

REGULATORY INFORMATION DISTRIBUTION SYSTEM (RIDS)

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 VASSALLO, D.B. Operating Reactors Branch 2

SUBJECT: Forwards evaluation of station electric distribution design of offsite electric power sys. Results of evaluation conclude that intent of Commission regulations met & present design acceptable. No further action planned.

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 AUTHOR AFFILIATION
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 Operating Reactors Branch 2

SUBJECT: Forwards evaluation of station electric distribution design
 of offsite electric power sys. Results of evaluation conclude
 that intent of Commission regulations met & present design
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December 22, 1983

Director of Nuclear Reactor Regulation
Attention: Mr. Domenic B. Vassallo, Chief
Operating Reactors Branch No. 2
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Re: Nine Mile Point Unit 1
Docket No. 50-220
DPR-63

Dear Mr. Vassallo:

Our letter of November 16, 1983 stated that Niagara Mohawk would perform an evaluation of the design of the Nine Mile Point Unit 1 115KV switchyard. The evaluation is attached. The results of our evaluation conclude that the intent of the Commission's regulations are met and the present design has the capacity, capability and reliability to protect the public health and safety. Therefore, no further action is planned at this time.

Very truly yours,

NIAGARA MOHAWK POWER CORPORATION

C. V. Mangan

C. V. Mangan
Vice President
Nuclear Engineering and Licensing

CVM/PAM:djm
Attachment

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STATION ELECTRIC DISTRIBUTION
DESIGN OF OFF SITE ELECTRIC POWER SYSTEM

NINE MILE POINT UNIT 1
SCRIBA, NEW YORK

NIAGARA MOHAWK POWER CORPORATION
SYRACUSE, NEW YORK



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NINE MILE POINT UNIT 1 STATION ELECTRIC DISTRIBUTION DESIGN OF OFF SITE ELECTRIC POWER SYSTEM

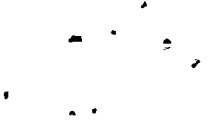
INTRODUCTION

Discussions with members of the U.S. Nuclear Regulatory Commission staff raised an issue regarding the design of the Nine Mile Point Unit 1 off site power system with respect to General Design Criterion 17, "Electric Power Systems", of the Commission's regulations. Niagara Mohawk Power Corporation has subsequently investigated this issue and concluded that the present design meets the intent of General Design Criterion 17. The present design, while not meeting a strict interpretation of General Design Criterion 17, provides the highest degree of reliability short of prohibitively expensive modifications.

DISCUSSION

Niagara Mohawk Power Corporation has completed a study comparing the design of the Nine Mile Point Unit 1 off site power system to General Design Criterion 17, "Electric Power Systems", of the Commission's regulations. This study involved a review of applicable regulations, a failure modes and effects analysis, a subject search of off site power system's components and an investigation into alternative designs. The results of this study concluded that the present design meets the intent of the Commission's regulations and provides the most reliable system short of a complete redesign of the Nine Mile Point Unit 1 and James A. Fitzpatrick off site power systems.

A review of General Design Criterion 17 concluded that while a strict interpretation of the regulation is not met, the intent is. The present design of the Nine Mile Point Unit 1 off site power system meets the stated safety function. This function is "to provide sufficient capacity and capability to assure that (1) specified acceptable fuel design limits and design conditions of the reactor coolant pressure boundary are not exceeded as a result of anticipated operational occurrences and (2) the core is cooled and containment integrity and other vital functions are maintained in the event of postulated accidents." The portion of the regulation that is not strictly met is the requirement for two physically independent circuits. As illustrated in Figure 1, the two Nine Mile Point Unit 1 off site power circuits are independent up to the 115 KV switchyard and from this switchyard to the station distribution network. In the 115 KV switchyard, however, both circuits are connected to a common bus which compromises their physical independence. The present design does utilize a motor operated bus disconnect switch which automatically opens to provide physical independence in the event that it is required. Therefore, while the 115KV switchyard bus does not strictly conform to the regulations, the automatically actuated motor operated bus disconnect switch provides the mechanism to meet the intent.



