Reliant Resources

Fleet Wide Deployment of PI

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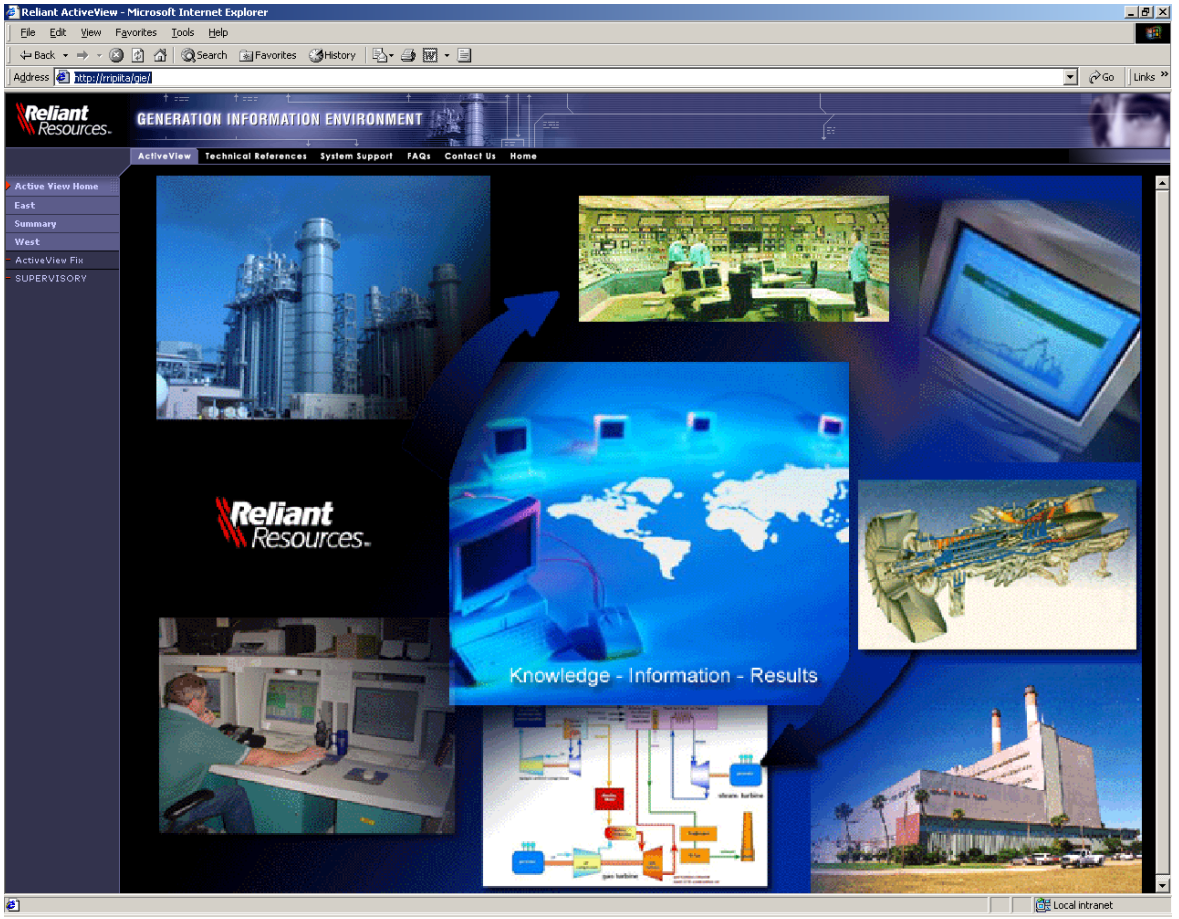
Reliant Resources: Fleet Wide Deployment of PI



Reliant Energy™

Presentation Summary

- Reliant Resources Company Overview
- Business Drivers - Rapid Growth through Acquisition and Construction
- Business Case
- Scope and Approach
- Current Status
- Benefits and Successes
- Open Discussion

Reliant Resources Company Information

- **Reliant Resources, Inc., based in Houston, Texas, provides electricity and energy services to retail and wholesale customers in the U.S. and Europe. Our wholesale business includes a portfolio of strategic electric generation assets with approximately 22,000 megawatts of power generation in operation, under construction or under contract in five key regions the U.S.**

- **For more information, visit our web site at** http://www.reliantresources.com

Reliant Energy™

Business Drivers

- **Rapid Growth Strategy**
- **Generation Assets via Acquisition**
  - 5 Power Plants in California from SCE in 1998
  - 1 Power Plant in FL from OUC in 1999
  - 21 Power Plants in PA, NJ, and MD from Sithe in 2000
  - 13 Fossil & 68 Hydro Plants from Orion Power in 2002
  - Combination of Gas, Coal, Oil, and Hydro

- **New Generation / Construction Sites**
  - 10 New Plants Built in FL, AZ, NV, MS, IL, TX, PA
  - Combustion Turbines for Peaking and Combined Cycle
- **One result with this growth was disparate plant systems, various software tools, and staffing limitations.**

Business Drivers

- Provide “Fleet wide” Plant Monitoring Capabilities
- Leverage Staff Expertise, by Providing Remote Monitoring & Diagnostics for Subject Matter Experts (SMEs)
- Support the Predictive Maintenance Process
- Provide Station with Data and Analytical Tools to Support Operations
- Provide Standard Database for Fleet Metrics:
  - Generation Data
  - Fuel Usage - Gas Meter and Fuel Burn Data
  - Emissions Data
  - Unit Status and Control System States
- Align with Power Generation’s Goal to be the Low Cost Power Producer

Business Case for Common Plant Historian Project

Project Justification was based on the Following Benefits:

Reduce Forced Outage Rate (FOR)

- Reduce and avoid unplanned outages

Convert Forced Outages (FO) to Planned Outages (PO)

- Identify potential issues that may cause a unit to be forced offline. Take immediate steps to avoid a unit trip and allow operations to perform maintenance at a more opportune time.

