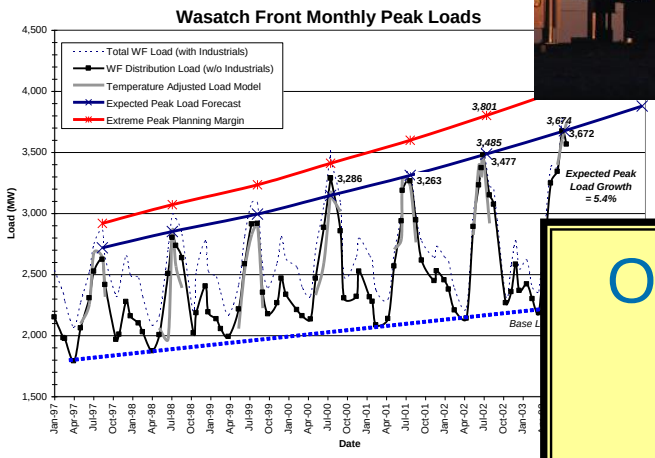
Going Back to ***SCHOOL***

Network Planning



Service Reliability

OSI T&D User Group

Sacramento

September 17-18, 2003

PACIFICORP

PacifiCorp SCHOOL Project

Substation/Circuit History of Operational Loading Phase 1

Steve Lathrop, Project Manager

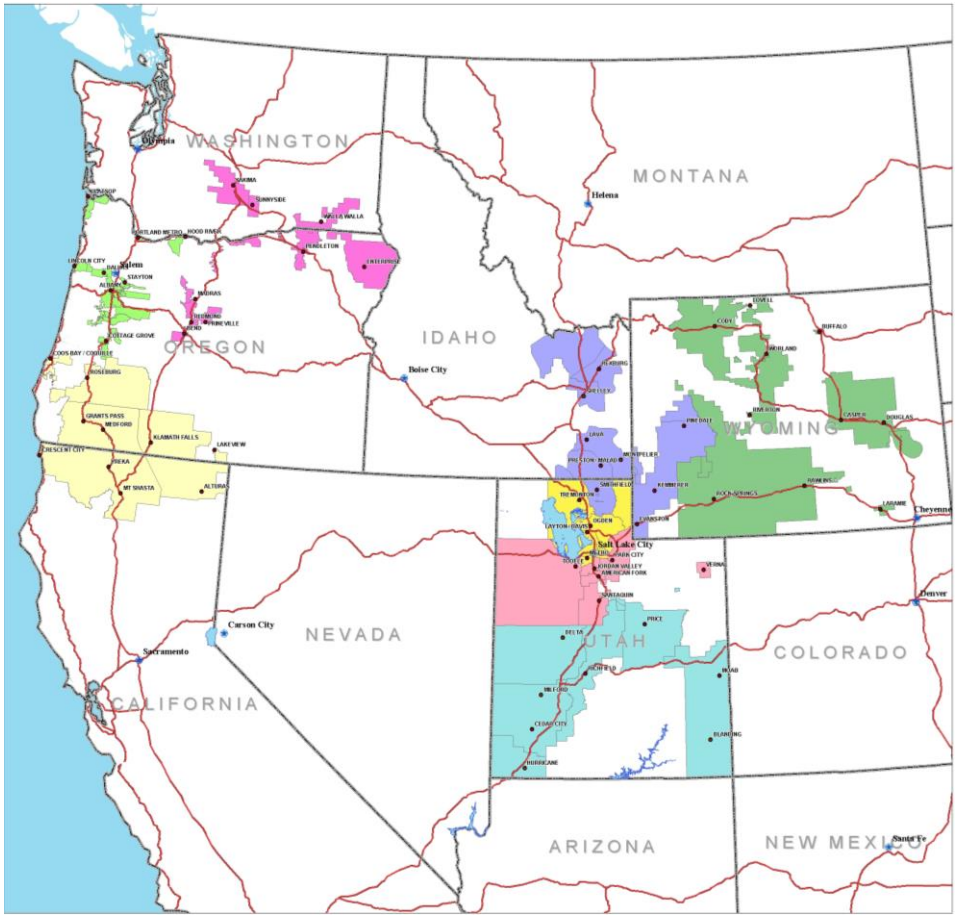
Amy Wiedemeier, Technical Support

Randy Rhodes, Project Sponsor

PACIFICORP

PacifiCorp's Service Territory

- 135,000 Mi^2 Service Territory
- 71,000 Transmission & Distribution Line Miles
- 1.5M Customers in Six States
- 39,000 New Customer Connects This Year
- 270 MVA Additional Substation Capacity Needed Each Year



