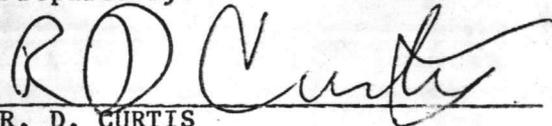


DISTRIBUTION SYSTEM ANALYSIS  
CAMP GEIGER  
CAMP LEJEUNE  
JACKSONVILLE, NORTH CAROLINA

JULY 1982

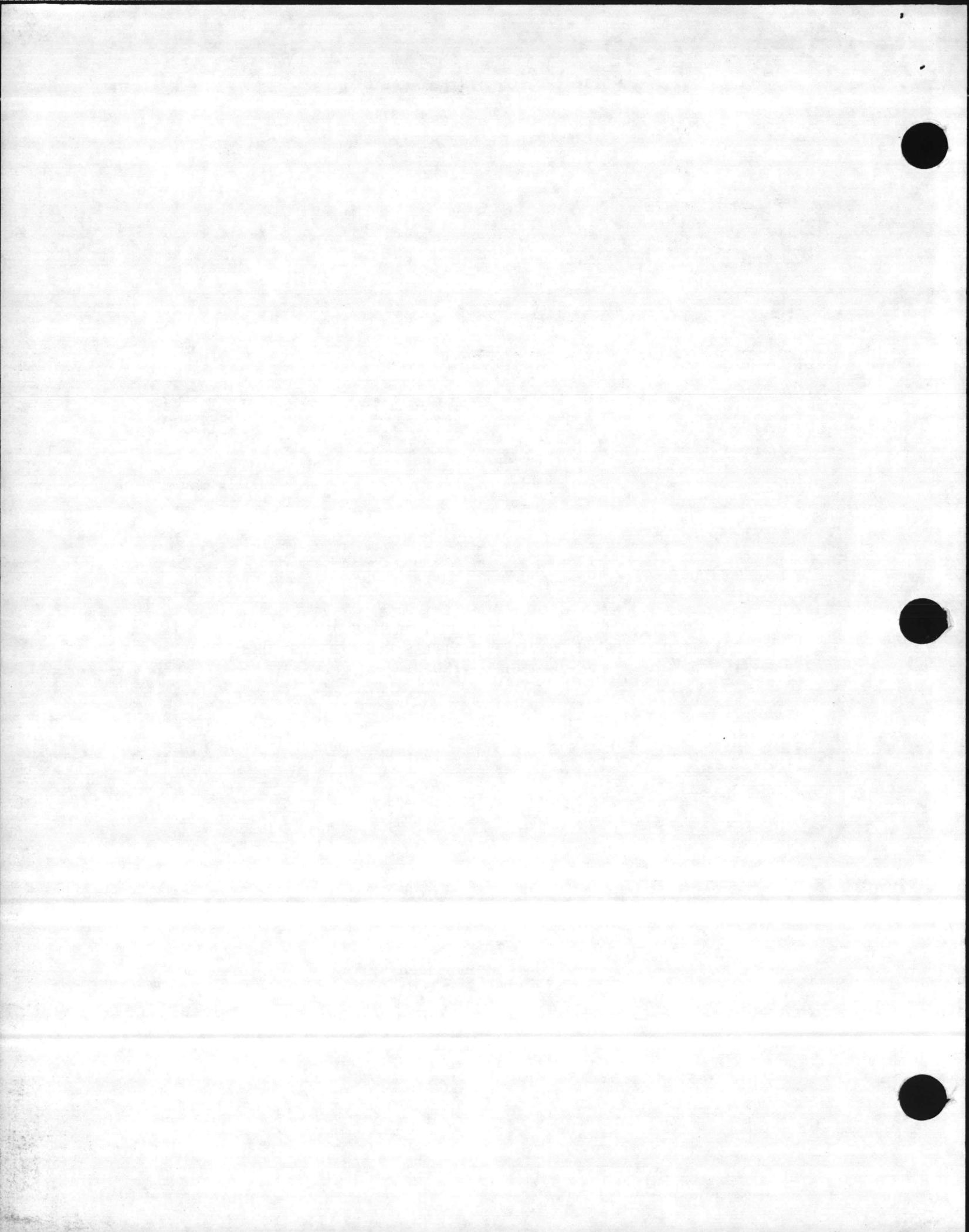
UTILITIES, ENERGY AND ENVIRONMENTAL DIVISION  
ATLANTIC DIVISION, NAVAL FACILITIES ENGINEERING COMMAND  
NORFOLK, VIRGINIA

Prepared by:

A handwritten signature in cursive script, appearing to read "R D Curtis", written over a horizontal line.

