

April 20, 2011 Randy Schrieber, Paul Bower ABB

Asset Health Center

Central Asset Management System to Alarm and Recommend Actions Based Upon Incoming Data

WPO-105-1

Power and productivity for a better world[™]



© ABB Inc. April 20, 2011

Managing the Aging Installed Base

- Very aged infrastructure (average 40⁺ years)
- Lack of expert knowledge (retirees, non-replacements, etc.)
- Utilities cannot afford to continue time-based maintenance
- Utilities cannot afford to replace aging equipment
- Utilities would like to move to condition-based maintenance to reduce cost and also reduce risk
- Data for asset management is often distributed in various locations and formats
- Monitoring systems are being installed to provide timely data
- Several utilities are pulling data from many places and concentrating it in new data servers, then prompting the questions ...

What do I do with all this data? and what data should I be gathering?

And, I only want one system for all my assets!



Traditional Scope of ABB Support Services





Service

Transformers

- 70% of large power transformers are ABB legacy
- Risk assessment and life extension
- Advanced diagnostics and testing
- LTC repairs and replacements
- Factory repair and remanufacturing

High Voltage Breakers

- Support capability for 60-70% of installed base
- Parts, Refurbishment and Retrofit
- Advanced diagnostics radiography and SF6 leak detection
- Risk assessment and life extension

Low- and Medium-Voltage Switchgear

- Over 1 million breakers in service in US
- Parts, Refurbishment, Retrofit, Roll-in Replacement
- Protection & Control assessment and upgrades
- Nuclear & Non-nuclear





Overall Asset Health Center Vision



March 11, 2011 | Slide 4



End-to-End Solution to Drive Asset Performance



March 11, 2011 | Slide 5

End-to-End Solution to Drive Asset Performance



ABB MTMProgram Well Established Fleet Risk Assessment – Patented Process



Transformer Fleet Assessment – Process Flow Map Includes Risk Factors Specific to Individual Designs





Transformer Fleet Assessment – Process Flow Map

- One-time data gathering process
- Utilizes ABB Risk of Failure algorithms developed using ABB legacy design knowledge and field experience
- Uses the unit criticality as defined by the utility to prioritize the work required to reduce risk





Transformer or Breaker Risk Assessment Risk Monitoring with Remote Monitoring and Consolidated Data

- Remote monitoring can continuously update many factors in the risk assessment to provide a near-real time alert for critical risks as they develop
- Defer routine inspections and PM but still stay ahead of risks that can cause an unexpected outage



Mix of Sensor Usage Units Shipped with ABB Transformers

Gas & Moisture sensors and Thermal Monitors are the predominant sensors installed on new power transformers





Sensor Price Range

| System / Sensor | Price Range (\$) |
|--------------------|------------------|
| Integrated monitor | 12 K – 60 K |
| Gas in Oil | 5 K – 50 K |
| Moisture in Oil | 1.5 K – 3 K |
| Thermal Monitor | 5 K – 15 K |
| Bushing Monitor | 3 K – 15 K |



Individual Asset Assessment

- Define contributing risks
- Quantification of Risk Factors
- Recommendation of mitigation actions and urgency
- Auto-notification of responsible parties
 - Everyone knows all we know
- Generation of draft work order for review
- Data mining capability to allow searches for similar issues and/or similar units in the fleet







Fleet Assessment

- Optimize spending across an asset fleet to address the highest risks first
- Quantify the unaddressed risks at selected spending levels
- Optimize the capital replacement program to evaluate the tradeoffs with continued maintenance expense and/or unaddressed risk
- Compliance reporting

Asset Fleet Performance Model



Sample Outputs

Easter

Centra

Air Blast Circuit Breake

F6 Circuit Breake

Oil Circuit Breake







System-Wide Assessment

- Define risk by region or substation
- Optimize O&M and CapEx replacement spend across assets for a balanced risk mitigation plan
 - Transformers
 - HV Breakers
 - Station batteries, ...







© ABB Inc. April 20, 2011 | Slide 15



Sample Outputs

Integrating the Data, Algorithms, Reporting, ERP

- ABB acquired Ventyx in 2010
 - Leading business solutions provider offering software, data and advisory services
- Ventyx acquired Insert Key Solutions in Dec 2010
 - Reliability focused process improvement at nuclear and thermal plants
- Ventyx acquired Obvient Strategies in Jan 2011
 - Obvient's FocalPoint Platform provides data integration and visualization capabilities



