



DECOMMISSIONING METHODOLOGY GAP ANALYSIS

BSEE Contract E15PD00165

Report Version: Final v2

Date: Friday, January 15, 2016

Prepared for:

Bratslavsky Consulting Engineers, Inc.

*500 West 27th Avenue
Anchorage, AK 99503*

On Behalf of:

Bureau of Safety and Environmental Enforcement

*45600 Woodland Road, VAE – AMD
Sterling, VA 20166-92106*

Prepared by:

SolstenXP Inc.

*406 West Fireweed Lane
Anchorage, AK 99503*

E15PD00165 – DECOMMISSIONING METHODOLOGY GAP ANALYSIS

Contents

Executive Summary 1

Introduction 3

Literature Review 5

Gap Analysis 9

Conclusions..... 14

Organizations Addressed 16

Acronyms 31

Bibliography 33

APPENDIX

Appendix A – Alaska OCS Region Acceptable Gravel-Founded Island Map, Prudhoe Bay

Appendix B – Alaska OCS Region Acceptable Gravel-Founded Island Map, Lower Cook Inlet

Appendix C – Alaska OCS Region Acceptable Gravel-Founded Island Map, Upper Cook Inlet

EXECUTIVE SUMMARY

The regulatory framework for decommissioning offshore oil and gas production facilities on the U. S. outer continental shelf (OCS) is codified in Code of Federal Regulations, 30 CFR § 250, Subpart Q – Decommissioning Activities [1]. This code encompasses the requirements for plugging wells, removing facilities, clearing seabed obstructions, and decommissioning associated pipelines. These regulations have evolved along with the advances in offshore oil and gas drilling and production technology, which have primarily occurred in temperate climate oceans. Thus, the regulations are oriented towards the bottom founded and floating facilities common to those waters. As the petroleum industry has advanced into higher latitudes, the design response to increasingly harsh environmental forces has resulted in more massive and robust structures, corresponding to more technically challenging operational modes. Regulation has somewhat followed this trend, but it still is based on the traditional facility structure designed for temperate environments.

In the Arctic, sea ice and the loads it exerts on an offshore structure are the most severe environmental forces encountered. Extreme lateral loads, seabed gouging and ice override events must be taken into account when designing offshore structures. One method of countering such loading is to increase the mass of the structure that will be impacted. Consequently, gravel islands have been utilized as the base structure for offshore oil and gas exploration and production operations in the Beaufort Sea for several decades. These installations have included natural islands, enhanced natural islands and new artificial islands in waters less than approximately 60 feet deep. More recently there has been an interest in these types of facilities in the Barents Sea, primarily in the Russian Arctic.

There is concern that the decommissioning requirements of 30 CFR § 250 Subpart Q may not have kept pace with the evolution of Arctic offshore gravel island-based oil and gas exploration and production facility design and construction. To assess this concern, a literature search and comprehensive comparative review of current State of Alaska regulations and guidelines, United States regulations and guidelines, international standards and industry best practices for decommissioning offshore gravel island-based oil and gas exploration and production facilities was performed. Based on this review, a Gap Analysis has been prepared which compares and contrasts relevant regulations and standards to 30 CFR § 250 Subpart Q.

The significant findings were as follows;

Executive Summary
E15PD00165 - Decommissioning Methodology Gap Analysis

- There is a common theme found in all the documents reviewed that decommissioning operations should be conducted in a manner to minimize the risk to human life, to vessel navigation and of adverse environmental impacts during and after decommissioning and reclamation.
- There are no decommissioning regulations or standards which specifically address Arctic offshore gravel islands.
- The common philosophy for offshore oil and gas structure removal is total removal to original seabed level.
- Exceptions to total removal addressed are specific to massive concrete gravity base structures and massive steel structures located in deeper waters.
- Exceptions to complete removal are also discussed in the context of alternate uses such as the creation of artificial reefs are proposed.
- Industry practice for Arctic offshore gravel island removal has been limited to removal of slope armor and allowing the island to ablate over time through natural sea ice movement and wave action.
- Knowledge as to the fate of islands abandoned in this manner is limited, but it appears that in the cases studied, stability was attained when the water depth above the eroded surface reached ten to twelve feet.
- Concerning well abandonment and plugging, the prescriptive regulations in 30 CFR § 250 Subpart Q have not kept pace with advancing industry practice for the definition of zonal isolation envelopes and the use of life cycle engineering design principles for zonal isolation and the prevention of flow within wellbores.

Details of the literature review, gap analysis and recommendations to the U.S. Bureau of Safety and Environmental Enforcement (BSEE) on any improvements which can be made to 30 CFR § 250 Subpart Q regarding the decommissioning of offshore gravel island-based oil and gas exploration and production facilities are presented in the following sections.