R. D. CURTIS  
Electrical Engineer

ENCLOSURE (1)



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SECTION II - Procedure

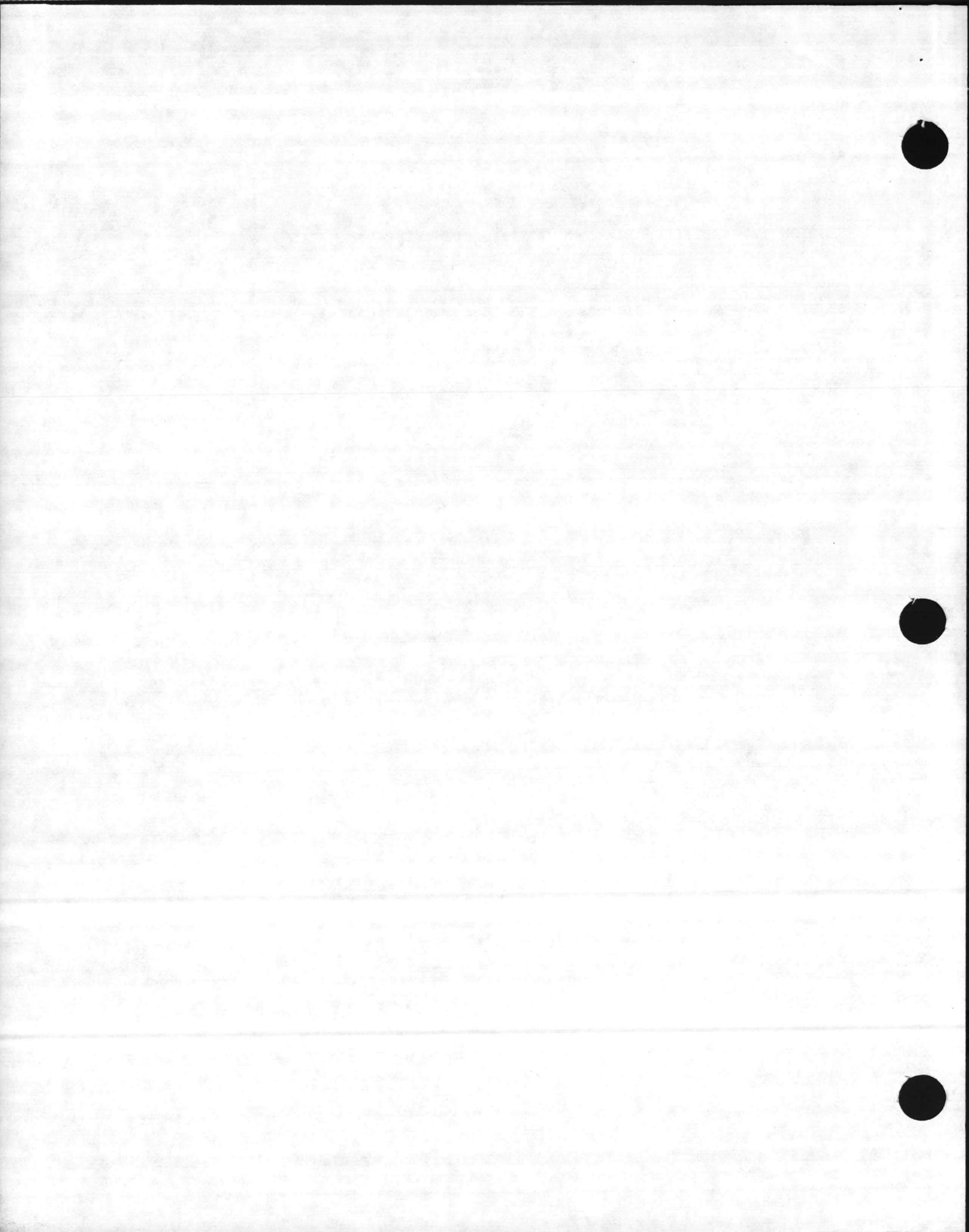
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SECTION V - Future Load Requirements

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## SECTION I

### Purpose

Utilities Division of the Atlantic Division, Naval Facilities Engineering Command, is conducting periodic in-depth analysis on all distribution systems to insure that the distribution systems provide a quantity and quality of service necessary to safely, reliably and efficiently meet all mission requirements.

Objective of the analysis is three fold.

First, it is used to develop a long range plan for system expansion to meet load growth and military construction objectives.

Second, it is used to optimize utilization of capital within DOD funding constraints.

Third, it is used to develop a data base for future system analysis.



## SECTION II

### Procedure

Procedure involved compiling information and data on file and from field investigation in order to determine existing circuit configurations and existing load data. Drawings and diagrams of the electrical system were prepared.

Load flow and fault current analysis were conducted as necessary for the existing system and loads. Future loading was projected based on military construction objectives and the system changes required to serve additional loading were determined.

It is requested that the data and information in the report be continually updated by the activity and that a copy of all changes be provided to LANTNAVFACENGCOM, Code 11.



SECTION III

Summary

Primary Source: Carolina Power and Light Company

Available Short Circuit: Three Phase = 6798 amps  
Line to Ground = 7012 amps

Supply Voltage: 12.47 KV

Supply Capacity: 15,000 KVA, CP&L main 115 - 12.47 KV substation

Voltage Regulation: One 3-Phase 500 KVA, 12.47 KV regulator

Frequency: 60 Hz

Station Capacity Limited by: Voltage regulator (500 KVA)

Maximum demand 1981: 2,500 KW (estimated)

Fault Interrupting Requirement: 147 MVA available fault at main switching station

Distribution Voltage: 12.47 KV



## SECTION IV

### Existing System Description

The MCAS H NEW RIVER regulating and switching station receives electric service from the Carolina Power and Light Company at 12,470/7,200 volts, at a CP&L 15,000 KVA, 115,000 - 12,470 volt transformer station. The CP&L Substation is fed by a 115 KV three-phase 60 Hz aerial line. The available fault at the CP&L Substation is 147 MVA.

