

Appendix U

RV-1919 Documentation and Interview Notes

Pipeline Rupture and Fire
Bellingham, Washington
June 10, 1999
DCA-99-MP-008

Beshore Allan

From: Katchmar, Peter (OPSDNVR) [Peter.Katchmar@rspa.dot.gov]
Sent: Thursday, September 28, 2000 1:28 PM
To: chris hoidal; Zach Barrett
Cc: beshora@ntsb.gov
Subject: Conversations With OPL Valve Contacts

Importance: High

Allan Beshore & I called Rich Stevenson & Bob Watson of Hoffman Instrument Supply, the company OPL used to purchase the springs for the RV's @ the BPT. Bob is based in the Renton office & Rich is in Portland, OR. The following is based on notes taken during the telephone interview.

On the afternoon of 27 SEPT 00, Allan Beshore, NTSB-IIC for the Bellingham, WA incident & I held a conference call with Rich Stevenson (503/466-2200) concerning his knowledge about the events surrounding the RV's at the BPT.

Allan explained who we were & asked if Rich had some time to discuss what he knew about the RV's at the BPT. Rich said that he had the time. Allan asked what he could remember about this issue.

Rich said that another person who works for Hoffman Instruments, Bob Watson, out of their Renton, WA office actually works directly with Olympic employees. Rich said he did not really know the OPL personnel. Rich stated that OPL personnel (Kenny-initials KCC on the purchase order) called to order 4, 350 - 650 psi springs on 12/17/98. He then stated that OPL personnel (Ron Greenidge-initials RMG on the purchase order) called Bob Watson on 12/18/98 to order 8, 150 - 350 psi springs. Rich had received word that OPL was having problems setting the pilot operators to a high enough set point so Rich called Bobby Brenson with Fisher Rosemont Petroleum (FRP) in GA to discuss the appropriate equipment to achieve a higher set point on the pilot operators. Once Rich received the info from FRP, he faxed the info to Bob Watson on 1/11/99, & Rich said that Bob gave the info to OPL personnel.

Allan asked about the cost of the pilot operator parts. Rich gave the figures of \$367.70 for 1 pilot without changing the "O" Ring. The "O" Ring originally was a "vitron" & for aggressive products (AP) they needed a "cal res" "O" Ring. This added an additional \$100 to the price so the total of the parts needed for each pilot operator to increase it's set pressure to 350 - 650 psi was \$477.72 each. A new complete HP pilot operator costs \$895.00 per Rich. Rich said that OPL ordered the appropriate parts for the pilot operators on July 14, 1999. We asked if Rich had any other information that he thought we should know about & Rich said no.

At ~2:55 p.m., mountain time, Allan & I called Bob Watson on his cell phone (number provided by Rich 206/200-6343).

Allan explained who we were & asked if Bob had some time to discuss what he knew about the RV's at the BPT. Bob said that he had the time. Allan asked what he could remember about this issue.

Bob stated that he remembered Ron Greenidge, from OPL, calling before 12/17/99, & complaining that they could not set the RV's to a high enough pressure, & asking why they could not increase the set point on the pilot operators. Bob told them he didn't know why. Bob stated that he thought the FRP factory was shutdown for Christmas at that time so he referred Ron to Ken Carlton, within OPL, who was more familiar with RV's. On 12/17/99, Bob received a call from OPL requesting the springs with a specific part number. Bob surmized that due to OPL having the actual spring part number that someone in OPL had researched the issue and had decided that the springs were the wrong springs in the pilot operators and so OPL needed to purchase the HP springs. Bob also remembered receiving a fax from Rich saying that they needed the piston, cover, & "O" Ring as well as the spring to make the pilot operator work @ higher pressures. He also remembers passing on that information to OPL but he doesn't remember exactly who he talked to @ OPL. Bob also remembers that OPL said that they were able to set the valves at the pressures they wanted to & the valves were working so they (OPL) was going to leave them alone for now.

This information is true & complete to the best of my recollection./PJK

Peter J. Katchmar
Petroleum Engineer
Western Region, OPS
12600 W. Colfax Ave.
Lakewood, CO 80215-3736
303/231-5715
303/231-5711 fax
(509) 351-5538 e-fax
303/356-6981 cell

I concur.
A. Beshore, III
6/27/01



HOFFMAN INSTRUMENTATION SUPPLY
6110 NW CROENI RD., HILLSBORO, OR 97124
PHONE:: 503.466.2200 • FAX: 503.466.2164

2003 MAPLE VALLEY HWY, STE. 209, RENTON, WA 98058
PHONE:: 425.255.6616 • FAX: 425.255.7714

WWW.HISOREGON.COM

September 27, 2000

Alan Beshore
National Transportation Safety Board
490 L'Enfant Plaza East, SW
Washington, D.C. 20594

Dear Mr. Beshore,

Enclosed are the requested copies of Hoffman Instrumentations correspondence regarding the solenoid valve upgrade for Olympic Pipeline.

There are four segments. The first two represent orders taken for replacement springs in December of 1998. The third segment is my fax correspondence to our salesman, Bob Watson, relaying the information from Bobby Brinson regarding the additional parts needed to make the springs work at the higher pressures. The last segment includes Olympics order of the additional parts.

Please let us know what more we can do to assist.

A handwritten signature in black ink, appearing to read "Rich Stevenson".

Rich Stevenson
Controller

encl..

RS/me

12/17

Fisher-Rosemount Petroleum Parts Order Data Sheet

fax: 215 362 3544 alternate 215 362 3745

BROOKS INSTRUMENT, 407 WEST VINE STREET, PA., 19440

BILL TO:		SHIP TO:		
OLYMPIC PIPELINE		SAME @		
PO BOX 1800		14879 OVENALL RD.		
RENTON, WA 98057		MT VERNON, WA 98273		
Customer Order Number 4425KCC		Date Entered 12/17/1998	Request Date 12/18/1998	Routing UPS RED
Terms: N-30		Factory Inspection Yes () No (XX)		
Export Order ()		Ultimate Destination: RENTON,WA		Penalty Clause () Begins:

Description	Part Number	Product Code	Item No.	Quantity	List Price	iscoun	PRICE
350-650# SOLENOID SPRINGS	460024		1	4	\$52.80	0	\$211.20
(1760)			0	0	\$0.00		\$0.00
BASE PRICE PLUS 10% INSTASHIP							
MUST SHIP 12/17/98		48.00 + 4.80					
TOTAL PRICE							\$211.20

SPECIAL NOTES:

**ATTN: JOE ALDUCH
EXPEDITE PLEASE!
THANKS.**

SALES CREDIT: Bill 6E Ship 6E Eng. 6E Eng. 6E By: RICH

Order form sent to
factory



Hoffman Instrumentation Supply, Inc.

