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REPORT ON THE ENGINEERING EVALUATION OF ELECTRICAL REQUIREMENTS
BUILDING M-223

Purpose: The purpose of this engineering report is to evaluate the existing configuration of electrical circuits and to determine the extent of expansion and/or renovation, as required, to provide sufficient electrical capacity for the 105 Zenith Z-248 Personal Computers (PC) installed in the training laboratory.

Findings: Under Construction Contract N62470-84-C-7844, this building was completely renovated to accommodate the training laboratory. The electrical circuits were designed and installed for 105 Telex terminals with the total connected electrical load of 63 KVA or 1.02 KVA per student station. The electrical requirement of 1.02 KVA for each station was based on the guidelines that were published in the "Facilities Analysis for Real Time Financial Manpower Management Information System" by Naval Training Equipment Center, Orlando, Florida. With the replacement of the Telex terminals with Zenith Z-248 PCs, the electrical load of each work station is increased from 1.02 KVA to 1.78 KVA and the total connected load is increased to 93 KVA. This 93 KVA load exceeds the 81 KVA rating of the electrical distribution panelboard and its related feeders.

Options and Recommendations: To accommodate the installation of the Zenith Z-248 PCs in this training laboratory, the following is suggested:

a. Reduce the number of PCs from 105 to 70 to match the electrical load rating of the existing electrical system with no interruption of class schedules and no cost to physical plant.

b. Upgrade electrical components for 105 PCs by providing separate utilization transformers rated at 300 KVA for Building M-223 and by renovating the existing electrical distribution panelboards to accommodate 20 ampacity branch circuits for each work station and increasing the ampacity rating of panelboard feeders.

To implement the upgrading of electrical components, a preliminary cost estimate was prepared and is in the amount of $33,200.

90-23

ENGINEERING EVALUATION REPORT
SMOKE DETECTORS IN
APARTMENT STYLE QUARTERS

1. Purpose - The purpose of this report is to evaluate the use of system type smoke detectors that have been installed in the living room of apartment-style quarters.

2. FINDINGS - The requirements of fire protection for Department of Defense facilities are specified in the military handbook, MIL-HDBK-1008A. This handbook states that any deviation from these requirements requires approval by the appropriate headquarters. Section 4 of this handbook requires that smoke detectors shall be located in living room/lounge areas of apartment style personnel housing quarters and when activated, these smoke detectors will sound the general building alarm and the fire department to be notified.

The apartment style quarters are located adjacent to coastal environment; nuisance alarms are caused by flying insects that enter through the base of photo-electric type smoke detectors.

3. Recommendations- It is recommended that 120 Volt smoke detectors be provided in the living rooms/ lounge areas since numerous deaths by fire/smoke occur in these rooms. These 120 Volt smoke detectors should be interconneced with the existing 120 Volt smoke detector.

Furthermore, it is recommended that system type heat detectors (to sound the general building alarm) be provided in the living rooms/ lounge areas to replace the system type smoke detector. The above-listed recommendations were discussed between Mr. R. F. Luca. Fire Protection Section, Atlantic Division, Naval Facilities Engineering Command and Mr. A. E Young, Public Works Design, CLNC on 29 Jun 90 and appears to be a viable solution.

4. Point of contact: Andrew Young, Public Works, MAR CORP BASE, CAMP LEJEUNE, NC.

Phone: (919) 451-3658

OPNAV 5216/144A (Rev. 8-81)
S/N 0107-LF-052-2320

DEPARTMENT OF THE NAVY

Memorandum

DATE: 25 Nov 1985

FROM: Public Works Officer, Marine Corps Base, Camp Lejeune

TO: Assistant Chief of Staff, Facilities

SUBJ: EXPANSION OF ELECTRICAL SERVICE AND INTERIM ELECTRICAL DISTRIBUTION SYSTEM MODIFICATIONS

Ref: (a) Your memo 11300 FAC of 11 Jun 1985

1. The recommendations noted in paragraph 2 of LANTDIV's ltr of 7 May 1985 forwarded by the reference are implemented as follow:

a. Modification to Berkeley Manor Housing feeder will be accomplished by Construction Contract 85-B-6349.

b. Construction Contract 85-B-6349 provides for connection point for the new high school.

2. The information requested in paragraph 3 of LANTDIV's letter is as follows:

a. Load projection - See Attachment A.

b. Load projection - See Attachment B.

c. List of MCON, special projects, and load growth upon which load estimates are based - See Attachment C.

d. Projected loads are listed in Attachment B.

3. Point of contact for additional information is Mr. Andrew Young, Electrical Section, at extension 3658.

M. I. KIMBALL
By direction

☆U.S. GOVERNMENT PRINTING OFFICE: 1985 — 505-012/18049

ATTACHMENT A

ELECTRICAL LOAD PEAK DEMAND PROJECTIONS IN MEGAWATTS FOR TOTAL STATION LOAD WITH UTILITY MANAGEMENT SYSTEM IN OPERATION:

	SUMMER	WINTER
1985	39.7 (Actual)	40.5 (Actual)
1986	41.3	42.1
1987	42.9	43.8
1988	44.7	44.7
1989	46.5	45.6
1990	48.3	46.5

SUMMER LOAD IS BASED ON 4% PER YEAR GROWTH.

WINTER LOAD IS BASED ON 4% PER YEAR GROWTH IN 1986 AND 1987, AND 2% PER YEAR GROWTH IN 1988 THROUGH 1990.

ATTACHMENT B

	AT EXISTING SERVICE POINT		AT NEW SERVICE POINT (OPERATIONAL IN FY88)								TOTAL STATION LOAD	
			SUMMER				WINTER					
FY	Summer	Winter	Hospital	Midway Park	Montford Point	Total	Hospital	Midway Park	Montford Point	Total	Summer	Winter
85	39.7	40.5	2.1	2.8	0.3	5.2	1.5	5.5	0.2	7.2	39.7	40.5
86	41.5	42.1	2.2	2.9	0.8	5.9	1.6	5.6	0.6	7.8	41.5	42.1
87	43.5	43.8	2.3	3.0	1.4	6.7	1.6	5.8	0.7	8.1	43.5	43.8
88	38.4	36.1	2.3	3.0	1.5	6.8	1.6	5.9	1.1	8.6	45.2	44.7
89	38.9	36.7	2.3	3.1	1.7	7.1	1.6	6.0	1.3	8.9	46	45.6
90	39.6	37.3	2.4	3.2	1.8	7.4	1.7	6.1	1.4	9.2	47	46.5

a. Hospital Load Growth Factor of 2% per year based on maximum recorded 1985 peak loads.

b. Midway Park Housing Growth Factor of 2% per year based on 2.5 KW per housing unit + 80% coincidental factor of 2 KW air conditioning and 6.8 KW heating loads.

c. Montford Point Load is the summation of expected loads of the MILCON Projects.

d. The 1985 Total Station Loads are the maximum recorded 1985 peak loads. Station load growth factor of 2% per year with an operational utility management system is assumed.

ATTACHMENT C

THE PLANNED PROJECTS, LISTED BY INDIVIDUAL EXISTING FEEDERS WHICH LOAD ESTIMATES ARE BASED:

MONTFORD POINT FEEDER (Camp Johnson)			KW
P628	FY86	UEPH	400
P808	FY86	Mech Sch	100
P809	FY87	Mech Sch	200
P663	FY87	Mess Hall	400
P810	FY88	Mech Sch	100
P828	FY89	Medical Sch	200
P807	FY91	Tng Fac	100

REGIMENTAL #1 FEEDER			KW
P808	FY86	Div Hq	400
P527	FY86	Maint Shop	200
P525	FY87	Maint Shop	100
P643	FY87	Maint Shop	200

RIFLE RANGE FEEDER			KW
P775	FY90	Rec Lodge	100
P417	FY91	Armory	150

HOSPITAL FEEDER			KW
P701	FY87	UEPH	100

INDUSTRIAL FEEDER			KW
P842	FY88	RASC	750
P786	FY91	Cold Stg Plant	500

REGIMENTAL #2 FEEDER			KW
P631	FY86	UEPH	400
P806	FY86	Maint Shop	200
P627	FY87	UEPH	400
P626	FY88	UEPH	400
P229	FY89	Maint Shop	400
P568	FY90	Maint Shop	100
P569	FY90	Maint Shop	100

REGIMENTAL #3 FEEDER			KW
P678	FY88	Maint Shop	200
P629	FY89	UEPH	100
P169	FY90	Maint Shop	200
P644	FY90	Maint Shop	200

FRENCH CREEK FEEDER			KW
P517	FY86	Maint Shop	100
P031	FY87	Btn HQ	100
P167	FY87	Maint Shop	100
P257	FY87	Maint Fac	200
P027	FY87	Maint Shop	100
P841	FY87	Mess Hall	200
P065	FY88	Gym	100
P803	FY88	Maint Shop	100
P679	FY89	Maint Shop	100
P804	FY89	Maint Shop	200
P564	FY89	Maint Shop	100
P805	FY90	Maint Shop	200
P266	FY90	Maint Shop	200
P541	FY90	Maint Shop	100
P542	FY90	Maint Shop	100
P227	FY91	Armory	100

PWD #85-08
PWO

27 MAR 1985

From: Commanding General, Marine Corps Base, Camp Lejeune
To: Commanding Officer, Naval Hospital, Camp Lejeune

Subj: ENGINEERING STUDY - PUBLIC WORKS DIVISION #85-08, POWER FLUCTUATIONS AT NAVAL HOSPITAL

Ref: (a) Your ltr 11310 104 of 12 Dec 1984
(b) Datapoint ltr to NH of 18 Feb 1985

1. Reference (a) requested that an engineering study be performed to determine the reason for poor quality of electricity within the Data Processing Room.

2. A preliminary site visit to the Data Processing Room was conducted on 14 March 1985 by A. Young (PubWksDiv MCB), and the following conditions were noted:

a. The existing electrical raceway systems within the room contain an insulated grounding conductor with grounding type receptacle outlets.

b. A standard type step-down transformer supplies unconditioned three phase, 208Y/120 volts to the distribution panel.

3. The Director of the Data Processing Center, Ensign Turner, provided reference (b) which states the computer vendor's concerns about the existing installation.

4. To reduce the electromagnetic interference on the grounding circuit, it is recommended that the existing receptacles within the Data Processing Room be replaced with an insulated type receptacle. The grounding terminal of an insulated type receptacle is insulated from the mounting yoke and raceway system; this should reduce the incident of interference.

5. The existing transformer is a general-purpose 480-208Y/120 volts step-down transformer and does not provide electrostatic shielding, voltage regulation, or transient suppression. To reduce the undesired voltage fluctuations and transients, it is recommended that a three-phase, 15KVA, 208 volt conditioner with transient suppressors and emergency power-off with remote operation be installed between the existing transformer and the distribution panel. Voltage conditioner with the aforementioned accessories which is manufactured by Liebert, Model Number CAC-15-C, may be purchased through GSA. List price without discount is $9,000.

6. To reduce the generation of static charge, removal of carpeting is recommended.

7. It is recommended that the room termperature be monitored to determine if the temperature does, in fact, exceed 80°F and its duration.

PUBLIC WORKS DIVISION
BUILDING 1005, MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA 28542

In reply refer to:

ESR 86-09
PWO
2 May 86

From: Public Works Officer, Marine Corps Base, Camp Lejeune
To: Base Maintenance Officer
Via: Assistant Chief of Staff, Facilities

Subj: ENGINEERING STUDY - PWD #86-09

Ref: (a) BMO memo 4280 MAIN of 10 Dec 86

1. The reference requested that an engineering study be conducted to determine the causes of voltage instability.

2. The utility power provided to the Government-owned electrical distribution systems is within the acceptable power tolerance envelope as defined by the American National Standards Institute Publication C84.1.

3. In order to achieve quality power for various major electronic equipment that may be required, there are various schemes that the user may implement during or after purchase. The various schemes are:

a. Transient suppression (caused by starting and stopping electric motor, fluorescent lamps, etc.) may be minimized by inserting a surge protector plug directly into a grounded receptacle outlet. Unit cost is approximately $100 for each.

b. To minimize the switching transients caused by the cycling duties of motors and the third-order harmonics produced by electromagnetic devices, a voltage regulator with transient suppressors may be inserted into a grounded receptacle outlet. Unit cost is approximately $675 per 1,000 volt-amphere.

c. To minimize the normal voltage fluctuations of the electrical utilization system, including third-order harmonics, a power conditioner may be inserted into a grounded receptacle outlet. Unit cost is approximately $755 per 1,000 volt-amphere.

4. Preliminary review of the "as-built" drawings indicates that Building 54 has more than one electrical service and the electrical utilization system should be renovated to correct numerous deficiencies, including the large voltage drops between the service equipment and the equipment terminals. An estimated cost to renovate the electrical system is between $7 and $12 per square foot, plus the cost of an utilization transformer.

5. Point of contact is Mr. Andrew Young, extension 3658.

M. I. KIMBALL
By direction

PUBLIC WORKS DIVISION
BUILDING 1005, MARINE CORPS BASE
CAMP LEJEUNE, NORTH CAROLINA 28542-5001

IN REPLY REFER TO:

11000
PWO
9 Jan 89

From: Public Works Officer, Marine Corps Base, Camp Lejeune
To: Base Maintenance Officer (Attn: Utilities)

Subj: PARADISE POINT VOLTAGE REGULATOR

Ref: (a) PHONCON btwn Mr. L. McMillian (BMD) and Mr. A. Young (PWD) of 29Dec88

Encl: (1) Engineering Report

1. The enclosure is provided as requested by the reference. If there are any questions, please contact Mr. Andrew Young, extension 3658.

