OTC 13295

An Industry in Transition

Cheryl L. Stark, BP America, James A. Heimer, ExxonMobil, Alain L. Loppinet, BNPé, Alf Reidar Johansen, Norsk-Hydro, P.T.N. Reeve, Shell Intl. E&P, Graham A.N. Thomas, BP International, and Don Smith, OGP

Copyright 2001, Offshore Technology Conference

This paper was prepared for presentation at the 2001 Offshore Technology Conference held in Houston, Texas, 30 April-3 May 2001.

This paper was selected for presentation by the OTC Program Committee following review of information contained in an abstract submitted by the author(s). Contents of the papers, as presented, have not been reviewed by the Offshore Technology Conference and are subject to correction by the author(s). The material, as presented, does not necessarily reflect any position of the Offshore Technology Conference or its officers. Electronic reproduction, distribution, or storage of any part of this paper for commercial purposes without the written consent of the Offshore Technology Conference is prohibited. Permission to reproduce in print is restricted to an abstract of not more than 300 words; illustrations may not be copied. The abstract must contain conspicuous acknowledgement of where and by whom the paper was presented.

ABSTRACT

The offshore areas around the world are beginning to play a more significant role in meeting global energy needs. Rigs and personnel move from one part of the globe to another on a daily basis. There is growing interest in the use of standards to both enhance safety and environmental performance and to lower costs.

An example of this is the increased interest in the activities of the International Organization for Standardization, and specifically ISO Technical Committee 67. ISO/TC67 is charged with preparing standards for materials and equipment, and offshore structures for the petroleum and natural gas industries. This committee has over 1,000 industry personnel working on over 130 standards. These standards define the technical operations and limits for pipe-both steel and aluminum, drilling fluids, cements and hydraulic fluids, drilling and production equipment including drill stem, packers and subsea production systems, OCTG, offshore piping, steam turbines and flexible couplings, compressors and turbines, and offshore structures including fixed steel or concrete, and floating systems. Specifically excluded from the remit for ISO/TC67 is any standardization of ships or marine technology covered by IMO, SOLAS and MARPOL.

Regulatory bodies in countries must write operating practices which address their safety and environmental requirements, including the protection of personnel. It is also becoming more important that these requirements are accomplished in a cost efficient manner since companies have alternative investment opportunities due to increased access around the globe. The use of standards to which both government and industry have contributed, provides an opportunity for government to express its requirements that reflects an industry consensus on what is the best way to accomplish a task.

International standards give the industry the ability to expedite manufacture and purchase of equipment, eliminating barriers to trade and commerce. Standards can also apply to less tangible items such as training and management systems. These same international standards allow regulatory agencies to apply a consistent nondiscriminatory basis for allowing industry to operate in their locale, i.e., provide a level playing field.

INTRODUCTION

The petroleum and natural gas industries have been vigorously pursuing the writing and adoption of international standards for about ten years. The historical perspective was presented in several papers given during former OTC meetings. [1,2,3,4, 5] Also defined in these papers are the operational aspects of each standards organization (ISO, CEN, ANSI, API, ASME, ASTM, etc.) and the interrelationships among them. This paper shows the progress made since the last paper was written (1995), and how the petroleum and natural gas is "an industry in transition" one which relies on national standards to one in which international standards represent the basis against which business is undertaken. Engaged in the transition process are oil and gas companies, manufacturers, suppliers/service companies, academia, and government bodies.

The historical events with which this overview deals began in 1989, when the International Organization (ISO) for Standardization reestablished the Technical Committee 67 for the standardization of "materials, equipment, and offshore structures for the petroleum and natural gas industries." ISO is defined from Greek as "equal" or "standard" and is the designation used for standards, but it is not an acronym for International Standards Organization. A former technical committee dealing with the same subject had been chartered in 1947 by ISO, and met during the period to 1954 to 1982. Ten standards were written, but later, withdrawn by the newly formed technical committee due to obsolete technology expressed in the standards and the lack of committee resolve to rewrite them.

