NEW JERSEY PETROLEUM COUNCIL

AND THE

AMERICAN PETROLEUM INSTITUTE

OIL AND NATURAL GAS INDUSTRY SECURITY ASSESSMENT AND GUIDANCE

PART 1
AN OVERVIEW OF OIL AND NATURAL GAS INDUSTRY OPERATIONS AND
AN ASSESSMENT OF CURRENT SECURITY PRACTICES & STANDARDS

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This document is intended to provide an overview of the oil and natural gas industry operations and a general assessment of current security practices and standards. Individual companies have assessed their own security needs and have adopted or implemented security measures as they consider appropriate. This document is not intended to supplant the measures adopted by individual companies or to offer commentary regarding the effectiveness of individual company efforts. With respect to particular circumstances, local, state and federal laws and regulations should be reviewed.

Information concerning safety and health risks and proper precautions with respect to particular materials and conditions should be obtained from individual companies or the manufacturer or supplier of a particular material, or the material safety data sheet.

API is not undertaking to meet the duties of employers, manufacturers, or suppliers to warn and properly train and equip their employees, and others exposed, concerning health and safety risks and precautions, nor undertaking their obligation under local, state or federal laws.

Introduction

Recognizing the vital importance of a safe, reliable energy supply to our nation's prosperity, security has always been a top priority at oil and natural gas facilities. From designing safe and secure facilities to protecting plants and infrastructure to training with local emergency response teams, companies have long recognized and responded to the need to protect their workers, communities, and energy supplies through a variety of standards and procedures. These efforts, in addition to serving as a protection for the general public, have also been effective against acts of vandalism, theft and other types of attacks.

Like other industries, since September 11, the oil and natural industry has taken steps to evaluate potential threats to the industry and enhance the physical and operational security of its facilities, its workers and data. The oil and natural gas industry has also taken steps to improve channels of communication to quickly disseminate government intelligence concerning potential acts of terrorism. In doing so, each sector of the petroleum industry has needed to assess the risks it faces along with potential preventative or response measures. The general risks to energy supply and vulnerability varies by segment of the industry, which we define broadly for these purposes as exploration and production, natural gas processing, refining, pipeline transportation (liquids), marine transportation, and distribution and marketing. Electronic data, hardware and software, prevalent throughout the high tech oil and natural gas industry, are logically treated separately with respect to security.

In order to develop guidance to help oil and natural gas companies evaluate and meet their potential and real threats, the following steps are being taken:

- Assess the general types of risks to supply interruptions that each sector may face.
- Identify existing standards, recommended practices, guidance and other operational practices, as well as ongoing initiatives that may mitigate those risks or vulnerability.
- Work with other industry associations and member companies, identify the practices or procedures needed to fill those gaps and prepare a guidance document.

This document addresses the first two of these steps. The assessment of risks is necessarily in only the broadest, most general terms. Individual companies, working cooperatively with local officials, are best suited for conducting assessments of their own facilities and how to protect their assets. Moreover, it would be counterproductive to produce a detailed threat assessment document. However, it is both possible and useful to characterize the general level of concern, since it is this risk that determines what measures might potentially be appropriate for each sector of the petroleum industry.

Communications

One important key to prevent of acts of terror and to protect facilities lies in good intelligence, and the quick dissemination of information to the large number of operators that may need the information. After September 11th, the oil and natural gas industry acted quickly to develop an effective information dissemination structure, with API taking the lead role in interfacing with key government agencies and disseminating government intelligence concerning potential acts of terrorism to the industry. API is providing this role until the Energy ISAC can take over this critical function.

Exploration and Production (E&P)

Overview of Segment Operations

Onshore, oil and natural gas is produced at over 300,000 sites across the United States, and nearly 30,000 new wells are drilled each year. The overwhelming majority of these sites are located in rural areas. There are only 3 large cities that have oil and gas production within the city limits: Houston, Oklahoma City, and Los Angeles. The city has generally expanded into areas of historic production. These urban facilities already employ more security measures than typical E&P facilities.

- *Oil wells*. Over 75% of oil wells in the U.S. produce less than 10 barrels of oil daily. Most of these wells also produce large volumes of water, making the oil/water mix that comes to the surface not very flammable. Over 95% of oil wells require a pumping unit to bring the oil to the surface. If the pumping unit is not working, oil is not coming to the surface. While most of these sites have a tank for storage of the oil, the volume of oil stored on-site is limited.
- *Gas wells*. Natural gas wells are typically constructed with a subsurface valve designed to shut-off the flow of gas if problems occur at the surface. The volume of natural gas produced by any single well would not be significant in terms of total U.S. consumption.