PACIFICORP

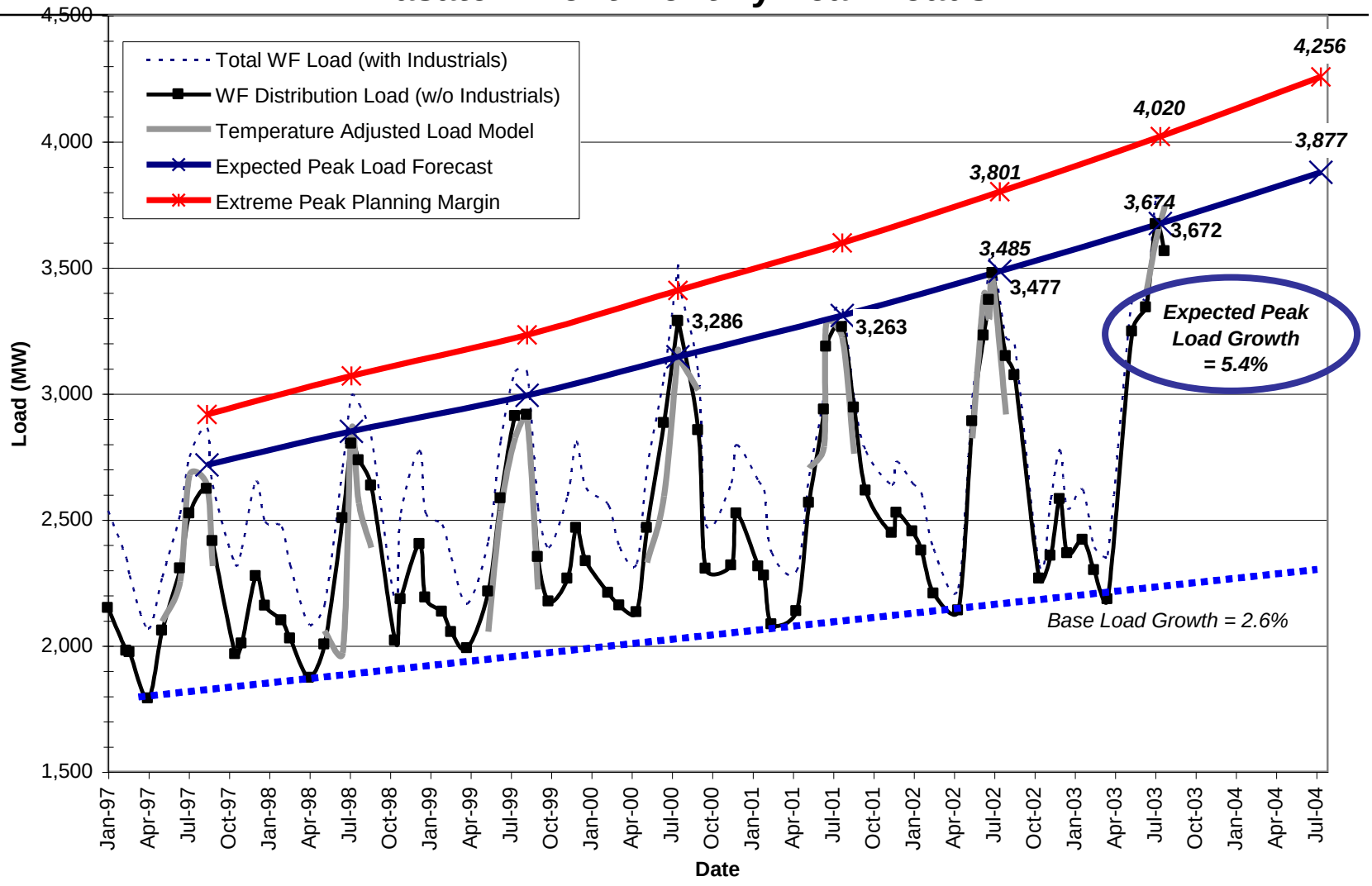
Why SCHOOL?

- Business Needs Better Tools to Manage Critically Loaded Assets
- Legacy Load Data Management Systems at the End Of Their Useful Life
- Quality Load Data Is Critical Because:
  - 30% (Over $100M Per Year) of Power Delivery CAPEX Budget Is Driven by Load Growth
  - PacifiCorp (and T&D Industry) Is Currently CAPEX-Constrained
  - Substation Capacity Projects Come in $2M-$5M “Chunks”
  - Measuring and Forecasting Peak Demand Drives the Timing of these Expenditures