INTERNATIONAL STANDARDIZATION DRIVERS

Many factors in the marketplace drove the need for new standards to be written. A major factor was the formation European Committee for Standardization (CEN) charged with preparing European standards (EN), designed to replace European national standards, remove trade barriers among countries, and improve worker and environmental safety. CEN could, in theory, prepare duplicates of existing API or national standards, or write totally new ones. Industry experts were being drawn into a standardizing effort that may have resulted in conflicting standards and appeared to lead only to a technical resource drain.

Other factors, such as activity in the North Sea with its very harsh conditions, international requirements for worker safety, environmental concerns, and the introduction of a European common market became additional drivers. Each company was expending time and technical resources to prepare documents that could be duplicates of existing specification, entirely different, and/or strictly company based. Many of these companies were operating in multiple geographic areas, each with a set of standards. Confusion, duplication, restrictions of trade, and general economic problems were the outfalls of these national and regional standards being implemented concurrently.

European and US-based operator companies, meeting under the umbrella of the International Exploration and Production Forum (E&P Forum) felt it the proper time to harmonize, consolidate, and create a single set of standards that could be used anywhere in the world. The single goal was the "nonproliferation of conflicting national standards."[3] and ISO became the vehicle to accomplish this goal.

NOTE: E&P Forum has changed its name to International Association of Oil and Gas Producers to better represent the activities of its members, and will be referred to as OGP in the remainder of this article.

ANSI DESIGNATES API AS ADMINISTRATOR

The reactivated technical committee 67 initially had eighteen P (participating) member countries, and thirteen O (observing) member countries. ANSI (USA member of ISO) accepted the secretariat. ANSI recognized that a standards development organization existed within the USA that could provide the technology and experts, and adequately handle the significant volume of paperwork involved in multi-level process of ISO standards writing.

Since 1923, the API (American Petroleum Institute) had been the accepted standardization body for petroleum and natural gas materials and equipment. As US-based companies expanded the exploration and production activities worldwide, the API standards had been used as *de facto* standards for manufacture and purchase of equipment. ANSI designated API as the Technical Advisory Group Administrator for TC67, and reviewed/validated some eighty standards as ANSI/API. This raised the API standards from industry common standards to national status and thereby, allowed acceptance by ISO and CEN. Universal and unequivocal acceptance of API standards changed in the late 1970s and early 1980s, and by the late 1980s, it was evident that API should take an international outlook. ANSI/API national standards could become the basis for international standards.

ISO/TC67 BEGAN WORKING WITH API STANDARDS

The initial effort of ISO/TC67 was to review the available ANSI/API national standards and decide upon the most pertinent to the industry. The API selected over seventy of its several hundred standards for review by an Advisory Group of ISO/TC67. Forty-four were selected for possible "quick" adoption based on the technical integrity and industry usage level. ISO/Central Secretariat agreed that these documents

could be "fast-tracked" and published as written with the addition of an ISO number, ISO cover sheet, and Foreword. In the years 1993 and 1994, a total of seventeen new ISO standards were issued with only ISO face-lifts to the existing document. All others were deemed by the Advisory Group to need modification and updating, and fell under the normal ISO work plan.

ORGANIZING TO WORK

The working effort of ISO/TC67 was divided into very broad-spectrum categories, and assigned to a series of seven subcommittees. These seven subcommittees continue the work today, and each has a multi-dimensional work effort. In many cases, the work program of a subcommittee is actually larger and more complicated than some other ISO technical committees handling other subjects. The industry felt it best to place all petroleum and natural gas equipment standards under a single committee in order to maintain the communication spanning all areas, and to provide the technical experts to cover many disciplines. The subcommittees are the program managers for their work program, and are responsible for setting of deadlines, identifying shortfalls, proposing new work items, and communication within the subcommittee and to the technical committee and ISO central secretariat. These subcommittees do not work alone but are interrelated, and the work of one impacts the work of another.

