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OMS/DMS Implementation at SDG&E

Vic Romero

Director – Asset Management & Smart Grid Projects

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Outage and Distribution Management System (OMS/DMS)

Replace existing OMS and install new DMS system with integrations to GIS, CIS, AMI, SCADA, Crew Dispatching ...

WENT LIVE SEPTEMBER 29, 2012!

Present PAST



- ▶ Paperwork
- ▶ Manual processes
- ▶ Software systems are not fully integrated
- ▶ Most Unplanned outages are reported by customers

Future NOW



- ▶ Near real time data
- ▶ Automated process
- ▶ Integration with many systems
- ▶ Faster outage restoration times
- ▶ Improved outage communications

Integrated OMS/DMS – Key Benefits Today

- ▶ Reduce outage time through integration with Smart Meter technology, SCADA, and customer calls with GIS based model
- ▶ Reduce outage time by improving utilization of response personnel
- ▶ Improve efficiency of planned switching process by taking advantage of mobile terminals in the field and automated generation and testing of switching plans
- ▶ Improve real time reporting of current outages for customers and management personnel
- ▶ Improve the management of resources during major events to more quickly restore service to customers and better predict and communicate restoration times

OMS/DMS: Project Scope

▶ ***Unplanned Outages***

- Implement Oracle Network Mgmt System (NMS)
- Integrate AMI & SCADA & Customer Calls for outage detection and prediction of interrupting device
- Utilize GIS ESRI model into NMS model
- Use NMS for restoration steps including SCADA operations
- Use PING function to confirm outage status

▶ ***Distribution Management***

- Use Real Time As-Switched Model of Distribution System

▶ ***Major Events-Storm Module***

- Aggregate Assessment and Repair Status for All Outages
- Estimate Overall Restoration Time and What-If Scenarios

