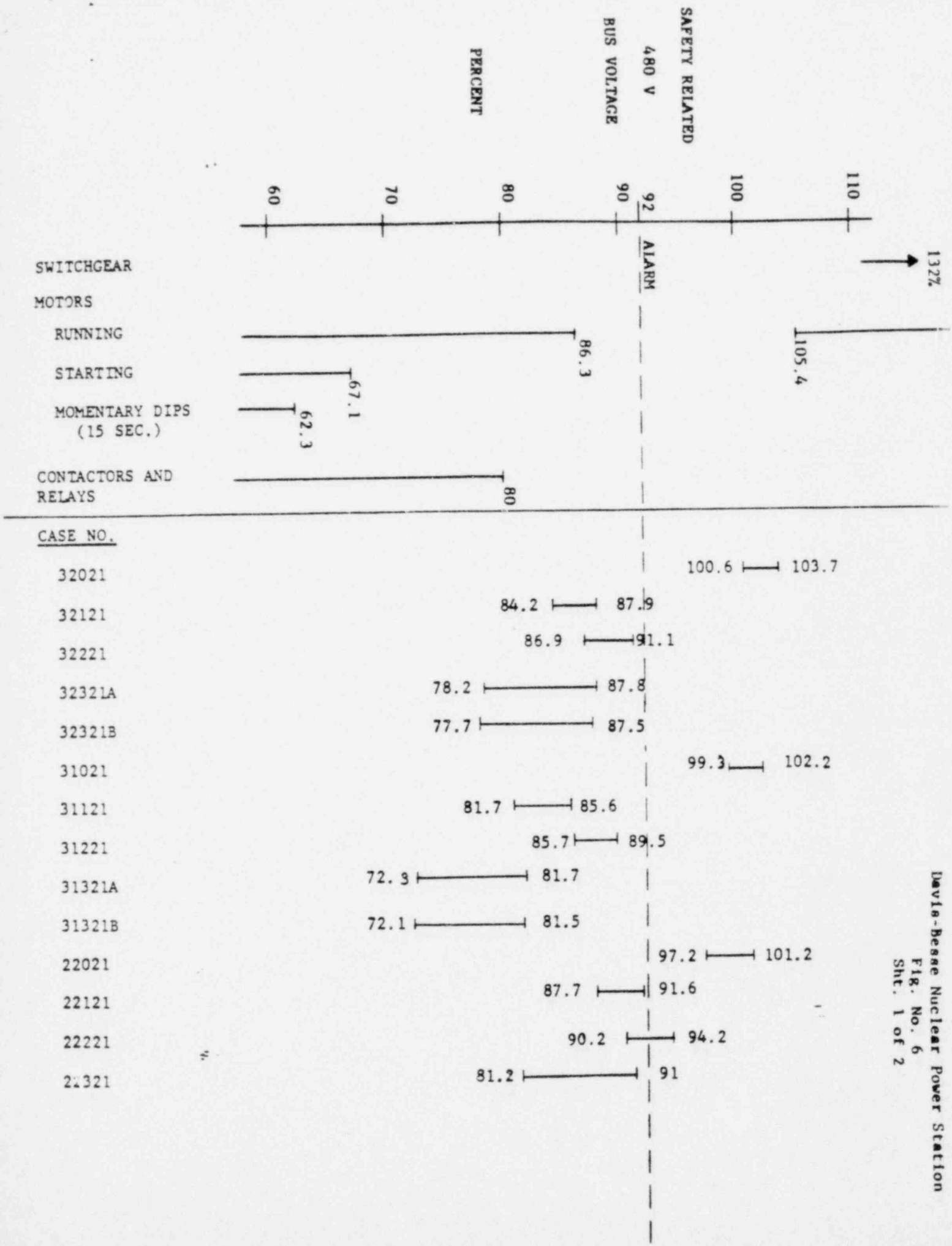
9-79

Davis-Besse Nuclear Power Station
Fig. No. 5
Sht. 1 of 2

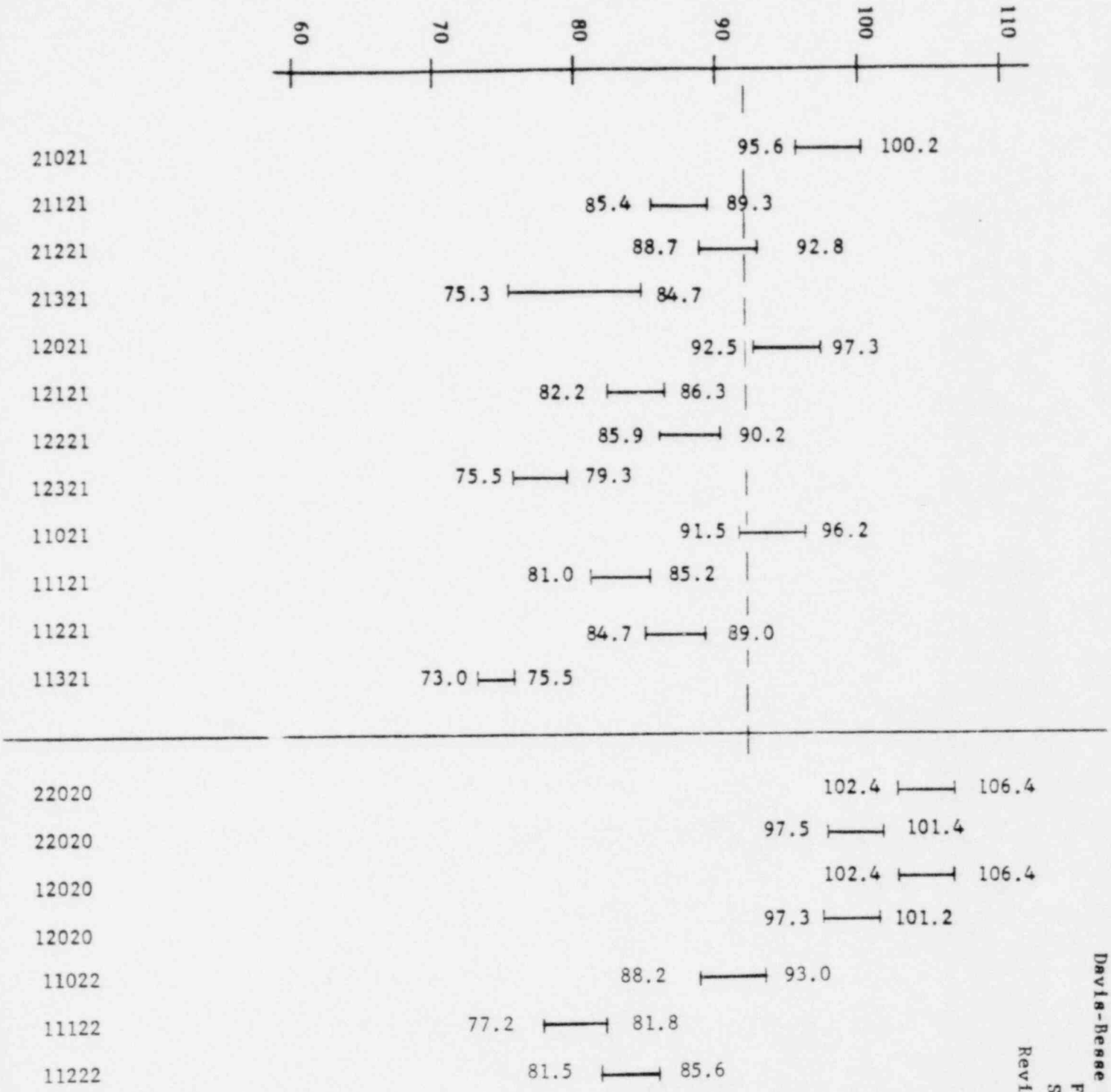


Davis-Besse Nuclear Power Station
Fig. No. 5
