

CPS Energy of San Antonio

Power Generation Dashboard/Reporting Process

08/01/13

Power Generation is the Energy Supply (Power Plant) division of CPS Energy of San Antonio, the largest municipally owned energy company in the nation providing both gas and electricity. Our responsibility at Power Gen is to maintain and overhaul the active generating units which daily provides over 6000 megawatts of available power to the city and surrounding areas.

Process changes and demands brought the need to provide our maintenance, operations, planning and management personnel with real time reporting and dashboards to monitor daily maintenance and outage activities. To minimize required user input and produce live, auto-refreshing dashboards, we found that “Visual Cut” by Millet Software provided a simple and extremely flexible process for exporting basic Crystal Reports into html format which can be scheduled to refresh on a recurring basis.

All of the reports, dashboards and web pages referred to in this document have been developed using Crystal Reports running against data sources ranging from standard Excel worksheets to Access, SQL and SAP relational data sources including real time Plant Information data sources. Each report is set up and scheduled on a local server and utilizing Visual Cut, is exported into a formatted document for web based viewing using a standard web browser. In addition to HTML formats, PDF documents with bookmarks and indexes, Excel worksheets with multiple tabs and emailed report results are accomplished using this same application.

The standard processing for a typical dashboard page is to create a scheduled batch file to initiate the process of running the report via Visual Cut, exporting it to the appropriate format and delivering the content to the shared file server location. Auto refreshing web pages are set up using frames with embedded code to refresh the page every “n” seconds which will automatically display the latest published content within those frames.

Most of these reports contain information for all end users, however there are some which contain sensitive information. Security to sensitive data is handled through server based shares and groups in accordance with standard company policies and procedures thus limiting access to only the screens necessary based on the users logon.

We, along with extensive help from Ido Millet of Millet Software, have developed the following dashboards to aid our users in monitoring daily progress and evaluating outstanding issues. These are only a few of the solutions here at Power Gen and we look forward to utilizing these capabilities to further enhance our productivity and effectiveness in Energy Supply. The following are some examples of the solutions currently available.

Dynamic Index Page:

The GencoWeb page is the entry point for our web distribution solution. This page refreshes each 15 minutes and is compiled by a series of subreports running against shared folders/files which contain the content published for the end users. As new pages, reports, dashboards are removed, added or updated the content on this page dynamically changes to provide access to the latest results. The scheduled refresh eliminates the need for manually updating the page and provides real time links to the users.

GencoWeb		CPS Energy	
		Powered by Genco Crystal Reports + Visual Cut	
WEBPAGES	DASHBOARDS	REPORTS	PLANT REPORTS
Business Objects InfoView Confined Space Procedures Contractor Activity Hours ED Contract List Environmental Genco Business Admin Genco Metrics Genco SharePoint Portal Loto Procedure Outage Schedule PDOC Archives Productivity Reports PwrGen Business Case App Spruce Operations Time Validation WORMS	Contract Activity Estimates Contract LatestEstimates Contract Safety Metrics CY Inspection Summary DataSystemDashboard Employee Communications GenProfits Dashboard GenStats Dashboard GenStats PL Dashboard Incidents(Trips-Derates-Spills) Mobile Dashboards Notification Log SAP-SQL Processing Water Chemistry Analysis Water Chemistry Readings PLANT Craft Resource Loading JKS Planning Dashboard OWSJTD Planning Dashboard RNPP Planning Dashboard VHBAVR Planning Dashboard WBTLCP Planning Dashboard OVERHAUL OH Planners Dashboard Overhaul Links	Genco Personnel List Genco Phone Directory On-Demand Reports NERC CCB Review Sheet Plant Call In List PM Plan Summary Power Generation Flashlights Power Generation Monthly Reports Spare Parts Inventory PLANNING SHEETS CONTR Maint Planning Sheets CY Maint Planning Sheets ENGR Maint Planning Sheets IT Maint Planning Sheets JKS Maint Planning Sheets LCPP Maint Planning Sheets MISC Maint Planning Sheets NDE Maint Planning Sheets OWSJTD Maint Planning Sheets PDM Maint Planning Sheets RNPP Maint Planning Sheets RR Maint Planning Sheets VHBAVR Maint Planning Sheets OVERHAUL OH C114 Outq Dev Plan Sheets OH C114 Pre-Outage Eng Rpt OH C314 Outq Dev Plan Sheets OH C314 Pre-Outage Eng Rpt OH J213 Outq Dev Plan Sheets OH J213 Pre-Outage Eng Rpt	JKS-RR JKS Compl Notif-Order Summary JKS Maint KPI Report JKS Weekly Scheduled Activites JKS-RR Notification Report CY CY Compl Notif-Order Summary CY Maint KPI Report CY Notification Report CY Weeklv Scheduled Activites OWS-JTD OWS-JTD Compl Notif-Order Summary OWS-JTD Maint KPI Report OWS-JTD Notification Report OWS-JTD Urgent Activity Monitoring OWS-JTD Weekly Scheduled Activites VHB-AVR VHB-AVR Notification Report LCP-WBT LCPP-WBT Notification Report

