



International
Association
of Oil & Gas
Producers

International standards available and active standards committees

DRAFT

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1 Introduction

OGP – The International Association of Oil & Gas Producers – will arrange a workshop 21 –22 November 2006, in London with the objective to arrange for global networking of the instrument and automation (process control) specialists of OGP members and global suppliers for the purpose of:

- discussing the existing company and project specifications and available standards related to this discipline and
- evaluating the needs for new international standards work in this area for the benefit of the global petroleum industry.

The workshop programme and all the presentations will be available at OGP website: <http://info.ogp.org.uk/standards/>.

This **DRAFT** report is a summary of the available international standards and technical committee work presently ongoing for this area (will be amended in and after the workshop to include all relevant standards and information). Metering and subsea instrumentation should have been included, but has been left out at present moment.

2 Available standards (identified so far)

The references below have been retrieved from the following NORSOK standards, from Hydro and other (HOLD) oil companies specifications (ref. Annex A):

- NORSOK I-001 Field Instrumentation
- NORSOK I-002 Safety and automation system (SAS)
- NORSOK I-005 System Control Diagram
- NORSOK Z-010 Electrical, instrumentation and telecommunication installation

Many of the references below are general standards not specifically made for instrument and automation purposes, but they are listed anyway to check if they are commonly referenced for the purpose they are used by the global oil & gas industry.

2.1 Instrument & automation specific standards available and used

| | |
|------------|---|
| API RP 520 | Sizing, Selection, and Installation Of Pressure-Relieving Devices in Refineries, Part I and II. |
| IEC 61508 | Functional safety of electrical/electronic/programmable electronic safetyrelated systems. |
| IEC 61511 | Functional safety - Safety instrumented systems for the process industry sector |
| OLF 070 | Recommenatal guidelines for the application of IEC 61508 and IEC 61511 in the petroleum activities on the Norwegian continental shelf |

2.2 Non specific standards used by instrument & automation discipline

| | |
|--------------|---|
| ANSI B1.20.1 | Pipe threads general purpose (imperial units) |
| ANSI B16.5 | Pipe Flanges and Flanged Fittings |

| | |
|----------------------|---|
| ANSI B16.10 | Face-to-face and end-to-end dimensions of valves. |
| ANSI B16.34 | Valves-flanged, threaded and |
| ANSI B16.36 | Steel orifice flanges |
| ANSI PTC 19.3 | Thermowells (chapter 1, section 8-19) |
| ANSI/FCI 70-2 | Control valve seat leakage. |
| API RP 14C | Analysis, Design, Installation and Testing of Basic Surface Safety Systems on Offshore Production Platforms (basis for ISO 10418). |
| API RP 521 | Guide for Pressure-Relieving and Depressuring Systems (basis for new ISO standard 23251 issued 2006) |
| API RP 526 | Flanged steel safety relief valves. |
| API RP 527 | Seat Tightness of Pressure Relief Valves. |
| API RP 670 | Vibration, axial position and bearing temperature system. |
| API RP 678 | Accelerometer-based Vibration Monitoring System. |
| ASME I | Power boilers |
| ASME VIII, Div 1 | Boiler and pressure vessel code |
| BS 2915 | Bursting Discs and Bursting Disc Devices |
| BS 6755-1 | Testing of valves. Part 1. Specification for production pressure testing requirements |
| DIN 3381 | Safety devices for gas supply installations operating at working pressures up to 100 bar; pressure relief governors and safety shut-off devices |
| EN 10204 | Metallic products. Types of inspection documents |
| EN 13445 | General rules for pressure vessels |
| EN 50081-2 | Electromagnetic compatibility Generic emission standard, Part 2: Industrial environment. |
| EN 50082-2 | Electromagnetic compatibility Generic immunity standard, Part 2: Industrial environment. |
| EN 50173 | Information technology – Generic cabling system |
| IEC 60529 | Degrees of protection provided by enclosures (IP code) |
| IEC 60534-2 | Industrial process control valves. Part 2 (adopted as EN 60534-2) |
| IEC 60584-1 | Thermocouples (adopted as EN 60584-1) |
| IEC 60751 | Resistance Temperature Detectors (adopted as EN 60751) |
| IEC 61131-1 | Programmable controllers - Part 1: General information |
| IEC 61131-2 | Programmable controllers - Part 2: Equipment and test requirements |
| IEC 61131-3 | Programmable controllers - Part 3: PLC programming languages |
| IEC 61131-4 | Programmable controllers - Part 4: User guidelines |
| IEC 61131-5 | Programmable controllers - Part 5: Communications |
| IFEA | Guidelines for heat tracing installation in industry and offshore. (Norwegian text only) |
| ISA 75.01 | Flow equations for sizing control valves. |
| ISO 1000 | SI Units and recommendation for the use of their multiples and of certain other units. |
| ISO 3511 (all parts) | Process measurement control functions and instrumentation – Symbolic representation |
| ISO 4406 | Cleanliness Requirements of Parts Used in Hydraulic Systems. |
| ISO 5167 | Measurement of fluid flow by means of pressure differential devices - Part 1. |

