SECTION 5

RESULTS PIPELINE 25

5. Results Pipeline 25

Data Collection

Several models were utilized to predict the burst pressure of pipeline 25. These models were: ASME B-31G, DNV RP-F101, ABS formulation (modified design), RAM Pipe #1 (SMYS) and RAM Pipe #2 (SMTS). The models were run in four phases, each using base data collected from different sources.

1. Before test – based on knowledge of pipeline D, t, age, general condition and speculation on materials, products (Spring POP report)
2. After Rosen in-line data – interpreted results
3. After Stress Engineering materials data – diameters, thickness, stress-strain, failed section pictures
4. After Winmar field test reports – given failure pressure data, locations, test history

Phase 1

Phase one predictions produced a rather wide range of burst pressures. They are as follows.

Method	Pb-psi	Bpb
B31G	5,000	1.35
DNV	7,000	0.97
ABS	3,800	1.79
RAMPipe #1	5,700	7.19

Phase 2

Phase 2 attempted to predict not only the burst pressure but also the burst location. This was achieved by combining data collected from the Rosen smart pig and the fore mentioned models. The results area as follows:

Method	Pb-psi	Bpb	Distance in feet
B31G	5,000	1.39	Linear
DNV	7,800	0.9	900
ABS	4,800	1.84	1700
RAMPipe #1	7,800	1.02	1900

Phase 3

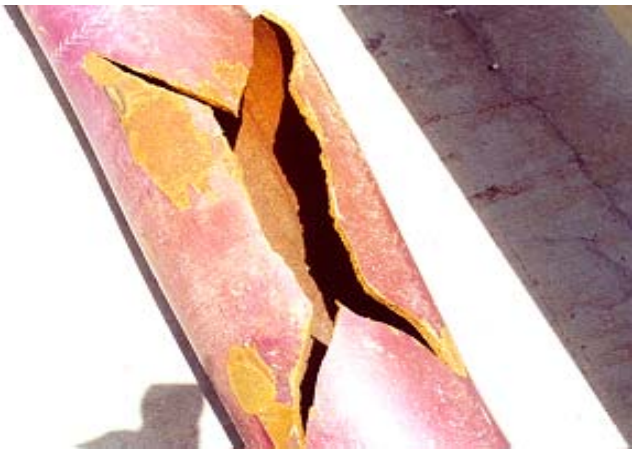
Phase 3 attempted to predict burst pressure based on data collected from the Rosen smart pig and the analysis from Stress Engineering. The results area as follows:

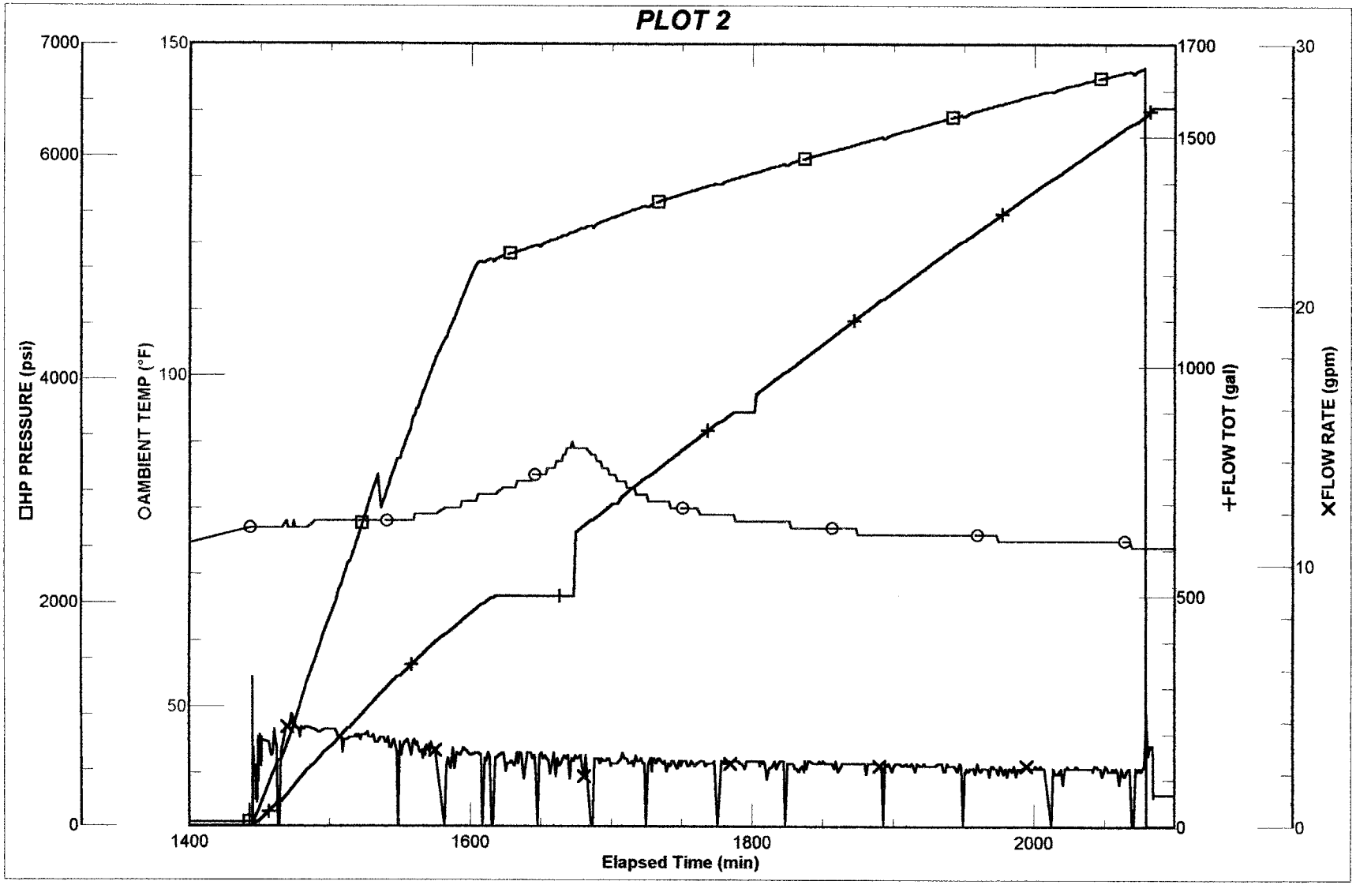
Method	Pb-psi	Bpb
B31G	4,683-5,318	1.28-1.45
DNV	7,474-8,351	0.91-0.81
ABS	4,927-5,595	1.21-1.38
RAMPipe #1	6,965 (long) 6,951 (tran) 6,794 (test)	0.98

