

Petrochemical Use Case

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Overview

This document provides an indication of how the St James Software j5 system can be used in the Petrochemical Environment. The examples shown are for the shift reports and also a plant trip.

j5 System

For more information on the j5 system, please see the St James Software Web Site at <http://www.sjsoft.com>.

j5 is an Enterprise Application Interface (EAN) that addresses the needs of PetroChemical Sites in the area of critical data capture and analysis. The application is the market leader in Industrial Control Room Logbooks and is offered by many process control engineers such as Invensys and Aspen Technology and is used by hundreds of companies worldwide. (Examples are Ameriven, Cheniere, Petro Rabigh)

System Navigation

If a user needs to locate specific information, there are a number of ways that this is possible as shown in the diagram below:



- There is a hierarchical tab system to locate the logbook or shift report of interest. Generally, the tab structure reflects the organizational structure so users intuitively understand how to get to a particular logbook or shift report.
- Reports are organized in **page** format (users can go to a particular page or (for shift reports, go to a particular day or shift),
- The user can click on any of the specific buttons assigned to the most frequent operations (the blue buttons in the diagram above),
- An interactive filter allows users to create specific ad hoc filters to find the information of interest to them at that time.



Shift Report Compilation

The need to effectively manage the handover period from one shift to the next is critical. The effectiveness of this handover relies on the automatic collection of key plant information, the efficient collection of manually entered data and the compilation, presentation and distribution of this information to the key personnel involved.

This Use Case shows the main steps in the process to creating the Handover reports.

Scheduled Addition of the Handover Log

- At the start of the new shift, the j5 system adds a new Power Handover Log record to the handover database table.

- Anyone clicking on the Handover Log Tab at the top of the screen will now be taken to this log which is the new current handover log. (Users can click on the previous shift links to go to previous shifts if they want information about the previous shifts.)
- Information relating to the shift is automatically added. (For example, the system will know which shift and which personnel should be on the shift, based on the shift rotation procedures.)
- The system generally allows information to be added immediately to the shift report and, for many of the fields, it annotates the comments with the time the information was added and who added the information.

Regular Updating of the Real Time and Log Information

- Within the Handover Log, there are several placeholders where the real-time information from the PI system is stored. This information is updated regularly (say every 5 minutes) to show the current state of the process should anyone want to see the on-going population of the reports.
- Calculations (for example, the calculation of mean values etc.) are also regularly updated.
- Logs that are deemed important from other logbooks (e.g. from the running general logbook (see next section) are also automatically added to the shift log.
- The objective of this is that the handover log is not only a document that is valid at the end of the shift; rather it is a document that reflects the current status of the shift **at any time during the shift**.

Audit Log for Deleted Rows						
Actions	LPG	Stock Bbls/m3	Space Bbls/m3	Status	Level	Mercaptan
	903	203	837	CLEARED	78.3	23
	902	203	1578	R / D	89.3	77
	901	243	1538	R / D	34	

Audit Log for Deleted Rows									
Actions	APP Tanks	Product	Level	Stock	MT	Space	Temp	Status	Time
	58	60/70	13.689	7405	4747	839	167	CLEARED	23:03
	807								
	806	Good	67.0	36247	23234	-28002	45		22:08
	805								
	804								
	803								

Operator Data Entry

- Within the handover log, there are placeholders where the operators can enter the information before the end of the shift.
- The business rules only allow the entry of this information within a specified time before then end of the shift. (E.g. operators can only enter the end of shift data half an hour before the end of the shift.)
- The business rules also check the validity of data and warn the operator if the data is outside the bounds.
- Certain information is only relevant under certain conditions, (for example if the unit is running). The system hides placeholders if the information is not relevant at that time.

Audit Log for Deleted Rows

Actions	Feed & rundown tanks	Tank	Status	Bbbs/Day	m3/Day	m3/Hour	Level
	FCCU slop ex/to	204	CLEARED	34	5	0	34
	HCN ex/to	203	S / D	38645	6144	256	13.3
	Slop to	401	S / N	-8597	-1366	-56	6.389
	Seal oil ex/to	204	CLEARED	23	3	0	45
	Phenolic H2O ex/to						
	HVGO ex/to						
	Crude ex SMP to						
	Crude feed to Zone 4						
	Crude feed to Zone 1						

Audit Log

Event Logging Procedure

- At any time during the shift, an operator can add a log in the general logbook which is located on a separate Tab at the top of the screen. This kind of log is a record of the events that occur during the shift. (See below)
- If the operator or supervisor deems a particular log is important, then that log can be attached (or transferred) to the handover log. The operator simply clicks on the "Add to Handover Report" check box and the log is then attached to the Handover log.

