



**Consumers
Power
Company**

James W Cook
Vice President - Projects, Engineering
and Construction

General Offices: 1945 West Parnall Road, Jackson, MI 49201 • (517) 788-0453

81-01 #7

June 4, 1982

Mr J G Keppler, Regional Administrator
US Nuclear Regulatory Commission
Region III
799 Roosevelt Road
Glen Ellyn, IL 60137

MIDLAND PROJECT -
DOCKET NCS 50-329 AND 50-330
UNDERRATED TERMINAL STRIPS ON LIMITORQUE VALVE OPERATORS
FILE: 0.4.9.47 SERIAL: 17503

References: J W Cook letters to J G Keppler, same subject:

- 1) Serial 11190, dated February 13, 1981
- 2) Serial 11976, dated April 24, 1981
- 3) Serial 12041, dated July 8, 1981
- 4) Serial 13665, dated September 11, 1981
- 5) Serial 14617, dated November 20, 1981
- 6) Serial 14690, dated February 12, 1982

This letter, as were the referenced letters, is an interim 50.55(e) report concerning the terminal strip voltage ratings on Limitorque valve operators. Attachment 1 provides a status of the corrective actions in progress to resolve this problem.

Another report, either interim or final, will be sent on or before August 6, 1982.

James W. Cook

WRB/lr

Attachment 1: MCAR-46, Interim Report 7, dated May 21, 1982 -
"Underrated/Unqualified Terminal Strips on Limitorque
Valve Operators"

CC: Document Control Desk, NRC
Washington, DC

RJCook, NRC Resident Inspector
Midland Nuclear Plant

JUN 7 1982

8206100284 820604
PDR ADOCK 05000329
S PDR

IE19

CC: CBechhoefer, ASLB Panel
RSDecker, ASLB Panel
- FFCowan, ASLB Panel
JHarbour, ASLB Panel
AS&L Appeal Panel
MMCherry, Esq
MSinclair
BStamiris
CRStephens, USNRC
WDPaton, Esq, USNRC
FJKelley, Esq, Attorney General
SHFreeman, Esq, Asst Attornel General
WHMarshall
GJMerritt, Esq, TNK&J

Bechtel Associates Professional Corporation

70917 SUBJECT: MCAR 46 (Issued 1/15/81)
Underrated/Unqualified Terminal Strips on Limitorque
Valve Operators

INTERIM REPORT 7

DATE: May 21, 1982

PROJECT: Consumers Power Company
Midland Plant Units 1 and 2
Bechtel Job 7220

Status of Corrective Action and Investigation

The status of actions in progress to resolve the subject MCAR is as follows.

1. Environmental qualification test reports of terminal block types Buchanan 0222, Buchanan 0524, Curtis Type L, Marathon 300 Series, and General Electric 28-5 for inside containment use are expected to be made available for Bechtel review by the latter part of May 1982 in accordance with Limitorque's letter of April 6, 1982. The previously committed date, in accordance with Item 2c, Interim Report 6, MCAR 46, was April 15, 1982.
2. Limitorque has provided its evaluation (reference: MCAR 46, Interim Report 6, Item 2d) of the terminal block types Kulka 622 and Beau 7600 for outside containment use based on parameters submitted by Bechtel (reference: MCAR 46, Interim Report 5, Item 3), in its letter dated April 6, 1982. Bechtel tentatively concurs with Limitorque's evaluation that these terminal blocks are acceptable pending documentation submittal to support its evaluation.
3. Resolution of Nonconformance Report 3780 (reference: MCAR 46, Interim Report 6, Item 1) is still pending resolution of Item 1 above.
4. Bechtel is continuing to expedite Limitorque to establish the root cause for the presence of unqualified terminal blocks as stated in MCAR 46, Interim Report 6, Item 3.
5. The status of the remaining 10 out of 18 operators (reference: MCAR 46, Interim Report 6, Item 4) to be inspected by resident engineering, at the jobsite upon receipt from the vendor for the presence of nonconforming terminal block, is as follows on page 2.

MCAR 46
 Interim Report 7

Page 2

<u>P.O. Number</u>	<u>Item (Quantity)</u>	<u>Remarks</u>
7220-J-255A(Q)	23 (4)	Not yet received at jobsite
7220-M-117(Q)	5.1 (1) 5.2 (1) 5.3 (1) 5.4 (1)	Valves converted to manual type; operators have been surplused
7220-M-168(Q)	1.5 (1)	Under investigation
7220-M-398(Q)	3.1 (1)	Terminal block type Kulka 622 exists

All operators listed above are located outside containment. The terminal block type found to exist is acceptable from voltage rating consideration. However, environmental acceptability is pending resolution of Item 2 above. Further status will be reported in the next interim report.