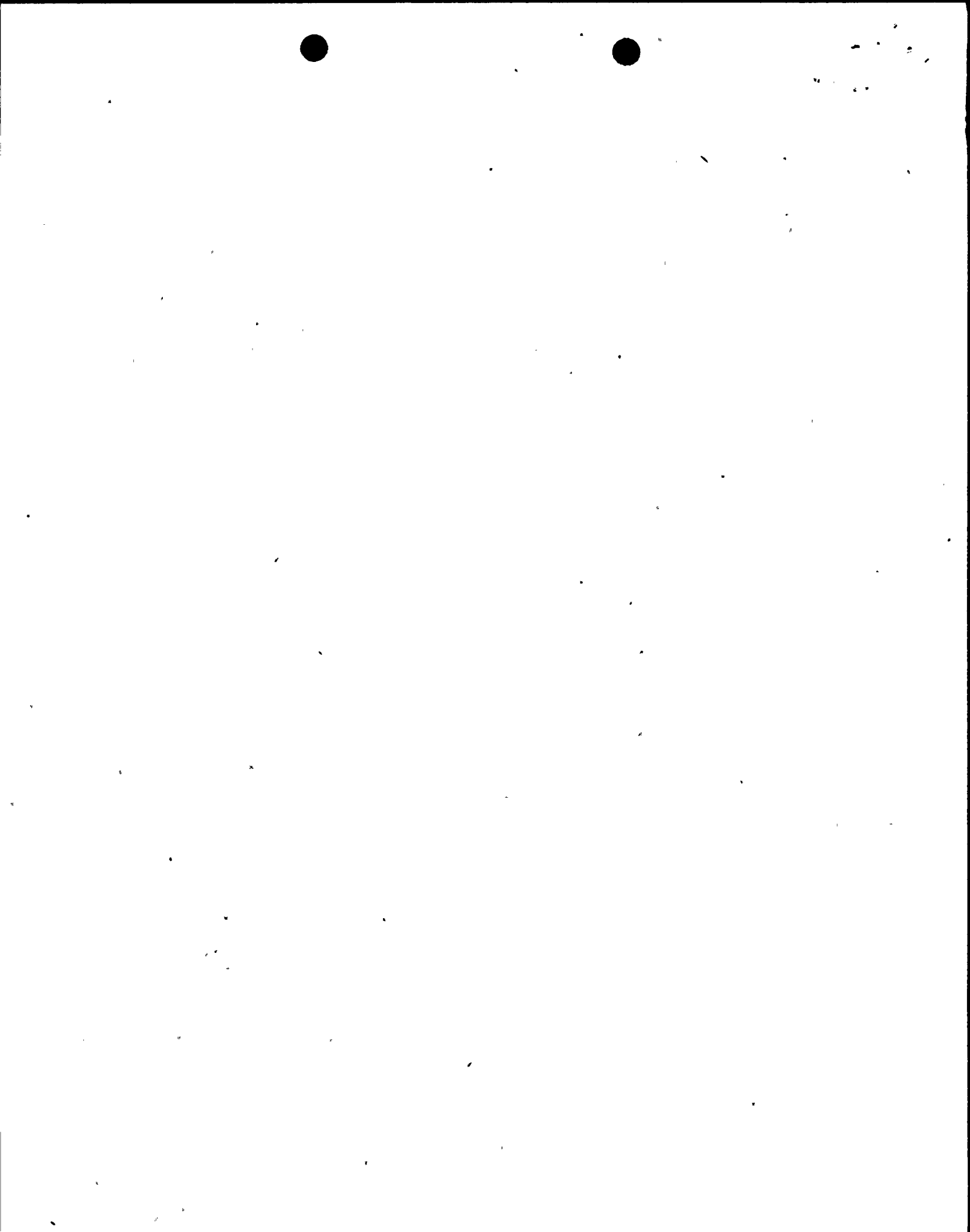
DISCUSSION (Continued)

The requirement for two physically independent circuits is to ensure that a permanent fault in one circuit will not disable both. In order to determine if this intent is met, a review of a failure modes and effects analysis was performed. Section IX, "Electrical Systems", of the Nine Mile Point Unit 1 Final Safety Analysis Report includes an analysis of all failure modes of the 115 KV system and their effects. There are only two situations in which the motor operated bus disconnect switch is required to automatically open. These situations involve a permanent bus fault or a permanent line fault in conjunction with a breaker failure. The likelihood of either of these situations occurring is extremely small due to the number of events involved. In either case, a failure of this switch to open would result in the loss of off site power. While this event is not desirable, it can be tolerated. The design of the Nine Mile Point Unit 1 station can withstand the loss of off site power and maintain the necessary protection of public health and safety.

