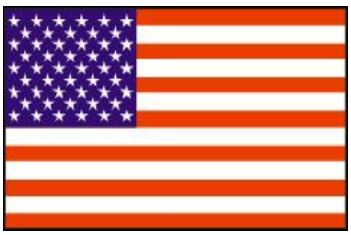
Minerals Management Service

United States



Lifting Strategy

Australia

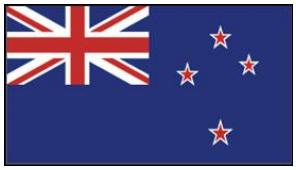
Brazil

Cananda

Netherlands

Norway

New Zealand



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Introduction

Cranes operating in the Outer Continental Shelf (OCS) are inherent to offshore oil and gas operations in all geographic provinces. Material and personnel are lifted to and from offshore facilities and marine vessels using large permanent or temporary fixed cranes. Crane accidents are a concern for both regulatory bodies and industry due to the inherent risk to personnel and the environment. The injuries and fatalities associated with crane operations prompted MMS to form internal workgroups as well as work in partnership with the industry on task groups and committees in analyzing and examining crane accidents and safety issues.

In addition, these work groups are tasked with the responsibility of reviewing the Minerals Management Service's (MMS) regulations that would include offshore specific regulations found at MMS 30 CFR 250.108, and industry crane standards, such as the American Petroleum Institute Recommended Practice (API RP 2D) and Operation and Maintenance of Offshore Cranes, which is incorporated into the MMS regulations. The review also includes American Petroleum Institute (API) Specification (Spec 2C), for Design, Construction and Testing of Offshore Cranes, as well as other domestic and international standards and regulations.

This undertaking examines what actions could be taken by the MMS and the industry to improve the safety of crane operations on the OCS. Additionally, while the main focus of this strategy lifting plan continues to be offshore crane operations, MMS realizes that material and pipe handling operations can be just as hazardous to personnel as traditional crane lifting activities. This growing realization is evident with new safety concerns on material and pipe handling operations that makes it necessary for MMS to address these new concerns in this lifting plan.

MMS Lifting Strategy

The MMS Lifting Strategy is based on regulating cranes, booms, and other material-handling equipment installed on fixed platforms, in accordance with a September 20, 2004, MMS/United States Coast Guard (USCG) Memorandum of Understanding (MOU).

The MMS regulates cranes by requiring lessees and operators to comply with American Petroleum Institute's Recommended Practice for the Operation and Maintenance of Offshore Cranes (API RP 2D), 5th Edition, June 2003, API RP 2A-WSD, Recommended Practice for Planning, Designing and Constructing Fixed Offshore Platforms – Working Stress Design, Twenty-first Edition, December 2000; and API Spec 2C, Specification for Offshore Cranes, API revised API SPEC 2C as the 6th Edition, March 2004.

These documents are periodically revised with the full participation and support of the MMS. As new API documents are published, they are reviewed for incorporation into the regulations. The MMS incorporates these documents by reference in the regulations found at 30 CFR 250.198. The MMS, industry and API workgroups are discussed in greater detail in the Technical Standards section of this document.

Shared Lifting Practices

The MMS Lifting practices are similar to the U.S. Coast Guard (USCG), who has the responsibility under the September 20, 2004, MMS/USCG MOU, for regulating cranes, booms and other material-handling equipment installed on mobile offshore drilling units (MODU) and floating production systems that receive a Certificate of Inspection or Letter of Compliance. Like the USCG, the MMS regulates the operation and maintenance of cranes as prescribed in API RP 2D (46 CFR 109.521). The USCG also requires that cranes installed on those facilities be:

- designed in accordance to API Specification for Offshore Cranes (API Spec 2C);
- installed according to an approved crane plan; and
- inspected and load tested by USCG or an approved third party when the crane is installed, every 48 months, and following repairs or alterations to any structural component of the crane.

The MMS has jurisdiction over material-handling operations on fixed OCS facilities. This same MOU provides regulatory jurisdiction to MMS for lifting and hoisting activities (e.g., pipe handling operations) related to drilling, well completion, well servicing, and well workover systems on fixed and floating OCS facilities and MODUs when they are associated with the derrick.