The Government receives the power from the CP&L Substation at the main circuit breaker, which is a vacuum breaker rated at 1200 amps. The power is then transmitted to the MCAS H NEW RIVER regulating and switching station via two parallel 750 MCM circuits. The Bus serves two regulators, one 750 KVA regulator for MCAS H NEW RIVER and one 500 KVA for Camp Geiger. A separate single phase line runs from the CP&L substation to the ammunition dump.

### System Switching Capabilities

<u>Feeder</u>	<u>Circuit Capacity</u>	<u>Breaker Interrupting Capacity</u>
Geiger No. 1	6.7 MVA	399 MVA
ITR	5.8 MVA	239 MVA

At present there is no standby or alternate power source for Camp Geiger. There are, however, emergency generators provided at critical loads.



SECTION V

Load Requirements

Existing peak load for 1981 was estimated to be 2500 KW. The future load requirements were determined by considering the increase electrical loads imposed by the following projects:

Projects scheduled for FY-82

N-223 - Addition/Alteration to NCO Enlisted Club

	Estimated Load	17 KW
Estimated Total Future Planned Load		17 KW



## SECTION VI

### General Discussion and Recommendations

The existing electrical system is in good condition with no major operational problems. The system has adequate capacity to supply the existing load and future projected loads.

The Main Breaker IAC 77 overcurrent relays have limited the ability to achieve adequate coordination of the distribution system. Replacing the IAC 77 with an IAC 53 type will result in increased flexibility in achieving relay coordination.

A number of the existing line and tap fuses cannot be coordinated with their main breaker or upstream reclosures due to the available fault current. This will result in the upstream devices clearing the high current faults before the fuses can interrupt the fault. In order to improve selectivity with downstream fuses the instantaneous elements of the feeder breakers must be locked out (blocked) on the first and subsequent reclosures. This will require modification to the circuit breaker time overcurrent relay and G.E. Type ACR reclosure control circuits.

The following relay settings are recommended for the electrical substation serving MCAS H NEW RIVER and Camp Geiger.



RELAY SETTINGS

LOCATION (SUBSTATION)	CIRCUIT VOLTAGE	RELAY FUNCTION	TYPE RELAY	RECOMMENDED SETTINGS				RATIO CT (PT)	REMARKS
				QUAN.	TAP	TIME DIAL	INST. TRIP		
MAIN BREAKER	12.47KV	PHASE OVERCURRENT	GE IAC 77	3	5	9	N.A.	800/5	1. INTERIM SETTING 2. SEE NOTE (1)
MAIN BREAKER	12.47KV	GND OVERCURRENT	GE IAC 77	1	4	10	N.A.	800/5	1. INTERIM SETTING 2. SEE NOTE (2)
OCB #1 CAMP GEIGER FDR	12.47KV	PHASE OVERCURRENT	GE IAC 51	3	1.5	1	20	400/5	SEE NOTE (3)
OCB #1 CAMP GEIGER FDR	12.47KV	GND OVERCURRENT	GE IAC 51	1	1.5	1	6	400/5	SEE NOTE (3)
OCB #2 CAMP GEIGER ITR FOR	12.47KV	PHASE OVERCURRENT	WH-PRM REC	INST. CURVE #3, TAP 3 TIME DELAY CURVE #2				600/5	TRIPS TO LOCKOUT-4 RESET - 2 SEC. RECLOSURE TIME - IT, 2, 15 SEC.
OCB #2 CAMP GEIGER ITR FOR	12.47KV	GND OVERCURRENT	WH-PRM REC	GND MIN. TRIP AMPS - 1.4 GND INST. TRIP - 4				600/5	
OCB #3 NEW RIVER FDR #1	12.47KV	PHASE OVERCURRENT	GE IAC 53	3	5	2	20	400/5	SEE NOTE (3)
OCB #3 NEW RIVER FDR #1	12.47KV	GND OVERCURRENT	GE IAC 53	1	1.5	1	25	400/5	SEE NOTE (3)
OCB #4 NEW RIVER FDR #2	12.47KV	PHASE OVERCURRENT	GE IAC 53	3	4	1.5	20	400/5	SEE NOTE (3)



RELAY SETTINGS

LOCATION (SUBSTATION)	CIRCUIT VOLTAGE	RELAY FUNCTION	TYPE RELAY	QUAN.	RECOMMENDED SETTINGS			RATIO CT (PT)	REMARKS
					TAP	TIME DIAL	INST. TRIP		
2OCB #4 NEW RIVER FDR #2	12.47KV	GND OVERCURRENT	GE IAC 53	1	1.5	2	20	400/5	SEE NOTE (3)
OCB #5 NEW RIVER LOOP FDR	12.47KV	PHASE OVERCURRENT	GE IAC 77	3	4	2	20	400/5	SEE NOTE (3)
OCB #5 NEW RIVER LOOP FDR	12.47KV	GND OVERCURRENT	GE IAC 77	1	1.5	2	12.5	400/5	SEE NOTE (3)

NOTE (1) Recommend existing relays be changed to G.E. type IAC 53 with the following settings: Tap 8, time dial 5, C.T. ratio 400/5.

NOTE (2) Recommend existing relays be changes to G.E. type IAC 53 with the following settings: Tap 3, time dial 4.5, C.T. ratio 400/5.

NOTE (3) Modify control circuit of circuit breaker time overcurrent relay and G.E. type ACR reclosure to lock out (block) overcurrent relay instantaneous trip on the first and subsequent reclosures.