To protect against a loss of off site power for the situations described above, a redundant means of opening the bus disconnect switch is available. A hand crank is provided in the design of the switch in order to manually open it. Also, since the 115 KV switchyard is readily accessible from within the protected area, the bus disconnect switch could be manually opened within a short time period. Therefore, in the unlikely event that the bus disconnect switch failed to automatically open, it could be opened manually and off site power restored in a time frame necessary to protect public health and safety.

As a further review, Niagara Mohawk researched the operational history of motor operated bus disconnect switches. The information obtained indicated that this component is very reliable. Niagara Mohawk conducted an industry survey and had discussions with the disconnect switch manufacturer. Both of these sources stated that there have been very few, if any, operational problems.

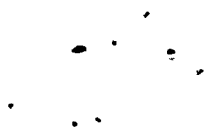
As the final part of the study, Niagara Mohawk investigated possible modifications to the present design. Figures 2 and 3 illustrate the two designs which involve the least modification and expense. While each design would conform to a strict interpretation of General Design Criterion 17, they would be more susceptible to disabling events and result in greater adverse consequences. For example, each alternative design requires additional transmission cable length, making them more susceptible to disabling events. Also, in both designs there are locations in which both circuits would have to share a common tower and one where the circuits would cross each other. At these locations, the greatest potential exists for both circuits to be lost by a single event. In addition, each alternate design introduces locations in which, if a double circuit failure occurred, all off site power to both Nine Mile Point Unit 1 and the James A. Fitzpatrick station would be lost. With the present design, a double circuit failure at any location would only result in the loss of one off site power source to each station. Therefore, without completely redesigning the off site power systems at Nine Mile Point Unit 1 and the James A. Fitzpatrick station, the present design cannot be modified to provide strict compliance to General Design Criterion 17 and provide the same degree of reliability.