OMS/DMS: Project Scope - continued

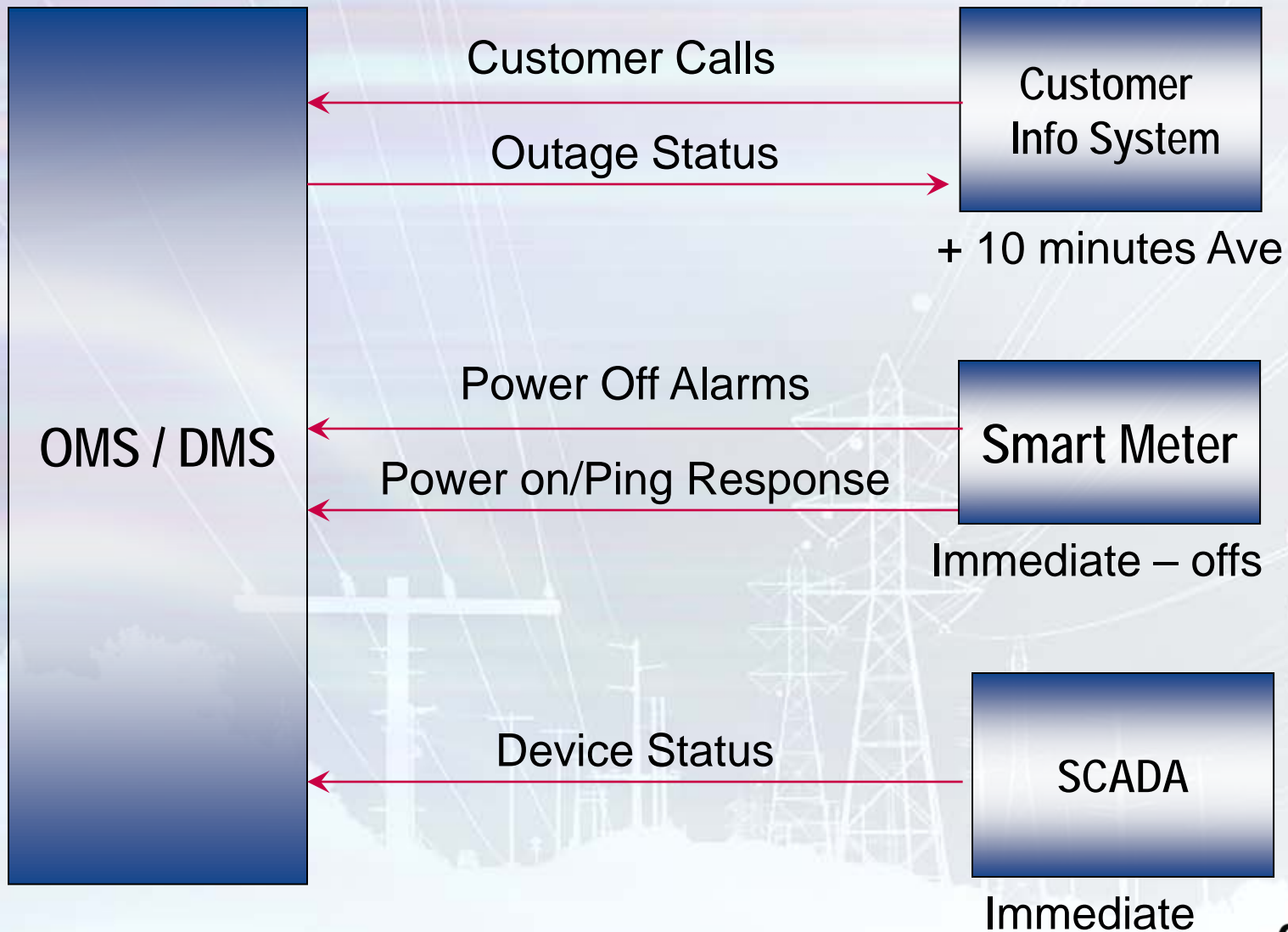
▶ **Planned Switching**

- Simplify Field Requests for scheduled work switching
- Facilitate communication with customers for planned outages

▶ **Outage Communications**

- Implement Obvient's focalPoint
- Provide real time stats on current outages – customers impacted and ETR status
- Provide primary & secondary outage whiteboards
- Provide status of repair jobs during storms
- Provide outage maps
- ... and many more

Outage Prediction Integrations



OMS/DMS Smart Grid Inputs

▶ **Smart Meter/AMI**

- Historical Transformer Load Profiles to support power flow calculations
- Power Off Alarms – to detect outages
- Power On Alarms – to verify restoration
- Status Pings – to verify outage predictions and restoration

▶ **Substation Equipment Real Time Information**

- Dynamic ratings for substation transformers
- Substation Alarms and Analog (e.g. oil temperature) Information