Reduce Maintenance Cost on Combustion Turbines

- Decrease full load rejections by at least 1 trip per unit, per year

Provide More Accurate and Reliable Generation Data

- Improved fence line data (custody and revenue)

Automation of Standard Reporting

- Automation of routine daily and monthly reports

Plants were installing systems "case by case"

Business Case - Benefit Calculations

Reduce Forced Outages

- The calculations below show how a 1% reduction (from 1,000 to 990 events) in forced outages can provide over $2 million per year in margin increase. This savings has significant upside potential if the forced outage were to occur during a high margin window.

156	MW average capacity per unit
48	Average duration in hours per forced outage
7,488	MWH lost per forced outage
74,880	MWH down time avoided by avoiding 10 outages
$30	average margin per MWH
$2,246,400	**Annual impact margin**

Business Case - Benefit Calculations

Convert Forced to Planned Outages

- The calculations below show how converting 1% of forced outages to planned outages can provide over $1.5 million per year in margin increase by shortening the duration and scheduling the outage to a lower margin window.

156	MW average capacity per unit
40	Average duration in hours per planned outage
6,240	MWH lost per planned outage
62,400	MWH down time from 10 planned outages
$10	average margin per MWH
$624,000	**Margin impact of planned outages**
$2,246,400	Margin impact if taken as forced outages
$1,622,400	Benefit of converting outages from forced to planned

Business Case - Benefit Calculations

Prevent Full Load Rejections

- PI will enable gas turbine engineering specialists to identify trends leading unit trips, enabling them to avoid an average of 1 trip per unit per year, across the current fleet of 40 advanced F-class gas turbines. The financial model shows how avoiding 40 trips per year result in $5 million per year in long-term service agreement cost reductions.

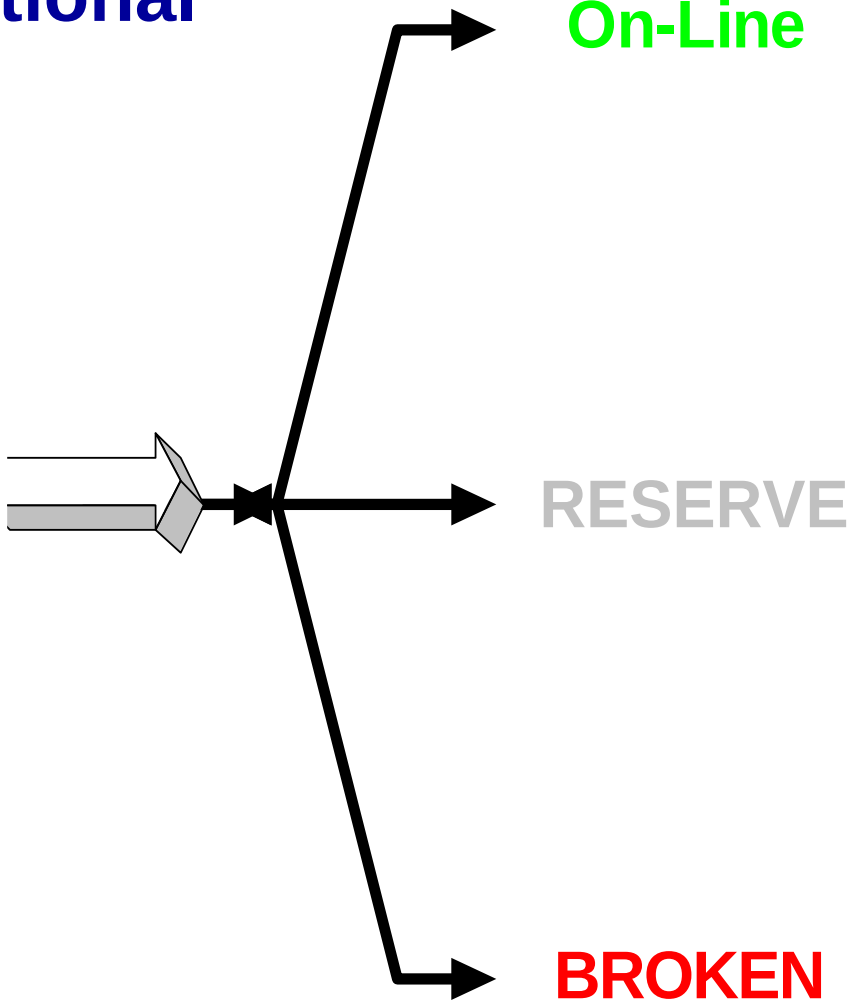
PI will enable plant operators to support Reliability Centered Maintenance by avoiding unnecessary equipment tear downs / rebuilds

- The calculations below show how avoiding one tear down / rebuild at each of 100 units will provide a maintenance cost savings of $2.5 million annually.

$25,000	Average cost per tear down / rebuild
100	Tear downs / rebuilds avoided per year
$2,500,000	**Maintenace cost savings per year**

