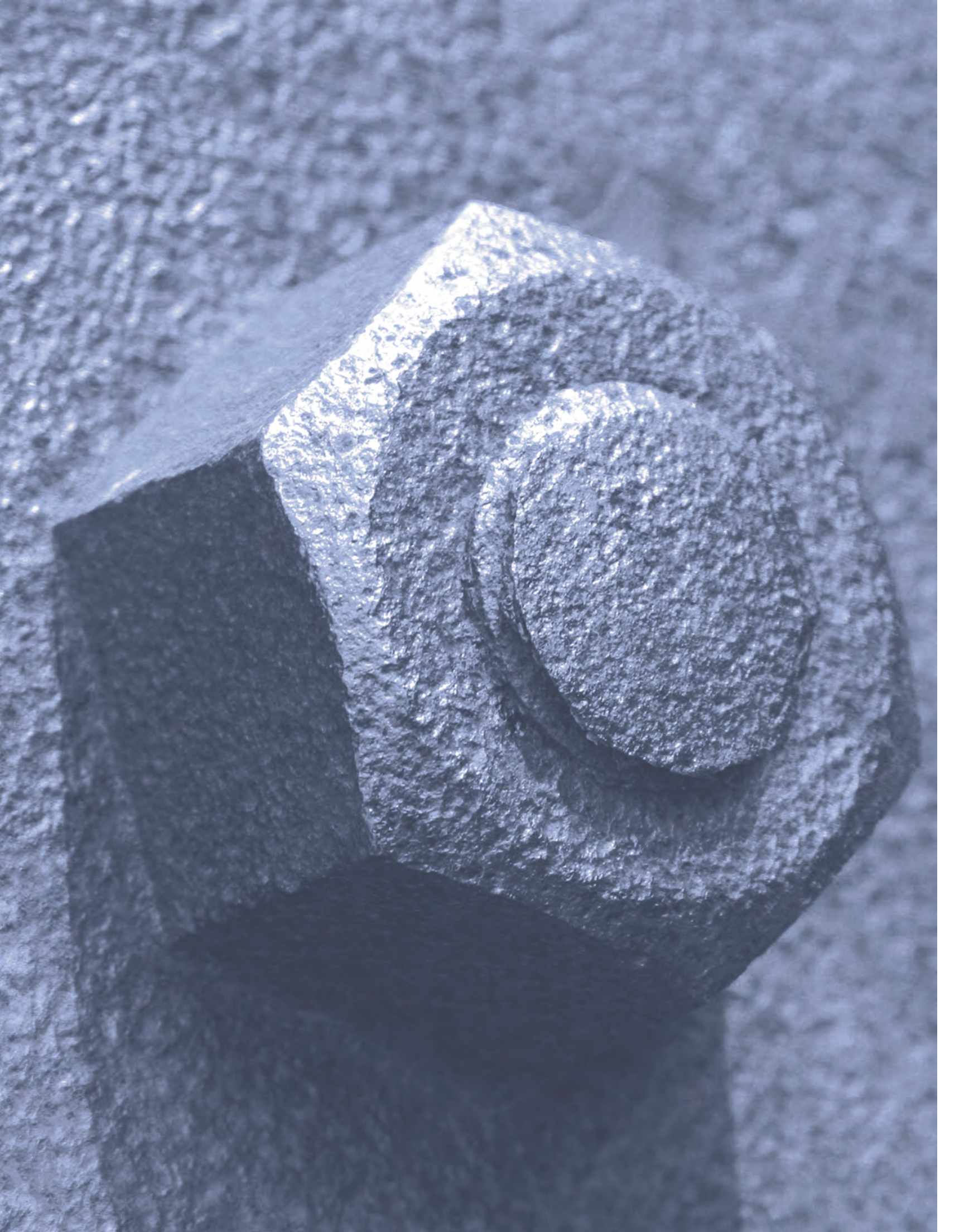




AMERICAN PETROLEUM INSTITUTE

THE OIL AND NATURAL GAS INDUSTRY'S MOST VALUABLE RESOURCE





ANYTHING BUT STANDARD?

IMAGINE IF EVERY NUT AND BOLT IN THE WORLD WERE MADE IN A DIFFERENT WAY.

And imagine that every time you needed to put a nut and bolt together, you needed a different tool to do it, depending on where and from whom you bought them.