▶ **SCADA**

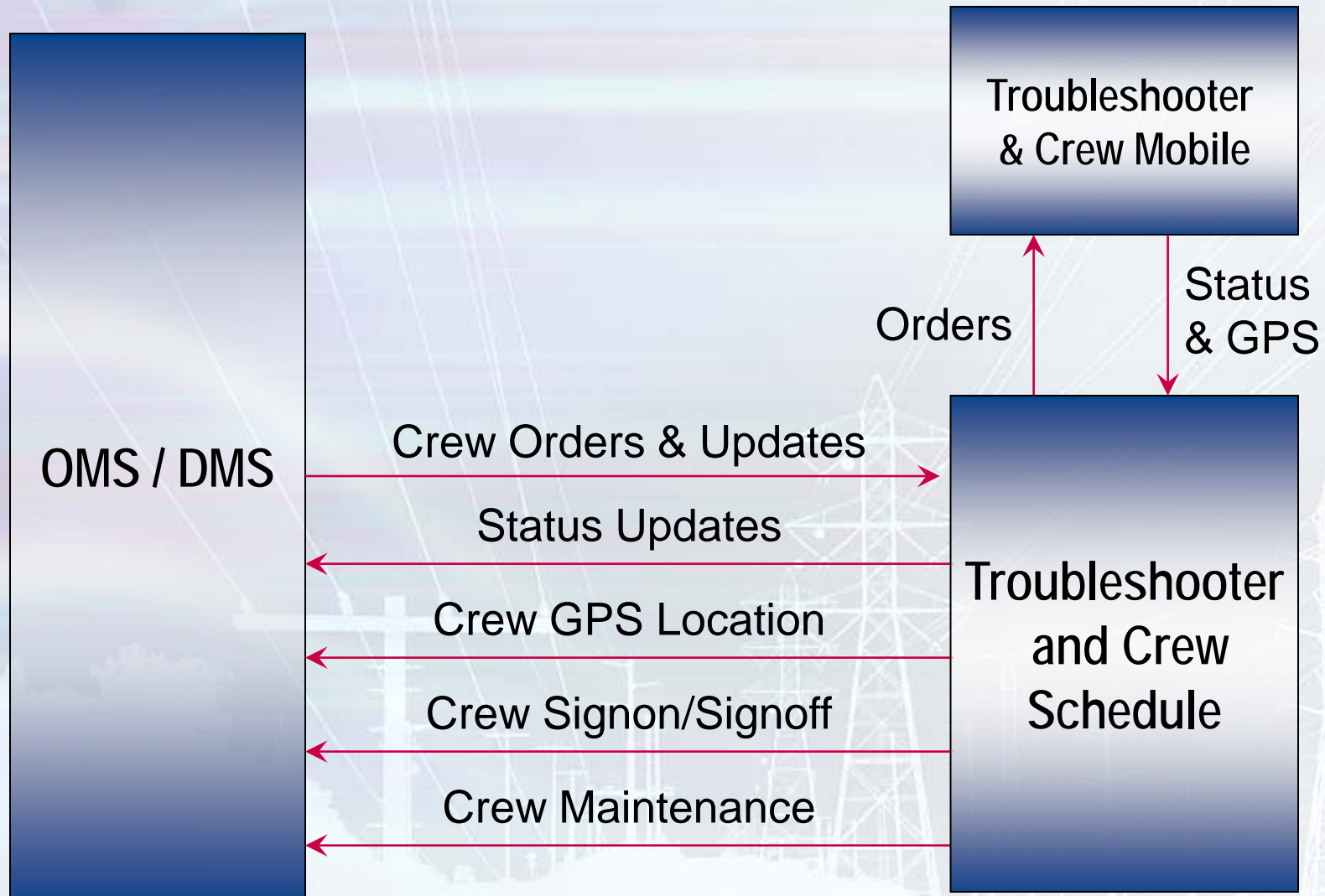
- Device Status (Open/Close)
- Alarms and Analog (e.g. load and voltage) Information
- Fault Indication and Fault current

