



Consumers
Power
Company

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

March 16, 1984

83-11 #2

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

MIDLAND ENERGY CENTER PROJECT
DOCKET NOS 50-329 AND 50-330
POTENTIAL DEFECTS IN MECHANICAL SHOCK ARRESTORS
FILE: 0.4.9.83 SERIAL: 28041

Reference: J W Cook letter to J G Keppler, Same Subject, Serial 26651, dated
January 6, 1984

This letter, as was the referenced letter, is an interim report of a
potential 10CFR50.55(e) condition involving defective capstan springs in
Pacific Scientific mechanical shock arrestors.

The attachment to this letter describes the concern and summarizes the
investigation and corrective action taking place.

Another report, either interim or final, will be sent on or before May 4,
1984.

James W. Cook

JWC/AHB/lr

Attachment: (1) MCAR-75, Interim Report 2, dated February 29, 1984

CC: Document Control Desk, NRC
Washington, DC

RJCook, NRC Resident Inspector
Midland Nuclear Plant

DHood, USNRC Office of NRR

INPO Records Center

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Bechtel Associates Professional Corporation

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SUBJECT: MCAR 75

Potential Defects in Mechanical Shock Arrestor Models PSA-1 and PSA-3

INTERIM REPORT 2

DATE: February 29, 1984

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

Introduction

This report addresses potentially defective capstan springs in Pacific Scientific Company (PSA) shock arrestors supplied to the Midland project. This has been identified as a 10 CFR 21 condition by Pacific Scientific.

Description of Concern

The attachment identifies certain Pacific Scientific Company mechanical shock arrestor Models PSA-1 and PSA-3 furnished to the Midland project by ITT Grinnell Corporation that may have cracked capstan springs. The suspect capstan springs were supplied to Pacific Scientific by one of two spring manufacturers. ITT Grinnell has identified 283 shock arrestors furnished to Midland that contain suspect springs.

Summary of Investigation and Historical Background

Pacific Scientific Company has investigated the subject deficiency and concluded that springs with possible cracks are limited to those supplied by one spring manufacturer. ITT Grinnell has identified those snubbers furnished to the Midland project that contain the suspect springs. Subsequently, PSA and ITT Grinnell have recommended that additional inspection/testing of uninstalled snubbers be performed. This is further addressed under the Corrective Action section of this report.

Analysis of Safety Implication

The possibility exists that cracks in the capstan springs could result in spring failure during dynamic loading, thereby potentially affecting the ability of the component to perform its intended safety function.

Probable Cause

As discussed in the attachment, Mettek's report indicates that spring cracking occurred because of stresses induced during spring forming, which caused hydrogen cracking during subsequent silver plating.

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MCAR 75
Interim Report 2

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Corrective Action

1. Field engineering has identified suspect shock arrestors on Nonconformance Report (NCR) C-00949. All snubbers on the Midland project with suspect capstan springs were supplied by ITT Grinnell only.
2. Bechtel engineering is evaluating the most expedient manner by which the uninstalled snubbers can be examined and tested. This decision will be made by March 12, 1984.
3. Bechtel engineering is evaluating the most expedient manner by which the installed subject snubbers can be examined and tested on site. This decision will be made by March 12, 1984.
4. Bechtel has requested corrective action by ITT Grinnell to prevent recurrence of this incidence (Reference: Bechtel TWX to ITT Grinnell, 12/22/83, Com 138168). This information is expected from Grinnell by March 12, 1984.

Reportability

Based on the safety implications, this deficiency was reported to the NRC as potentially reportable in accordance with Title 10 of the Code of Federal Regulations, Part 50.55(e) on December 7, 1983.