About 28 percent of US oil and gas production is from offshore sources. But this production is spread over more than 4,000 oil and gas platforms. Even the platforms with the highest daily production total only around 2 percent of U.S. production and an even lower percentage of consumption. The loss of any one platform would not significantly affect U.S. oil and gas supplies. Increasingly, however, larger platforms are the norm, used for development of several fields in deep water. These larger platforms mean a greater concentration of personnel, often 100 to 150 people.

Offshore platforms are designed with redundant systems to stop the flow of oil or gas in case of any unusual event. Platforms use sophisticated downhole safety valves that close automatically to prevent oil spills when sensors detect any drop in pressure at the surface. These automatic

fail-safe devices are installed in wells below the sea floor, protecting sea beds and sea life. Manual safety shut-off switches are also accessible in a number of locations around platforms. In the event of a fire or attack on the platform, the valves would shut off the flow of oil or gas. Any release would be limited to the amount of oil in the flowlines from the sea floor to the platform.

Relevant Operational Standards and Industry Practices

API maintains a number of design and operational recommended practices that address aspects of safety and security in the E&P industry. While none of these were developed specifically for security reasons, aspects of them are directly applicable. In many cases, prudent safety procedures would also serve to address appropriate security precautions. These recommended practices provide a starting point for developing guidance on security at E&P sites.

The following list of recommended practices address operational measures:

- Recommended Practice 2A, Planning, Designing, Constructing Fixed Offshore Platforms (Contains engineering design principles and practices for fixed offshore platforms including assessment of existing platforms, and fire, blast, and accidental loading)

- Recommended Practice 2FPS, Planning, Designing, Constructing Floating Production Systems (FPSO's) (This recommended practice provides guidelines for design, fabrication, installation, inspection and operation of floating production systems)

- Recommended Practice 2T, Planning, Designing, and Constructing Tension Leg Platforms (TLP's) (Summarizes available information and guidance for the design, fabrication and installation of a tension leg platform)

- Recommended Practice 14B, Design, Installation, Repair and Operation of Subsurface Safety Valve Systems (Provides guidelines for safe operating practices of equipment used to prevent accidental release of hydrocarbons to the environment in the event of unforeseen circumstances)

- Recommended Practice 14C, Analysis, Design, Installation and Testing of Basic Surface Safety Systems on Offshore Production Platforms (Describes processes and systems for emergency well shut-ins on offshore platforms)

- Recommended Practice 14H, Installation, Maintenance and Repair of Surface Safety Valves and Underwater Safety Valves Offshore (Provides guidelines for safe operating practices of equipment used to prevent accidental release of hydrocarbons to the environment in the event of unforeseen circumstances)

The following recommended practices address prevention, safety and emergency response:

- Recommended Practice 49, Drilling and Well Servicing Operations involving Hydrogen Sulfide (Describes response plans for wells involving hydrogen sulfide)

- Recommended Practice 54, Occupational Safety for Oil and Well Gas Well Drilling and Servicing Operations (Describes emergency response plans for oil well drilling and servicing)

- Recommended Practice 74, Occupational Safety for Onshore Oil and gas Production Operations (Describes general occupational safety and emergency response plans)

- Publication 761, Model Risk Management Plan for E&P Facilities (Provides a guideline on how affected facilities develop a risk management plan including hazard assessment, prevention and emergency response)

Ongoing Initiatives/Additional Measures Implemented

Since September 11, several efforts focused on enhanced security have been initiated.

- The Offshore Operators Committee[1] (OOC) is working closely with the U.S. Coast Guard on protection and response at offshore platforms. They have a joint meeting planned for January 17, 2002.
- A group of offshore production and service/supply companies are coordinating on development of a unified identification system for offshore contractor personnel that would enable companies to better track contractor employees that are authorized to travel to their offshore platforms.
- Onshore, oil and gas companies and service/supply companies have been working closely together to coordinate and enhance security procedures since personnel from several companies are involved in drilling and production and must have access to E&P sites.
- The Independent Petroleum Association of America is currently canvassing its membership to identify security mechanisms already in place, preparatory to a "gaps" analysis.

Added security measures already implemented include:

- Enhanced identification verification for contractor personnel being transported to offshore platforms
- Extending background screening of personnel to those working at heliports and boat docks
- Increased scrutiny of cargo and personal baggage destined for offshore platforms
- Developing mutual assistance plans in the event of an attack or problem (for a platform 200 miles from shore, closest source of help is probably at someone else's platform)
- Reviewing and updating emergency plans
- Testing and assuring communications networks are functioning
- Heightened awareness at all facilities and among all employees to be vigilant for out of ordinary people or events

[1] The Offshore Operators Committee represents oil and gas producers operating in the Gulf of Mexico. OOC represents over 90% of the production in the Gulf of Mexico.