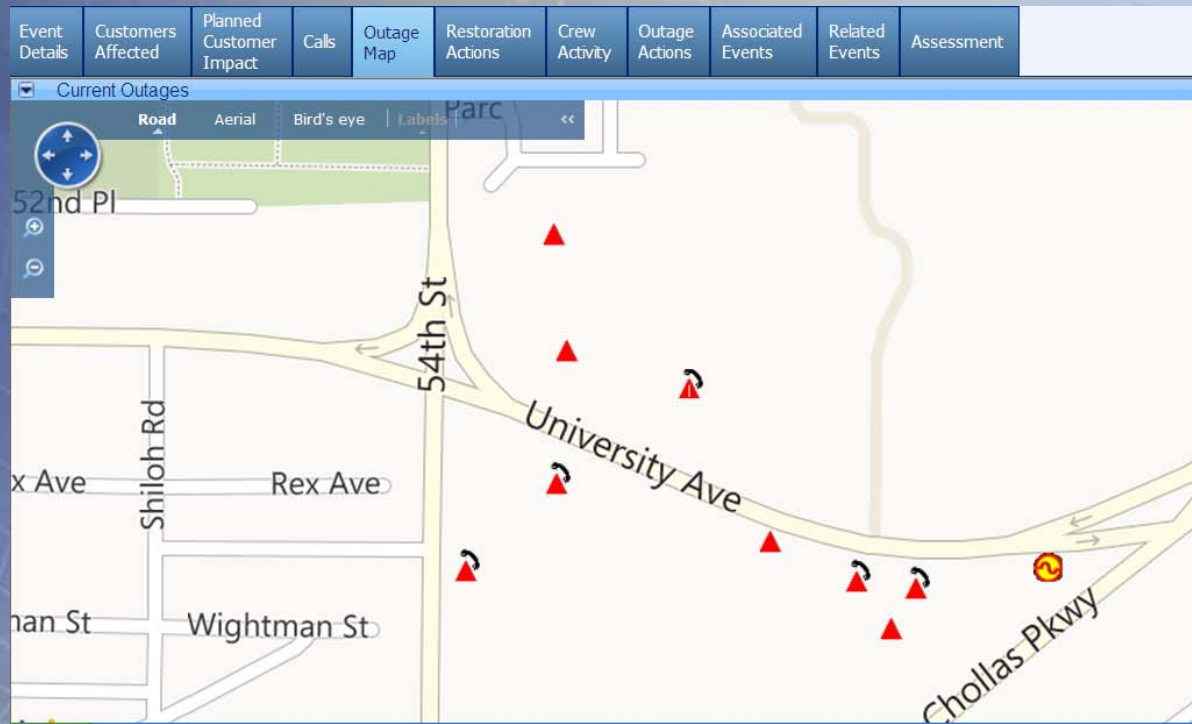
▶ **Wireless Fault Indicators**

Positive Effects of AMI

- ▶ Fuse Outages are predicted earlier
 - 10 minutes 1st call, 25 minutes same prediction
- ▶ Service Connection problems have been identified and resolved

Mobile Integrations



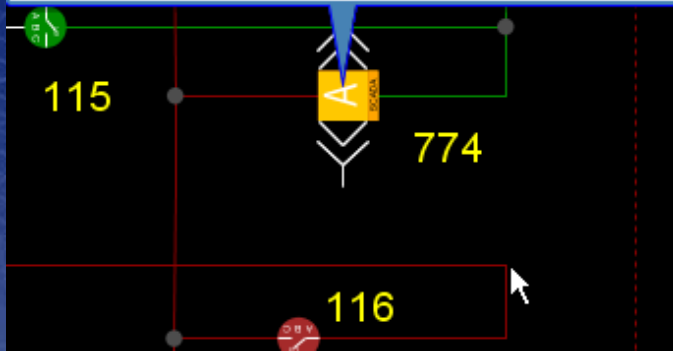


- ▶ Road and Aerial Views of Outage Area
- ▶ Location of outage device and distribution transformers
- ▶ Indication of where calls have been received

MSH-12KV-774

Device Info SCADA Power Flow Results Fault Details

Attribute	Value	Quality	Source
Phase C Current (A)	147.00		
Phase B Current (A)	145.80		
Phase A Current (A)	144.60		
Reactive Power (MVAR)	1.19		
MW_3 Phase	2.80		
Topology Status	Closed		



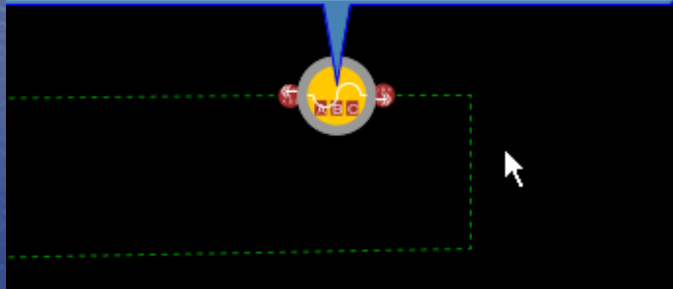
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Device Info SCADA Power Flow Results Fault Details

