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PLAINTIFF'S EXHIBIT

SH-2679

INTEROFFICE MEMORANDUM

JANUARY 22, 1990

FROM: INCORRECTLY MARKED PLAT-2 GASKET CORRECTIVE ACTION TEAM
E. A. DOE, ENG-ENG SVCS-PRESR EQPT
L. G. HALE, ENG-ENG SVC-PRESR EQPT-FLS
W. HARNAMJI, ENG-ENG SVC-PRESR EQPT-FLS
W. A. HYMEL, P&AS-PUR-PRCMT, PROCUREMENT
G. N. PUSTEJOVSKY, FLS OPNS-MAINT, MAINTENANCE

TO: J. W. GRIFFITHS, SUPERINTENDENT - FUELS
DEER PARK MANUFACTURING COMPLEX

SUBJECT: INCIDENT REPORT - PLAT-2 GASKETS INCORRECTLY COLOR CODE MARKED
BY MANUFACTURER

INCIDENT DESCRIPTION

On the evening of Monday November 6, 1989 the PLAT-2 process unit, in the Aromatics area, had just completed a start-up after a planned turnaround. A small piping flange leak, upstream of the top side of the Secondary Feed Exchanger shell, E-1252, ignited. The Area Maintenance Foreman was notified and soon after examining the leak and discussing it with the Pressure Equipment Inspector, the leak stopped. It is thought that the leak coked up before further bolt tightening could be performed.

The Area Maintenance Foreman also noted that the leaking spiral wound gasket was color code marked white with no stripes. The color code for spiral wound gaskets used in this unit is yellow with a light pink stripe, which correlates to a Lamons' Chlorocarb filler with 304 S.S. windings. A spiral wound gasket is color code marked with paint on the outside edge of the centering compression ring or stop ring. A solid white color marking indicates an asbestos type filler with Incoloy windings. The Pressure Equipment Inspector approved the gaskets marked white, since these materials are acceptable, although more costly.

A survey of the remaining spiral wound gaskets replaced during the turnaround surfaced a total of five (5) gaskets that were not the normal color code. Two (2) were marked all white and three (3) were marked yellow with a white stripe, which indicates a Teflon filler with 304 S.S. windings. Both the asbestos and Chlorocarb fillers have been acceptable for higher temperature service (over 650°F), while the Teflon material has a maximum rating of 500°F. Most of the PLAT-2 hot systems operate above 650°F.

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The unit was shutdown and the five (5) gaskets were replaced. After the gaskets were removed, the Pressure Equipment Inspector identified all five (5) gaskets as the correct Chlorocarb type filler. The stop ring surface facing the flange were stamped "Chlorocarb" and had been color code marked incorrectly.

The next Friday, Purchasing's Bill Hymel and Pressure Equipment's Ed Doe had a discussion on our problem with Lamons Gasket Company's President, Richard S. Owen, our primary gasket manufacturer. He agreed that Lamons must have incorrectly color marked the five (5) spiral wound gaskets during manufacturing. During the meeting, Lamons shared that they recently experienced similar marking problems with some of their spiral wound gaskets supplied to another client. Lamons performed a test to assure the color had not changed when the unit was heated up, thus yielding incorrect information on the color code. The tests showed that although some minor color change occurred, this was not a factor. Lamons' "fix" was to change the responsibility for applying the color marking to a higher level skill group in the manufacturing process.

This CAT was chartered to investigate and put forth appropriate corrective action to assure DPMC receives acceptable quality spiral wound piping gaskets. This includes construction to the API-601 standard for spiral wound gaskets and DPMC's requirements from our primary supplier/manufacturer, Lamons Gasket Company.

Another CAT, in Aromatics, is addressing the field implementation issues related to this incident.

CAUSES AND CONTRIBUTING FACTORS

1. The gasket was incorrectly color code marked during manufacturing by the Lamons Gasket Company.
2. Contributing Factors: The DPMC Blanket Order requires the following information from Lamons:
 - * A Quality Control Mission (Goal).
 - * Quality Control Records.
 - * The sources of raw material and how materials are inspected for conformance standards.
 - * The names of personnel assigned to "Quality".

However, this information has not been provided, nor have follow up reviews been conducted or specific noncompliances reported since this Blanket Order was awarded.

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BACKGROUND INFORMATION

Lamons was awarded the current Blanket Order in 1985 and supplies the base amount of all gaskets required to meet routine maintenance needs.