INTRODUCTION

While United States federal regulations governing the decommissioning of an offshore oil and gas exploration and production facility on the OCS are codified in 30 CFR § 250 Subpart Q, industry practice worldwide is also influenced by sovereign state law, local governmental entity regulations, international treaties, international guidelines, and considerations for industry best practices. These laws, standards, and guidelines vary widely in form with jurisdictional area of adoption. Some entail prescriptive technical procedures while others contain generalized performance-based standards or goals. There is little to no consistency in the format of the law versus the presentation of standards. In some jurisdictions, laws are prescriptive and standards are general; in other regions, the laws set performance-based goals and the standards become prescriptive. There are also cases in which both legislation and standards contain prescriptive requirements and operational goals. The fact that Arctic offshore gravel island-based oil and gas facilities, one subset of the range of possible facility types, are not specifically addressed in the regulations and standards further confuses comparison of these documents.

Regardless of the wide range of type and form of regulation and standards, a common set of underlying goals was found in all the cited references. These universal themes for decommissioning and reclamation of offshore structures, gravel islands included, are well captured in Chapter 10.7 of ANSI/API RP 2N Planning, Designing, and Constructing Structures and Pipelines for Arctic Conditions [29] which states:

10.7 Decommissioning and Reclamation

The structure shall be planned, designed, constructed, and maintained in such a manner as to minimize the risk to human life, the risk to vessel navigation and the risk of adverse environmental impacts during and after decommissioning and reclamation.

Similarly, 30 CFR Part §250.1703(f) states that the “general requirements for decommissioning” includes:

(f) Conduct all decommissioning activities in a manner that is safe, does not unreasonably interfere with other uses of the OCS, and does not cause undue or serious harm or damage to the human, marine, or coastal environment.

Introduction
E15PD00165 - Decommissioning Methodology Gap Analysis

In addition to these common performance-based goals, the majority of the regulations and standards subdivide decommissioning into a consistent set of four main sub-categories. These groupings are:

- Permanently plugging wells;
- Removing platforms and other facilities;
- Site clearance for wells, platforms, and other facilities; and
- Pipeline decommissioning.

These commonalities are discussed in the following literature review and discrepancies between the United States Offshore regulations and the other regulations and standards are presented in the Gap Analysis.

Recommendations for possible revisions to 30 CFR § 250 Subpart Q are presented in the final section of the report.

LITERATURE REVIEW

A literature review was performed with specific reference to decommissioning Arctic offshore gravel island-based oil and gas exploration and production facilities. SolstenXP operational archives were reviewed for relevant materials. An initial search focused on countries, agencies, and international groups which have an interest in Arctic oil and gas development. The review was then expanded to include areas in which current oil and gas activities are conducted on man-made islands or other offshore structures in high latitudes. The result of this review is a selection of 92 sources relating to decommissioning such facilities in California, Alaska, Canada, the United Kingdom, Norway, and Russia. The documents fall into three categories: regulations established by legislation; standards developed by industry or special interest groups; and technical and policy review papers from a variety of sources. In some cases, the distinction between the legal requirements of a regulation and the suggested best practice of a standard are not clear. Personal communications were pursued with industry peers [2, 3] and standardization society staff to clarify the areas of ambiguity [4].

The most notable finding from this review is a significant lack of regulation and standards specific to offshore gravel islands. This is most likely due to the limited use of these islands and the even more uncommon decommissioning of such facilities.

The generalized findings of the literature review are presented in geographic sequence subdivided by the jurisdictional locations in which they apply. The offshore waters of the United States and the states of Alaska and California comprise the first grouping. International laws, treaties and standards in place globally are included in the second grouping. Canada and Canadian provincial jurisdictions are in group three. The remaining countries with operations in northern waters including the United Kingdom, Norway, and Russia are in the fourth grouping.

A bibliography of all reference materials used to compile this report is attached as well as a brief description of each agency from which regulations or standards were reviewed.

ZONE 1, UNITED STATES, ALASKA, AND CALIFORNIA

UNITED STATES OFFSHORE REGULATIONS, 30 CFR § 250 SUBPART Q.

The format of 30 CFR § 250 Subpart Q is to frame the regulations in the form of answers to posed hypothetical questions [1]. The CFR provides tightly prescriptive regulations for the plugging of wells but becomes less prescriptive and more goal-oriented on the topics of facility removal, site clearance, and pipeline removal. This

Literature Review
E15PD00165 - Decommissioning Methodology Gap Analysis

blending of prescriptive approach, performance based standards and the hypothetical case document format all in one section of regulation does not align with the safety-case approach adopted by most other international regulators. This regulation does not specifically address offshore gravel islands.

ALASKA

The Alaska oil and gas laws and regulations pertinent to the decommissioning of offshore gravel islands are primarily discussed in the Alaska Administrative Code in Title 20 Chapter 25 Alaska Oil and Gas Conservation Commission (AOGCC) [5]. The sections of the Alaska regulations pertaining to well plugging and associated equipment are highly prescriptive and parallel federal requirements. Regulations relating to the remaining aspects of island decommissioning are more performance-based. Requirements for removal of facilities are minimally described. Pipeline abandonment is also not addressed in these regulations and this regulation does not specifically address offshore man-made gravel islands.