ORDER NO. _____

14271 N.W. Science Park Drive • Portland, Oregon 97229 • (503) 643-5648 • FAX (503) 646-2164

ORDER QUOTATION RETURN FOR CREDIT RETURN FOR REPAIR/EXCH. OTHER DATE 12/17/98

CUSTOMER ORDER NO. 4425 KCC

H.I.S. ORDER NO. _____

S O L D T O
 NAME OLYMPIC
 ADDRESS _____
 CITY _____ STATE _____ ZIP CODE _____

S H I P T O
 NAME _____
 ADDRESS 14879 OVERALL RD
NET VERNON 98273
 CITY _____ STATE _____ ZIP CODE _____

PERSON CALLING _____

TELEPHONE NO. _____ EXT. _____

METHOD OF SHIPPING TO H.I.S. _____

FAX NO. _____

METHOD OF SHIPPING TO CUST. _____

REQUESTED DELIVERY DATE _____

SALESMAN _____

TAXABLE NON-TAXABLE TAX EXEMPT NO. _____

ITEM NO.	QUANTITY	DESCRIPTION	PRICE
		VALUE w/ wrong spring 70-180 sp need 350-650	
	4	760 PILOT SPRINGS # 460024	\$ 48.00 4.70 \$ 52.80
		Above conversation w/ Bob Watson - HIS REP SENDING IN ORDER	

* * * COMMUNICATION RESULT REPORT (DEC.17.1998 9:56AM) * * *

TTI H.I.S.

FILE MODE	OPTION	ADDRESS (GROUP)	RESULT	PAGE
453 MEMORY TX		19124890430	OK	P. 1/1

*fax
confirmation
of sent
order*

REASON FOR ERROR
 E-1) HANG UP OR LINE FAIL
 E-2) BUSY
 E-3) NO ANSWER
 E-4) NO FACSIMILE CONNECTION

Fisher-Rosemount Petroleum Parts Order Data Sheet

fax: 215 362 3544 alternate 215 382 3745

BROOKS INSTRUMENT, 407 WEST VINE STREET, PA. 18440

OLYMPIC PIPELINE		SAME @	
PO BOX 1800		14879 OVENALL RD.	
RENTON, WA 98057		MT VERNON, WA 98273	
4426KCC	12/17/1998	12/18/1998	UPS RED
Terms: N-30		Factory Inspection QA Certification Form:	
Yes () No (XX)		Freight Collect () Freight Prepaid & Chg. (X)	
Export Order () Ultimate Destination: RENTON, WA		Penalty Clause () Begins:	

Description	Part Number	Product Code	Item No.	Quantity	List Price	Discoun	PRICE
350-650# SOLENOID SPRINGS	460024		1	4	\$52.80	0	\$211.20
(1760)			0	0	\$0.00		\$0.00
BASE PRICE PLUS 10% INSTASHIP		48.00 + 4.80					
MUST SHIP 12/17/98							

12/18

Fisher-Rosemount Petroleum Parts Order Data Sheet

fax: 215 362 3544 alternate 215 362 3745

BROOKS INSTRUMENT, 407 WEST VINE STREET, PA., 19440

BILL TO:		SHIP TO:	
OLYMPIC PIPELINE		SAME @	
PO BOX 1800		1449 HWY 20	
RENTON, WA 98057		MT VERNON, WA 98273	
Customer Order Number 4425RMG		Date Entered 12/18/1998	Request Date 12/23/1998
Terms: N 30		Factory Inspection Yes () No (XX)	QA Certification Form:
Export Order ()		Ultimate Destination: MT VERNON, WA	Penalty Clause () Begins:

Description	Part Number	Product Code	Item No.	Quantity	List Price	iscoun	PRICE
150 - 350# PRESSURE SPRING	460023		1	8	\$51.15	0	\$409.20
			2	0	\$0.00		\$0.00
	BASE PRICE PLUS 10% INSTASHIP						
		46.50 + 4.65					
	MUST SHIP 12/21/98						
PISTON - 150-650	463016	94.00					
COVER -	463006-600	270.00					
O-RING	152091-022	3.70					
		\$ 367.70					
COMPLETE 1760	H-PEETS 150-350 4561005	\$ 895.00					
TOTAL PRICE							\$409.20

NOTES MADE IN JANUARY
 1/11/00 REGARDING HOW TO
 MAKE 12/18 ORDER WORK.
 → FROM BOBBY BRUNSON & FRP

SPECIAL NOTES:

ATTN: JOE ALDRICH
PLEASE SHIP MONDAY
THANKS!
Rich

SALES CREDIT: Bill 6E Ship 6E Eng. 6E Eng. 6E By: RICH

ORDER FORM SENT TO
 FACTORY



Hoffman Instrumentation Supply, Inc.

14271 N.W. SCIENCE PARK DRIVE • PORTLAND, OREGON 97229
(503) 643-5648 • FAX: (503) 646-2164

7/11

Fax Transmittal

Total number of pages including this sheet 2

JANUARY 11, 1999

FROM: RICH STEVENSON

TO: BOB WATSON

SUBJECT: OLYMPIC PIPELINE, SOLENOID UPGRADE

THE 1760 PILOT THEY CALLED OUT ON THE ORIGINAL SALES ORDER WAS SET @ 100 PSI AND WAS THE 70-180 SPRING.

IT TURNS OUT YOU CANNOT SIMPLY CHANGE THE SPRING TO GET A HIGHER RATING. YOU NEED TO ALSO CHANGE THE PISTON, COVER AND PISTON O-RING.

HERE IS A LIST OF THE PARTS NEEDED TO CONVERT, THIS IN ADDITION TO THE SPRING:

PISTON, 150 - 650#	463016	\$ 94.00
PISTON O-RING	152091	\$ 3.70
COVER	463006-600	<u>\$270.00</u>
	TOTAL	\$367.70 per unit

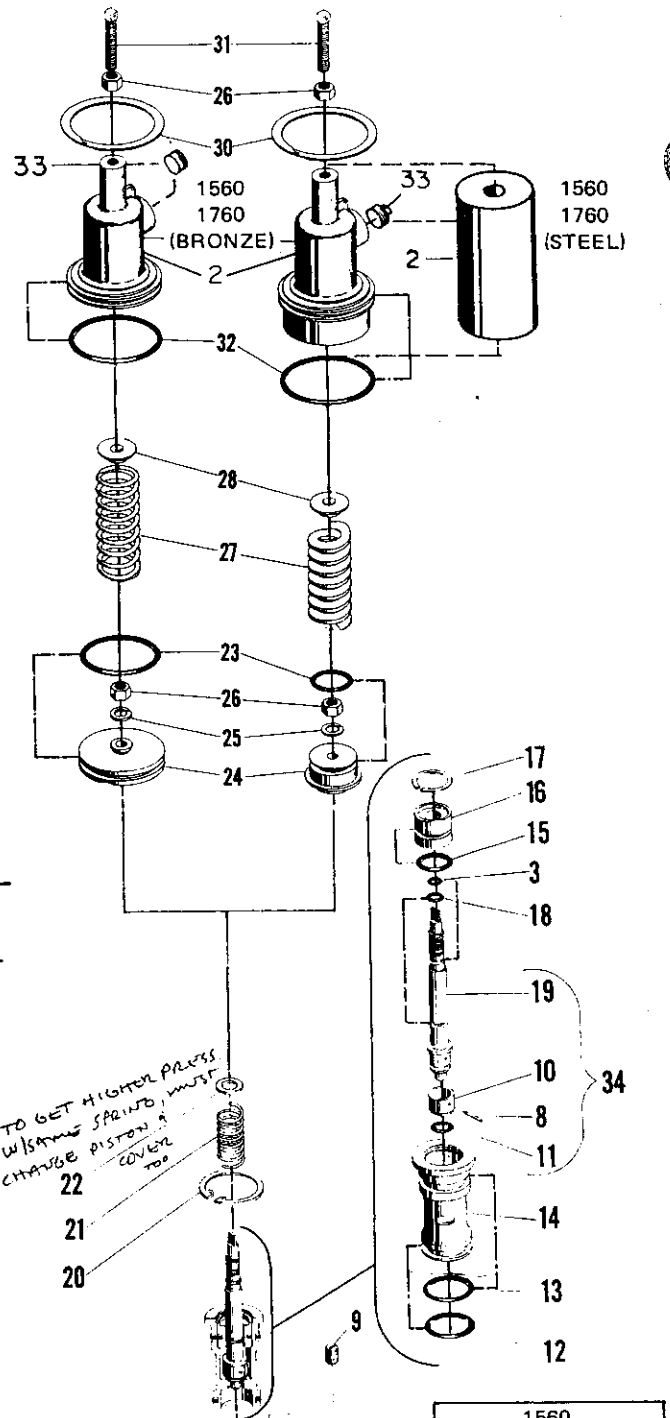
A NEW PILOT, #1760 HIGH PRESSURE IS P/N 456100S \$895.00