F. E. CONE
By direction

REPORT ON THE ENGINEERING CALCULATIONS AND DETERMINATIONS FOR THE VOLTAGE REGULATOR

1. PURPOSE - Engineering services were performed to determine the numerical values for setting the control functions of the newly-installed voltage regulators on the Paradise Point medium voltage distribution feeder. Each of the three voltage regulators is the Siemens single-phase type JFR distribution step-voltage regulators with ACCU/STAT MJ-3A regulator control. The regulators are wye-connected and are "straight" designed.

2. CALCULATIONS -

a. Conductor spacing was determined by the geometric mean method. The spacing for armless construction is 36 inches.

b. Distribution line resistance and reactance values that were given in the manufacturer's tables for 4/0 AWG hard-drawn copper conductor are:

Resistance = 0.303 OHMS per conducter per mile

Reactance = 0.630 OHMS per conductor per mile

c. The equivalent distance to the load center was determined by the division of the summation of the products of each load and the distances to each load center by the summation of the loads. An equivalent distance of 10,980 feet or 2.08 miles was calculated.

d. Compensation multipler that is given in the manufacturer's table is 6.67 wye-connected regulators.

3. SETTINGS -

a. Voltage Reduction Control - OFF

b. Voltage Limit Control: Upper - 130 volts
Lower - 115 volts

c. Bandwidth - 3 volts

d. Voltage Level - 120 volts

e. Time Delay - 60 seconds

f. Resistance - 4 volts

g. Reactance - 9 volts

4. Configuring eight position DIP switch: C - Closed, O - Opened

Switch		Switch	
1	C	5	C
2	C	6	C
3	C	7	O
4	C	8	C

BLDG 1101 - RASC

PWR FAC EQUIP ON LINE 12/09/87

REDUCED LINE CURRENT FROM 420 TO 330 AMPS

SPECIAL INSTRUCTIONS

Automatic Power Factor Control Equipment

Before making any connections, first establish the phase identification and the phase rotation (1-2-3 clockwise) for the electrical system to which this equipment is connected.

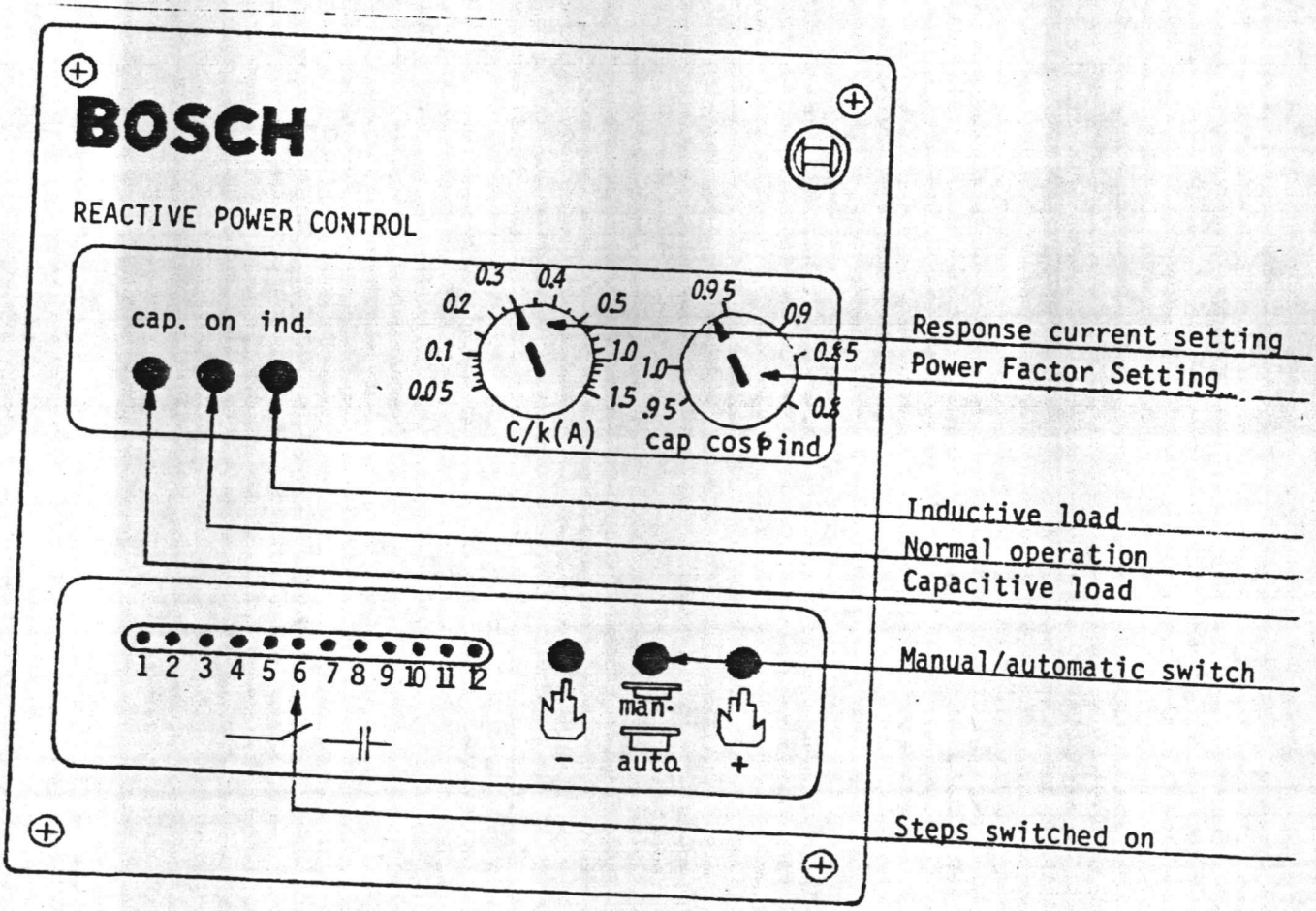
It is necessary that the external current transformer be installed in phase 1 of the electrical system with Polarity H1 facing the source, and that the secondary wires "A" (Polarity X1) and "B" be connected to the terminal block as shown on the schematic drawing (sheet 2 enclosed.)

It is necessary that the 3 phase power input connections phase 1, 2 and 3 be connected to terminals L1, L2 & L3 respectively, as marked at the lug landings.

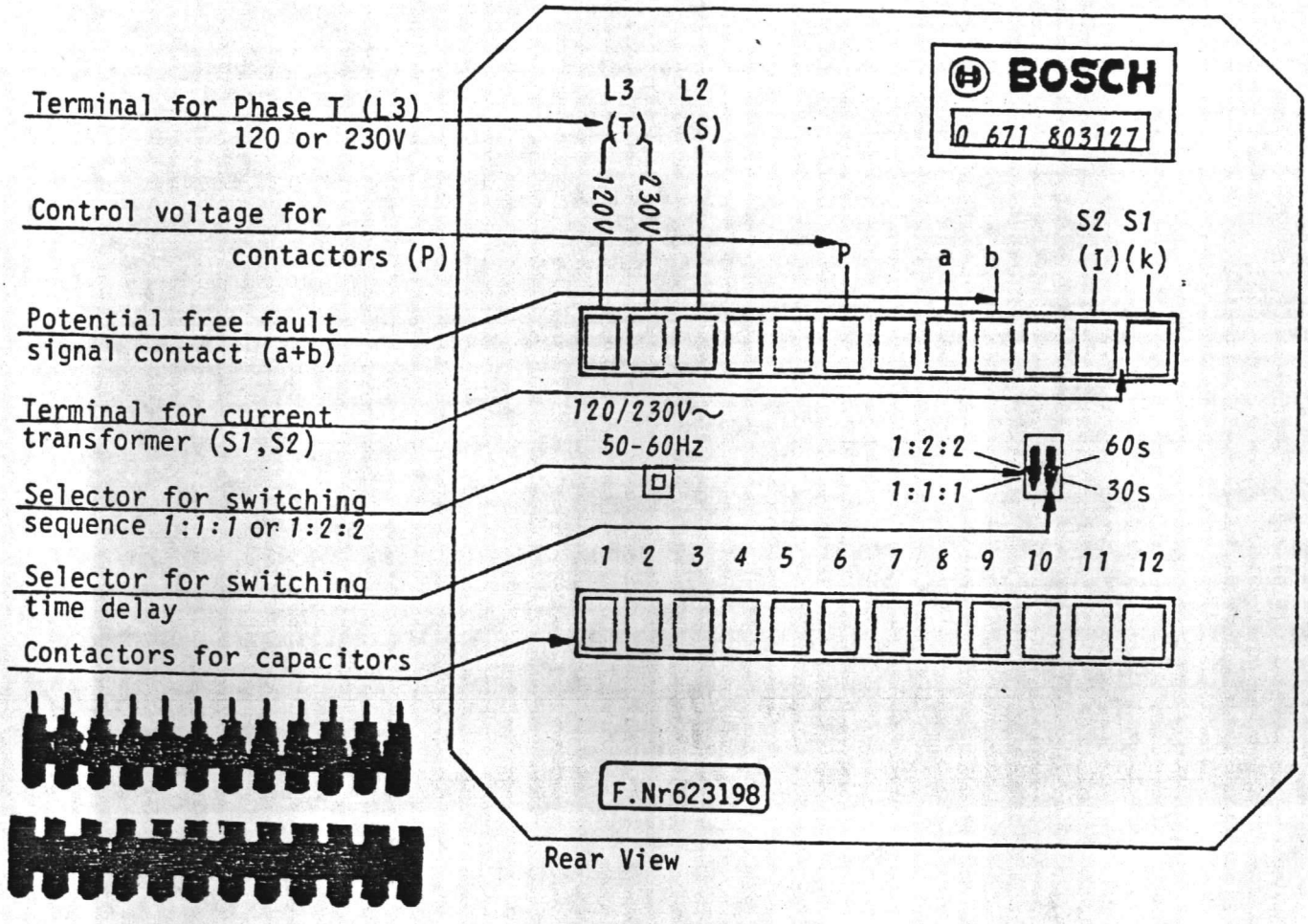
If any of the above cannot be accomplished please advise your salesman so he can obtain assistance from the factory.

Functional Description

If the reactive current component in phase L1 (R) of the three-phase system exceeds certain threshold values which can be set on the front panel of the reactive power controller, this produces a digital signal. In the case of inductive reactive current (inductive reactive power) the first control contact of the reactive power controller is closed after a time delay. This causes a contactor to switch on a capacitor step into the power circuit from the supply system. If this correction is not sufficient, further steps are switched on as required. If the inductive reactive current component of the loads decreases again, the capacitive component causes the capacitor steps to be switched off.

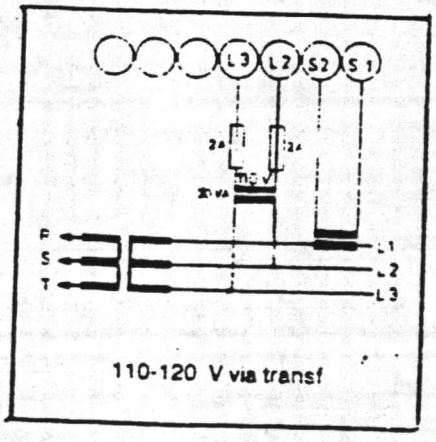


Control Elements



Connector blocks

Connection diagram



The reactive power controller is connected to the 3-phase system in accordance with the connection diagram. It must be ensured that the phase with the current transformer is connected to L 1 (R).

Phases L 2 (S) and L 3 (T) are connected so as to establish a clock-wise phase sequence.

The control voltage for the contactors is connected to terminal P. The easiest way of doing this is by means of a bridge between P and L 2 (S). In this case, the connections can be protected jointly by a max. 6 A fuse. However, note the coil voltage of the contactors.

A potential-free fault signal contact at terminals "a" and "b" signals "supply system failure". The contact closes if no supply voltage is applied to the controller.

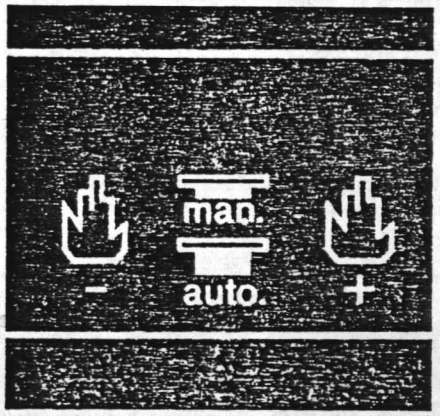
The potential S 1 (K) of the current transformer must be earthed.

Setting the Switching Time Delay

On the back of the reactive power controller there are two selector switches between the two connector blocks. With the right-hand switch it is possible to set the switching time delay between two steps to 30 or 60 seconds. The 60 second setting helps to reduce contact wear in the case of high switching frequencies. The switches are easy to operate, for example by using a ball-point pen.