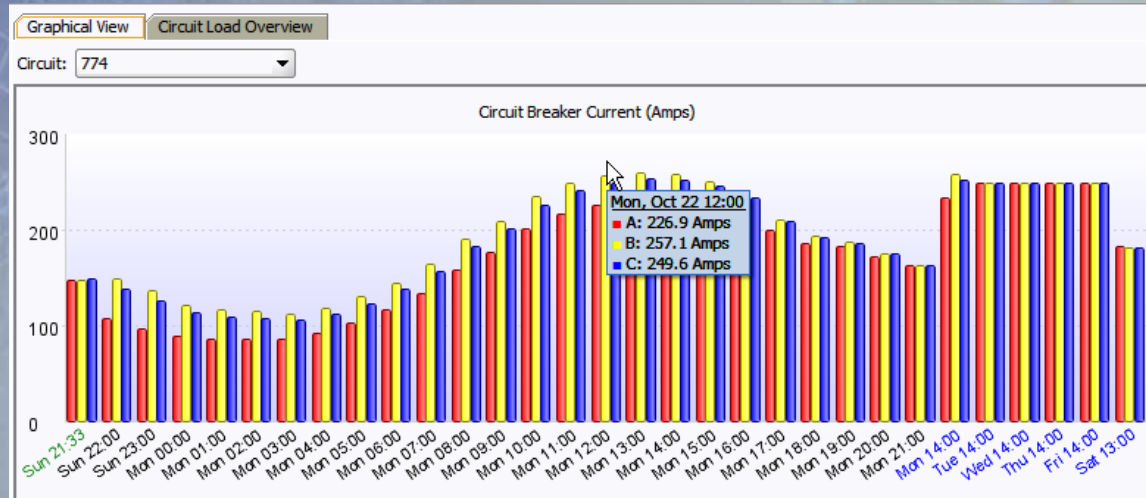
Nominal Base Voltage

Phase	kV	kW	kVAr	Amps	Limit
A	6.95	25	15	4	150 A
B	6.9	34	16	6	150 A
C	6.99	37	17	6	150 A