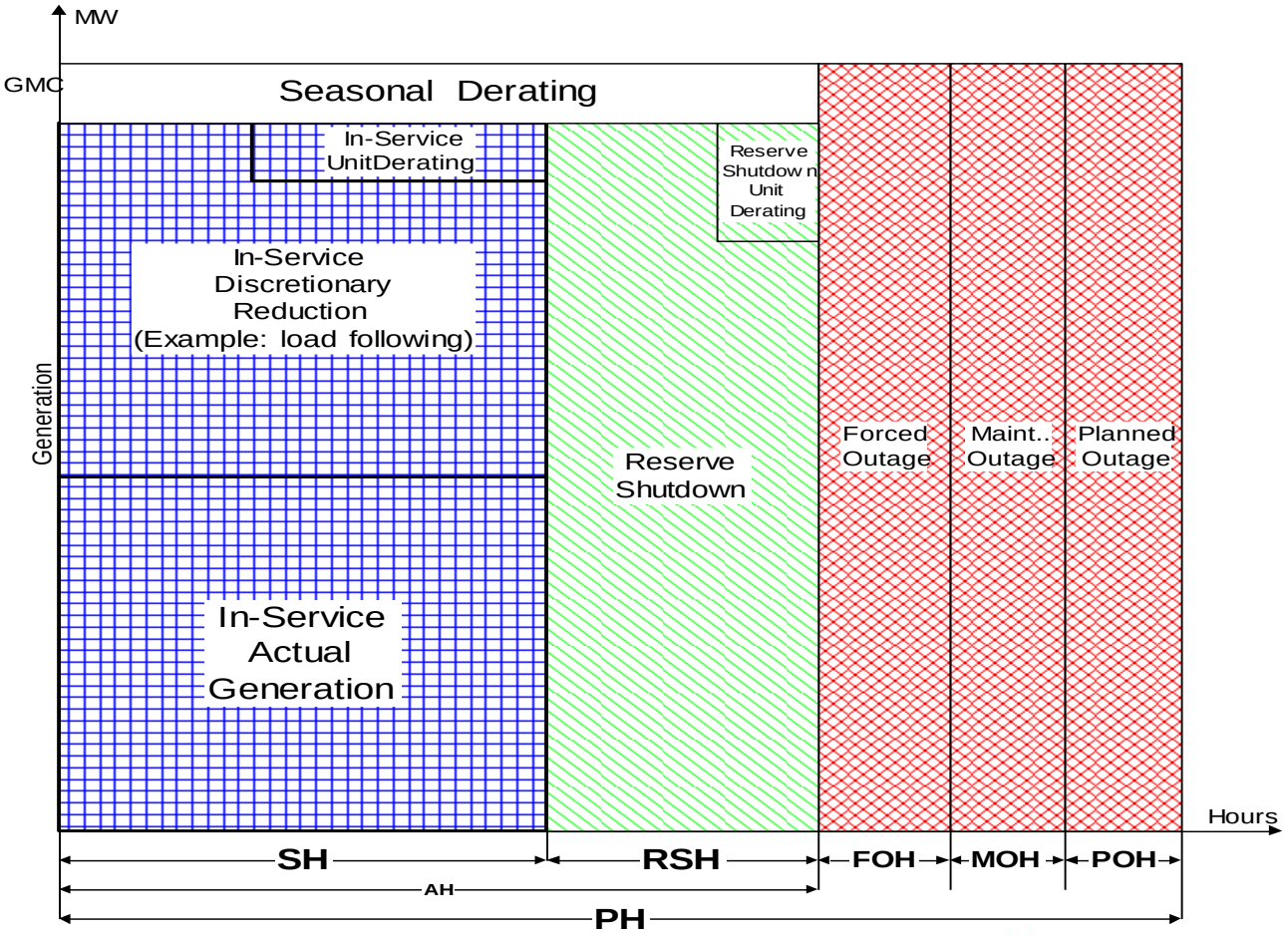
Business Case Background

Major operational states



Business Case Background

Production vs Time



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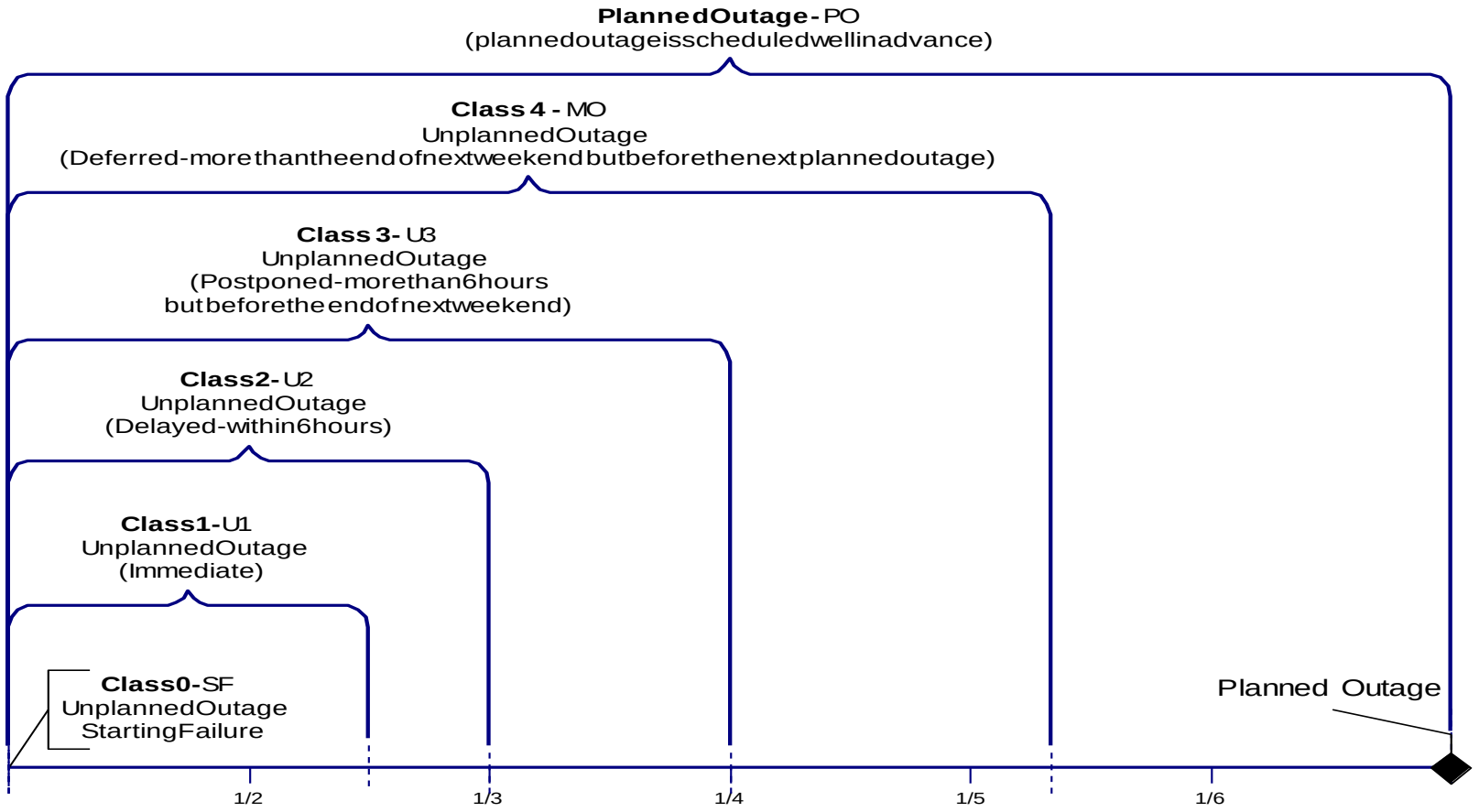