 Submitted by: D. Poser for E.B. Poser
E.B. Poser
Project Engineering Manager

 Approved by: B.R. Klein
B.R. Klein
Plant Design Chief Engineer

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

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

RFT/MS/kje*(PD)

Attachment: ITT Grinnell letter to Bechtel, 10/5/83 (Com 131017)

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ITT Grinnell Corporation

Executive Offices

260 West Exchange Street

Providence, Rhode Island 02901

(401) 831-7000

October 5, '83

Bechtel Associates Professional Corp.
P.O. Box 100
Ann Arbor, MI 48106

Attn: Mr. E. M. Hughes - Project Engineer

Re: MIDLAND PLANT - UNITS 1 & 2
P.O. No. 7220-M-106-AC

Subject: Pacific Scientific Mechanical Shock Arrestors
Model PSA-1 and PSA-3
Capstan Spring Potential Quality Problem

Gentlemen:

Attached please find a copy of Pacific Scientific's letter to us dated 9-21-83 (Attachment I) which identifies a potential quality problem with Size 1 and 3 Mechanical Shock Arrestor Capstan Springs. The scope of the problem is identified on Page 4 of 5 of the attached report, and the arrestors supplied to ITT Grinnell are summarized on Page 5 of 5.

A review of our records indicates that the mechanical shock arrestors - as listed on Attachment II - have been supplied on the subject contract by ITT Grinnell. We are confident that Attachment II represents a complete listing of the arrestors supplied to your project, since of the (2,888) arrestors supplied to ITT Grinnell, all but (70) units (19 Size #1 and 51 Size #3) have been identified to a specific customer shipment. Any additional arrestors supplied to your project will be identified to your attention as soon as possible.

As a valued customer of ours, we are bringing this information to your attention for appropriate action. We recommend that you contact the following - directly - to resolve this problem:

Mr. Paul A. Hadnagy - Director Technical Operations
or
Mr. Peter M. Zatezalo - Director of Marketing

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Oct. 5, '83

Pacific Scientific Co.
1346 S. State College Blvd.
Anaheim, CA 92803
Tel. No. (714) 774-5217

It is our position that all charges for this effort are to Pacific Scientific's account.

Please let us know if you require any additional information.

Very truly yours,

ITT GRINNELL CORPORATION

N. A. DeCristofaro
N. A. DeCRISTOFARO
Project Manager

NAD/m (Att.)
cc's w/Att.

R. Kon - Prov.
F. Shepard - Bechtel/Ann Arbor
D. Sewell - Warren
B. Kelly - Prov.
P. Zatezalo - P.S. Co.
P. Hadnagy - P.S. Co.

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Kin-Tech Division



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21 September 1983

cc: D. CHARTRAU
D. SEWELL
B. KELLY

ITT Grinnell
621 Dana Street N.E.
Warren, Ohio 44481

Attention: Mr. T. Lauka

Subject: Pacific Scientific Mechanical Shock Arrestors
Model PSA-1 and PSA-3

Reference: Service Report No. SR83-01

Gentlemen:

The attached report discusses potential problems with certain serial number PSA-1 and PSA-3 snubbers. Our records indicate that the units shown on Attachment A are in the affected group and were delivered to you.

At your convenience, please return these snubbers to us for inspection and repair as necessary. If the snubbers are still in warranty (one year warranty if shipped prior to 1 April 1983 and five year warranty if shipped on or after 1 April 1983), this will be done at no charge to you--excluding freight. Should the units be beyond the warranty period, there will be a \$100.00 per unit charge, also excluding freight.

All affected snubbers will be returned to you within 30 days after we receive them.

The foregoing will apply to snubbers returned to us through 31 December 1984.

We apologize for any inconvenience this may cause you.

Very truly yours,

A handwritten signature in dark ink, appearing to read 'P. A. Hadnagy'.

P. A. Hadnagy
Director Technical Operations

PAH:sf

Enclosure

ATTACHMENT I

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SR 83-01

SHOCK ARRESTOR CAPSTAN SPRING SERVICE REPORT

During testing of Pacific Scientific Company's PSA-1 Shock Arrestors, part number 1801102-05, at Union Electric Callaway Station by Daniel International personnel, 4 of 7 snubbers tested revealed a broken capstan spring tang.

Pacific Scientific Company requested failed springs for independent metallurgical examination. Failed components were returned to Pacific Scientific Company who forwarded broken springs to "Mettek", 1805 E. Carnegie, Santa Ana, CA 92705, (714) 549-1083, for metallurgical and fracture analysis.