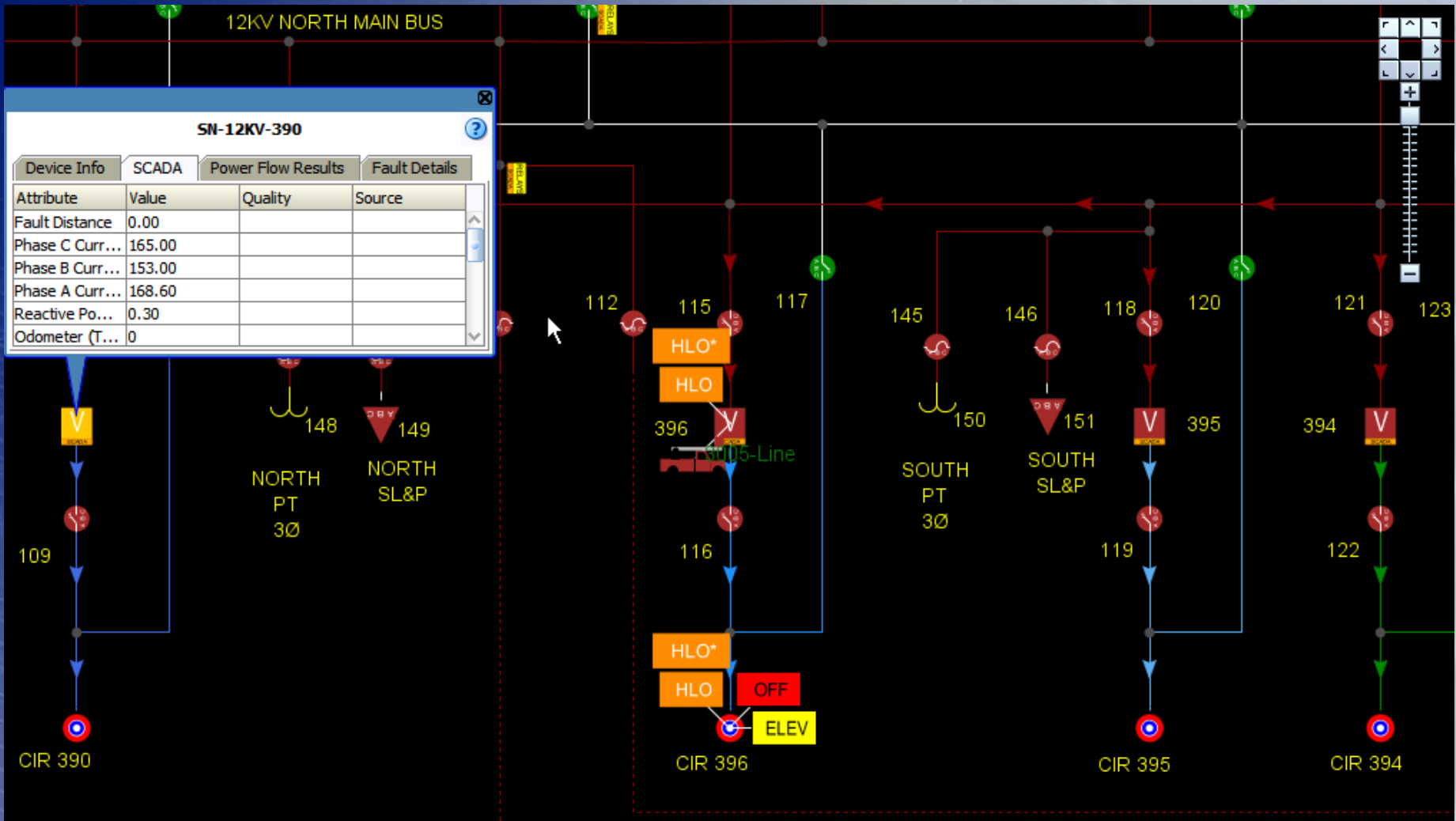
Power Flow Solved 10/21/12 20:48



- ▶ Integrated with SCADA for real time analog and status information.
- ▶ Distribution feeder power flow forecast calculated using real time SCADA reads and transformer profiles built from historical AMI data



- ▶ Power flow calculated for distribution devices and compared against rated capacity.



Real Time view of Substation with breaker status, reclosing status and SCADA measured currents.

OMS/DMS Smart Grid Applications

Future Capabilities

- ▶ Use power flow calculations and real time modeling for unplanned and planned outages
- ▶ Self Healing grid – automatically detect outage, determine fault location and switch to isolate fault and restore customers - FLISR
- ▶ Load Balancing – determine overloaded circuits, provide switch plans to balance load and execute switching to balance load
- ▶ Volt/Var Control – determine out of tolerance volt/var conditions, provide recommended settings for LTC/Voltage Regulators and Capacitors
- ▶ Fault locating analysis using circuit model and fault currents
- ▶ Automation of reliability reporting to accurately calculate the scope and duration of outages

Current Information for Circuit:

► Load Details for all SCADA devices

Circuit 391 at Wed, Oct 24 09:48 (Calculated on Wed, Oct 24 09:48)

Violations (0) Tie Points (5) Transformers (1) Capacitors (1) Equivalent Sources (2) **Load Details (6)**

SCADA Measurements

Device	Amps A	Amps B	Amps C	kW A	kW B	kW C	kVar A	kVar B	kVar C	kV A
309-T1-391	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
391-399	58	59	50	103	103	103	-421	-421	-421	N/A
391-400F	25	31	24	185	185	185	N/A	N/A	N/A	N/A
391-401	N/A	1	0	N/A	N/A	N/A	N/A	N/A	N/A	N/A
391-402	70	76	61	-318	-318	-318	406	406	406	N/A
SN-12KV-391	121	137	108	828	828	828	-224	-224	-224	N/A

► Tie Point load and capacity

Violations (0) Tie Points (5) Transformers (1) Capacitors (1) Equivalent Sources (2) Load Details (6)

Tie Point	To Circuit	To Substation	To Circuit Amps A	To Circuit Amps B	To Circuit Amps C	Tie Point Capacity Amp...	Tie Point Capacity Amps B	Tie Point Capacity Amps C
281-T1-391	281	CARLTON HILLS	103	103	104	479	479	478
282-T1-391	282	CARLTON HILLS	192	191	191	393	393	392
282-T2-391	282	CARLTON HILLS	192	191	191	393	393	392
309-T1-391	309	CARLTON HILLS	108	110	108	475	472	474
391-T1-394	394	SANTEE	229	230	226	354	353	358



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Thank You