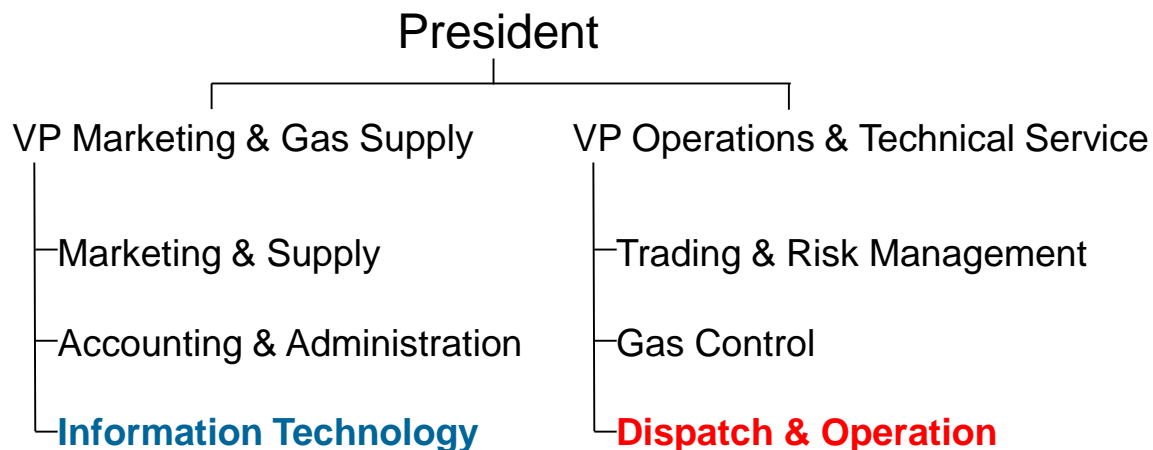


Monitoring a Pipeline and Sharing Data with Key Customers

How to do this when you own the
pipeline but do not operate it!!

- ChevronTexaco/Enron JV – formed March 2001 (not subject to Enron Chapter 11)
- Headquartered in Houston, TX
- 1,000+ miles of natural gas pipeline in southern Louisiana
- World's single largest salt dome cavern – 11.5 billion ft³ (bcf)
- Total gas storage capacity – 32 bcf
- Working gas storage – 18 bcf
- Customers – industrial, process & utility companies along the Mississippi

- Bridgeline Pipeline owned by Bridgeline Holdings, operated by ChevronTexaco Pipelines
- Organizational structure