FOLLOWING IS THE PARTS BREAKDOWN FOR THE 1760. HOPE THIS COVERS IT.

AFTER TALKING TO BOBBY BLUNSON
Q FRP, & NOTES MADE ON Q12
ORDER FORM, PUT INTO INTO FAX
& SENT TO BOB W. ALSO SENT
ATTACHED PARTS LIST HIGHLIGHTING
PARTS NEEDED.

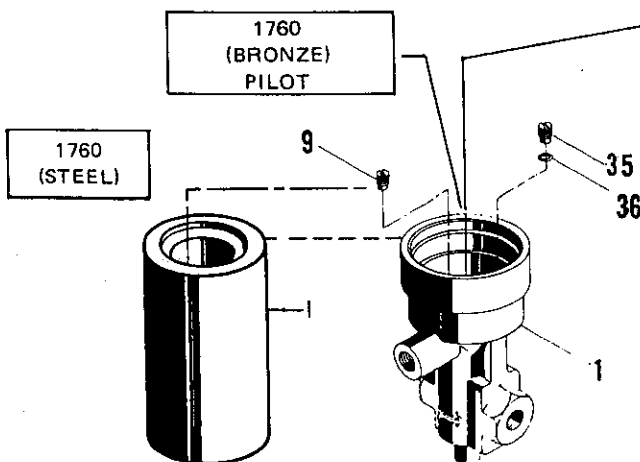
Parts List – Models 1560 and 1760

Item No.	Description	Part Number		Qty. Req.	
		1560 Pilot	1760 Pilot		
1	Pilot Body	(Bronze)	460001-200	453101-200	1
		(Steel)	460001-500	453301-500	1
2	Cover	(Bronze, 0-180 PSI)	460006-200	460006-200	1
		(Bronze, 150-650 PSI)	463006-200	463006-200	1
		(Steel, 0-180 PSI)	460006-600	460006-600	1
		(Steel, 150-650 PSI)	463006-600	463006-600	1
*3	O-Ring	152064	152064	1	
4	Adjustment Cap	460119	—	1	
5	Adjustment Screw	460118	—	1	
6	Cap Screw	150761	—	4	
7	Pipe Plug	(Bronze)	154772	—	2
		(Steel)	154720	—	2
8	Roll Pin	153511	153511	1	
9	Orifice Screw	460108	460108	1	
10	Retainer Sleeve	460112	460112	1	
*11	O-Ring	152067	152067	1	
*12	O-Ring	157009	157009	1	
*13	O-Ring	157010	157010	1	
14	Pilot Valve Cage	460007	460007	1	
*15	O-Ring	152090	152090	1	
16	Guide Bushing	460008	460008	1	
17	Retainer Ring	156467	156467	1	
*18	O-Ring	152066	—	2	
		—	152066	1	
19	Poppet Shaft	460111	460111	1	
20	Retainer Ring	156466	156466	1	
21	Spring	460021	460021	1	
22	Thrust Washer	460013	460013	1	
*23	O-Ring	(Bronze, 0-180 PSI)	157007	157007	1
		(Steel, 0-180 PSI)	152078	152073	1
		(Bronze and Steel 150-650 PSI)	152091	—	1
24	Piston	(Bronze, 0-180 PSI)	460016	460016	1
		(Steel, 0-180 PSI)	460116	460116	1
		(Bronze and Steel, 150-650 PSI)	463016	—	1
		—	—	—	1
25	Lockwasher	152267	152267	1	
26	Nut	151543-019	151543-019	2	
27	Spring	0-20 lbs.	460223	—	1
		0-40 lbs.	460022	460022	1
		30-80 lbs.	460023	460023	1
		70-180 lbs.	460024	460024	1
		150-350 lbs.	460023	460023	1
		350-650 lbs.	460024	460024	1
28	Spring Guide	460017	460017	1	
*29	O-Ring	152070	—	3	
30	Retainer Ring	156465	156465	1	
31	Screw	150687-024	150687-024	1	
*32	O-Ring	157011	157011	1	
33	Vent Pipe Plug	(Bronze)	460015	460015	1
		(Steel)	460015-500	460015-500	1
34	Poppet Shaft Assembly	460110	460110	1	
35	Orifice Plug (Bronze)	—	150688	1	
*36	O-Ring (Bronze)	—	152062	1	



TO GET HIGHER PRESSURE SPRINGS, MUST CHANGE PISTON & COVER TO

*Recommended Spare Parts



NOTE: Part numbers listed for o-rings are Buna N. For other o-ring materials add suffix as follows:

EPR (Use in place of Butyl)	-005
PL (low temperature)	-016
Viton-A	-022
Neoprene	-116

* * * COMMUNICATION RESULT REPORT (JAN.11.1999 3:32PM) * * *

TTI H.I.S.

FILE MODE	OPTION	ADDRESS (GROUP)	RESULT	PAGE
285	MEMORY TX	RENTON HIS	OK <i>2</i>	P. 2/2

*FAX
CONFIRMATION*

REASON FOR ERROR

E-1) HANG UP OR LINE FAIL
E-3) NO ANSWER

E-2) BUSY
E-4) NO FACSIMILE CONNECTION



Hoffman Instrumentation Supply, Inc.

14271 N.W. SCIENCE PARK DRIVE • PORTLAND, OREGON 97229
(503) 643-5648 • FAX: (503) 646-2164

Fax Transmittal

Total number of pages including this sheet 2

JANUARY 11, 1999

FROM: RICH STEVENSON

TO: BOB WATSON

SUBJECT: OLYMPIC PIPELINE, SOLENOID UPGRADE

THE 1760 PILOT THEY CALLED OUT ON THE ORIGINAL SALES ORDER WAS SET @ 100 PSI AND WAS THE 70-180 SPRING.

IT TURNS OUT YOU CANNOT SIMPLY CHANGE THE SPRING TO GET A HIGHER RATING. YOU NEED TO ALSO CHANGE THE PISTON, COVER AND PISTON O-RING.