Natural Gas Processing

Overview of Segment Operations and Vulnerabilities

According to the Oil & Gas Journal, there are currently nearly 600 natural gas processing plants in the United States. These plants are located in gas producing areas; consequently, most are rural. They remove impurities from the natural gas stream, along with commercial liquid hydrocarbons, such as propane. Natural gas plants typically have a security fence around the perimeter and limited access through a gate to the plant. Around 200 natural gas processing plants have filed Risk Management Plans under the EPA's RMP program. In compliance with that regulation, these facilities have conducted a detailed assessment of the potential offsite consequences of an explosion or accident at the facility. Also as part of that program, these facilities have instituted measures to reduce the potential threat.

Relevant Operational Standards and Industry Practices

Gas plant operations are often addressed in conjunction with other E&P operations in API recommended practices. However, the following recommended practice document specifically addresses safe operations where hydrogen sulfide (H_2S) is present. Prevention of H_2S releases would be one possible concern in an attack on gas plants in locations where H_2S is produced.

- Recommended Practice 55, Conducting Oil and Gas Producing and Gas Processing Plant Operations Involving Hydrogen Sulfide

Ongoing Initiatives/Additional Measures Implemented

Additional security measures already implemented include:

- Increased limits on access to the facility (keeping gate closed, increased verification of contractor personnel need for access)
- Reviewing and updating emergency plans
- Testing and assuring communications networks are functioning
- Heightened awareness at all facilities and among all employees to be vigilant for out of ordinary people or events

Pipeline Transportation (Liquids)

Overview of Segment Operations

Oil pipelines, both crude oil and refined petroleum products, are the most significant mode of petroleum transportation in the U.S. Pipelines carry 68% of oil transported (in barrel-miles), while water transportation accounts for 27%, trucks 3% and rail 2%. Nationwide there are some 160,000 miles of oil pipelines, excluding intra-state systems and gathering lines associated with crude oil production (see E&P segment operations). The vast majority of oil pipeline assets are buried, providing limited access to the cross-country lines themselves.

The concentrations of pipeline assets vary across the United States based on whether regions of the country are net producing regions or net consuming regions. For example, the Gulf Coast region is the largest supply area of the U.S, while the East Coast has virtually no indigenous crude oil production and the highest regional refined product demand. Pipelines play a key role in moving oil from producing areas and coastal ports to refineries and from refineries and large redistribution centers to smaller regional supply centers. Logistics hubs provide for the interconnections of major pipeline systems.

Pipeline systems vary from large diameter, large throughput major systems to small diameter, small throughput pipelines and run the gamut in between. Each pipeline operator maintains relationships with the shippers on its systems. Shippers also vary widely, including major integrated oil companies, power plants, airports, municipalities, defense facilities, and many others.

Pipeline operators have long recognized the importance of system reliability, both to themselves as operators, to the shippers that transport on their systems and to the consuming public. As such all operators have effective emergency response plans and the capability to rapidly restore service disruptions, regardless of the initiating event. Operators also have mutual aid agreements in place to augment emergency response capability in areas where multiple operators' systems converge, such as logistics hubs. The capability of operators to recover has been proven by responses to accidents in the past.

Relevant Operations Standards and Industry Practices

The federal government through the U.S. Department of Transportation Office of Pipeline Safety regulates the oil pipeline industry. The federal regulations address design, construction, operations, maintenance, testing, emergency response planning, and overall pipeline system integrity. Many aspects of the federal regulations address safety and security issues. The oil pipeline industry works in cooperation with the Office of Pipeline Safety.

The oil pipeline industry has used a risk management approach to ensuring pipeline system reliability and integrity. One key industry standard is API 1160, Managing System Integrity for Hazardous Liquid Pipelines. This standard lays out a framework for conducting risk assessments for pipeline systems.

Ongoing Initiatives/Additional Measures Implemented

Since September 11, several efforts have been undertaken by the oil pipeline industry to enhance security:

- The oil pipeline industry has developed a set of standardized security condition alert levels based on the DOE security conditions.
- The oil pipeline industry has drafted a standard set of countermeasures that operators can implement as threat conditions change. Operators would build on these standard measures

for those critical company assets that require additional protections. These protective measures are company specific and necessarily confidential.
- The oil pipeline industry is drafting a guidance document based on the principles of risk management and risk assessment specific to security preparedness.
- The oil pipeline industry is recommending to operators that company personnel apply for and maintain appropriate security clearances and develop appropriate networks related to security information, including contacts with the FBI, the National Infrastructure Protection Center, and federal, state and local law enforcement, as appropriate.

Individual pipeline operators have been evaluating their own security preparedness and the relative vulnerability of systems or system components. Both the likelihood and potential consequences of potential terrorist acts vary widely for individual operators dependent on the size, complexity, location, product moved, and associated facilities for particular assets.