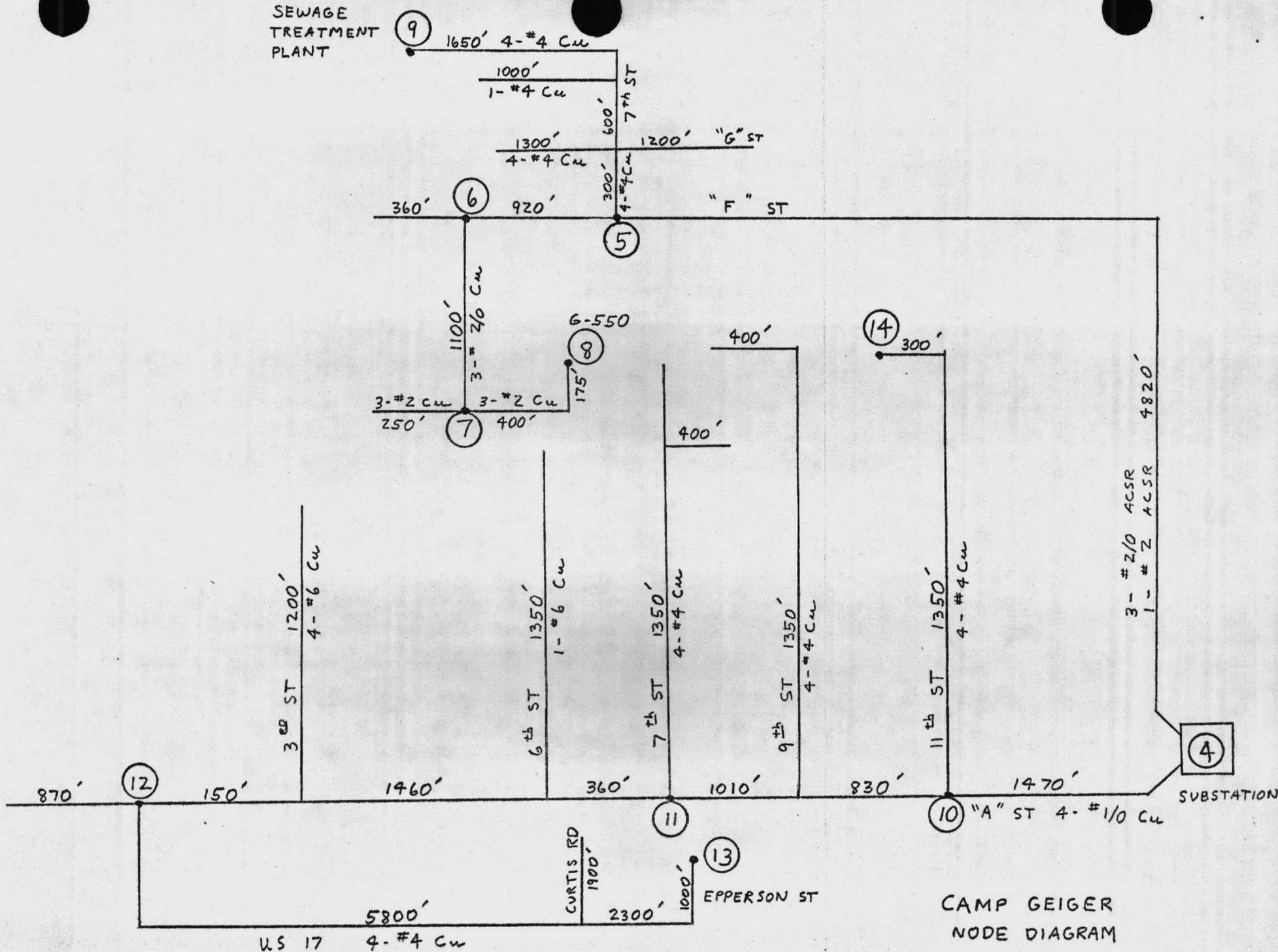


Section VII

One-Line Diagram of Existing System

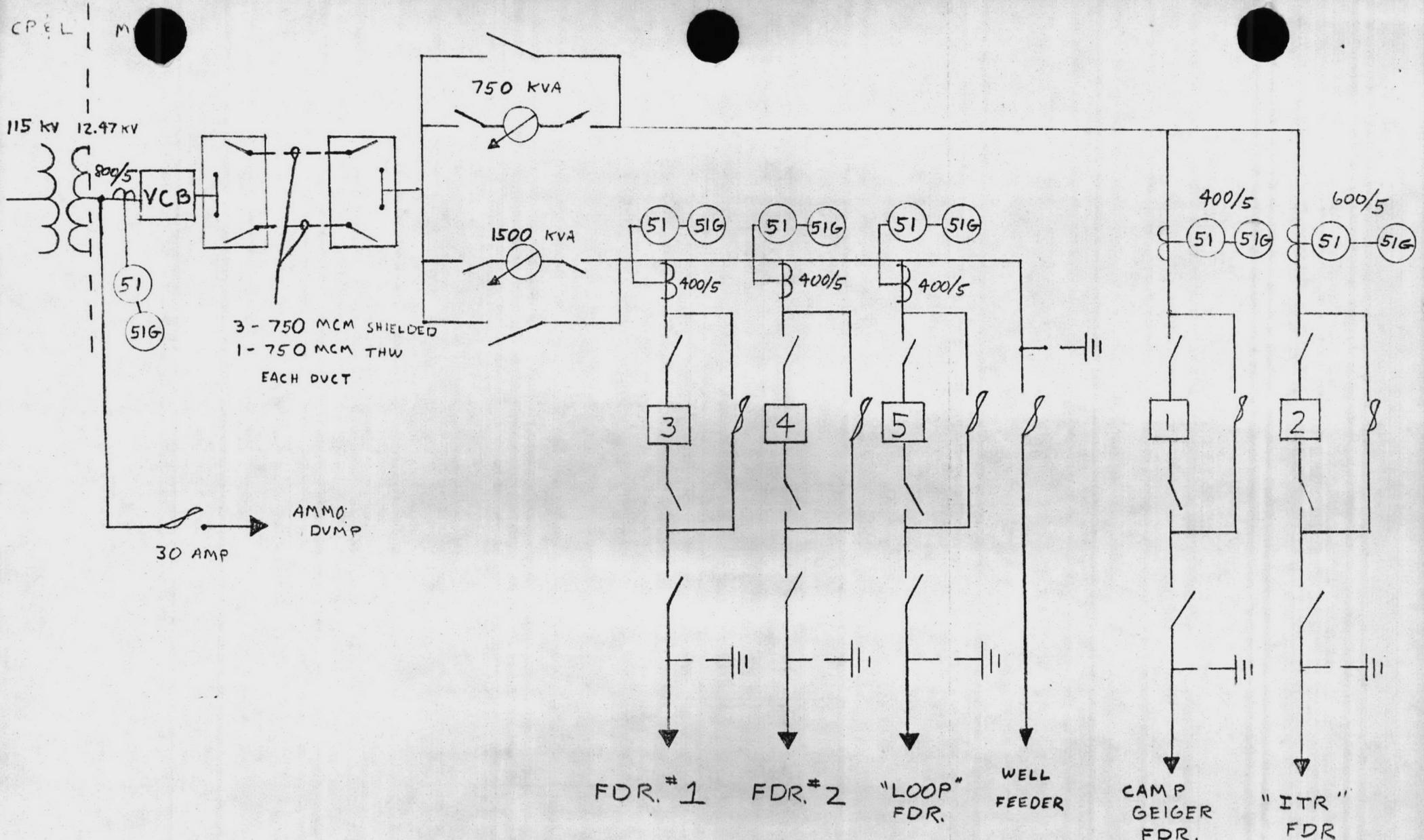


SEWAGE  
TREATMENT  
PLANT

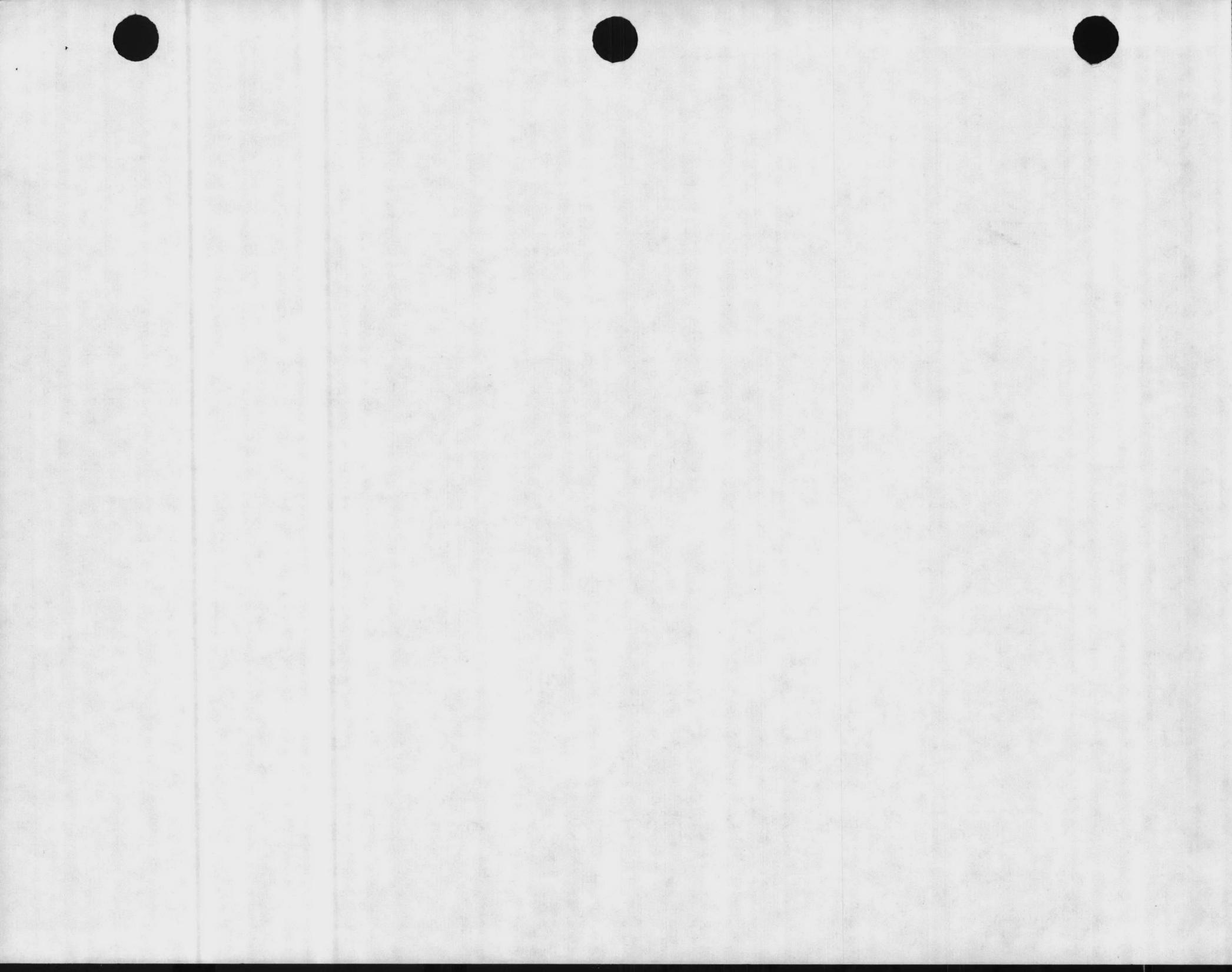


CAMP GEIGER  
NODE DIAGRAM



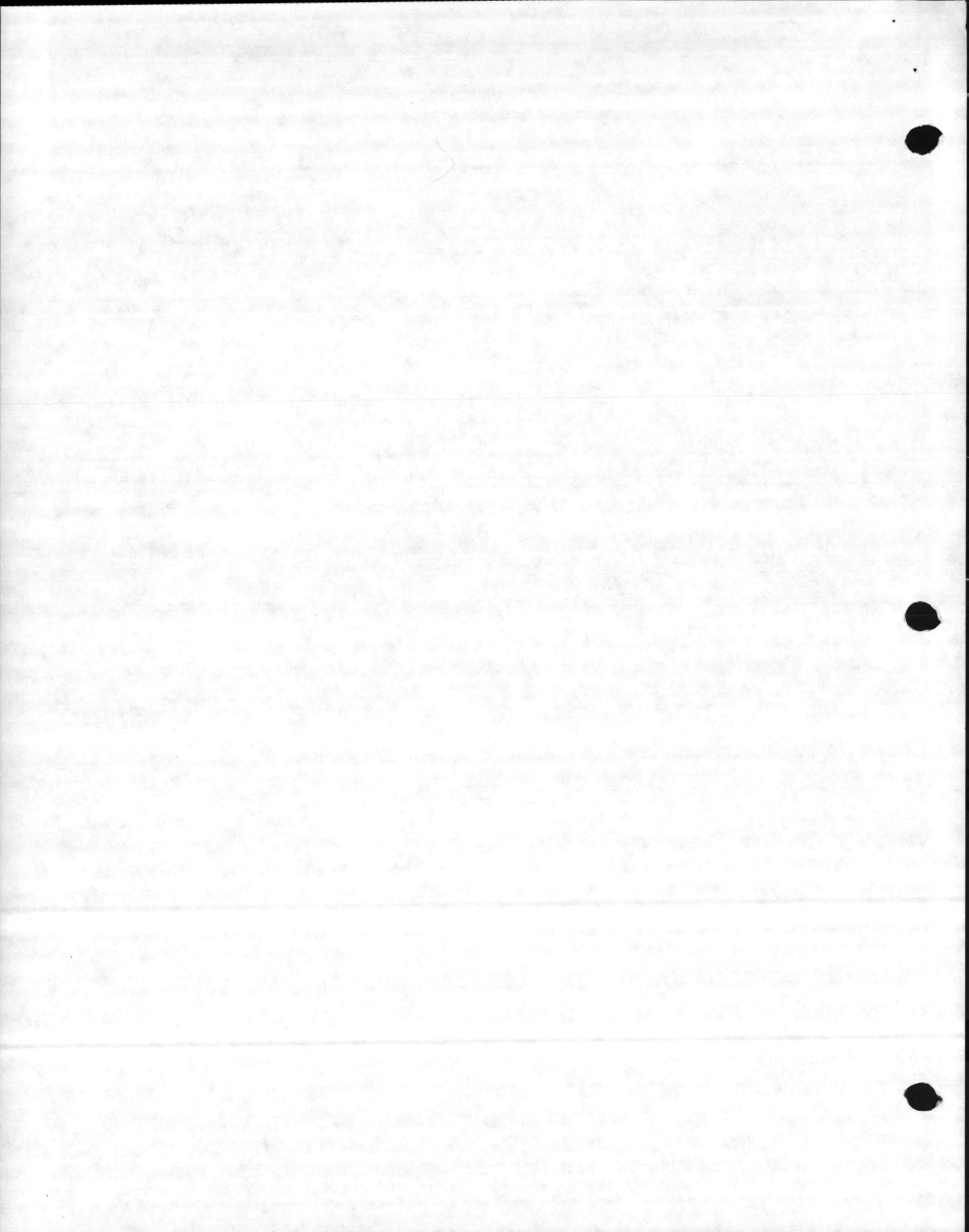


AIR STATION SUBSTATION - ONE LINE DIAGRAM