Project Milestones

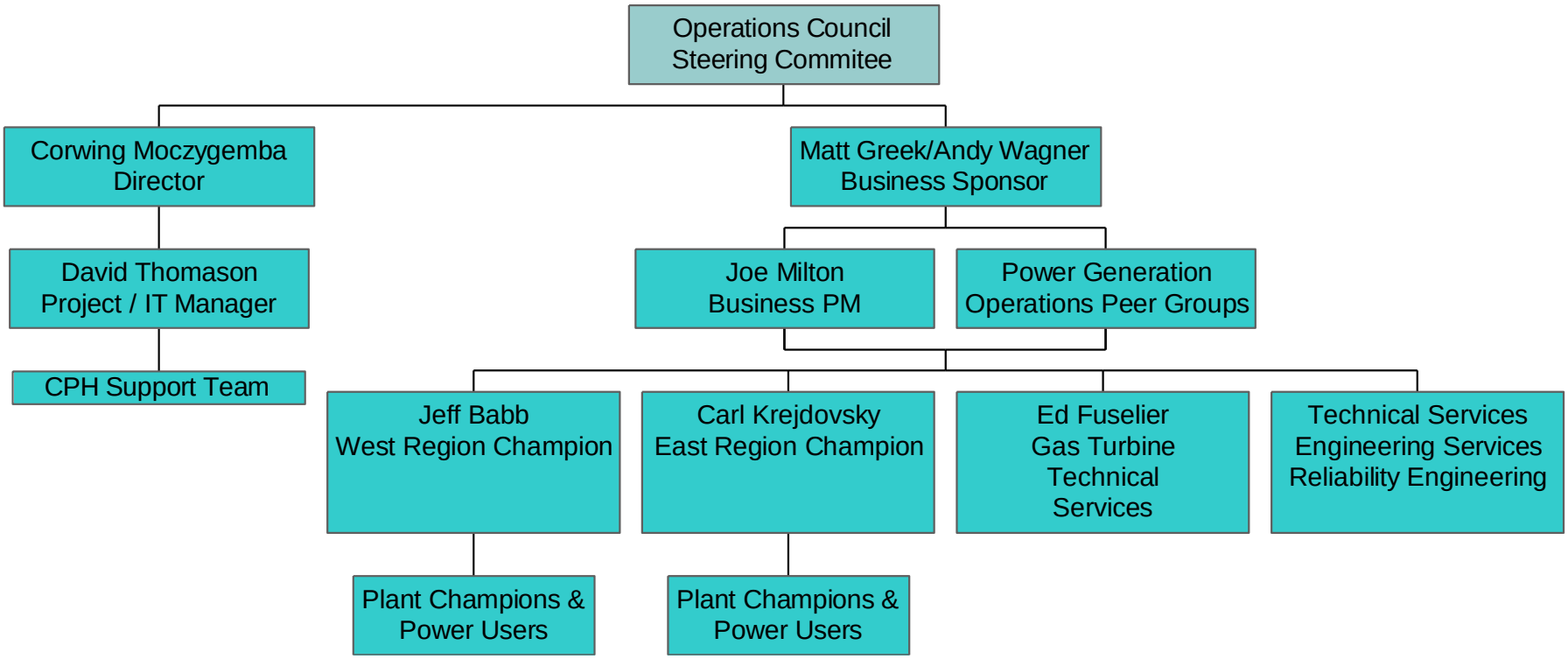
- Common Plant Historian Evaluation Started in Q1 2000
- Management Approvals March 2002
- PI Purchased/Licenses Signed – April 2002
- Fleet Wide Deployment May 2002 – June 2003

Scope and Approach

- Implement the Common Plant Historian at Plants that will Get Value from the Business Case
- Create a Project Organization with Business Directed Priorities
- Utilize an IT Approach to Implementation and Systems Management
- Identify Regional, Support Teams, and Plant Champions
- Deploy Systems, OSI Software Tools, Training, and Template Screens at Each Plant
- Provide Company Wide Access to Plant Information (ActiveView & ICE)
- Deliver of Business Value