- IT function
 - Develop, acquire & maintain business systems

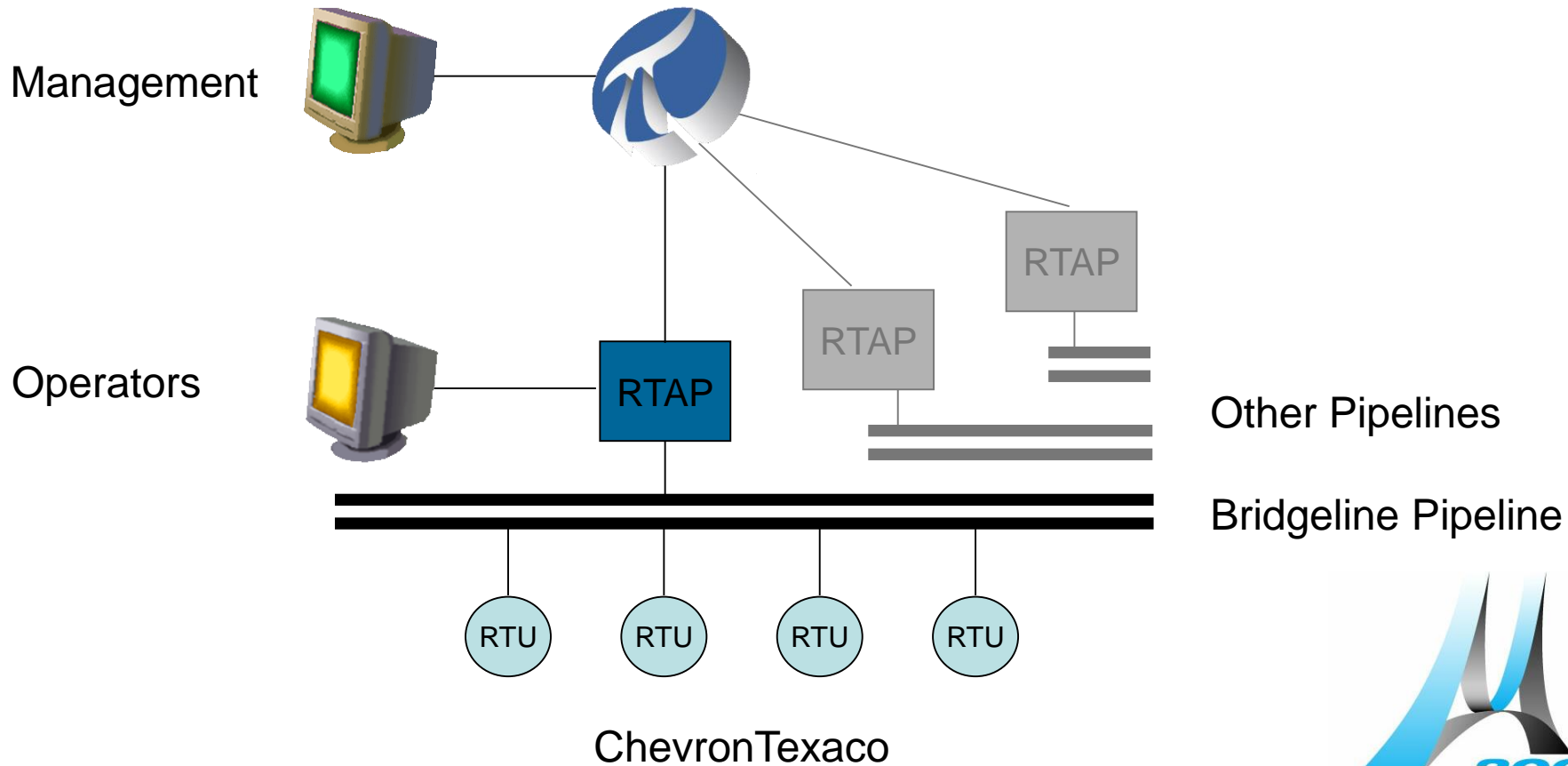
- Organizational structure

IT Manager – Bert Stipelcovich

- Networks – Bert Stipelcovich
- Trading systems – Bert Stipelcovich
- Financial systems – Bert Stipelcovich
- Phone system – Bert Stipelcovich
- Real-time systems – Bert Stipelcovich
- Desktop systems – Bert Stipelcovich

- Real-time systems managed for Bridgeline by ChevronTexaco Pipelines
- Data sources – meter stations and compressor stations distributed along the length of pipeline
- Communication by RTU
- Local data collection by RTAP SCADA system – direct access available for Bridgeline
- Data historized by PI (Unix Version) – no direct access for Bridgeline

