

Final agreed minutes

Instrumentation and automation workshop – identify International Standards needs in the global oil & gas industry

OGP London, 21-22 November 2006

Present :

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Agenda Item 1: Introduction

Jon Olav Li welcomed everyone to the workshop and reviewed agenda and the objectives (Ref: **Attachment 1**):

- To arrange for global networking of the instrument and automation specialists of OGP members and global suppliers.
- To present existing company and project specifications and available standards related to the discipline.

To discuss, propose and evaluate the needs for harmonisation of company specifications in international standards in this area for the benefit of the global petroleum industry.

It was noted that the invitation to attend the meeting had been issued to all OGP Standards committee members, and while many were not able to attend, several more had expressed an interest in the objectives of the meeting and were likely to be involved in the future.

Agenda Item 2 : Introduction to OGP

Don Smith gave an overview of OGP, its background, objectives and method of work (Ref: **Attachment 2**). He noted that one of the missions of OGP related to the pulling together of best practice, whether through international standards, guidance notes or other documents.

Agenda Item : Introduction to Standards within OGP

Alf Reidar Johansen reviewed the work of the Standards Committee within OGP (Ref: **Attachment 3**) and in particular the OGP position on standards:

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- Development and use of ISO and IEC standards should be promoted;
- Development of standards should be based on a consensus of need;
- The 'user' should be represented on standards work groups;
- Duplication of effort should be avoided;
- Standards should be simple and fit for purpose;
- International standards should be used without modification wherever possible;
- Company specifications should be minimised and where necessary, written as company functional specifications.

He noted the importance, in terms of efficiency and benefits, to OGP members of having available international standards.

He presented the standards the industry has been active on (through ISO TC67; Ref: centrespread of OGP Standards Bulletin) noting a lack of standards in the instrumentation and automation area under the influence of the O&G industry itself. The purpose of the workshop was to consider whether there was a need and willingness to progress standards in this area.

ARJ tabled a draft report collated by Hydro's on available I&C standards and related activities in the industry (Ref: Draft Report **Attachment 4**). He noted that the groups currently active in this area included:

- IEC TC 65;
- API CRE Sub-Committee on Instrumentation and Control Systems (SOICS);
- UKOOA OPS 15 Instrument-based protective systems (may not be a group);
- ANSI/ISA 84;
- Process Industry Practice (PIP).

ARJ noted that one of the objectives of the meeting was to update and improve the draft report.

Agenda Item : Hydro Presentation

Jon Olav Li presented an overview of Hydro and its current activities in the instrumentation and automation standards arena (Ref: **Attachment 5**). He noted that they made use of a range of documents:

- Norwegian Petroleum Safety Authority (PSA) HSE – Regulations and guidelines:
 - o The guidelines make reference to certain standards that may be used by operators working in Norwegian waters.
- NORSOK Standards:
 - o These are application/function related standards for use in Norwegian waters and include documents relating to Field Instrumentation, Safety and Automation Systems, System Control Diagram and Electrical, instrumentation and telecommunication installation.
- Company Specifications (within Hydro):
 - o These include supplements to the NORSOK and other standards, additional specifications and 'frame' agreements. All these documents were openly available on the Hydro website.
- Standards produced by worldwide standards bodies.

Hydro's position on the standards they use outside of Norway is *'it is up to the selected contractor to define/propose what standards and discipline specifications are to be used for the specific project.'* However, these proposals are subject to company review and approval. It was noted that the NORSOK standards were used as a means of checking the adequacy of any

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standard proposed. One of Hydro's key targets is to take NORSOK standards into international standards work and replace them with consensus based IEC or ISO standards.

JOL presented a list of proposals for international standards work in the I&A area:

1. Make a new ISO standards based in NORSOK I-005 System Control Diagram Related international standards are IEC 61804-1 and ISO 14617;
2. Make an international standard for O&G SAS systems based on NORSOK I-002 and other relevant input;
3. Make an international standard for O&G Field Instrumentation based on NORSOK I-001 and other relevant input;
4. Make an international guideline for use of IEC 61508/IEC 61511 in O&G applications based on the Norwegian OLF 070 guideline and other relevant input.