- Lack Of Quality Load Data = Asset Overloads and Outages

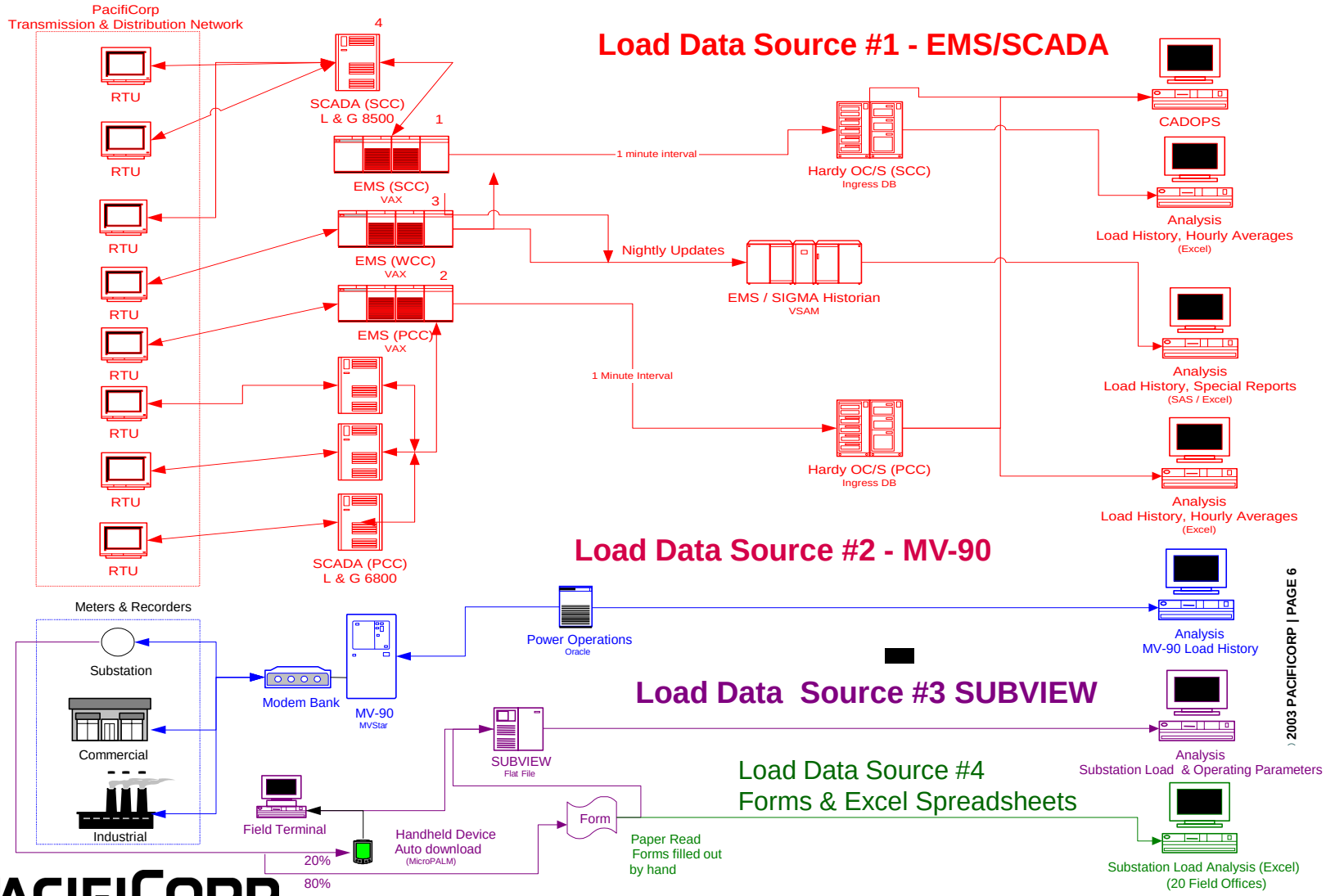
PACIFICORP

Wasatch Front Monthly Peak Loads



PACIFICORP

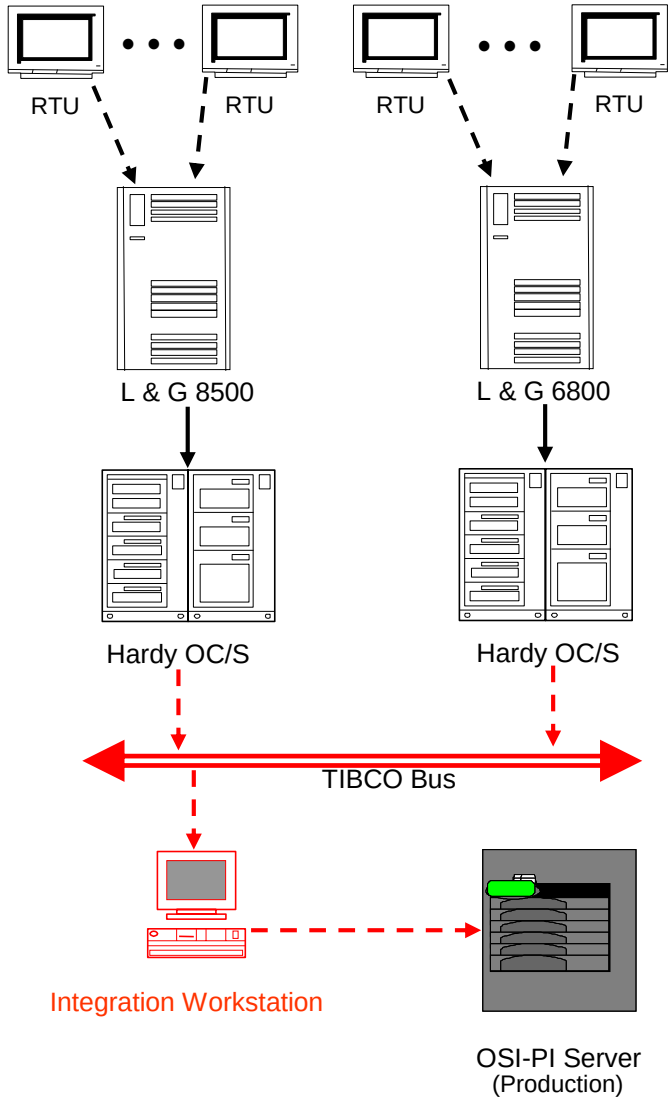
Legacy Load Data Sources



PACIFICORP

SCHOOL Data Integration

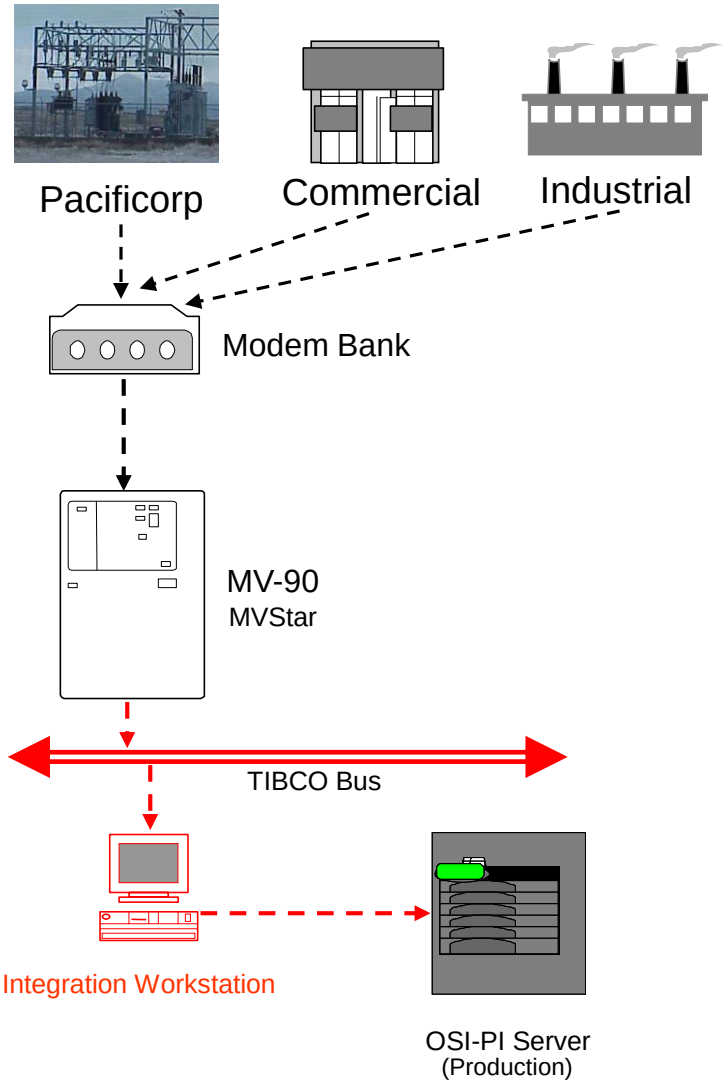
- SCADA (~ 400 Substations)
  - RTUs Polled By The EMS System Every 1-10 Seconds
  - Hardy OC/S Server Polls This Data And Stores 1-minute Interval Data
    - OC/S Is A 3rd Party Data Archiving System Whose Main Function Is To Send SCADA Info To CADOPS
  - The OC/S - PI Interface Runs Every 2 Hours, Backfilling PI SCADA Tags With OC/S Data.