Pipe handling activities commence when tubular goods, such as drill pipe, casing, tubing, risers, and associated equipment are placed on the pipe rack, and continue as this material is moved from the pipe rack to the derrick, and while in and around the derrick. Additionally, USCG, like MMS, does not appear to have a specific lifting strategy in place for booms and other material-handling equipment in its regulations.

The MMS's jurisdiction over material and pipe handling activities is discussed in greater detail in the Material and Pipe Handling Operations section of this plan.

MMS Inspection and Accident Investigation Program

The MMS inspection program provides day-to-day review and inspection of oil and gas operations in the Gulf of Mexico (GOM), Pacific and Alaska Regions. The MMS Inspectors also perform periodic inspection on offshore cranes to insure compliance with the regulations. The inspectors utilize the Potential Incident of Non-Compliance (PINC) list to insure complete and accurate inspections. The PINC's provide clear instructions for the inspectors much the same as the KP2 and KP3 Inspection Templates that are used in the United Kingdom (UK) i.e., where to reference the regulation, guidelines on how to perform the inspection and what action should be taken if the operator is non-compliant.

Should an inspector find that a crane is out of compliance, an Incident of Non Compliance (INC) will be issued, and other action may be taken, such as requiring that the crane be taken out of service pending corrective action. If the non-compliance resulted in a crane accident, this could trigger an investigation from the MMS district office in which the incident occurred.

In the case of a major accident, the MMS may create an investigative panel of district, regional, and headquarters personnel, as well as representatives of the USCG. Findings from both types

of investigations may lead to the issuance of safety alerts, technology assessment and research, changes in the training program, and/or improvements in the MMS regulatory program all of which further ensure safe and environmentally sound operations.

Remedies and Penalties

The MMS OCS Civil/Criminal Penalties Program is an integral part of MMS's Lifting Strategy. Through the pursuit, assessment, and collection of civil penalties and referrals for the consideration of criminal penalties, the program is designed to encourage compliance with OCS statutes and regulations. Under 43 U.S.C. 1350(b) of the OCS Lands Act, as amended, and regulations appearing at 30 CFR 250.200-250.206, civil penalties can be assessed for failure to comply with responsibilities under the law, a license, a permit, or any regulation or order issued pursuant to the Act.

The Oil Pollution Act of 1990 changed the way MMS addresses civil penalties and remedies. Civil penalties are now issued for serious violations. If the violation is serious enough and is found to be a knowing and willful violation, the MMS may recommend that the matter be referred to the Department of Justice for criminal prosecution (43 U.S.C. 1350(c)). The issuance and continuance in effect of any lease or of any assignment or other transfer of any lease shall be conditioned upon compliance with regulations issued under the OCSLA.

Annual Operator Safety Performance Review

An important part of the MMS lifting strategy is the Annual Performance Review (APR) MMS issued this Notice to Lessees and Operators (NTL No. 97-3N), with an effective date of August 1, 1997. This notice informed lessees and operators that MMS will conduct an Annual Performance Review with each operator on the OCS. This annual review examines the following areas:

- the operator's history of compliance as it relates to the MMS Inspection Program
- any action that MMS has forwarded for review or has resulted in a civil penalty,
- the operator's safety record as it relates to accidents and incidents, and
- the operator's progress in implementing a Safety and Environmental Management Program.

In the GOM, this annual review is initiated in either the Regional or District offices. Through these comprehensive programs MMS remains deeply committed to ensuring that safety is paramount to all activity on the OCS, now and in the future.

