

Analysis of planned pressure increases

1/31/11

Identification of planned pressure increase events

- Annual comparison of SCADA Gas Historian¹ data performed for dates of pressure exercise increase with segments with manufacturing seam threat consisting of:
 - Highest operating pressure experienced in a 5-year rolling window when a segment is identified in an HCA, beginning in 2003
 - System MOP based on the “weakest” link of the respective pipeline segment

Year	2003	2004	2008	2009	2010	Total
# of Events	4	1	6	3	2	16

Pipeline Segment Identification

- GIS used to identify HCA segments with manufacturing seam threat consisting of:
 - Pre-1970 ERW pipe
 - Pipe with Joint Efficiency < 1 (SSAW², AO Smith, Lap Weld and Pre-1970 Unknowns)

¹ Based on hourly pressure average data

²SSAW is identified by the code and ASME B31.8 to have a Joint Efficiency (JE) of 1 but is defined as PG&E to have a JE < 1



Event Details

Event	Pressure Exercise Date	Line	Max P reached (psig)	MOP (psig)	5 YR MOP (psig)	% SMYS at Max P ¹	% SMYS at MOP ¹	% SMYS at 5 YR MOP ¹
1	12-Apr-10	L-109*	147.23	145	148.38	25.8%	25.4%	26.0%
2	08-Jan-10	L118A	402.41	400	400.62	36.7%	36.4%	36.5%
3	13-Aug-09	L-142S*	523.82	478	554.06	35.7%	32.5%	37.7%
4	19-Jun-09	L-107	470.66	477	469.13	59.2%	60.0%	59.0%
5	19-Jun-09	L-114	499.01	497	498.07	58.2%	57.9%	58.1%
6	08-Jan-09	L-108	408.97	412	410.03	49.6%	49.9%	49.7%
7	09-Dec-08	L-132*	400.73	400	402.73	38.2%	38.1%	38.4%
8	14-Nov-08	L-109	375.05	375	374.60	50.0%	50.0%	50.0%
9	14-Nov-08	0805-01 ²	197.41	200	194.00	-	-	-
10	30-Oct-08	L-138	651.21	650	654.47	44.1%	44.1%	44.4%
11	23-May-08	1607-01	175.17	175	196.67	22.3%	22.3%	25.1%
12	19-Oct-04	L-142S*	554.06	478	523.31	37.7%	32.5%	35.6%
13	11-Dec-03	L-101	402.20	375	373.87	60.9%	56.8%	56.7%
14	11-Dec-03	L-132*	402.73	400	374.33	38.4%	38.1%	35.7%
15	29-Sep-03	L-142S*	523.31	478	483.11	35.6%	32.5%	32.9%
16	11-Dec-03	L-109*	150.01	145	147.76	26.3%	25.4%	25.9%

¹Maximum %SMYS of segment within the pipeline system

²Pipe characteristics data unavailable in GIS to conduct SMYS analysis for 0805-01

*Pipelines with multiple pressure increase events

- Excluded segments where downstream SCADA data points exist for the identified pipeline and pressure readings were below the 5-year MOP high or system MOP
- Performed correlation of SCADA pressure readings where multiple data points exist for the identified pipeline
 - Identified and excluded segments where calculated pressure was below the 5-year MOP high or system MOP based on interpolating SCADA pressure readings and the distance between those readings
 - Further refined impacted segments by conducting hydraulic analysis based on pipeline conditions of pressure event date to identify segments where pressure was below the 5-year MOP high or system MOP
- Conducted records review to verify seam type and MAOP data in GIS
 - Excluded segments with DSAW seam and SMLS
- Pipeline Engineering performed review of segments to identify uprate or replacement work performed that may not have been reflected in GIS



Results

Event	Pipeline Number	Total Pipeline Miles (HCA + non-HCA)	HCA Miles	HCA Miles (Impacted)
1	L109*	9.7	2.8	0.2
2	L118A	49.4	8.2	0.0
3	L142S*	9.1	6.8	6.8
4	L107	26.2	0.9	0.4
5	L114	8.1	<0.1	<0.1
6	L108	14.0	4.7	0.0
7	L132*	48.5	2.8	0.0
8	L109	47.6	8.8	0.0
9	0805-01	4.0	<0.1	0.0
10	L138	28.5	9.0	0.0
11	1607-01	2.3	0.7	0.0
12	L142S*	9.1	6.8	6.7
13	L101	35.1	1.8	0.0
14	L132*	48.5	2.8	0.0
15	L142S*	9.1	6.8	6.8
16	L109*	9.7	2.8	2.8
Total¹		282	46.5	10.0