Phase 4

Phase 4 was the collection of Winmar field data from the actual burst test for comparison to the predictions made earlier. The results area as follows:

- Location of burst section – 6793 feet from the “B” platform riser
- Wall loss from in-line direct measurements – 22%
- Length of corrosion feature at burst point in-line – 0.59in.
- Actual burst pressure – 6794 psi




PLOT 2
7000
6000
4000
2000
0
□HP PRESSURE (psi)
150
100
50
○AMBIENT TEMP (°F)
1700
1500
1000
500
0
+FLOW TOT (gal)
30
20
10
0
XFLOW RATE (gpm)
1400
1600
1800
2000
Elapsed Time (min)

Stage Time (min)	Time of Day	HP PRESSURE (psi)	AMBIENT TEMP (°F)	FLOW RATE (gpm)	FLOW TOT (gal)
Monday, June 11, 2001					
1:10:02:31	22:36:27	6687	75	2.2	1471.0
1:10:03:01	22:36:57	6687	75	2.1	1472.0
1:10:03:31	22:37:27	6688	75	2.2	1474.0
1:10:04:01	22:37:57	6693	75	2.1	1475.0
1:10:04:31	22:38:27	6691	75	2.1	1476.0
1:10:05:01	22:38:57	6693	75	2.3	1477.0
1:10:05:31	22:39:27	6692	75	2.0	1478.0
1:10:06:01	22:39:57	6698	75	2.2	1479.0
1:10:06:31	22:40:27	6697	75	2.3	1480.0
1:10:07:01	22:40:57	6697	75	2.1	1481.0
1:10:07:31	22:41:27	6702	75	1.9	1482.0
1:10:08:01	22:41:57	6704	75	2.2	1483.0
1:10:08:31	22:42:27	6702	75	2.0	1484.0
1:10:09:01	22:42:57	6705	75	2.0	1485.0
1:10:09:31	22:43:27	6705	75	2.2	1486.0
1:10:10:01	22:43:57	6705	75	2.2	1487.0
1:10:10:31	22:44:27	6712	75	2.2	1489.0
1:10:11:01	22:44:57	6711	75	2.2	1490.0
1:10:11:31	22:45:27	6716	75	2.1	1491.0
1:10:12:01	22:45:57	6716	75	2.2	1492.0
1:10:12:31	22:46:27	6718	75	1.9	1493.0
1:10:13:01	22:46:57	6718	75	2.3	1494.0
1:10:13:31	22:47:27	6720	75	2.1	1495.0
1:10:14:01	22:47:57	6723	75	2.3	1496.0
1:10:14:31	22:48:27	6724	75	2.2	1497.0
1:10:15:01	22:48:57	6721	75	2.1	1498.0
1:10:15:31	22:49:27	6724	75	2.1	1499.0
1:10:16:01	22:49:57	6732	75	2.2	1500.0
1:10:16:31	22:50:27	6730	75	2.2	1501.0
1:10:17:01	22:50:57	6730	75	2.3	1503.0
1:10:17:31	22:51:27	6732	75	2.2	1504.0
1:10:18:01	22:51:57	6733	75	2.1	1505.0
1:10:18:31	22:52:27	6737	75	2.1	1506.0
1:10:19:01	22:52:57	6736	75	2.1	1507.0
1:10:19:31	22:53:27	6738	75	2.2	1508.0
1:10:20:01	22:53:57	6741	75	2.3	1509.0
1:10:20:31	22:54:27	6740	75	2.2	1510.0