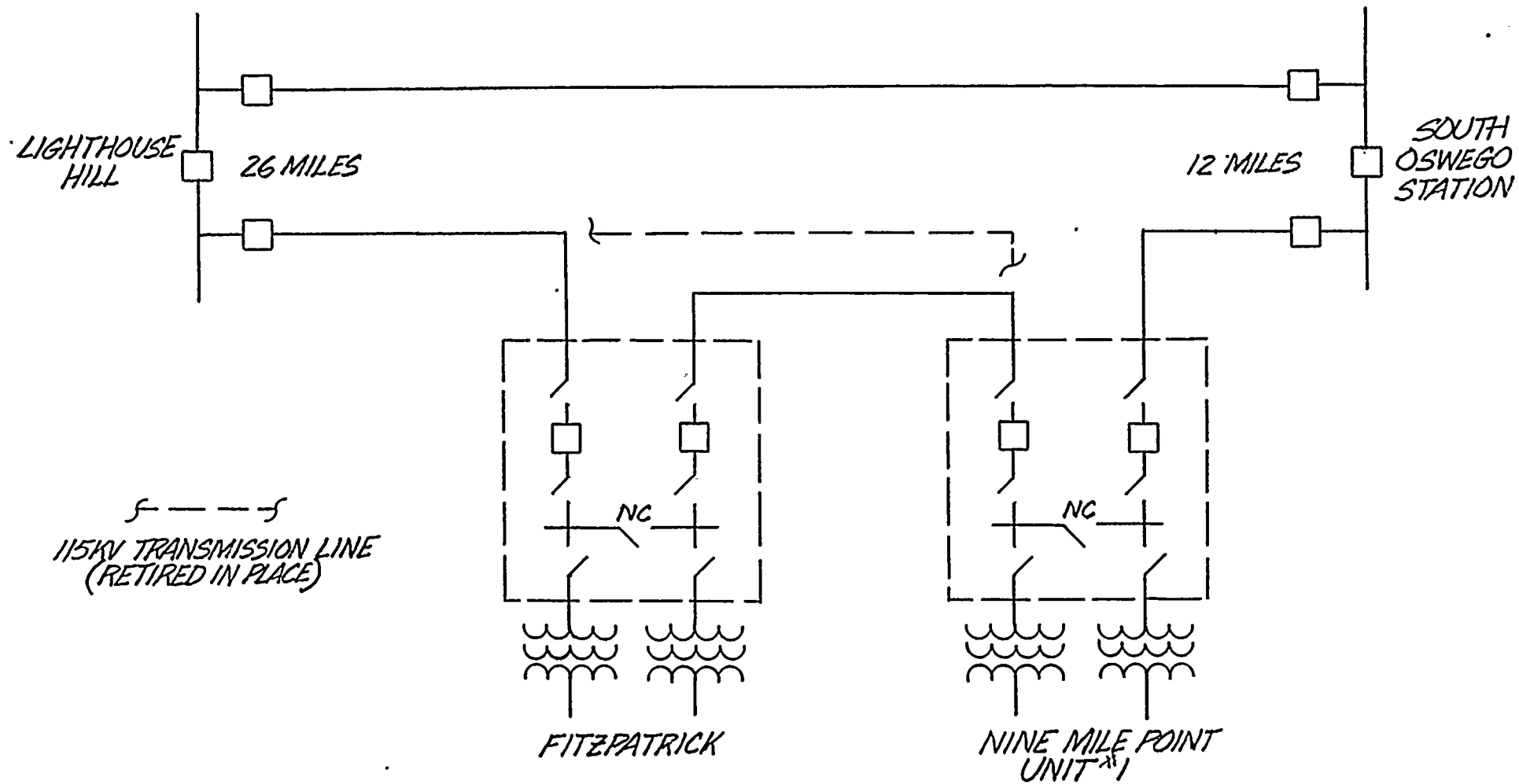


CONCLUSION

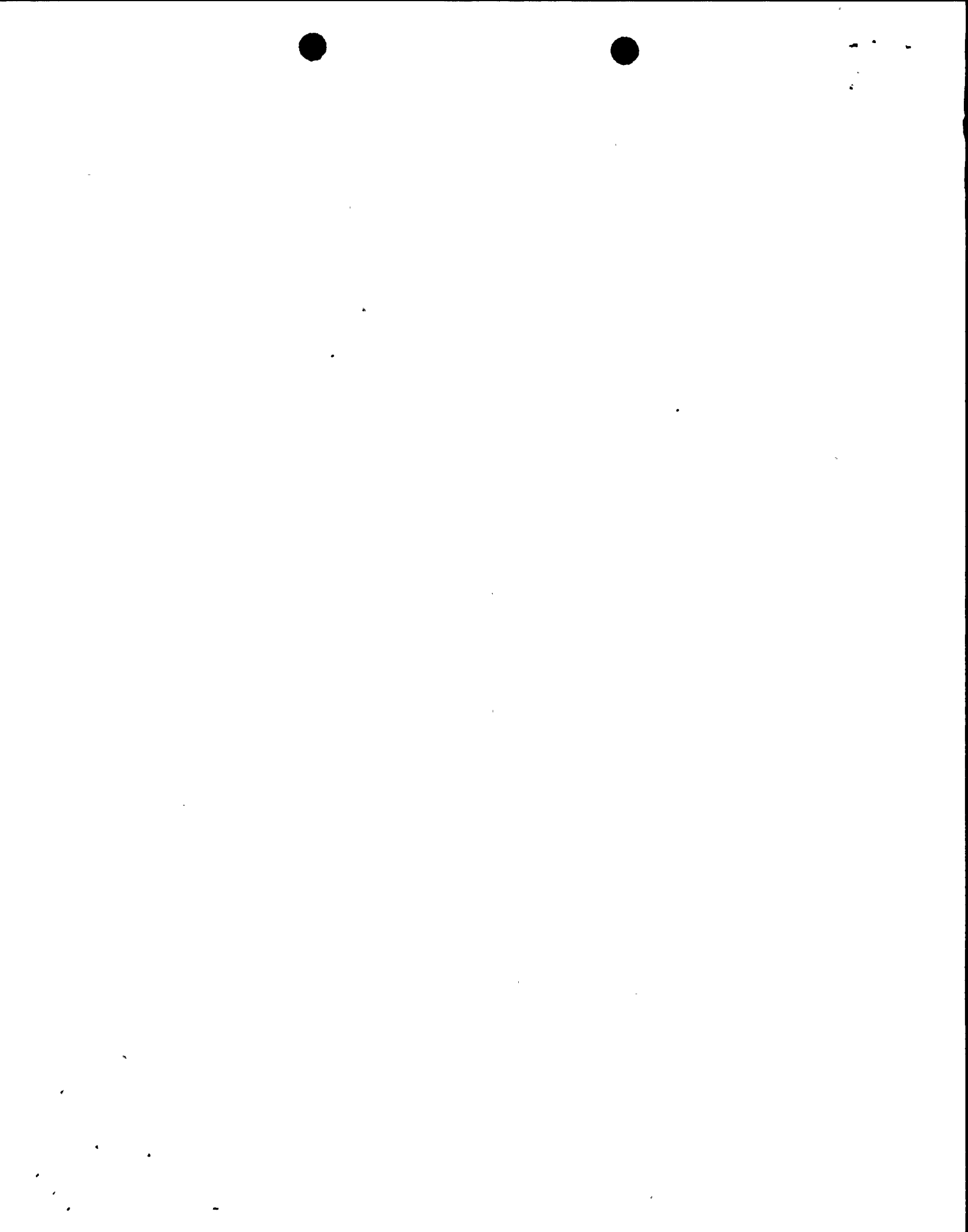
As discussed above, the present design of the Nine Mile Point Unit 1 off site power system is the most reliable short of a prohibitively expensive redesign. The safety function and physical independence intent of General Design Criterion 17 of the Commission's regulations are met. The present design contains redundant mechanisms to provide physical independence for those rare situations when it is required. Also, possible modifications to the present off site power system which would provide strict conformance to the regulations and be feasible, result in a configuration that is more susceptible to interruption and has more adverse consequence.