| | |
|--------------|---|
| ISO 5210 | Industrial valves - Multi-turn valve actuator attachments. |
| ISO 5211 | Industrial valves - Part-turn valve actuator attachment - Part 1, 2 & 3. |
| ISO 9001 | Quality Management System Requirements |
| ISO 10418 | Recommended practice for Analysis, Design, Installation and Testing of Basic surface Safety Systems for Offshore Production Platforms |
| ISO 11064 | Ergonomic design of control centres -- Part 1: Principles for the design of control centres |
| ISO 15663 | Life Cycle Costing |
| NACE MR0175 | Materials for use in H ₂ S-containing environments in oil and gas production (now adopted and published as ISO 15156) |
| NAMUR | Normenarbeitsgemeinschaft für Mess- und Regelungstechnik in der Chemischen Industrie |
| NEK 606 | Cables for offshore installations Halogen-free, or mud resistant. |
| NFPA 72E 3-3 | Temperature Classification |
| NORSOK I-001 | Field Instrumentation |
| NORSOK I-002 | Safety and automation system (SAS) |
| NORSOK I-005 | System Control Diagram (SCD). |
| NORSOK Z-010 | Electrical, instrumentation and telecommunication installation |
| NS 1710 | Technical drawings – Drawing symbols for piping systems |
| NS 1438 | Process measurement control functions and instrumentation – Symbolic representation – Part 1: Basic requirements |
| NS5820 | Supplier Documentation of Equipment |
| PD 5500 | Specification for Unfired Fusion Welded Pressure Vessels. |
| YA-711 | Principles for design of alarm systems. Norwegian Petroleum Directorate. |

3 OGP Catalogue of standards

OGP Standards committee has developed a Catalogue of International – IEC and ISO – standards for use in the petroleum and natural gas industries. This report lists about 1300 ISO standards and 700 IEC standards used by the OGP Standards committee member companies.

4 Active IEC standards committees

4.1 IEC TC65: Industrial-process measurement and control

TC65 was established in 1968 to prepare basic standards for industrial automation (e.g. programmable controllers, functional safety, fieldbus) as well as process industry specific standards (e.g. actuators and sensors, batch control, analysing equipment). Scopes of TC65 and its SCs are as follows :

To prepare international standards for systems and elements used for industrial-process measurement and control concerning continuous and batch processes. To co-ordinate the standardization of those features of related elements which affect suitability for integration into such systems. The work of standardization outlined above is to be carried out in the international fields for equipment and systems operating with electric, pneumatic, hydraulic, mechanical or other systems of measurement and/or control.

IEC TC65/SC 65A: System Aspects

To prepare international standards regarding the generic aspects of systems used in industrial process measurement and control: operational conditions (including EMC), methodology for the assessment of systems, functional safety, etc. SC65A also has a safety pilot function to prepare standards dealing with functional safety of electrical/electronic/programmable electronic systems.

IEC TC65/SC 65B: Devices

To prepare international standards regarding the devices (hardware and software) used in industrial-process measurement and control, ranging from the simple device (e. g. actuator) to the complex one (e. g. Programmable Logic Controller), and covering such aspects as interchangeability, performance evaluation, functionality definition etc.

IEC TC65/SC 65C: Digital Communications

To prepare international standards on Digital Data Communications sub-systems for industrial process measurement and control as well as on instrumentation systems used for research, development and testing purposes.

IEC TC65/SC 65D: Analysing Equipment

To prepare international standards relating to: (A) the performance of permanently installed chemical analysers, utilizing either a sampling system or an in situ measurement technique, which are used in the field of process control analysis, (B) the safety of analysers houses which may, under certain circumstances, contain the above analysers. These standards will specify both the terminology and definitions related to the performance of the analyser, which tests should be performed in order to determine the functional performance, and how such tests should be carried out.