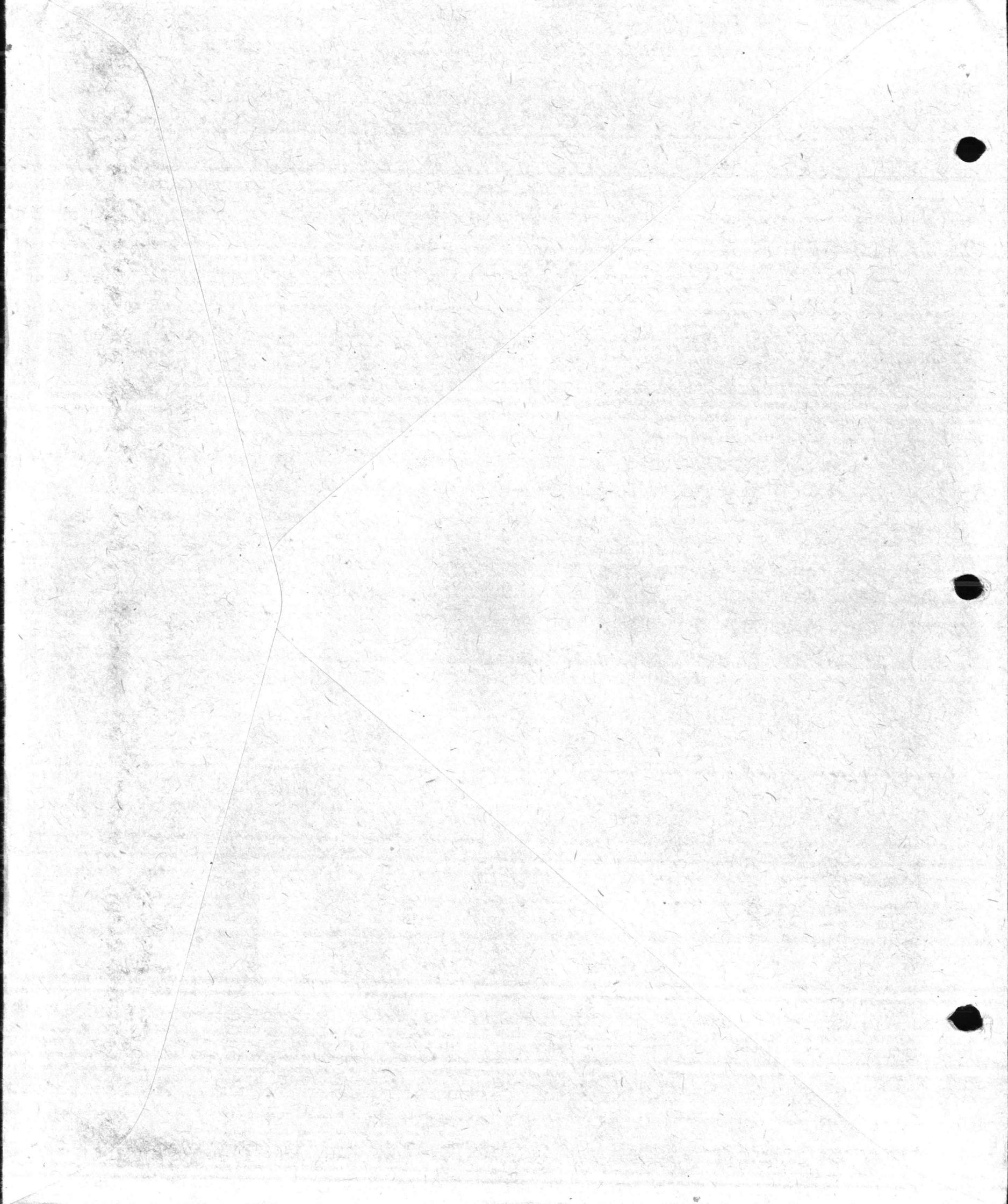


CAMP GIEGER  
FAULT CURRENT STUDY SUMMARY SHEET

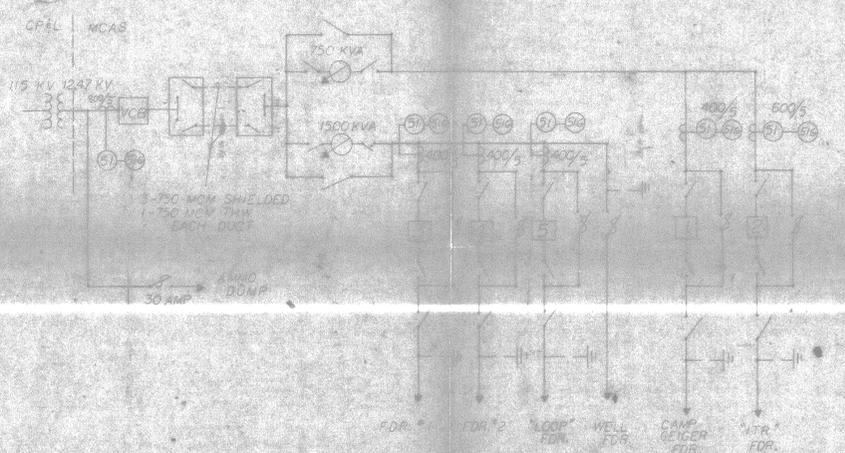
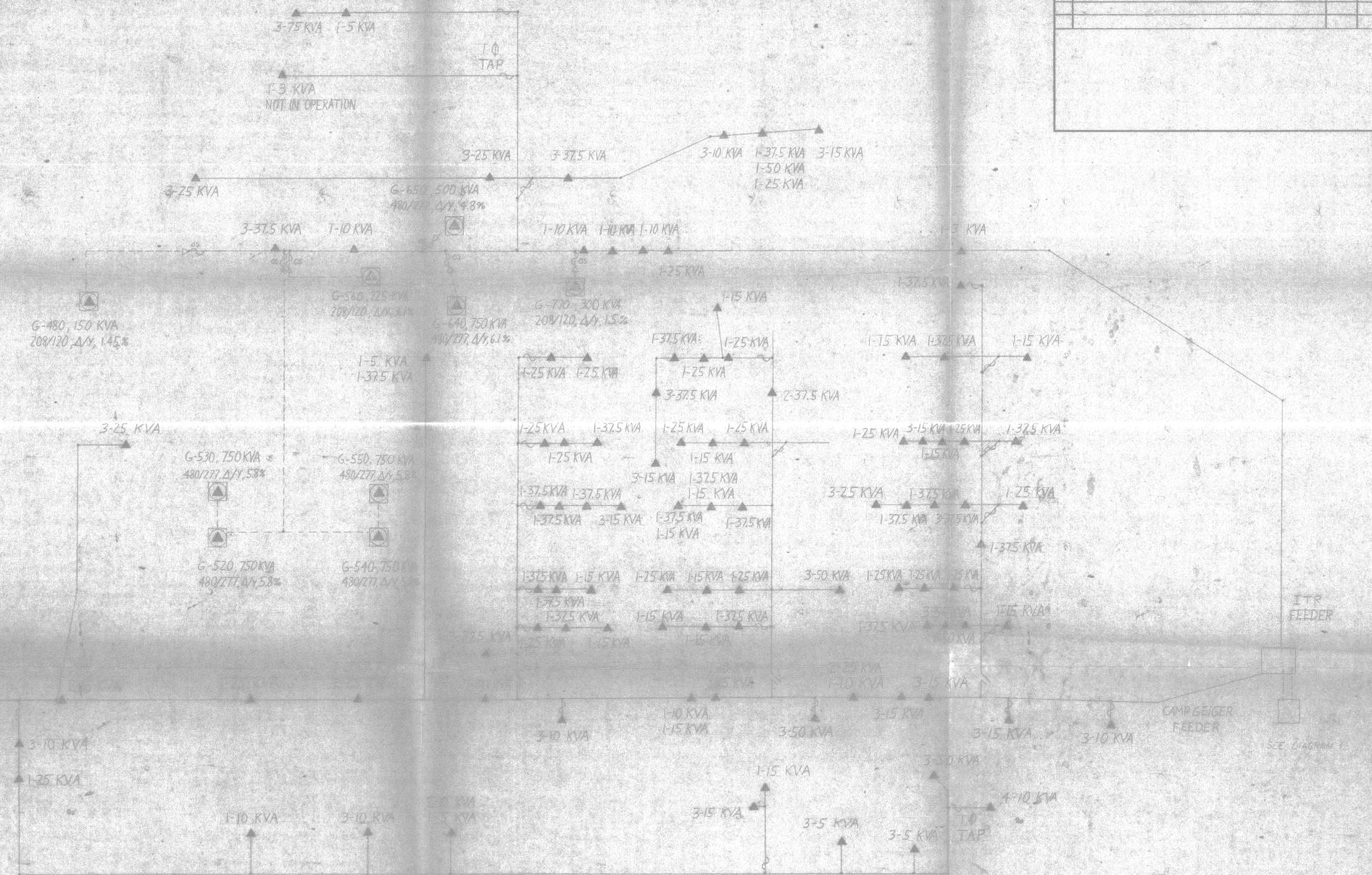
BUS NO.	LOCATION	3- $\phi$ MVA	AMPS	1- $\phi$ MVA	AMPS
1	CP&L	147	6803	152	7015
2	Vacuum Breaker	147	6799	151	7013
4	Camp Geiger Bus	146	6776	149	6891
5	F St. and 7 St.	79	3642	62	2884