Think of how difficult it would make your life. Think of the amount of money you'd have to spend on all the different tools just to match each nut and bolt. Think about all the problems there would be building equipment, manufacturing products, and providing services.

If we all just arbitrarily used different nuts and bolts for putting things together, we'd be facing problems with virtually everything.

Plain and simple, that's why standards are so important. Standards cross the realms of manufacturing, science and technology, and safety and security. They're a big part of everyday life.

Standards enhance the safety of industry operations, assure quality, help keep costs down, reduce waste, and minimize confusion. They help speed acceptance and bring products to market quicker. And they avoid having to reinvent the wheel every time a product is manufactured.

Since 1924, API has been a cornerstone in establishing and maintaining standards for the worldwide oil and natural gas industry. Our work helps the industry invent and manufacture superior products consistently, provide critical services, ensure fairness in the marketplace for businesses and consumers alike, and promotes the acceptance of products and practices globally.

Our work is anything but standard.

IT'S A BIG WORLD. SOMEBODY HAS TO STANDARDIZE IT.
SOMEBODY LIKE YOU.

TODAY'S OIL AND NATURAL GAS INDUSTRY REACHES AROUND THE GLOBE, TOUCHING THE LIVES OF MILLIONS OF PEOPLE EVERY SINGLE DAY.

It's an industry that relies on high-quality equipment, materials, and methods that meet the industry's growing demands worldwide. It's an industry that relies on API standards to get the job done right.

In today's environment of increased workload and decreased human resources, standardization has become a paramount concern of the world's oil and natural gas companies, equipment manufacturers, and suppliers.

It's standardization that keeps the oil and natural gas industry moving forward, allowing it to operate safely and reliably anywhere in the world. And it's standardization that should be at the top of your priorities.

By understanding the value of participating in API industry standardization efforts, you and your organization will help ensure the industry as a whole benefits. And when the industry benefits, you'll receive tangible benefits too.





But why support the standardization of petroleum and refining equipment, materials, and operating practices? Because your organization will realize both tangible and intangible benefits that apply to all facets of the oil and natural gas industry. Benefits such as improved reliability, safety, quality, and environmental performance that will help position your organization at the forefront of an ever-changing industry. Plus, your standardization efforts will help assure compliance with government requirements and ensure equipment interchangeability, demonstrating you can meet the needs of a global industry.

The oil and natural gas industry is becoming more and more standardized. And though it may be difficult to put a dollar figure on the value of standardization work, some studies clearly show the magnitude and types of benefits of industry participation.

Let us show you.

THE KEY TO REDUCING COSTS LIES IN MAXIMIZING THE USE OF STANDARD EQUIPMENT AND MATERIALS AND THE APPLICATION OF STANDARD DESIGNS AND PROCEDURES.

CRINE STRATEGIES FOR COST REDUCTION THROUGH SIMPLIFICATION AND STANDARDIZATION OF SPECIFICATIONS, UKOOA/IP, 1994

THE SAFETY OF EMPLOYEES AND THE COMMUNITY AT LARGE IS A MAJOR CONCERN OF THE OIL AND NATURAL GAS INDUSTRY.


An operator can minimize safety hazards through the use of equipment and materials designed and built to industry-developed API specifications and operated according to API recommended practices.

API standards add value to the equipment or materials by helping to manage liability while reducing the operator's risk, assuring that equipment and materials satisfy regulations and laws, and providing valuable information for training and educating workers. In addition, API standards are crucial to developing greater public trust by assuring that equipment and designs meet certain performance levels with appropriate safety margins, thus enhancing the operator's ability to meet public expectations regarding safety. All of these intangible benefits are measures of the industry's "license to operate."

The work done by API's Standardization Committees assure that API product standards, combined with API quality and certification programs, provide companies with procurement specifications that significantly reduce the resources spent developing and maintaining their own internal procurement specifications.

In addition, API committees have found that introducing third-party witnessing programs managed by API for the industry also leads to greater reliability. This approach allows companies to leverage their engineering resources by providing technical input for documents that can be regarded as true industry standards. Once a standard is established, the industry benefits as a whole, allowing end users to reap cost savings by procuring standard, readily available equipment at lower costs, and by having access to the industry's "lessons learned" and best practices.