Regulations

Regulators have addressed the inherent risk of crane operations to personnel, the environment, and property through various approaches. These approaches include the development of offshore specific regulations (MMS 30 CFR 250.108), incorporation or reliance upon domestic standards which include but are not limited to the API, American Society for Mechanical Engineers (ASME) or other regional standards. Participation in the development of international standards i.e., International Standards Organization (ISO), European Committee for Standardization— reliance upon a variety of management system-based strategies, such as the

Norwegian Petroleum Doctorate (NPD), Canadian Nova Scotia Offshore Petroleum Board (CNSOPB). Also adherence to industry based guidelines provided by organization, such as NORSOK, Oil Gas Producers (OGP) as well as other organization that provide guidance for the international community. Though we are unable to quantitatively measure the success or failure of these different approaches, it is fair to say that they have helped minimize the frequency and/or severity of incidents associated with offshore crane operations.

Technical Standards API RP 2D — API Spec 2C

The MMS formed a special workgroup to evaluate areas of concern related to a steady increase in OCS accidents from 1998 through 2003. The workgroup investigated the high rate of fatalities associated with crane operations on the OCS. This joint Headquarters/Region team prepared a comprehensive report which was posted on the web for industry. The report discussed the workgroups review and analysis of past and most recent accidents and made recommendations for improving crane safety.

As a result of this study, the MMS asked API to revise the third edition to include rigger training. API formed a work group (including an MMS representative) to revise API RP 2D. The revision was completed in a timely manner MMS then prepared a Final *Federal Register* notice incorporating the new edition of API RP 2D, Fourth Edition, August 1999, Recommended Practice for Operation and Maintenance of Offshore Cranes, into the regulations (including rigger training). In 2003, MMS and API continued to be proactive in promoting crane safety on the OCS by revising API RP 2D as the 5th Edition, June 2003, to include the following:

- Crane inspector training;
- Positive locking latch on hooks used for personnel transfer; and
- Deck/structure evaluation for temporary cranes.

After revising API RP 2D the work group focused its attention on incorporating API Spec. 2C. Incorporating this document would close a safety gap that had persisted in the MMS regulatory program for years. The API Spec 2C was a second tier document that was referenced by API RP 2D but was not incorporated into MMS regulations therefore it did not have the force of law behind it since it was not referenced in MMS's regulations. In the past, the MMS has encouraged industry to equip all cranes operating on OCS fixed platforms with an anti-two block safety device, regardless of the age or specific use of the crane. The MMS determined that anti-two block safety devices must be used on all cranes installed on OCS fixed platforms. Thus, by retrofitting all existing cranes with the anti-two block safety devices will benefit the industry by increasing safety, and reducing crane incidents on the OCS.

The addition of API Spec 2C would ensure that lessees or contractors use the best available and safest technologies for design, construction, and testing of pedestal mounted cranes while operating in the OCS. On July 19, 2001, the MMS published a proposed rule in the *Federal Register* (66 FR 37611) to incorporate API's Specification for Offshore Cranes (API Spec 2C) and to require the installation of anti-two block devices on all cranes on fixed platforms.

In March 2003, the MMS published a final rule, which became effective on March 2005. The final rule required the following:

- Cranes installed on new fixed platforms must be manufactured according to specifications of API Spec 2C;
- Newly manufactured cranes installed on existing fixed platforms must be manufactured according to specifications of API Spec 2C; which includes the installation of anti-two block devices.
- All existing Cranes must install anti-two block devices within 2 years of the effective date of the final rule.

Although MMS did not incorporate the Fifth Edition of API Spec 2C, until March 2003, API started revising the Fifth Edition in 2002. In one year, API had revised the Fifth Edition of Spec 2C, to the Sixth Edition April 2003 that included the following changes:

- Corrected error in the new equations for loads with boat and crane motion
- Added out of services load calculations
- Added wind, ice, and earthquake load calculations.

Summary

The API RP 2D, Spec 2C and API RP 2A-WSD provides practical guidance for the safe operation, inspection, maintenance, construction and testing of pedestal-mounted cranes. It also outlines the necessary qualifications and minimum training requirements for crane operators. The MMS inspectors have used these documents to establish PINC items associated with crane operations, inspection, and maintenance.