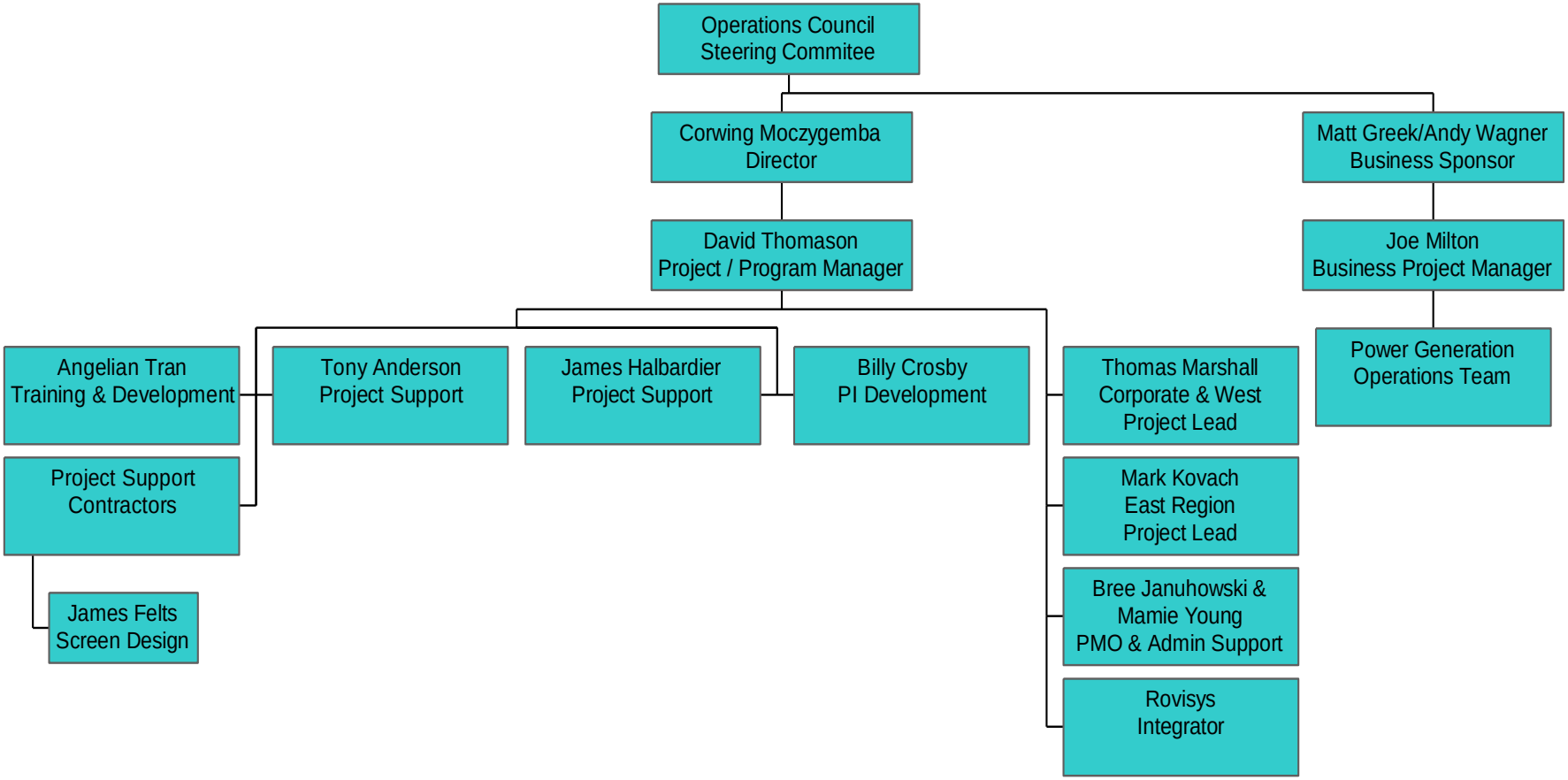
Scope and Approach

Common Plant Historian Business Structure



Scope and Approach

Common Plant Historian Project Organization



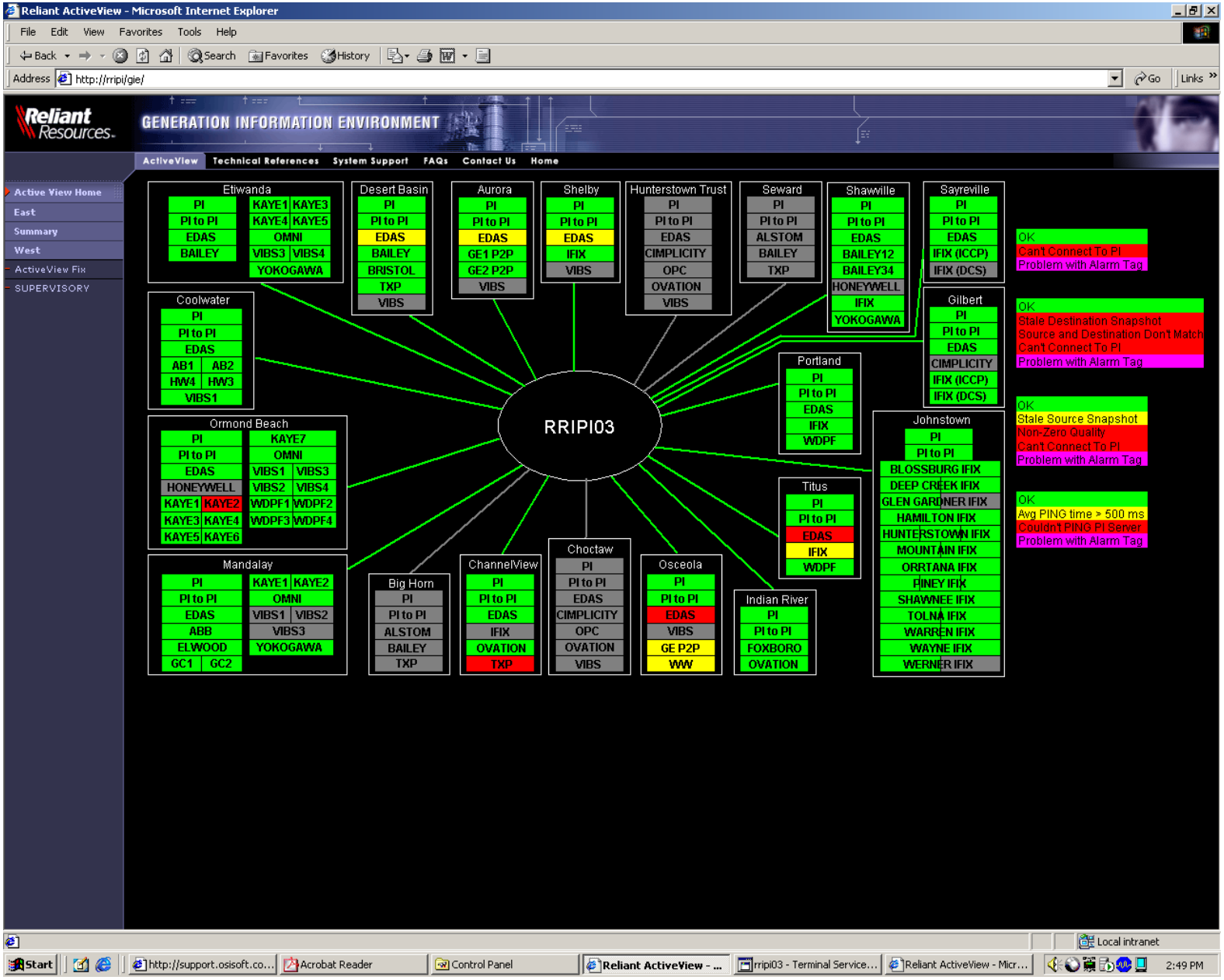
Scope and Approach

IT Approach to Systems Management

- Take responsibility of Database & Server Management, Tape Backups, Hardware, Client Software, and Security
- Manage System and Interface Availability
- Take Ownership of Problem Resolution with the Plant
- Leverage Existing Server Management and Monitoring Tools
- Provide 24/7 “on call” Support

Our goal here is to enable the Plant Personnel and Generation Support Teams to focus on getting value from the information and not the operations of the system.