  - Future: ABB Ranger System With PI Data Historian



PACIFICORP

SCHOOL Data Integration (cont.)

- MV-90 (~150 Substations)
  - Modem-equipped Substation Meters Are Polled Weekly By The MV-90 System
  - Data Is Stored In MV-STAR
  - SCHOOL Built An MV-STAR to PI Interface That Backfills PI MV-90 Tags Every 2 Hours



PACIFICORP

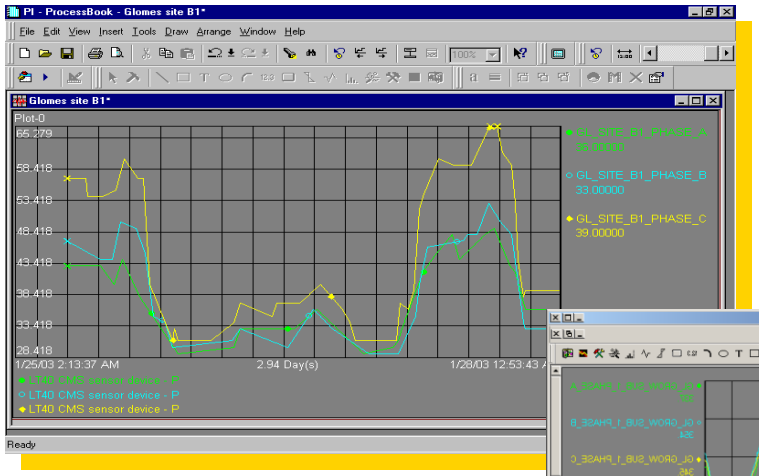
Data Integration (cont.)

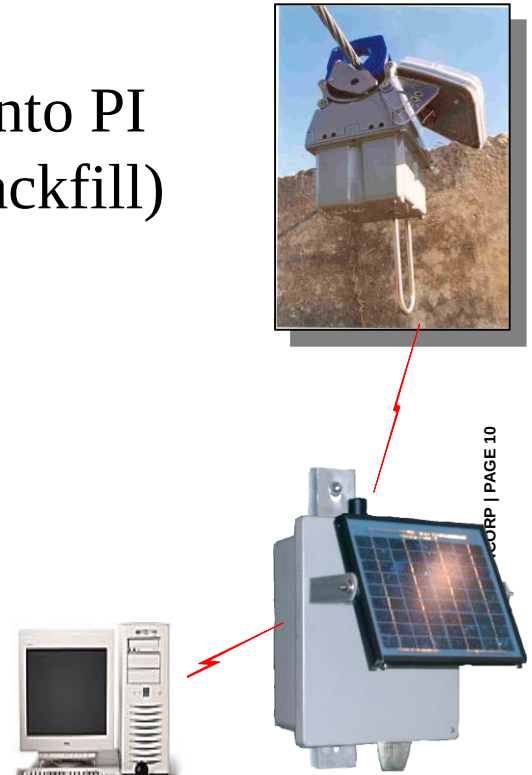
- Handheld Data (~ 500 Substations)
  - Non-SCADA and Non-MV90 Subs Have Peak Recording Analog And Digital Meters
  - Read Monthly by Substation Technicians
  - Application Developed Using PI Manual Logger

PACIFICORP

Data Integration (cont.)