Last meeting IEC TC65 in Berlin, Germany, from 2006-09-29 to 2006-09-29

4.2 IEC TC 65 Membership

| | | | |
|-------------------------------------|---------------|---|---------------|
| AUSTRALIA (AU) | Observer | MEXICO (MX) | Participating |
| AUSTRIA (AT) | Participating | NETHERLANDS (NL) | Participating |
| BELGIUM (BE) | Participating | NEW ZEALAND (NZ) | Observer |
| BULGARIA (BG) | Observer | NORWAY (NO) | Participating |
| CANADA (CA) | Participating | POLAND (PL) | Participating |
| CHINA (CN) | Participating | PORTUGAL (PT) | Observer |
| CZECH REPUBLIC (CZ) | Observer | ROMANIA (RO) | Participating |
| DENMARK (DK) | Participating | RUSSIAN FEDERATION (RU) | Participating |
| FINLAND (FI) | Participating | SERBIA (RS) | Observer |
| FRANCE (FR) | Participating | SINGAPORE (SG) | Observer |
| GERMANY (DE) | Participating | SLOVAKIA (SK) | Participating |
| GREECE (GR) | Observer | SLOVENIA (SI) | Observer |
| HUNGARY (HU) | Participating | SPAIN (ES) | Participating |
| INDIA (IN) | Observer | SWEDEN (SE) | Participating |
| INDONESIA (ID) | Observer | SWITZERLAND (CH) | Participating |
| IRELAND (IE) | Observer | TURKEY (TR) | Observer |
| ITALY (IT) | Participating | UKRAINE (UA) | Observer |
| JAPAN (JP) | Participating | UNITED KINGDOM (GB) | Participating |

[KOREA \(REPUBLIC OF
\(KR\)\)](#)

Participating

[UNITED STATES OF
AMERICA \(US\)](#)

Participating

[LUXEMBOURG \(LU\)](#)

Observer

[Strategic Policy Statement](#) have been prepared and is available from IEC web (www.iec.ch).

Chairman: (Term of office 2010-01)

Mr. Roland HEIDEL

Siemens AG A&D, ATS SR

Oestliche Rheinbrueckenstrasse 50

DE - 76187 KARLSRUHE, GERMANY

Tel: +49 721 595 4632

Email: Mr. Roland HEIDEL (click on name to start an email)

Secretary:

Monsieur Bernard DUMORTIER

28 chemin des Hauts Doigts

Schneider Electric

Information Technology Standardization

Manager

FR - 78750 MAREIL MARLY, FRANCE

Tel: +33 1 72 55 80 62

Fax: +33 1 39 16 99 60

Email: Monsieur Bernard DUMORTIER (click on name to start an email)

Working Groups:

[WG 1: Terms and definitions](#)

[WG 6: Function blocks](#)

[WG 9: Fossil fired steam power stations](#)

[WG 10: Security for industrial process measurement and control - Network and system security](#)

[WG 12: Representation of process control engineering requests in P&I diagrams and data exchange between P&ID tools and PCE-CAE tools](#)

4.3 Subcommittee 65A: System aspects

Secretariat: United Kingdom

Last meeting: Place: Berlin, DE Date: 2006-09-26 to 2006-09-26

[Membership](#)

Chairman: (Term of office 2008-02)

Mr. Joseph D. DUFFY

Emerson Process Management

12301 Research Blvd

Research Park Plaza, Bldg III

AUSTIN, TX 78759, USA

Tel: +1 512 834 71 96

Fax: +1 512 834 72 00

Email: Mr. Joseph D. DUFFY (click on name to start an email)

Secretary:

Mr. George F. THOMPSON
British Electrotechnical Committee
Electrical Department - Floor 11-6
British Standards Institution
389 Chiswick High Road
GB - LONDON W4 4AL, UNITED KINGDOM
Tel: +44 208 996 7297
Fax: +44 208 996 7799
Email: Mr. George F. THOMPSON (click on name to start an email)

Scope:

To prepare standards regarding the generic aspects of systems used in industrial-process measurement and control: operational conditions (including EMC), methodology for the assessment of systems, functional safety, etc.
Horizontal Safety Function
Functional safety or electrical/electronic/programmable electronic systems (which would encompass safety-related software).