Multi Tabbed Data Sheets:

Using Visual Cuts multi tabbed export functionality we provide the end users with Excel based workbooks for daily maintenance and planning with activities grouped by Craft and Location. This option provides mass amounts of data to the field personnel within a familiar format and easy access to their specific information. These reports refresh hourly and the most recent link is available to the users via the GencoWeb page.

MAINTENANCE PLANNING SHEETS

Planning Sheets are used to update orders using Microsoft Excel.
Sheets update Mon

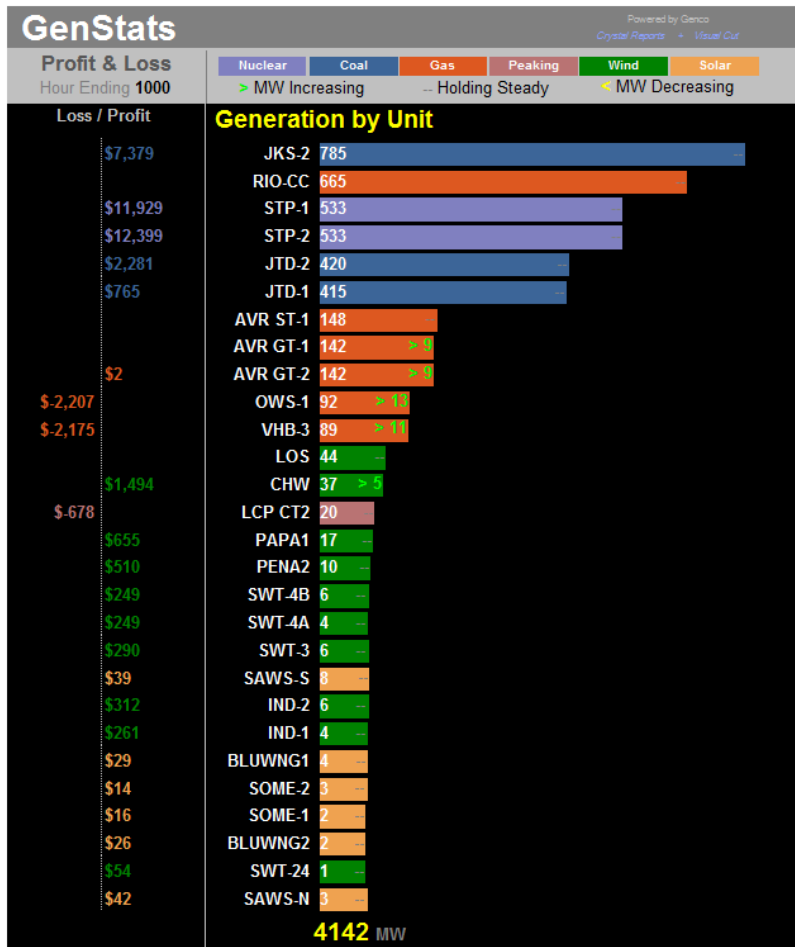
- ◆ Locate respective
- ◆ Return Planning Sh