Asset Health Center – Solution Architecture





Asset Health Center – Information Flow and Analysis



Asset Health Center – Transformer Fleet

| 🏉 Obvient | | | 🟠 🕶 🔝 💌 🚍 🖶 🕶 Pa | ige ▼ Safety ▼ Tools ▼ @ ▼ [≫] |
|------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Navigation | Fleet Wide by Class by Region by Time b Risk of Failure for Fleet | A Contract of the serious Issues (#) | MONITORING tion Size Spare Units Maint. Cost Ave. 1 51 21 \$3 Issue Needs Attention (#) 57 | Repair Cost \$935 Ave. Replace. Cost 1200 No Issue 493 |
| Reports | Health (%) Average Station Age Duble Duble Road rev rev | Actralian Bread Hanceville Pana Attalia Gadsdel Colony Oneonta Rainbow City Glencoe Sulpher Aligood Ashville Southside Jacksonville Kimberty Springville Saks Weaver ale Center Point Lincoln Anniston Heflin 50 Trussville Eastaboga 20 Oxford Birmingham Tucktown Talladega Deita | Silver Creek Cartersville Holy Springs Big Creek Cedartown Kennesaw Roswell Alph North Buchanan Douglasure Attanta Wato Villa Rica East approximation Carrolitom Bowdon Whitesorg Union City Farest Newell Peachtree City Fayetteville | Cumming Councestric Commerce Buford Buford Commerce Buford Councestric Commerce Auburn Arcade Duluth Auburn Arcade Duluth Auburn Arcade Winder Athens Addana Nations Redan Covington Madison Park Porterdale Greensboro Worthville Shady Dale |
| | 97 % 98.0 % 96 % 95 % Fleet 95 % Fleet 95 % Stanton | Hoover Childersburg Ashiand ter Columbiana Sylacauga Corinth Wer Shelby Deans Goodwater Brierfield A M A Kellyton Alexander City le Clanton Jacksons Gap Dadeville Isabella Pinthlocco Equality Camp H Verbena Marbury Sardis Felartic | Wedowee Franklin Newna L St Gro Franklin Hogansville Roanok Drinth Hogansville High Pine Hillcrest LaGrange Woodbury Molena Th Huguley Lanett Manchester Woodbury Thom Hamilton Talbotton Lacataula Ellorelin Talbotton | Jackson Monticello Eatontor iffin Orchard Hill Flovilla Hillsboro Barnesville Gray OD haston Lizella Maconf0 miles 2 1011 fitersouff Schere With Streep 112, Utility re- 0 1011 fitersouff Schere With Streep 112, Utility re- 10 10 % |



Asset Health Center – Transformer Fleet by Class

| LECUTIVE SUMMARY EXECUTIVE SUMMARY <th> Obvient Navigation </th> <th></th> <th></th> <th>TRA</th> <th>NSFORME</th> <th></th> <th></th> <th>▼ D ▼ D ⊕ ▼ Pa</th> <th>ige 🕶 Safety 🕶 Tools 👻 🔞 🛡</th> | Obvient Navigation | | | TRA | NSFORME | | | ▼ D ▼ D ⊕ ▼ Pa | ige 🕶 Safety 🕶 Tools 👻 🔞 🛡 |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------|----------------|--------------------------------------|----------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Hierarchy NOIC Failure Rate Population Size Available Spare Units Maintenance Cost Average Cost to Repair (KS) Average Cost to Repair (KS) Current User ed addroute < 69 kV 20 kV 0.01% 5 21 50 51 7 Dashboard 00% 5 21 50 51 7 6 Options 1 0.4% 5 2 57 51 6 Options 0 0.1% 1 1 59 52 3 Print Screen 100% 0.01% 1 1 32 341 90% 50% 90% 0 0.1% 1 32 341 100% 20% 0 7 135 2 27 Verage Station Acera Station Ac | Dashboard Executive Summary | Fleet Wide by | Class by Region | by Time | by Substation | (EXECUTIVE SOMMAR | T) | | |
| Current User < 07 % 5 21 50 51 7 Dashboard 5 2 57 51 6 Dashboard > 230 kV 0 0.1% 1 1 59 52 3 Print Screen Health (%) Unit Count (#) Serious Issue (#) Issue Needs Attention (#) No Issue 90 % 90 % 80 % 1 1 1 32 341 90 % 90 % 80 % 1 1 1 32 341 90 % 90 % 80 % 0 7 135 230 kV 0 2 27 Print Screen 90 % 50 % 80 % 0 2 20 % 0 230 kV 0 20 % 0 20 % 0 1 000 % 0 20 % 0 0 0 0 0 0 0 0 0 < | Hierarchy NONE | | Failed Units (# - last 12 months) | Failure Rate (%) | Population Size (# of units) | Available Spare Units (#) | Maintenance C (k\$/unit) | ost Average Cost to Rep (k\$) | air Average Cost to Replac (k\$) |
| Bashboard S20 kV 1 0.44 % 5 2 57 51 6 Cueries S20 kV 0 01% 1 1 53 52 3 Cueries Options Print Screen 100 % 0 01% 1 1 32 341 Print Screen Hein 100 % 0 0 0 7 155 Print Screen 95 % 90 % 50 % 0 7 155 200 kV 0 7 155 96 % 90 % 50 % 90 % 90 % 90 % 0 20 % 0 20 % 0 20 % 0 20 % 0 20 % 0 20 % 0 20 % 0 20 % 0 20 % 0 20 % 0 20 % 0 20 % 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 <td< td=""><th>current User</th><td>< 69 kV</td><td>2</td><td>.07 %</td><td>5</td><td>21</td><td>\$0</td><td>\$1</td><td>7</td></td<> | current User | < 69 kV | 2 | .07 % | 5 | 21 | \$0 | \$1 | 7 |
| Dashboard > 2.20 kV 0 .01 % 1 1 59 52 3 Options Pint Screen 100 % 2.0 % 0 .01 % 1 1 39 52 3 Pint Screen 100 % 2.0 % 0 .01 % 1 1 32 341 90 % 90 % 90 % 80 % .00 % .01 % 1 .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % .01 % | | 69 kV - 230 kV | 1 | .04 % | 5 | 2 | \$7 | \$1 | 6 |
| Queries Health (%) Unit Count (#) Reports 00% 20% 10% 50% 341 Print Screen 10% 69 kV 1 32 341 Brown Screen 95% 90% 80% 0 2 27 Mappen Screen 90% 50% 90% 80% 90% 80% 90% 80% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% 90% | Dashboard | > 230 kV | 0 | .01 % | 1 | 1 | \$9 | \$2 | 3 |
| Reports Serious Issues (#) Issue Needs Attention (#) No Issue Options Print Screen 32 341 Help 95 % 90 % 0.0 % 0 7 135 90 % 90 % 80 % 0 7 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % 100 % <th>Queries 🕨</th> <td>Health (%)</td> <td></td> <td></td> <td>Unit Count (#)</td> <td></td> <td></td> <td></td> <td></td> | Queries 🕨 | Health (%) | | | Unit Count (#) | | | | |
| Neports 100 x - 0 20 x - 0 40 x - 0 0 7 135 Print Screen 95 x - 90 x - 80 x - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 - 0 | Banarta 🔹 | 100.% | | | | Serious Iss | sues (#) Is | sue Needs Attention (#) | No Issue |
| Options 0 7 135 Print Screen 95 % 90 % 80 % 0 2 20 kV 0 2 220 kV 0 2 220 kV 0 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 <th2< th=""> 2 2 2 <t< td=""><th>Reports -</th><td></td><td>- 2.0%</td><td></td><td>< 69 kV</td><td>1</td><td></td><td>32</td><td>341</td></t<></th2<> | Reports - | | - 2.0% | | < 69 kV | 1 | | 32 | 341 |
| Print Screen Help 95 % 90 % 80 % 90 % 80 % 90 % 90 % 2 2 27 Control 120 % 120 % 0 2 2 27 Control 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % 120 % | Options 🔸 | | | | 69 kV - 230 kV | 0 | | 7 | 135 |
| | нер | 90 % | 5.0 % 92.0 % 98.0 3 | ey Hi Bethe Bethe Bodst Br | Road Coloma Forestale Cordova Bremen Colony C Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulpher Sulph | Snead Boaz Pleas Ceville Pana Attalla Gad peonta Rainbow City G Aligood Ashville South Remiap Alexandria Springville Saks Center Point Lincoln Annisto Trussvil Eastaboga 20 ingham Tucktown Talladeg Vincent Thornhill Childersburg Columbiana Sylacauga M Shelby Deans Goodw A M A Kellyton Ale Rockford Lancers G | Centre Silver ant Hill Exie lencoe Piedmont side Jacksonville Weaver Buct Weaver Buct Weaver Hefin Oxford Bowd a Delta New Liberty Wedo Corinth West Nahand Wedo Corinth West New Site oxander City | Creek Cartersville Europe Contensville Cedartown Kennesaw Ros Cedartown Kennesaw Ros Felton Pallas Styp Felton Pallas Styp Fanklin Esorg WhiteSorg WhiteSorg Peachtree City Pephesus Peachtree City Pephesus Peachtree City Pine Hillcrest Penville LaGrange Woodbury Woodbury Hey Lanett Manchester | Cumming Galnesville Big Creek Buford G3 Mell PDuluth Auburn Bolluth Auburn Winde Tucker Monre Farest Park Covington Fayetteville Worthville Grant Griffin Orchard Hill Flovilla Hill bulon Barnesville Gra Monre Griffin Orchard Hill Flovilla Hill bulon Barnesville Gra |