The general structure for ISO/TC67 is shown in Figure 1, and has been discussed in previous papers. Generally, it is:
Subcommittee 1 – Steel pipe for pipelines
Subcommittee 2 – Pipe transportation systems
Subcommittee 3 – Drilling fluids and cements, and workover fluids
Subcommittee 4 – Drilling and production equipment
Subcommittee 5 – Casing, tubing and drill pipe
Subcommittee 6 – Processing equipment and systems (including refinery equipment)
Subcommittee 7 – Offshore structures

Additional items of a small, defined subject are handled by working groups reporting directly to the technical committee. At the present time, there are six working groups:
Working group 2 – Certification principles
Working group 4 – Reliability and maintenance data
Working group 5 – Aluminum drill pipe
Working group 7 – Materials for corrosive (H_2S) service
Working group 8 – Resource group for questions on metallurgy
Working group 9 – Life cycle costing

As a working group addresses its task, several actions can conclude their work. The first is the normal process of consensus building resulting in a standard or specification; in this case the experts form a network led by the convenor, that can address interpretations and issue amendment(s) and initiate a full revision when appropriate. The second is the lack of consensus and incomplete work, which could result in a technical report or total stalemate; in this case, the working group may be disbanded, and a new work item would be required to reestablish the need and reactivate the project. The third result is one in which the working group determines that the project is much larger than their smaller group can handle, additional resources or expertise are needed, and the working group recommends that the effort be elevated to a standing subcommittee with a newly defined and broadened scope of work.

Secretariats to each subcommittee are held by countries, as indicated by the national flag. These secretariats are permanent until the country holding it decides to relinquish the position. The secretariat provides the support functions of record maintenance, meeting preparation, document retention, correspondence, and direct link to the ISO central secretariat. All tracking of drafts is done through the identified secretariat office, which is also the keeper of personnel rosters for the subcommittee and its working groups.

ISO IS VERY SPECIFIC IN NOMENCLATURE AND WRITING STYLE

The original work program of 70 specifications has now expanded to over 130, and several of the original seventeen have come under a five-year review cycle. Only about 70% of these 130 documents are based on ANSI/API documents, so the subcommittees and working groups are also conducting research and technical consensus building. The technical committee has maintained its basic structure of seven subcommittees covering broad topics, and working groups reporting to the technical committee have been formed to address single issues and then discharged. Each subcommittee has from three to ten working groups dealing with specific issues, and writing standard or standards about that topic.

ISO/TC67 experienced a major learning curve in dealing with ISO style documents. The technical experts were not always clear in writing style, and the petroleum and natural gas industry has inherent idiomatic and "slang" expressions that baffled the ISO editorial staff. ISO/TC67 undertook several ways of assisting the learning curve issue across the varied subcommittees and within ISO/CS. The most successful was an Ad Hoc Group acting as mentors, coaches, editors, and resource staffing for the subcommittees. This Ad Hoc Group has recently been formalized into a Management Committee responsible for the same issues, and interacting in an Executive Committee with the subcommittee chairs.

The chart in Figure 2, demonstrates the early years were not particularly fruitful. The years of 1995-1998 saw only small numbers of standards actually come to publication. However, the subcommittees, working groups and project leaders actively continued their efforts. The year of 1999 was a major step forward with twelve standards and technical report being published. The ISO/TC67 published twenty two documents during 2000 and is projecting publication of at least another twenty-two during 2001. An optimistic guess would be that all standards currently on the program (133) would be published by early 2005. There will be reprinting of standards reviewed under the mandatory five-year cycle and new technical issues worked as new work items, so the number of standards published each year should continue to escalate.

COMMUNICATION IS THE CONNECTION

The TC67 Portal http://www.tc67.net/ provides access to several web-based aides to assist in communicating the policies of the TC67, as well as informational training materials for project leaders and their teams. These aides include on-line training, links to all TC67 managerial documents, links to the ISO/CS web pages and directives, a specific lessons learnt page, a listing of editorial help, and summaries of standards published during the year.

Communication among the countries is also considered imperative. The TC67 has instituted an Executive Committee which includes the secretariats (chair and secretary) of each subcommittee. A subset of the EC is the Management Committee (MC) with a representative(s) from each P member country. The EC meets annually about four months prior to the scheduled Plenary Meeting, and prepares the statement of work accomplished within each subcommittee. The MC meets at three additional times per year, to discuss resource needs, program successes and shortfalls, respond to requests/statements from the ISO CS, and general business of the TC. The TC is required by ISO CS to maintain an internal Policies and Procedures statement, a Strategy Policy and a Business Plan. In addition, TC67 MC puts forward a project management chart that tracks each document month by month through the various stages of ISO development.