...	3
...	6
...NG RSCH	5
...	2
...CTR BRKR	5
...LY INSP	8
...GHOUSE TO INSP	40
...OUTH OF SCR	16
...ECLAIM SYS PRESS CTRL	2
...C RETURN TROUGH DRAIN VLV	10
...SH CONVY AIR LINE B SIDE	3
...NG CNTRL CABNTS EXTND	40
...EPACK CRH LS 005 ISOL VALVE	4
...RMV/INSOL 1A MAIN STEAM VENT BLK VLV	2
...RPL/INSOL 1A MAIN STEAM VENT BLK VLV	4
...BLK BUILD SCAF. 1A MAIN STEAM VENT BLK VLV	4
...IN BLK RMV SCAF. 1A MAIN STEAM VENT BLK VLV	4
...ER PIPING \ BUILD SCAFFOLD LP FEED WTR PIPG	5
...LOWDN SEPAR. RMV INSLTN INTERMITTANT BLOCK IS	0
...LOWDN SEPAR. RPL INSLTN INTERMITTANT BLOCK IS	0
...MAINTENANCE WAREHS MAINTENANCE FOR GMS WAREHOUSE	0
...SER WTR VLV 153 PIPES NEED TO BE INSULATED	0
...BOILER AREA EXHAUST JKS1 REMOVE OLD/INSTALL NEW VENT FAN-009	20
...#9 BOILER AREA EXHAUST JKS1 INSTALL ACCCESS PLATFORM TO FAN	10
...#10 BOILER AREA EXHAUST JKS1 REMOVE OLD/INSTALL NEW VENT FAN-009	20

COVER / GCP7 / GMS / I&C / I&E / L7 / LE7 / MACH / OS7 / P7 / PAG / PYA / U7 / UMS7 / WELD

Auto Refreshing Dashboard:

Refreshing each 2 minutes this dashboard provides real time monitoring of the units which are currently running, their output in MW and Profit/Loss status based on market prices and current rates. Content is derived from the PI (Plant Information) System and unit links provide current and historical trends for each unit for the past 30 days. This particular page can also be accessed with a Blackberry or iPhone when necessary providing a complete mobile solution to information distribution.