April 20, 2011 | Slide 20

Asset Health Center – Transformer Fleet by Class

| Navigation | | | | | |
|----------------|--------------------------------------|-------------------------------|---------------------------------------------|--------------|-----------------------------------------|
| ADD | | | | | - |
| Aidid | C Obvient FocalPoint Composite WebPa | t - Windows Internet Explorer | | | |
| Dashboard | Asset Details | | | | |
| Executive | Asset Detail [/31412] | | | | |
| Summary 💾 | Asset Id: 731412 | Health Index: 57.98 % | Utility: Energy South | | |
| Hierarchy | Asset Type: Auto Transformer | Health Score: 207 of 357 | Operating Area AUR | | verage Cost to Repla |
| NONE | Manufacturer: General Electric | | Station: TSS - 167 - Senoia | | (k\$) |
| Current User | Model Number: N/A | | Circuit / Utility Designation TR 94 B PHASE | | 7 |
| | Serial Number: K547387 | | | | 6 |
| Dashboard | Manufacture Date: Jul 01, 1974 | | Annual Maintenance Co | st | 3 |
| Queries 🕨 | Age: 35 | | Replacement Co | st | |
| | Attributes Health Index CM Activity | oading Assessments | | | No Issue |
| Reports | ▼ Asset Attributes [731412] | | | | 341 |
| Options 🕨 | | LTC Manufacturer: | | | 135 |
| Print Screen | | LTC Model: | | | 27 |
| T THE OCICEN | | LTC Date of Manufacture: | | | Silver City |
| Help | | LTC Annual Maint Cost: | | | Cumming Gainesvil |
| | | LTC Replacement Cost: | | | ek Buford (85) |
| | | Max MVA: | 333 MVA | | Ipharetta Auburn |
| | | Mid MVA: | | | Winde |
| | | Min MVA: | | | rth Atlanta Loganville |
| | | Primary Voltage Rating: | 765 kV | | Tucker |
| | | Secondary Voltage Rating: | 345 kV | | lle-Redan |
| | | Tertiary Voltage Rating: | 33 kV | | st Park |
| | | Nominal MVA: | 333 MVA | | Stockbridge Porterdale |
| | | | | | ille Worthville |
| | | | | | iroveo Jackson Mon |
| | | | | | Orchard Hill Flovilla Hil |
| | | | | | Juliette |
| | | | | | Barnesville Gra |
| | | | | | The Rock Polsyth |
| | | | | | Lizella |
| Parat Re | | | | | Knoxville 40 mile |
| OBVIENT | Done | | Second intranet | 🖓 🕶 🔍 100% 🔻 | srozofi CorportionBy73010114R |
| | | | | | And |