Industry standards written to meet the industry's needs provide the essential foundation for minimizing internal company specifications, leading to lower capital and operating costs. Manufacturers also realize savings since they need fewer manufacturing practices and related quality systems to meet the requirements. Without proper standards, these savings cannot be realized.

A full-page background image showing a male worker in a blue uniform, safety glasses, and a red hard hat with a headlamp. He is climbing a complex metal structure, possibly a staircase or scaffolding, in an industrial environment. The scene is lit with a strong blue light, creating a dramatic and somewhat somber atmosphere. The worker is looking upwards and to the right, focused on his task. The background consists of large, vertical cylindrical structures, likely part of a refinery or chemical plant.

API standards also play a significant role in modifying, supplementing, or clarifying government regulations. In many cases, recommended practices that address common industry operations are standardized and then referenced by government agencies in regulations. Standards written by the industry and referenced in government regulations are invaluable because they are written by industry experts and interested parties, in technical terms familiar to industry personnel. This saves the industry the time and costs associated with obtaining interpretations from government agencies on vague regulatory language.

In addition, industry-developed standards can mitigate the adverse economic impact and impractical operating effects of regulatory standards developed by sources outside of the industry. Industry standards usually reflect real world operating conditions and practices. They help make regulations more straightforward and less onerous to implement while still meeting the intended purpose of the regulation.

THE DEVELOPMENT OF AND USE OF VOLUNTARY TECHNICAL STANDARDS ARE ESSENTIAL TO PROMOTING INNOVATION, REDUCING EXPENSES, IMPROVING QUALITY ASSURANCE, MARKETING GOODS AND SERVICES, AND ALLOWING THE U.S. TO COMPETE IN A GLOBAL ECONOMY.

"IMPORTANCE OF VOLUNTARY STANDARDS FOR FEDERAL AGENCIES"
C. KALLAUR, ASSOCIATE DIRECTOR, UNITED STATES MINERALS MANAGEMENT SERVICE, 1998

TAKE THE OVERALL ECONOMIC VALUE THAT STANDARDIZATION PROVIDES ALONG WITH SPECIFIC CASE STUDIES OF COST SAVINGS AND YOU CAN EASILY SEE THE TANGIBLE BENEFITS, BOTH FROM A MACRO AND MICRO POINT OF VIEW.

The tremendous impact of standards cannot be underestimated at the macro level. In March 2003, the U.S. Department of Commerce (DOC) announced its Standards Initiative in response to industry concerns that standards are among the greatest barriers to expanding imports. The DOC estimated that standards-related issues impacted 80 percent of world commodity trade.¹ Given that the world trade in petroleum was about 44 million barrels per day in 2003, the impact of standards for this industry is crystal clear.²

Also at the macro level, the German National Standards Body, or DIN, recently studied the direct economic benefits of standardization. In this study, published in 2000, the direct economic benefit of standardization was found to be one percent of Gross Domestic Product, or GDP.³ For the oil and natural gas industry, the estimated capital expenditure, or CAPEX, is between \$150–\$200 billion annually. Using the DIN value, this translates into an annual savings attributed to standardization of between \$200 to \$500 million.⁴

Numerous examples exist for actual cost savings, or micro economic benefits, of standardization. For instance:

- ▶ The customer of an offshore fabricator had project specifications for welding processes and practices considerably in excess of normal industry practices. The fabricator estimated that the "customization" of the special requirements was responsible for an eight to nine percent premium on the fabrication prices.⁵
- ▶ A North Sea operator investigating the cost of subsea equipment found that the variety of subsea christmas trees used on a number of projects was too great. The operator standardized the pressure limitation and the configuration, and allowed for alternate use of production or water injection. By configuring to this base standard, they found the cost of the trees was reduced by 30 percent.⁶
- ▶ A petrochemical manufacturer reduced plant turnaround costs by \$2.5 million in one year by implementing an industry-developed risk-based inspection methodology for process equipment. The optimized inspection plan allowed the facility to remove many low-risk pieces of equipment from its turnaround plan while focusing its resources on equipment with the highest probability and consequence of failure.⁷