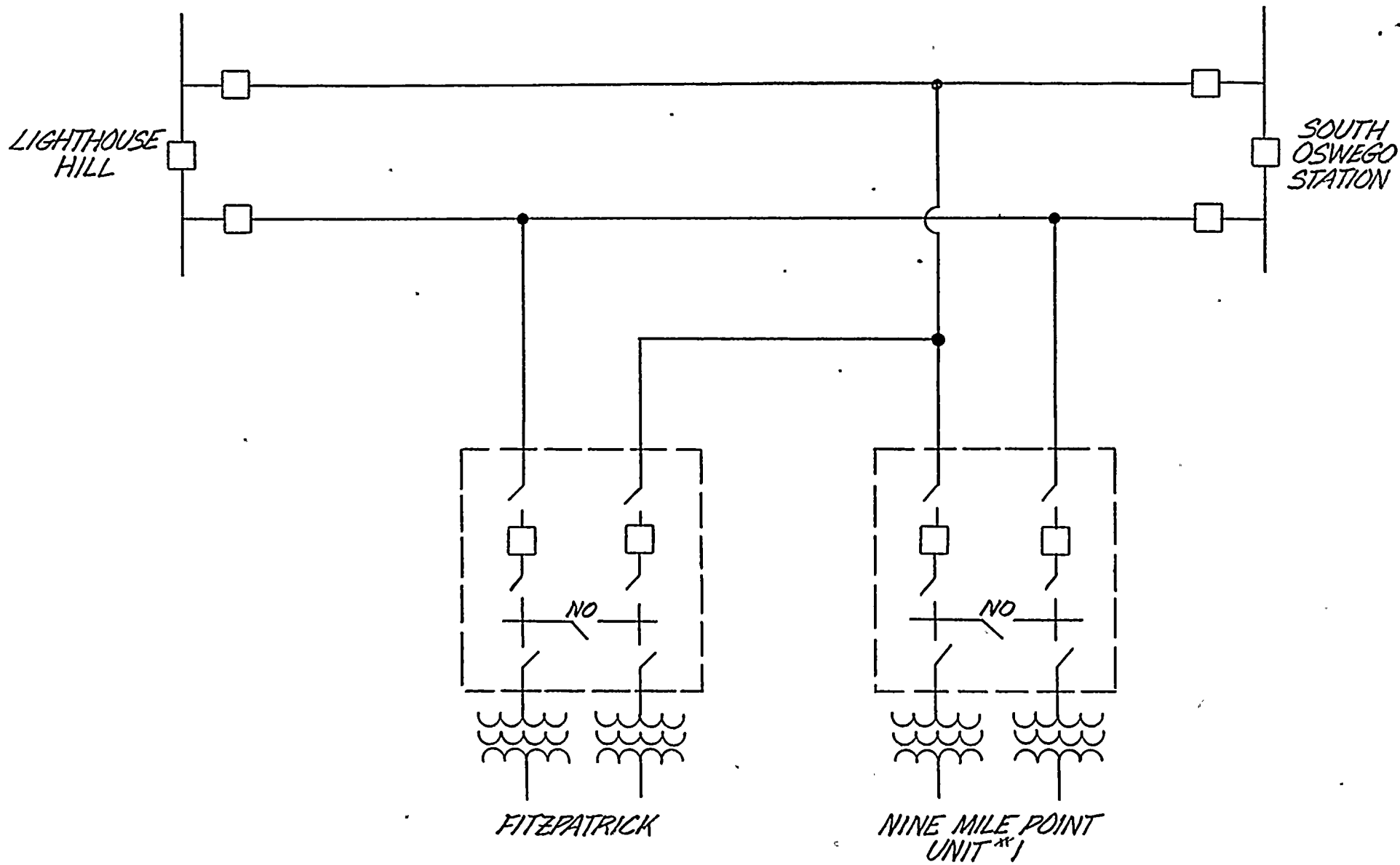
Therefore, Niagara Mohawk does not currently plan to take further action with respect to the Nine Mile Point Unit 1 off site power system.