7	C St. and 5 St.	39	1828	20	903
8	Bldg. G-550	28	1285	14	647
9	Sewer Treat Plant	46	2123	35	1616
10	A St. and 11 St.	119	5503	109	5066
11	A St. and 7 St.	95	4406	81	3767
12	A St. and 2 St.	78	3608	64	2943
13	Epperson and R. L. Wilson	34	1586	26	1218







REVISIONS			
NO.	DESCRIPTION	DATE	APPROVED



AIR STATION SUBSTATION  
DIAGRAM 1

	OVERHEAD		FUSED CUTOUT & OIL SWITCH
	UNDERGROUND		POLE MOUNTED TRANSFORMER
	TERMINATION		PAD MOUNTED TRANSFORMER
	FUSED CUTOUT		OVERCURRENT DEVICE
	BLADE DISCONNECT		CURRENT TRANSFORMER
	SWITCH		VOLTAGE REGULATOR
	OIL SWITCH		SUBSTATION TRANSFORMER
	CIRCUIT BREAKER		NO CONNECTION
	LIGHTNING ARRESTER		
	CONNECTION		

LEGEND

EFD DWS NO.		DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND	
JOB ORDER NO.		ATLANTIC DIVISION	
DES.		NAVAL STATION NORFOLK VA	
DRAWN: TWA		MARINE CORPS BASE, CAMP LEJEUNE, NC.	
CHK.		ELECTRICAL DISTRIBUTION SYSTEM	
ENR. NO.		CAMP GEIGER	
DES. DIS.		DATE	
MANUFACTURE NO.		DATE	
APPROVED		DATE	
FOR EFD FOR CONSTRUCTION USE		DATE	

