William J. Cahill, Jr.
Vice President

Consolidated Edison Company of New York, Inc.
4 Irving Place, New York, N Y 10003
Telephone (212) 460-3819

August 29, 1977
Re: Indian Point Unit No. 3
Docket No. 50-286

Director of Nuclear Reactor Regulation
ATTN: Mr. Robert W. Reid, Chief
Operating Reactors Branch #4
Division of Operating Reactors
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Regulatory File Cy

Dear Mr. Reid:

As requested by your letter of June 3, 1977, we have compared the current design of the Indian Point Unit No. 3 emergency power system with the staff positions stated in the enclosure to your letter. A detailed analysis which shows our facility design has equivalent capabilities and protective features to those stated in staff positions 1 and 2 is attached.

It is anticipated that appropriate Technical Specification changes requested in your letter will be submitted to the Commission by September 15, 1977.

Should you or your staff have any further questions regarding the information presented in the attachment, we would be pleased to discuss them with you at your convenience.

Very truly yours,

William J. Cahill, Jr.
Vice President

Attachment

cc: Mr. George T. Berry
General Manager and Chief Engineer
Power Authority of the State of New York
10 Columbus Circle
New York, New York 10019

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ATTACHMENT A

INDIAN POINT NO. 3

POSITION 1 - Second Level of Under-or-Over Voltage Protection with a Time Delay.

Answer:

The existing facilities are more than adequate to maintain a reliable supply to the 480V safeguard system. Recent studies indicate that any possible degradation of offsite power sources would not result in failure of any required safeguard loads to perform their required functions. An additional level of automatic voltage protection for the onsite power system is therefore not justified.

The following is 1) a description of existing relays and standard operations performed and 2) a description of safeguard bus operation and worst case system degradation.

1. Each of the four (4) 6.9KV buses (1, 2, 3, & 4) normally fed from the generator output has an SV type instantaneous undervoltage relay set at 75% (5175V). Operation of any two of the four relays (when above 10% reactor power level) initiates a reactor scram after a 18 cycle delay. This will transfer buses 1 & 2 via bus 5 to the 138KV grid and buses 3 & 4 via bus 6 to the 138KV grid.

   In addition, each of the six (6) 6.9KV buses has a CV-7 inverse-time undervoltage relay set at 81% (5580V); with a minimum trip time (voltage declines to zero) of 31 seconds.

The CV-7 relay will automatically strip all associated loads on the 6.9KV bus including the station service transformer supplying the 480V safeguard bus (failure of any one relay would affect only its associated bus). The associated time delay is at least one order of magnitude longer than necessary to ride through transient grid disturbances.

Each of the four (4) 480V safeguard buses is equipped with CV-7 inverse-time undervoltage relays set at 46% (220V) which automatically strip their associated loads (except safeguard MCC36A, 36B & 36C) after a minimum delay of 120 cycles (voltage decline to zero). The above relays are used for starting the emergency diesel generators and sequencing required loads. Transient disturbances on the grid or the 6.9KV system (faults etc.) which will produce 480V bus voltages approaching zero will be cleared in less than 39 cycles.

This combination of relays provides complete independence between the functions of isolating safeguard buses from offsite power disturbances and tripping/ sequencing of all 480V safeguard loads.

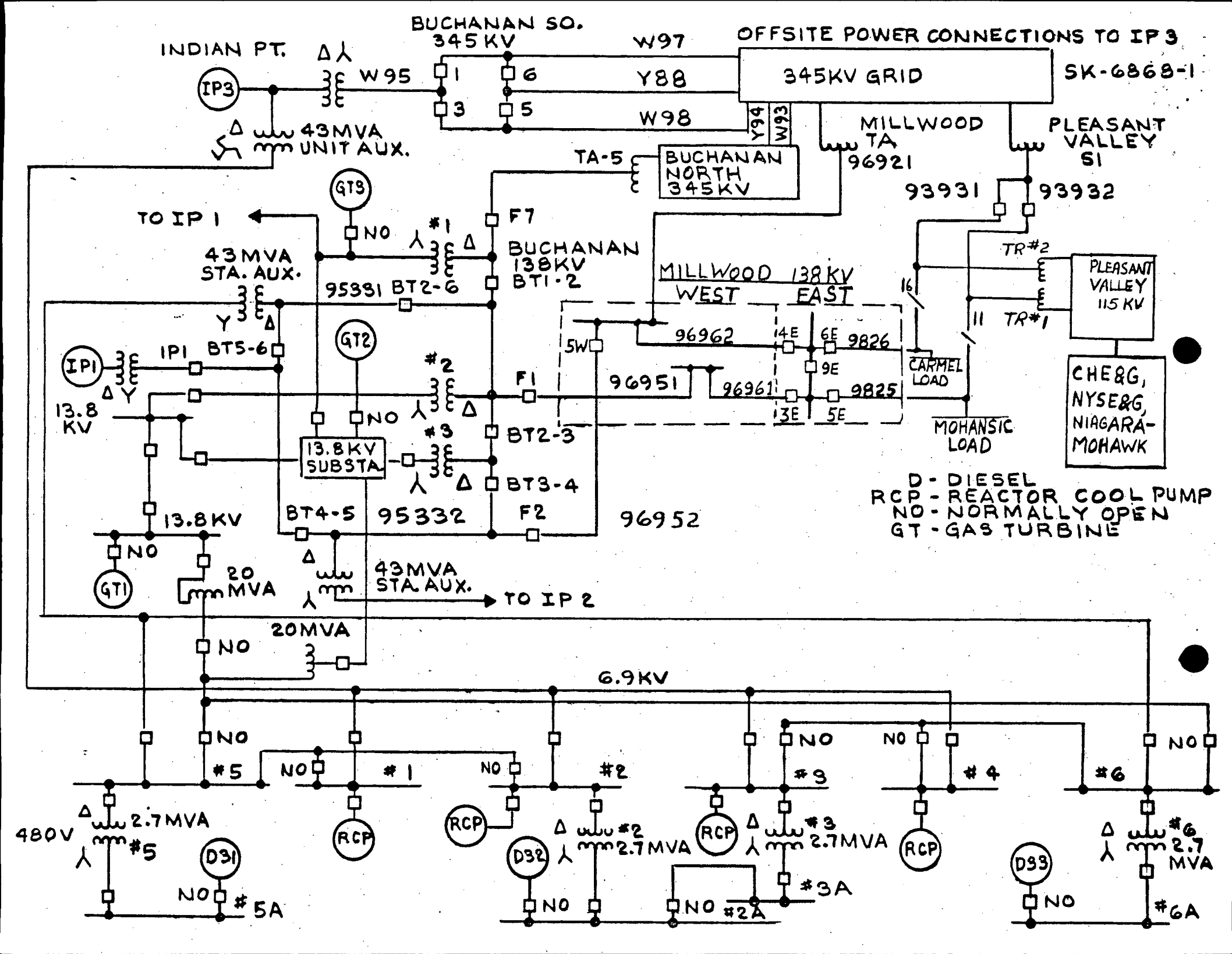
2. During normal plant operation, 480V safeguard buses #5A & #6A are supplied from the 138KV grid and in turn each supplies a 50% train of safety related equipment.