Many operators have instituted additional security measures. Such enhanced security measures include:

- Enhanced verification and identification procedures for persons entering pipeline facilities, including control centers, manned facilities, and tank farms.
- Review of company emergency response capability considering the potential for terrorist activities.
- Review of company physical security preparedness (gates, fences, lighting, surveillance).
- Increased employee awareness of security, including bomb threat procedures, mail handling procedures, package inspection, and vehicle security.

Marine Transportation

Overview of Segment Operations

The Marine Transportation Segment represents the transportation by water of crude oil, its products and derivatives, petroleum gases and liquefied natural gas. This includes marine operations at terminals at the ship-to-shore interface.

Every day, Americans use nearly 20 million barrels of oil and petroleum products. Of that, about 10 million barrels are imported by tankers. Tankers make more that 20,000 port calls to the U.S. each year. Tankers and barges not only carry crude oil, but with pipelines transport petroleum products like gasoline, diesel fuel and home heating oil from refineries to consumers.

Regulations relating to the Marine Segment were put in place to promote the safe, environmentally sound, secure, and efficient marine transportation of petroleum and petroleum products. Since the September 11 events, we have placed new emphasis on working with the US Coast Guard to ensure maritime transportation security at US ports and abroad.

Relevant Operational Standards and Industry Practices

U.S. Regulations

Since the Exxon Valdez incident of 1989, and the passage of the Oil Pollution Act of 1990 (OPA), the petroleum industry has made vast improvements in reducing the number of vessel casualties, reducing the number of spills and the quantity of oil spilled, and increasing the effectiveness of response efforts. These improvements stem from various legislative rulemakings and international treaties. In addition to the petroleum industry's extensive involvement with government agencies in developing rulemaking and treaties, improvements have resulted from industry research and development. The numerous regulatory programs and international treaties regarding pollution prevention, preparedness and response already in place set the stage for the incorporation of more rigorous maritime security elements. These include:

EPA	Facility Response Plans	59 FR 34070	July 1, 1994
MMS	Financial Responsibility	63 FR 42699	October 13, 1998
MMS	Response Plans for Facilities Located Seaward of the Coast Line	62 FR 13991	June 23, 1997
NOAA	Natural resources (Damage Assessment Regulations)	61 FR 440	February 5, 1996
RSPA/OPS	Oil and Bulk Containers	61 FR 30541	June 17, 1996
RSPA/OPS	Facility Response Plans for Pipelines (Interim Final Rule)	61 FR 30533	June 17, 1996
U. S. Coast	Auto Pilot, Unattended Engine Room, Tank Vessel Manning	58 FR 27628	July 9, 1993
U. S. Coast	Captain of the Port Zone Boundaries	58 FR 51726	November 3, 1993
U. S. Coast	Chemical Testing of Mariners at License Renewal	60 FR 4522	March 24, 1995
U. S. Coast	Claims Procedures and Designation of Source	57 FR 36314	August 12, 1992
U. S. Coast	Coastwise Oil spill Response Cooperatives	57 FR 7640	April 2, 1992
U. S. Coast	Criminal Record Reviews in Renewals.	60 FR 65478	January 18, 1996
U. S. Coast	Delegation of Authority	59 FR 66482	December 27, 1994
U. S. Coast	Designation of Lightering Zones	60 FR 45006	August 29, 1995
U. S. Coast	Escorts for Certain Tankers (partial suspension issued November 1, 1994)	59 FR 42962	November 17, 1994
U. S. Coast	Establishment of Double Hull Requirements for Tank Vessels	60 FR 13318	April 10, 1995
U. S. Coast	Existing Tank Vessel Requirements – Lightering requirements and Advanced Notification	59 FR 40186	November 3, 1994
U. S. Coast	Existing Tank Vessel Requirements – Structural requirements	62 FR 1622	February 10, 1997
U. S. Coast	Existing Tank Vessel Requirements – Training, survey and maneuverability measures	61 FR 39770	July 29, 1997
U. S. Coast	**Facility Response Plans for Marine and Non-Marine Transportation Facilities**	**61 FR 7890**	**May 29, 1996**
U. S. Coast	Federal Removal Authority	59 FR 66482	December 27, 1994
U. S. Coast	Federal Water Pollution Control Act Penalties	59 FR 15020	March 30, 1994
U. S. Coast	Financial Responsibility and Civil Penalties	61 FR 9264	March 7, 1996
U. S. Coast	Great Lakes Pilotage Amendments	60 FR 18366	June 12, 1995
U. S. Coast	Lightering Requirements	58 FR 48434	October 15, 1993
U. S. Coast	Limits on Liability for Deepwater Ports	60 FR 39849	August 4, 1995
U. S. Coast	National Contingency Plan Revisions	59 FR 47384	September 15, 1994
U. S. Coast	Navigation Safety Equipment for Towing Vessels	61 FR 35064	August 2, 1996
U. S. Coast	Other Penalties	57 FR 33260	July 27, 1992
U. S. Coast	Overfill Devices on Tank Vessels	59 FR 53286	September 21, 1997
U. S. Coast	Periodic Gauging of Plate Thickness of Commercial Vessels	58 FR 52598	November 8, 1993
U. S. Coast	Pilotage in Prince William Sound	58 FR 13360	April 9, 1993
U. S. Coast	Removal Equipment Requirements and Inspections (Interim Final Rule)	58 FR 67988	January 24, 1994
U. S. Coast	Second Person Required (on bridge)	58 FR 27628	July 9, 1993
U. S. Coast	Tank Level or Pressure Monitoring Devices	60 FR 43427	March 21, 1997
U. S. Coast	**Tank Vessel Response Plans**	**61 FR 1052**	**April 11, 1996**
U. S. Coast	Term of Licenses, Certificates of Registry and Merchant Mariners Documents.	59 FR 49294	October 27, 1994
U. S. Coast	Uses of the Oil Spill Liability Trust Fund	57 FR 53968	November 13, 1992
U. S. Coast	Vessel Communication Equipment Regulations	57 FR 14483	August 18, 1992
U. S. Coast	Vessel Traffic Service	59 FR 36316	July 15, 1994
U. S. Coast	Vessel Traffic Service (Prince William Sound Automated Dependent Surveillance System)	57 FR 31660	August 17, 1992