Scope and Approach



Scope and Approach

User Training

- Training was provided at each site on ProcessBook and DataLink
- Schedule Training after System Installation

Screen Templates

- ProcessBook Screen Templates developed for different Plant Classes. Combined Cycle, Coal Fired, and Gas / Oil Steam Units
- Rollout of Screens Concurrent with Training (Where possible)

The template screens enabled us to: show some initial value, work directly with the plant staff, and leverage work done on previous sites.

Scope and Approach

Company Wide Access

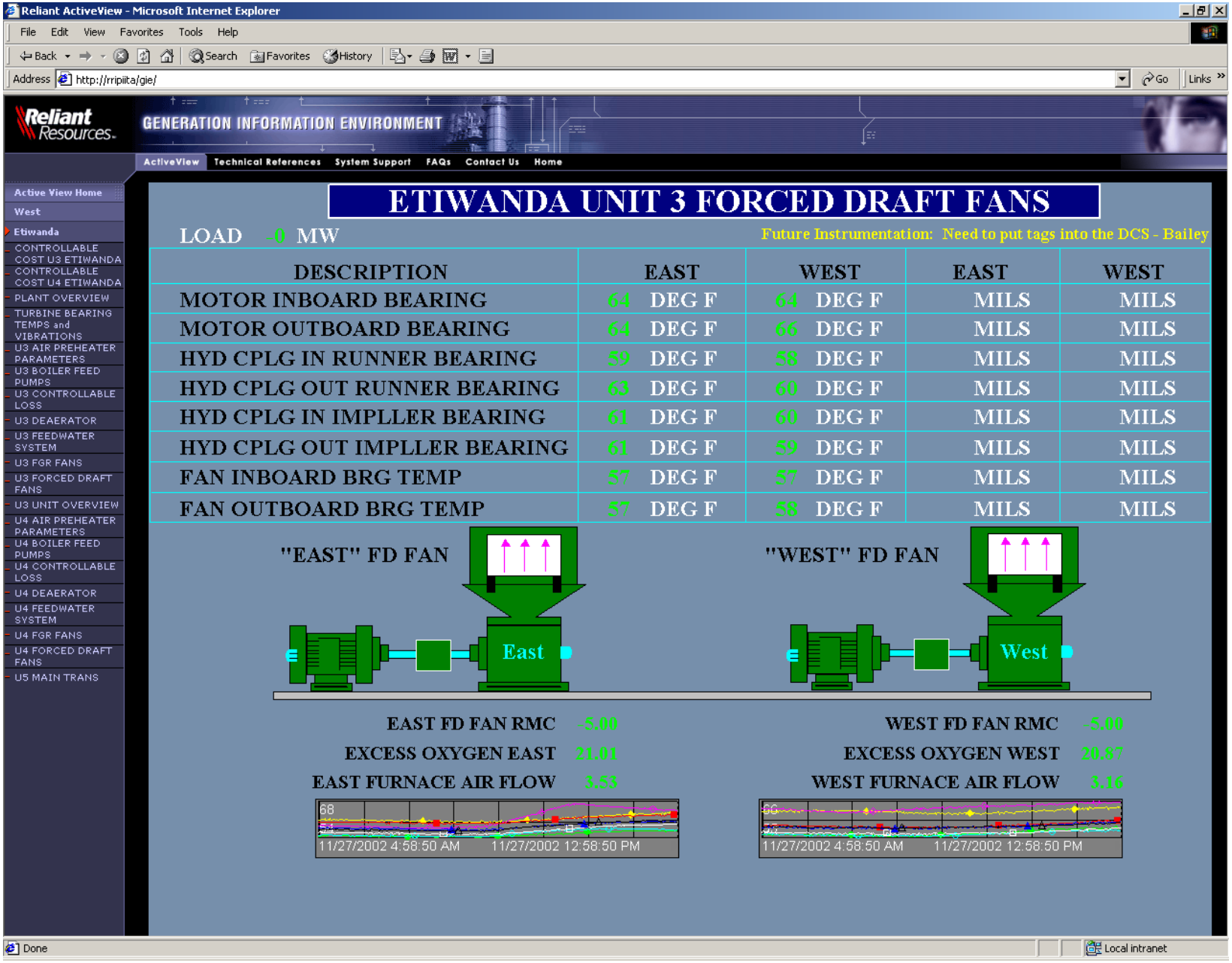
- Implemented GIE (Generation Information Environment) an ActiveView based WEB Platform
- Provides access to Developed ProcessBook Screens
- Provides access to Technical Data / Information
  - Plant (SMT) Tag Lists
  - Infrastructure Diagrams
  - Configuration Specifications
- Support and Service Request Form
  - General Inquiries and Issues
  - Tag Requests (Changes and add new)
  - Screen Enhancements