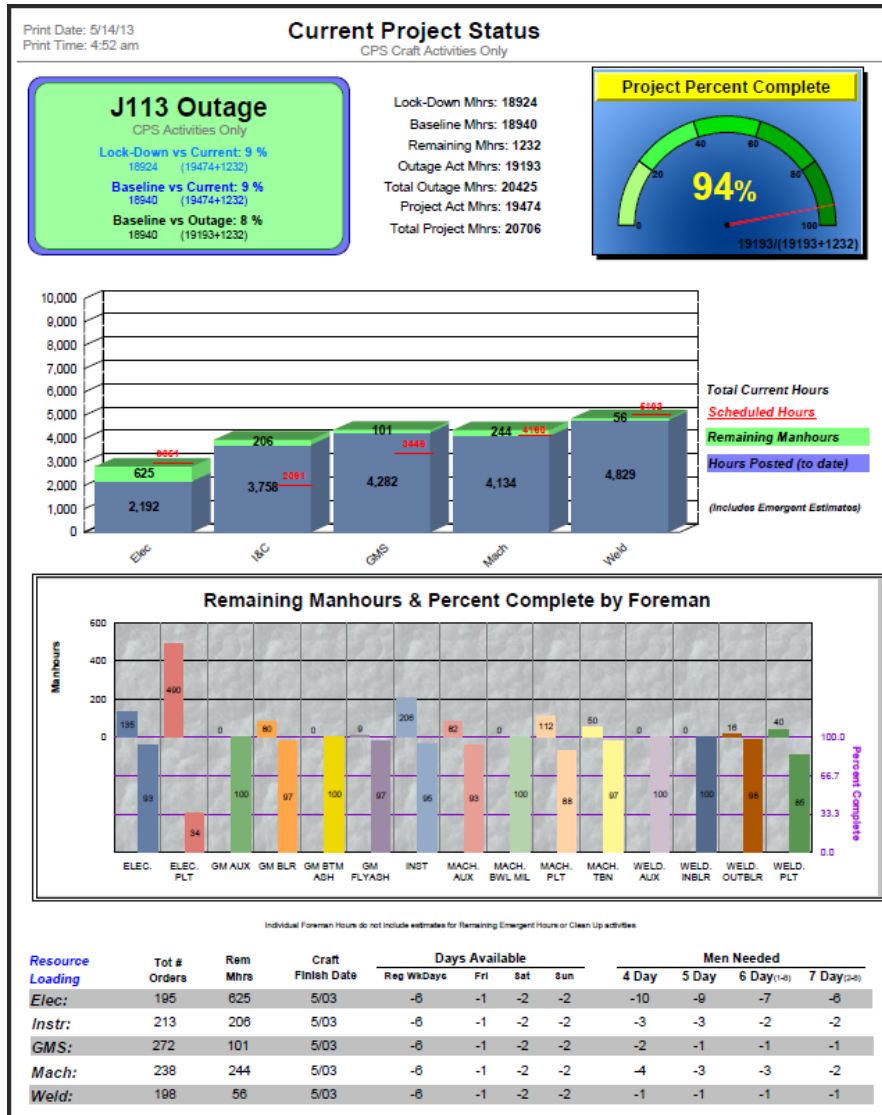


Project Status Dashboard:

Refreshes each 5 minutes and shows an overview if the current overhaul status including progress by each craft, thresholds, targets and overall project percent complete.

Also included is a Notification Log displaying only those requests which are specific to overhaul projects.

The Project Schedulers monitor this dashboard to track progress, identify critical activities and process outstanding overhaul notifications.



Project Calendar:

Refreshes nightly and provides an overview of the overhaul major milestones in calendar format. The project calendar is compiled by the Outage Schedulers and activities are color coded by project and struck through as completed based on updates to the underlying database by the Outage Coordinator.

Outage personnel use this calendar to keep up to date with upcoming and completed milestones during outages/shutdowns.

Run Date: 5/13/2013 2:55:20PM

J113 Overhaul Calendar

New Activities
 Changed Activities
 Outage Days Remaining
 Outage Milestone

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
17	18	19	20	21	22	23
24	25	26	27	28	29	30
31	1 April	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	1 May	2	3	4
5	6	7	8	9	10	11

The table contains a grid of activities for each day, color-coded by project and marked as completed. The activities listed include:

- 0100 Main Engine Overhaul
- 0200 Main Engine Overhaul
- 0300 Main Engine Overhaul
- 0400 Main Engine Overhaul
- 0500 Main Engine Overhaul
- 0600 Main Engine Overhaul
- 0700 Main Engine Overhaul
- 0800 Main Engine Overhaul
- 0900 Main Engine Overhaul
- 1000 Main Engine Overhaul
- 1100 Main Engine Overhaul
- 1200 Main Engine Overhaul
- 1300 Main Engine Overhaul
- 1400 Main Engine Overhaul
- 1500 Main Engine Overhaul
- 1600 Main Engine Overhaul
- 1700 Main Engine Overhaul
- 1800 Main Engine Overhaul
- 1900 Main Engine Overhaul
- 2000 Main Engine Overhaul
- 2100 Main Engine Overhaul
- 2200 Main Engine Overhaul
- 2300 Main Engine Overhaul
- 2400 Main Engine Overhaul
- 2500 Main Engine Overhaul
- 2600 Main Engine Overhaul
- 2700 Main Engine Overhaul
- 2800 Main Engine Overhaul
- 2900 Main Engine Overhaul
- 3000 Main Engine Overhaul
- 3100 Main Engine Overhaul
- 3200 Main Engine Overhaul
- 3300 Main Engine Overhaul
- 3400 Main Engine Overhaul
- 3500 Main Engine Overhaul
- 3600 Main Engine Overhaul
- 3700 Main Engine Overhaul
- 3800 Main Engine Overhaul
- 3900 Main Engine Overhaul
- 4000 Main Engine Overhaul
- 4100 Main Engine Overhaul
- 4200 Main Engine Overhaul
- 4300 Main Engine Overhaul
- 4400 Main Engine Overhaul
- 4500 Main Engine Overhaul
- 4600 Main Engine Overhaul
- 4700 Main Engine Overhaul
- 4800 Main Engine Overhaul
- 4900 Main Engine Overhaul
- 5000 Main Engine Overhaul
- 5100 Main Engine Overhaul
- 5200 Main Engine Overhaul
- 5300 Main Engine Overhaul
- 5400 Main Engine Overhaul
- 5500 Main Engine Overhaul
- 5600 Main Engine Overhaul
- 5700 Main Engine Overhaul
- 5800 Main Engine Overhaul
- 5900 Main Engine Overhaul
- 6000 Main Engine Overhaul
- 6100 Main Engine Overhaul
- 6200 Main Engine Overhaul
- 6300 Main Engine Overhaul
- 6400 Main Engine Overhaul
- 6500 Main Engine Overhaul
- 6600 Main Engine Overhaul
- 6700 Main Engine Overhaul
- 6800 Main Engine Overhaul
- 6900 Main Engine Overhaul
- 7000 Main Engine Overhaul
- 7100 Main Engine Overhaul
- 7200 Main Engine Overhaul
- 7300 Main Engine Overhaul
- 7400 Main Engine Overhaul
- 7500 Main Engine Overhaul
- 7600 Main Engine Overhaul
- 7700 Main Engine Overhaul
- 7800 Main Engine Overhaul
- 7900 Main Engine Overhaul
- 8000 Main Engine Overhaul
- 8100 Main Engine Overhaul
- 8200 Main Engine Overhaul
- 8300 Main Engine Overhaul
- 8400 Main Engine Overhaul
- 8500 Main Engine Overhaul
- 8600 Main Engine Overhaul
- 8700 Main Engine Overhaul
- 8800 Main Engine Overhaul
- 8900 Main Engine Overhaul
- 9000 Main Engine Overhaul
- 9100 Main Engine Overhaul
- 9200 Main Engine Overhaul
- 9300 Main Engine Overhaul
- 9400 Main Engine Overhaul
- 9500 Main Engine Overhaul
- 9600 Main Engine Overhaul
- 9700 Main Engine Overhaul
- 9800 Main Engine Overhaul
- 9900 Main Engine Overhaul
- 10000 Main Engine Overhaul

Merged Reports:

Each month the staff of the different departments are required to compile a monthly summary of their areas activities for inclusion into a Power Gen Monthly Report. This process has been simplified by allowing the users to drop content into specified shared folders and at a scheduled time the monthly report is automatically generated by merging all the individual files and distributed via a shared link on the GencoWeb page. The resulting document is grouped and bookmarked based on the shared folders and files provided by the staff throughout the month providing a consistent format that's easy to follow.