Submitted by: T. Ballweg
 T. Ballweg
 Mechanical Group
 Supervisor

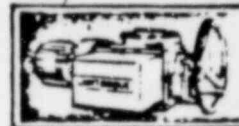
Approved by: L.H. Curtis
 L.H. Curtis
 Project Engineering
 Manager

Concurrence by: E.H. Smith
 E.H. Smith
 Engineering Manager

Concurrence by: M.A. Dietrich
 M.A. Dietrich
 Project Quality
 Assurance Engineer

LIMITORQUE CORPORATION

5114 Woodall Road • P. O. Box 11318 • Lynchburg, Virginia 24506
Telephone—804-528-4400 • Telex—82-9448



MCAR-
IR.7

070917

April 6, 1982

Bechtel Power Corporation
P. O. Box 1000
Ann Arbor, MI 48106

Attention: Mr. R. M. Collins, Jr.
Project Procurement Manager

Gentlemen:

Subject: Limitorque Terminal Blocks on Actuators
Furnished to Midland Plant, Units 1 and 2

RECEIVED	
APR 14 1982	
PURCH	✓
INSTR	
FILE	
PROJ	
PRG	
REC	
Vijay Shah	✓
RMC - Orig. Return	

In response to our meeting of December 11, 1981, you have been furnished with a copy of my letter of January 22, 1982, by Mr. Ken Wilson of Henry Pratt Company. We are currently awaiting your response to our request for a maximum cost estimate.

In your letter of February 19, 1982, you requested that we provide documentation for the voltage rating on the Curtis Type L terminal blocks. The appropriate catalog cuts have been attached as requested. However, I would like to bring to your attention that this data has previously been submitted and approved as stated in Interim Report #5 of MCAR 46, Item 2.E.

Inspections at the Midland site have indicated that the Buchanan 0824 has been used in Limitorque actuators mounted on Westinghouse valves. This terminal block has not been tested for use in containment service and was provided based on the Westinghouse order requirements given to Limitorque. The Marathon 300, Buchanan 0524, and General Electric EB-5 terminal blocks are qualified for inside containment actuators. The IEEE standards historically have not defined test parameters for outside containment service. Consequently, discussions concerning outside containment environmental qualifications are not appropriate for much of the equipment that has been provided for the Midland project. Obviously, the use of Buchanan 0524, Marathon 300, and General Electric EB-5 terminal blocks are suitable for outside containment environments based upon their inside containment qualifications.

Bechtel has informed us that the outside containment worst case conditions are for a temperature of 50 to 150°F, 100 percent humidity, zero differential pressure, and 1.2×10^7 rads. The units outside of

Bechtel Power Corporation
Mr. R. M. Collins, Jr.
April 5, 1982

070917

containment are not open to atmosphere and there is no differential pressure that would cause an ingress of the humidity in the environment. The Beau 7600 terminal block has a maximum continuous temperature rating of 205°F, similarly the Kulka 622 terminal block has a continuous temperature rating of 290°F. These are well within your 150°F harsh environment requirements. Terminal block materials are ABS/PVC and phenolic for the Beau 7600 and Kulka 622 terminal blocks respectively. These materials are capable of withstanding the radiation dosage specified without damage.

The qualification testing on terminal blocks for inside containment use is in progress. The unit with the terminal blocks installed has completed mechanical aging, heat aging, irradiation, seismic testing, and is now undergoing the environmental test. The testing is scheduled to be completed by the first of May and the test report will be available in the latter part of that month.

In your letter of February 19, 1982, you make reference to an environmental testing program for outside of containment applications. Limitorque has neither planned nor discussed with Bechtel a program of this type. Please keep in mind that there was no such thing as an outside containment environmental qualification during the period when much of this equipment was furnished.

MCAR 46, Interim Report #6, was also referenced in your letter of February 19, 1982. To date we have not received a copy of this interim report. Interim Reports #1 through #5 have been furnished to Limitorque for informational purposes. The transmittal letters that were associated with these reports indicated that these were internal reports for Bechtel and Consumers Power use and Limitorque was not requested to provide comments. Although we have not responded directly to these interim reports, practically all of the items listed in these reports have been addressed in the correspondence between Limitorque, Henry Pratt, and Bechtel over the past year.

Please contact this office should you require any further assistance.

Very truly yours,

LIMITORQUE CORPORATION

Daniel S. Warsing
Daniel S. Warsing
Technical Manager

/lc

cc: A. K. Wilson, Henry Pratt Co., Aurora, IL 60507
F. K. Denham, Limitorque, Lynchburg, VA

Wire Range:

Type L

UL recognized
to No. 1AWG.

Type O

UL recognized
to No. 1/0AWG.

Type S

UL recognized
to No. 4/0AWG.

Number of Terminals: Type L: 1 thru 12
Type O: 1 thru 4
Type S: 1 thru 4

Voltage Rating: 600 volts. (See Page 37 for UL Ratings.)