Pre-Project Systems Architecture

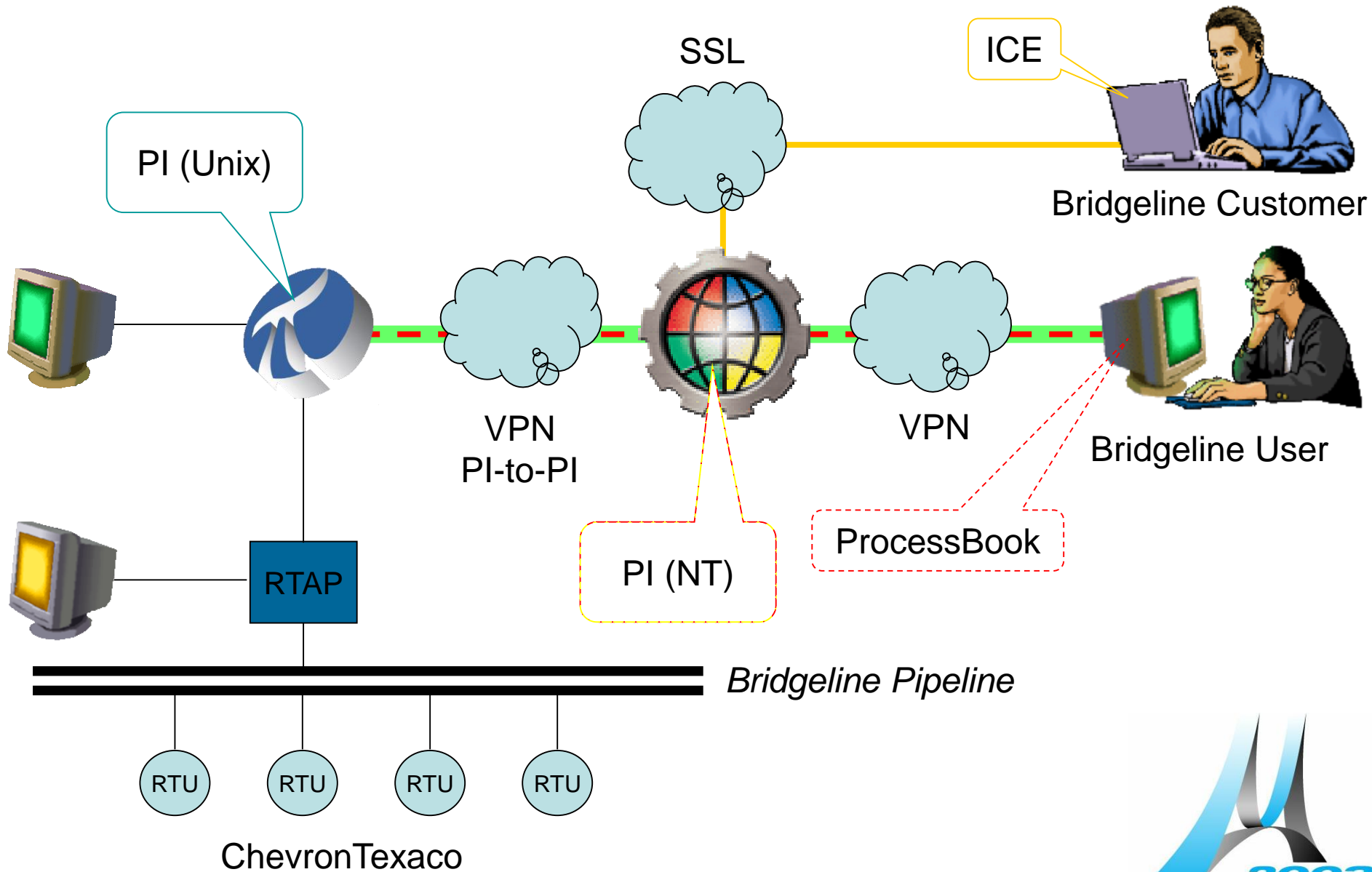


- Objectives
 - Access to ChevronTexaco PI database
 - Securely share PI data with key customers
 - Meter station flow vs nomination
 - Overall pipeline health
 - Outsource implementation and support
- Selected Industrial Evolution
 - OSI relationship and ownership
 - Proven track record
 - Favorable pricing

- Identify Bridgeline portion of ChevronTexaco Pipelines' PI System
- Establish secure connection between ChevronTexaco and Industrial Evolution
- Synchronize Industrial Evolution PI System with ChevronTexaco's
- Implement PI connection from Bridgeline to Industrial Evolution PI System
- Implement Web-based access to Industrial Evolution PI System for Bridgeline customers