Manual Mode

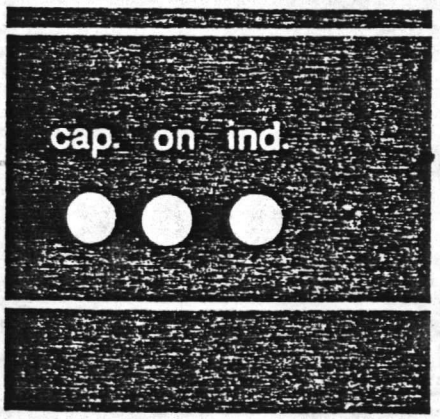
By pressing in the middle push-button "auto/man" the reactive power controller can be switched over from automatic to manual mode. Manual mode is indicated by the green LED "on" which flashes when manual mode is selected. In manual mode (push-button "auto/man" pressed) the desired number of capacitor steps can be switched on by pressing the right-hand push-button "+ΔC" or can be switched off with the left-hand push-button "−ΔC". This is also indicated by the LEDs "ind" and "cap". The user can thus check the correct connection and operation of the entire power factor correction system. When switching on or off capacitor steps manually, the corresponding push-buttons must remain pressed until the signal has been processed internally. This prevents repetition of switching within 10 seconds.



LED Indicators

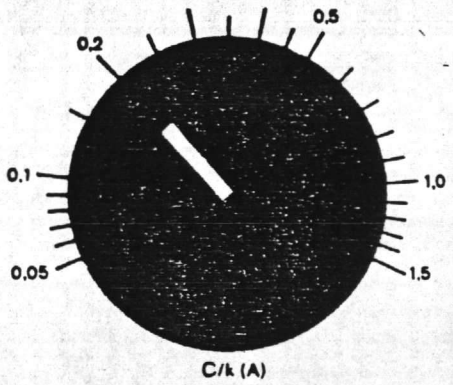
The green LED "on" indicates the normal operating status of the reactive power controller. When continuously lit, this indicates automatic mode; flashing indicates manual mode. This is of particular benefit since after manual operation it is easy to forget to switch over to automatic mode.

The red LEDs "ind" and "cap" indicate the correction status of the system. If neither of the LEDs is lit, this shows that the system is corrected. If one of the LEDs is lit, this means that either the inductive or the capacitive reactive current component has exceeded the set threshold value.



Another row of 7 or 12 red LEDs on the front panel shows which control contacts are closed.

Setting the Response Current



The arrow of the "C/k" adjusting disc is set to the specified response current.

The value of the response current to be set depends on the size of the power factor correction system. For standard current transformers with a secondary current of .../5 A and a rated voltage it is possible to calculate the response current from the general formula as follows:

$$J_A = \frac{2}{3} \cdot \frac{Q}{U \cdot \sqrt{3} \cdot k}$$

$$\approx 0.385 \frac{Q}{U \cdot k}$$

J_A = value in A of reponse current to be set
Q = capacitor step rating in var
U = supply system voltage (phase/phase) in V
k = current transformer transformation ratio (primary/secondary current)

$$= \frac{2}{3} \times \frac{25}{480\sqrt{3} \times 400/5}$$

$$J_A = .00025$$

Setting the Switching Sequence

By means of the left-hand switch on the back of the reactive power controller it is possible to set the switching sequence to a capacitor step ratio of 1:1:1... or to a ratio of 1:2:2... In the first case, all capacitor steps are of the same rating whereas, in the second case, the ratings of the second step and each further step are double the rating of the first one. With the switch set to "1:1:1..." the control contacts of the reactive power controller are switched on or switched off in succession. With the switch set to "1:2:2..." the first step alternates; the other steps are switched in succession. The following table illustrates the principle.

Switching sequence 1:1:1...

switching operation	control contact 1	2	3	4	5	6	7
1	●						
2	●	●					
3	●	●	●				
4	●	●	●	●			
5	●	●	●	●	●		
6	●	●	●	●	●	●	
7	●	●	●	●	●	●	●

● = control contact closed
(in the example 7-step reactive power controller with 7 switching operations)

Switching sequence 1:2:2...

switching operation	control contact 1	2	3	4	5	6	7
1	●						
2		●					
3	●	●					
4		●	●				
5	●	●	●				
6		●	●	●			
7	●	●	●	●			
8		●	●	●	●		
9	●	●	●	●	●		
10		●	●	●	●	●	
11	●	●	●	●	●	●	
12		●	●	●	●	●	●
13	●	●	●	●	●	●	●

● = control contact closed
(in the example 7-step reactive power controller with 13 switching operations)

M739

single-phase, C.T. on Phase L1

120 - 230 V, 1 phase

10 VA

phase to phase, connections L2, L3

independent from the mains frequency

rated current 5A rated power 1.7VA

plus 20% continuously

0.05 - 1.5A

LED "lag" and LED "lead"

incorporated as standard

continuously adjustable between 0.95 leading unity and 0.8 lagging

7 or 12 contacts, isolated from mains

380V max, 5A, 1800VA

selector switch on the back of the controller

60 sec; selector switch on back of troller

LEDs

and 2 push buttons; (+) = Advance, etard

rated as standard

44 mm (DIN 43700)

38 mm (DIN 43700)

nt panel, only

ctor blocks, pin type

60°C

Colour	housing and front panel in black, high impact plastic

4. Other Features

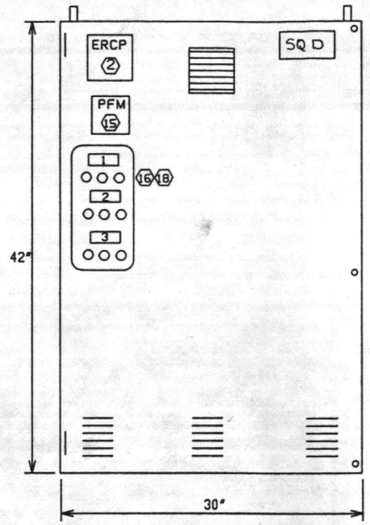
4.1 Connections	120V single phase via connector blocks; fault single contact
4.2 Display	Mode of operation display Manual: intermittant light Automatic: continuous light
4.3 C/K setting	symetrical

2.5 x

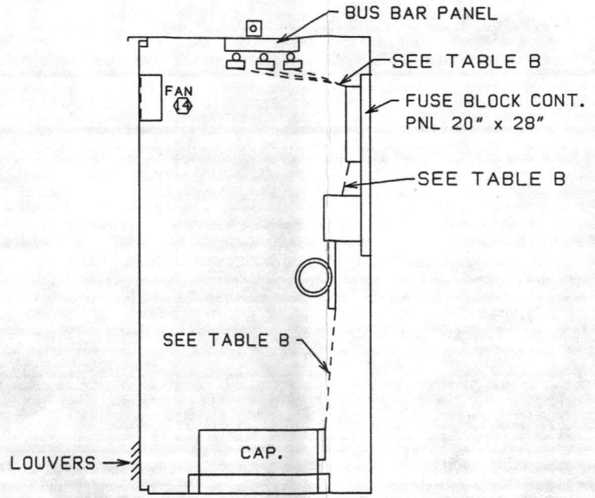
HINTS FOR TROUBLE SHOOTING - M739

Controller does not work.	1. Check measuring voltage on terminals L2 & L3 2. Check C.T. connection. 3. Check C.T. secondary current with prong-type Amp meter.
Controller does not react on pushing "advance" (+) or "retard" (-) button.	1. Has the button been continuously pushed for 15 or 30 sec? 2. Has only one button been pushed at a time? 3. Check voltage.
In spite of inductive load the response current indicators do not light.	Reduce both leading and lagging response current by turning setting screws to the left until LEDs light up.
One capacitor stage is continuously switched on and off (hunting).	Too low value of response current set. Turn both setting screws to the right until hunting stops. Same is done with unknown transformation ratio of C.T. Recheck C/K calculation.
No off switching of controller during low load conditions.	Possibly the C.T. is in wrong place. Check on wiring connection and sequence: supply - C.T. - capacitors-load (consumers).
Under lagging load the response current indicator leading lights up.	Change C.T. leads on terminal 1 and 2 against each other.
Intermittent light of response current indicator.	Peak currents caused by on switching processes or welding machines. Of no importance due to delayed operation of controller.
Both response current indicators light up at the same time.	Fault of the electronics.
To check for proper C.T. connection	1. Turn PF (COSØ) dial to point where neither lead LED or lag LED is lighted. System is balanced. 2. Turn P.F. (COSØ) dial to .95 lead. Lag (ind) LED (right hand) should light. Turn P.F. (COSØ) dial to .80 lag. Lead (cap) LED (left hand) should light. If opposite LED's light, then reverse C.T. connection.
If unit steps up or down manually. but will not function automatically.	Check CT for proper ampere reading.

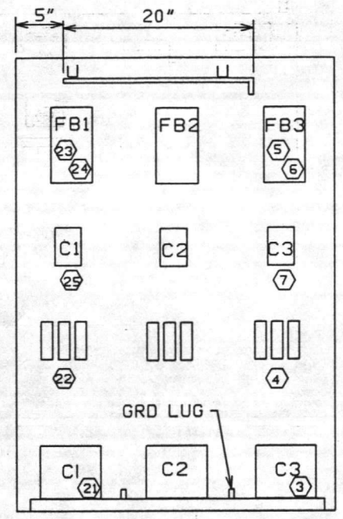
The reading of a power factor meter does not correspond with the function of the controller: Showing unity the controller LED lag still lights up.	1. A power factor meter gives wrong readings if nominal load decreases to 20 percent. 2. Check programming plugs on rear of controller.
In spite of the controller working properly the reactive current meter works fast.	1. Check control circuits: a) Contactor coil voltage between phase L2 or L3 or neutral and terminal 9 to 20, b) cable connection to contactors, c) coils of contactors. 2. Check capacitor circuits: a) Current input with prong type Amp meter, b) fuses and contactor contacts with voltage meter.



ELEVATION

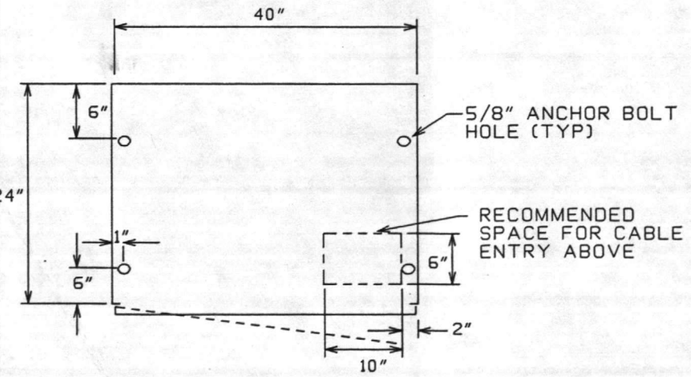


SECTION A-A

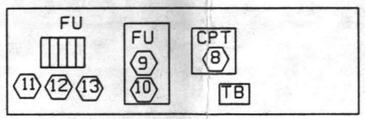


FRONT VIEW OF INTERIOR BACK WALL

NAMEPLATES 1"x3" 3/16" WHITE LETTERS ON BLACK			
NO	QUAN	INSCRIPTION	
		LINE-1	LINE 2
1	1	BLOWN FUSE CKT. 1	1-2-3
2	1	BLOWN FUSE CKT. 2	1-2-3
3	1	BLOWN FUSE CKT. 3	1-2-3



PLAN VIEW



CONTROL PAN LAYOUT

KVAR	TABLE A WIRE SIZE	TABLE B WIRE SIZE
50	1-#4AWG	#8&#10,20&10KVAR
75	1-#2AWG	#6&#10,30&15KVAR
100	1-1/0AWG	#6&#8,40&20KVAR
125	1-3/0AWG	#4&#6,50&25KVAR
150	1-4/0AWG	#4

SPECIFICATIONS

1. CABINET TO BE INDOOR NEMA 1, 12 GAUGE FORMED UP SHEET STEEL CONSTRUCTION ACCESSIBLE FROM FRONT.
2. PAINT-ANSI #61 LT. GRAY ACRYLIC.
3. MAIN BUS TO BE 600A 1/4"x2" PLATED WITH NO NEUTRAL AND BRACED FOR 42000A SIM. SHORT CIRCUIT DUTY.
4. CONTROL WIRING SHALL BE #14 STANDARD SIS WIRE.
5. POWER CIRCUITS SHALL BE AS SHOWN.
6. ⬡ DENOTES ITEM NUMBER ON BILL OF MATERIAL.