Recent MMS Crane Initiatives

In an effort to decrease the number and severity of crane incidents occurring on the U.S. OCS, the MMS has been involved in a number of initiatives, including:

- MMS, API and industry sponsored Crane Workshops in 2000, 2001, and 2003 and 2007 to raise awareness about crane accidents.
- 2007 - MMS incorporated the 6th Edition of API Specification 2C.
- 2007 - MMS incorporated the 5th Edition of API Recommended Practice 2D.
- 2006 - API revised API RP 2D as the 6th Edition, June 2006, to include:
    - Installing the Temporary Crane
    - Testing and Inspecting the Installation
    - Operating the Temporary Crane.
    - Removing the Crane
    - Crane Records
- 2004 - API revised API SPEC 2C as the 6th Edition, March 2004. The dynamic load calculation section was expanded.
- 2003 - MMS require the installation of anti-two block devices on all cranes by March 2005

These initiatives have helped focus attention on the seriousness of OCS crane operations in the United States and will hopefully contribute to increased OCS safety in the future.

Material and Pipe Handling Operations

Material and pipe handling activities are an inherent part of offshore oil and gas operations. These operations are conducted routinely on production and drilling facilities to move equipment from point to point by a variety of mechanical means, including hoists, reels, chains, and cable-based driver systems. These operations are an area of concern to both regulatory bodies and industry due to the inherent risk to personnel and the environment that these activities pose.

Material and pipe handling related incidents continue to occur on OCS fixed and floating facilities, and mobile offshore drilling units (MODU) on a regular basis. Under the September 20, 2004 Memorandum of Understanding (MOU) between the MMS and the USCG, the MMS has jurisdiction over material handling operations on fixed OCS facilities while the USCG retains jurisdiction for these activities on floating OCS facilities and MODUs.

This same MOU provides regulatory jurisdiction to MMS over lifting and hoisting activities (e.g., pipe handling operations) related to drilling, well completion, well servicing, and well workover systems on fixed and floating OCS facilities and MODUs when they are associated with the derrick. Pipe handling activities commence when tubular goods such as drill pipe, casing, tubing, risers, and associated equipment are placed on the pipe rack, and continue as this material is moved from the pipe rack to the derrick, and while in and around the derrick.

Current MMS regulations for material handling equipment are contained in 30 CFR 250.108 (f), Subpart A, effective January 27, 2000 and states, "You must operate and maintain all other material-handling equipment in a manner that ensures safe operations and prevents pollution." For the period January 1995–January, 2006, the OCS operators reported to MMS a total of 119 incidents occurring on fixed and floating OCS facilities and MODUs that are related to lifting operations; 49 of these incidents were attributable to material handling operations; 52 to pipe handling; 10 to personnel handling; and 8 involved a combination of lifting activities.

An example of an incident involving a combination of lifting activities would be a simultaneous personnel handling and pipe handling operation. The MMS conducted an analysis of 119 incidents and discovered that not every incident resulted in an injury or fatality. Some incidents resulted in multiple injuries or a combination of injuries and fatalities. Pipe and material handling operations both resulted in the highest number of injuries (89), and fatalities (11).

Further analysis of the 119 incidents by type of equipment revealed that 65 of the incidents reported involved use of a hoist which included a variety of equipment e.g., man riding winches, air tuggers, as well as smaller air hoists used to move people and light equipment. In summary the analysis of the 119 incidents showed that 44 percent involved pipe handling, 54 percent involved the use air hoist which resulted in 89 injuries and 11 fatalities. In December 2000, the MMS formed a task group to review other government regulations and industry standards in an effort to improve our material, pipe and personnel handling requirements. The task group finally

identified a series American Society of Mechanical Engineers (ASME) B30 standards for possible incorporation into MMS regulations. The problem— ASME standards apply to both onshore and offshore applications. This means that MMS and ASME will have to work together to amend certain B30 standards (specifically air hoist, hooks and stiff leg cranes) standards to address our specific safety concerns on the OCS. The MMS and ASME are continuing to work together in 2007, in hopes of incorporating many if not all of the B30 series of ASME standards into MMS regulations.

