OSISOFE USERS CONFERENCE **2009** SAN FRANCISCO Stitching Together Disparate Data Systems to Create a 'Single Version of the Truth'

A Southwest Gas Case Study

Presented by Jim Mlachnik and Jeremy Snider

Empowering Business in Real Time PI Infrastructure for the Enterprise

Southwest Gas Corporation



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Southwest Gas Business Strategies

- Continue to work closely with regulators to improve the level and stability of earnings and cash flows
- Continue to aggressively manage growth
- Continue to maximize efficiency and productivity
- Continue to exceed customers' expectations
- Remain watchful and positioned to seize strategic growth opportunities

Source: 2006 Annual Report





The Growth Challenge

Total SWG Customers





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Using Technology to Meet Business Challenges

Southwest Gas has used technology to meet "The Growth Challenge"



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Southwest Gas System Assets

- Arizona, California & Nevada
- 2,000 miles gas transmission pipeline
- 27,000 miles gas distribution main
- 34 Districts in 6 Divisions

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Single SCADA System



Transmission and Distribution

- Southwest Gas operates 2 natural gas transmission systems
 - Transporting natural gas from Idaho to customers and Southwest's distribution systems in Northern Nevada and Lake Tahoe in California
 - Transporting natural gas from points in Arizona to customers and Southwest's distribution system in the Las Vegas area
- Southwest also operates distribution systems receiving natural gas from other transmission system operators in Southern California and in Central and Southern Arizona
- From its transmission and distribution systems natural gas is delivered to two classes of customers
 - Direct sales of gas purchased by Southwest to residential and commercial customers billed monthly
 - Transporting gas purchased daily by industrial, power generation and large commercial customers to their facilities







Our Business Challenges

- Using technology opposed to hiring full time employees to meet business needs
- Information is available but not necessarily in a useable format
- The daily and hourly tracking of ordered versus received gas for transportation customers
- Avoid penalties from upstream pipelines during an Operational Flow Order (OFO)







From SCADA Historian to Critical Infrastructure

- PI application was deployed in 2001 as a replacement to the SCADA application's historical subsystem
- Access to real-time SCADA data was provided to internal users via DataLink and ProcessBook
- RtPortal was deployed to provide gas usage information to external agents and customers as well as internal users
- Over next 2-3 years PI will support SWG data integration, compliance and maintenance system initiatives



Current PI System Footprint

Supervisory Control and Data Acquisition

Revised 09/27/06

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S:\GSSS\Documentation\Drawings & Procedures\SCADA_Structure

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Data Flow: From Database Storage to WebServer to Thin Client Display



Let Everyone Look at SCADA Data

- <u>Challenge</u>: Put SCADA data to work for the rest of the company (not just Gas Control)
- <u>Before PI</u>: Information had to be extracted from the SCADA historical subsystem in a very cumbersome and time consuming method to provide data to end users
- <u>After PI</u>: End users are now able to extract data themselves using the PI client tools
- <u>Benefits Derived</u>:

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Easy access to SCADA data for planning purposes and engineering studies

Access to SCADA data during an emergency situation Ability to provide PI data to internal and external customers via the WEB PI ProcessBook - [LV4 taps and limits]



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PI ProcessBook - [Southern Nevada Taps]

SOUTHERN NEVADA TAPS

		STATION	SUPPLY	DELIVERY	CURRENT DAY
TAP SITE	SUPPLIER	FLOWRATE	PRESSURE	PRESSURE	VOLUME
SGTC	EL PASO	2.66	593.31	545.78	7
SGTC	TRANSWESTERN	2906.95	909.51	545.78	5175
LAS VEGAS PURCHASE	EL PASO	0.00		497.05	0
BULLHEAD CITY	EL PASO	54.57		244.90	213
BLUE DIAMOND	KERN RIVER	4510.05	706.02	634.80	14098
LONE MOUNTAIN	KERN RIVER	4077.94	842.64	703.28	13297
CENTENNIAL	KERN RIVER	543.20	963.48	714.55	2085
PECOS	KERN RIVER	91.71	979.99	704.48	275
APEX	KERN RIVER	1595.78	977.58	678.30	4748





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EL DORADO S	1007.36	483.08	451.13	3017	1000.00	454.00	
EL DORADO N	2038.14	643.93	451.13	6813	3600.00	452.00	
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OOTHILLS	282.38		291.73	1165			
ABCO E	0.00	479.59	246.24	0	6500.00	275.00	480.00
ABCO W	0.00	429.65	246.51	0	3500.00	240.00	340.00
SIBSON W	401.36	646.35	598.82	735	12000.00	600.00	
SIBSON S	0.00	646.35	598.82	0	10000.00	500.00	
ATRICK	382.96	644.90	242.75	1615	5000.00	243.00	
APEX	126.24	644.87	244.50	374			
RAIG	116.41	Scan Off	248.93	456	150.00	287.00	685.00
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REDCOACH							
DURANGO	0.00	637.22	255.10	0	4600.00	255.00	





