j5 OMS LOGBOOKS AND REGULATORY COMPLIANCE IN THE LNG INDUSTRY

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Compliance within the LNG industry is primarily about safety (staff, neighbours, plant, and infrastructure), the environment and security (of facilities and data). j5 International (Part of Hexagon) aims to ensure the design, configuration and implementation of its software – and associated applications – enhances the safety, positive environmental impact and security of LNG Operations by complying with all regulatory requirements. j5 also check that nothing in the design and configuration negates any controls and checks that have been put in place.
Executive Summary

Compliance within the LNG industry is primarily about safety (staff, neighbors, plant, and infrastructure), the environment and security (of facilities and data). j5 International (Part of Hexagon) aims to ensure the design, configuration and implementation of its software – and associated applications – enhances the safety, positive environmental impact and security of LNG Operations by complying with all regulatory requirements. j5 International (Part of Hexagon) also check that nothing in the design and configuration negates any controls and checks that have been put in place.

j5 International (Part of Hexagon) achieves this objective in a two-step process during the configuration of any application for the LNG Industry:

i) Evaluate the process steps from an Operator-centric view during the design and configuration stages

ii) Ensure that the key requirements common to all regulatory standards are complied with

j5 Operations Management Software (OMS) – and associated applications – is operator centric software. This means that we have designed – and configured – the software to see the plant (and process) from the Operator’s point of view. The Operator – and Operations Manager – holds ultimate fiduciary responsibility for ensuring that the entire operation complies – at all times – with safety, environmental and security standards. We attempt to support the Operator (operations department) in meeting all standards and even in assisting the Operator to identify potential situations that could be considered unsafe, potentially hazardous or insecure.
The consulting and engineering staff at j5 International (Part of Hexagon) has experience in the LNG, Oil and Gas, Petrochemical, Pipeline and Power industries and have deployed Operations Logbooks, Shift Handover Logbooks and Compliance Monitoring Logbooks in these industries in many different countries. During the business analysis and design phases of the project we constantly refer to previous examples, best practice documents and regulatory requirements, thus ensuring that we consider all aspects of regulatory compliance from the outset.

We have identified **nine key characteristics** (regulatory requirements) that are common to all regulations used in these industries. We believe that compliance with all nine will result in a client-specific application meeting the local (regional and / or international) regulatory requirement as well and this is discussed below.

The configuration of the Logbook applications consists of two major phases, namely:

1. Define & structure all the fields
2. Format the layout
In defining the fields to be used, the configuration engineer, business analyst and client ensure that all compliance matters are addressed and secured. The formatting (or layout) stage is to provide an ergonomically acceptable Logbook – and reports – for different users. The layout stage has no impact on the ability of the application to remain compliant to safety, environmental or security regulations. The j5 OMS system is designed to be compliant to data and data-security regulations at its core. This means that presentation configuration – and layout changes – can be offered without fear of compromising compliance.

**j5 International (Part of Hexagon) - j5 OMS - Compliance Methodology**

j5 International (Part of Hexagon) has developed the j5 OMS Framework in such a manner so that compliance is easily achieved and supported. The configuration process comprises of two main steps, namely:

**DEFINE THE FIELDS:** During this stage, a comprehensive list of every field is created. This list can be extended – and added to – later, so that future enhancements can be made quite easily. The list is created after discussion with the client (operations department) and based on recommendations arising from best practice suggestions, other projects and industries. Once the fields have been listed, the following information is captured for each field:

1. **a)** Source of the field content (manual entry; transfer from DCS, Data Historian; external system)
2. **b)** Nature of the content (text, data, scientific, pulldown, conditional, etc.)
3. **c)** Format of the content (including conditional formatting)
4. **d)** Impact of this field on any other fields (and impact ON this field from elsewhere)
5. **e)** Any rules that apply to this field (for example, an approval field cannot be set to
approved before a previous signature)

f) Any conditions that apply to this field or arising from the content of this field

g) Any conditions that this field causes, or that must be applied to this field

h) Any workflow steps that must be applied to this field

i) Any workflow processes that this field triggers

j) Any specific actions that start, stop or change because of the content of this field

When compiling this table, the client – and business analyst – can ensure that all compliance requirements are catered for.

**FORMAT THE LOGBOOK(S) LAYOUT:** The layout of each Logbook is an independent stage. The “look and feel” – or format – of each Logbook can be adjusted to suit each specific user or supervisor or manager or department. During the layout (formatting) stage, the fields – defined as per the section above – are simply given a position on the page (like putting bricks on a wall). This layout process does not change any of the rules which affect regulatory compliance.
LNG Process

By nature of the product and the industry, LNG processing plants are potentially hazardous and represent a potential environmental risk. For this reason, all LNG facilities are controlled under local, regional and international regulatory authorities and – in many cases – fall under the jurisdiction of many different authorities.

To ensure that the j5 OMS platform and range of applications is as widely compliant as possible, j5 International (Part of Hexagon) has evaluated the use of j5 OMS at every stage in the LNG process – including Ship Loading and Ship Unloading – as per Fig 1. j5 Applications are currently used by Operations Departments in various facilities around the world and (collectively) cover every stage in the overall LNG process.

Together with the evaluation of the use at each stage in the LNG process, j5 International (Part of Hexagon) has examined the various industrial and regulatory standards applicable to the LNG industry and has extracted nine key requirements that we believe form the basis of all regulations. We have ensured that the j5 OMS software is fully compliant against each of these generic requirements and – consequently – we are confident to submit our software to any specific (local, regional or international) authority for specific certification as and when required.