Aging Cranes and Integrity Concerns (API RP 2D)

A significant number of offshore cranes in the United States is approaching or exceeding the original anticipated design life. One major area of concern for both MMS and industry is crane/bearing connection integrity that seems to be prevalent in older model cranes. This wear can be monitored by periodic grease sample analysis and/or a physical inspection of the grease. Grease samples which should be collected every twelve (12) months as a minimum; and this period should be shortened if obvious metal or contaminants are present. Unless effectively managed there is concern that this situation will significantly increase the risk of major accidents on the OCS.

The MMS proposes that the key to enhancing safety on the OCS is disseminating critical information that can lead to immediate safety improvements e.g., the crane/bearing can be connected using bolts, welding or combinations of the two. The integrity of this connection is crucial to the life of the swing circle assembly. The crane and/or swing circle assembly manufacturer should be contacted for guidance when developing the inspection procedures, as each crane is unique.
Although crane/bearing connection integrity is a major concern for MMS it is not our only concern.

Moreover, the MMS is continuing its work with API and other industry groups to proceed with a rule making or revise API RP 2D requiring that all cranes regardless of the date of manufacture (age) be required to have both static and dynamic load chart calculated in accordance with the latest revision of API Specification 2C. This will help to address the safety concerns of overloading cranes due to inaccurate or missing load charts. In 2007, the MMS is continuing to work with an industry task group to address crane/bearing connection integrity issues, maintenance, inspection and thorough examination particularly of older model crane. This is essential to ensure that risks associated with the major critical items (e.g., crane pedestal failure boom collapse) are logically and systematically controlled.

Crane Operations Occupational Injuries and Fatalities

Unlike material and pipe handling operations regulating crane safety through the incorporation of certain industry standards has been a practice since the early 1970's. This practice was intensified in the late 1990's when a rash of serious injuries and fatalities forced the MMS and Industry to revise its regulations and amend or incorporate certain standards that was better focused on eliminating fatalities and reducing major injuries on OCS fixed facilities.

On the (OCS during the period 1995 – May 2006, data reported to MMS, per regulation, shows the following:

- Total number of reported incidents = 300
- Total number of fatalities = 11
- Total number of injuries = 104

Since 1998, cranes on, fixed platforms, MODUs and floating facilities have accounted for 16 percent of all injuries and 18 percent of all fatalities in the GOM, the Pacific and Alaska Regions in the United States.

Crane Inspections — Records Integrity and Other Operations and Maintenance Issues

Recently, the MMS conducted a query of the MMS database to see how many INC were issued from January, 1995 through August, 1998. The results of this query showed that a total of 165 crane related INC's were issued during this time period. The most frequently cited PINC was G 201, which is primarily a records' PINC. In fact, with the exception of G204 now I-102 (proper crane operating practices for attaching and moving the load) all of the crane INC's were associated with record keeping; this is not an unusual finding.

However, with the variety of safety inspection expected to be performed in a very limited time, record checks on cranes are not only consider a legitimate type of inspection, but sometimes the only means of inspections. Additionally, the MMS Inspectors are not trained nor expected to conduct actual physical inspections of cranes. Consequently, aside from obvious deficiencies that may be found during a routine visual inspection of a crane, the MMS Inspectors must rely on the integrity of the operator and the accuracy of their required paperwork associated with the Operator's Crane Inspection Program to ensure that the performance standards set for safety critical elements are being complied with.

Taking all of this into account, the MMS continues to be concerned with the number of crane related accidents that continue to occur on the OCS, despite the recent revisions to API RP 2D and the increased attention of the MMS Inspection Program for crane maintenance and operations. Of particular concern is the safety of the approximately 2,050 cranes currently being operated on the OCS. The MMS suspects that at least some of these cranes (permanently mounted and temporary rental cranes) are being operated in excess of their current safe load capacity.

For example, in the last 5 years MMS has issued 4 Safety Alerts concerning bracing, ball-ring and king pin failure. To address this and other serious crane safety concerns the MMS crane, material and pipe handling inspection program is geared towards assessing whether the lessees has adequate procedures in place for employing and training of qualified personnel that are responsible for maintenance operation and thorough examination of lifting of equipment. In order to do this lessees must comply with the recognized benchmarks that are incorporated into MMS regulations e.g., API Spec 2C, API RP 2D ASME, ISO and other standards as applicable.