Asset Health Center – Transformer Fleet by Class

| Navigation | Columnation Compared Compared in WebD | nt Wednesder | | |
|--------------|---------------------------------------|-------------------------------------------|------------------------------------------------------------------|----------------------------|
| ~~1010 | Covent rocaroint composite webra | art - windows internet Explorer | | |
| Dashboard | Asset Details | | | |
| Executive | Asset Detail [731412] | | | |
| Summary 💾 | Asset Id: 731412 | Health Index: 57.98 % | Utility: Energy South | |
| Hierarchy | Asset Type: Auto Transformer | Health Score: 207 of 357 | Operating Area AUR | verage Cost to Replac |
| NONE | Manufacturer: General Electric | | Station: TSS - 167 - Senoia | (k\$) |
| Current User | Model Number: N/A | | Circuit / Utility Designation TR 94 B PHASE | 7 |
| ed.laderoute | Serial Number: K547387 | | | 6 |
| Dashboard | Manufacture Date: Jul 01, 1974 | | Annual Maintenance Cost | 3 |
| | Age: 35 | | Replacement Cost | |
| Quenes | | | | No Issue |
| Reports > | Attributes Health Index CM Activity | Loading Assessments | | 341 |
| Onting | ▼Load Peaks [731412] | | | 135 |
| Options • | Health | | | 27 |
| Print Screen | Index 800 | | | |
| llala | Monthly | Ŷ | | Silver City |
| негр | Chart | | 2 | ugs Cumming Gainesvill |
| | Monthly 600 | | | ek Buford 35 |
| | | | | Auburn Auburn |
| | oad | | 18 8 VI VPS I VI Same PSRI | Winde |
| | * | | | th Atlanta Loganville |
| | a 400 | | | Tucker |
| | | | | - Redan |
| | ž – | | | st Park Covington |
| | 200 | | | Stockbridge |
| | 200 | | | ille Worthville S |
| | | | | Iroven Jackson Mon |
| | | | | Griffin |
| | 0-1000000 | oooofin (n (n (n jn j n j | | Orchard Hill Flovilla Hill |
| | N N N | રું સ્પેર્સ્સ. | 3 G \$ & & 3 G \$ & & 3 G \$ & & & & & & & & & & & & & & & & & & | Barnesville |
| | Ð | le la | E E E | The Bock Forsyth Gray |
| | | | | pmaston |
| | | | | Lizella |
| Powerst Bu | | | | Knoxville 40 mile |
| OPVIENT | 1 | | | - Buttonin |