Event Record Logbook - Overview

Page 1 of 10 | 2008-05-13 12:00 (last 120) Go to Date: []

Filter: **Log Entry**

Print View Generate Excel Report

Hold Ctrl+click to select rows for deletion

Actions	Log Time	Type	Priority	Description	From	To	User	Report Time
	2008-05-13 21:24	General	Urgent	Started up and completed BDO	306	208 B-A /	admin	2008-05-14 07:53
	2008-05-13 22:17	General	Normal	Leak repaired 907 for the crane and brought it into service			admin	2008-05-13 22:58
	2008-05-13 21:40	General	Normal	Started up and completed displacing BDO	502	208 B-C /	admin	2008-05-13 22:55
	2008-05-13 22:08	General	Low	Started up 207 for oilstone	403	403	admin	2008-05-13 22:59
	2008-05-13 22:58	Key Item	Urgent	208 Sounded due 208/100 Air 218 Test			admin	2008-05-13 22:58
	2008-05-13 22:59	Key Item	Urgent	Crude B/D and B/W Valves are closed B/D S/N B/W Fan Flare / closed 208/100 Local			admin	2008-05-13 22:55
	2008-05-13 12:00	Key Item	Normal	Handover Status: 45,000 not opening on Remote Local	307	203	admin	2008-05-13 22:36
	2008-05-13 21:36	Transfer	Normal	Crude	203	208 B /	admin	2008-05-13 22:36

Field Entered Data



- The j5 system includes support for field operators (use tablet computers or PDA's) to enter information.
- At the time specified, the field operator is presented with a form to enter the information for the particular sensor selected in the inspection round. For example, the PDA may instruct the operator to choose the appropriate pump status (whether on or off) from a combo. (See the detailed description at <http://www.sjsoft.com/j5PDA.html>)
- Once all the field values have been collected on the PDA, the operator returns to the control room where the information is automatically transferred (via a PDA yoke or Blue Tooth Connection).

End of Shift Procedures

- At the end of the shift, there is a final collection of the real-time and "marked as important" logs.
- The system makes any additional calculations. (For example, the calculation of averages and mean values.)
- If values fall outside the limits, these are highlighted in the report.
- The Supervisor examines the handover report and makes any further changes if necessary. (The supervisor is allowed to do this up until a typical grace period of 20 minutes past the end of the shift.)
- Additional attachments may be added to the report. (E.g. documents or graphic files)
- The shift supervisor closes the report using the "Close Report" button. From this point on, no-one is allowed to change any of the details in the report.
- The report is printed out on the printer and is signed by the operators and supervisor.
- A pdf version of the report (or spreadsheet version if required) is sent via email to the nominated recipients. (This is configured from within the logbook and can be easily changed.)
- A hard electronic copy of the handover log is stored in a repository managed by j5 so that past reports can be easily retrieved. There is a menu system which enables a user to easily locate the report of interest.

Page navigation: Operational Data Historical Data 2008-05-13 12:00 Shut Log Go to Date

Filter: [Add Filter](#)

Print View Generate Excel Report Generate PDF Report

Shut Log for Deleted Rows

Query for 12:00 on 05/13 Shut Log

Query for 12:00 on 05/13

Shut Log for Deleted Rows

Actions	LPG	Stock BMM/m3	Space BMM/m3	Status	Level	Workpoint
	901	208	817	CLEARED	78.3	23
	402	208	1576	R / D	89.8	29
	901	243	1338	R / D	34	

Shut Log for Deleted Rows

Actions	APP Tanks	Product	Level	Stock	MT	Space	Temp	Status	Time
	58	6070	13.889	7481	4787	839	187	CLEARED	23:03
	887								
	886	Good	87.0	36247	23234	-28002	85		22:08
	885								
	884								
	883								

Shut Log for Deleted Rows

Actions	Feed & rundown tanks	Tank	Status	Bbl/Dry	m3/Dry	m3/Hour	Level
	FOO/step ex/fo	104	CLEARED	34	0	0	24
	MON ex/fo	297	S / D	3848	6144	254	13.3
	Shp to	401	S / N	-8197	-1246	-36	6.389
	Shp ex/fo	204	CLEARED	21	3	0	42
	Phenols H2O ex/fo						
	H2SO4 ex/fo						
	Crude ex SHP to						
	Crude feed to Zone 4						
	Crude feed to Zone 1						

Shut Log

Operational variations

We are trying to increase the flow at the moment.