Finally, JOL presented a proposal for an International standardisation working group and liaison activities to handle potential ISO work:

- Establish a new Work Group under ISO/TC67 for 'Instrument and Automation' (because this is where the O&G industry have placed most of its international standards work) with liaison to relevant IEC committees.
- Seek a Convenor for this WG among interested members.
- Seek participation from and cooperation with API CRE Instrumentation and Control Systems.

Agenda Item : Petrobras Presentation

Milton Quintanilha dos Santos presented the position of Petrobras with respect to I&A standards (Ref: **Attachment 6a**).

He explained the Structure of Petrobras on how the standards get to ISO and reviewed the Petrobras company standards and areas covered. Listing all the standards, he informed the meeting that Petrobras adopts ISO and IEC standards and most of them are referenced within company documents.

Antonio Luiz de Carvalho identified a number of areas where he thought the I&A standards agenda could be progressed:

Proposals for collaborative work, elevating standards to work at an international level:

- 1) Standards related to Field Instrumentation and Automation Design:
 - ISA 5.1, Instrumentation Symbols and Identification (R1992), since ISO 3611 (Process Measurement Control Functions and Instrumentation – Parts 1 and 2) does not fit with oil & gas industry needs;
 - ISA 5.2, Binary Logic Diagrams for Process Operations (1976), since it seems does not exist an equivalent standard in ISO or IEC portfolio;
 - ISA 5.4, Instrument Loop Diagrams (1991), since ISO 3611 (Process Measurement Control Functions and Instrumentation – Part 3) does not fit with oil & gas industry needs;
 - ISA 5.5, Graphic Symbols for Process Displays (1985), since it seems does not exist an equivalent standard in ISO or IEC portfolio;
 - ISA 20, Specification Forms for Process Measurement and Control Instruments,

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Primary Elements, and Control Valves (1981), since IEC 60534-7, Industrial-Process Control Valves – Control Valve Data Sheet seems the only international standard-related with this subject.

Alternatively, modify existing ISO and IEC standards to fit oil & gas industry needs.

2) Standard related to Alarm Management:

- EEMUA-191, Alarms systems – A Guide to Design Management and Procurement - elevated to ISO standards

In addition, AC tabled a list of the standards referenced within Petrobras related to Basic Offshore Design – Instrumentation & Automation Perspective - (Ref: **Attachment 6b**).

Agenda Item : Total Presentation

Daniel Rioche, Total presented the organisation's position with respect to I&A standards (Ref: **Attachment 7**).

The intent of the organisation is to base their general specifications, as far as practicable, on international standards. The specifications are mandatory in Total worldwide. Further, the need for the involvement of company experts in the standardisation work was viewed as important.

DR noted that Total, on an annual basis, produces a CD of the documents (General Specification) that are used in the organisation. He noted that they have 18 in-house, E&P specific instrumentation and control related documents. Altogether, Total has about 10.000 pages of specifications. There is a clear aim to reduce this volume.

Serge Macrez, Total provided further details concerning the 18 documents. He noted that the documents refer to other standards and practices and, if necessary, address deviations to them. Furthermore Total Corporate General Specifications are complemented by dedicated project specifications which address any project specific requirements.

Cables, controls valves/choke valves, pressure safety valves and analysers/analyser shelters are not dealt with within the general specifications.

SM noted that there were 55 references to Standards, Recommended Practices and Design Guidelines in the General Specifications.

SM identified what he viewed as missing Standards or Recommended Practices

- Cyber Security of networks and systems;
- Safety systems: implementation guidelines;
- Control and safety systems: design documents requirements;
- Control and safety system HMI: focus on fundamental basic requirements and avoid/eliminate all non required/unnecessary functions embedded in standard software operating systems;
- Control and safety system testing requirements (factory testing);
- On/Off actuated valve controls ;
- Analysers;
- Wet gas metering: flow line modelling;
- Sub-sea instrumentation.