Working Groups:

[WG 4: EMC Requirements](#)
[WG 14: Functional Safety Guide: IEC 61508-0](#)

Maintenance Teams:

[MT 61508-1/2: Maintenance of IEC 61508-1, -2, -4, -5,-6 and 7](#)
[MT 61508-1/2-TG1: Digital communication systems with reference to IEC 61508](#)
[MT 61508-3: Maintenance of IEC 61508-3, -4, -6 and -7](#)
[MT 61511: Functional safety - Safety instrumented systems for the process industry](#)
[MT 61512: Batch control systems](#)

5 API Subcommittee on Instruments & Control Systems (API SOICS)

5.1 General

Website: <http://committees.api.org/standards/cre/soics/mtginfo/mtghm.html>

[Meeting Information](#) | [References](#) | [Ballots](#) | [Archives](#) | [Technical Inquires](#)

This information is derived from the home page for the CRE (Committee for Refining Equipment) Subcommittee on Instruments and Controls. The website provides information on upcoming meetings, minutes and presentations from recent meetings and information on the status and balloting of standards maintained by SOICS.

The mission of SOICS is to develop standards and recommended practices specific to the refining industry, analyze technical issues, provide training and advice on relevant technical issues and share information which is useful to the industry as a group. The SOICS also works closely with other standards organizations such as ISA and PIP.

SOICS Chairman: Richard Stanley

Last meeting: May 1-3, 2006 (info from meeting in paragraphs below)

Next meeting: October 30 - November 1, 2006, Renaissance Parc 55, San Francisco, CA.

5.2 Recommended Practices prepared by this API CRE subcommittee

RP 551 Process Measurement Instrumentation

Provides procedures for the installation of the more generally used measuring and control instruments and related accessories. 1st Edition / May 1993

RP 552 Transmission Systems

Reviews the recommended practices for the installation of electronic and pneumatic measurement and control-signal transmission systems. Transmission systems permit operation of one or more large or small process units from a remote control center. 1st Edition / October 1994

RP 553 Refinery Control Valves

This document provides recommended criteria for the selection, specification and application of piston and diaphragm actuated control valves. It also outlines control valve design considerations, discusses control valve sizing, noise, fugitive emissions, and defines types of commonly used control valves and their actuators. 1st Edition / September 1998

RP 554 Process Instrumentation and Control – 3 parts

Covers performance requirements and considerations for the selection, specification, installation and testing of process instrumentation and control systems. Control centers as used in the petroleum industry are also covered. This practice is not intended to be used as a purchase specification, but makes recommendations from minimum requirements and can be used to provide guidance for the development of detailed designs and specifications. 1st Edition / September 1995

RP 557 Guide to Advanced Control Systems

Addresses the implementation and ownership of advanced control systems for refinery purposes. RP 557 describes commonly used practices for the opportunity identification, justification, project management, implementation and maintenance of advanced control system applications in refinery service. 1st Edition / December 2000.

5.3 Major issues the API SC is addressing:

1. Attendance and participation is improving, but more participation is still needed. Attendance at joint meeting was 21 - 7 user members, 1 user visitor, 4 contractor members and 2 contractor visitors, 4 manufacturer members and 3 manufacturer visitors. Attendance at Task Group B (RP-556) was quite strong with about 20 attendees.
2. The Subcommittee held a technical session on Control Systems Security with presentations from Emerson, Honeywell, Matrikon and Yokogawa. These presentations were very informative and provide the S/C with user guidance material that will be included in RP-554 part 2 and part 3.
3. Continued work on RP-556 - Fired Heater and Boiler Instrumentation and Protective Systems (RP-556) – Heat Transfer S/C members are participating in discussion. Task Group has been through the full document and are discussing details. Recommendations for ultra low NOx burners are still being discussed.
4. Completion of RP-554 Parts 1-3. Part 1 (Process Control Systems Functions and Functional Specifications) has been through ballot review is ready for submission to API for publication. The Task Group reviewed the content of the draft of Part 3 (Project Execution and Ownership) and expect to be able to complete a full draft for S/C review after the Fall 2006 meeting. PIP has almost completed Part 2 (Design) and API will be providing final

comments to PIP for their July 2006 meeting. We expect a joint PIP/API ballot fairly soon thereafter.