International Conventions and Treaties

The International Maritime Organization (IMO), a body of the United Nations, was organized in the late 1950s to effectively promote maritime safety. Throughout the years, IMO has led

international efforts to develop conventions and treaties aimed at increasing safety and reducing marine pollution. As recently as a month ago, at the request of the Commandant of the US Coast Guard, the IMO nations approved a resolution calling for the organization to seek ways to enhance maritime security on a global basis. Activities are underway to meet the goals of this resolution. To learn more about IMO, see www.imo.org. Detailed information on each of the IMO Conventions can be found within the IMO web page at IMO's Conventions.

Ongoing Initiatives/Additional Measures Implemented Since September 11

As a multi-mission, maritime, military service, the US Coast Guard has taken the lead in America's maritime security efforts through coordinating a multi-agency, private sector, and international effort to prevent terrorism. Immediately following the September 11 attack, the US Coast Guard undertook the following:

- Identified high interest vessels and prioritized critical infrastructure so that its limited resources could be applied in an efficient manner.

- As part of the Homeland Security Plan, the US Coast Guard established Maritime Security (MARSEC) levels (MARSEC I - III) for assessing security response capabilities, activities, and equipment inventories.

- Increased the Advanced Notice of Arrival Information (NOA) time for commercial vessels arriving from foreign ports from 24 to 96 hours, to provide more analysis of crew and passenger lists, etc.

- Instituted a Sea Marshall program for high risk ports on the west coast (San Francisco, San Diego, and Los Angeles).

- Announced a three-day public workshop (January 28-30, 2002) to discuss/assess security procedures, programs, and capabilities within marine transportation systems, in an effort to ascertain whether improvements (i.e., new regulations, the development of industry standards) are necessary. Formal federally approved vessel and facility security plans are the anticipated outcome of this initiative

Refining

Overview of Segment Operations

The Refining segment currently represents the 150 refineries in the U.S., which have a combined operating capacity of about 16.5 million barrels per day. While the number of refineries has decreased from a high of 305 in 1980, the average size of the remaining refineries has increased from 60,000 barrels per day to about 110,000 barrels per day. The majority of the refining capacity is currently centered in large, integrated companies with multiple refining facilities. Most refineries are located on the West and Gulf coasts, primarily because of access to major sea transportation and shipping routes. The refineries process crude oil into a variety of petroleum products such as gasoline, heating oil, jet fuel and asphalt.

Relevant Operational Standards and Industry Practices

API develops and maintains a suite of design, inspection, operational and procurement standards for the refining industry. While they were not written to address security issues, many of the documents have elements applicable to security concerns.

Physical Security

- Recommended Practice 752--Management of Hazards Associated with Location of Process Plant Buildings (Methodology for assessing and evaluating the hazards associated with location of process plant buildings that should be considered in process hazard analyses)

Operational Measures

Recommended Practice 521, Guide for Pressure Relieving and Depressuring Systems Code (Guidelines for examining causes of overpressure, determining relieving rates and selecting and designing disposal systems).

Standard 510, Pressure Vessel Inspection (Covers the maintenance inspection, repair, alteration, and rerating procedures for pressure vessels used by the petroleum and chemical process industries).

Standard 570, Piping Inspection Code (Covers the inspection, repair, alteration, and rerating procedures for metallic piping systems that have been in-service in the refining and chemical process industries).