The MC is a resource coordinator for the project leaders, editors and subcommittees. The primary resource of all work is the technical experts involved in preparing the standard through a consensus of all interested parties. The MC, at times must be willing to query within their home countries to locate experts who might be able to participate in a specific issue or in a complete standard. The MC also maintains an on-line information source for education of the project leaders and editors. The ISO directives, examples of ISO scripted standards, helpful hints and lessons learned are accessible via the MC-created site http://teched.tc67.net.

Communicating internal ISO business is not the only goal of the MC. The external world of standards users must be kept informed of changes, and availability of newly produced documents. The users include manufacturers and service/supply who have not previously been involved in development of standards, operator's procurement teams, and the worldwide regulatory community. All information of the TC is accessed through the TC67 Portal www.tc67.net which is routinely updated and information made available for users and standards writers. Communication is also accomplished through standards bulletins, industry magazines, trade shows, and technical conferences, such as OTC. Communication forms the linkage between preparation and use.

SALE OF STANDARDS

Normal business practice would say that the volume of product sales indicates the market acceptance. This normal approach does not generally hold when discussing standards use and application. One of the major negatives in the production of standards is the historically low volume of purchase. Standards are necessary to set the design parameters, but once a manufacturer or operator has a single copy of the standard, it is valid for all his usage locales or manufacturing sites. This is, however, one of the positive benefits accrued to a company through standardization. Some companies estimate a 25-fold cost to savings benefit by participating and utilizing international standards.

The sales figures at ISO do not reflect well the acceptance of the TC67 standards. Sales figures for the previous three years are given in Figure 3, and show that only nominal sales have been made. This low volume is a function of the above mentioned traditionally low sales and two additional factors:

1. few standards were actually available in these years: 1996 (29), 1997 (33), 1998 (34) and 1999 (36), with 10 being early (1973) ISO standards which were not viable.
2. countries readopt ISO standards into their standards literature, and as such, sales will be made at the national rather than international level.

Year 2000 should have a much better ISO sales record as more standards were available, although data is not available as this paper is being written. In the keeping with the above statement, 48 standards were available (of which 42 were viable). Figure 4 illustrates the 42 useful ISO Standards published to end 2000. By 2001, 60 should be in the document base at ISO (of which 50 would be considered useful standards). Many countries within the EU and Asia have already accepted these standards into the national standards programs. The year 2000 saw the initial readoption

within American Petroleum Institute (USA) of ISO formatted and produced standards.

USE IS THE PERFORMANCE MEASURE

Standards preparation is a monumentally time-consuming effort, and could be done without realizing the users goals. The true measure of success is in the application of any standard prepared. Manufactures of equipment must choose to produce goods (materials and equipment) to ISO specifications in preference to other standards available. Many times that decision choice is made by the purchaser (e.g., drilling contractor or operator) specifying a particular standard. At other times, regulators will demand use by having incorporated by reference particular standards into the operating regulations for an area.

An operator has many reasons for using a specific standard but the majority hinge on economic reasons. The primary reason for use of any standard is the ability to use equipment manufactured worldwide, and know with certainty that the equipment meets load and strength criteria, that it can be mated with similar parts and maintain integrity, and that the specified equipment is interchangeable. The operator would prefer to use internationally recognized standards, and not prepare and maintain costly internal company specifications. The international standards allows a stable, competitive global market, in which no supplier or country is given preferential treatment and one in which equipment of known integrity is available universally. Also of major concern, is the health and safety of workers and the general public, and protection of the working environment. International standards go some way toward providing rational, consistent health, safety and environment levels which is often difficult to demonstrate through the use of regional standards. Protection against accidents is the only operating mode for any operator.

The European Economic Community (EEC), and the associated legislation have created a special need for European Union (EU) countries. The EU has legislated a procurement directive in which equipment can only be produced to "EU recognized" standards. This requires at a minimum of CEN standards but in reality, demands only ISO standards.