Asset Health Center – Asset Class Scorecard

| 🖉 Obvient - Windows Ir | nternet Exp | olorer | | | | | | | | | | | X |
|-------------------------|----------------|---------|-------------------|----------|------------|---------|-------------------|-------------------------|----------------------|------------------|---------------------|----------|--------|
| 💽 🗢 🙋 http://wi | nxptemplate2 | /DEV606 | ORA/cor | nmon/fri | m_mode_fi | ame.asp |))x?_WI=10118 | LHT=6668m 🔽 🗲 | 🗲 🗙 🚼 Google | | | ٩ | - |
| 🔶 Favorites 🛛 🔏 Obvient | t | | | | | | | | 🖄 • 🔊 - 🖃 🖷 | 🖡 🔻 Page 🕶 Safel | ty v Too | ls 🕶 🔞 🕶 | , » |
| | | | | | | | | | | Clia | k Arrow to | Show Out | |
| 🖴 Navigation | 1114-1 | | | | alth Indo | v Char | Haalth Co | ara Chart Haalt | h Inday Trand | | k Allow lo | Show Que | ery 🗸 |
| focalpoint | | uex So | coreca Ioret H | | altri inue | x crian | riealth St | ore chart Healt | In Index Trend Load | Asset Age | | | |
| JSOLUTIONS | Assets | Accet | | CM | Health | Max | Health | | | Sorial | VE | Google | |
| Dashboard | ID | Age | Score | Score | Score | Score | Index | Station | Manufacturer | Number | Map | Map | |
| AMSHI\Health | 731412 | 35 | 6 | 78 | 207 | 357 | 57.98 % | TSS - 167 - Senoia | General Electric | K547387 | • | • | • |
| | 72876 | 36 | 6 | 83 | 224 | 357 | 62.75 % | TSS - 112 - Helena | Westinghouse | 7001989 | • | • | |
| paul.bower | 731411 | 33 | 6 | 83 | 235 | 357 | 65.83 % | TSS - 167 - Senoia | Westinghouse | 7002528 | <u>•</u> | <u>•</u> | |
| Dashboard | <u>72875</u> | 36 | 6 | 81 | 238 | 357 | 66.67 % | TSS - 112 - Helena | Westinghouse | 7001990 | <u>•</u> | <u>•</u> | |
| Ontions | <u>731426</u> | 29 | 6 | 63 | 266 | 357 | 74.51 % | TSS - 86 - Ellenwoo | Westinghouse | 7002702 | <u>•</u> | <u>•</u> | |
| Options | <u>731440</u> | 20 | 6 | 55 | 267 | 357 | 74.79 % | TSS - 115 - Braselto | Cooper Power Systems | C0717751 | • | <u>•</u> | |
| | <u>731439</u> | 14 | 8 | 75 | 269 | 357 | 75.35 % | <u>TSS - 103 - Odum</u> | Smit | 220214 | • | <u>•</u> | |
| Dashboards | <u>731437</u> | 20 | 6 | 74 | 270 | 357 | 75.63 % | TSS - 51 - Peachtre | General Electric | D590849 XAM30091 | <u>•</u> | <u>•</u> | |
| Executive Summa | <u>1475408</u> | 34 | 6 | 86 | 271 | 357 | 75.91 % | STA - 13 - Douglasy | Westinghouse | 7002230 | <u>•</u> | <u>•</u> | |
| | <u>72880</u> | 39 | 6 | 82 | 273 | 357 | 76.47 % | TSS - 112 - Helena | Westinghouse | 7001564 | <u>•</u> | <u>•</u> | |
| Emergency Respo | <u>731409</u> | 36 | 6 | 79 | 275 | 357 | 77.03 % | TSS - 144 - Woodst | Westinghouse | 7002227 | <u>•</u> | <u>◆</u> | |
| Current Outages | <u>72881</u> | 36 | 6 | 81 | 276 | 357 | 77.31 % | STA - 23 - Dearing | Westinghouse | 7002033 | <u>•</u> | <u>•</u> | |
| Work Backlog | <u>731410</u> | 36 | 6 | 70 | 276 | 357 | 77.31 % | TSS - 144 - Woodst | Westinghouse | 7002226 | <u>•</u> | <u>•</u> | |
| West Commitments | <u>731413</u> | 35 | 6 | 82 | 276 | 357 | 77.31 % | TSS - 167 - Senoia | General Electric | K547388 | <u>•</u> | <u>•</u> | |
| Work Commitments | <u>731438</u> | 20 | 6 | 62 | 277 | 357 | 77.59 % | TSS - 103 - Odum | ABB | AEM21934 | <u>•</u> | <u>◆</u> | |
| Work Performance | <u>731408</u> | 33 | 6 | 86 | 278 | 357 | 77.87 % | TSS - 167 - Senoia | Westinghouse | 7002527 | <u>•</u> | <u>•</u> | |
| Work Volume | <u>1475432</u> | 20 | 6 | 68 | 279 | 357 | 78.15 % | TSS - 138 - Tennille | Cooper Power Systems | C0717752 | <u>•</u> | <u>•</u> | |
| | <u>1475431</u> | 40 | 4 | 62 | 280 | 357 | 78.43 % | TSS - 138 - Tennille | General Electric | D596508 | <u>•</u> | <u>•</u> | |
| | <u>72874</u> | 36 | 6 | 82 | 280 | 357 | 78.43 % | STA - 23 - Dearing | Westinghouse | 7002032 | <u>•</u> | <u>•</u> | |
| | <u>731424</u> | 35 | 6 | 80 | 280 | 357 | 78.43 % | TSS - 179 - Cedarto | Westinghouse | 7002298 | <u>•</u> | <u>•</u> | |
| | <u>1475423</u> | 40 | 4 | 60 | 281 | 357 | 78.71 % | TSS - 88 - Thomasto | ASEA | 6201218 | <u>•</u> | <u>•</u> | |
| 🖂 Inbox | <u>1475422</u> | 17 | 8 | 86 | 282 | 357 | 78.99 % | TSS - 88 - Thomasto | ABB | AEM31031 | <u>•</u> | <u>•</u> | |
| Powered By | <u>1475409</u> | 34 | 6 | 75 | 283 | 357 | 79.27 % | STA - 13 - Douglasv | General Electric | K547058 | <u>•</u> | <u>•</u> | |
| OBVIENT | <u>731423</u> | 39 | 6 | 80 | 286 | 357 | 80.11 % | TSS - 167 - Senoia | Westinghouse | 7001563 | <u>•</u> | <u>•</u> | |
| STRATEGIES | 72879 | 39 | 6 | 82 | 288 | 357 | 80 67 % | TSS - 112 - Helena I | Westinghouse | 7001562 | _ | | \sim |