HERE IS A LIST OF THE PARTS NEEDED TO CONVERT, THIS IN ADDITION TO THE SPRING:

PISTON, 150 - 650#	463016	\$ 94.00
PISTON O-RING	152091	\$ 3.70
COVER	463006-600	\$ 270.00

Emerson Electric Co.
P.O. Box 450
19267 Hwy 301 North
Statesboro, GA 30459-0450 USA
Tel. (912) 489-0200
Fax (912) 489-0410

Fisher-Rosemount Petroleum Sales Order/ Acknowledgement

BILL TO: FISHER-ROSEMOUNT™ **SHIP TO:**

OLYMPIC PIPELINE
P.O. BOX 1800

OLYMPIC PIPELINE

16471 STATE ROUTE 20
MT. VERNON, WA

RENTON WA 98057

98273

BILL TO CUSTOMER ▶ P01202-A01 SHIP TO CUSTOMER ▶ P01202-003

SALES ORDER NO. C054390	RVSN 0	DATE 07/21/99	PAGE 1
CUSTOMER ORDER NO. 4422RMG			
ORDER DATE 07/19/99	SALES CAT. 4600	TAXABLE YES	
METHOD OF SHIPMENT UPS		FOB 2	PPD XXXX
S.A. X6E			
TERMS NET 30 DAYS			

ITEM	PRODUCT NUMBER	DESCRIPTION	TAX	SCHEDULED SHIP DATE	QUANTITY ORDERED	UNIT PRICE	EXTENSION
1	463016	PISTON	*	07/30/99	4.000	94.000	376.00
2	152091-075	O-RING KALREZ	*	07/30/99	4.000	113.620	454.48
3	463006-600	PILOT COVER	*	07/30/99	4.000	270.000	1080.00
		WASHINGTON SALES TAX AT 8.6%					1910.48
		AT: 8.600%					164.30
		** SHIP COMPLETE - NO PARTIAL SHIPMENTS **					2074.78
		STATESBORO RECEIPT DATE: 07/15/99					
		* LC- EXT 346					

		REC'D FROM RICH STEVENS					
		* PHONE 425-235-7728					

		FREIGHT TERMS: FOB FACTORY, FRT PPD					

ORDER ACKNOWLEDGEMENT

CUSTOMER COPY

PRINTED: 07/20/99 01:46
REPORT: QJAGTACK
SALES ORDERS FOR SALES AGENT: X6E HOFFMAN INSTRUMENTATION SUPPLY

SHIP-TO:
P01202-003
OLYMPIC PIPELINE
16471 STATE ROUTE 20
MT. VERNON, WA
98273

BILL-TO:
P01202-A01
OLYMPIC PIPELINE
P.O. BOX 1800
RENTON
WA
98057

SALES ORDER: C054390
ORDER DATE: 07/14/99
ENTER DATE: 07/19/99
SIC CODE: 4600
CUSTOMER PO: 4422RMG
SALES AGENT: X6E 100.00%
SHIP VIA: UPS
FREIGHT TERMS: FOB FACTORY, FRT PPD
PAYMENT TERMS: NET 30 DAYS

REV: 0
NEW
BY: LARRYC
TAX: YES

LN	PRODUCT #	DESCRIPTION	PROD TYPE	TAX ?	CUST DATE	REQ DATE	SCHD DATE	SHIP	ORDER QTY	UNIT PRICE	EXTENDED PRICE	COMM %	DISCT %
1	463016	PISTON	20 Y		07/23/99				4.00	94.00	376.00	10.00	.00
2	152091-075	O-RING KALREZ	20 Y		07/23/99				4.00	113.62	454.48	10.00	.00
3	463006-600	PILOT COVER	20 Y		07/23/99				4.00	270.00	1,080.00	10.00	.00
ORDER TOTAL (EXCLUDING TAX & FRT):											1,910.48		

***** END OF TRANSMISSION TO 15036462164 *****

*Preliminary
ORDER
ACKNOWLEDGEMENT*

54390
7/30

Fisher-Rosemount Petroleum Parts Order Data Sheet

fax: 912-489-0430

FISHER ROSEMOUNT PETROLEUM, 19287 HWY 301 NORTH, STATESBORO, GA 30459

BILL TO:		SHIP TO:	
OLYMPIC PIPELINE		SAME @	
PO BOX 1800		16471 STATE ROUTE 20	
RENTON, WA 98057		MT. VERNON, WA 98273	
PH#: 425-235-7728			
Order Number 4422RMG	Date Order 7/14/99	Request Date 7/20/99	Routing UPS QED
Term N 30		Factory Inspection Yes () No (XX)	
Export Order ()		Ultimate Destination: WA.	
		Penalty Clause () Begins:	
		Freight Collect ()	
		Freight Prepaid & Chg. (X)	
QA Certification Form:			

Description	Part Number	Product Code	Item No.	Quantity	List Price	iscou	PRICE
PISTON, - 150-650#	463016		1	4	\$94.00	0	\$376.00
PISTON O-RING <i>KALREZ</i>	152091		2	4	113.70 \$2.70		\$14.80
COVER	463006-600		3	4	\$270.00		\$1,080.00
			4	0	\$0.00	0	\$0.00
			5	0	\$0.00		\$0.00
			6	0	\$0.00		\$0.00

*454.88
7/15

PER BOBBY BLINSON - 7/15

TOTAL PRICE \$1,470.80

SPECIAL NOTES:
*7/15 - modified to:
 AIP OPTION
 PLU WATSON - LHM.*

\$1910.80

SALES CREDIT: Bill 6E Ship 6E Eng. 6E Eng. 6E By: RICH

*7/14 ORDER SENT TO
 FACTORY.
 KALREZ NOTES MADE
 NEXT DAY. 7/15*



Hoffman Instrumentation Supply, Inc.

14271 N.W. SCIENCE PARK DRIVE • PORTLAND, OREGON 97229
(503) 643-5648 • FAX: (503) 646-2164

Fax Transmittal Memo

Total number of pages including this sheet 1

JULY 15, 1999

FROM: RICH STEVENSON

TO: BOB WATSON

SUBJECT: OLYMPIC PIPELINE, SOLENOID UPGRADE

CONFIRMING THE MESSAGE I LEFT ON YOUR VOICE MAIL TODAY, THE SOLENOID UPGRADE FOR OLYMPIC IS EVIDENTLY IN AN "AP" OPTION APPLICATION. THE PART NUMBER THEY GAVE ME LAST JANUARY WAS A STANDARD "O" RING. THE AP OPTION REQUIRES A KALREZ O-RING.

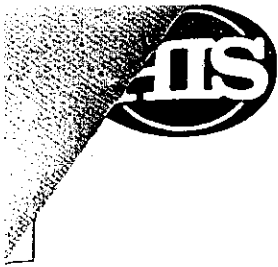
THE CORRECTED PART NUMBER IS: 152091-075

THE CORRECTED PRICE, EACH, IS: \$113.62

PLEASE LET THE APPROPRIATE PEOPLE AT OLYMPIC KNOW. WE HAVE CHANGED THE FOUR SETS TO REFLECT THE KALREZ PART. THANKS!

IS NEW VLV - AP?