Vendors of equipment are included in the standards development process to insure total consensus and agreement. Again, economic issues drive a manufacturer's desire to be involved in standards setting. A manufacturer or service/supply company benefits from the application of standards to equipment production. No in-depth redesign is necessitated by each customer order. Standard tooling and die work can "mass produce" equipment with engineering and safety specifications being designed into the equipment via the standard. The manufacturing facility can be located anywhere in the world – near the source of raw material, near the customer base, near a favorable tax situation, or near a source of skilled workers.

Purchasers encourage the participation of manufacturers in the ISO process, so that standards are written that are technically sound but meet economic feasibility. In applying an international standard, a manufacturer is assured that the product will be accepted in any global marketplace.

The final facet of the standards development and usage picture is the role of local and national government regulatory agencies. Depending on the legislation in each country, regulators find that incorporation of standards by reference, allows technically sound information to be incorporated without reproducing the document or doing the technical development work in-house. Operators and manufacturers include regulators in the production of specifications for materials and equipment, so that legislative needs are met. Operators benefit in compliance by using common international standards and being able to quote these specifications in permitting and operating documents.

The use of standards is also an economic question for regulatory groups. Regulatory agencies must meet the prescribed legislation promulgated by various countries to protect personnel, and assure safety and environmental maintenance. But these regulations must also address the encouragement of commerce within the country, and must accomplish this in a cost efficient manner. Companies – both operator and manufacturer - have alternative investment opportunities and could move an activity to a more favorable market elsewhere around the globe.

The regulatory community of several countries is considering the acceptance of ISO standards, especially for operating practices in the offshore marketplace. The use of standards to which both government and industry have contributed, provides an opportunity for government to incorporate its requirements and still reflect the industry consensus on what is the best way to accomplish a task.

CHALLENGES FOR TC67

Resources remain the biggest challenge for the technical committee. Primarily, this reduces to a people challenge. The proper balance of operators, manufacturers, and government must be maintained, but as results of the current industry philosophy of merger, right sizing and early retirement, the pool of technical experts is shrinking. As experienced technical experts and editors shift employment status and focus of work, the ISO work becomes delayed or understaffed. At present, most committees have adequate resources, however, this may not always be the case. The new or replacement experts must be trained and brought to a level of comfort within the ISO process.

Industry and government are not the only people challenged areas. The ISO Central Secretariat is also experiencing the loss of skilled employees, and will face a big challenge in the next two to three years, as more of the ISO TC67 documents are submitted for editing, typesetting, proofing, printing and inventory/shipping.

CONCLUSIONS

The goals of TC67 are being realized in the publication of standards. Technical development work and document writing are progressing. However, there remains a large portion of the work program which needs to be completed before publication status is reached. Revision of existing standards has begun and will accelerate during the next five years. Communication to the user community is progressing, but certainly not completed. The stakeholders – operators, manufacturers, and government – have successfully been engaged in the development process. By having all parties contributing to the consensus, voluntary standard have developed market relevant standards that can be used globally.

ACKNOWLEDGEMENTS

The authors wish to acknowledge the resources provided by their organizations to prepare and present this paper, and for their permission to publish.

The authors also wish to acknowledge the many participants in the internationalization process, and in particular the members of OGP Standards Committee who have encouraged and supported the initiatives described in this paper.

BIBLIOGRAPHY

1. Thomas, G.A.N., Geoffrey Thorp, and J.B. Denham. "The Upstream Oil and Gas Industry's Initiative in the Development of International Standards Based on API Standards." Offshore Technology Conference, OTC 6920, Houston 1992.

2. Wilson, D.E "Internationalization of Oil Industry Standards." Offshore Technology Conference, OTC 6921, Houston 1992.

3. Arney, C.E. "Toward One Set of Internal Standards for the Petroleum Industry Worldwide." Offshore Technology Conference, OTC 6922, Houston 1992.

4. Reeve, P.T.N., A.R. Johansen, J. Lautier. "International Standards for the Oil and Natural Gas Industries: A Review Paper." Offshore Technology Conference, OTC 7554, Houston 1994.