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Agenda Item : BP Presentation

Mervyn Currie of BP presented the BP position with respect to instruments and control standards (Ref: **Attachment 8**). BP's in-house standards are based on conformity with relevant international and industry standards via two routes:

- addition to, deletion or amplification of reference standards;
- specific references in referenced standards apply.

Within BP the standards are referred to as Engineering Technical Practices (ETP). Up to date these have been reference documents; however BP was in a state of transferring these to basically mandatory company requirements.

ETPs can take the form of Guidance on Practice, Guidance on Industry Standards, Guidance Notes, Reference Documents and Data Sheets. With reference to Instrumentation and Control, ETPs exist in four categories: instrumentation and control, analysers, telecoms and measurement.

BP has 430 ETPs based on previous BP, Amoco, ARCO and Castrol company specifications.

Three topics MC felt the group should consider taking forward related to:

- ASME PTC 19.3 temperature measurement. Contains guidance on selection of thermowells to avoid fatigue failure due to wakes which could be developed as an ISO standard.
- EEMUA 191 Alarm systems – a guide to design, management and procurement.

UKOOA/EEMUA/EIC document 'Guide to the application of IEC 61511 to safety instrumented systems in the UK process industries' (currently at a review stage) could form the basis of an international document.

Agenda Item : Honeywell Presentation

Barrie Reynolds, Honeywell (also chair of BSI GEL 65/1 – UK's shadow committee to IEC/TC65A) gave a supplier's perspective on tendering for industry process safety systems and the role of standards (Ref: **Attachment 9**). He reviewed the End User-Contractor-Supplier interfaces, noting that there were no common corporate standards and no common mandatory safety compliance standards. Re-use of requirement documents, without proper review, is an issue. On occasion conflicting standards are proposed. In addition, contractors were, in some instances, failing to address the short-comings in the requirements they were being presented with.

BR suggested that the O&G industry establish better communication with IEC/TC65 either through OGP, ISO/TC67, the national committees or what may be the most appropriate way.

BR noted the importance for suppliers of being involved in FEED.

IEC 61508 was essentially a project standard mainly for use by the end user and contractor – it was not a component compliance standard. Changes being made to the standard were likely to change the way the standard would be used in the future. There exists a lack of experience in using 61508 within company procurement processes. A range of other problems exist with

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the application of 61508 (Ref: presentation for details).

The industry was trying to improve on the situation through a number of initiatives:

- The CASS Scheme Ltd: a UK initiative related to the assessment of the capability of a company to meet the IEC 61508 competency and compliancy requirements. A CASS certificate is submitted as part of a bid.
- The 61508 association (www.61508.org)

A number of pointers to best practice were identified:

- Review current procurement practices;
- Encourage the development of typical safety functions as standard procurement templates;
- Seek competent clarification and review from suppliers through FEED or similar studies;
- Seek supplier feedback after contract award;
- Review the supporting material available from CASS.

Recommendations and potential future initiatives:

1. Address the internal company processes to provide an assessment of compliance to those internal procedures;
2. For every mandated standard there should be a procedure for establishing compliance;
3. Establish a process for assessing the quality of a procurement specification at any point in time;
4. Invite/discuss with the project engineering tools suppliers – Intools etc;
5. Understand the ISO TC 184 SC4 step/PISTEP activities;
6. Establish a formal liaison with IEC TC 65 through ISO TC 67;
7. Be aware of SAT and FAT standards (New Work) in TC 65.

Agenda Item : Emerson Presentation

Travis Hesketh of Emerson gave a presentation (Ref: **Attachment 10**). Consistent, repeatable and understandable interactions with companies were something they sought.

The organisation was involved in many standards activities. TH noted the widely different company documents/requirements they received; some very prescriptive, others high level. The pros and cons associated with company standards were reviewed, as were the benefits of rationalisation of such standards. There were considerable potential savings associated with more consistent, repeatable and understandable interactions with companies.

Benefits of standardisation include:

- Reduced risk;
- Reduced capex;
- Reduced opex.

He noted that EEMUA 191 has been adopted by major suppliers and was a de-facto standard.