One spring exhibiting a visual crack in one tang (removed from snubber S/N 21524 which was returned by Union Electric) was installed by Pacific Scientific Co. into a snubber and subjected to a full load (1500 lbs.) acceleration test. This test was repeated 5 times (10 full load cycles) with no failures. The cracked spring was then subjected to a dynamic load cycling test. This test cycles the snubber at 3 Hertz intervals from 3 to 33 Hertz for 10 seconds at each interval at 100%, 75% and 50% rated loads, a total of 5940 cycles. The cracked spring satisfactorily passed this test.

Springs from the identical lot as those that failed were traced to snubbers located at Kansas Gas & Electric Co. Wolf Creek Station. These were returned to Pacific Scientific for testing and evaluation.

Eleven (11) each 1801102-05 PSA-1 Shock Arrestors returned to Pacific Scientific Co. by Kansas Gas & Electric Co. Wolf Creek Station were visually and functionally tested by Pacific Scientific Co. personnel in the presence of KG&E and Union Electric Co. personnel.

All eleven PSA-1 Shock Arrestors (S/Ns 21511 thru 21521) were disassembled to a level permitting verification that the capstan spring was properly installed and whole. The Shock Arrestors were reassembled and subjected to a successful acceleration test at full rated load (1500 lbs.).

Following successful acceleration test, all eleven Shock Arrestors were disassembled to facilitate visual and non-destructive examination of the capstan springs:

S/N 21511 - No apparent visual defects. Magnetic particle non-destructive examination revealed indications in both spring tangs with one tang exhibiting three separate indications. Indications were suspected to be micro cracks.

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SHOCK ARRESTOR CAPSTAN SPRING SERVICE REPORT (Cont'd.)

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- S/N 21512 - No apparent visual defects. Magnetic particle examination exhibited an indication of one micro crack on one tang.
- S/N 21513 - No apparent visual defects. No magnetic particle examination indications.
- S/N 21514 - No apparent visual defects. No magnetic particle examination indications.
- S/N 21515 - No apparent visual defects. Both tangs exhibited a magnetic particle micro crack indication.
- S/N 21516 - No apparent visual defects. No magnetic particle examination indications.
- S/N 21517 - No apparent visual defects. No magnetic particle examination indications.
- S/N 21518 - No apparent visual defects. Both tangs exhibited a magnetic particle micro crack indication.
- S/N 21519 - No apparent visual defects. Both tangs exhibited a magnetic particle micro crack indication.
- S/N 21520 - No apparent visual defects. One tang exhibited a magnetic particle micro crack indication.
- S/N 21521 - No apparent visual defects. One tang exhibited a magnetic particle micro crack indication.

Five (5) capstan springs exhibiting non-destructive magnetic particle examination indications were assembled into a test snubber and subjected to a dynamic load of 1500 lbs. at frequencies of 3 to 33 Hertz intervals for 10 seconds each at 100%, 75% and 50% of rated load.

The springs tested represented the "worst case" as determined by the non-destructive magnetic particle inspection. They were S/Ns 21511, 21515, 21518, 21519 and 21520.

Springs, S/Ns 21515 and 21518, survived the entire test (5940 cycles). Spring, S/N 21511, survived 533 full load cycles before both tangs failed. S/N 21518 survived 1800 full load cycles before one tang failed, and S/N 21520 survived 1850 full load cycles before one tang failed.

Metallurgical report by Mettek Material Engineering Technology Laboratories indicates spring cracking occurred because of stresses induced during spring forming which caused hydrogen cracking during subsequent silver plating.

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SHOCK ARRESTOR CAPSTAN SPRING SERVICE REPORT - (Cont'd.)

Metallurgical report also explains that, although the spring fracture face exhibited brittleness at the crack onset, the core of the spring was ductile and spring fracture was simple dimple (ductile) rupture. This accounts for the ability of the springs to withstand the full load functional and dynamic load testing conducted and suggests that the useful life of springs which contain cracks remains to be substantial.

The capstan springs are manufactured for Pacific Scientific Co. by a spring manufacturer. These springs are supplied formed, stress relieved and 100% magnetic particle inspected to Pacific Scientific Co., who then subcontracts the springs for silver plating. Pacific Scientific Co. part numbers for the capstan springs are as follows:

PSA-1 (1801613)

PSA-3 (1801614)

Pacific Scientific is effecting corrective action with the spring manufacturer, the nature of which is not yet fully established.