Other quality problems and concerns were surfaced during the Corrective Action Team meetings. Generally the requirements of API-601 are being met, however some dimensions not put forth in API-601, and appear to be questionable. As an example, the outside centering ring, which also acts as a stop ring to prevent over compression, is 1/8 " thick and the filler/windings are 0.175" thick before installation. After the spiral wound gasket is installed and correctly bolted up, the filler/metallic layered chevron shaped windings in the center, are crushed from the 0.175" to a thickness of approximately 0.135". A maximum crush is to a 0.125" minimum thickness, which is controlled by the outside centering and stop ring. Close examination of some of the Lamons' gaskets shows that the "V" notch on the I.D. of the outside centering ring is not always centered in the middle of the ring. This causes the "V" of the chevron filler/windings to be off centered, and results in the available crush thickness being mainly on one side of the gasket, with the other side mainly flush with the ring. Lamons' attributes this problem to their method of machining the "V" in the ring in combination with the allowable material specification tolerances on the under/over thickness of the plate. While Lamons recognizes this problem, it does not appear they have tried to tighten up their requirements for ordering the plate or change their machining procedure to correct for the under/over thickness tolerances on the plate.

There is a perception that spiral wound gasket quality has decreased from our main suppliers (Lamons and Flexitallic). Also, they have not always responded in a timely and/or satisfactory manner when gasket problems have been discussed with their key personnel.

RECOMMENDATIONS FOR PREVENTION1. Short Term:

Shell must clarify our quality expectations, in terms that Lamons and Shell can deal with. (The API-601 Standard does not address all the potential problem areas that can/have developed.)

- * Lamons review the current DPMC stock of spiral gaskets they supplied to assure correct color code marking.
- * Shell to review the gasket Blanket Order specifications and address explicit needs, including tolerance requirements.
- * Lamons to review, with Shell, the requirements that are implicit and explicit in our Blanket Order.
- * Shell and Lamons to agree on the requirements.

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- * Lamons to implement a reporting system, to Shell, regarding quality and non-compliance.

ACTION: A meeting was held with Lamons by the Corrective Action Team on November 30, 1989 outlining our concerns. Addressing and resolving the quality issues is thought to require several months. The remaining actions agreed to were:

- Lamons indicated there have been similar concerns expressed by other clients. This has increased their interest to implement a quality improvement process. Lamons plans to have a quality program review at their Houston manufacturing plant. The review will be conducted by a quality program representative from Masco Industries, their parent company. Masco Industries has a high quality rating from Ford, who is one their major clients.
- Future focal points for quality issues related to spiral wound gaskets: Shell's focal point on quality issues pertaining to spiral wound gaskets is Purchasing's Bill Hymel, with Pressure Equipment's Ed Doe providing technical support. Lamons' focal point is Willie Jenkins.
- Lamons is to provide a report to Shell Purchasing and Pressure Equipment on their quality.
- Shell Purchasing's Bill Hymel is to provide Lamons with a quality suppliers presentation.
- Shell Purchasing's Bill Hymel is to take the lead role in setting up ongoing meetings, approximately one per month, to put forth the appropriate quality standards with Lamons. Ed Doe from Pressure Equipment will support this effort. Ralph Rapp from Head Office Engineering Services also plans to support this effort. Bill Hymel is to issue meeting minutes to communicate the progress.
(ACTION: W. A. Hymel to complete by 7/1/90)

2. Long Term:

- * Shell to perform similar reviews and issue explicit requirements to other gasket manufacturers. (This is currently planned for only Flexitallic. However, as the issues and requirements develop it may become appropriate to conduct similar reviews with other manufacturers or to limit the number of recommended suppliers to only those who are on board from a quality stand point.
(ACTION: W.A. Hymel to complete by 10/1/90)

3. Action Item Monitor:

Purchasing is to monitor the progress and status of the above action items.
(J.W. Hurley)

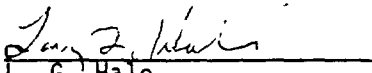
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ALTERNATIVES CONSIDERED

The total yearly piping spiral wound gasket costs for DPMC are approximately \$625M and justify 100% quality compliance. The Lamons' Blanket Order accounts for \$600M, while the Flexitallic's business is approximately \$25M, or less than four percent (4%).

PRICE OF NONCONFORMANCE

\$90M for this incident.


L. G. Hale
for Investigation Team

cc: DPMC
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