Temporary Rental Cranes

API RP 2D – In 2004, an API RP 2D Work Group was formed comprised of MMS, API, oil and gas industry and Temporary/rental crane company representatives. This task group was formed as the result of an increase in temporary/rental crane incidents. This group was tasked by the MMS to start work on the Sixth Edition API RP 2D, which would include a new section on temporary and rental cranes.
The group held its first meeting on April 20, 2005, and completed the first draft of the temporary/rental crane section.

Following this meeting it was decided that expertise was needed from the temporary/rental crane industry to participate in this process in order to have creditability with this industry. The MMS contacted a Subject Matter Expert of Dynamic Cranes to see if he would be willing to work on this project. After being contacted the expert agreed to work on a section for temporary cranes to be included in the new Sixth Edition of API RP 2D.

The Expert also insisted on getting input from several of the other temporary crane companies, which all agreed was a great idea and would also give the other temporary/rental crane companies ownership and buy in to what the group was trying to accomplish with this re-write. The task group continued to meet until September 2006. Finally, the Group came to consensus on what the temporary/rental crane section would contain when the sixth edition is released in late 2007, or early 2008.

Below is an example of how some of the general statements may look along with the new topics that will be included in the new release:

Temporary Cranes (Section #?)

> Planning the installation – Planning of a temporary crane installation will require that a qualified structural engineer review the platform design and condition, selected temporary crane, planned crane placement on the platform and tie down design against the desired load requirements. Should any of these component limit the load of the cranes, then this shall be reflected in a load chart designed specifically for the proposed installation.
>
> Installing the Temp Crane
>
> Testing and Inspecting the Installation
>
> Operating the Temp Crane
>
> Removing the Crane
>
> Crane Records

Risk Associated with Crane, Material and Pipe handling Activities

- Evaluate the potential risks associated with personnel transfers using personnel carriers.
- Evaluate human factors data in lifting around the pipe rack and drilling areas; disseminate statistical findings and propose options to address safety concerns to industry.
- Inspection of deck rigging activities using the appropriate industry accepted standards and guidelines on the safe use and operation and maintenance of come-longs, chain lever and cable hoists used offshore as an example of good practice.
- Man riding operations using winches continued to challenge OCS lessees and MMS to devise alternatives to the man riding apparatus; inspections in accordance with recognized industry guidelines is essential to safe operation in reducing injuries and eliminating fatalities. As a proactive safety measure MMS continues to monitor and encourage the development of a rider-operated control on specialist personnel riding winches.

Excellence Achieved Through Information Collection and Sharing

The MMS has developed a crane, material and pipe handling data base which is used to monitor and track crane, material and pipe handling incident data. This effort was implemented after realizing that MMS needed to have consistent and accurate data available for use in evaluating and analyzing crane, material and pipe handling incidents. When crane, material or pipe handling accidents are investigated on the OCS the data base provides but is not limited to the following information:

- Investigation data e.g., non-lifting operation, lifting operation, Severity of injuries, etc;…
- Crane, material and pipe handling identification information e.g., installation date, model number, etc;…
- Equipment operator training and experience;
- Information on its maintenance and inspection regime;
- Any associated MMS or USCG investigation reports, etc; and
- Monitor incident rates to determine emerging trends and to make a determination if industry standard(s) should be amended or incorporated through a rulemaking process.

The MMS participates when possible in some industrial forums and committees meetings such as OHMEC and the Aberdeen Crane Forum, etc. For the past 5 years, the MMS has participated in the Annual North Sea Offshore Crane Conference which alternates between Aberdeen Scotland and Norway. It also participates as often as possible in all relevant lifting conference e.g., IADC, API, USCG, and oil and gas industry sponsored workshops. These forums and conferences are excellent venues for sharing best practices.

Additionally, the MMS disseminates any relevant information following an accident investigation of a crane, material or pipe handling accident. This information is provided by several means i.e., Notice to Lessees (NTL), Safety Alerts and Accident Investigation Reports.