Recommendations

At your earliest convenience, return the affected snubbers to Pacific Scientific for inspection.

Inspection will include removal of spring to facilitate examination for tang cracks by use of magnetic particle or liquid penetrant non-destructive examination.

Urgency of inspection is to be assessed by individual owners based on snubber system application and analysis of results of tests conducted on failed snubbers and reported herein.

Affected Serial Numbers

PSA-1 Pacific Scientific Part No. 1801102-05

S/Ns 15672 thru 16921

16526 " 16662
18211 thru 21160

21411 thru 22060

22311 thru 22710

22711 " 22860

PSA-3 Pacific Scientific Part No. 1801106-05

S/Ns 21311 thru 21610

24311 thru 25310

25361 thru 25960

27194 thru 28543

20302 " 20395

20551 " 20636

20398 " 20400

20637

20700

20851 THRU 20869
20870 " 20955

LONG STROKES - 07

506 THRU 510

486 " 487

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- 1) Model Number PSA-1
Part Number 1801102-05 and -07

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Serial Numbers

16526 thru 16667
16667 thru 16733
16754 thru 16920
18346 thru 18445
18709 thru 18724
18725 thru 18735
18736 thru 18765
18766 thru 18908
19482 thru 19551
19552 thru 19576
19982 thru 20081
20418 thru 20547
20691 thru 20736
20961 thru 21060
21061 thru 21084
22443 thru 22542
22711 thru 22860

- 2) Model Number PSA-3
Part Number 1801106-05 and -07

Serial Numbers

28144 thru 28232
27623 thru 27693
27906 thru 27937
27696 thru 27738
27739 thru 27905
25826 thru 25916
25444 thru 25498
25532 thru 25642
25646 thru 25759
25036
25393 thru 25443
24711 thru 24910
21565 thru 21610
506 thru 510 (-07)
486 thru 487 (-07)
24311 thru 24410
21461 thru 21495
20302 thru 20395
20551 thru 20636
20398 thru 20400
20637
20700
20851 thru 20869
20870 thru 20955

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20460	MD-A21	MIDLND	2-617-5-123
20462	MD-A21	MIDLND	1-603-3-505
20474	MD-A21	MIDLND	1-616-4-526
21062	MD-A21	MIDLND	1-616-4-526
20476	MD-A21	MIDLND	2-617-5-122
20967	MD-A21	MIDLND	1-616-4-527
20472	MD-A21	MIDLND	1-616-4-539
19549	MD-A21	MIDLND	1-616-2-509
21004	MD-A21	MIDLND	1-616-2-509
21006	MD-A21	MIDLND	1-616-3-500
21071	MD-A21	MIDLND	1-616-3-500
21063	MD-A21	MIDLND	1-601-2-512
20530	MD-A21	MIDLND	1-616-3-501
20479	MD-A21	MIDLND	1-616-3-509
20434	MD-A21	MIDLND	1-616-3-509
21074	MD-A21	MIDLND	1-616-2-533
20993	MD-A21	MIDLND	1-616-3-525
20529	MD-A21	MIDLND	1-616-4-542
20519	MD-A21	MIDLND	1-616-4-530
20520	MD-A21	MIDLND	1-616-4-530
20996	MD-A21	MIDLND	1-616-4-529
21070	MD-A21	MIDLND	1-616-4-529
20992	MD-A21	MIDLND	1-616-4-530
21007	MD-A21	MIDLND	1-616-3-503
21072	MD-A21	MIDLND	1-616-3-507
20473	MD-A21	MIDLND	1-616-4-523
20991	MD-A21	MIDLND	1-616-4-536
21073	MD-A21	MIDLND	1-616-4-537
20483	MD-A21	MIDLND	1-616-4-541
20439	MD-A21	MIDLND	1-616-4-541
20990	MD-A21	MIDLND	1-616-2-502
21000	MD-A21	MIDLND	1-616-2-502
18863	MD-A55	MIDLND	2-617-5-131
18842	MD-A55	MIDLND	1-616-2-534
18726	MD-A90	MIDLND	1-652-1-522
18789	MD-A90	MIDLND	1-652-1-523
20046	MD-A46	MIDLND	1-EBB-2-3-H4
18785	MD-A90	MIDLND	2-652-1-519
18824	MD-A90	MIDLND	2-652-1-520
18730	MD-A90	MIDLND	2-652-1-521
18721	MD-A56	MIDLND	1-638-14-501
18729	MD-A56	MIDLND	1-638-14-501
18711	MD-A56	MIDLND	1-638-14-503
18720	MD-A89	MIDLND	1-603-1-500
18712	MD-A89	MIDLND	2-639-14-500
18732	MD-A89	MIDLND	1-603-2-38
18731	MD-A89	MIDLND	1-616-2-535
18716	MD-A89	MIDLND	2-652-1-504
18724	MD-A89	MIDLND	2-652-1-505
18715	MD-A89	MIDLND	2-652-1-506
18723	MD-A89	MIDLND	2-652-1-507
18719	MD-A89	MIDLND	2-652-1-509
18722	MD-A89	MIDLND	1-652-1-510
18713	MD-A89	MIDLND	1-652-1-511
18727	MD-A89	MIDLND	1-652-1-512