Asset Health Center – Asset Class Loading Scorecard

| C Obvient - Windows In | nternet Explo | orer | | | | | | | | | _ D | \mathbf{X} |
|------------------------------------------------------------|----------------|------------------|------------------|------------------------------------|---------------------------------|------------------------------|---------------------------|-------------------------|-----------------------------------|-------------------------------------|---------------------------------------------|-----------------|
| 💽 🗢 🙋 http://wi | nxptemplate2/D | EV606ORA/co | mmon/frm_mo | de_frame.asp> | ?_WI=1011& | _HT=666&m 💊 | / { } | 🛃 Google | | | P | |
| File Edit View Favorite | es Tools He | elp | | | | | | | | | | |
| 🔶 Favorites 🛛 🌈 Obvient | t | | | | | | 🗿 • (| a - 🖃 e | 🚽 🔹 Page 🕇 | - Safety - | Tools 👻 🔞 🗸 | >> |
| Navigation | | | | | | | | | | Click Arroy | v to Show Que | |
| Huvigution | Health Index | x Scorecard | Health Ind | ex Chart | lealth Score | Chart Hea | alth Index Tre | end Loadi | ng Asset | Aae | | |
| fộcalpoint | ▼ (EXL_Pe | akLoad_T] | litle) | | | | | | | 3-1 | | |
| Dashboard AMSHI\Health Index Results Current User | Asset Id | Zero Readings | Good Readings | Number of A, B, C, D Ratings | Number of A, B, C Ratings | Number of A, B Ratings | Number of A Ratings | Load Health Index | Number of Overheating Peaks | Modified Load Health Index | Modified Load Health Index (Eq) | |
| paul.bower | <u>731413</u> | 7 | 52 | 3 | 3 | 3 | 3 | 0.2308 | 27 | 0 | 0 | <u>^</u> |
| Dashboard | <u>731412</u> | 7 | 52 | 3 | 3 | 3 | 3 | 0.2308 | 27 | 0 | 0 | |
| Options 🕨 🕨 | <u>731414</u> | 7 | 52 | 3 | 3 | 3 | 3 | 0.2308 | 27 | 0 | 0 | |
| | <u>731423</u> | 7 | 52 | 4 | 3 | 3 | 3 | 0.25 | 27 | 0 | 0 | |
| Dashboards | 731408 | 7 | 52 | 4 | 3 | 3 | 3 | 0.25 | 27 | 0 | 0 | |
| Europeting Dummer | 731411 | 7 | 52 | 4 | 3 | 3 | 3 | 0.25 | 27 | 0 | 0 | |
| Executive Summa | 72874 | 0 | 59 | 13 | 2 | 1 | 0 | 0.2/12 | 26 | 0 | 0 | |
| Emergency Respo | 72002 | 0 | 59 | 13 | 2 | 1 | 0 | 0.2712 | 20 | 0 | 0 | |
| Current Outages | 2722759 | 50 | 10 | 13 | 2 | 0 | 0 | 0.2712 | 20 | 1 | 1 | |
| Work Backlog | 72875 | 6 | 51 | 34 | - 19 | 5 | 4 | 1.2157 | 4 | 1 | 1 | |
| Work Commitments | 72876 | 6 | 51 | 34 | 19 | 5 | 4 | 1.2157 | 4 | 1 | 1 | |
| Work Communication | 72877 | 6 | 51 | 34 | 19 | 5 | 4 | 1.2157 | 4 | 1 | 1 | |
| Work Performance | 1475409 | 0 | 59 | 51 | 28 | 5 | 0 | 1.4237 | 0 | 1 | 1 | |
| Work Volume | 72878 | 10 | 47 | 34 | 22 | 7 | 4 | 1.4255 | 1 | 1 | 1 | |
| | 72879 | 10 | 47 | 34 | 22 | 7 | 4 | 1.4255 | 1 | 1 | 1 | |
| | <u>72880</u> | 10 | 47 | 34 | 22 | 7 | 4 | 1.4255 | 1 | 1 | 1 | |
| M Inhov | <u>1475408</u> | 0 | 59 | 54 | 33 | 5 | 0 | 1.5593 | 0 | 2 | 2 | |
| | <u>1475415</u> | 9 | 51 | 50 | 28 | 2 | 2 | 1.6078 | 0 | 2 | 2 | |
| OBVIENT | <u>1475429</u> | 0 | 60 | 50 | 32 | 15 | 3 | 1.6667 | 0 | 2 | 2 | |
| STRATEGIES | 731409 | 10 | 50 | 49 | 31 | 9 | 0 | 1.78 | 0 | 2 | 2 | ~ |



Asset Health Center – Asset Class Age Distribution

| Intro://winxptemplate2/DEV606ORA/common/frm_mode_frame.aspx?_WI=10118_HT=6668m Atto://winxptemplate2/DEV606ORA/common/frm_mode_frame.aspx?_WI=10118_HT=6668m Payorites Obvient Page + Safety + Tools + @+ * |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Favorites Obvient Obvient Obvient Obvient Other of the second |
| Navigation Construction Current User Pathboard Options Options Pathboards Current User Pathboards 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 < |
| Health Index Scorecard Health Index Chart Health Score Chart Health Index Trend Loading Asset Age Dashboard Options Image Chart Options Image Chart |
| Executive Summa Emergency Respo Current Outages Work Backlog Work Commitments Work Volume Work Volume Work Volume Prevent By Prevent By Prevent By Work Performance |