- ▶ A valve manufacturer estimated that approximately 65 percent of the valves manufactured during a recent calendar year from one of their facilities were non-standard. Customers paid premiums of 10 percent to 75 percent for these “customizations.” In the opinion of the manufacturer’s engineering and quality control staffs, the vast majority of the customization required by the customer specifications did not add sufficient performance or safety improvements to justify the additional cost. The customized specifications typically included special material, packing, and similar requirements that were based on company or individual preference but did not alter the performance of the valve.⁸
- ▶ One manufacturer reported that a recent update to an API standard on subsurface safety valves (API Specification 14A) saved them \$500,000 per year by detailing when design changes necessitated third-party testing.⁹
- ▶ In the development of the Andrew field by BP, one of the ten minimum conditions of satisfaction (MCOs) for alliance contractor selection was to “pursue design philosophies and standards to deliver a safe, operable minimal intervention platform and minimize asset life cycle costs.” Through this and additional innovative techniques, the project was completed with a 23 percent decrease in planned expenditures.¹⁰
- ▶ One petrochemical plant operator reported a cost savings of \$2 million by using reconditioned valves versus new valves. The majority of these valves are stainless or alloy materials and were reconditioned in accordance with an API standard.¹¹

1 UNITED STATES DEPARTMENT OF COMMERCE NEWS RELEASE, MARCH 2004

2 BP STATISTICAL REVIEW OF WORLD ENERGY, 2003

3 ECONOMIC BENEFITS OF STANDARDIZATION, DIN, 2000

4 API STRATEGIC STANDARDIZATION TASK FORCE REPORT, 2003

5, 6 ECS STANDARDIZATION REPORT, 1995

7 API RBI USER GROUP MINUTES, OCTOBER 2000

8 ECS STANDARDIZATION REPORT, 1995

9 API STRATEGIC STANDARDIZATION TASK FORCE REPORT, 2003

10 NO BUSINESS AS USUAL, AN EXTRAORDINARY NORTH SEA RESULT, T. KNOTT, 1996

11 SUBCOMMITTEE ON VALVES CHAIRMAN’S REPORT TO THE API COMMITTEE ON REFINERY EQUIPMENT, 2000

ABOUT 80 PERCENT OF GLOBAL MERCHANDISE TRADE IS AFFECTED BY STANDARDS AND BY REGULATIONS THAT EMBODY STANDARDS.

"THE ROLE OF STANDARDS IN TODAY'S SOCIETY AND IN THE FUTURE"
RAYMOND G. KAMMER, DIRECTOR, NATIONAL INSTITUTE OF STANDARDS AND TECHNOLOGY, TECHNOLOGY ADMINISTRATION,
DEPARTMENT OF COMMERCE, 2000

THE USE OF STANDARDS ALSO HAS A PRONOUNCED VALUE FOR MANUFACTURERS ASPIRING TO WORLD MARKET STATUS.

In one case, a Russian oil field equipment manufacturer reported that their export market had increased ten-fold since converting to industry standard products under a globally recognized quality management system.¹² They also reported that their non-conforming product rate dropped from 10 to 12 percent to three to four percent during the same time period. In another case, a Chinese manufacturer reported a similar increase.¹³

To quantify the benefits of standardization from the perspective of improved industry reliability and reduced regulatory burden, one needs to understand the role of standards in regulation. In the United States, the National Technology Transfer and Advancement Act (NTTAA) requires that U.S. government agencies use consensus standards whenever they meet their needs, and encourages agency personnel to participate in their development.¹⁴ As a result, many API standards are referenced in government regulations. In fact, approximately 15 percent, or 100 of API's 600 standards, are referenced in the U.S. Code of Federal Regulations (CFR) in over 270 separate regulations.

Use of these standards results in reduced compliance costs and improved reliability. One specific example of a standard used in place of government regulations is the Safety and Environmental Management Program (SEMP). The U.S. Minerals Management Service (MMS) issued a notice of intent to develop SEMF requirements for offshore oil and gas operations. API, in response, produced API Recommended Practice 75, *Safety and Environmental Management Programs*, and demonstrated to the MMS that offshore operators, who helped develop the documents, would voluntarily comply with these practices. The savings to the industry was conservatively estimated at \$200 million for the first year and \$20 million a year thereafter. This activity resulted in the 1994 Safety in Seas award.¹⁵



Use of standards by regulators in international waters has resulted in cost savings as well. In the North Sea, the Norwegian oil industry has developed some 80 harmonized specifications, called NORSOK standards, freely available on the Internet. This work was started in 1993 under the industry effort to enhance the Norwegian Continental Shelf Competitive Position. The goal was to replace company specifications and detailed regulatory requirements and cut cost by up to 50 percent and project completion time by up to 25 percent. These cost reductions include savings from shortened project schedules and refined engineering, along with capital and operating cost savings.