*AFTER PHONE CALL FROM
BOBBY BRUNSON, SENT ABOVE
FAX TO BOB W.*



Hoffman Instrumentation Supply, Inc.

14271 N.W. SCIENCE PARK DRIVE • PORTLAND, OREGON 97229
(503) 643-5648 • FAX: (503) 646-2164

Fax Transmittal

Total number of pages including this sheet 2

JANUARY 11, 1999

FROM: RICH STEVENSON

TO: BOB WATSON

SUBJECT: OLYMPIC PIPELINE, SOLENOID UPGRADE

THE 1760 PILOT THEY CALLED OUT ON THE ORIGINAL SALES ORDER WAS SET @ 100 PSI AND WAS THE 70-180 SPRING.

IT TURNS OUT YOU CANNOT SIMPLY CHANGE THE SPRING TO GET A HIGHER RATING. YOU NEED TO ALSO CHANGE THE PISTON, COVER AND PISTON O-RING.

HERE IS A LIST OF THE PARTS NEEDED TO CONVERT, THIS IN ADDITION TO THE SPRING:

PISTON, 150 - 650#	463016	\$ 94.00
PISTON O-RING	152091-075	\$ 3.70 113.62
COVER	463006-600	<u>\$270.00</u>
TOTAL		\$367.70 per unit

A NEW PILOT, #1760 HIGH PRESSURE IS P/N 456100S \$895.00

FOLLOWING IS THE PARTS BREAKDOWN FOR THE 1760. HOPE THIS COVERS IT.

*4 SETS - PARTS
PO # 4422 R.M.G.
TO O.P. 16471 STATE ST 20
MT VIEW AD 13*

*AP
OPTION*

*REQ.
KAREZ*

*7/14 - call from Watson re
7/11 fax. GAVE ME PO#
TO ORDER 4 SETS*

Author: Bobby Brinson at USSBOMIS
Date: 6/28/99 1:30 PM
Priority: Normal
Subject: 350 To 650 Pilot Spring

Allen,

Color code is bronze or brown.

If I can be of further assistance in any way, please feel free to contact me.

Regards,

Bobby Brinson

Allen Shore
Fax: 360-676-8519

MTR
12/22/98

Protective Devices

Device	Number	Variable Component	Set Point
CONTROL VALVES			
Ferndale Inlet	CV-1904	Pressure/ <i>Flow R.</i> Variable	<i>100 - 1440</i> psig 0-16000 ^{BPH}
Anacortes Inlet	CV-1916	Pressure/ <i>Flow R.</i> Variable	<i>50 - 1440</i> 0-16000
Anacortes Back Pressure	CV-1946	Pressure Variable	<i>35 mid.</i> 0-600
Ferndale Back Pressure	CV-1951	Pressure Variable	<i>35 mid.</i> 0-600
Ferndale Discharge	CV-1963	Pressure Variable	<i>Q - 1440</i> 0-16000
Anacortes Discharge	CV-1969	Pressure Variable	<i>Q - 1440</i> 0-16000

SURGE RELIEF VALVES

Ferndale Inlet	RV-1919	Pressure	740 psig	<i>650</i>
Anacortes Inlet	RV-1923	Pressure	740 psig	<i>650</i>
Ferndale Discharge	RV-1932	Pressure	740 psig	<i>650</i>
Anacortes Discharge	RV-1941	Pressure	740 psig	<i>650</i>
Ferndale Donut Manifold	RV-2002	Pressure	285 psig	<i>250</i>
Anacortes Donut Manifold	RV-2005	Pressure	285 psig	<i>250</i>
TK-202 Inlet	RV-2065	Pressure	285 psig	<i>200</i>
TK-204 Inlet	RV-2072	Pressure	285 psig	<i>200</i>
TK-205 Inlet	RV-2077	Pressure	285 psig	<i>200</i>
TK-203 Inlet	RV-2082	Pressure	285 psig	<i>200</i>
TK-206 Inlet	RV-2088	Pressure	285 psig	<i>200</i>

Just strainer

OK
CCM
RDB
RJK
10/14/98

THERMAL RELIEF VALVES

Ferndale Receiver R-201	RV-1910	Pressure	1480 psig
Anacortes Receiver R-202	RV-1917	Pressure	1480 psig
Ferndale Launcher L-201	RV-1939	Pressure	1480 psig
Anacortes Launcher L-202	RV-1949	Pressure	1480 psig
Ana Incoming Strainer	RV-1953	Pressure	740 psig
Ana Incoming Strainer Outlet	RV-1955	Pressure	740 psig
Fern Incoming Strainer	RV-1964	Pressure	740 psig
Fern Incoming Strainer Outlet	RV-1965	Pressure	740 psig
Fern Outgoing Meter Outlet	RV-1970	Pressure	740 psig
Fern Outgoing Strainer Outlet	RV-1976	Pressure	740 psig
Fern Outgoing Strainer	RV-1978	Pressure	740 psig
Fern Outgoing Strainer Inlet	RV-1982	Pressure	740 psig
Ana Outgoing Meter Outlet	RV-1993	Pressure	740 psig
Ana Outgoing Strainer Outlet	RV-2004	Pressure	740 psig
Ana Outgoing Strainer	RV-2009	Pressure	740 psig
Ana Outgoing Strainer Inlet	RV-2011	Pressure	740 psig
P-201 Discharge	RV-2013	Pressure	740 psig
P-202 Discharge	RV-2020	Pressure	740 psig
P-203 Discharge	RV-2025	Pressure	740 psig
P-205 Discharge	RV-2057	Pressure	285 psig
Ferndale Inlet Manifold	RV-2058	Pressure	740 psig
Anacortes Inlet Manifold	RV-2060	Pressure	740 psig
TK-202 Transfer Line	RV-2064	Pressure	285 psig
TK-204 Transfer Line	RV-2070	Pressure	285 psig

OK

Transfer pump OK

From next page
P. 206 Division

ALB
CONFIDENTIAL
DO NOT COPY

0001030

Thermal Relief Valves

TK-205 Transfer Line	RV-2076	Pressure	285 psig	} OK
TK-203 Transfer Line	RV-2081	Pressure	285 psig	
TK-206 Transfer Line	RV-2087	Pressure	285 psig	