5. Johansen, A.R., A. Loppinet, P.T.N. Reeve, G.A.N. Thomas, G. Thorp, R. Vanzini. "International Standards for the Exploration & Production Industry – Their Development and Use." Offshore Technology Conference, OTC 7759, Houston 1995.

FIGURE 1 – TC67 COMMITTEE STRUCTURE

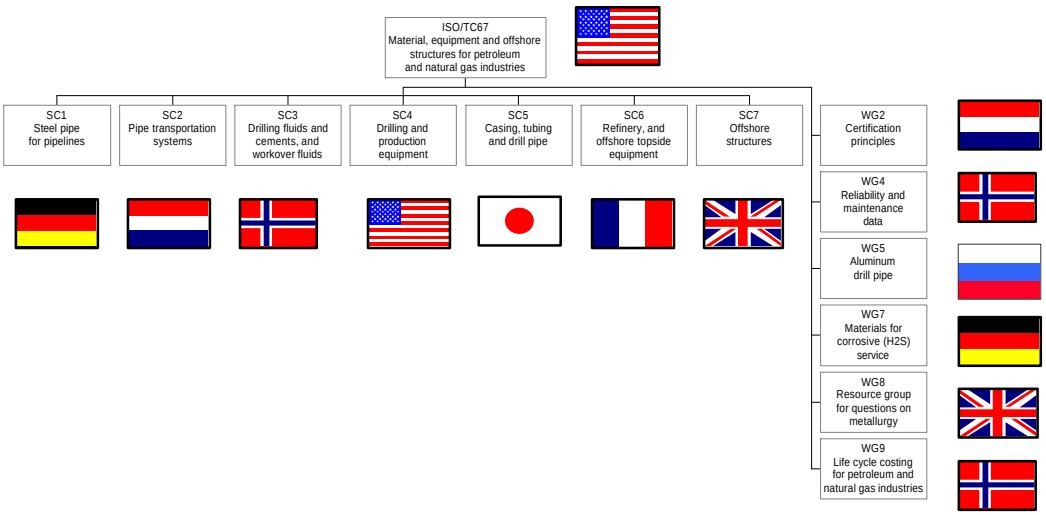

FIGURE 2 – YEARLY TOTAL OF DOCUMENTS PUBLISHED

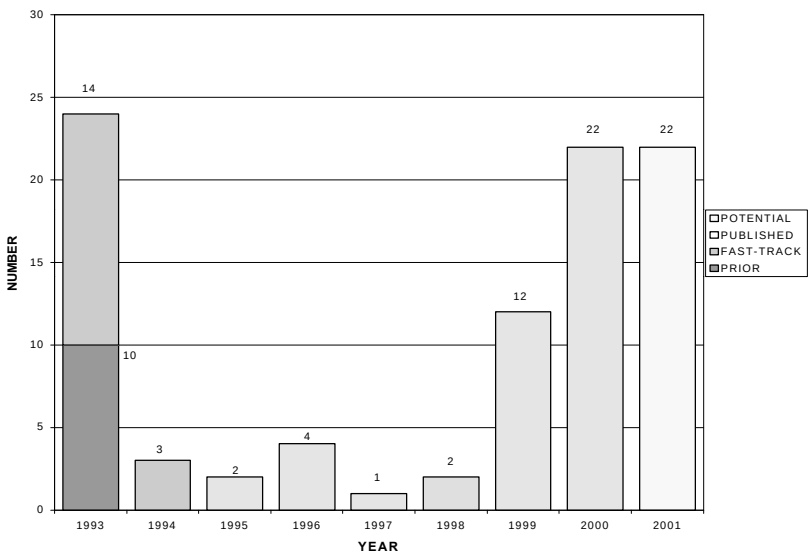

FIGURE 3 – ISO SALES OF DOCUMENTS

YEAR	TOTAL TC67 STANDARDS	STANDARDS PURCHASED	REVENUE TO ISO, SWISS FRANCS
1997	33	239	14 766
1998	34	199	12 946
1999	36	735	36 567

NOTE: This chart reflects only direct ISO-branded sales, and does not include nationally or regionally adopted documents.

FIGURE 4 – ISO/TC67 USEFUL PUBLICATIONS: 1993-2000