Sht. 2 of 2
Revised 12/30/80



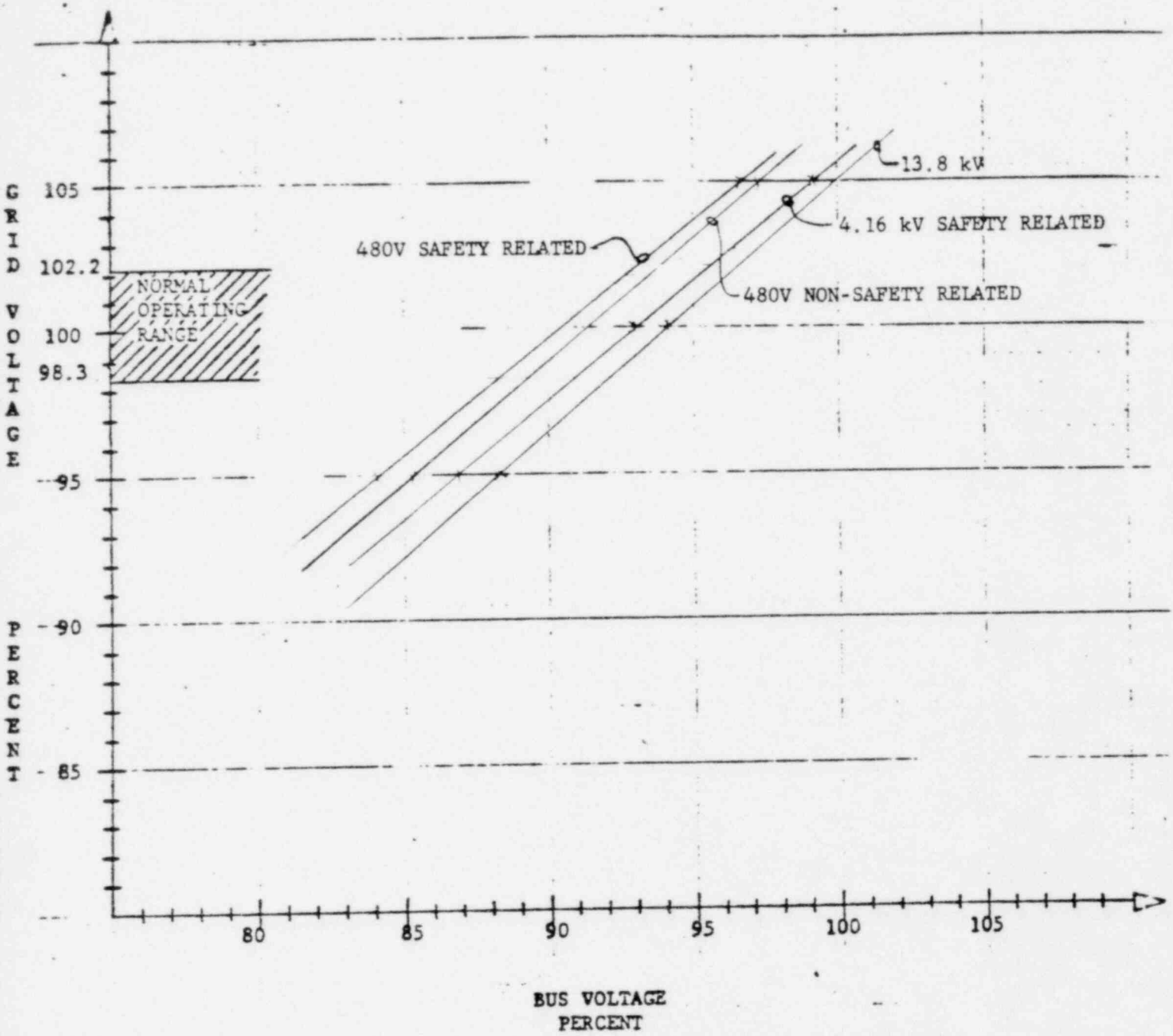


Davis-Besse Nuclear Power Station
Fig. No. 6
Sht. 1 of 2



Davis-Besse Nuclear Power Station
Fig. No. 6
Sht. 2 of 2
Revised 12/30/80

CASE NO. 11022



	TRANSFORMER TAPS	
NOM.	1 TAP DOWN	2 TAPS DOWN
UNIT AUX. START UP	N/A	
X01	X	
X02	N/A	
BUS TIE		
AC	X	
BD	N/A	
13.8 kV/480V	X	
4.16 kV/480V	X	