- Critically Loaded Substations:
  - For Non-SCADA, Non-MV-90 Substations Needing Load Profile Data: Cost Effective GridSense LINEtracker sensors.
  - GridSense Integrated LINEtracker Data Into PI Using The RDBMSPI Interface (24-hr Backfill)





PACIFICORP

Data Integration (cont.)

- ~80,000 Tags
  - 12,000 SCADA
  - 3,000 MV-90
  - 65,000 Handheld
- Mostly Watt, Var, Amp, kWH

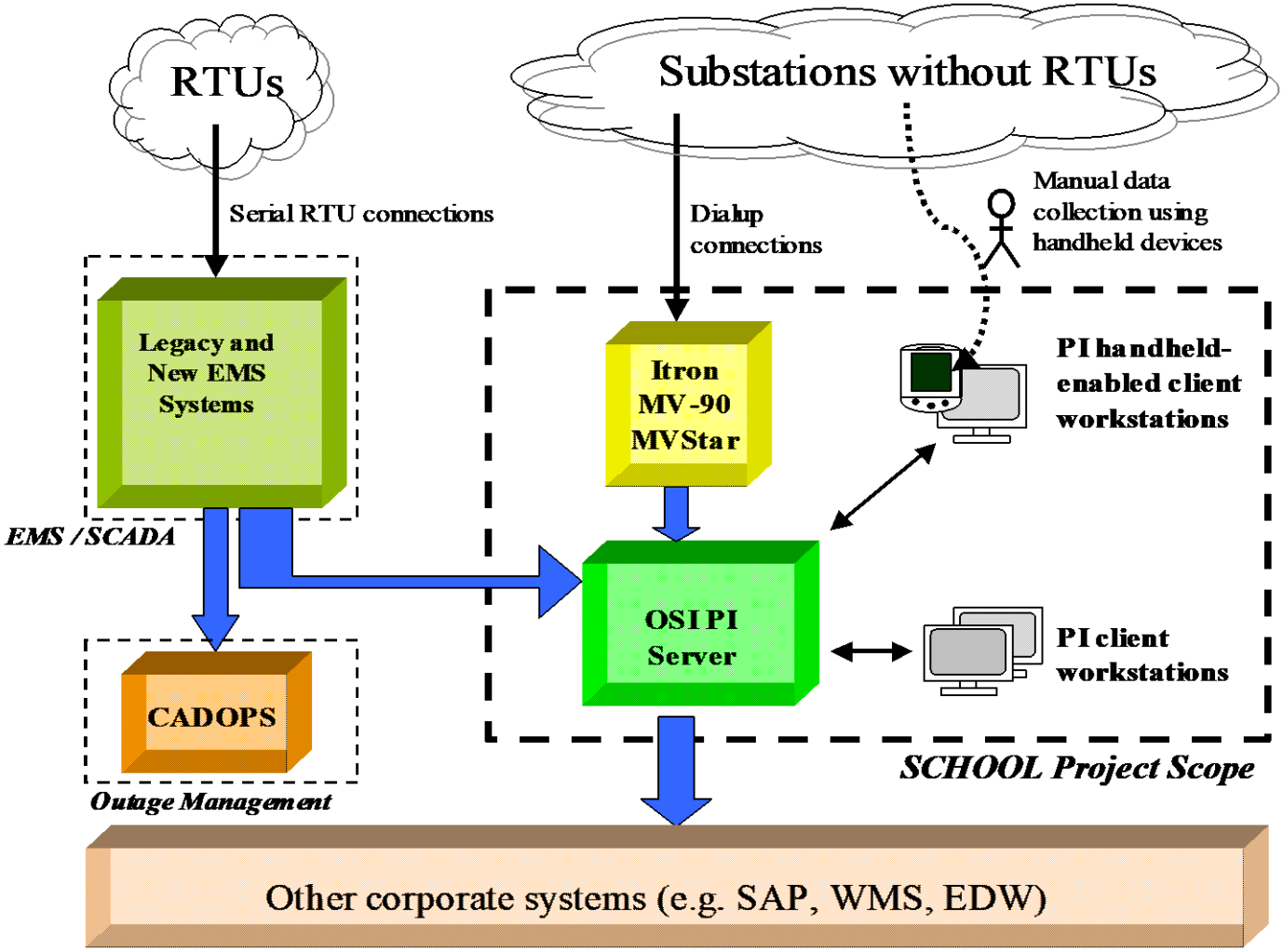
Tag Naming Format:

UT.NIB.TRF.001.ZKW

SOLUTION

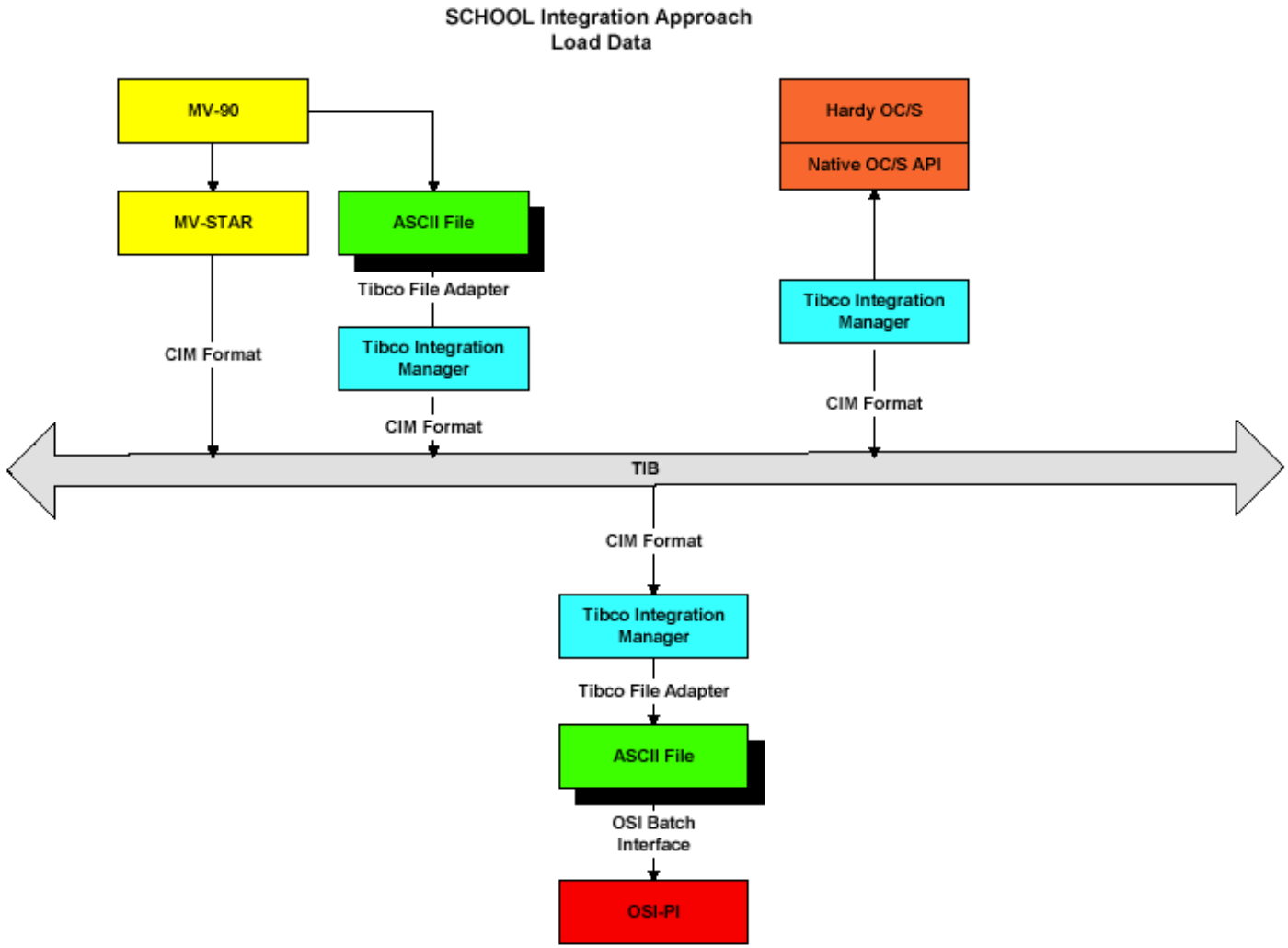
PACIFICORP

Overall Integration Requirements



PACIFICORP

Application of Industry Standards

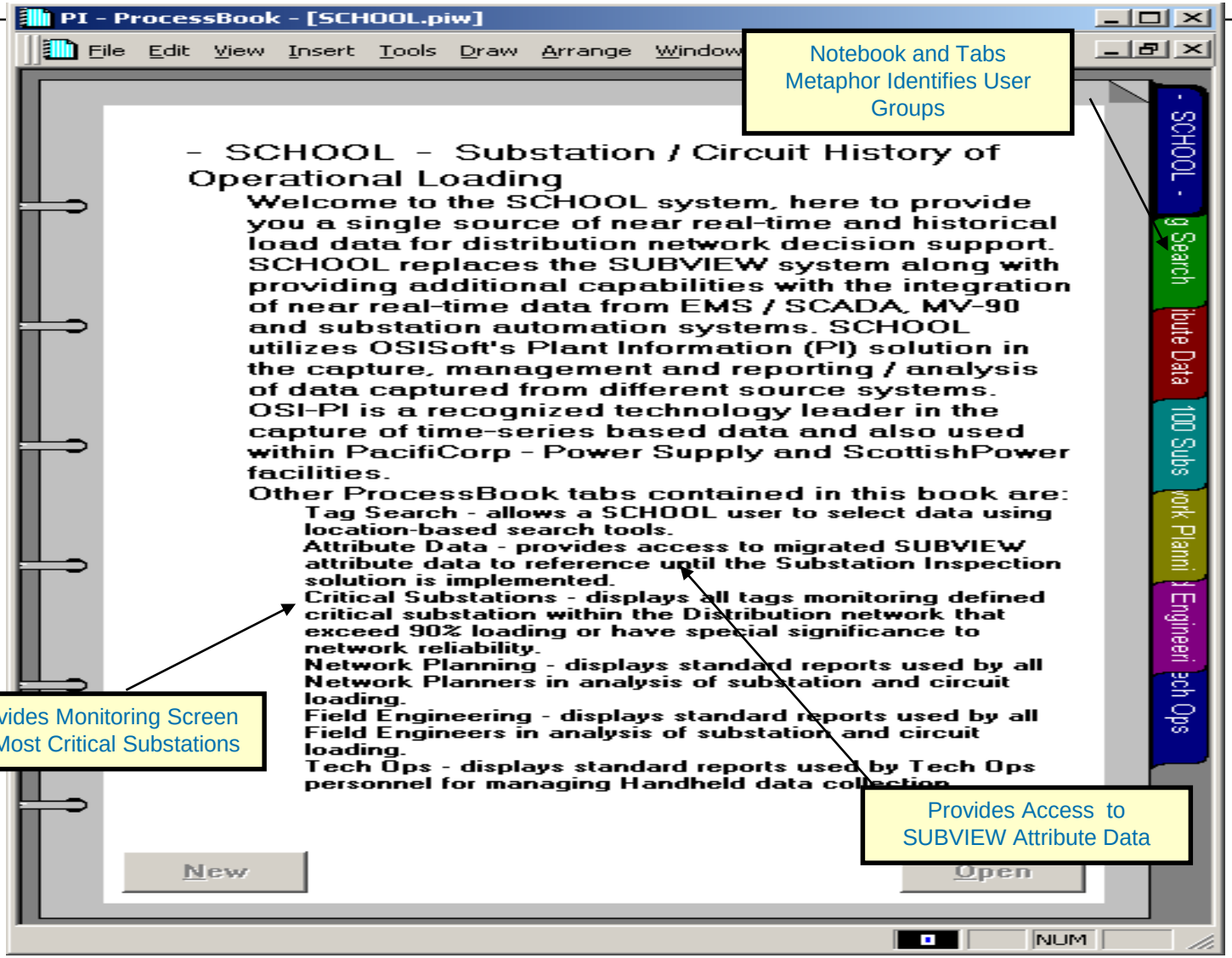


PACIFICORP

CIM Modeling

- IEC TC57 CIM
  - Model Used For Storing SUBVIEW, MV-90 And Sigma (SCADA) Reads in Oracle
  - Used In XML Schemas For Messaging Among
    - Hardy OC/S - Real-time Data Capture Of SCADA Reads
    - OSI PI
    - MV-STAR - Interval Meter Reads
- TIBCO Used For Messaging Infrastructure