MISCELLANEOUS RELIEF VALVES

Product Sump V-211	RV-2102	Pressure	2.6 in H2O pressure/ 0.865 in H2O vacuum
TK-202 Floating Roof	RV-2192A	Pressure	+/- 1/2" WC
TK-202 Floating Roof	RV-2192B	Pressure	+/- 1/2" WC
TK-202 Floating Roof	RV-2192C	Pressure	+/- 1/2" WC
TK-202 Floating Roof	RV-2192D	Pressure	+/- 1/2" WC
TK-204 Floating Roof	RV-2193A	Pressure	+/- 1/2" WC
TK-204 Floating Roof	RV-2193B	Pressure	+/- 1/2" WC
TK-204 Floating Roof	RV-2193C	Pressure	+/- 1/2" WC
TK-204 Floating Roof	RV-2193D	Pressure	+/- 1/2" WC
TK-205 Floating Roof	RV-2194A	Pressure	+/- 1/2" WC
TK-205 Floating Roof	RV-2194B	Pressure	+/- 1/2" WC
TK-205 Floating Roof	RV-2194C	Pressure	+/- 1/2" WC
TK-205 Floating Roof	RV-2194D	Pressure	+/- 1/2" WC
TK-203 Floating Roof	RV-2195A	Pressure	+/- 1/2" WC
TK-203 Floating Roof	RV-2195B	Pressure	+/- 1/2" WC
TK-203 Floating Roof	RV-2195C	Pressure	+/- 1/2" WC
TK-203 Floating Roof	RV-2195D	Pressure	+/- 1/2" WC
TK-206 Floating Roof	RV-2196A	Pressure	+/- 1/2" WC
TK-206 Floating Roof	RV-2196B	Pressure	+/- 1/2" WC
TK-206 Floating Roof	RV-2196C	Pressure	+/- 1/2" WC
TK-206 Floating Roof	RV-2196D	Pressure	+/- 1/2" WC
TK-209 Floating Roof	RV-2197A	Pressure	+/- 1/2" WC
TK-209 Floating Roof	RV-2197B	Pressure	+/- 1/2" WC
TK-209 Floating Roof	RV-2197C	Pressure	+/- 1/2" WC
TK-209 Floating Roof	RV-2197D	Pressure	+/- 1/2" WC
P-206 Discharge	RV-xxxx	Pressure	590 psig

PRESSURE SWITCHES

High Inlet - Ferndale	PS-1911	Pressure	815 psig	700	OK CCA ROB RJK Spec for 2 min 10/14/98
High Inlet - Anacortes	PS-1929	Pressure	815 psig	700	
High Discharge - Ferndale	PS-1979	Pressure	815 psig	700	
High Discharge - Anacortes	PS-2010	Pressure	815 psig	700	
Low Suction - P-201	PS-2016	Pressure	10 psig Decreasing	2	
Low Suction - P-202	PS-2022	Pressure	10 psig Decreasing	2	
Low Suction - P-203 <i>Inspump P-206</i>	PS-2028	Pressure	10 psig Decreasing	2	

FLOW SWITCHES

Low Flow - P-201 Suction	FS-2015	Flow	26 gpm
Low Flow - P-202 Suction	FS-2021	Flow	26 gpm
Low Flow - P-203 Suction	FS-2027	Flow	26 gpm
Flow to Relief Header <i>P-205 Tank pump P-208 Sump pump</i>	FS-2099	Flow	26 gpm

TANK SWITCHES

High Level - TK-202	LS-2066	Level	43' - 8" 43.67'
High Level - TK-204	LS-2073	Level	43' - 8" 43.67'

ALB
CONFIDENTIAL
DO NOT COPY

0001031



OLYMPIC PIPE LINE COMPANY

4140 MERIDIAN ST.
SUITE 210
BELLINGHAM, WA 98226
(360) 733-9715

September 13, 1999

Chris Hoidal
U.S. Department of Transportation
Western Region-Office of Pipeline Safety
12600 W Colfax Ave - Suite A-250
Lakewood CO 80215-3736

RE: Response to Request For Specific Information
dated August 10, 1999/received August 24, 1999

Dear Mr. Hoidal:

In response to the letter from your office dated August 10, 1999 and received on August 24, 1999, and in an effort to assist the Office of Pipeline Safety in its investigation of the June 10th pipeline incident on Olympic's 16-inch pipeline in the City of Bellingham, Washington, the following response and attachments are offered.

- 1. Please provide a copy of the Maintenance Log that shows all malfunctions of all valves since the start of operation of the Bayview Products Terminal. Also, please provide any documentation from the Supervisor of Product Movement concerning each event indicated in the Maintenance Log referred to above.*

The Maintenance Logs referenced above are generated by field personnel at the Olympic facility or as required by the Manager of Operations or the Area Supervisor. The field generated Maintenance Logs related to all valves are attached for your review (Attachment A). The Supervisor of Product Movement was not involved in the generation, review, or repair of any item described in the Maintenance Logs provided.

- 2. Please provide a copy of the entries made in the outage report book since the start of operations of the Bayview Products Terminal.*

Please see Attachment B.

3. *Please provide a copy of all reports to the operations controller from field personnel concerning "malfunctions or failure of equipment" concerning the Bayview Products Terminal since start of operations of that terminal.*

Copies of e-mail correspondence from field personnel to the control center concerning the Bayview Products Terminal are attached (Attachment C).

4. *Please provide a copy of the following, "Operations Controller Generated Reports and Logs," since the start of operation of the Bayview Products Terminal. "Maintenance Logs¹," "Emergency Logs²," "Outage Reports³," "Miscellaneous Operations Notes (Spiral Notebook)⁴," "MOV-Mainline block valve logs⁵," and "Valve and Equipment (LOCK-OUT/TAG-OUT)-Software tagged On-Hand Breakers Pulled⁶, during construction and maintenance periods."*

1. There are no Operations Controller generated Maintenance Logs. Maintenance Logs are generated by field operations personnel. See response to question 1.
 2. All control center generated Emergency Logs are immediately turned over to Environmental/Regulatory Affairs Supervisor. As of this date, none have been generated since the start of operations of the Bayview Products Terminal.
 3. System outage reports are provided in Attachment B.
 4. The Miscellaneous Operations Notes (spiral notebook) has been replaced by e-mail system messages. See e-mails enclosed in Attachment D.
 5. A MOV-Mainline Block Valve Log does not exist.
 6. Such logs generated and tracked by O/C during construction and maintenance periods are kept only for the life of the project.
5. *Please provide a copy of the "Pig Log Book" entries for all pigs run on the Ferndale to Bayview Products Terminal since the start of operations of the Bayview Products Terminal. If this log is different from the "station scraper log book," please provide a copy of the "station scraper log book" for the Ferndale Pump Station and the Bayview Product Terminal.*

Please see Attachment E.

6. *Please provide a copy of the "Operations Controller log book" that documents all information the "on-duty" controller brought to the attention of the Control Center Supervisor following "start up" of the Bayview Station.*

An "Operations Controller log book" does not exist. There is currently no position within the Olympic system of Control Center Supervisor. The Supervisor of Product Movement assumes these responsibilities. Communication with the supervisor of Product Movement is usually either verbal or via e-mail.

7. *Please provide copies of all training records for the two controllers, computer support technician, and supervisor that were on duty during the hours of 8:00 a.m. and 6:00 p.m. on June 10, 1999, for the period of time from January 1, 1994, to present.*

Attached (Attachment F) are the training records for the computer support technician and the supervisor that were on duty on June 10, 1999. Copies of training records for the two controllers identified above were previously provided to the NTSB under production number four, document numbers 0622 - 0639 and 0640 - 0654. We understand copies were forwarded to the DOT/OPS. Please let us know if this is not the case.

8. *Copies of any/all documentation of field tests on RV-1919 at the Bayview Products Terminal that show that the valve was correctly installed, and that the valve operated correctly.*

See Attachment G.

If you have any question concerning this request, please contact me at (360) 733-9715.