¹Mileage for multiple events is only counted once in calculating the total pipeline miles

*Pipelines with multiple pressure increase events



Long Seam Threat Potential Activation Determination

Event	Pipeline Number	HCA Miles (Impacted)	5 YR MOP Exceeded? ¹	Long Seam Threat Potentially Activated? ²
1	L109*	0.2	N	N
2	L118A	0.0	N	N
3	L142S*	6.8	N	N
4	L107	0.4	Y	Y
5	L114	<0.1	Y	Y
6	L108	0.0	N	N
7	L132*	0.0	N	N
8	L109	0.0	N	N
9	0805-01	0.0	N	N
10	L138	0.0	N	N
11	1607-01	0.0	N	N
12	L142S*	6.7	Y	Y
13	L101	0.0	N	N
14	L132*	0.0	N	N
15	L142S*	6.8	Y	Y
16	L109*	2.8	Y	Y
Total		10.0		10.0

¹ Per 49 CFR 192.917, an operator may consider manufacturing and construction defects stable if operating pressure on the covered segment has not increased over the maximum operating pressure experienced during the preceding 5 years

² Long Seam Threat Potential Activation was considered for any increase in pressure above 5 year MOP

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Recommended Actions

HCA and Non-HCA Segments

Event(s)	Pipeline Number	HCA Miles (Impacted)	Non-HCA Miles	Max % 5 YR MOP Exceeded? ¹	Long Seam Threat Potentially Activated?	Recommended Actions ²
12, 15	L142S*	6.8	0.4	8.3%	Y	<ol style="list-style-type: none"> 1. Reduce pressure by 20% 2. Investigate hydro test feasibility. It will likely become hydraulically infeasible to conduct an ILI with a 20% pressure reduction (ILI re-assessment is currently schedule for Sept 2011) 3. Research replacement options
16	L109*	2.8	<0.1 (8 feet)	1.5%	Y	<ol style="list-style-type: none"> 1. Further evaluate reduction of pressure by 20% 2. Investigate feasibility of using ILI crack tool or conducting hydro test³ 3. Research replacement options³
5	L114	<0.1	0.0	0.1%	Y	<ol style="list-style-type: none"> 1. Reduce pressure by 20% 2. Conduct further engineering analysis to determine if segment with the governing MAOP (weakest link) actually experienced the pressure increase
4	L107	0.4	11.8	<0.01%	Y	<ol style="list-style-type: none"> 1. Reduce pressure by 20% 2. Hydro test or replace impacted segment
Total		<10.1	<12.3			

¹ Per 49 CFR 192.917, an operator may consider manufacturing and construction defects stable if operating pressure on the covered segment has not increased over the maximum operating pressure experienced during the preceding 5 years.

² Conduct records research to confirm GIS data

³ To be completed prior to winter 2011 – 2012 to restore pressure and mitigate customer impact during Stage 2 conditions

*Pipelines with multiple pressure increase events



Potential Customer Impacts for *Pressure Reduction*¹

Pipeline Number	Customer Impacts	Comments
L107	None	Pipeline pressure was reduced in MAOP by 17% in April 2010, when the pipeline underwent a class location change
L142S ²	None	N/A
L114	None	N/A
L109 ³	Significant	Stage 1: No impact Stage 2: Significant curtailments required for core customers

¹Reduction in MAOP by 20%

² Solely based on consistent application of PG&E's new threat activation policy, L-142S would not have an activated long seam threat due to the timing of the pressure increase events relative to when it officially contained HCA segments. However, PG&E is taking a conservative approach by considering L-142S to have an activated long seam threat which must be addressed.

³No pressure reduction previously performed as segment is downstream of Sullivan Regulator Station (pressure regulated to 150 psig) which is downstream of the 375 psig MOP system currently operating at 300 psig