ProcessBook Application



PACIFICORP

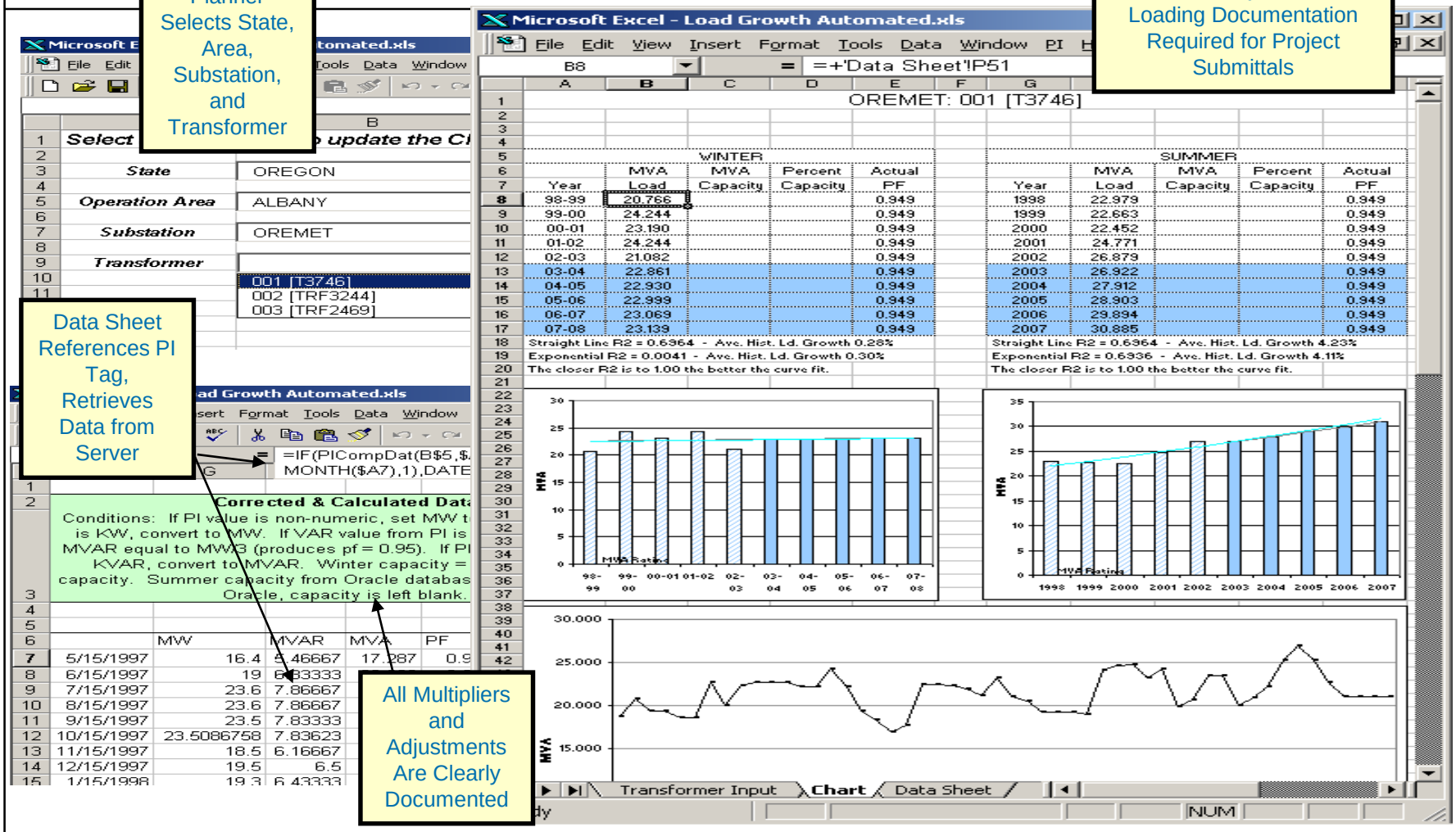
LiveData Application

Planner Selects State, Area, Substation, and Transformer

Automatically Produces Loading Documentation Required for Project Submittals

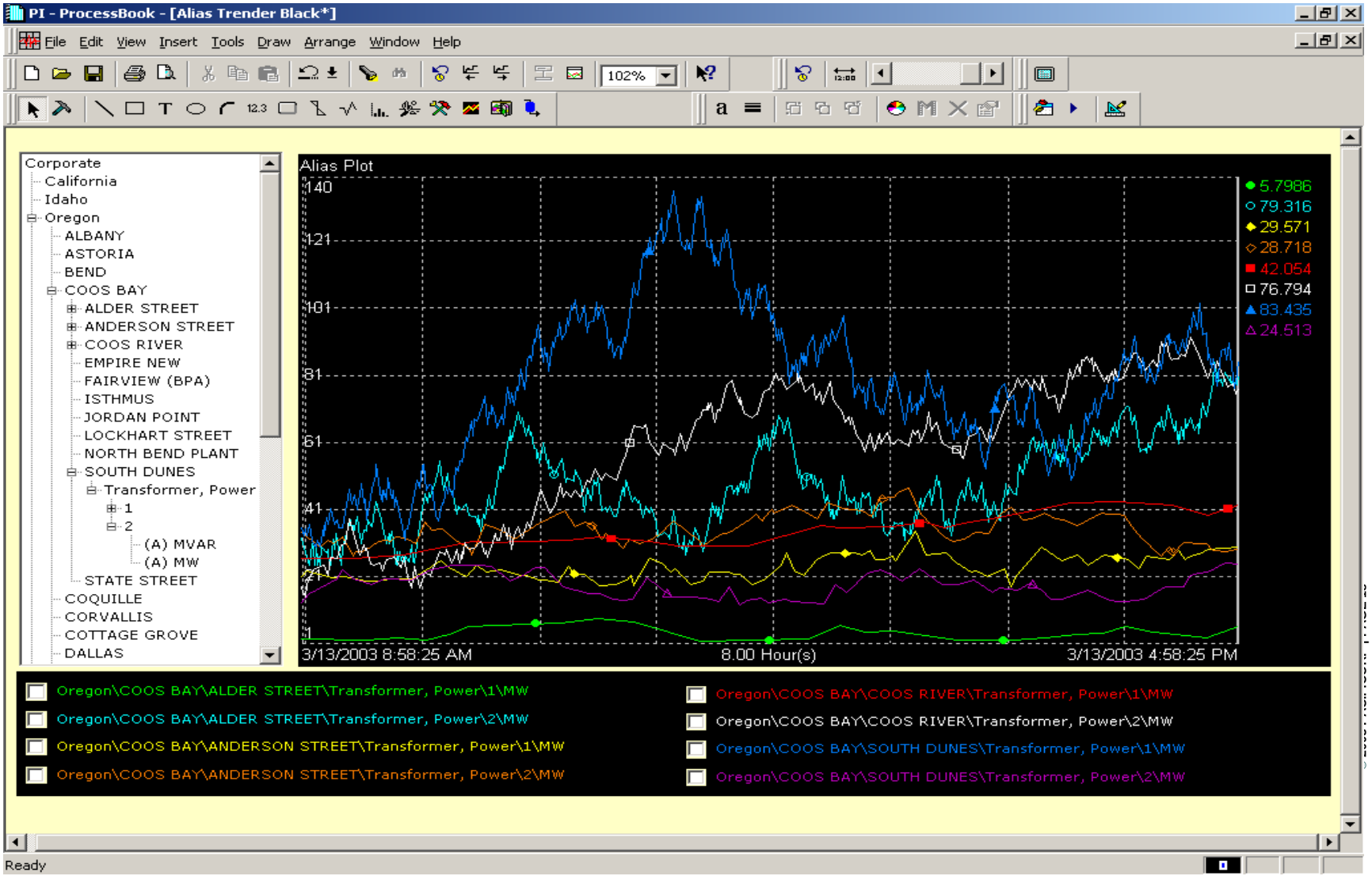
Data Sheet References PI Tag, Retrieves Data from Server

All Multipliers and Adjustments Are Clearly Documented



PACIFICORP

Trending Application



PACIFICORP

Lessons Learned

- *Completely* Understand Data Structure And Relationship Before Detailed Modeling Begins
- Require I/T And End-User Involvement From The Very Beginning
- Clearly Understand Solution Capabilities
- CIM Network Model Savings Are In Data Reuse
- CIM Makes Programming Of Interfaces Faster
- Training…training…training...

PACIFICORP

Questions?

steve.lathrop@pacificorp.com

(801) 220-2310

PACIFICORP