APPROX. WT. = 475#

RATING: 480V, 3P3W, 60HZ, 125KVAR
SQ.D. CAT.#: PFC42550L125PL
SQ.D. F.O.#: 8739912

DO NOT SCALE - WORK TO DIMENSIONS

D1169001-1

CJL | 8/11/87

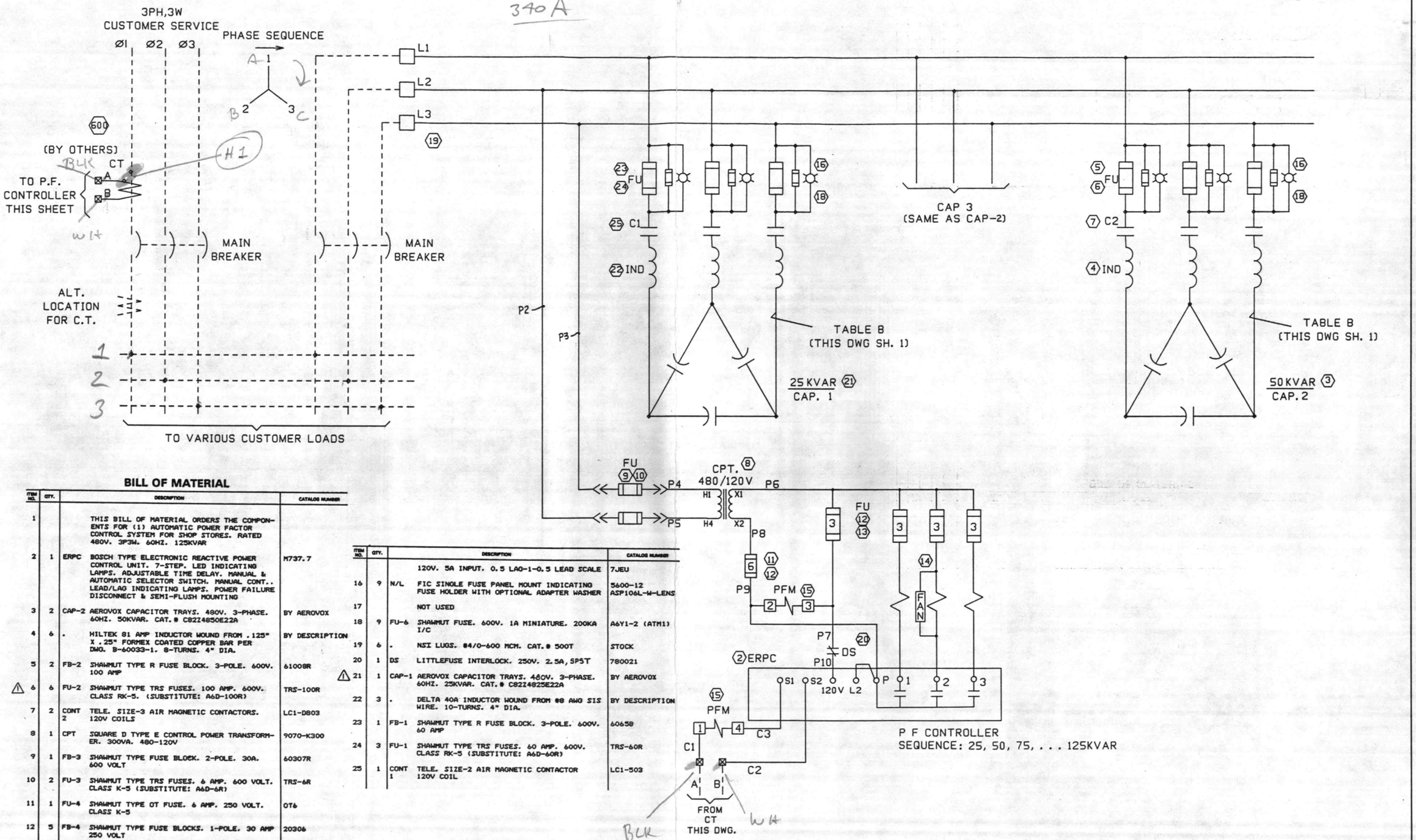
PRINTS TO

VARGARD-MECHANICAL

FOR SHOP STORES

SQUARE D COMPANY
LEXINGTON, KY., U.S.A.

340 A



BILL OF MATERIAL

ITEM NO.	QTY.		DESCRIPTION	CATALOG NUMBER
1			THIS BILL OF MATERIAL ORDERS THE COMPONENTS FOR (1) AUTOMATIC POWER FACTOR CONTROL SYSTEM FOR SHOP STORES. RATED 480V. 3P3W. 60HZ. 125KVAR	
2	1	ERPC	BOSCH TYPE ELECTRONIC REACTIVE POWER CONTROL UNIT. 7-STEP. LED INDICATING LAMPS. ADJUSTABLE TIME DELAY. MANUAL & AUTOMATIC SELECTOR SWITCH. MANUAL CONT.. LEAD/LAG INDICATING LAMPS. POWER FAILURE DISCONNECT & SEMI-FLUSH MOUNTING	M737.7
3	2	CAP-2	AEROVOX CAPACITOR TRAYS. 480V. 3-PHASE. 60HZ. 50KVAR. CAT.# C82Z4850E22A	BY AEROVOX
4	6	.	MILTEK 81 AMP INDUCTOR WOUND FROM .125" X .25" FORMEX COATED COPPER BAR PER DWG. B-60033-1. 8-TURNS. 4" DIA.	BY DESCRIPTION
5	2	FB-2	SHAWMUT TYPE R FUSE BLOCK. 3-POLE. 600V. 100 AMP	61008R
⚠1 6	6	FU-2	SHAWMUT TYPE TRS FUSES. 100 AMP. 600V. CLASS RK-5. (SUBSTITUTE: A6D-100R)	TRS-100R
7	2	CONT 2	TELE. SIZE-3 AIR MAGNETIC CONTACTORS. 120V COILS	LC1-D803
8	1	CPT	SQUARE D TYPE E CONTROL POWER TRANSFORMER. 300VA. 480-120V	9070-K300
9	1	FB-3	SHAWMUT TYPE FUSE BLOCK. 2-POLE. 30A. 600 VOLT	60307R
10	2	FU-3	SHAWMUT TYPE TRS FUSES. 6 AMP. 600 VOLT. CLASS K-5 (SUBSTITUTE: A6D-6R)	TRS-6R
11	1	FU-4	SHAWMUT TYPE OT FUSE. 6 AMP. 250 VOLT. CLASS K-5	OT6
12	5	FB-4	SHAWMUT TYPE FUSE BLOCKS. 1-POLE. 30 AMP 250 VOLT	20306
13	4	FU-5	SHAWMUT TYPE OTS FUSES. 3 AMP. 250 VOLTS CLASS K-5	OT3
14	1	FAN .	DAYTON FAN ASSEMBLY. 120 VAC. 400 CFM	GRAINGERS 7X673
15	1	PFM	O.E. TYPE AB-40 POWER FACTOR METER. 3P3W	R50-103402-FCAD
16	9	N/L	120V. 5A INPUT. 0.5 LAG-1-0.5 LEAD SCALE	7JEU
			FIC SINGLE FUSE PANEL MOUNT INDICATING FUSE HOLDER WITH OPTIONAL ADAPTER WASHER	5600-12 ASP106L-W-LENS
17			NOT USED	
18	9	FU-6	SHAWMUT FUSE. 600V. 1A MINIATURE. 200KA I/C	A6Y1-2 (ATM1)
19	6	.	NSI LUGS. #4/0-600 MCM. CAT.# 500T	STOCK
20	1	DS	LITTLEFUSE INTERLOCK. 250V. 2.5A, SPST	780021
⚠21	1	CAP-1	AEROVOX CAPACITOR TRAYS. 480V. 3-PHASE. 60HZ. 25KVAR. CAT.# C82Z4825E22A	BY AEROVOX
22	3	.	DELTA 40A INDUCTOR WOUND FROM #8 AWG SIS WIRE. 10-TURNS. 4" DIA.	BY DESCRIPTION
23	1	FB-1	SHAWMUT TYPE R FUSE BLOCK. 3-POLE. 600V. 60 AMP	60658
24	3	FU-1	SHAWMUT TYPE TRS FUSES. 60 AMP. 600V. CLASS RK-5 (SUBSTITUTE: A6D-60R)	TRS-60R
25	1	CONT 1	TELE. SIZE-2 AIR MAGNETIC CONTACTOR 120V COIL	LC1-503

DO NOT SCALE - WORK TO DIMENSIONS

REV.	CA.	DATE	BY	MODIFY BILL OF MATERIALS
1		8-21	CJP	

STANDARD TOLERANCE UNLESS OTHERWISE SPECIFIED: LINEAL dim. TWO PLACE DECIMAL ± .010; THREE PLACE DECIMAL ± .005; ANGLE ± 1°; MACHINED SURF. 125; FINISH ALL OVER 250; THREE PLACE DECIMAL ± .002; TWO PLACE DECIMAL ± .010; UNDIMENSIONED 90° ± 1°

D1169001-2

PRINTS TO

VARGARD-ELECTRICAL

FOR SHOP STORES

8/17/87

SQUARE D COMPANY
LEXINGTON, KY., U.S.A.

From: Public Works Officer, Marine Corps Base, Camp Lejeune

To: Base Maintenance Officer

Subj: PWD STUDY90-22, EVALUATE OF EARTH RESISTANCEREADINGS, AMMO. STORAGE SITES.

Ref: (a) BMO memo 4280/1 MAIN of 04 Jun 90

1. Prior to the developing the scopeof work as requested by the reference, the following information is needed:

a. What manuals have the testingpersonnel studied? What manual is used as a reference?

b. How familiar are the testing personnel with the lightning protection system?

2. It is suggested that the personnel with testing equipment be assembled at a lightning protection system at one of the storage sites and a ground test be conducted to demonstrate the method and procedures to Mr. A. Young.

3. Point of contact is Mr. Andrew Young, extension 3658.

ENGINEERING EVALUATION REPORT
LIGHTNING GROUND SYSTEM
AMMO STORAGE FACILITIES

1. PURPOSE - The purpose of this report is to evaluate the measured earth resistance readings that were taking for Spring, 1990 annual facility report and to develop a project to correct any deficiencies uncovered by this study.

2. GENERAL - The primary purpose of a lightning protection grounding system is to intercept or divert a lightning stroke to a low impedance path to an earth ground. The secondary purpose is to ensure that all metal surfaces are bonded together to maintain the same electrical potential in order to minimize side flashes.

The Naval Sea Systems Command (NAVSEASYSCOM) OP5 Technical Manual requires that each lightning protection system in an ammunition facility be visually inspected and electrically tested with regularity.

Visual inspection of each lightning protection system is required to be conducted at least every seven months fordiscrepancies such as broken or corroded connections or conductors. Repairs of all discrepancies uncovered by the visual inspections are required by the NAVSEASYSCOM instructions in to be completed immediately. Damage caused by alightning strike is to be reportedto NAVSEASYS-COM with repairs to follow after the securing of photographic documentation.

Electrical testing of each system is required to be conducted at least every fourteen months by personnel who are thoroughly familiar with both the lightning protection system and the ground resistance test instrument including the testing procedures. The test is to be in accordance with the appropriate test instrument manufacturer's instructions. A reading of ten ohms or lessfor the resistance measurement between the ground ring or girdle to the earth is satisfactory. A reading of one ohm or less for the resistance measurement conducive path that exists between a conductive surface and the grounding ring is satisfactory. (The resistive value of the test leads or conductors should be determined and subtracted from these readings.)

2. FINDINGS - To verify the accuracy of the earth resistance readings that where previous taken and to observe the testing procedures that are used, a demonstration of the testing was conducted on 24 Aug 90 andthe following deficiencies were noted: the format of the annual report does not include the readings for the resistance measurements between each metal surfaceand the grounding ring nor the readings for resistance measurement of the grounding ring with respect to the earth. The reportreadings listed the ohmic value of the grounding system to the earth which included the test leads resistance and confirmed the report writer's suspicion that the readings were not properly taken.

3. RECOMMENDATIONS - Manuals pertaining to thetesting of electricalresistance measurement should be obtained and studied by the personnel that are conducting these test.The Electrical Engineering Branch at the Public Works Division will provide instructions in the training of test personnel upon request.

It is recommended that another test of each lightning protection ground system be conductedin the near future. The testing of each ammo facility will requiredapproximately one-half manhour persite or facility.

4. Point of contact: Andrew Young, Public Works, MAR CORP BASE, CAMP LEJEUNE, NC.

Phone: (919) 451-3658

100 Ton 109.5 Ton.
CH-1 208/3ϕ
2 Comp - @ 228A ea
137.5 KW
Ckt Ampacity = 607 Amps.

84-7211

ELEVATION "A-A"

SINGLE LINE FOR ELEVATION "A-A" SERVICE #4

ELECTRICAL FEEDER & EQUIPMENT FLOOR PLAN

SCALE 1/8" = 1'-0"

GRAPHIC SCALE
4' 2' 0 10' 20'
1/8" = 1'-0"

EQUIPMENT SCHEDULE

- (21) 3P 4W SN 250V 200A FUSES
- B 2P 3W SN 250V
- (19) 3P 225A ENCL CB
- (22) 3P 4W SN 250V 100A FUSES
- (15) 3P 4W SN 250V 200A FUSES
- F 3P 4W SN 250V 60A FUSES
- G 3P 4W SN 250V 60A FUSES
- H 3P 4W SN 250V 100A FUSES
- I 10 CIRC. PLUG FUSE PANEL
- (23) 1P 2W 250V 30A FUSE
- K 2P 3W 250V 30A FUSE (1)
- (16) 3P 4W SN 250V 200A

ELECTRICAL STUDY
STUDY # 84-01
BUILDING NO. 1101
RASC - LDMX AREAS
MARINE CORPS BASE CAMP LEJEUNE, N.C.
HENRY VON OESEN & ASSOCIATES, INC.
611 PRINCESS STREET WILMINGTON, N.C.
APRIL 1985

1. COMPONENT	NAVOSH Deficiency Abatement Program FY 19 84 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		1 SEP 1981

3. INSTALLATION AND LOCATION	4. PROJECT TITLE
MARINE CORPS BASE CAMP LEJEUNE, NORTH CAROLINA 28542	ELECTRICAL GROUNDING AND BONDING

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
	VARIOUS	P-811	$520

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT COST	COST ($000)
WIRING, PANELS, GROUNDING, MISC.	LS	-	-	450
CONTINGENCIES - 10%	LS	-	-	45
TOTAL CONTRACT COST	LS	-	-	495
SUPERVISION, INSPECTION, & OVERHEAD - 5.5%	LS	-	-	27
TOTAL REQUEST	LS	-	-	522
TOTAL REQUEST (ROUNDED)	LS	-	-	520
INSTALLED EQUIP - OTHER APPROPRIATIONS	-	-	-	-

10. DESCRIPTION OF PROPOSED CONSTRUCTION

Provide various electrical modifications to miscellaneous buildings, Basewide. Work to include new conductors, panels, service and panels.