Mechanical breakdowns

320128
320114

Mechanical repairs

280218 (3 side Oil Seal)
3204003 (GRU)

Staff

DO: M. Freeman
Leave
Sick: BRIDGEMAN
Coverage: C. JEFFERSON, S. MURPHY

Typical Trip Logging

This section covers the typical scenario expected when a site experiences a trip. It is arranged in chronological order. This description is carried out in technical terms. To simplify the description, a specific example has been chosen.

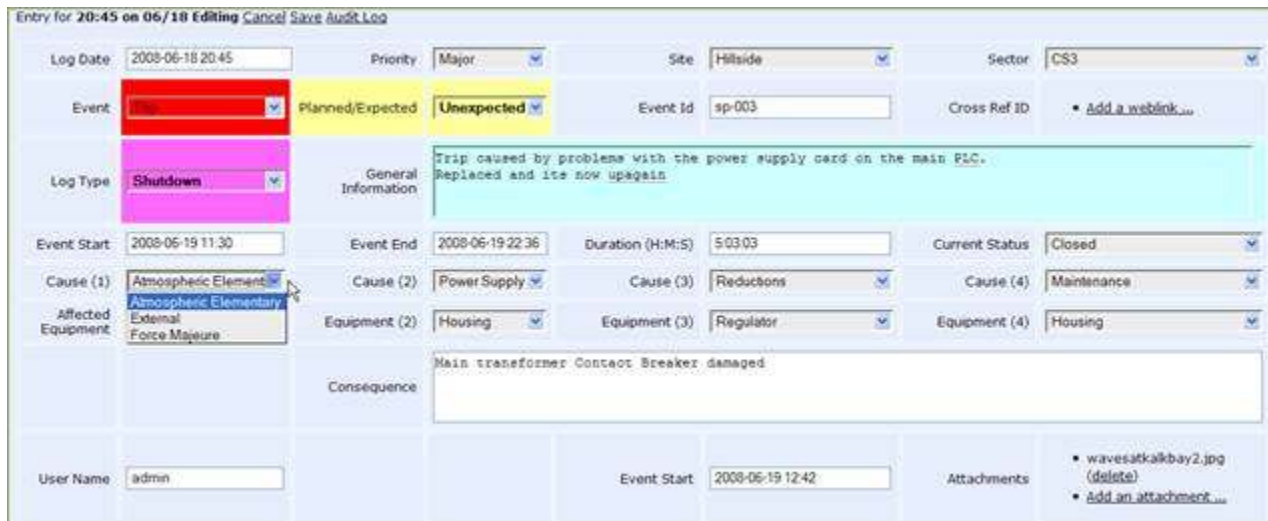
Detection and Registration of the Trip

- In this example, a trip occurs when the PI system detects an alarm temperature and it initiates the trip sequence.
- The j5 System's PI connection registers the trip and activates the trip interrogation script.
- The script reads significant information from the PI such as:
 - The register that holds the tag name that caused the trip,
 - The exact time of the trip,
 - Any other relevant information.
- The script then inserts a log into the j5 Logbook. The details of the log include:
 - The Log Type (in this case Shutdown resulting from a Trip Condition),

- The setting of Priorities, Start Time of the Trip, the equipment information causing the trip and any other information programmed into the script.
- The script also gathers information from the PI tag database. For example, the tagname could be T3267.PH. The tag database would show this as Unit 2, Main Machine Stator Winding Sensor 3267 Overtemperature Alarm. This information is also inserted in the Logbook.
- J5 Automatically colors the various fields within the Log.
- The status of the log is marked active. (When the system returns to on-line, this status is automatically reset to inactive.)
- A unique human readable id is also added to the log. This is a serial number which can be referenced from other logs.

Operator Actions

- An operator will notice that there is a new log in the logbook. (The relevant tab will change colors indicating a new log has been added.)
- The new log will be shown in aggressive colors indicating he/she must address this log.
- The operator completes the required information in the log. (See the diagram below.) (The different fields will be discussed in more detail later.)



- The operator will add general comments and information that the PI will not have known.
- In some cases, there are "drill down combos" which enable an operator to locate the specific cause or piece of equipment quickly without having to choose from a large list of options.
- The operator can also add attachments to further add information to the log. (For example, a jpg graphic, a Word or Excel document etc.)
- The operator can also link this log to a log in the same logbook or in a different logbook via the Cross Reference ID. (Or in fact to any web page.)
- Once the operator has completed the entries, the Save link is clicked and the log is added to the database.
- The system calculates the duration of the event and shows this in the duration field.
- An email (or sms) is sent to the recipients that have subscribed to these events indicating the nature of the trip and all the details added by the system and the operator.
- The information is also captured in the audit log and is available for viewing by any of the users

authorized to do so.