- Set up VPN between Industrial Evolution and ChevronTexaco
- Make PI-to-PI connection
- Test communications and system loading
- Set up VPN between Industrial Evolution and Bridgeline
- Set up remote access to PI for Bridgeline using ProcessBook & DataLink
- Set up Web-based remote access to PI for Bridgeline customers using PI-ICE

Solution Architecture



- PI System data integrity
 - Bridgeline only 1 of 3 pipelines managed by ChevronTexaco
 - All 3 companies' data historized on same PI System
- Security
 - ChevronTexaco network
 - Bridgeline Pipeline data
 - Other pipelines' data
- System loading acceptability
 - Bridgeline database size – 35,000 tags
 - Plan to synchronize databases every minute

- Confirm tunnel established between ChevronTexaco (CT) & Industrial Evolution (IE)
 - Each party pinged the other
- Confirm tunnel re-establishes upon disconnect
 - IE disconnect network cable from router to VPN hardware
 - Wait 10 minutes to confirm no connectivity
 - CT confirm IPSec tunnel down
 - Reconnect cable
 - Wait 10 minutes for connectivity to be re-established
 - CT & IE confirm IPSec tunnel is up.
- Confirm bandwidth – 1 MB; 50MB
 - CT create a 1 MB ASCII file
 - CT sent file to IE ftp site (simulates the “push” mechanism)
 - IE view/download the test file.
 - IE & CT note transfer rate and time.
 - Repeat with large test file (50 MB)

- Data integrity test
 - CT configure the PI-to-PI interface and the associated tag attributes on the appropriate PI servers
 - IE replicate the configuration on IE PI servers
 - CT start the interface.
 - CT verify log file on the CT PI server (pitopi.log), to ensure that “0 errors for XXX tags” where XXX is the number of tags configured for the PI-to-PI interface
 - IE confirm that the PI-to-PI interface connecting normally.
 - CT & IE confirm acceptable load on CT & IE servers by doing a top command
 - Bridgeline verify data integrity on both servers (i.e. validate that they received what was sent)

- Shutdown test – 60 mins; 48 hrs
 - CT manually shutdown interface for 2 hours and restart it
 - CT verify log file on the PI server (pitopi.log)
 - CT confirm that interface re-connecting normally
 - Bridgeline verify data integrity on both servers
 - IE use SMT to verify the archives are identical
- Reboot test
 - IE reboot IE PI server
 - CT verify that interface is automatically reconnecting
 - CT & IE confirm acceptable load on both servers
- Source PI System Failover Test
 - CT fail live PI Server to the backup source server
 - CT verify that interface is automatically reconnecting
 - CT & IE confirm acceptable load on both servers
- Endurance Test – repeat for 48 hours

- Load test
 - Repeat above for 1,000 tags/min
 - Repeat above for 5,000 tags/min
 - Repeat above for 15,000 tags/min
 - Repeat above for 35,000 tags/min



- Conclusion
 - 12 PI-to-PI interfaces running at maximum load
 - No major impact on ChevronTexaco PI System CPU with



- AnyWhere/AnyTime data access
 - Login from any internet-connected PC
 - 318 meter stations monitored
 - Pipeline scheduler enters nominations into ChevronTexaco's PI System each day
 - Bridgeline has 80+ customers
 - Each user is authorized to see his local meter station
 - Current data
 - Historical data vs nomination
 - Trends



Grand Chenier Pipeline Segment

LogOut | Content | Layout | Settings

Grand Chenier Demand, %

Descriptor	Value	Current State
Mud Lake #1	98.9	
Mud Lake #2	58.6	
Ship Channel	102.3	
Broussarot Lake #1	95.4	
Broussarot Lake #2	67.2	
Hementau River #1	56.4	
Hementau River #2	48.9	
Deep Lake #1	92.4	
Deep Lake #2	86.3	