11. REQUIREMENTS

PROJECT: Provide correction of various OSHA standards violations.

REQUIREMENT: Provide safe electrical utilities for use by military and civilian population in support of missions.

CURRENT SITUATION: Many buildings at Camp Lejeune were constructed in 1942/1943. The electrical deficiencies are numerous, varied, and widespread. Much of the wiring systems do not conform to OSHA standards and the National Electric Code.

IMPACT IF NOT PROVIDED: Probability of fire or physical harm due to now grounded system. Existing system is in violation of OSHA 1910.308 and 1910.309. The Risk Assessment Code is IIB.

VM

1. COMPONENT	FY 19 84 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		1 SEP 1981

3. INSTALLATION AND LOCATION

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542

4. PROJECT TITLE	5. PROJECT NUMBER
ELECTRICAL GROUNDING AND BONDING	P-811

SPECIAL CONSIDERATIONS:

1. Pollution Prevention, Abatement, and Control: This project will not cause additional air or water pollution.

2. Flood Hazard Evaluation: Requirements of Executive Order No. 11296 (Flood Hazards) are not applicable.

3. Environmental Impact: Not applicable.

4. Fallout Shelter Construction: Not applicable.

5. Design for Accessibility of Physically Handicapped Personnel: Not applicable.

6. Use of Air Conditioning: Not applicable.

7. Preservation of Historical Sites and Structures: This project does not directly or indirectly affect a district, site, building, structure, object, or setting which is listed in the National Register or otherwise possesses a significant quality of American history.

8. "New Start" Criteria for Commercial or Industrial Activities Program (OMB Circular A-76): Not applicable.

☆U.S. GOVERNMENT PRINTING OFFICE: 1978—703-173/34312-1

1. COMPONENT	FY 19 84 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		1 SEP 1981

3. INSTALLATION AND LOCATION

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542

4. PROJECT TITLE	5. PROJECT NUMBER
ELECTRICAL GROUNDING AND BONDING	P-811

FACILITY STUDY:

1. Project. Provide for correction of various OSHA standards violations in order to provide safe and healthful work places.

2. Current and Planned Future Workload with Regard to this Project. These facilities will be used 100% of the time, and the duration of need is indefinite.

3. Description of Proposed Construction:

a. Type of Construction. Replace two-wire electrical system.

b. Replacement. Not applicable.

c. Description of Work to Be Done:

(1) Primary Facility. Rewire buildings.

(2) Energy Conservation. Not applicable.

(3) Collateral Equipment: Not applicable.

4. Cost Estimate. Area Cost Factor for Camp Lejeune, NC is 0.95, from the Military Construction Cost Review Guide, FY-82 (DOD 4270 1-CG). This project is escalated to FY-82 to provide the cost for the proposed project.

5. Justification for Project and for Scope of Project:

a. Justification for Project. Proposed project is required to provide safe working conditions for personnel in the structures and buildings.

(1) Project. Provide correction of various OSHA regulations pertaining to electrical discrepancies.

(2) Current Situation: Violation of OSHA and NEC of an electrical nature are numerous, varied, and widespread throughout the Base complex.

(3) Impact if Not Provided: Continued violation of OSHA and NEC regulations.

b. Justification for Scope of Project. The project scope is the minimum amount that can meet the deficiency requirement corrections as noted in the Base Safety Inspection Report, 1977.

$$\begin{array}{r} 35 \\ 4 \\ \hline 140 \\ 2 \\ \hline 168 \end{array}$$

1. COMPONENT	FY 19 84 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		1 SEP 1981

3. INSTALLATION AND LOCATION

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542

4. PROJECT TITLE	5. PROJECT NUMBER
ELECTRICAL GROUNDING AND BONDING	P-811

6. Equipment Provided from Other Appropriations: Not applicable.

7. Common Support Facilities: Not applicable.

8. Effect on Other Resources: No effect on utility costs or additional personnel required to operate these facilities.

9. Siting of the Project: The facilities will be located in the following buildings. See enclosure (1).

79-4470

4		1105	1811 GP 816	TC-761
11		1107	1812	TC-771
18		1108	1824	TC-823
25		1114	1847	TC-831
33		1115	1916	TC-832
37		1117	1919	TC-834
45		1118	CG-1	TC-900
234 80		1120	FC-100	TC-952
329 311		1200	FC-101	TC-1021
414 331		1203	FC-200	TC-1022
728	1205 1206	1207	RR-6	TC-1023
442 740		1209	RR-10	TC-1030
532 780	1310	1211	RR-13	TC-1031
598 816		1302	RR-14	M-103 M-130
599 901		1304	RR-15	M-112
902		1306	RR-85	M-136 M-324
739 904		1312	RR-92	M-170
905		1212	TC-341	M-171
909 906		1400	TC-362	M-178
907	1405	1401	TC-462	M-302
910 908		1402	RR-470	M-303
913 914	1406	1403	TC-471	M-602
916		1408	TC-474	BA-106
928	1505	1500	TC-563	BA-138
1002	1506	1503	TC-720	BA-166
1004	1402	1504	TC-721	BB-3
1005	1404	1601	TC-722	BB-9
1011		1610	TC-723	BB-16
1012	1405	1611	TC-730	BB-31
1014	1711	1613	TC-731	BB-32
1015		1706	TC-733	BB-43
1100		1708	TC-734	BB-48
1102		1800	TC-735	BB-49
1104		1808	TC-760	BB-50

U.S. GOVERNMENT PRINTING OFFICE: 1978—703-173/3431 2-1

1. COMPONENT	FY 1984 MILITARY CONSTRUCTION PROJECT DATA	2. DATE
NAVY		1 SEP 1981

3. INSTALLATION AND LOCATION

MARINE CORPS BASE, CAMP LEJEUNE, NORTH CAROLINA 28542

4. PROJECT TITLE	5. PROJECT NUMBER
ELECTRICAL GROUNDING AND BONDING	P-811

9. Siting of the Project (continued...)

BB-51	BB-175	TT-49	STT-50
BB-68	BB-176	TT-2453	STT-69
BB-69	BB-177	TT-2455	LCH-4000
BB-71	TT-36	TT-2457	LCH-4014
BB-80	TT-38	TT-2461	LCH-4022
BB-83	TT-41	TT-2463	LCH-4023
BB-174	TT-42	TT-2477	

10. Other Graphic Presentations, including Photographs: None

11. Economic Analysis: No analysis has been made. This project is required to correct an OSHA violation.

12. Environmental Impact: Not applicable.

13. Quantitative Data: Not applicable.

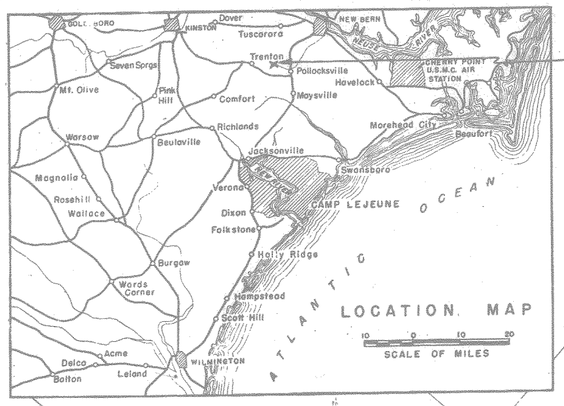
14. Maintenance Facilities: Not applicable.

15. Morale, Welfare, and Recreation Facilities: This project will provide a safe workplace for military and civilian personnel.

16. Relocation Facilities: Not applicable.

17. Storage Facilities: Not applicable.

18. Hazards Identification, Assessment, and Analysis: This project will replace deteriorated electrical systems with approved wiring and panels properly grounded.



OAK GROVE
SHEET 24 OF 24

NUMBER	LOCATION	USE
~~748~~	2-C	~~QUARTERS, CIVILIAN~~
814	5-B	RANGE HOUSE
~~815~~	2-C	~~PUMP HOUSE~~
~~824~~	2-B	~~RANGE HOUSE~~
S-822	2-C	HISTORICAL MARKER (2)
S-823	1-D	HISTORICAL MARKER (1)
S-824	3-C	HISTORICAL MARKER (1)
S-8A-136	5-G	SMALL ARMS MAGAZINE (PYRO)
S-8A-137	5-G	SMALL ARMS MAGAZINE "
~~S-8A-141~~	~~4-G~~	~~OBSERVATION OFFICE~~
~~S-822~~	~~2-C~~	~~RUSTIC BRIDGE~~
839	5-B	RANGE HOUSE - RANGE F-4
S-863	4-E	VEHICULAR BRIDGE
CR-106	5-D	ARTILLERY OBSERVATION BUILDING
~~ST-10~~	~~3-C~~	~~WELL HOUSE~~
~~ST-21~~	~~3-A~~	~~WELL HOUSE~~
~~S-T-21-A~~	~~7-E~~	~~CONTROL TOWER~~
S-H-1	5-E	COMBAT TOWN
~~S-TC-1008~~	~~1-B~~	~~SMALL ARMS MAGAZINE~~
~~S-TC-1010~~	~~1-B~~	~~SMALL ARMS MAGAZINE~~
~~S-TC-1011~~	~~2-B~~	~~SMALL ARMS MAGAZINE~~
~~S-VL-115~~	~~2-B~~	~~CLASSROOM (OPEN)~~
S-872	6-C	VEHICULAR BRIDGE
S-RR-244	2-E	CONTROL TOWER
S-RR-243	2-F	" "
~~RR-246~~	~~2-F~~	~~STORAGE~~
S-850	5-D	OBSERVATION MND (LUCKEYS MOUND)
S-961	4-E	W/VEHICULAR BRIDGE
S-WF-1	3-E	MARINE WARNING FLAG
S-WF-2	3-C	" " "
S-WF-3	4-D	" " "
S-WF-4	4-F	" " "
S-WF-5	3-B	" " "
S-TC-1226	1-B	CLASSROOM/COVR
650	5-B	WELL HOUSE
BA-300	4-G	PUBLIC TOILET
BA-301	4-G	" "

HELICOPTER LANDING ZONES		
NUMBER	GRID LOCATION	AREA LOCATION
S-LZ-1	3-B	MONTFORD POINT
" 2	3-C	NAVAL HOSPITAL
" 3	4-C	6TH MAR AREA RIVER RD-A ST
" 4	4-C	PARADE GROUND
" 5	4-D	BUILDING NO.2
" 6	4-D	10TH MAR AREA RIVER RD OPPOSITE BLDG NO.540
" 7	5-D	OP 2 LUCKEYS MOUND
" 8	4-F	ENGINEER SCHOOL CTHSE BAY MARINES RD-POE RD
" 9	2-F	RIFLE RANGE RANGE RD NEAR RANGE A
" 10	3-B	MOG AREA RIVER SHORE 2700 BLOCK
" 11	4-C	CENTRAL AREA VA DARE MOLLY PITCHER DR.
" 12	3-B	PARADISE POINT BREWSTER BLVD-KENT RD.
" 14	2-F	RIFLE RANGE NEAR WATER PLANT
" 15	2-A	GEIGER AREA CHURCH ST NEAR BLDG TC-200
" 16	4-D	8TH MAR AREA RIVER RD-K ST
" 18	4-C	2TH MAR AREA RIVER RD-E ST
" 19	2-F	RIFLE RANGE AREA TRI-ME VILLAGE-ADMIN AREA

TACTICAL LANDING ZONES	
5-F	ALBATROSS
4-G	BLUE BIRD
4-F	CANARY
4-E	DOVE
3-C	EAGLE
5-F	FALCON
5-E	GOOSE
5-E	HAWK
4-D	JAY BIRD
6-C	LARK
5-D	PENGUIN
6-B	ROBIN
4-C	SPARROW

LEGEND
- ▲ FIRE CONTROL AND OBSERVATION TOWER
- ▬ FOREST FIRE OBSERVATION TOWER
- + NO. HELICOPTER LANDING ZONES
- ○ OBSERVATION POINT
- -WF WARNING FLAGS
- SHEET BOUNDARY

SITE LOCATION MAP P-811

ELECTRICAL GROUNDING & BONDING

CAMP LEJEUNE, NORTH CAROLINA

SHOWING CONDITIONS ON

JUNE 30, 1979

4000' 0 4000' 8000' 12000' 16000'

SCALE OF FEET

LCDR, CEC, USN
PUBLIC WORKS OFFICER
MCB CLNC

SHEET 1 OF 24

FOR OFFICIAL USE ONLY

CAMP LEJEUNE, N.C.

NAVOSH DEFICIENCY ABATEMENT PROGRAM
OCCUPATIONAL SAFETY AND HEALTH CONTROL REPORT (OSHCR)

UIC: M67001
SERIAL NO.

****
* PROJ. NAME ELECTRICAL GROUNDING AND BONDING *
****

PROGRAM: MCON
FUNDING COMMAND: NAVFAC

DATE PREPARED: 1 Sep 1981
DATE INPUT:
DATE REVISED:
PROJ. NO. P-811

****

AGENCY: DEPARTMENT OF THE NAVY

1. ACTIVITY: MARINE CORPS BASE
ADDRESS: CAMP LEJEUNE, NORTH CAROLINA

NAVFAC CONTACT:

NARRATIVE
(LIMIT OF 65 POSITIONS PER LINE INCLUDING SPACES AND PUNCTUATION)

2. PROBLEM DESCRIPTION:

Many facilities were constructed in 1942/1943 and still have the same wiring systems; the wiring is deficient and deteriorated with only a two-wire conductor system. There is no provision for proper grounding.