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SOUTHWEST GAS

Turn Regulations into Value for Our Customers

- <u>Challenge</u>: To comply with tariffs requiring SWG to provide key natural gas parameters like pressure, temperature, flow and quality to both agents and customers.
- <u>Before PI</u>: SWG provided agents and customers with phone numbers and passwords for direct access to system RTUs.
- <u>After PI</u>: Direct RTU access was revoked. PI-RtWebParts was used to configure Agent and Customer specific web views of tariff data in a secure environment.
- Benefits Derived:
 - Securing RTUs
 - The ability for agents and customers to access gas parameters in near real-time
 - PI-RtWebParts provides trending and data downloading via the web









Disclaimer

Contacts

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Links

- Southwest Gas Home Page
- Gas Control
- Documents
- Create Items
- Site Settings
- Gas Control
- Gas Control
- Blue Diamond
- Big Bear Waste Water
- Chemical Lime
- City of Tucson
- City of Tucson
- Eagle Picher
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- Flamingo, Las Vegas
- Fort Huachuca
- University of Arizona
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3/19/2009 7:23:42 AM	149
3/19/2009 7:25:00 AM	157





Reduce and Control Project Risk

- <u>Challenge</u>: To provide a single 'window' for users to look through for viewing distribution operations data alongside business data held in other databases.
- <u>Before PI</u>: SWG conceived and roughed in a RFP for an extensive 'data warehouse' project designed to consolidate data held in various database applications across every major department.
- <u>After PI</u>: Data Warehouse project was avoided. SWG introducing portal pages to various internal user groups that leverages RtBaseLine Services and RtWebParts to view data held within critical database applications.
- Benefits Derived:
 - Avoided a very costly, complicated project
 - Avoided future maintenance of custom system
 - Used technology (OSIsoft and Microsoft) that we already owned





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SOUTHWEST GAS

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GTS Transport Customers

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12/10/2008 6:36:19	АМ	8007.312
12/10/2008 6:36:59	АМ	8018.134
12/10/2008 6:41:38	АМ	8018.706
12/10/2008 7:00:52	АМ	8032.919
12/10/2008 7:01:27	АМ	8009.77
12/10/2008 7:05:29	АМ	8043.211
12/10/2008 7:06:12	АМ	8044.977
12/10/2008 7:07:15	АМ	8064.059
12/10/2008 7:08:28	АМ	8007.166
12/10/2008 7:15:29	АМ	8073.386
12/10/2008 7:16:03	АМ	8017.518
12/10/2008 7:16:54	АМ	8017.518
12/10/2008 7:17:46	АМ	8000.238
12/10/2008 7:18:23	АМ	8020.1
12/10/2008 7:19:31	АМ	8007.762
12/10/2008 7:25:31	АМ	8058.157
12/10/2008 7:25:53	АМ	8187.9
12/10/2008 7:26:34	АМ	8157.529
12/10/2008 7:27:09	АМ	8094.337
12/10/2008 7:27:42	АМ	8122.222
12/10/2008 7:28:16	АМ	8040.082
12/10/2008 7:31:14	АМ	8007.339
12/12/2008 7:29:54	АМ	8060.92
12/14/2008 6:50:45	АМ	8362.718
12/14/2008 6:51:17	АМ	8343.757
12/14/2008 7:07:39	АМ	8035.404
12/14/2008 7:10:32	АМ	8023.685
12/14/2008 7:11:04	АМ	8029.949
12/14/2008 7:11:44	АМ	8056.65
12/14/2008 7:12:16	АМ	8038.722
12/14/2008 7:14:00	AM	8056.65
12/14/2008 7:15:49	АМ	8062.05
12/14/2008 7:19:14	AM	8001.126
12/14/2008 7:21:37	AM	8025.297
12/14/2008 7:23:19	AM	8031.552
12/14/2008 7:23:57	AM	8003.644
12/14/2008 7:25:40	AM	8110.68
12/14/2008 7:26:18	AM	8131.876
12/14/2008 7:26:50	AM	8225.563
		Showing 1 to 40 of 10388