Time Range

Start:

End:

Apply



Grand Chenier 24h Flow Totals

\\xxx.xx.x.xxx\Server\Flows

Date/Time	Value
25-Sep-2002 00:00:00	12,453.23
25-Sep-2002 06:00:00	11,745.58
25-Sep-2002 12:00:00	10,879.34
25-Sep-2002 18:00:00	11,035.93

Grand Chenier 72h Flow Totals

\\xxx.xx.x.xxx\Server\Flows

Date/Time	Value
22-Sep-2002 00:00:00	49,073.26
23-Sep-2002 00:00:00	47,853.59
24-Sep-2002 00:00:00	50,985.86
25-Sep-2002 00:00:00	49,582.39

Compressor RPM Summary

Descriptor	Value	Engineering Units
C-405A	33.5	rpm x1000
C-405B	31.4	rpm x1000
C-8120	24.5	rpm x1000
C-8122	44.6	rpm x1000
C-8345	23.4	rpm x1000
C-92A	37.9	rpm x1000
C92B	34.4	rpm x1000
C945-X	33.2	rpm x1000

- Compressor Efficiencies
- Compressor KW Summary
- Compressor HP Summary



Marketing, trading and storage services to
 South Louisiana's industrial, power and utility marketplace.





Grand Chenier Pipeline Segment

LogOut | Content | Layout | Settings

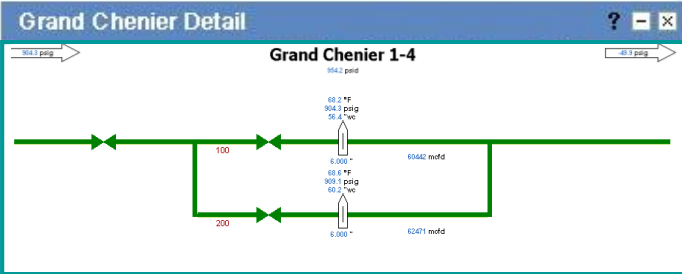
Grand Chenier Demand, %

Descriptor	Value	Current State
Mud Lake #1	98.9	
Mud Lake #2	58.6	
Ship Channel	102.3	
Broussarot Lake #1	95.4	
Broussarot Lake #2	67.2	
Hementau River #1	56.4	
Hementau River #2	48.9	
Deep Lake #1	92.4	
Deep Lake #2	86.3	

Time Range

Start:
 End:

Apply



Grand Chenier 24h Flow Totals

\\xxx.xx.x.xxx\Server\FIows

Date/Time	Value
25-Sep-2002 00:00:00	12,453.23
25-Sep-2002 06:00:00	11,745.58
25-Sep-2002 12:00:00	10,879.34
25-Sep-2002 18:00:00	11,035.93

Grand Chenier 72h Flow Totals

\\xxx.xx.x.xxx\Server\FIows

Date/Time	Value
22-Sep-2002 00:00:00	49,073.26
23-Sep-2002 00:00:00	47,853.59
24-Sep-2002 00:00:00	50,985.86
25-Sep-2002 00:00:00	49,582.39

Compressor RPM Summary

Descriptor	Value	Engineering Units
C-405A	33.5	rpm x1000
C-405B	31.4	rpm x1000
C-8120	24.5	rpm x1000
C-8122	44.6	rpm x1000
C-8345	23.4	rpm x1000
C-92A	37.9	rpm x1000
C92B	34.4	rpm x1000
C945-X	33.2	rpm x1000

- Compressor Efficiencies
- Compressor KW Summary
- Compressor HP Summary



Marketing, trading and storage services to
 South Louisiana's industrial, power and utility marketplace.



- Project has been live 1 year
 - Performance excellent
 - Security well-handled and no accepted
- 5 customers on-line now
- Target is 80+
- Bridgeline plans to increase its investment in PI
 - Buy own PI System for internal use
 - Still use Industrial Evolution for secure sharing with customers