3. SPECIFIC HAZARD AND LOCATION:

Electrical hazards to personnel; potential fire hazards.

U M67001
SERIAL NO.

****
* PROJ. NAME ELECTRICAL GROUNDING AND BONDING *
****

4. INTERIM CONTROL MEASURES:

Training of personnel in safe use of an inadequate electrical system.

5. EFFECTIVENESS OF INTERIM CONTROL MEASURES:

Interim measures have proved adequate; however, potential of fire or electrical shock exists.

6. PROPOSED CORRECTIVE ACTION AND EFFECTIVENESS:

This project will provide an adequate electrical system with grounding capability in accordance with OSHA standards.

7. OTHER RELEVANT INFORMATION:

LOCAL CONTACT: Mr. Almond C. Austin, Facility Coordinator, AV 484-3034.

NAVOSH DEFICIENCY ABATEMENT PROGRAM
OCCUPATIONAL SAFETY AND HEALTH CONTROL REPORT (NAVOSHR)

UIC: M67001
SERIAL NO.

****

* PROJ. NAME ELECTRICAL GROUNDING AND BONDING *

****

8. APPLICABLE STANDARDS:

OSHA 1910.308 and 1910.309 - The requirements contained in the National Electric Code shall apply to all electrical installations.

9. COST OF SAFETY AND HEALTH MEASURES: (IN THOUSANDS OF DOLLARS)

	CONSTRUCTION				REPAIR			
FY	DESIGN	FND	CONSTR	FND	DESIGN	FND	REPAIR	FND
84	31200	NO	520000	NO	____	__	____	__
	TOTAL				TOTAL			

10. PROJECT SCHEDULE:

	ACTIVITY (MMM/YY)	REGULATION (MMM/YY)
DESIGN (START)	____	
DESIGN (COMPLETION)	____	
CONSTR (START)	____	
CONSTR (COMPLETION)	____	
OPERATION (START)	____	
FINAL COMPLIANCE	____	OCT 1972

NAVOSH DEFICIENCY ABATEMENT PROGRAM
OCCUPATIONAL SAFETY AND HEALTH CONTROL REPORT (OSCR)

UIC: M67001
SERIAL NO.

****
* PROJ. NAME ELECTRICAL GROUNDING AND BONDING *
****

11. MISCELLANEOUS DATA:

APPROPRIATION: MCON

MAJOR CLAIMANT: CMC

SUB-CLAIMANT: CMC

HEALTH CATEGORY:

(016) HAZARD SUB-CATEGORY:

(018) HAZARD CATEGORY:

(005) VARIOUS LOCATIONS:

(009) STATUS:

12. BUILDINGS AFFECTED:

PROPERTY RECORD CARD NO: _____

NAVY CATEGORY CODE: _____ } VARIOUS

BUILDING NO: _____

13. HAZARD CONTROL ASSESSMENT:

SAFETY	OR	HEALTH
1) SPECIFIC HAZARD Electrical		1) SPECIFIC HAZARD _____
2) HAZARD VIOLATION (REGULATIONS) OSHA 1910-308 & 1910.309		2) HAZARD VIOLATION (REGULATIONS) _____
3) PROBABILITY (CIRCLE ONE) A) LIKELY B) PROBABLE C) (POSSIBLE) D) UNLIKELY		3) CONCENTRATION OF HAZARD: _____ UNITS: _____ IS CONCENTRATION ABOVE CEILING A) YES B) NO
4) SEVERITY OF MOST LIKELY INJURY Shock		4) CURRENT STANDARDS: _____ THE UNITS MUST BE THE SAME AS ITEM 3.
5) DAYS LOST PER INCIDENT (CIRCLE ONE) A) 4200 B) 2500-4199 C) 1200-2499 D) 400-1199 E) 100-399 F) 30-99 G) (<30)		5) TIME BETWEEN EXPOSURE AND HARMFUL IMPACTS (CIRCLE ONE): A) IMMEDIATE B) IN MONTHS C) IN YEARS

*(001) UIC: M67001
(002) SERIAL NO.

****

* PROJ. NAME ELECTRICAL GROUNDING AND BONDING *

****

13. HAZARD CONTROL ASSESSMENT: (Cont'd)

6) NORMAL WORKING POPULATION EXPOSED TO HAZARD (EMPLOYEES) (CIRCLE ONE):

A) 1-4 B) 5-9 C) (10-50) D) > 50

7) RATE OF EXPOSURE TO HAZARD (HOURS/YEAR PER PERSON EXPOSED) (CIRCLE ONE): NOT APPLICABLE.

A) < 40 B) 40-150 C) 151-959 D) 960-2000 E) > 2000

8) INSTALLED COST OF CORRECTIVE ACTION ($X10^3) (CIRCLE ONE):

A) ≤ 40 B) 41-60 C) 61-80 D) 81-100 E) (> 100)

9) CHANGE IN ANNUAL O&M COST ($X10^3) (CIRCLE ONE):

A) < (-5) B) (-5)-0 C) (1-5) D) 6-10 E) > 10

10) TIME TO ACCOMPLISH THE CONSTRUCTION OF CORRECTIVE ACTION (MONTHS) (CIRCLE ONE):

A) 1-3 B) 4-6 C) 7-9 D) (10-12) E) 13-24 F) > 24

SAFETY	OR	HEALTH
11) UPON COMPLETION, WILL THE SAFETY PROJECT BE IN FULL LEGAL COMPLIANCE? (CIRCLE ONE): A) (YES) B) NO		11) UPON COMPLETION, WHAT WILL THE ESTIMATED CONCENTRATION OF THE DESIGNATED HEALTH HAZARD BE? CONCENTRATION _____ THE UNITS MUST BE THE SAME AS ITEM 3.

12) CHANGE IN ENERGY CONSUMPTION CAUSED BY CORRECTIVE ACTION (10^6BTU/YEAR) (CIRCLE ONE): NOT APPLICABLE.

A) < (-500) B) (-500)-0 C) 1-500 D) 501-1000 E) > 1000

13) EFFECTIVE LIFE OF CORRECTIVE ACTION (YEARS):;

A) (≥ 10) B) 5-9 C) 3-4 D) 1-2 E) 1

NAVOSH DEFICIENCY ABATEMENT PROGRAM

OCCUPATIONAL S[illegible]TY AND HEALTH CONTROL REPORT (OCR)

*(001) UIC: M67001

(002) SERIAL NO.

****

* PROJ. NAME ELECTRICAL GROUNDING AND BONDING *

****

13. HAZARD CONTROL ASSESSMENT: (Cont'd)

14) POTENTIAL FOR RELOCATING THE PROCESS OR FUNCTION TO AVOID THE HAZARD (CIRCLE ONE): NOT APPLICABLE.

A) HIGH B) MEDIUM C) LOW

15) EXPECTED LIFE OF HAZARDOUS OPERATION (YEARS) (CIRCLE ONE):

A) (>10) B) 6-10 C) 3-5 D) 1-2 E) 1

PWD 87-04
PWO
6 Feb 87

From: Public Works Officer, Marine Corps Base, Camp Lejeune
To: Assistant Chief of Staff, Facilities

Subj: PWD 87-04, ELECTRICAL POWER REQUIREMENTS STUDY

Ref: (a) AC/S FAC note of 4Dec86

Encl: (1) Engineering Evaluation Report

1. The enclosure is provided as requested by the reference.

2. Preliminary cost estimates of the recommendations are included in the report.

3. Upon review of the study, request Base Maintenance and RASC coordinate project request to Public Works to begin design of recommended work. In addition, the RASC should address their desire to incorporate an Uninterruptable Power Supply System (UPS) in the design. Funds should be available for all work included in the project.

4. Point of contact is Mr. Andrew Young, Manager, Electrical Branch, extension 3658.

F. E. CONE
By direction

Ck re Asbestos —

REPORT ON THE ENGINEERING EVALUATION OF THE ELECTRICAL UTILITY SERVICES
AT
BUILDING 1101

1. Purpose: The purpose of this engineering service request is to evaluate the approximate spare capacity of the existing electrical utility services and to determine the extent of the renovation and/or expansion, as required, to provide sufficient services to the data process center.

2. Findings: The findings are based on the electrical study that was previously accomplished in 1984, the renovation that was accomplished under Construction Contract N62470-84-C-7111, and the monitoring of each utility service with demand recorder during the months of November and December 1986.

Service No. 1 serves the LDMX area which had an operating load of 112 KVA. Spare capacity of normal service is approximately 188 KVA; spare capacity of standby service is approximately 138 KVA.

Service No. 2 serves the mechanical loads in the LDMX area which had an operating load of 27 KVA. Spare capcity of normal service is approximately 123 KVA. Spare capacity of standby service is approximately 48 KVA.

Service No. 3 serves various mechanical loads which had an operating load of 148 KVA. Under full chiller operation, the operating load could peak at 295 KVA which is in excess of 70 KVA over the 225 KVA rating of the service.

Service No. 4 serves various mechanical loads which had an operating load of 253 KVA. Spare capacity of normal source is approximately 247 KVA; spare capacity is approximately 247 KVA; spare capacity of standby source is approximately 185 KVA. However, the service equipment is rated for 280 KVA.

Service No. 5 serves the RASC area which had an operating load of 290 KVA. Spare capacity of normal service is approximately 210 KVA; spare capacity of standby service is approximately 145 KVA.

3. Discussion: Service Nos. 1 and 2 are in satisfactory operating condition and are limited by the capacities of the alternate sources.

Service No. 3 is in need of renovation. Loads other than the mechanical loads should be removed from Service No. 3 and shifted to Service No. 4. Then the new maximum load connected to Service No. 3 would be 745 AMPS and an anticipated operating load of 641 AMPS.

Service No. 4 is in need of renovation. This service should be expanded with the addition of a 400 AMP automatic transfer switch and related service equipment to accept the loads transfered from Service No. 3

Service No. 5 is in satisfactory operating condition with a 50% diversity factor based on the existing connected load of 600 KVA and a maximum load demand of 290 KVA. Based on the data that was provided by the using agency, the electrical load by FY93 will increase to 192 KVA. The existing service equipment will then be loaded to 80% of its capacity.

4. Recommendations:

a. Renovate Service No. 3 by upgrading of components and by shifting panels, L-1 and L-2 to service No. 4 and as indicated on sketch #87-04-01.

b. Renovate Service No. 4 by upgrading of components and by increasing the service with a 400 AMP automatic transfer switch to accept the loads transfered from Service No. 3 and as indicated on sketch #87-04-02.

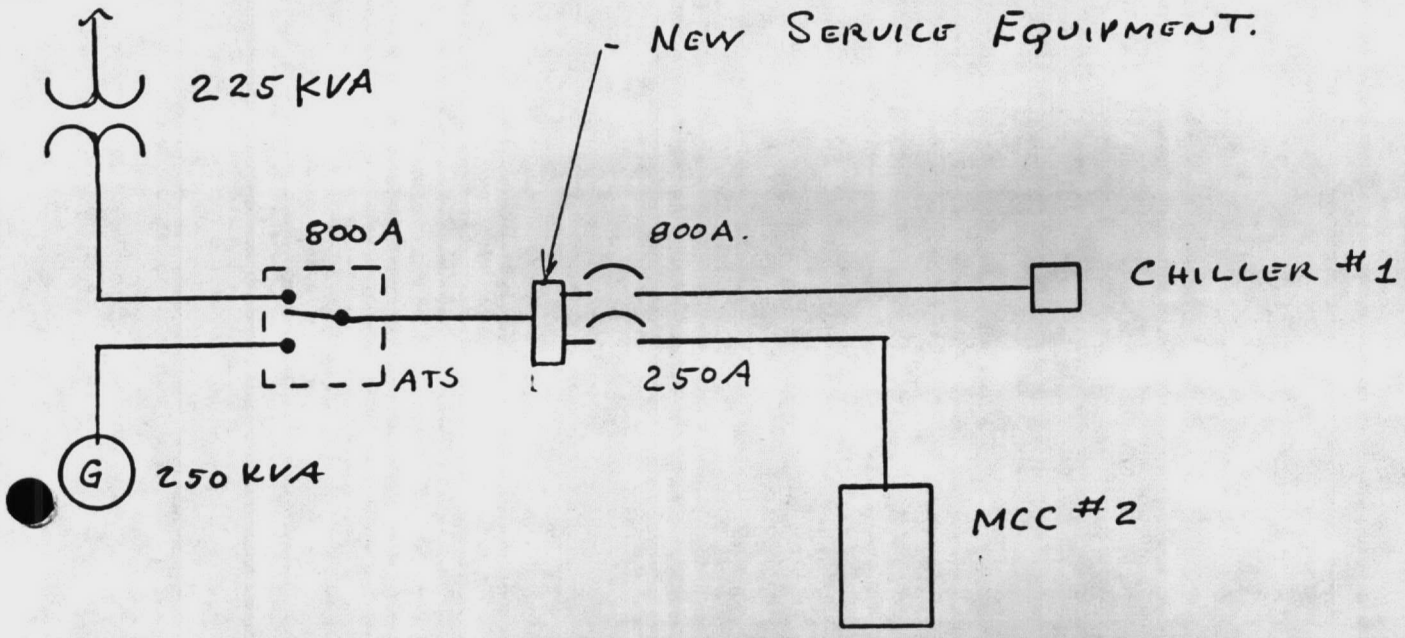
c. Improve the power factor from a low of 53 percent to an acceptable range of 90 to 95 percent by either operating one frequency converter at full load or by the installation of low voltage capacitors to supply compensating reactive power to correct the 57 percent power factor of the lightly-loaded frequency convertors. Low voltage capacitors should be installed on the 60 Hertz stabilizer to correct the 83 percent power factor.

d. Develop an interim operating procedure to reduce air conditioning loads and to optimize the environmental controls of chillers and reheat coils to minimize the temperature differential while maintaining adequate humidity level.