TH also noted that Joseph Duffy, Emerson was chair of IEC/TC65A and suggested he be invited to the next meeting. See Additional information received from Joe during this meeting at end of these minutes.

Recommendations and potential future activities include:

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Development Areas:

- Project Data exchange – transfer mechanisms, issue and approvals workflows, format definition;
- Data quality – objective measure on completeness state;
- Equipment specification sheets – standardised format and data fields;
- Security – Systems and Asset Management and remote operations;
- Abnormal Situation Prevention / Asset Health – monitoring and diagnosing measurement, control & process equipment and trains.

DAY 2

Agenda Item : ABB Presentation

Torgrim Schiefloe of ABB presented on behalf of the organisation (Ref: **Attachment 11**). He presented some of the issues arising out of recent requests for proposals:

- Considerable overlaps and conflicts between standards;
- Multiple choices actually causes loss of standardisation;
- Focus on low level and high level issues, leads to a lack of focus on 'middle' functionality.

He noted some areas of concern, including:

- Standards limit product development on occasion;
- The standardisation process can be slow and 'political';
- Low participation in standards groups by end users;
- Lack of interoperability between different systems design to different standards .

Despite the above, '*... end users are quick to jump on new features instead of priority on interoperability, standardisation etc.*'.

Potential future activities:

- IEC Sector Board 3 for industrial automation – Automation objects (IEC 61499) – need to establish status and need for input;
 - o Lift NORSOK I-005 to work at an international level
- End user participation in IEC committees, e.g. TC 65.

Agenda Item : Siemens Presentation

Widar Syverinsen of Siemens presented on behalf of the organisation (Ref: **Attachment 12**). He presented many of the standards they used, noting their involvement in development of some of them.

The organisation's experience with respect to standards includes considerable variation in requirements in different areas of the world:

- UK, Norway and Russia:

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- Specifications for new projects from major oil operators are usually adequate and with necessary content.
- Middle/North America and some Arabic regions:
 - Specifications tend to set the requirements too high;
 - Requirements too detailed - the solution becomes impossible, or over-complex.
- Specifications are more and more in line world wide:
 - Countries or Oil Operators change from old and very detailed specifications to more modern and international requirements;
 - Allows state of the art systems to be used.

Some areas where development was needed related to:

- Initial versions of standards made years ago;
- Based on instrumented systems and relay logics;
- New revisions does not take new technology into account;
- Conservative topology:
 - Decreased availability;
 - Increased probability of failure on demand.

He noted the benefits of combining different aspects of the control of a system into a single product (rather than linking independent control systems).

WS presented some views/recommendations:

- Safety Systems should be made to serve the actual safety functions the best way;
- Safety systems should not be made according to regulations based on limitations in historical technology;
- Harmonized company standards would be an advantage;
- Standards and requirements should be open for new technology;
- Standards should not be too detailed (e.g. EN 54-2:1998 Fire detection and fire alarm systems. Control and indicating equipment);
- Standards should focus on risk based approaches;
- Common standards should be based on:
 - o EEMUA 191 Alarm System Philosophy and Guidance;
 - o IEC 61508 Functional Safety of Electrical/Electronic/Programmable Electronic Safety Related Systems – develop guideline for its use;
 - o IEC 61511 Functional safety instrumented systems for the process industry sector – develop guideline for its use;
 - o IEC 61158 Fieldbus for Use in Industrial Control Systems;
 - o IEC 61131 Programmable Controllers.

Agenda Item : Presentation on System Control Diagram

Jon Olav Li ran a pre-recorded presentation on system control diagram standards (Ref: **Attachment 13**).

The presentation covered:

- Brief introduction to NORSOK I-005 System Control Diagram Standard;
- Some existing IEC standards;
- ISO TC 67 The oil and gas industry standards technical committee.

The presentation questioned whether the I-005 system control diagram standards was viewed as useful and whether it should be made into an international standard.