Recommended Practice 572, Inspection of Pressure Vessels (Includes the reasons for inspection, causes of deterioration, frequency and methods of inspection, methods of repair, and preparation of records and reports).

Recommended Practice 573, Inspection of Fired Boilers & Heaters (Provides guidance promoting proactive inspection procedures to prevent equipment failures and increase overall equipment reliability and plant safety).

Recommended Practice 574, Inspection Practices for Piping System Components (Covers the inspection practices for piping, tubing, valves (other than control valves), and fittings used in petroleum refineries and chemical plants).

Recommended Practice 575, Inspection of Atmospheric & Low-Pressure Storage Tanks (Covers the reasons for inspection, causes of deterioration, frequency and methods of inspection, methods of repair, and preparation of records and reports).

Recommended Practice 576, Inspection of Pressure Relieving Devices (Describes the inspection and repair practices for automatic pressure-relieving devices commonly used in the oil and petrochemical industries).

- Recommended Practice 578, Material Verification Program for New and Existing Alloy Piping Systems (Describes procedures to ensure that the composition of alloy components of a process piping system are consistent with design specifications in order to minimize the potential for catastrophic toxic or hazardous releases of liquids or vapors).

- Recommended Practice 579, Fitness-for-Service (Describes fitness-for-service (FFS) assessment techniques for pressurized equipment in the refining and chemical industries. FFS is defined as the ability to demonstrate the structural integrity of an in-service component containing a flaw).

- Recommended Practice 580, Risk-Based Inspection (Describes the application of the RBI process to prioritize inspection activities by ranking all equipment by probability and consequence of failure [risk]).

- Publication 581, Risk-Based Inspection Base Resource Document (Describes the principles behind, and the technical basis for the API RBI methodology).

- Recommended Practice 582, Welding Guidelines for the Chemical Oil, and Gas Industries (Provides supplementary guidelines and practices for welding and welding-related topics for shop and field fabrication, repair and modification of refining and chemical process equipment).

- Standard 620, Design and Construction of Large, Welded, Low-Pressure Storage Tanks (Provides the design and construction specifications of large, welded, field-erected low-pressure and refrigerated carbon steel aboveground storage tanks).

- Standard 650, Welded Steel Tanks for Oil Storage (Provides the design and construction specifications of large, welded, field-erected atmospheric carbon steel aboveground storage tanks).

- Recommended Practice 651, Cathodic Protection of Aboveground Storage Tanks (Describes the corrosion problems characteristic in aboveground steel storage tanks and associated piping systems and provides a general description of the two methods currently used to provide cathodic protection against corrosion.

- Recommended Practice 652, Lining of Aboveground Petroleum Storage Tank Bottoms (Describes the procedures and practices for achieving effective corrosion control in aboveground storage tanks by application of tank bottom linings to existing and to new storage tanks).

- Standard 653, Tank Inspection, Repair, Alteration, and Reconstruction (Provides minimum requirements for maintaining the integrity of welded or riveted, nonrefrigerated, atmospheric pressure, aboveground storage tanks after they have been placed in service).

- Recommended Practice 751, Safe Operation of Hydrofluoric Acid Alkylation Units

- Recommended Practice 934, Materials and Fabrication Requirements for 2-1/4Cr-1Mo and 3Cr-1Mo Steel Heavy Wall Pressure Vessels for High-Temperature, High-Pressure Service (Presents materials and fabrication requirements for new 2-1/4Cr and 3Cr steel heavy wall pressure vessels for high temperature, high pressure hydrogen service).

- Publication 936, Refractory Installation Quality Control Guidelines (Provides guidelines for the installation quality control of monolithic refractory linings).

- Recommended Practice 941, Steels for Hydrogen Service at Elevated Temperature and Pressures in Petroleum Refineries and Petrochemical Plants (Discusses the resistance of steels to high temperature hydrogen attack (HTHA). Applies to equipment in refineries, petrochemical facilities, and chemical facilities in which hydrogen or hydrogen-containing fluids are processed at elevated temperature and pressure.)Recommended Practice 945, Avoiding Environmental Cracking in Amine Units (Discusses environmental cracking problems of carbon steel equipment in amine units.)

- Recommended Practice 945, Avoiding Environmental Cracking in Amine Units

- Recommended Practice 1007, Loading and unloading of MC306/DOT 406 Cargo tank Motor Vehicles (This document provides details on how tank trucks can be safely loaded when all equipment is used properly and when the person responsible for the loading follows prescribed safety procedures. It provides a short list of the equipment that should be available in case of an emergency.)

- Standard 2610, Design, Construction, Operation, Maintenance, & Inspection of Terminal and Tank Facilities (Addresses fire prevention and protection and terminal and tank facilities)

Access Control

- Recommended Practice 540, Electrical Installations in Petroleum Processing Plants (Address installation of emergency lighting and CCTV systems)

- Recommended Practice 751, Safe Operation of Hydrofluoric Acid Alkylation Units

- Recommended Practice 1626, Storage and Handling Ethanol and Gasoline-Ethanol Blends at Distribution Terminals and Service Stations (Provides safety and fire protection guidelines for emergency response personnel and the facility.)