RENOVATION NOTES.

1) REMOVE MDP III & UNUSED FEEDERS & DEVICES.

2) TRANSFER PANEL "L1" & "L2" TO SERVICE NO 4.

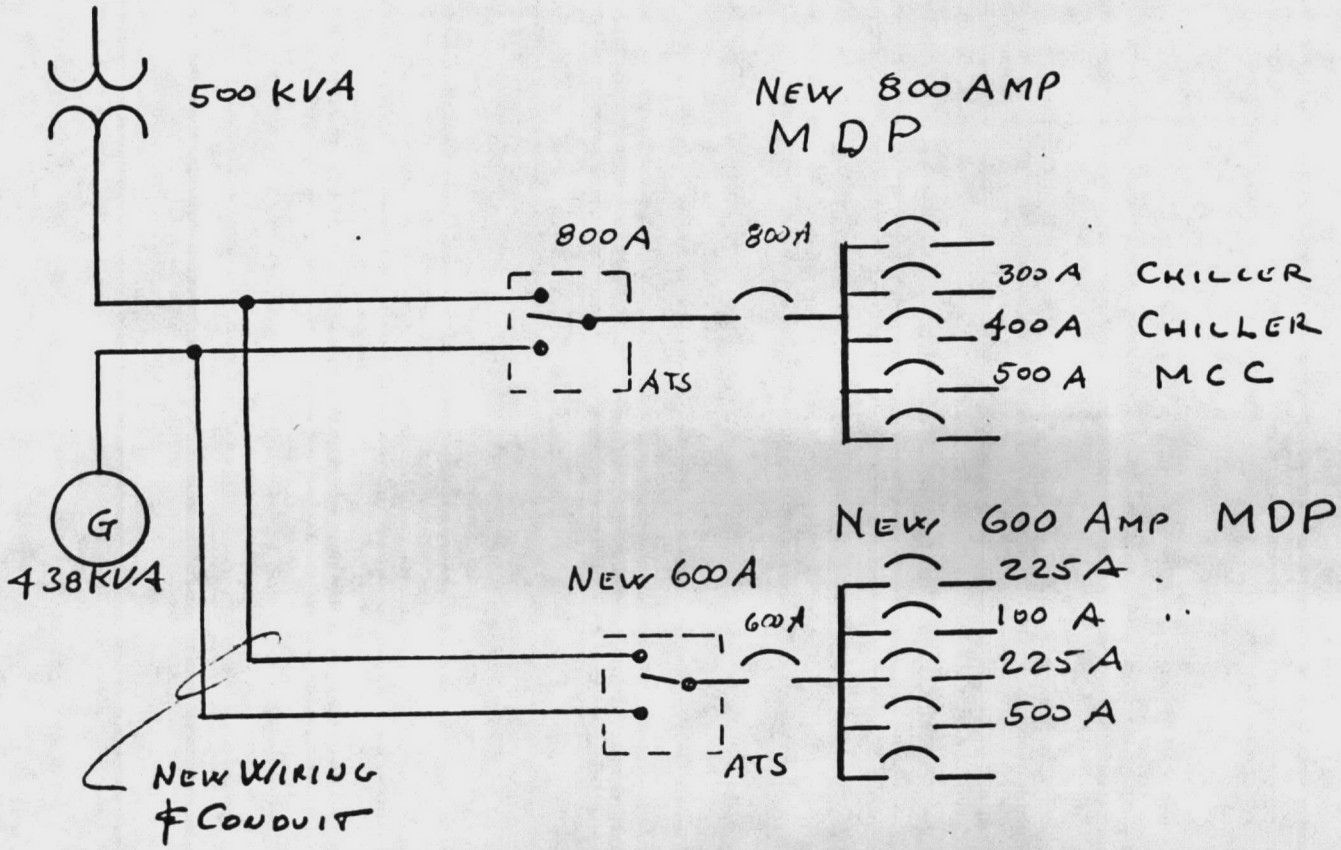


PROPOSED RENOVATION - ELECTRICAL SERVICE NO 3.

BLDG NO. 1101

SKETCH NO. 3/4-04-01

1/20/82



PROPOSED RENOVATION - ELECTRICAL SERVICE No 4

BLDG No. 1101

SKETCH No 87-0-1-02.

1/26/87

MATERIAL & LABOR COST ESTIMATE

PREPARED BY AY

FUNDS AVAI. .

SHEET 1 of 2

Const. Contr. No. PWO-87-04

DATE 01/27/86

PROJECT RENOVATE SVC, BLDG 1101 | LOCATION CLNC | [+] PRELIM. [ ] FINAL

ITEMS	QUANTITY	UNIT	MATERIAL COST UNIT	MATERIAL COST TOTAL	LABOR COST UNIT	LABOR COST TOTAL	TOTAL COST	REMARKS
SERVICE NO 4 -								
600A, 208V ATS	1	EA	13400	13400	1340	1340		
MDP - 800 MCB w/ 14 CKTS	1	EA	15000	15000	1500	1500		
MDP - 600 MCB w/ 14 CKTS	1	EA	14325	14325	1433	1433		
500 MCM	2500	LF	4 -	10000	1 -	2500		
#2AWG EG	200	LF	1 -	200	50	100		
4" ϕ CONDUIT	600	LF	7 -	4200	8 -	4800		
PNL - 100A MLO w/30 CKTS	3	EA	1200	3600	500	1500		
PNL - 225A MLO w/30 CKTS	3	EA	1895	5685	500	1500		
WIRE & CONDUIT		LS		6000		3000		
DEMOLITION		LS		-		1000		
SUBTTL				72410		18673		
TAX & INS		4½%		3259	20%	3735		
STTL				75669		22408	98077	
O.H, BOND, PROFIT		1.2					117692	
						SAY	$115,000	
SVC # 3							25,000	
SVC # 4							118,000	
PWR FACT. CAPACITORS							5,200	
				SAY			$ 148,200	

MCBCL 11014/34

MATERIAL & LABOR COST ESTIMATE

PREPARED BY AY

FUNDS AVAI. .

SHEET 2 of 2

Const. Contr. No. PWO - 87-04

DATE 01/27/96

PROJECT | LOCATION | ☐ PRELIM. ☐ FINAL

ITEMS	QUANTITY	UNIT	MATERIAL COST UNIT	MATERIAL COST TOTAL	LABOR COST UNIT	LABOR COST TOTAL	TOTAL COST	REMARKS
SERVICE No 3								
DEMOLITION		LS		—	—	2000		
PNL - 225A MLO w/30 CKTS	2	EA	1895	3790	500	1000		
WIRING & CONDUIT		LS		3000		1500		
500 MCM SVC EQ	800	LF	4—	3200	1—	800		
#2 AWG "	200	LF	1—	200	50	100		
4" ϕ CONDUIT "	200	LF	7—	1400	8—	1600		
STTL				11570		7000		
TAX & INS			4½%	522	20%	1400		
STTC				12112		8400	20512	
OH, BOND, PROFIT							246.14	
					SAY	12.5,000		
POWER FACTOR CORRECTING CAPACITORS								
75 KVA M/G	3	EA	821	2463	100	300		
100 KVA M/G	1	EA	1110	1110	200	200		
				3573		500		
TAX & INS			4½%	161	20%	100		
SUB				3734		600	4334	
1.2 MARK UP					SAY	$	5200	

NCBCL 11014/34

ASSISTANT CHIEF OF STAFF, FACILITIES
HEADQUARTERS, MARINE CORPS BASE

19/0
04/7m
404

DATE 10-3-86

Andy - IH or A-E
We need to get something
rolling on this -

TO:

BASE MAINT O
PUBLIC WORKS O
COMM-ELECT O
DIR., NAT. RESOURCES & ENV. AFFAIRS
DIR, FAMILY HOUSING
DIR, BACHELOR HOUSING
BASE FIRE CHIEF

ATTN: Mr Cone

1. Attached is forwarded for info/action.
Request you review power requirements and provide suggested response.

2. Please initial, or comment, and return all papers to this office.

3. Your file copy.

By direction

"LET'S THINK OF A FEW REASONS
WHY IT CAN BE DONE"

MCBCL 5216/21 (REV. 04-85)

UNITED STATES MARINE CORPS
Regional Automated Services Center
Marine Corps Base
Camp Lejeune, North Carolina 28542-5001

5230
RASC
2 Oct 86

From: Director, Regional Automated Services Center, Marine Corps Base, Camp Lejeune
To: Assistant Chief of Staff, Facilities, Marine Corps Base, Camp Lejeune

Subj: ELECTRICAL POWER REQUIREMENTS STUDY

Ref: (a) Electrical Study of Building 1101 dtd 30 Apr 85

1. The Regional Automated Services Center (RASC) requires stabilized, reliable electrical power to run the sensitive automatic data processing (ADP) equipment housed in building 1101. The lack of stabilized electrical power can not only cause the loss of user data and costly damage to expensive ADP equipment, but can also result in potentially lengthy ADP support outages to the eight major commands which we are required to support.

2. Whenever commercial electrical outages have occurred in the past, the RASC has been able to provide continued ADP support by powering our air conditioning and ADP equipment through the use of two large motor generators. Although this approach has adequately met our needs to date, we are concerned that in the very near future our requirements for electrical power will exceed both our commercial and motor generator capabilities. We base our concern on the amount of equipment we have installed today and on the planned equipment installations and upgrades of the next year. For example, by as early as January, 1987, we expect to install an additional large computer processor, a laser page printer and a minicomputer. Still further, the reference, as well as a preliminary analysis by the Base Maintenance Electrical Shop, also indicates that an upgrade of our electrical power capabilities is needed.

3. In order to allow us to fully and properly address our concerns for electrical power, both short and long term, it is requested that a study of our electrical power requirements be conducted, to include the analysis of our commercial circuits, power distribution centers and backup generator power capabilities. We will work with you in providing you specifics on existing and planned ADP equipment power requirements. Your assistance in initiating this study as soon as possible will be greatly appreciated since any corrective action will undoubtedly involve a lengthy contractual effort.

4. Point of contact for questions relating to this subject is either 1stLt R. J. Labriola, extension 5709, or Major J. E. Hull, extension 2725.

1753

D. L. Marsh
D. L. MARSH

UNITED STATES MARINE CORPS
Regional Automated Services Center
Marine Corps Base
Camp Lejeune, North Carolina 28542-5001

5230
RASC
2 Oct 86

From: Director, Regional Automated Services Center, Marine Corps Base, Camp Lejeune
To: Assistant Chief of Staff, Facilities, Marine Corps Base, Camp Lejeune

Subj: ELECTRICAL POWER REQUIREMENTS STUDY

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4. Point of contact for questions relating to this subject is either 1stLt R. J. Labriola, extension 5709, or Major J. E. Hull, extension 2725.

D. L. Marsh
D. L. MARSH

FY 90

PWD 87-04
PWO
15 Dec 86

From: Public Works Officer, Marine Corps Base, Camp Lejeune
To: Assistant Chief of Staff, Facilities

Subj: PWD No. 87-04, ELECTRICAL POWER REQUIREMENTS STUDY

Ref: (a) AC/S FAC note dtd 4 Dec 86

Encl: (1) Preliminary Engineering Evaluation Report

1. The enclosure is provided as requested by the reference.

2. A final evaluation report will be provided in the near future upon the completion of electrical utility service monitoring.

3. Point of contact is Mr. Andy Young, Manager, Electrical Branch, extension 3558.

F. E. CONE
By direction

PRELIMINARY REPORT ON THE ENGINEERING EVALUATION OF THE ELECTRICAL UTILITY SERVICES

1. Purpose: The purpose of this engineering service request is to evaluate the approximate space capacity of the existing electrical utility services and to determine the extent of the renovation and/or expansion, as required, to provide sufficient services.

2. Preliminary Findings: The preliminary findings are based on the electrical study that was previously accomplished in 1984 and on the renovation under Construction Contract N62470-84-B-7111. The existing services are presently being monitored to provide updates and will be forthcoming in the final report.

Service No. 5 supplies the 480 volts to serve the computer equipment in the RASC with an approximated total connected load of 310.5 KVA an an approximated operating load of 225 KVA. Service No. 5 has a maximum normal capacity of 500 KVA and a maximum standby capacity of 435 KVA.

Service No. 4 serves various mechanical loads and presently has no spare capacity with an operating load of approximately 215 KVA. The transfer switch is rated for 288 KVA maximum. The maximum normal capacity of the utilization transformer is 500 KVA and a maximum standby capacity of 435 KVA. However, this service is limited to the maximum of 280 KVA.

Service No. 3 serves various loads with an operating load of approximately 32 KVA. Service No. 3 has a maximum normal capacity of 225 KVA and a maximum standby capacity of 250 KVA.

Service No. 2 serves the mechanical loads in the LDMX area with an operating load of 20 KVA with a maximum normal capacity of 150 KVA and a maximum standby capacity of 75 KVA.

Service No. 1 serves the LDMX area with an operating load of 100 KVA with a maximum normal capacity of 300 KVA and a maximum standby capacity of 250 KVA.