5. Starting review of RP-553 (Control Valves) and RP-557 (Advanced Control Systems) for reaffirmation. Its expected that 553 will require some minor updates, and it is likely that 557 will be submitted for reaffirmation.
6. RP-552 (Transmission Systems) was balloted by did not receive a sufficient response. A rebalot will be requested. A ballot of 551 was requested after fall meeting in Chicago, but status of that ballot is unkown. We need to verify that a ballot request was actually made to API.
7. SOICS will meet in the fall at the API meeting in San Francisco. Will not meet at ISA this year

5.4 Major concerns of SC and proposed remedies

Attendance and participation is improving but still not what we would like it to be. Attendance by user representatives was improved with attendees from BP, Chevron, Aramco, Conoco-Phillips and Citgo. Exxon-Mobil has nominated a member to replace Dan Bolland, but he was unable to attend this meeting. Still no representation from Shell. Of the major contractors, Fluor was the only represented company. UOP has changed representatives due to changes in the existing representative's job assignment

5.5 Changes in revised standards that could have significant business impact on users

1. The CRE is looking for a brief description (1-2 paragraphs) of any forthcoming changes to standards that should be highlighted to company management because they may:
2. Incur a significant cost or savings to equipment cost or repair; Require a significant addition or allow for a reduction in engineering effort necessary to design or specify equipment procurement;
3. Noticeably improve equipment reliability or safety.

The Task Group working on RP-556 is discussing making the 3rd edition an API Standard instead of an RP. Work on the 2nd edition will be wrapping up this year and they expect to ballot the 2nd edition as an RP. The Task Group has been requested to provide a written proposal on the reasons for converting to a Standard and the expected impacts upon the industry.

The reasoning for this is that compliance with IEC-61508 and IEC-61511 is becoming more widespread in the US and the industry in general is reaching consensus on the techniques for compliances. The Task Group is considering whether the general practice has reached a point to where the guidance in RP-556 should be upgraded to a Standard.

5.6 Confirm publication development/revision schedule

1. RP-552, Signal Transmission Systems has been submitted to API for ballot – need to submit for rebalot due to insufficient response. We believe that much of the problem is that ballots were sent to inactive members still on the API distribution list.
2. RP-551, Instrumentation was reported to have been submitted for ballot after the fall 2005 meeting. Need to confirm status.
3. RP-554, Part 1, Process Control Systems, is ready for publication
4. PIP continues work on RP-554, Part 2, Process Control Systems. A ballot version of the document is expected as soon as fall of 2006
5. RP-554, Part 3 is actively being worked. A full draft for SC review should be ready after the Fall 2006 meeting. Projected ballot after Spring 2007 meeting.

6. RP-553 and RP-557 are due for update or reaffirmation. SC is looking at restarting Task Group A to look at RP-553. Task Group C will likely recommend reaffirmation of RP-557

6 UKOOA OPS15 Instrument-Based Protective Systems - (1999)

The purpose of these guidelines is to provide guidance on good practice for the design, operation, maintenance and modification of instrument-based protective systems against identified process hazards on oil and gas processing facilities associated with the UK Continental Shelf. The document primarily applies to process and facilities on offshore installations; however, the principles may be applied to drilling facilities and onshore terminals.

7 ANSI / ISA arbeid

7.1 Background

ISA is an ANSI accredited organization. Founded in 1945, ISA (www.isa.org) is a leading, global, nonprofit organization that is setting the standard for automation by helping over 30.000 worldwide members and other professionals solve difficult technical problems, while enhancing their leadership and personal career capabilities. Based in Research Triangle Park, North Carolina, ISA develops standards; certifies industry professionals; provides education and training; publishes books and technical articles; and hosts the largest conference and exhibition for automation professionals in the Western Hemisphere. ISA is the founding sponsor of The Automation Federation (www.automationfederation.org).

ISA is globally recognized as a standards writing organization, developing consensus standards for automation, security, safety, batch control, control valves, fieldbus, environmental conditions, measurement, and symbols.

Accredited by the American National Standards Institute (ANSI), ISA has published more than 150 standards, recommended practices, and technical reports, through the dedicated efforts of a network of industry experts.

In March 2000, OSHA issued a letter to ISA, in which OSHA responded to questions pertaining to ANSI/ISA 84.01-1996, "Application of Safety Instrumented Systems for the Process Industries." Since then, based on experience gained from its use and the availability of newer technology, ISA has updated and modified ANSI/ISA 84.01-1996. This new standard — ANSI/ISA-84.00.01-2004 Parts 1-3 (IEC 61511 Mod), "Functional Safety: Safety Instrumented Systems for the Process Industry Sector," has been approved by ISA and by ANSI. With this background, ISA is again requesting a response to the following questions:

7.2 Introduction to Safety Integrity Levels

Safety instrumented systems (SIS) are used to provide safe control functions for processes, e.g. emergency shutdown (ESD), fire detection and blowdown functions. SIS typically are composed of sensors, logic solvers and final control elements. Due to the critical nature of such systems, OSHA recognizes compliance with the standard ANSI/ISA S84.01 - Application of SIS for the Process Industries - as a good engineering practice for safety instrumented systems. This is a consensus standard for the application of SIS for the process industries, which is based on international standards from the International Electrotechnical Commission (IEC).