Attachment II
1 of 6

CONTRACT: MD 131017

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18725	MD-A89	MIDLND	1-652-1-513
18733	MD-A89	MIDLND	1-652-1-514
18728	MD-A89	MIDLND	1-652-1-515
16625	MD-935	MIDLND	BULK
16558	MD-935	"	"
16863	MD-935	"	"
16782	MD-935	"	"
16667	MD-935	"	"
18487	MD-957	MIDLND	NONE LISTED
19519	MD-996	MIDLND	"
19532	MD-996	"	"
19512	MD-996	"	"
19548	MD-996	"	"
19547	MD-996	"	"
19550	MD-996	"	"
19488	MD-996	"	"
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16548	MD-996	"	"
16588	MD-996	"	"
16562	MD-881	MIDLND	2-619-6-189
16641	MD-881	MIDLND	2-619-6-189
18369	MD-797	MIDLND	NOT LISTED
18371	MD-979	"	"
18379	MD-979	"	"
18401	MD-979	MIDLND	BULK
18486	MD-979	"	"
22447	MD-D82	MIDLND	NOT LISTED
22449	MD-D82	MIDLND	"
22451	MD-D82	"	"
22452	MD-D82	"	"
22455	MD-D82	"	"
22456	MD-C82	MIDLND	BULK
22458	MD-C82	MIDLND	"
22460	MD-D82	"	"
22461	MD-C82	"	"
22462	MD-C82	"	"
22464	MD-C82	MIDLND	BULK
22466	MD-D82	"	"
22468	MD-D82	"	"
22469	MD-C82	"	"
22478	MD-C82	"	"
22472	MD-C82	"	"

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Att. II
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CONTRACT: MD

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22473	MD-C02	"	"
22474	MD-D02	"	"
22476	MD-C02	"	"
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22479	MD-C02	"	"
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22495	MD-C02	"	"
22496	MD-D02	"	"
22505	MD-D02	"	"
22506	MD-C02	"	"
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22536	MD-D02	"	BULK
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22808	MD-D01	"	"
22810	MD-D01	"	"
22811	MD-D02	"	"

Att. II
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CONTRACT: MD 131017

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22813	MD-D01	"	"	
22815	MD-D02	"	"	
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22851	MD-D01	"	"	
22856	MD-D01	"	"	

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NUMBER OF RECORDS FOUND: 189

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Att. II
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PSA105-R01
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06:09:08I T T GRINNELL CORPORATION
PIPE HANGER DIVISION - WARREN
PSA LUG BY CONTRACT