- Recommended Practice 1627, Storage and Handling of Gasoline-Methanol/CoSolvent Blends at Distribution Terminal and Service Stations (Provides safety and fire protection guidelines for emergency response personnel and the facility.)

Emergency Response

- Recommend Practice 750, Management of Process Hazardous (Provides assistance in helping to prevent the occurrence of, or minimize the consequences of catastrophic releases of toxic or explosive materials)

- Recommended Practice 751, Safe Operation of Hydrofluoric Acid Alkylation Units

- Publication 760, Model Risk Management Plan for Petroleum Refineries (Provides a guideline on how affected facilities develop a risk management plan including hazard assessment, prevention and emergency response)

- Publication 2001, Fire Protection in Refineries (Addresses safe storage, handling and processing of petroleum and petroleum products in refineries)

- Publication 2216, Ignition Risk of Hydrocarbon Vapors by Hot Surfaces in the Open Air (Describes the ignition risk

- Publication 2218, Fireproofing Practices in Petroleum and Petrochemical Processing Plants (Guide to selecting, maintaining and applying fireproofing systems to limit the extent of fire related property loss in subject facilities)

- Recommended Practice 2021, Management of Atmospheric Storage Tank Fires (Provides information on the management of tank fires including prevention and guidance for responders to optimize fire suppression techniques to reduce the severity of the incident and reduce the potential for escalation)

- Publication 2030, Guidelines for Application of Water Spray Systems for Fire Protection in the Petroleum Industry (Addresses the application of fixed water spray suppression systems to the petroleum industry)

- Publication 2510A, Fire Protection Considerations for the Design and Operation of Liquefied Petroleum Gas (LPG) Storage Facilities Facilities (Includes information addressing prevention and control of releases, fire protection design and fire control measures for subject facilities)

- Recommended Practice 1112, Developing a Highway Emergency Response Plan for Incidents Involving Hazardous Materials (Provides minimum guidelines for developing and emergency response plan for incidents involving hazardous liquid hydrocarbons such as gasoline or crude oil)

Ongoing Initiatives/Additional Measures Implemented since September 11

For refineries, some specific examples include:

- Increased identification checks of all persons entering facilities.
- Conducting new and existing security/threat scenario assessments
- Initiated detailed, visible checks of all vehicles and packages entering facilities
- Placed concrete barriers at critical points around the perimeter to protect against vehicular intrusion
- No ship personnel permitted to disembark the ship onto facility docks
- Increased perimeter security by additional security guards and surveillance equipment
- Restricted vehicle access to and from facilities
- Background checks of employees and contractors

Since every refinery is different, individual refineries have been evaluating their own security preparedness and the relative vulnerability of operating units and associated systems. A risk-based approach is often used that takes into account both the likelihood and potential consequences of potential terrorist acts. These will vary widely for individual plants depending on the size, complexity, location, products, and associated facilities for particular assets.

Distribution and Marketing

Overview of Segment Operations

The petroleum distribution and marketing sector includes over 1,400 terminals, 7,500 bulk stations, more than 45,000 trucks and more than 170,000 gasoline stations. Each day the petroleum industry transports and purchasers consume more than 350 million gallons of gasoline and more than 150 million gallons of diesel and home heating oil. The loss of any one terminal, bulk station, truck or gasoline station would not significantly affect U.S. energy supplies. While an attack on any one asset would not result in an impact to the national energy supply, the large number of facilities and trucks provides multiple opportunities for an attack. API members have recognized this and developed security procedures to address these concerns.

Since September 11, members have been spending significant resources to develop security procedures and have implemented them. They have found that procedures to deter theft can also help thwart potential attacks. As a result of concern for theft of product at terminals, members' implemented card-in/card-out procedures that only allow authorized drivers access to the facility. These cards contain driver information that tells the terminal who is entering a facility and the product they are scheduled to receive (e.g., gasoline, diesel, kerosene). Once inside the terminal, the driver connects the loading arms (filling hoses) to the truck then takes his card into the pump control room and enters his personal identification number to start the pumps. This process prevents the theft of bulk fuel from a terminal.

Members have taken other security procedures. For example, some members have stationed armed guards at some facilities based on the risk to the community or to sensitive environmental areas.

Once a truck is loaded with product at a terminal, the driver delivers the product to a retail gasoline station. The driver, in accordance with DOT rules, must follow designated hazardous material routes. Once he arrives at the facility he has equipment available to extinguish small fires on the ground surface. Because the vapors are too rich to burn in the underground storage tank an attack at a gasoline station appears remote.