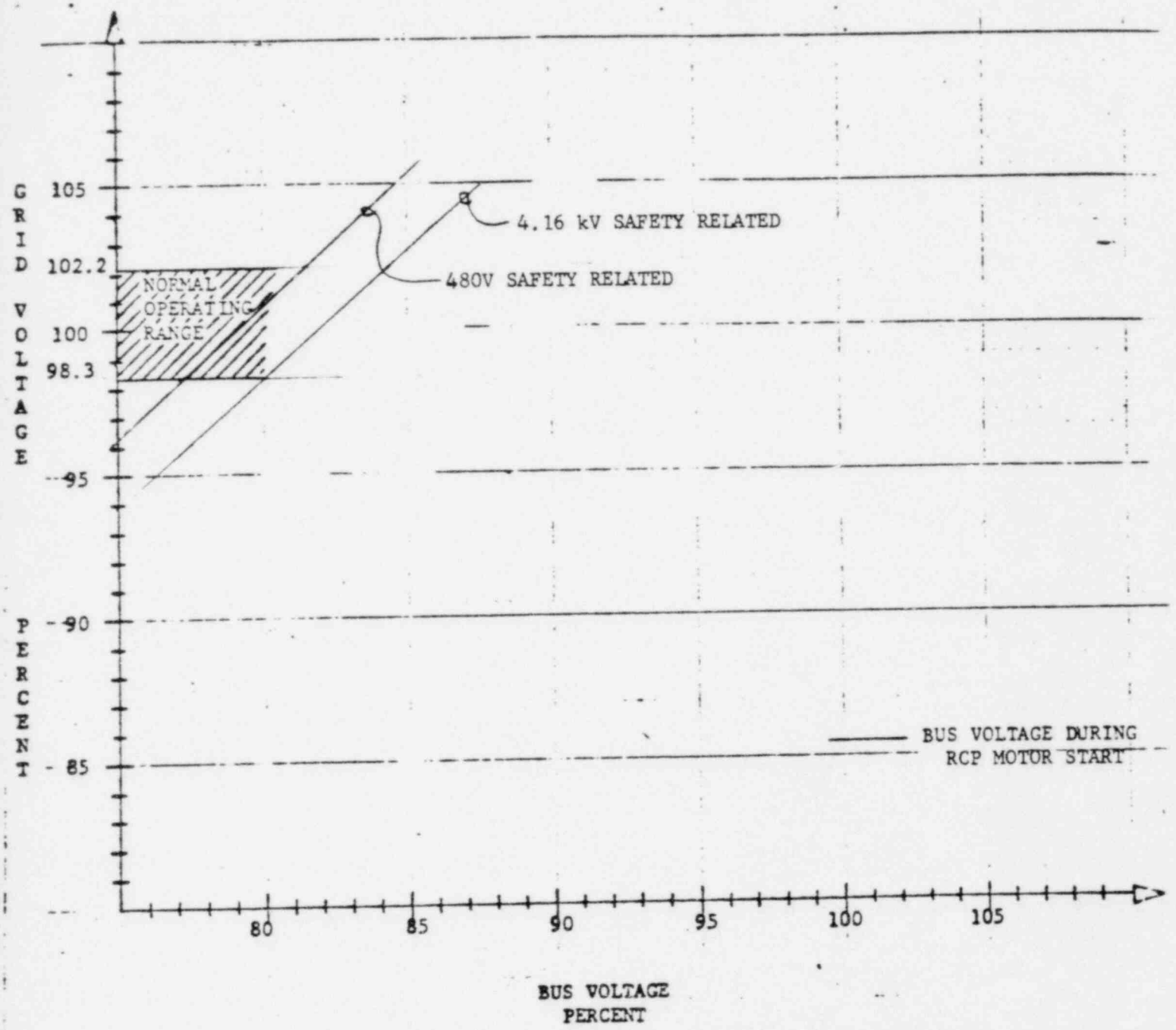
ELECTRICAL AUXILIARY LOAD CONDITIONS

- [X] FULL LOAD plus ESFAS
- [ ] NO LOAD

STARTING CONDITIONS

- [X] NONE
- [ ] REACTOR COOLANT PUMP
- [ ] CIRCULATING WATER PUMP
- [ ] CONDENSATE PUMP
- [ ] ESFAS

CASE NO. 11122



TRANSFORMER TAPS			
	NOM.	1 TAP DOWN	2 TAPS DOWN
UNIT AUX. START UP		N/A	
XO1		X	
XO2		N/A	
BUS TIE			
AC		X	
BD		N/A	
13.8 kV/480V	X		
4.16 kV/480V	X		