One of the standards is IEC 61508, Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems, Parts 1-7, 1998. It is an umbrella standard applicable to all industries. IEC is in the process of developing a process-industry-specific version of IEC 61508 based on ANSI/ISA S84.01 i.e. IEC 61511, Functional SIS for the Process Industry Sector. Part 1 of the standard, IEC 61511-1 (Ed. 1.0) "Framework, definitions, systems, hardware and software requirements" is now available from IEC. Part 2 of the standard, IEC 61511-2 (Ed. 1.0) "Guidelines in the application of Part 1" will be published shortly and Part 3, IEC 61511-3 (Ed. 1.0) "Guidance for the determination of safety integrity levels" is scheduled to appear in June 2003.

7.3 What is Target SIL?

ANSI/ISA S84.01 and IEC 61508 require that companies assign a target SIL for any new or retrofitted SIS. The assignment of the target SIL is a decision requiring the extension of the Process Hazards Analysis (PHA). The assignment is based on the amount of risk reduction that is necessary to mitigate the risk associated with the process to an acceptable level. All of the SIS design, operation and maintenance choices must then be verified against the target SIL.

7.4 Standards and Regulations relating to SIL Analysis

- ANSI/ISA-SP-84.01, "Application of Safety Instrumented Systems for the Process Industries," Instrument Society of America Standards and Practices, 1996.
- IEC-61508, "Functional Safety: Safety Related Systems," International Electrotechnical Commission, Technical Committee (1998).
- IEC-61511, "Functional Safety: Safety Instrumented Systems for the process industry sector", International Electrotechnical Commission, Technical Committee (Draft).
- "Programmable Electronic Systems in Safety Related Applications", Health and Safety Executive, U.K., 1987.
- 29 CFR Part 1910, "Process Safety Management of Highly Hazardous Chemicals; Explosives and Blasting Agents", Occupational Safety and Health Administration, 1992.

7.5 ISA-SP84 committee, Programmable Electronic System (PES) for Use in Safety Applications

The ISA-SP84 committee achieved a major milestone in publishing ANSI/ISA-84.00.01-2004 Parts 1-3 (IEC 61511 Mod), *Functional Safety: Safety Instrumented Systems for the Process Industry Sector*. This three-part series gives requirements for the specification, design, installation, operation, and maintenance of a safety instrumented system so that it can be confidently entrusted to place and/or maintain a process in a safe state. Through its working groups, ISA-SP84 has and is currently developing several key technical reports to provide guidance on the implementation and use of the three-part series of standards.

7.6 ANSI / ISA S84 Path Forward

TR84.00.02 – This is the 5 part document that reviews the major evaluation techniques and the calculation methods. The plan is to streamline this to a 3 part technical report.

- Simple Functions
- Fault Tree Specifics
- Markov Models

dTR84.00.04 – This draft guidance document is nearing completion and will be submitted to ANSI. Multiple discussions took place within the committee concerning a dedicated alternate means of shutting down. (aka. Big Red Pushbutton) In many processes this action is not installed to avoid a more catastrophic event from occurring when the button is pushed at any time other than a true

emergency situation. The use of an alternate means will be considered only an option in this document.

TR84.00.03-2002 – Guidelines for Testing is up for renewal. Plan is to offer 5 different methodologies from different companies including partial stroke testing as it is applied by some of these companies.

dTR84.00.05 – BMS – This technical report concludes that there is not reason not to follow S84 for burner management systems with some general guidance.

WG-6 – Fire and Gas – This working group is still developing their plans for any technical reports but some interest has surfaced on discussing dispersion models and applying S84 to monitoring process facilities.

dTR84.00.06 – (WG-1) – Safety Fieldbus – Draft 5 will be sent to the S84 committee. So far only Foundation Fieldbus has been working with the committee. They have responded to earlier communications stating that they agree with the limitations requested by this working group and will propose that any Safety Fieldbus from the Foundation must meet all the requirements of the SP84 committee as outlined in the technical report. The major points were spurious trip rate, probability of failure on demand, and interoperability testing compliance. This concept has been approved by TUV and a more detailed review is now ongoing. So far a TUV certified Safety Fieldbus based on Foundation Fieldbus is not commercially available.