Sincerely,



Craig Hammett
Whatcom Creek Project
Olympic Pipe Line Company



Attachment G

0006369

CONFIDENTIAL
DO NOT COPY

ACB

BAYVIEW PRODUCTS TERMINAL

THERMAL & SURGE RELIEF VALVE CHECK SHEET

THERMAL RELIEF VALVES

Location of Valve	Set Point	Date	Initials	Date	Initials	Date	Initials
Ferndale Receiver R-201 (RV-1910)	1480	11-20-98	AD				
Anacortes Receiver R-202 (RV-1917)	1480	11-20-98	AD				
Ferndale Launcher L-201 (RV-1939)	1480	11-20-98	AD				
Anacortes Launcher L-202 (RV-1949)	1480	11-20-98	AD				
Ana Incoming Strainer (RV-1953)	740	11-20-98	AD				
Ana Incoming Strainer Outlet (RV-1955)	740	11-20-98	AD				
Fern Incoming Strainer (RV-1964)	740	11-20-98	AD				
Fern Incoming Strainer Outlet (RV-1965)	740	11-20-98	AD				
Fern Outgoing Meter Outlet (RV-1970)	740	11-20-98	AD				
Fern Outgoing Strainer Outlet (RV-1976)	740	11-20-98	AD				
Fern Outgoing Strainer (RV-1978)	740	11-20-98	AD				
Fern Outgoing Strainer Inlet (RV-1982)	740	11-20-98	AD				
Ana Outgoing Meter Outlet (RV-1993)	740	11-20-98	AD				
Ana Outgoing Strainer Outlet (RV-2004)	740	11-20-98	AD				
Ana Outgoing Strainer (RV-2009)	740	11-20-98	AD				
Ana Outgoing Strainer Inlet (RV-2011)	740	11-20-98	AD				
P-201 Discharge (RV-2013)	740	11-20-98	AD				
P-202 Discharge (RV-2020)	740	11-20-98	AD				

0006370

CONFIDENTIAL
DO NOT COPY

ALB

P-203 Discharge (RV-2025)	740	11-19-98	[Signature]			
P-205 Discharge (RV-2057)	285	11-19-98	[Signature]			
P-206 Discharge (RV-xxxx)	590	11-19-98	[Signature]			
Ferndale Inlet Manifold (RV-2058)	740	11-19-98	[Signature]			
Anacortes Inlet Manifold (RV-2060)	740	11-19-98	[Signature]			
TK-202 Transfer Line (RV-2064)	285	11-19-98	[Signature]			
TK-204 Transfer Line (RV-2070)	285	11-19-98	[Signature]			
TK-205 Transfer Line (RV-2076)	285	11-19-98	[Signature]			
TK-203 Transfer Line (RV-2081)	285	11-19-98	[Signature]			
TK-206 Transfer Line (RV-2087)	285	11-19-98	[Signature]			

SURGE RELIEF VALVES

Location of Valve	Set Point	Date	Initials	Date	Initials
Ferndale Inlet (RV-1919)	650	11-18-98	[Signature]		
Anacortes Inlet (RV-1923)	650	11-18-98	[Signature]		
Ferndale Discharge (RV-1932)	650	11-18-98	[Signature]		
Anacortes Discharge (RV-1941)	650	11-18-98	[Signature]		
Ferndale Donut Manifold (RV-2002)	250	11-18-98	[Signature]		
Anacortes Donut Manifold (RV-2005)	250	11-18-98	[Signature]		
TK-202 Inlet (RV-2065)	200	11-18-98	[Signature]		
TK-204 Inlet (RV-2072)	200	11-18-98	[Signature]		
TK-205 Inlet (RV-2077)	200	11-18-98	[Signature]		
TK-203 Inlet (RV-2082)	200	11-18-98	[Signature]		
TK-206 Inlet (RV-2088)	200	11-18-98	[Signature]		

ACB

Date: 12/19/98
Sender: Pam Chowning
To: AAE Chicago Employees
Priority: Normal
Subject: Bayview surge relief valves and On call coverage

The Bayview/Ferndale incoming surge relief and the Bayview/Ferndale outgoing surge relief are active and set to relieve at seven hundred pounds. This means that both sides (incoming and outgoing) pipelines are protected against any high surges. You may use one or both pumps as you wish at Bayview. On another subject, Ken Carlton will cover my area and take my call-outs and my on-call weekend while I am on vacation. I will return to work on Wednesday, Jan. 6th, 1999. Merry Christmas and Happy New Year to all my friends at Olympic.

0006372

CONFIDENTIAL
DO NOT COPY

ACB



Olympic Pipe Line Company

2319 Lind Ave. S.W.
P.O. Box 1800
Renton, WA. 98057-1800
(425) 235-7736

28 June, 1999

NTSB Document / Information Request
via D. Beu – 28 June, 1999

- **Bayview Products Terminal (BPT) – Relief valve setting changes**
12 May 1999 – R. Greenidge / Mechanical Technician – Changed settings on surge relief valves RV-1919, RV-1923, RV-1932, RV-1941 from 700 psi to 650 psi as per C. Hammett, OPL engineering dept.
- **Documentation of surges at BPT**
Activation of surge relief valves at OPL facilities are not documented, other than through the SCADA system on a realtime basis. Since all surge relief settings are designed to relieve below MAOP, documentation of surge activation is not OPL procedure or policy.

0006373

0001542
~~CONFIDENTIAL
DO NOT COPY~~ ACB

6-28-99 Bayview Sta.

Rick Kiemo OPL

Did work - Ron Greenidge OPL

Joe Sobotta - DOE

R. Fisher - Egerton

Byron Coy - OIS

Peter Katchmar - OIS

John Parish - Brooks

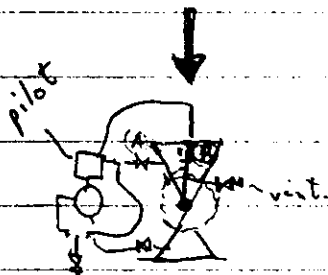
Steve Wright - Brooks

Doug Brew - OPL

3:00pm
Test
Surge Valve

Michael Martin - Seattle
(Attorney)

** Corrective
Action →
Copy of Pump curve
& Notes



Peter Make point
of valve not being
locked.

Tasted 1919 Surge relief valve

3:39 opened vent Heard piston move + fluid came out

3:52 Pressure pump tester closed inlet (A)

4:05 Relieve 440 psi 6 times closed piston (B)
value hold 2/2

Tasted 1923

4:15 Relieve 655 psi 2 times record at 320 psi

4:20

Test 5:30 pm

R D Fisher
6/28/99

ALB

2:55pm 6/28/99 Bayview Terminal
 Michael Martin Surgeon for Ron Greenidge
 Ron Greenidge CPL Machine
 Joe Subito DOE (pictures)
 Ron Fischer = Eginon
 Byron Coy = OPS
 Peter Ketchum = OPS
 John Parrish = Brooks
 Steve Wright = Brooks
 Doug Ben = OPL

A cutoff loop for a leak was found underneath the head on the high side of the relief valve #1919. A leak was seen near the valve to.

Joe got pics.

We all discussed the appropriate tests to be made & decided that instead of introducing pressure to the female line, we would relieve pressure from the top of the piston to see if it is free. Ron opened the valve slowly & it spouted into a bucket & we heard that fluid go through the relief valve. ~~It~~ A slow trickle continued when the valve was

regarded due to the head in the elevated portion of the line

* Closed the inlet port to pilot upstream of RV

Closed the valve that relieves pressure off of top of piston

Hooked up tester to test port

Relieving at 440 psi (pilot opens)

Holds @ 232 psi (pilot recants)

Subsequent tests relieving at 440 psi

+ holds at 212 psi.