480V Safeguard buses #2A & #3A are normally supplied from the generator and in turn together supply a 50% train of safety related equipment (various offsite power source connections can be seen on the attached sketch SK-6868-1).

The worst generator terminal voltage degradation that will not cause a unit trip would result from large reactive power flow into the generator due to abnormally low generator excitation, such that conditions are just outside the loss-of-field relay trip characteristic. This condition will result in low voltage on the Buchanan 345KV S/S South bus (97% or 336KV). Buses #2A & #3A will be at 94%V or higher and buses #5A & #6A will be virtually normal.

The worst 138KV degradation would result if Buchanan 345/138KV transformer TA5 is lost coincident with loss of 138KV feeder 96962 and associated Millwood 345/138KV transformer TA. During this contingency the Buchanan 138KV offsite power supply bus will be supplied only from Pleasant Valley 345KV S/S (S1 transformer) and Pleasant Valley 115KV S/S (transformers 1 & 2) through 138KV feeder 96951.

The Buchanan S/S 345KV South bus voltage is calculated at 102% immediately after the contingency, but generator voltage regulator response will immediately restore voltage to normal. Under this condition the voltage on buses #2A & #3A are normal and buses #5A & #6A will be at 90% or higher.


OFFSITE POWER CONNECTIONS TO IP 3
SK-6868-1
INDIAN PT.
IP3
W95
BUCHANAN SO.
345 KV
W97
Y88
W98
345KV GRID
Y94
W93
43MVA
UNIT AUX.
TA-5
BUCHANAN
NORTH
345KV
MILLWOOD
TA
96921
PLEASANT
VALLEY
SI
93931
93932
GT3
TO IP 1
NO
#1
F7
BUCHANAN
138KV
BTI-2
43MVA
STA. AUX.
95331 BT2-6
MILLWOOD 138KV
WEST
EAST
TR#2
PLEASANT
VALLEY
115 KV
16
11
TR#1
96962
14E
6E
9826
5W
9E
96951
96961
9825
13E
5E
CARMEL
LOAD
MOHANSIC
LOAD
CHE&G,
NYSE&G,
NIAGARA-
MOHAWK
IP1
IP1
BT5-6
GT2
#2
F1
13.8
KV
NO
#3
13.8KV
SUBSTA.
BT2-3
BT3-4
13.8KV
BT4-5
95332
F2
96952
NO
GT1
20
MVA
43MVA
STA. AUX.
TO IP 2
20MVA
NO
6.9KV
NO
#5
NO
#1
NO
#2
NO
#3
NO
#4
NO
#6
480V
2.7MVA
#5
D31
RCP
RCP
D32
#2
2.7MVA
RCP
#3
2.7MVA
RCP
#6
2.7
MVA
NO
#5A
NO
NO
#2A
#3A
D33
NO
#6A
D - DIESEL
RCP - REACTOR COOL PUMP
NO - NORMALLY OPEN
GT - GAS TURBINE

POSITION 2 - Interaction of Onsite Power Sources with Load Shed Feature.

Answer:

The existing, 480 volt safeguards bus load shedding feature is triggered by undervoltage of the respective 480V safeguard bus, sensed by CV-7 inverse time undervoltage relays (set point 46% 220V) with a 120 cycle time delay (when voltage declines to zero). The CV-7 inverse-time undervoltage relays on the 480V buses sense loss of voltage and initiate diesel start and load shedding. They are set at minimum tap (55V) to provide maximum security against operation for transient disturbances.

Since this relay has a nominal dropout of 46% voltage it is not affected by motor starting dips. Therefore, load shedding will not occur with a diesel connected to its 480V bus.

The Diesel Generators contain internal protection circuits which will isolate the respective diesel on sustained undervoltage (75% nominal 360V, for 540 cycles), while an automatic governor acts to restore the engine speed as load is supplied, thus insuring no undervoltage condition. The functional operation of the diesel has been demonstrated by the monthly testing of the Safeguard Diesels, as required by the Technical Specification. Based on the above descriptions the existing automatic load shedding feature meets the intent of the position 2. requirements.