WG-4 – electromagnetic issues – no activities to report

S91.00.01- Initial plan was to limit OSHA to an SIS focus. Plan is to review with the committee to see if it is still useful to maintain this standard.

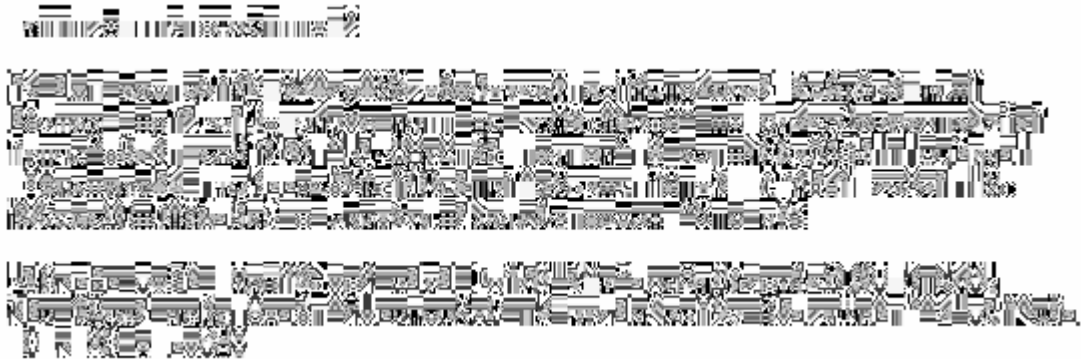
TR91.00.02- Still an active job to review how to integrate asset protection within the overall classification and reliability activity.

ISA SP96 made a presentation stating that they continue to work on actuator documents including MOV, pneumatic and hydraulic. They plan to issue TR96.05 to cover the issue of partial stroking including a discussion of when you could or should consider partial valve stroking for testing.

IEC-61508 – Still working on 5 year maintenance cycle.

IEC-61511 – Plan to start moving forward with the next maintenance cycle although originally this was delayed while waiting for IEC-61508 to be renewed.





In March 2000, OSHA issued a letter stating that the ANSI/ISA S84.01-1996 standard is considered "good engineering practice" for safety instrumented system design. This effectively makes the S84 standard part of process safety management (PSM) since paragraph (d)(3)(ii) of the OSHA PSM standard specifies: "The employer shall document that equipment complies with recognized and generally accepted good engineering practices".

7.7 Standards issued by SP84, Programmable Electronic Systems for Use in Safety Applications

[ANSI/ISA-84.00.01-2004 Part 1 \(IEC 61511-1 Mod\) - Functional Safety: Safety Instrumented Systems for the Process Industry Sector - Part 1: Framework, Definitions, System, Hardware and Software Requirements](#)

[ANSI/ISA-84.00.01-2004 Part 2 \(IEC 61511-2 Mod\) - Functional Safety: Safety Instrumented Systems for the Process Industry Sector - Part 2: Guidelines for the Application of ANSI/ISA-84.00.01-2004 Part 1 \(IEC 61511-1 Mod\) - Informative](#)

[ANSI/ISA-84.00.01-2004 Part 3 \(IEC 61511-3 Mod\) - Functional Safety: Safety Instrumented Systems for the Process Industry Sector - Part 3: Guidance for the Determination of the Required Safety Integrity Levels - Informative \(Downloadable\)](#)

[ISA-99 - Manufacturing & Control Systems Security CD](#)

[ISA-TR84.00.02-2002, Part 1 - Safety Instrumented Functions \(SIF\) - Safety Integrity Level \(SIL\) Evaluation Techniques Part 1: Introduction](#)

[ISA-TR84.00.02-2002, Part 2 - Safety Instrumented Functions \(SIF\) - Safety Integrity Level \(SIL\) Evaluation Techniques Part 2: Determining the SIL of a SIF via Simplified Equations](#)

[ISA-TR84.00.02-2002, Part 3 - Safety Instrumented Functions \(SIF\) - Safety Integrity Level \(SIL\) Evaluation Techniques Part 3: Determining the SIL of a SIF via Fault Tree Analysis](#)

[ISA-TR84.00.02-2002, Part 4 - Safety Instrumented Functions \(SIF\) - Safety Integrity Level \(SIL\) Evaluation Techniques Part 4: Determining the SIL of a SIF via Markov Analysis](#)