Scope and Approach

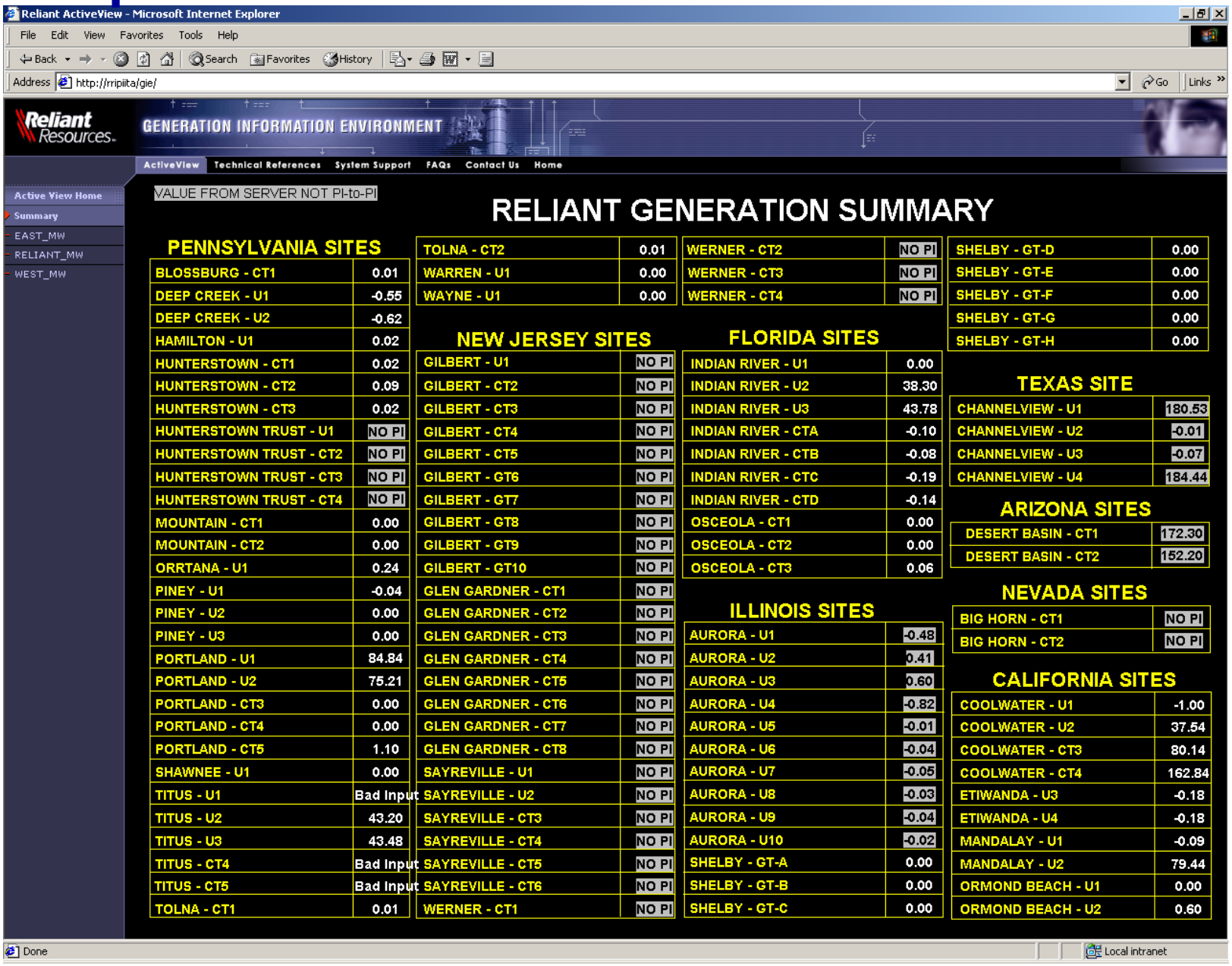
Expanding the Business Vision of PI

- Use ACE for Plant Unit Calculations
  - Heat Rate and Controllable Losses
  - Equipment Run Time & Performance Calculations (Turbines, Condensers, Pumps, etc.)
  - Unit Benchmarking
- Use of PI-ICE is in the Design & Planning Phase