Asset Health Center – Asset Class Age Distribution

| C Obvient - Windows I | nternet E | xplore | er | | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------|----------|-----------------|-------------------------------|------------------|-----------------|----------------|-----------------|-----------------|
| 💽 🗢 🙋 http://w | nxptemplat | e2/DEV | 606ORA/comm | on/frm_mode_frame.aspx?_WI=10 |)118_HT=6668m 🔽 | 59 🗙 🚼 | Google | | P - |
| 🚖 Favorites 🏾 🏉 Obvien | t | | | | | 👌 • 🔊 | - 🖃 🖶 | ▼ Page ▼ Safety | • Tools • 🔞 • * |
| Navigation | C EXL_As | setList_ | _forYrType_T - | Windows Internet Explorer | | | | | how Query |
| C OBVIENT | Asset Lis | st by Ma | anufacture Yea | r [AutoTransformer - 1969] | | | | | |
| <i>focal</i> POINT | Drag a co | lumn he | ader here to gr | oup by that column | | | | | |
| Dashboard | Asset Number | Age | Manufactured | Station Name | Manufacturer | Model Number | | Circuit | |
| AMSHI\Health | <u>1475404</u> | 40 | January, 1969 | TSS - 46 - Fairburn | General Electric | N/A | TR 81 | | _ |
| Index Results | <u>731436</u> | 40 | January, 1969 | TSS - 51 - Peachtree City | General Electric | N/A | TR 84 | | |
| Current User | <u>1475431</u> | 40 | January, 1969 | TSS - 138 - Tennille | General Electric | N/A | TR 82 | | |
| paul.bower | <u>1475419</u> | 40 | January, 1969 | TSS - 155 - Rock Spring | General Electric | N/A | TR 84 | | |
| Dashboard | <u>1475416</u> | 40 | January, 1969 | TSS - 156 - Dahlonega | General Electric | N/A | TR 81 | | |
| Ontions | 14/5434 | 40 | January, 1969 | TSS - 172 - Holly Springs | General Electric | N/A | TR 81 | | |
| Options | 1475422 | 40 | June, 1969 | TSS - 76 - Chatsworth | ASEA | N/A | TR 82 | | |
| Dashboards Executive Summa Emergency Respo Current Outages Work Backlog Work Commitments Work Commitments Work Volume | | | | | | | | | |
| Power of By OBVIENT STRATEGIES | Done | | | | | | Local intranet | 🖓 🕶 🍕 100 | % 🔻 ,;; |



Asset Health Center – Parameters & Equations

| C Obvient - Windows In | nternet Explorer | | | | | | | |
|------------------------|------------------------|------------------------------------------------------|-----------------------------|--------------------------------------------|-----------------------------------|--------------------------------------------|--------------------------------------------------|------------------------|
| 💽 🗢 🖻 http://wi | inxptemplate2/DEV606OR | A/common/frm_mode_frame.aspx?width=935&height=5988 🗸 | 🗲 🗙 🚼 Google | e | | | | |
| 🔶 Favorites 🏾 🌈 Obvien | ıt | | 👌 • 🔊 - 🖻 | 1 🖶 🔹 Page 🗸 Safety 🗸 | Tools + 🕢 * | | | |
| Navigation | Constants Factors | and Weights Equations Data Validation | | | | | | |
| COBVIENT | ▼ Parameters | | | | | | | |
| focalpoint | All | ▼Factors & Weights | | | | | | |
| SOLUTIONS | Air Mag Breakers | Asset Type / Measure / Range | | Factor Weight | Score | | | |
| Dashboard | Auto Transformers | AirMagneticBreaker / AIR HYDRO PRESS | (CM) | 1 | <u>^</u> | | | |
| AMSHI\Health | | No CMs | | 4 | 4 | | | |
| Index Parameters | | AIR HYDRO PRESS (CM) is > 0 and <= 1 | | 4 | 4 | | | |
| Current User | | AIR HYDRO PRESS (CM) is > 1 and <= 2 | | 3 | 3 | | | |
| Deabhaard | | AIR HYDRO PRESS (CM) is > 2 and <= 5 | OSIS - Obvient Strat | tegies | | | | 808 |
| Dashboard | | AIR HYDRO PRESS (CM) is > 5 and <= 70 | Elle View Tools Wir | ndow Help | | | | |
| Options 🕨 | | AIR HYDRO PRESS (CM) is > 70 | Cipen Items | | | | | ą |
| | | AirMagneticBreaker / AIR FAK (CM) | 🖗 🔦 <u>"SendEmailWithAt</u> | itachment × | | | | |
| Daebboarde | | No CMs | 8 | | 1000 IC 11 | | | |
| Dashboarus | | AIR LEAK (CM) is > 0 and <= 1 | ** Equation Name: | | ** Business Area: | | | |
| Executive Summa | | AIR LEAK (CM) is > 1 and <= 2 | SendEmailWithAttach | hment | General Data | × | | |
| Emergency Respo | | AIR I EAK (CM) is > 2 and ≤ 5 | Description: | | | | | |
| Current Outeren | | AIR LEAK (CM) is > 5 and <= 70 | Send an email wit an | attachment | | | | |
| Current Outages | | | Operators Other | < > | | | | Add Parameter |
| Work Backlog | | AirMagnotioProcker / ALAPM REPAID (CI | | System.Net.Mail.Sr | mtpClientIC:\WINDOWS\Mic | rosoft.NET\Framework\v2.0.50727\Svstem.dll | | Allashment |
| Work Commitments | | Airmagneucbreaker / ALARM REPAIR (CI | – | mail obvi | • | | | Attachment |
| West Destances | | | Xua | mail.obvient.com | Object 🖆 System. | Net.Mail.SmtpClient | Execute System.Net.Mail.SmtpClient | Value: |
| work Performance | | ALARM REPAIR (CM) is > 0 and <= 1 | a a | null | | Send Function | Send Function | FortYargo-sitemap.pdf |
| Work Volume | | ALARM REPAIR (CM) is > 1 and <= 2 | | robert be | ray 🔹 System.Obje | ct[] Send | | Add at Click Point |
| | | ALARM REPAIR (CM) is > 2 and <= 5 | X | robert.henry@obvi | ent com | _ | | = |
| | | ALARM REPAIR (CM) is > 5 and <= 70 | x | Ar | ray 🗐 System.Obje | Ct[] System:Net:Mail:MailMessage C:\WIND(| WS Microsoft.NET\Framework\v2.0.50727\System.dll | Show Values |
| | | ALARM REPAIR (CM) is > 70 | a a | 2 To robert.h | enry@obvient.com | - \ | | System.Net.Mail.Smtp |
| | | AirMagneticBreaker / ARC EX COMP (CM | | | ray 🔞 💿 dan okin | | | Get Value |
| 🖂 Inbox | | No CMs | ο Σ - | Subject This test | s reflection from an equation | Object System.Net.Mail.Ma | ilMessage | E |
| Poweral By | | ARC EX COMP (CM) is > 0 and <= 1 | | | | | | W 930 @ |
| OBVIENT | | ARC EX COMP (CM) is > 1 and <= 2 | Acos | Body | ray 🔄 System Objer | ct[] Execute Syste | em.Net.Mail.AttachmentCollection | |
| STRATEGIES | | | Asin () | 1115 0114 | Ge | etter 🕙 Get Property Attachments | | H 580 💭 |
| | | | Atan () | | Attachme | chments | True | Clear Equation |
| | | | | | | Fx | ecute | |
| | | | Centre | System. | | | | |
| | | | Cos () | System.Net.Mail.At | tachment C:\WINDOWS\Mid | crosoft.NET\Framework\v2.U.SU727\System.dl | | |
| | | | Cosh () | | oject 🗿 | Lail Attachment | | |
| | | | David C | Attachment | · · · · · · · · · · · · | Function | dd Function | |
| | | | Literat 0 | d:\obvie | int\FortYargo-sitemap.pdf | | | |
| | | | Add at Click Poin | int | | | | |
| | | | 🖂 Messages 📸 Em | rors | | | | |
| | | | C Database Connection: (| Open [FP6:OBVIENT] - Browsing: "SendEmaily | WithAttachment - Editing: *SendEr | maïWithAttachment | Au | ag-26-2009 12:05:17 PM |
| | | | | | | | | |