[ISA-TR84.00.02-2002, Part 5 - Safety Instrumented Functions \(SIF\) - Safety Integrity Level \(SIL\) Evaluation Techniques Part 5: Determining the PFD of SIS Logic Solvers via Markov Analysis](#)

[ISA-TR84.00.03-2002 - Guidance for Testing of Process Sector Safety Instrumented Functions \(SIF\) Implemented as or Within Safety Instrumented Systems \(SIS\)](#)

[ISA-TR84.00.04-2005, Part 1 - ISA-TR84.00.04-2005 Part 1: Guideline on the Implementation of ANSI/ISA-84.00.01-2004 \(IEC 61511 Mod\)](#)

[ISA-TR84.00.04-2005, Part 2 - ISA-TR84.00.04-2005 Part 2: Example Implementation of ANSI/ISA-84.00.01-2004 \(IEC 61511 Mod\)](#)

8 Process Industry Practices (PIP)

8.1 Introduction

Process Industry Practices (PIP) is a consortium of process industry owners and engineering construction contractors who serve the industry. PIP was organized in 1993 and is a separately funded initiative of the [Construction Industry Institute](#) (CII), at [The University of Texas at Austin](#).

PIP publishes documents called Practices. These Practices reflect a harmonization of company engineering standards in many engineering disciplines. [Up to 6% savings on capital projects can be achieved](#) with the implementation of the Practices. Specific Practices include design, selection and specification, and installation information.

Practices are developed for a number of areas, including the following disciplines:

| | |
|---------------------------------------|---------------------------------------|
| Control Panels | Instrument Piping |
| Control Regulators | Level Instrumentation |
| Control Valves | Process Analyzers |
| Differential Pressure | Safety Systems |
| Instrument Air | |

8.2 PIP Mission

To increase the value of the engineering - procurement - construction process for the U.S. process industry in the global marketplace, and enhance compliance with safety, health and environmental objectives. This will be accomplished through ensuring the availability of recommended Practices for the detailed design, procurement, and construction of process facilities, including the perspective of maintenance and operations.

8.3 Scope

Develop voluntary recommended "Practices" for the detailed design, procurement, and construction of process manufacturing facilities, based on a compilation and harmonization of existing member company internal standards, or will develop recommended practices based on new material where harmonization of existing material is not adequate and the need for the Practice is clearly demonstrated. Versions of the U.S. voluntary recommended Practices can be used as the basis to meet international requirements.

8.4 Applicability to Other Industries

While the emphasis is on the Process Industry, it is clear that many PIP Practices can effectively be used by related industries such as Pharmaceuticals, Pulp & Paper, and Power.

8.5 Value Proposition

[Position Paper](#) PDF (318 KB) "PIP - A Way to Achieve up to 6% Savings on Your Capital Projects." Members Reported Recent Successes:

- More than 30% reduction in costs for maintaining internal company standards.
- Reduced valve inventory by 40% using PIP Practices.
- Piping Practices save up to 1,6% of total installed cost and 2 weeks on schedule.
- PIP davits cost 7% less than others.
- Estimated potential 6,7% savings in total installed cost for project. (See PIP Paper Measuring the Value below)

["PIP Paper - Measuring the Value"](#) PDF (32 KB)

This paper was presented at the April 1999 General Meeting and is now available for downloading.

Annex A

List of Hydro specifications related to instrument & automation:

- NHT-I52-00017 Field instrumentation , supplement to I-001
- NHT-I52-00049 Safety and automation system, supplement to I-002
- NHT-X52-00005 Electrical, Instrumentation and Teleconm Installation, supplement to Z-010

- NHT-I50-00038 IS requirements to production systems
- NHT-I52-00046 PIMS Functional requirements
- NHT-I52-00022 Control of Signal Budget
- NHT-I52-00035 Shut down Hierarchy, General requirements
- NHT-I52-00067 High Integrity Pressure Protection System (HIPPS)
- NHT-I52-00066 Safety Relief Valves and Rupture Disks
- NHT-I52-00070 Mechanical package programming and interface requirements
- 10-00-UP-I02-00001 DISCOS/SAS Alarmfilosofi

- NHT-I50-00026 Electronic Process Transmitters Requirement Specification
- NHT-I52-00001 Control Valves
- NHT-I52-00006 Actuators for On/Off Valves
- NHT-I52-00040 Vibration Monitoring
- NHT-I52-00043 Compression Tube fitting
- NHT-I52-00054 Choke valves

Most of these specifications are available online at:

http://www.hydro.com/en/our_business/oil_energy/new_projects/index.html