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Blue Diamond (Pressure Exceptions	s - Last 100 days) 🔹 🔻
time	value
3/19/2009 8:28:48 AM	635.1235
3/19/2009 8:30:30 AM	634.8013
3/19/2009 8:32:18 AM	635.1235
3/19/2009 8:33:59 AM	634.8013
3/19/2009 8:34:35 AM	635.1235
3/19/2009 8:36:58 AM	634.8013
3/19/2009 8:38:04 AM	635.1235
3/19/2009 8:40:28 AM	634.8013
3/19/2009 8:40:58 AM	635.1235
3/19/2009 8:48:02 AM	634.8013
3/19/2009 8:51:32 AM	634.4791
3/19/2009 8:55:02 AM	635.1235
3/19/2009 8:56:43 AM	635.4458
3/19/2009 8:58:40 AM	635.1235
3/19/2009 8:59:09 AM	635.4458
3/19/2009 8:59:53 AM	635.1235
3/19/2009 9:00:15 AM	635.4458
3/19/2009 9:00:51 AM	635.1235
3/19/2009 9:09:38 AM	634.8013
3/19/2009 9:20:44 AM	634.4791
3/19/2009 9:21:20 AM	634.8013
3/19/2009 9:21:50 AM	634.4791
3/19/2009 9:22:27 AM	634.8013
3/19/2009 9:24:09 AM	634.4791
3/19/2009 9:24:46 AM	634.8013
3/19/2009 9:25:23 AM	635.1235
3/19/2009 9:26:00 AM	635.4458
3/19/2009 9:29:24 AM	635.768
3/19/2009 9:30:00 AM	635.4458
3/19/2009 9:30:37 AM	635.1235
	Showing 1 to 30 of 67





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Address 🙆 https://gasinfo.swgas.com/default.aspx



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Av.	ailable Weather Tags With Current Values	-	WeatherBank Data From PI
×	Descriptor 🔺	Value	🖃 🐻 Weather
	LAS VEGAS FORECAST EDD 0 DAY	0	🖻 🔚 Central Arizona
	LAS VEGAS FORECAST EDD 1 DAY	0	🛛 💽 Casa Grande
	LAS VEGAS FORECAST EDD 2 DAY	0	Phoenix
	LAS VEGAS FORECAST EDD 3 DAY	6	- Northern Nevada/California
	LAS VEGAS FORECAST EDD 4 DAY	11	
	LAS VEGAS FORECAST EDD 5 DAY	7	Tallan
	LAS VEGAS FORECAST EDD 6 DAY	4	
	LAS VEGAS FORECAST EDD 7 DAY	3	
	LAS VEGAS FORECAST HDD 0 DAY	0	Reno
	LAS VEGAS FORECAST HDD 1 DAY	0	Truckee
	LAS VEGAS FORECAST HDD 2 DAY	0	- Winnemucca
	LAS VEGAS FORECAST HDD 3 DAY	5	🖨 🐻 Southern Arizona
		11	🛛 🙀 Deer Valley
	LAS VEGAS FORECAST HDD 5 DAT	4	Douglas-Bisbee
	LAS VEGAS FORECAST HDD 7 DAY	3	Fort Huachuca
	LAS VEGAS FORECAST HIGH TEMP 0 DAY	84	Gila Bend
	LAS VEGAS FORECAST HIGH TEMP 1 DAY	84	
	LAS VEGAS FORECAST HIGH TEMP 2 DAY	78	
	LAS VEGAS FORECAST HIGH TEMP 3 DAY	65	Safford
	LAS VEGAS FORECAST HIGH TEMP 4 DAY	65	Tucson
	LAS VEGAS FORECAST HIGH TEMP 5 DAY	71	🔤 🎆 Yuma
	LAS VEGAS FORECAST HIGH TEMP 6 DAY	75	🗄 🚺 Southern California
	LAS VEGAS FORECAST HIGH TEMP 7 DAY	76	🛛 🛐 Barstow-Daggett
	LAS VEGAS FORECAST LOW TEMP 0 DAY	57	Big Bear
	LAS VEGAS FORECAST LOW TEMP 1 DAY	59	
	LAS VEGAS FORECAST LOW TEMP 2 DAY	58	Victorville
	LAS VEGAS FORECAST LOW TEMP 3 DAY	55	
	LAS VEGAS FORECAST LOW TEMP 4 DAY	45	
	LAS VEGAS FORECAST LOW TEMP 5 DAY	46	Bullhead City
	LAS VEGAS FORECAST LOW TEMP 6 DAT	47	Las Vegas
	LAS VEGAS OBSERVED AMBIENT TEMPEDATURE	70	
<u>_</u>	LAS VEGAS OBSERVED AMBLENT TEMPERATURE	70	
	LAS VEGAS OBSERVED EDD	,0	
		0	
	LAS VEGAS OBSERVED HUMIDITY	20	
	LAS VEGAS OBSERVED WIND CHILL	70	
	LAS VEGAS OBSERVED WIND DIRECTION	0	
	LAS VEGAS OBSERVED WIND VELOCITY	0	

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Vision for SW Gas

- Continue to use technology to meet business needs versus hiring more employees
- Integrate disparate systems to provide a "single version of the truth" to end users
- Continue to explore uses of the PI system to accomplish future goals





Questions ?