Furthermore, the goal was to replace NORSOK standards with international standards as soon as possible. This effort has resulted in fewer company specifications, and the Norwegian Petroleum Directorate (NPD) has reduced its regulations from over 1,200 pages to just 300 pages through the use of referenced standards, including both international and global standards such as API, IEC, ISO, and NACE.¹⁶

A final example of cost savings and improved industry reliability is the case of API Standard 19.2, *Evaporative Loss from Floating Roof Tanks*, previously published as API Standard 2517. Regulators in Louisiana and California were considering strict requirements on emissions related to slotted guide poles in large aboveground storage tanks. The API committee responsible for this standard worked closely with the industry and regulators and updated the document, addressing emission factors for these guide poles, thereby avoiding over \$97 million in compliance costs.¹⁷



12 FIRST INTERNATIONAL CONFERENCE ON API AND RUSSIAN OIL INDUSTRY, TACIS, FEBRUARY 6-7, 2001, MOSCOW, RUSSIA

13 API NETWORK CONFERENCE, MARCH 10-12, 2003, BEIJING, CHINA

14 NATIONAL TECHNOLOGY TRANSFER AND ADVANCEMENT ACT OF 1995, PL 104-113

15 1994 NATIONAL OCEAN INDUSTRIES ASSOCIATION SAFETY IN SEAS AWARD, SPONSORED BY COMPASS PUBLICATIONS

16 NORGE WEB SITE, WWW.STANDARD.NO

17 PROJECT REPORT FOR 2517D, DOCUMENTATION FILE FOR API STANDARD 2517, *EVAPORATIVE LOSS FROM EXTERNAL FLOATING ROOF TANKS*

STANDARDS ARE LIKE DNA; THEY ARE THE BASIC BUILDING BLOCKS FOR ALL TECHNOLOGY AND ECONOMIC SYSTEMS.

DONALD E. PURCELL, CHAIRMAN, CENTER FOR GLOBAL STANDARDS ANALYSIS, 2004

SEVERAL OIL COMPANIES HAVE CONDUCTED INTERNAL STUDIES RELATED TO THE VALUE OF PARTICIPATION IN INDUSTRY STANDARDIZATION.

In one study, an integrated, global company noted it is difficult to predict in advance the return on investment from participating in industry standardization; however, a historical perspective showed the benefits of standardization were almost eight times the cost of developing the standards. Additionally, the company realized intangible benefits, such as:

- ▶ Contacts with other companies' experts to learn from their experiences.
- ▶ Sharing "lessons learned" to prevent problems before they occur.
- ▶ Personnel development and technology transfer.¹⁸

A study by another global, integrated company concluded it was necessary to streamline standardization activities and make more use of international standards. This study recommended that much of the time and effort previously invested in developing and maintaining internal company standards should be redirected toward developing industry standards that would be global in scope. In this way, duplication of effort was reduced. This company spent approximately seven man-years per year on industry activities, and approximately 35 man-years per year on developing and maintaining internal company standards. It was anticipated that a more focused approach to participating in industry-wide standards would result in considerable savings by reducing the internal workload.¹⁹

¹⁸ ANSI AIF MINUTES, 2000

¹⁹ ECS STANDARDIZATION REPORT, 1995



Companies can realize many tangible and intangible benefits from supporting industry standardization efforts. API, through its industry committees, continually manages its standardization process to meet the users' needs for standards that incorporate the best and most current value-added practices. To meet this goal, however, continued participation and support from both users and manufacturers is required.

The best way for petroleum and related equipment companies to be competitive in today's environment of continuous improvement with shrinking technical support is by leveraging each company's manpower through industry standardization efforts.

After all, it's a big world. Somebody has to standardize it.

Somebody like you.

This information was prepared by API's Executive Committee on Standardization of Oilfield Equipment and Materials (ECS), the API Committee on Refinery Equipment (CRE) and the API Committee on Petroleum Measurement (COPM) in conjunction with API staff.

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