EXISTING 115KV TRANSMISSION
LINE SYSTEM
FIGURE*1





FIGURE*2



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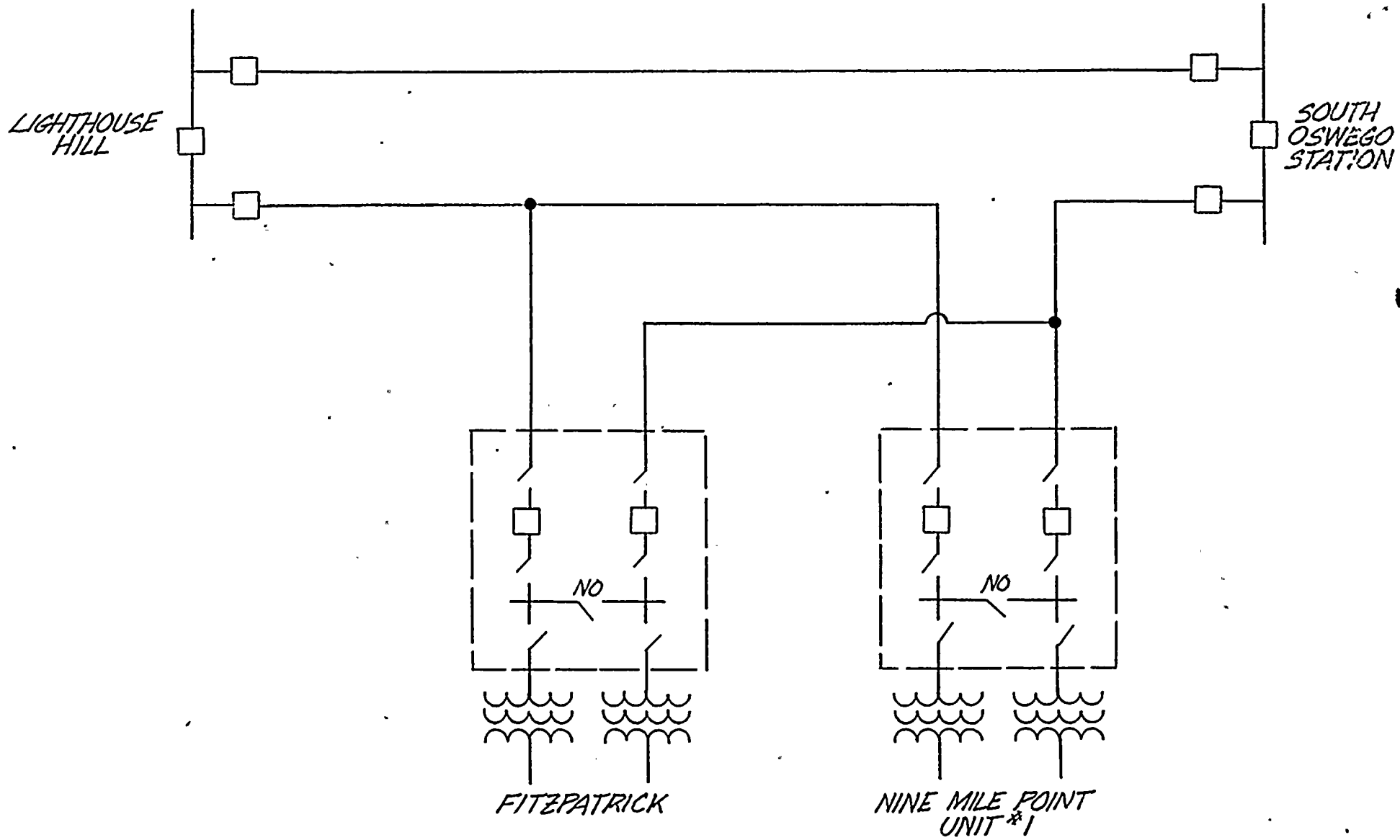


FIGURE #3



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