This information is then posted on the MMS website, these reports and notices are used to:

- Provide recommendation for future action;
- Need to revise regulation or standard;
- Advise lessees of problem areas relating to safety issues which could affect safety of personnel; and
- Alert industry and other federal regulators of potential safety concerns.

How the MMS strategy maps across to the IRF top ten issues

To reiterate what the International Regulators Forum (IRF) stated in its report, injuries and dangerous occurrences arising from lifting operations account for a significant proportion of the total of those occurring offshore. The IRF decided that it would be beneficial to look at the worldwide picture to review national initiatives and to share best practice in order to improve our effectiveness in regulating these risks. In particular, the project sought to:

- Identify concerns associated with lifting and mechanical handling**;**
- Identify initiatives to address those concerns;
- Identify benchmarks used to seek compliance with relevant national legislation, e.g., relevant codes and standards;
- Rank the issues to identify the priority concerns;
- Promulgate the findings to raise awareness; and to
- Develop common approaches to generic issues.

The table below shows the activities in MMS's lifting strategy that address the top ten priority issues identified by the IRF.

E	**IRF Issues**	**MMS Strategy Elements**
E2	Training and competence of crane operators	API RP 2D 3.1.1 "Operators", 3.1.2 "Qualifications for Operators" and Appendix A1 "Commentary for Operator Training". Must train and have experience on type of crane that will be operated. PINC I-182
E1	Training and competence of banksmen / slingers / signalers	API RP 2D 3.1.4 "Qualification for Riggers" and Appendix A2 "Commentary for Rigger Training". Signal training is covered in Rigger training. PINC I-181
D3	Man riding using winches – alternatives and safeguards	The USCG addresses personnel lifting equipment and procedures through Subchapter N of their requirements
E6	Poor planning and or management of lifting operations.	RP 75 and API RP 2D 2.3, 3.1.3 and 3.1.4, Planning and equipment selection covered under Operator and Rigger training.

E1	IRF Issues	MMS Strategy Elements
F1	Analysis of lifting accidents	MMS Crane, Material and Pipe handling Data base and Subpart A the Incident Report Rule
B4	Static and dynamic cranes rating	API RP 2D 3.2.1 "The Load" and API Spec 2C 3.3 "Load Rating Charts" static and dynamic load chart are required to be visible to the operator at the control station. API RP 2D "Crane Re-rating" Re-rating must be performed by the 2C crane manufacturer or a licensed engineer. New load charts are to be generated by the 2C crane manufacturer or a licensed engineer. API Spec. 2C 3.3(b) The basis for the load chart will be clearly marked on the load chart. PINC I-31 and I-133
B1	Risk of the crane hook / pennant snagging with the supply boat because of the position of the loads laid out on the supply vessel deck	MMS and API is considering a revision to API RP 2A, that would address this safety issue we would propose that the hoist/load line drum would be rated for failure at the rated load of the crane, and that a weak link, also rated for failure at the hoist/load line drum and the hoist rope or load. This approach will allow the hoist/load line drum to spool out cable while the rated capacity of the crane is exceeded and will allow the cable to disconnect from the drum when all of the cable is spooled out. It will also prevent the crane and crane cab from being pulled off its anchorage on an offshore platform.
E3	Training and competence of mechanics undertaking crane maintenance	API 2D 4.3.3 and 4.3.1 I-151 I-152 I-153

E1	IRF Issues	MMS Strategy Elements
E5	Supervision of lifting operations.	RP 75 and API RP 2D 2.3, 3.1.3 and 3.1.4, Planning and equipment selection covered under Operator and Rigger training. API RP 2D 3.2.3 and Appendix B, C3.2.3 "Moving the Load"
E7	Inadequate maintenance	Prevention of mechanical failures through inspection, testing and maintenance API RP 2D 4 and Appendix C, D, E and F for Inspection, Testing and Maintenance. Also API RP 2D 5 and Appendix G for "Wire Rope and Sling Inspection" PINCS I-141 , I-142, I-143, I-144, I-145, & I-146