Key Regulatory Requirements

j5 International (Part of Hexagon) staff have examined several LNG industry standards, in particular the US Federal Energy Regulation Commission’s document 18 CFR and related references. Comparing this document with those in other industries – such as Nuclear, Refinery, Pipelines, Food, Pharmaceutical and Water – we have identified nine key requirements that form
the basis of all regulatory standards linked to electronic logging, data storage, notes, retention of data, source of data and reporting. We address the j5 International (Part of Hexagon) compliance against each of these requirements below.

**Comprehensive:**

During the design stage (URS – User Requirement Specification) we undertake a business analysis with the Operations Manager (Operations Team) and we also provide suggestions – and examples – from other applications and other industries – to provide best practice suggestions. This URS is then “tested” against the regulatory standards and compliance rules applicable to the specific project in that location (for example, specific to LNG processing in Peru). Together with the responsible end-user (usually the Operations Manager) we make sure that every piece of required information is captured, or imported from another system (such as DCS, SCADA, Data Historian, etc.) and is available within the j5 OMS application. We can configure the application so that all compulsory information must be collected – and saved – before the Operator can close a log entry or end their shift.
Audit Logs:

Every entry, every change, every edit and every erasure (if erasing is allowed) creates an audit entry. The audit-log can never be changed or erased. It is possible to print a report containing every change made. It is also possible to schedule a special report – daily, weekly, etc. – for the regulatory officer within the company, so that the officer can check that any changes are justified.

Controlled Changes (Identification):

The j5 Operations Logbook is highly configurable. Each field, each Logbook view and all reports can be configured so that each user can have clear (and strictly managed) set of permissions on what they can add, change, edit or delete. The system ensures nobody without correct authorization can make or change any log entry, and it also ensures that every change has a clear indication of whom and when that change was made. The logged-in user’s identity is logged against each entry.

Non-Erasable:

It is possible to configure the application so that nothing may be erased. This means that once an entry has been saved, it may never be erased. This rule is however not always required, because of the Audit-Log protection (see entry above) and some clients have requested the following alternatives:
Only the person who made the entry can modify or erase that entry
Only that person’s supervisor (or a manager) can erase an entry, once saved
The “delete” command puts a “line-through” the existing entry to show that it is to be deleted, but the words remain visible

**Time / Date Stamps:**

Every log has at least two time and date fields associated with the entry (the name of the logged-in user is also stored, see controlled changes above):

- Time, date, user of the actual log entry (this entry cannot be edited)
- Time and date of when the event occurred, it is possible that the Operator is reporting on an event that occurred at some earlier time, the default entry is the time the log entry is made, but the Date-Time can be edited (once saved, this field cannot be changed)
- A third date, time, user entry is stored against a log entry whenever a CHANGE is made (last modified)

**Security:**

Only securely logged-on users may make log entries and make changes. We support various logging-in options, including:

- LDAP – integration with Active Directory
- 2nd level sign-on if required. (i.e. LDAP ++)
- Biometric logon
- RFID and other “smart card” login support

The relevant fields – and audit logs – maintain a clear record of which person has made which change and when.
Ease of Access of Information:

It is possible for a suitably authorized person to search all log entries, all changes and all audit logs. Reports can be generated, requested and scheduled.

Clear Identification:

Every log entry is clearly – and permanently – linked to suitable identification including:

- Name and position of user
- Name and position of person who edited
- Plant or process being referred to
- Equipment (or tag) to which the log entry refers

Reports and Information:

The j5 OMS framework has been designed to enable Operations departments to search for, find and report on specific information very quickly. This is achieved through various means, the most regular being:

- Filters, we deploy (user configurable) filter buttons that can be personalized for different users
- Dashboard and Report generation
Logbook Examples

This section includes some examples of different Logbook layouts (formats). It must be stressed that because the Logbook is highly configurable, each project (and each user within each project) can have a different format. The following screenshots are examples of some Operational Logbooks used within LNG, Refinery, Petrochemical and Pipeline facilities in different countries. They are not fixed format and can be changed in language, layout, content, format or order.

Operations Logbook Example:
Shift Handover Example:
**Permit to Work Example:**

![Permit to Work Example Image](image1)

**Inspection Rounds Example:**

![Inspection Rounds Example Image](image2)
**Incident Management Example:**

```plaintext
<table>
<thead>
<tr>
<th>Incident Management</th>
<th>Loading Accident</th>
</tr>
</thead>
<tbody>
<tr>
<td>Title</td>
<td>Loading Accident</td>
</tr>
<tr>
<td>Date of Incident</td>
<td>2018-08-10 04:15:00</td>
</tr>
<tr>
<td>Incident Category</td>
<td>Incident</td>
</tr>
<tr>
<td>Lost Work Hours</td>
<td>2</td>
</tr>
<tr>
<td>Reported By</td>
<td>Administrator</td>
</tr>
<tr>
<td>Date and Time</td>
<td>Aug 11, 2018 12:35 PM</td>
</tr>
<tr>
<td>Incident Recorded</td>
<td>Site 1</td>
</tr>
<tr>
<td>Incident Closed</td>
<td>Section 1</td>
</tr>
<tr>
<td>Incident Category</td>
<td>Category</td>
</tr>
<tr>
<td>Investigation Status</td>
<td>Site 1</td>
</tr>
<tr>
<td>Investigated By</td>
<td>Section 1</td>
</tr>
<tr>
<td></td>
<td>Category</td>
</tr>
</tbody>
</table>
```

Accident at loading dock