Relevant Operational Standards and Industry Practices

API maintains a number of design and operational recommended practices that address aspects of safety and emergency response in the distribution and marketing industry. While none of these were developed specifically for security purposes, the proper operation of a this segment of the industry provides the ability to properly address security issues.

The following list of recommended practices address operational practices:

- Standard 2610, Design, Construction, Operation, Maintenance, & Inspection of Terminal and Tank Facilities (Addresses fire prevention and protection and terminal and tank facilities)

- Recommended Practice 1621 Bulk Liquid Stock Control at Retail Outlets

- Recommended Practice 1004, Bottom Loading and Vapor Recovery for MC-306 Tank Motor Vehicles

- Recommended Practice 1007, Loading and unloading of MC306/DOT 406 Cargo tank Motor Vehicles (This document provides details on how tank trucks can be safely loaded when all equipment is used properly and when the person responsible for the loading follows prescribed safety procedures. It provides a short list of the equipment that should be available in case of an emergency.)

The following recommended practices address prevention, safety and emergency response:

- Recommended Practice 1112, Developing a Highway Emergency Response Plan for Incidents Involving Hazardous Materials (Provides minimum guidelines for developing and emergency response plan for incidents involving hazardous liquid hydrocarbons such as gasoline or crude oil)

- Recommended Practice 1626, Storage and Handling Ethanol and Gasoline-Ethanol Blends at Distribution Terminals and Service Stations (Provides safety and fire protection guidelines for emergency response personnel and the facility.)

- Recommended Practice 1627, Storage and Handling of Gasoline-Methanol/CoSolvent Blends at Distribution Terminal and Service Stations (Provides safety and fire protection guidelines for emergency response personnel and the facility.)

Ongoing Initiatives/Additional Measures Implemented

Since September 11, several efforts focused on enhanced security have been initiated. For example:

- Members are now tracking security information and alert levels and have appropriate security procedures in place to respond to the alert levels.
- Members have developed and implemented security procedures.

Added security measures already implemented may include:

- Companies changed the way they look at their physical security, from the threat of a theft (protection of product) to that of a hostile threat.
- Gates are now locked around the clock with card-in, card-out procedures in effect
- Facilities are telling drivers not to leave their truck running unattended and keys are never to be left in their trucks
- Companies are meeting with local police and fire personnel to discuss emergency procedures and issues
- Electronic locks on pumps at loading facilities prevent theft.
- Companies are assessing the need for 24/7 attendants for additional security.
- Companies are considering biomarker identification technology for terminals.
- Companies are reassessing hiring procedures.
- Heightened awareness at all facilities and among all employees to be vigilant for out-of-ordinary people or events

Industry Information

Overview of Oil and Natural Gas Information

As technology advances, making the petroleum industry more streamlined and efficient, information technology (IT) security has become an increasingly important topic of concern. The petroleum industry is a worldwide industry that is highly dependent on technology for communications and operations, many of which are in remote or politically unstable areas. Therefore, the industry's infrastructure and security are highly visible targets for disaffected groups. Consequently, members of the industry are increasingly concerned about cyber terrorism that would disrupt their operations. The American Petroleum Institute has been helping our members proactively identify, discuss and address IT security issues that are of common interest to the industry.

Relevant Operational Standards and Industry Practices

Framework for a Computer Security Incident Response Plan (November 2001) - Responding to computer security incidents is generally not a simple matter. This activity requires technical knowledge, detailed communication and close coordination among the personnel assigned to respond to the incident. Incidents over the last few years indicate that, if anything, responding to incidents is increasingly more complex. Intrusions into machines are a serious concern, and increasing sophistication and collaboration among network attackers pose a considerable threat to the integrity and availability of computing resources.

Ongoing Initiatives/ Additional Measures Implemented

In November 2000 The API Information Technology Security Forum was formed to address security of the industry. The committee has been focusing on activities and initiatives in the following areas:

- Increase Security Awareness within the Industry: Compliance with Recognized IT Standards Bodies
- Privacy: European Union Privacy Directive [PDD 63], Business and Consumer Rights
- Policies: Email/ Internet Policies and Consequences

- Risk Management & Mitigation: Intrusion Detection, Incident Response Plans and Recovery Recommended Practices, Audit Processes, Virus Protection and Mitigation, Firewall and Encryption Implementation and Use
- Technologies: Encryption Technologies Implementation and Use, and Cellular, PDA, and Wireless Implementation and Management, Technology Enhancements and Problems, Connectivity Standards

Since September 11, several efforts focused on enhanced security have been initiated.

- Increased access control to facilities and networks, by use of badges and proximity controls.
- Reexamine and test disaster recovery plans in mainframe, PC and Unix environments.
- Looking to leverage operational knowledge about being involved in countries that are used to increased tensions.