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AGREED ACTIONS AND WAY FORWARD

1) It was agreed that relevant I&A company specifications, standards, best practices etc., as far as possible, would be placed e.g. on the OGP website (password protected) for individuals to access and review. E&P companies to provide OGP with relevant documents.

ACTION: E&P Companies

Deadline for input: 24th Nov 2006

2) It was agreed that other E&P organisations unable to attend the workshop should be invited to provide their documents and become part of this review.

It was agreed that all documents and presentations could be made available to other members of the OGP Standards Committee.

3) The E&P companies were requested to review the other E&P organisations' specifications and try to identify any documents they have that could, potentially be harmonised.

ACTION: E&P Companies

Deadline: by end March 2007

4) The suppliers were invited to review any specifications placed on the website and advise relevant companies of any problems they see.

ACTION: Suppliers

Deadline: by end March 2007

5) After discussion of the various proposals by the presenters, Appendix A to these minutes were developed and reviewed to combine joint proposals. All workshop participants and members of the OGP Standards Committee were invited to review all the items listed in Appendix A and identify which of the proposals:

- a) they consider useful to the O&G industry
- b) their company is willing to participate in to development further.

ACTION: All plus OGP Standards Committee

Deadline: End January 2007.

6) ARJ and Barrie Reynolds were actioned to gather information on the activities of IEC TC65 and, if appropriate, consider the need for increased end user participation – and circulate relevant information and proposals to the group.

ACTION: ARJ and BR

Deadline: As soon as possible.

7) ARJ proposed to update the draft report circulated prior to the meeting based on input received during the workshop and return to the participants for review asap. All attendees were invited to provide comments on the revised document and send them to him. In particular, information on other relevant documents and activities in the I&A arena would be of value. Mervyn Currie and Daniel Rioche offered to support ARJ on this effort.

ACTION: All

Deadline: by end Jan 2007

8) ARJ proposed to propose for the OGP Standards Committee that this group works within the OGP structure under the title 'Instrumentation & Automation Standards Task Force.' The

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Task Force would report its activities to the OGP Standards Committee. This proposal was accepted.

ACTION: ARJ

Deadline: End December 2006.

9) Once the agreed actions had been progressed, consideration would be given to the next meeting of the group.

ACTION: ARJ

Deadline: End March 2007.

Additional information from Emerson

TH tabled a note dealing with current IEC SC65A action:

Chairman of IEC SC65A. I will give a short answer in terms of that role.

This SC is busy mostly maintaining published standards at this time. The main standards of interest are 61508 Programmable Electronic Systems (PES) Functional Safety. 65A has a maintenance team working on version 2 of this document. This work is at least 2 years away from completion as the maintenance team is working on lots of comments and will go out for another CD.

Document 61511 (this is the process industry sector specific application of the 61508 generic standard. Document 61511 is published at version 1 and will not be revised until after 61508 is approved as a CDV. This is at least 2 years away.

65A also develops the EMC sector standard for the process industry. Version 1 of this document is published and is the basis of the current Euro-norm mark for the Process industry. Version 2 of this document is partially published and has been reorganized into 3 parts. Part 3 deals with EMC for functional safety application which is a new area of application. Part 3 is at least a year away from IEC approval and probably 2-3 years away

APPENDIX A

Proposals and Recommendations identified as potential future work products

Joint proposals by two or more participants:

- Make an international standard for O&G Field Instrumentation datasheets (standardised format and data fields) (layers and details) based on Norsok I-001, ISA 20:1981 (Specification Forms for Process Measurement and Control Instruments, Primary Elements, and Control Valves) and other relevant input
- Make an international guideline for use of IEC 61508/IEC 61511 in O&G applications. Relevant reference documents: the Norwegian OLF 070, ISA 84.00.04, and UKOOA/EEMUA/EIC draft publication and other relevant docs.
- Alarms systems – elevate to work at an international level. Relevant documents: PSA YA 711, EEMUA – 191 (Anything from ISA Workgroups?)
- Control and safety systems: minimum requirement design documents requirements (ie input to a functional design document). *IEC TC 65 WG12 (Representation of process control engineering requests in P&I diagrams and data exchange between P&ID tools and PCE-CAE tools) is active on this issue*
 - a. Make a new international standard based on Norsok I-005 System Control Diagram. Related international standards are:
 - ISO 14617 (Graphical symbols for diagrams)
 - IEC 61499 (Function blocks)
 - IEC 61804 (industry specific libraries)
 - System tools suppliers may have a document available or some strong views to bring to the table
 - Work underway on developing definitions for describing systems electronically for lifetime use (Ref: IEC TC65 SC B mainly)
- Security – Systems and Asset Management and remote operations (IEC TC65/10 Security for industrial process measurement and control - Network and system security) Cyber Security of networks and systems
- Control and safety system testing requirements (factory testing). *New factory acceptance tests standard have been developed by IEC TC 65 (IEC 62381:2006 Automation systems in the process industry – Factory acceptance test (FAT), site acceptance test (SAT), and site integration test (SIT)). Note that little support for this within the UK sector – possibly because of lack of end-user awareness of related standards. Possible need for liaison or membership of appropriate groups.*
- Establish a formal liaison with IEC/TC65 through ISO/TC67
- Understand the ISO TC 184 SC4 step/PISTEP activities. Project Data exchange – transfer mechanisms, issue and approvals workflows, format definition (ISO TC184 – SC4)

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Listed below are proposals/items/issues identified by only one organisation.

Hydro:

Put priority on one or more of the following:

- Make an international standard for O&G SAS systems based on Norsok I-002 and other relevant input
- Make an international standard for O&G Field Instrumentation based on (remaining parts of) Norsok I-001 and other relevant input (joint proposal for datasheets above)

Proposal for an International standardisation working group (if relevant ISO work is agreed) and liaison:

- Establish a new Work group under ISO/TC67 for 'Instrumental and Automation' with liaison to relevant IEC committees.
- Seek a Convenor for this WG among interested members.
- Seek participation from and cooperation with API CRE Instrumentation and Control Systems.

Petrobras

Proposals for collaborative work, elevating standards to work at an international level:

- ISA 5.1, Instrumentation Symbols and Identification (R1992);
- ISA 5.2, Binary Logic Diagrams for Process Operations (1976);
- ISA 5.4, Instrument Loop Diagrams (1991);
- ISA 5.5, Graphic Symbols for Process Displays (1985);
- Alternatively modify existing ISO and IEC standards to fit oil & gas industry needs.

Total

Total identified 'missing' Standards or Recommended Practices:

- Control and safety system HMI: focus on fundamental basic requirements and avoid/eliminate all non required/unnecessary functions embedded in standard software operating systems.
- On/Off actuated valve controls (ie control circuits)
- Analysers (*API RP 555 Process analysers, Nov 2001; IEC TC65B IEC 61115:1992 Expression of performance of sample handling systems for process analyzers - potentially higher priority for downstream sector.*)
- Wet gas metering: flow line modelling (*API working on this? (Ref. API RP 85 Use of Subsea Wet-gas Flowmeters in Allocation Measurement Systems, published 2003) BP developing internal standard in 2007 related to metering). (Ref: UK DTI guideline on wet gas measurement, module 7, publication year 2003)*)
- Sub-sea instrumentation (*ISO 13628 Design and operation of subsea production systems -- Part 6: Subsea production control systems, published 2006 covers instrumentation*)

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BP

BP felt the group should consider taking forward related to:

- Guidance on selection of thermowells to avoid fatigue failure due to wakes. ASME PTC 19.3 temperature measurement contains a section which could be developed as an ISO standard.

Honeywell

Potential future initiatives:

- Address the internal company processes to provide an assessment of compliance to those internal procedures;
- For every mandated standard there should be a procedure for establishing compliance;
- Establish a process for assessing the quality of a procurement specification at any point in time;
- Invite/discuss with the project engineering tools suppliers – Intools etc.

Emerson

Potential future activities include the following development Areas:

- Data quality – objective measure on completeness state;
- Abnormal Situation Prevention / Asset Health – monitoring and diagnosing measurement, control & process equipment and trains.