Stage Time (min)	Time of Day	HP PRESSURE (psi)	AMBIENT TEMP (°F)	FLOW RATE (gpm)	FLOW TOT (gal)
Monday, June 11, 2001					
1:10:21:01	22:54:57	6741	75	2.3	1511.0
1:10:21:31	22:55:27	6747	75	2.3	1512.0
1:10:22:01	22:55:57	6746	75	1.9	1513.0
1:10:22:31	22:56:27	6746	75	1.9	1514.0
1:10:23:01	22:56:57	6750	75	2.2	1515.0
1:10:23:31	22:57:27	6752	75	2.2	1517.0
1:10:24:01	22:57:57	6751	75	2.2	1518.0
1:10:24:31	22:58:27	6752	75	2.2	1519.0
1:10:25:01	22:58:57	6756	75	2.1	1520.0
1:10:25:31	22:59:27	6753	75	2.1	1521.0
1:10:26:01	22:59:57	6760	75	2.0	1522.0
1:10:26:32	23:00:27	6756	75	2.3	1523.0
1:10:27:02	23:00:58	6759	75	2.3	1524.0
1:10:27:32	23:01:28	6761	75	2.1	1525.0
1:10:28:02	23:01:58	6762	75	2.2	1526.0
1:10:28:32	23:02:27	6764	74	1.9	1527.0
1:10:29:02	23:02:58	6767	74	0.0	1528.0
1:10:29:32	23:03:28	6756	74	0.0	1528.0
1:10:30:02	23:03:58	6746	74	0.0	1528.0
1:10:30:32	23:04:28	6739	74	0.0	1528.0
1:10:31:02	23:04:58	6742	74	2.1	1529.0
1:10:31:32	23:05:28	6749	74	2.3	1530.0
1:10:32:02	23:05:58	6756	74	2.2	1531.0
1:10:32:32	23:06:28	6760	74	2.1	1532.0
1:10:33:02	23:06:58	6766	74	2.2	1533.0
1:10:33:32	23:07:28	6771	74	1.9	1534.0
1:10:34:02	23:07:58	6775	74	2.2	1535.0
1:10:34:32	23:08:28	6777	74	2.3	1536.0
1:10:35:02	23:08:58	6780	74	2.2	1538.0
1:10:35:32	23:09:28	6782	74	2.2	1539.0
1:10:36:02	23:09:58	6784	74	2.0	1540.0
1:10:36:32	23:10:28	6788	74	2.2	1541.0
1:10:37:02	23:10:58	6787	74	2.2	1542.0
1:10:37:32	23:11:28	6790	74	2.2	1543.0
1:10:38:02	23:11:58	6793	74	2.2	1544.0
1:10:38:32	23:12:28	6794	74	2.2	1545.0
1:10:39:02	23:12:58	6793	74	2.3	1546.0
1:10:39:32	23:13:28	0	74	4.3	1548.0
1:10:40:02	23:13:58	0	74	3.1	1550.0
1:10:40:32	23:14:28	0	74	3.0	1551.0
1:10:41:02	23:14:58	0	74	3.1	1553.0
1:10:41:32	23:15:28	0	74	3.1	1554.0
1:10:42:02	23:15:58	0	74	3.1	1556.0
1:10:42:32	23:16:28	0	74	3.1	1557.0
1:10:43:02	23:16:58	0	74	3.1	1559.0
1:10:43:32	23:17:28	0	74	3.1	1560.0
1:10:44:02	23:17:58	0	74	3.1	1562.0
1:10:44:32	23:18:28	0	74	1.2	1563.0
1:10:44:38	23:18:34	0	74	1.2	1563.0

Conclusion

A comparison of the predicted data to the actual data gives gives the following conclusions:

- Phase 1 – The DNV model projected the closest burst pressure.
- Phase 2 – The DNV and Ram Pipe #1 models both predicted the same burst pressure and the closest pressure. However the burst location predicted by the RAM Pipe #1 model was the closest.
- Phase 3 – The burst pressures predicted by the RAM Pipe #1 proved extremely accurate and far out performed the other models used.

The facts show that a sucessful burst test was conducted and the data was gathered and analyzed. Many conclusions can be made based on the models and field results. It is important to remember that this was one test on one line. In order to perform a true comparison many lines would need to be subjected to the same testing. A number of factors could have played a role in the failure of pipeline 25. Some of these being: material defects produced durring manufacturing, external corrosion features, structural defects incurred durring installation of the line, poor maintenance of the line after installation, and the list goes on. For the age and service of pipeline 25 it performed well above MAOP and could be a prime candidate for re-entry to active service.

SECTION 6

UCB REPORTS