Asset Health Center – Functional Expansion

| | Inputs: Outputs: | Inspection Data, Loading Data, Nameplate Data, History of Work Design Information, Actions to Take, Performance Model Individual Asset Health Status, System Health Status, Alarm Notification Individual Asset Health Trends, System Health Trends Action(s) to Take |
|---------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| | | Generated Work Orders – Inspection, PM, CM |
| | | |
| DC | | |
| Perform | iance Mode | el Analysis - Measure Algorithms |
| Perform Inputs: | nance Mode Inspection D | el Analysis - Measure Algorithms Data, Loading Data, Nameplate Data, History of Work |
| Perform Inputs: | iance Mode Inspection D Design Infor | el Analysis - Measure Algorithms Data, Loading Data, Nameplate Data, History of Work Imation, Actions to Take, Performance Model |
| Perform Inputs: Outputs: | Inspection D Design Infor Individual As | el Analysis - Measure Algorithms Data, Loading Data, Nameplate Data, History of Work Imation, Actions to Take, Performance Model sset Health Status, System Health Status, Alarm Notification |
| Perform Inputs: Outputs: | Inspection D Inspection D Design Infor Individual As Individual As | el Analysis - Measure Algorithms Data, Loading Data, Nameplate Data, History of Work Imation, Actions to Take, Performance Model sset Health Status, System Health Status, Alarm Notification sset Health Trends, System Health Trends |
| Perform Inputs: Outputs: | Inspection D Design Infor Individual As Individual As Action(s) to | el Analysis - Measure Algorithms Data, Loading Data, Nameplate Data, History of Work Imation, Actions to Take, Performance Model sset Health Status, System Health Status, Alarm Notification sset Health Trends, System Health Trends Take |
| Perform Inputs: Outputs: | Inspection D Design Infor Individual As Individual As Action(s) to | el Analysis - Measure Algorithms Data, Loading Data, Nameplate Data, History of Work Imation, Actions to Take, Performance Model sset Health Status, System Health Status, Alarm Notification sset Health Trends, System Health Trends Take |
| Perform Inputs: Outputs: | Inspection D Design Infor Individual As Individual As Action(s) to | el Analysis - Measure Algorithms Data, Loading Data, Nameplate Data, History of Work Immation, Actions to Take, Performance Model sset Health Status, System Health Status, Alarm Notification sset Health Trends, System Health Trends Take |
| Perform Inputs: Outputs: •t Measur | Inspection D Design Infor Individual As Individual As Action(s) to | el Analysis - Measure Algorithms Data, Loading Data, Nameplate Data, History of Work Imation, Actions to Take, Performance Model sset Health Status, System Health Status, Alarm Notification sset Health Trends, System Health Trends Take e Asset Health – Factors, Weights & Trending |

Individual Asset Health Trends, System Health Trends

Discreet Measure Analysis – Factors & Weights

Inputs:Inspection Data, Loading Data, Nameplate Data, History of WorkOutputs:Individual Asset Health Status, System Health Status, Alarm Notification



Overall Asset Health Center Vision



March 11, 2011 | Slide 31



Asset Health Center

- We believe that the convergence of domain expertise and system integration can be a great step forward in quantifying risk and optimizing spending plans
- Early identification of incipient failures can avoid unexpected and costly outages
- We are working closely with utilities to define their requirements for the system
- Product risk algorithms are already well developed, and more are in process
- Ventyx's Obvient FocalPoint software platform is already applied at many utilities, and seems well suited for visualization and as a dashboard
- Target for pilot application late 2010



Power and productivity for a better world[™]