- Once the changes have been made, a less aggressive colour is used to indicate that the information has now been added to the log.

Registration of the Return to Normal

When the system returns to normal (i.e. the unit starts up again), the j5 system will:

- Detect the startup via the PI interface.
- Set the event end time in the logbook and calculate the duration of the event.
- Set the status to inactive
- Sends an email with all the relevant statistics to the recipients that have subscribed to the event.
- Updates the availability statistics database tables. The tables provide information

Additional Comments after the Return to Normal

At any stage, the operators or supervisors can add additional comments and make adjustments to the log. For example, if the reason for the trip only becomes clear later, then the operator can add to the information. Whenever a modification occurs, the system will:

- Add the information to the audit log, making a note of who made the change and at what time the change was made,
- Send an updated email to the users that have subscribed to the event.

Note that some information may not be modified. For example, the information provided by the PI system may not be modified. The system's authorization management system will take care of this.

Statistics and Calculations

In addition to the logs that are stored for every event, there are statistics that are stored periodically.

- These statistics are typically stored on a shift basis and record such things as the total uptime, number of trips, trips associated with particular causes etc. The statistics are updated with every trip as well as updated at the end of the shift.
- The statistics are attached to the handover log and there are also fields where operators can add summary information such as information relating to the number of open work orders, ongoing maintenance and operating activities etc.
- The statistics are also available from the perspective of the effected users (via the area), the affected equipment and also the cause of the events.
- Since the data is recorded against specific times, charts may be created showing trends against any of the different factors.
- Additionally, the MTTR/MTBF figures are also calculated against various variables such as the equipment or group of equipment (e.g. a specific)
- Statistics on any of the devices can also be pulled up using the filtering mechanism.
- Finally, the statistics for each of the consumer groups based on the sector are maintained and held.
- Preformatted reports may be scheduled with the in-built j5 data scheduler and these reports may be printed or emailed in spreadsheet, pdf or html format.
- The reports are also available on line and in a repository with an active index for retrieving them.

Site Data Queries

A manager, supervisor or operator can make queries on the logs and statistics at any time. The user may:

- Use the predefined filter buttons to get a filtered view of the logs. (See diagram below.)



Filter: [Edit Filter](#) [All](#) [Atmospheric Elementary](#) [External](#) [Planned](#) [Unexpected](#)

[Print View](#) [Generate Excel Report](#) [Generate PDF Report](#)

[Add log entry](#) [Audit Log for Deleted Rows](#)

Actions	Log time	Log Type	Comment
	2008-06-18 20:45	Shutdown	Trip caused by problems with the power supply card on the main PLC. Replaced and its now upagain

- Use the Ad Hoc filter mechanism to find specific logs of interest. (See diagram below.)



Editing Filter:

[Apply](#) [Clear Filter](#) [Close](#)

cause2: Power Supply Primary Transmission

planned: Planned Unexpected

site: - Hillside North Point Riverside

Add field:

- Use the database viewer application to look directly at the data.
- Use the database query program (we support Oracle, MySQL, SQLServer, Access, SQLite and PostgreSQL.)
- Set up specific queries in the in-built scripting language.
- On finding the information, the user may print the information directly to the screen or printer, may save the information into a spreadsheet or pdf file directly from the logbook screen.

Site to Corporate Data Rollup

The preceding information all relates to information that is stored on a single site. This information is of course (via any browser like Firefox or Internet Explorer) available to any user in the corporate head office. **In addition to this**, on any event or at the end of the shift, the information is sent up to the corporate data warehouse.database. This database contains cumulative information from all the sites. This occurs as follows:

- When a record is added or modified on any site, the j5 system connects to the corporate server via a j5 SOAP server and the record is pushed into the server database.
- Likewise, when the statistics and handover information is modified or updated, the information is also pushed into the j5 server at the corporate head office.

- Each record in the data warehouse contains a field which defines the site and sector from which the log originates.
- There are also maintenance facilities to monitor the progress and efficacy of the data rollup facility.

Corporate Statistics Queries and Reports

- Since the corporate data warehouse contains all the logs and statistics from all the sites, updated in near real-time, the corporate user can query the information and compare the information from the different sites. For example, the user may want to get a summary of the total percentage uptime of all the sites for the last week.
- Once the information has been displayed, the user can then drill down to the individual site log level to find out the cause of specific downtime.
- Corporate dashboard displays are also available showing the relative performance of each of the sites relative to each other.
- Reports showing corporate wide information may be emailed in spreadsheet or pdf format to the registered users.

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