Current Rating: 100 amps (Type L); 125 amps (Type O); and 225 amps (Type S). (See temperature rise chart.)

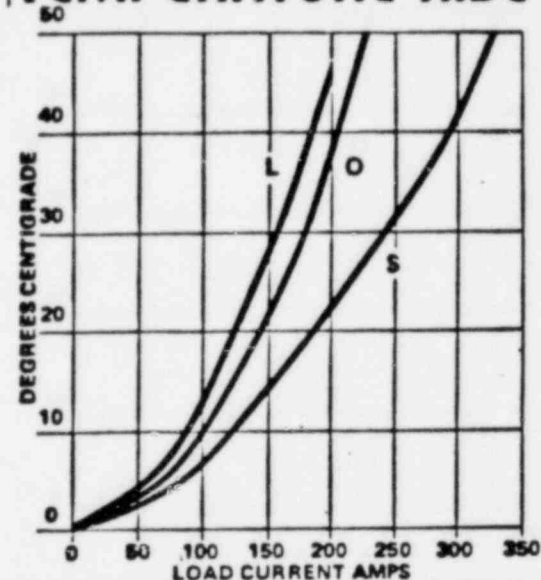
Housing:

Material Phenolic
Continuous Use Temp. 150° C (302° F)
(UL Index)
Flammability Rating 94V-1
Water Absorption (24 hrs. % wt. gain) 0.5%
Chemical Resistance Resistant to Most organic solvents

Breakdown Voltage	L	O	S
Terminal - Terminal	11,100V Typ.	10,900V Typ.	10,400V Typ.
Terminal - Ground	9,700V Typ.	10,300V Typ.	10,500V Typ.

Specifications contained herein are subject to change without notice.

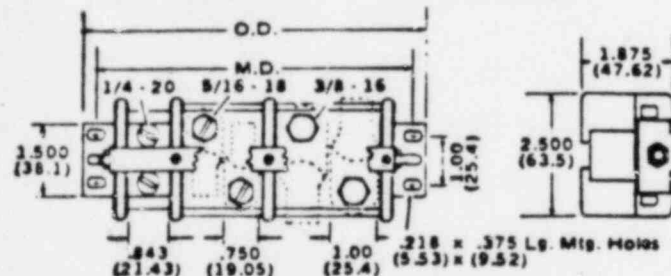
TEMPERATURE RISE



UL Standard 1059 Paragraph 9.1 States: "A terminal block shall be capable of carrying continuously a current having a value in accordance with the maximum size of wire or cable for which the terminal is designed, or a current equal to the terminal block rating without exceeding a temperature rise of 30° C (54° F). For applications exceeding the current rating as stated in the engineering specifications, the temperature rise plus the ambient temperature should not exceed the continuous use temperature."

DIMENSIONS

NOTE: mm dim. are shown in parentheses



NOTE: Lugs are not furnished with blocks

No. of Terminals	Mounting Dimensions		Overall Dimensions	
	Inches	Metric (mm)	Inches	Metric (mm)
SERIES "L"				
1	2.183	55.46	2.683	68.16
2	3.342	84.88	3.842	97.58
3	4.500	114.31	5.000	127.01
4	5.659	143.73	6.159	156.43
5	6.817	173.16	7.317	185.86
6	7.976	202.59	8.476	215.29
7	9.134	232.01	9.634	244.71
8	10.293	261.44	10.793	274.14
9	11.451	290.86	11.951	303.56
10	12.610	320.29	13.110	332.99
11	13.768	349.71	14.268	362.41
12	14.927	379.14	15.427	391.84
SERIES "O"				
1	2.880	73.16	3.380	85.86
2	4.736	120.29	5.236	132.99
3	6.591	167.42	7.091	180.12
4	8.447	214.55	8.947	227.25
SERIES "S"				
1	3.440	87.38	3.940	100.08
2	5.856	148.74	6.356	161.44
3	8.271	210.09	8.771	222.79
4	10.687	271.44	11.187	284.14

NOTE: Thru-hole construction is amply strong for normal applications, but if excessive mechanical loads are expected, strain relief should be provided. Chart lists dimensions for recommended maximum number of terminals, but longer lengths are available. Tie-down points are suggested for blocks exceeding these lengths.

HOW TO ORDER

Types L, O and S terminal blocks are ordered by listing a composite number made up of the model designation followed by the number of terminals required for the application. Example: four-pole terminal block becomes stock number L-4, O-4 or S-4.

When ordering combinations of any or all types, the composite number is made up of the model designations followed by total number of poles and number of each type. A composite of two L terminals followed by one S terminal thus is converted to stock number LS-3 (2L, 1S). Combining these types with Types T, U, H and BT would follow the same ordering format. (Note: When combined with types H or BT a special adapter is required.)