PAGE 1

CONTRACT NO - MIDLAND

SERIAL NO	ORDER NO	MARK/SKETCH NUMBER	SIZE
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24318	E-MD-A21-00	2-632-2-23	3
24322	E-MD-A21-00	1-610-1-504	3
24329	E-MD-A21-00	1-616-2-505	3
24353	E-MD-A21-00	1-610-1-507	3
24354	E-MD-A21-00	1-610-1-503	3
24357	E-MD-A21-00	1-610-2-503	3
24358	E-MD-A21-00	2-617-5-121	3
25400	E-MD-A55-00	1-638-13-503	3
25408	E-MD-A55-00	2-611-2-501	3
25428	E-MD-A55-00	1-601-1-503	3
25437	E-MD-A55-00	1-601-2-508	3
25438	E-MD-A55-00	1-601-1-503	3
25182	E-MD-A56-00	2-632-2-34	3
25209	E-MD-A56-00	1-638-13-501	3
25214	E-MD-A56-00	1-631-2-133	3
25215	E-MD-A56-00	2-631-2-33	3
24806	E-MD-A89-00	2-602-1-21	3
24814	E-MD-A89-00	1-610-1-517	3
24845	E-MD-A89-00	2-602-1-21	3
25148	E-MD-A89-00	2-639-13-504	3
25216	E-MD-A89-00	2-602-1-21	3
25228	E-MD-A89-00	2-602-1-21	3
25233	E-MD-A89-00	2-637-13-501	3
25238	E-MD-A89-00	1-638-13-504	3
25240	E-MD-A89-00	2-639-13-505	3
25244	E-MD-A89-00	2-602-1-2	3
25247	E-MD-A89-00	2-602-1-2	3
25613	E-MD-A89-01	2-639-13-505	3
25149	E-MD-A90-00	1-601-1-501	3
25155	E-MD-A90-00	1-638-13-505	3
25549	E-MD-A98-00		3
25451	E-MD-A98-00		3
25602	E-MD-A98-00	2-614-3-512	3
25609	E-MD-A98-00		3
25612	E-MD-A98-00		3
25618	E-MD-A98-00	1-618-3-520	3
25619	E-MD-A98-00		3
25620	E-MD-A98-00	1-618-3-512	3
25714	E-MD-B10-00		3
25834	E-MD-B10-00		3
25839	E-MD-B10-00		3
25653	E-MD-B10-00		3
25733	E-MD-B18-00		3
25741	E-MD-B18-00		3
25565	E-MD-B42-00	2-639-3-512	3
25566	E-MD-C01-00		3
25569	E-MD-C01-00		3
25570	E-MD-C01-00		3
25572	E-MD-C01-00		3

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PSA105-R01
10/03/83
06:09:08I T T GRINNELL CORPORATION
PIPE HANGER DIVISION - WARREN
PSA LOG BY CONTRACT

PAGE 2

CONTRACT MD - MIDLAND

SERIAL NO ORDER NO MARK/SKETCH NUMBER SIZE

25581	E-MD-C01-00		
25583	E-MD-C01-00		
25586	E-MD-C01-00		
25605	E-MD-C01-00		
25614	E-MD-C01-00		
25615	E-MD-C01-00		
25616	E-MD-C01-00		
25617	E-MD-C01-00		
25660	E-MD-C02-00		
25661	E-MD-C02-00		
25662	E-MD-C02-00		
25663	E-MD-C02-00		
25664	E-MD-C02-00		
25665	E-MD-C02-00		
25667	E-MD-C02-00		
25668	E-MD-C02-00		
25672	E-MD-C02-00		
25673	E-MD-C02-00		
25677	E-MD-C02-00		
25679	E-MD-C02-00		
25444	E-MD-D01-00	BULK	3
25445	E-MD-D01-00	BULK	3
25449	E-MD-D01-00	BULK	3
25450	E-MD-D01-00	BULK	3
25459	E-MD-D01-00	BULK	3
25463	E-MD-D01-00	BULK	3
25464	E-MD-D01-00	BULK	3
25469	E-MD-D01-00	BULK	3
25474	E-MD-D01-00	BULK	3
25608	E-MD-D01-00	BULK	3
25623	E-MD-D01-00	BULK	3
25624	E-MD-D01-00	BULK	3
25625	E-MD-D01-00	BULK	3
25626	E-MD-D01-00	BULK	3
25627	E-MD-D01-00	BULK	3
25628	E-MD-D01-00	BULK	3
25629	E-MD-D01-00	BULK	3
25630	E-MD-D01-00	BULK	3
25639	E-MD-D01-00	BULK	3
25640	E-MD-D01-00	BULK	3
25641	E-MD-D01-00	BULK	3
25538	E-MD-D02-00		3
25636	E-MD-D02-00		
25642	E-MD-D02-00		
20630	E-MD-957-00		3

94 PSA LISTED FOR THIS CONTRACT

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