Example of GIE Screens



Example of GIE Screens



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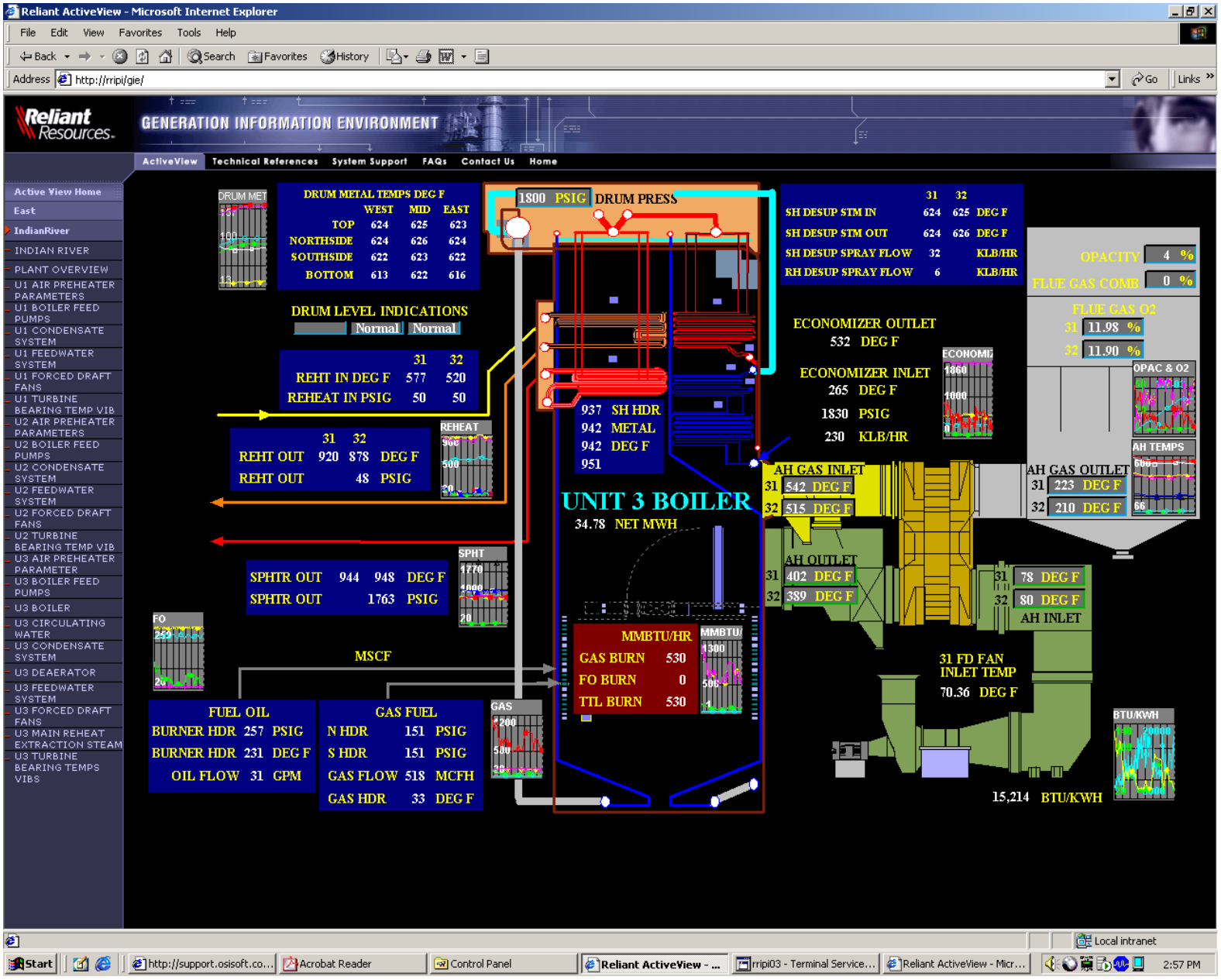
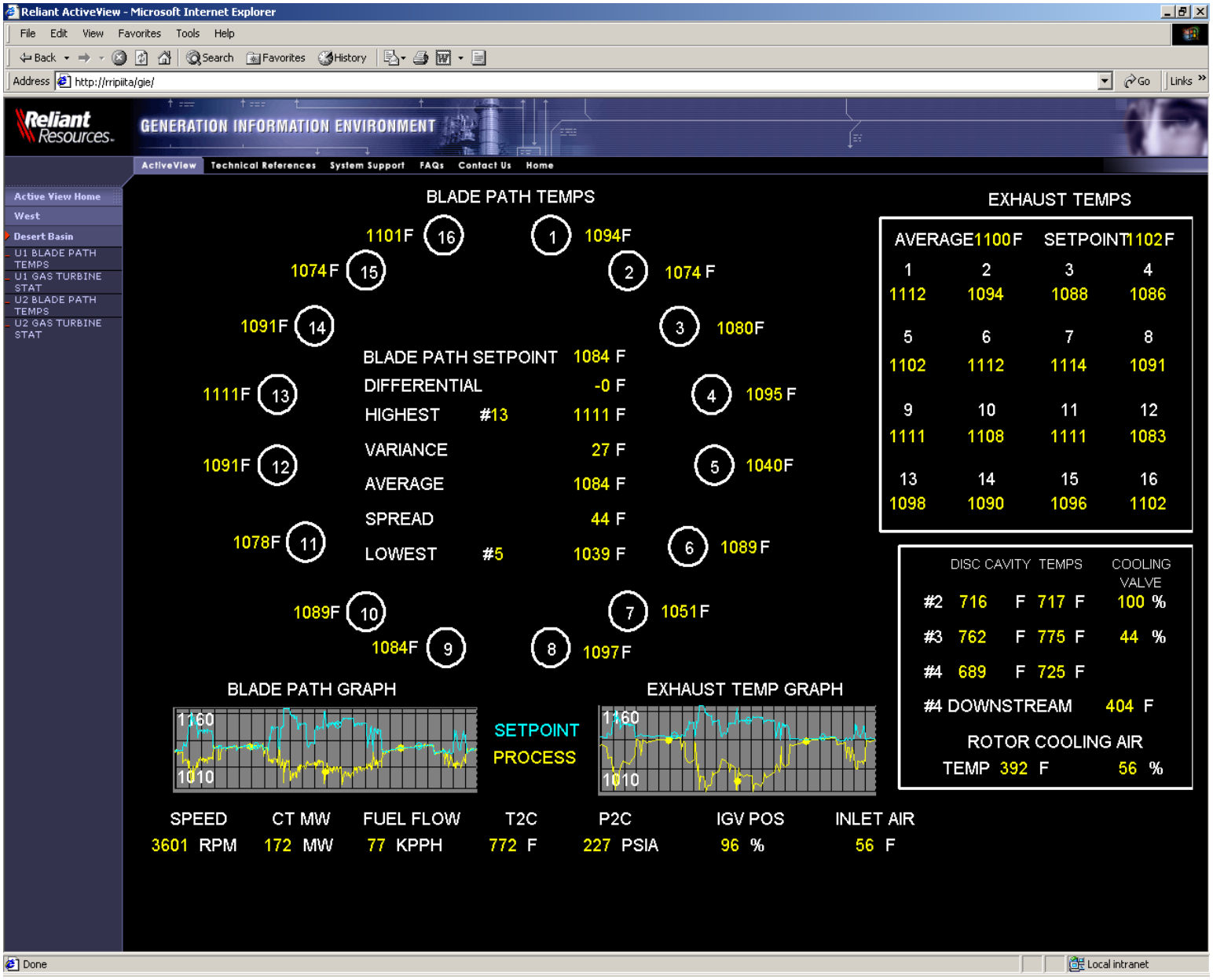


Example of GIE Screens



Benefits and Successes

The following are examples of the various benefits achieved by our clients utilizing the PI Systems.

- Move a Forced Outage to Scheduled
- Remote Monitoring By SMEs (2 Pilot Nozzle Cases)
- Automation of Manual Tasks (Steam & Fuel Reports)
- Discovered Over Firing on Large Combustion Turbine
- Revise Trading Models for Heat Rate IO
- West System Frequency Disruption Study

These benefits support our business case

Current Status

We've Been Very Busy

Since May 2002…

- Performed 31 Plant Installations
- Installed ~ 120 Various Interfaces
- Implemented a Central PI Cluster
- Deployed approximately 350 Calculations (PEs and ACE)
- Developed approx 300+ Screens
- Rolled Out the GIE to the Enterprise
- Trained 150+ Users on Process Book and Data Link
- Held Internal Users Group Meeting
- Gained Users Acceptance

This has created a paradigm shift in how we access and use our plant information…

Upcoming and Future Plans

- Complete PI Installations at Plants Under Construction
- Finish Plant ProcessBook/ActiveView Displays
- Deploy PI-ICE and Prototype
- Leverage our PI User Group to Spread PI Knowledge and Expand Functionality
- Utilize PI-Batch for Analyzing Startup Performance
- Tie PI into Other 3rd Party Packages if required

Open Discussion