Used 1st Tester from Allen Station

3rd Brand

Part # 8112-3000

02-98

Gage # 23544-32854P
 Calibration is due 3/9/2000

Calibration is due 3/9/2000

Tested Annettes RV 1923 minit^o
 650-660 RV paper } did 2x w/s repeatable
 Results @ 325 psi

Received STADA Control OK!



OLYMPIC PIPE LINE COMPANY

2319 Lind Avenue SW

P.O. Box 1800

Renton, WA 98057

(425) 235-7736

FAX (425) 271-5320

We are sending 5 pages, including this page. If you need confirmation or a resend of any page, please call (425) 235-7736.

FROM:

Craig Hammett

DATE:

1/31/00

TO:

Allan Beshore

FAX#:

202 314-6482

COMMENTS:

**OLYMPIC PIPE LINE COMPANY**

2919 LIND AVE. S.W.
P.O. BOX 1800
RENTON, WASHINGTON 98057
(425) 235-7736

January 31, 2000

Mr. Allan Beshore
National Transportation Safety Board
490 L'Enfant Plaza East, S.W.
Washington, D.C. 20594-2000

Re: Relief Valve Testing

Dear Mr. Beshore:

Please reference your January 13, 2000 E-Mail to Mr. Doug Beu regarding the Olympic relief valve test submittal of December 17, 1999.

The following are responses to your specific questions:

1. *Where was the debris found in the Anacortes incoming valve?*

The debris was found on the upstream side of the surge relief valve piston barrel.

Cont. Did it cause the pilot to be inoperative or the main valve itself?

The valve did not operate. We believe it was from the debris found upstream of the piston barrel.

2. *Regarding the table summarizing the results of the testing. Please verify the device number corresponding to each of the valve I.D. descriptions.*

The device numbers have been placed at the bottom of the corrected summary table for each of the relief valves. See attachment 1 for a copy of the corrected summary table.

Were the set point changes and sensitivity changes made manually by Olympic personnel between tests?

Yes.

It appears that for test number 3, 4, and 6, the pilot pressure settings do not match those given in the data sheets provided for each test. Can your personnel correct these discrepancies, verify the rest of the data?

The summary table (Attachment 1) has been corrected to reflect the same data as the data sheets. The data sheets provided in the December 17 submittal are correct.

3. *Is the test loop Olympic fabricated still in place or, at least still intact?*

No, the piping and manifolding was dismantled after the testing was performed.

4. *Is Milbar a contractor specializing in this type of testing?*

No, Milbar is a Hydrotesting contractor. They had not done this type of work before but were able to adapt their pumping equipment to perform the tests as directed by Olympic.

Please feel free to contact me at (425) 235-7746 should you have any question or require any additional information in this regard.

Sincerely,

C. Craig Hammett
Project Manager
Whatcom Creek Restoration Project

CC: Chris Hoidal, DOT

Attachment 1

OLYMPIC PIPE LINE COMPANY

* Revised 1-17-2000

The results of the tests are summarized below

No.	Date	Valve I.D.	Pilot Pressure Setting	Sensitivity Setting	Actual Relief Pressure	Relief Pressure Reset	Remarks
0	7/14/99	AA Incoming	650	3	N/A	N/A	Did not work, found trash at valve inlet
1	8/2/99	AA Outgoing	650	3.5	760	530	New parts for pilot
2	8/2/99	FE Incoming	450	Factory set	510	330	New rif viv & pilot to replace viv at NTSB
3	8/4/99	AA Outgoing	350*	3.5	370	Closed	Would not reset
4	11/5/99	AA Incoming	350*	2	380	340	New parts for pilot Water manifold
5	11/5/99	AA Outgoing	400	3.5	430	400	Flow fluctuated
6	11/5/99	AA Outgoing	400*	2	430	N/A	Flow constant
7	11/5/99	AA Outgoing	400	2.5	N/A	N/A	Flow little fluctuation
8	11/5/99	AA Outgoing	400	3	N/A	N/A	Flow fluctuated
9	11/5/99	AA Outgoing	400	1	N/A	N/A	Flow fluctuated
10	11/5/99	AA Outgoing	400	0.5	N/A*	N/A	Closed slow
11	11/5/99	AA Outgoing	400	2	430	400	Smooth operation
12	11/5/99	FE Incoming	400	2	445	420	Smooth operation
13	11/5/99	FE Outgoing	400	2	435	400	New parts for pilot Smooth operation
14	11/5/99	FE Outgoing	400	3	450	400	Flow fluctuated
15	11/5/99	FE Mainline	1050	2	1200	N/A	Successful openings
16	11/5/99	FE Mainline	1000	2	1090	N/A	Successful openings
17	11/5/99	FE Mainline	900	2	1030	995*	Successful openings
18	11/8/99	Tk 202 piping	185	2	210	145-150	Little fluctuation
19	11/8/99	Tk 203 piping	185	2	200	160	Little fluctuation
20	11/8/99	Tk 204 piping	175	2	200	145	Little fluctuation
21	11/8/99	Tk 205 piping	195	2	205	175	Fluctuation
22	11/8/99	Tk 206 piping	195	3 found	210	180	Smooth operation
23	11/8/99	Tk 206 piping	195	2	230	190	Fluctuation
24	11/8/99	B20 Manifold	250	2	270	240	Fluctuates due to pump slow rate
25	11/8/99	B16 Manifold	250	2	270	240	Fluctuates due to pump slow rate
26	11/8/99	FE Incoming	650	2	690	630	Smooth operation
27	11/8/99	FE Outgoing	400	2	430	N/A	Smooth operation
28	11/8/99	FE Outgoing	400	2	430	N/A	Smooth operation
29	11/8/99	FE Outgoing	400	3	450	N/A	Little fluctuation
30	11/8/99	FE Outgoing	570	2	605	N/A	Smooth operation
31	11/8/99	FE Outgoing	400	2	430	N/A	Smooth 600 gpm
32	11/8/99	FE Outgoing	400	3	430	N/A	Ruff fluctuation reset to 2 sensitivity while flowing
33	11/8/99	FE Mainline	900	2	1010	N/A	Smooth openings
34	12/2/99	RE 16" Allen	1150	2.5	1160	1120	Smooth operation
35	12/2/99	RE 20" Allen	742	3	750	740	Smooth operation

Note: Fluctuation indicates that the flow rate increased and decreased while the pressure cycled between the relief and reset pressures. Also referred to as throttling, this fluctuation indicates that the valve is actuating open further than is required to maintain the test flow rate, and indicates that there is still additional flow capacity available.

Valve designations:

AA Incoming RV-1922

FE Outgoing (B20) RV-1932

FE ML Incoming RV 2229

Tk 204 RV-2072

FE Incoming RV-1919

AA Manifold (B16) RV 2005

Tk 202 RV-2065

Tk 205 RV-2077

AA Outgoing (B16) RV-1941

FE Manifold (B20) RV-2002

Tk 203 RV-2082

Tk 206 RV-2088

**CONFIDENTIAL
DO NOT COPY**

014983A