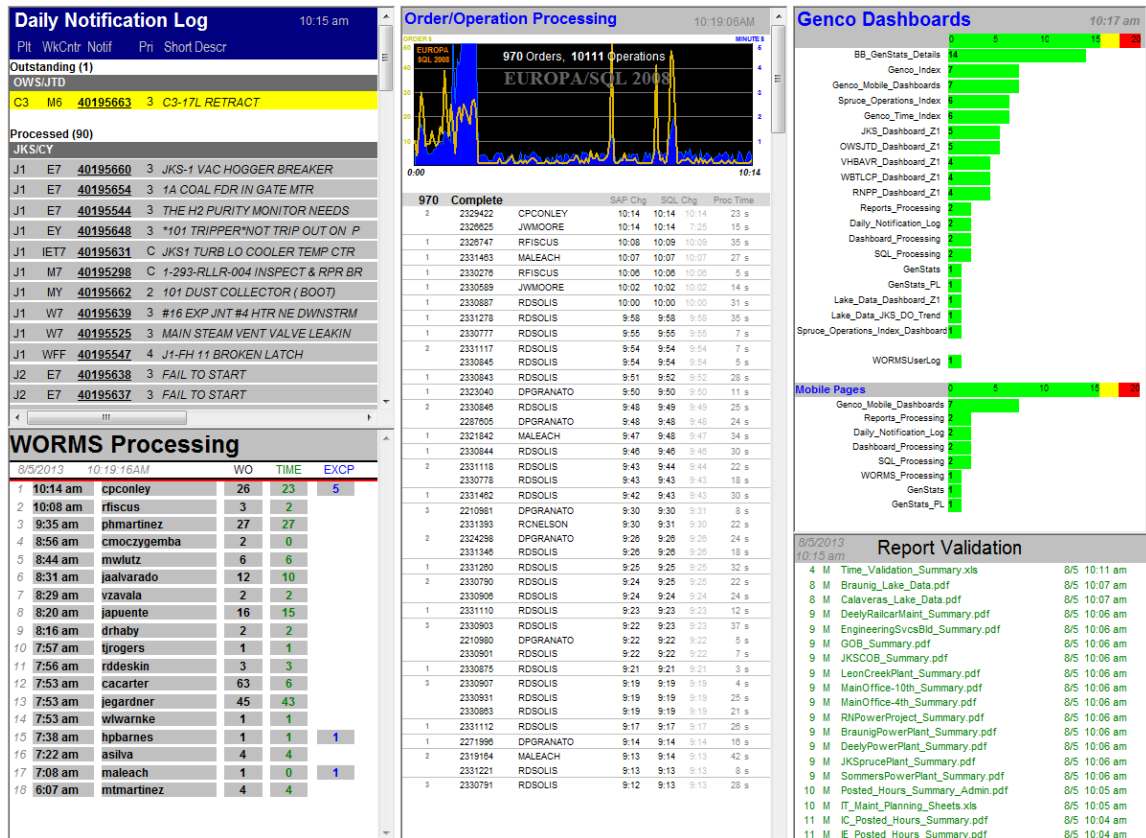
The image displays a web application interface. On the left, a 'Bookmarks' sidebar lists a hierarchical structure under the heading 'POWER GENERATION'. The items listed are:

- Index
- Safety
 - Injuries Dashboard
- Environmental
 - Cal CO2
 - Cal CO
 - Cal NOX
 - Cal SO2
 - VHB-AVR CO2
 - VHB-AVR NOX
 - VHB-CGT CO2
 - VHB-CGT CO
 - VHB2+CGT NOX
- Outage/Derates
 - Outage/Derate Summary
 - Outage/Derate Details
- Unit Operation/Notes
 - Unit Operation Summary
 - Plant Managers Notes/Highlights
- Water Lab
 - Monthly Report
- Eng Tech Svcs
 - Monthly Report
- Asset Management
 - Monthly Report
- Coal Yard
 - Monthly Report
- Training
 - Monthly Report
 - June_2013
 - 2013_June_Stats
 - PGTrng_June2013

On the right, a report cover page is shown with the title 'Power Generation' and subtitle 'Monthly Report'. Below the title are three images of power stations: a large aerial view of the Calaveras Power Station, a smaller view of the Braunig Power Station, and another view of the Leon Creek Power Station.

Data Systems Dashboard:

Refreshes each 2 minutes and shows an overview of the current status of data processing through the Power Gen data system servers. This page is used to monitor the processing time of Visual Cut, time to process Work Order changes from SAP to a SQL reporting database, a log of users and transactions as well as age of each dashboard and report in minutes. This page will alert the viewer to any server processing delays or issues and is monitored throughout the day by the Data Systems Analyst.



While this does not include everything currently in use at CPS Energy – Power Generation, it does give a general overview of what we have accomplished thus far in 5 years of development. In addition to creating dashboards, Reports and web pages we also use Visual Cut to distribute daily Maintenance Planning sheets, PM Plan Job Packets, detailed Stores Materials Issue reports as well as Time Posting and Approval documentation. We are always making changes and improvements to the way we conduct our business and having a flexible reporting/dashboarding tool is a valuable asset.

Let me know if I can clarify anything or if you have questions.

Phillip Scheel, CPS Energy – Power Gen Data Analyst
wpscheel@cpsenergy.com