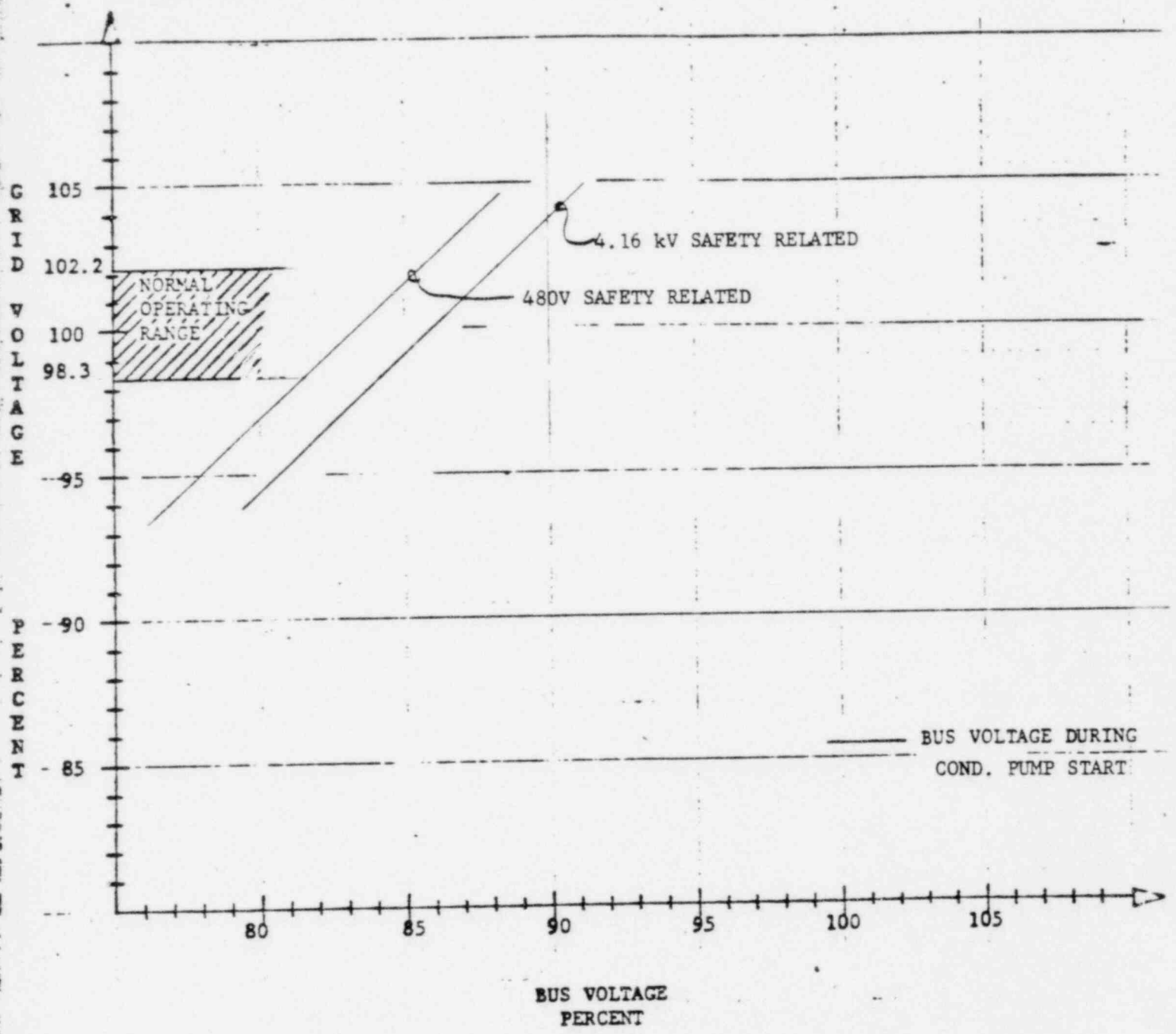
ELECTRICAL AUXILIARY LOAD CONDITIONS

- [X] FULL LOAD plus ESFAS
- [ ] NO LOAD

STARTING CONDITIONS

- [ ] NONE
- [X] REACTOR COOLANT PUMP
- [ ] CIRCULATING WATER PUMP
- [ ] CONDENSATE PUMP
- [ ] ESFAS

CASE NO. 11222



	TRANSFORMER TAPS	
	NOM.	1 TAP DOWN / 2 TAPS DOWN
UNIT AUX.		N/A
START UP		
X01		X
X02		N/A
BUS TIE		
AC		X
BD		N/A
13.8 kV/480V	X	
4.16 kV/480V	X	

ELECTRICAL AUXILIARY LOAD CONDITIONS

- [X] FULL LOAD plus ESFAS
- [ ] NO LOAD

STARTING CONDITIONS

- [ ] NONE
- [ ] REACTOR COOLANT PUMP
- [ ] CIRCULATING WATER PUMP
- [X] CONDENSATE PUMP
- [ ] ESFAS