3. Preliminary Recommendations: The preliminary recommendations are based on the 1984 study and may be changed upon the conclusion of the services presently being monitored.

a. Renovate Services No. 3 and 4 by the upgrading of components and by the shifing of some mechanical loads to obtain a better redundancy in the operation of the mechanical systems.

b. Optimize the environmental controls of chillers and reheat coils to minimize the temperature differential while maintaining allowable humidity.

c. Develop an interim procedure to reduce air conditioning loads while operating on standby generation by minimizing the operation of heat producing equipment.

Enclosure (1)

d. Lower ceilings, rearrange air ducts, and build walls to separate the office areas and lobby from the computer area in order to reduce the quantity of conditioned air.

e. Develop an alternate location for ADP location in the event of the loss of the entire building.

ASSISTANT CHIEF OF STAFF, FACILITIES
HEADQUARTERS, MARINE CORPS BASE

DATE 4 Dec 86

TO:

BASE MAINT O
PUBLIC WORKS O
COMM-ELECT O
DIR., NAT. RESOURCES & ENV. AFFAIRS
DIR, FAMILY HOUSING
DIR, BACHELOR HOUSING
BASE FIRE CHIEF

ATTN: MR. CONE

1. Attached is forwarded for ~~info~~/action.

Encl
Please provide comments concerning actions to be taken. Comments requested by 8 Dec 86.

2. Please initial, or comment, and return all papers to this office.

3. Your file copy.

N. J. Kiriacopoulos

"LET'S THINK OF A FEW REASONS
WHY IT CAN BE DONE"

MCBCL 5216/21 (REV. 04-85)

UNITED STATES MARINE CORPS
Regional Automated Services Center
Marine Corps Base
Camp Lejeune, North Carolina 28584-5001

4700
RASC
26 Nov 86

From: Director, Regional Automated Services Center, Marine Corps Base, Camp Lejeune
To: Assistant Chief of Staff, Facilities, Marine Corps Base, Camp Lejeune

Subj: ELECTRICAL POWER REQUIREMENTS

Ref: (a) Dir RASC ltr 5230 RASC dtd 2 Oct 86
(b) Electrical Study of Building 1101 dtd 30 Apr 85

Encl: (1) RASC Electrical Requirements

1. Reference (a) requested that a study of our electrical power requirements be conducted, to include the analysis of our commercial circuits, existing diesel generator capabilities, and power distribution centers. Our concern is that we expect considerable more automatic data processing equipment to be installed at the Regional Automated Services Center (RASC) in the near future, and that insufficient capability existed to power this equipment either commercially or through the use of the existing motor generators.

2. On 3 November and again on 13 November 1986, meetings were held with members of your staff to discuss both our near and long term electrical requirements. During these discussions some major issues were raised. First, the RASC had just undergone a major air conditioning upgrade and now there was a question as to whether or not the existing auxiliary generators, as presently configured, could support the additional electrical load. Secondly, and more importantly, reference (b) identified some serious deficiencies in the electrical system of Building 1101, to include some which may be potentially dangerous.

3. To aid in the analysis of our electrical power requirements, we agreed to provide to you, to the best of our ability, our present and planned electrical requirements for the next several years. The enclosure, a copy of which has previously been provided to your staff, represents a working document which presents our requirements. It is our understanding that a two pronged approach is being taken to meet these requirements and to satisfy the issues raised on 3 and 13 November 1986. First, to meet our immediate needs, an analysis of those items of equipment which are to be installed in the next few months will be done to ensure that sufficient electrical power exists to handle the additional load. Secondly, that an architectural and engineering (A&E) effort will be initiated to analyze our long term electrical requirements and to present a plan to meet those requirements, as well as to resolve the deficiencies identified in reference (b). Coupled with this A&E effort, provided funding could be made available, was the provision for

analyzing and sizing an uninterruptible power supply (UPS) for the RASC. Informal conversation with Headquarters Marine Corps indicates that funding is available to support the acquisition of an UPS provided that the funding can be obligated prior to the fourth quarter FY87.

4. Your assistance in analyzing both our near and long term electrical requirements is greatly appreciated, especially as it relates to the expeditious resolution to any potential safety concerns. If there are any questions relating to this issue they may be directed to either CW04 J. K. Williams, extension 5709, or Major J. E. Hull, extension 1465.

J. E. HULL
By direction

LISTING OF ON-SITE EQUIPMENT, RASC, CAMP LEJEUNE
26 NOV 1987

MANF.	MOD.	UNIT	QY	WT	CFM	BTU/HR	POWER REQ	KVA	NOTES
DATAGR	1920	MAG TAPE DRIVE	1	170	250	8000	60HZ,115V,1PH	1.0	
DATAGR		AUTOCON PROCESSOR	1	700		8424	60HZ,115V,1PH	16.0	
DATAGR	100	DATAMASTER	1	740		18,000	60HZ,220V,3PH	5.5	
IBM	3505	CARD READER	1	900	250	4600	60HZ,208V.3PH	1.9	
IBM	3525	CARD PUNCH	1	850	200	4400	60HZ,208V,3PH	1.6	
IBM	3277	DISPLAY STATION	3	95	CONV	525	60HZ,115V,1PH	.51 .17	EACH
IBM	4978	DISPLAY STA SER1	1	60	CONV	399	60HZ,208V,1PH	.1	
IBM	4974	PRINTER SER1	1	55	CONV	390	60HZ,208V,1PH	.12	
IBM	4952	PROCESSOR SER1	1	50	CONV	2389	60HZ,208V,1PH	1.0	
IBM	4966	DISKETTE MAG UNIT	2	93	CONV	700	60HZ,208V,1PH	1 .5	EACH
IBM	4963	DISK UNIT SER1	1	120	CONV	827	60HZ,208V,1PH	152 .52	
IBM	4245	ONLINE PRINTER	4	1100	640	11,000	60HZ,208V,3PH	3.8	EACH
IBM	3088	MULTI-CHAN UNIT	1	580	240	3450	60HZ,208V,3PH	1.2	
IBM	3081	MAINFRAME PROC	1	13780	1700	28,000	416HZ,208V,3PH	24.4	
IBM	3082	PROC CONTROLLER	1	5380	1600	18,150	60HZ,208V,3PH	2.1	
IBM	3087	COOLER DIST UNIT	2	1830	3800	1,400	60HZ,208V,3PH	.4 0.2	EACH
IBM	3880	CONTROLLER	1	720	320	3800	60HZ,208V,3PH	1.7	
IBM	3380	DUAL DEN DASD	3	1200	300	6000	60HZ,208V,3PH	7.2 2.4	EACH
IBM	3380	DUAL DEN DASD	1	1200	300	6000	60HZ,208V,3PH	2.4	
AMDAHL	470	V8 MAINFRAME PROC	1	1607	6230	121960	415HZ,208V,3PH	75.0	
AMDAHL	MODV	POWER DISB UNIT	1	900	CONV	8500	60HZ,208V,3PH	7.6	
IBM	3274	CONTROLLER	1	165	CONV	1382	60HZ,115V,1PH	.45	
IBM	3272	CONTROLLER	1	95	CONV	595	60HZ.115V.1PH	.18	
IBM	3278	DISPLAY STATION	1	93	CONV	420	60HZ,115V,1PH	.17	
IBM	3803	-2 TAPE CONTROL	4	600	360	5700	60HZ,208V,3PH	7.2 1.8	EACH
IBM	3420	-5 TAPE DRIVE	4	800	360	4400	60HZ,208V,3PH	6.4 1.6	EACH
IBM	3420	-8 TAPE DRIVE	20	800	360	8400	60HZ,208V,3PH	58 2.9	EACH
IBM	3880	-3 DASD CONTROL	6	720	320	3800	60HZ,208V,3PH	10.2 1.7	EACH
IBM	3350	AA4 DASD	6	1200	300	6000	60HZ,208V,3PH	14.4 2.4	EACH
IBM	3350	B04 DASD	24	1000	220	5100	60HZ,208V,3PH	52.6 2.2	EACH
IBM	3350	A2F DASD	2	1000	400	7200	60HZ,208V,3PH	4.6 2.3	EACH
IBM	3350	C2F DASD	2	1050	400	6500	60HZ,208V,3PH	4.2 2.1	EACH
EPE	SYST	90 COMP POW CTR	1			13200	416HZ,208V,3PH	N/A	
LIEBERT	FD38	6C COM RM A.C.	5				60HZ,208V,3PH	435 8.7	EACH
NCR	3690	COM TEN	2	1400	800	14744	60HZ,208V,3PH	17.2 8.6	EACH
NCR	3691	EXPANSION CABINET	2	800	400	8600	60HZ,208V,3PH	5 2.5	EACH
NCR	T403	0 DISPLAY STATION	2					.17	
NCR	T403	2 PRINTER	2					.2	
AT&T	4271	PROTOCOL CONVERT	1					.115	
TESDAT	MVP	GRPHIC PRINTER	1	60	CONV		60HZ,115V,1PH	.2	
TESDAT	AWS	400 WORK STATION	2	85	CONV		60HZ,115V,1PH	2 1.0	
HEWPAC	7470	GRAPHICS PLOTTER	1	14	CONV		60HZ,115V,1PH	.2	
TESDAT	LI32	LINE INTERFACE MD	2	60	CONV	630	60HZ,115V,1PH	.36 .18	EACH
AT&T	2024	MODEM	50	21	CONV		60HZ,115V,1PH	4 .08	EACH
AT&T	2096	MODEM	50	21	CONV		60HZ,115V,1PH	4 .08	EACH
OSTRNC	CPA7	COMM.PERF.ANALSYS	1	10	CONV		60HZ,115V,1PH	.3	
AT&T		DIAG CONSOLE	1	14	CONV	116	60HZ,115V,1PH	.3	
HALCYO	803A	DATALINK ANALYZER	1	39	CONV		60HZ,115V,1PH	.15	
HALCYO	803B	DATALINK ANALYZER	1	37	CONV		60HZ,115V,1PH	.3	
TELEX	178	DISPLAY STATION	40	39	CONV	215	60HZ,115V,1PH	4.6 .115	EACH
TELEX	287	PRINTER	10	50	CONV	375	60HZ,115V,1PH	1.15 .115	EACH
TELEX	274C	CONTROL UNIT	3	115	CONV	850	60HZ,115V,1PH	1 .56	EACH
TELEX	276	DISPLAY/CONTROL	6	73	CONV	502	60HZ,115V,1PH	9.6 1.6	EACH
TELEX	289C	LINE PRINTER	1	215	CONV	1365	60HZ,115V,1PH	.575	
TOTALS						347018 BTU/HR		192.85 KVA	

ENCLOSURE [1]

LISTING OF PROJECTED EQUIPMENT, MASC, CAMP LEJEUNE, N.C.

MANF.	MOD.	UNIT	QY	WT	CFM	BTU/HR	POWER REQ	KVA	NOTES
NCR	3390	COMTEN	1	1400	800	14744	60HZ,208V,3PH	8.6	4
NCR	6091	EXPANSION CABINET	1	800	400	8600	60HZ,208V,3PH	2.5	4
IBM	3081	MAINFRAME	1	13780	1700	28,000	415HZ,208V,3PH	24.4	2
IBM	3082	PROC CONTROLLER	1	5380	1600	18,160	60HZ,208V,3PH	4.2	2
IBM	3087	COOLANT DIST UNIT	1	1830	3800	1400	60HZ,208V,3PH	.2	2
IBM	4978	DISPLAY STA SER1	1	60	CONV	399	60HZ,208V,1PH	.1	1
IBM	4974	PRINTER SER1	1	55	CONV	390	60HZ,208V,1PH	.12	1
IBM	4954	PRO SER 1	1	50	CONV	2389	60HZ,208V,1PH	1.0	1
IBM	4966	MAG DISKETTE DR	2	93	CONV	700	60HZ,208V,1PH	0.5	1
IBM	4963	DISK DRIVE SER1	1	120	CONV	827	60HZ,208V,1PH	.52	1
XEROX	9700	PRINTER	1	2684		11,000	60HZ,208V,3PH	.3	1
XEROX	9700	CONTROLLER	1	1630		11,000	60HZ,208V,3PH	1.3	1
XEROX	9700	CRT CONSOLE	1	25		11,000	60HZ,208V,3PH	.1	1
IBM	3480	A22 TAPE CONTROL	4	430	400	2850	60HZ,208V,3PH	1.0	EACH3
IBM	3480	B22 TAPE DRIVE	16	340	400	4250	60HZ,208V,3PH	1.5	EACH3
IBM	3090	MAINFRAME PROC	2				400HZ,208V,3PH	48.8	EACH4*
DATAGR	1920	MAG TAPE DRIVE	1	170	250	8000	60HZ,115V,1PH	1.0	4
DATAGR		AUTOCOM PROCESSOR	1	700		8424	60HZ,115V,1PH	16.0	4
DATAGR	100	DATAMASTER	1	740		18,000	60HZ,220V,3PH	5.5	4
TOTALS						115959 BTU/HR		117.64 KVA*	
GRAND TOTALS						462977 BTU/HR		310.49 KVA*	

ADDITIONAL LOAD 191.44

1 INSTALLATION PROJECTED WITHIN 30-60 DAYS

2 INSTALLATION PROJECTED BY 1 APRIL 1987

3 INSTALLATION PROJECTED BY 1 JULY 1987

4 DENOTES FUTURE DELIVERY AS PROJECTED BY THE MID-RANGE INFORMATION SYSTEMS PLAN (FY 87-93)

* KVA RATINGS ARE NOT INCLUSIVE OF THE EXISTING OR PROJECTED AIR CONDITIONING EQUIPMENT.

ENCLOSURE (1)