CALIFORNIA STATE REGULATIONS

In the state of California, regulations pertinent to the plugging of wells and the decommissioning of offshore oil and gas facilities are found in sections of the Public Resources Code (Fish and Game Code), Civil Code (California Statutes and Regulations for Conservation of Oil, Gas and Geothermal Resources) and the Code of Regulations Title 2. Administration, Division 3. State Property Operations, Chapter 1. State Lands Commission, Article 3.2. Oil and Gas Drilling Regulations; there may be other possible sources as well [6-8]. As in the federal regulations, the well abandonment requirements are prescriptive while the requirements for removal of facilities are goal-oriented. The ultimate objectives of the regulations align with the common aim of safety and mitigation of adverse environmental impacts. Of interest is the Fish and Game Code Section 6600-6605 [6] which establishes a process for approval of the partial removal of facilities in cases of positive net environmental benefit when compared to complete removal. This discussion of the net benefit of options is not common in the bulk of the regulations reviewed. This regulation does not specifically address offshore man-made gravel islands.

ZONE 2, INTERNATIONAL STANDARDS, LAWS, AND TREATIES

The entities interested in Arctic oil and gas activity are highly varied, as is their purview and authority. At one extreme there is the international treaty *United Nations Convention on the Law of the Sea (UNCLOS)* [9]. UNCLOS defines the rights and

Literature Review
E15PD00165 - Decommissioning Methodology Gap Analysis

responsibilities of nations on their use of the world's oceans, establishing guidelines for businesses, the environment, and the management of marine natural resources, based on the overarching goals enumerated in the UNCLOS report. One hundred sixty-seven countries have ratified the Convention. The United States has not joined this group and thus is not bound by the Convention. In the realm of recommended practices the World Bank, American Petroleum Institute (API), International Organization for Standardization (ISO), Norwegian Technology Center, International Association of Oil and Gas Producers (IOGP) and ASTM International are among the many organizations that have offered guidance [10-21]. Non-governmental advisory organizations such as the Brookings Institute, Pew Charitable Trusts, National Petroleum Council, and the Arctic Council have also been involved in developing a policy for Arctic oil and gas activity [22-25].

ZONE 3, CANADA

The regulation of oil and gas in Canada is based in federal legislation such as the Canada Petroleum Resources Act, Canada Oil and Gas Operations Act and National Energy Board Act [26-29]. Regulatory administration of oil and gas operations in offshore waters of the Yukon, Northwest Territories, and Nunavut resides within the National Energy Board. In the coastal provinces, this authority lies within joint federal-provincial energy boards, [30-37]. The bulk of the federal regulations are performance- goal-oriented while regional authorities (such as the Canada-Nova Scotia Offshore Petroleum Board, etc.) use “guidelines.” The guidelines, which carry legal requirement authority, are prescriptive in the treatment of well abandonment and less so on facility removal. None of the Canadian documents reviewed specifically refer to offshore man-made gravel islands [38, 39].

ZONE 4, EUROPE AND RUSSIA

The United Kingdom, Norway, and Russia were also selected for review. While each country has their own legislation, they are all involved to some degree in regional agreements and joint industry projects (JIP) and they all use international standards as operational guidelines.

Fifteen European governments and the European Union have adopted the Convention for the Protection of the Marine Environment of the North-East Atlantic [40].

Administered by the OSPAR Commission, the guidelines relate to prevention of pollution or dumping from offshore structures but do not address offshore man-made gravel islands. Russia is not an OSPAR signatory.

Literature Review
E15PD00165 - Decommissioning Methodology Gap Analysis

The oil and gas regulatory structure in the United Kingdom begins with national legislation through many acts. These again tend to be performance-goal-oriented but also establish compliance reporting requirements [41-43]. A set of operational “guidelines” are presented by the industry cooperative group Oil & Gas UK [43, 44]. These guidelines are much more prescriptive and have become the commonly accepted minimum standards recognized for compliance with legislation.

In Norway, the bulk of oil and gas legislation is found in acts relating to the Norwegian Environmental Agency [45-48]. These regulations reference the industry group NORSOK Standards for more technical and prescriptive direction [17]. The NORSOK standards are commonly used for compliance but again do not address offshore man-made gravel islands.

Russian offshore oil and gas regulation is somewhat difficult to assess, and the current petroleum technology trade sanctions enacted by the European Union and the United States do not facilitate communication and clarification. An example of this situation is the fate of the Barents 2020 workgroup on offshore man-made islands [49, 50]. The Barents 2020 project was a joint Norwegian–Russian study group convened to assess international standards for exploration, production, and transport of oil and gas in the Barents Sea. This multi-year project developed many recommendations that were submitted to ISO for incorporation in ISO 19906:2010. One of the last workgroups to be established was WG-8 focusing on man-made islands and causeways. Russia discontinued their efforts with the WG-8 group and the group was disbanded when the European Union (EU) placed economic sanctions on Russia for unrelated political reasons. Some of this work has been redirected through ISO, but no publications are available for review [4]. To the extent that Russian regulations could be reviewed they seem to be regionally-based and rather prescriptive [51-54].

GAP ANALYSIS

The objective of this report is to provide a gap analysis of 30 CFR § 250 Subpart Q versus the data obtained from the literature review described above and to provide recommendations to BSEE for any improvements which can be made to 30 CFR § 250 Subpart Q regarding the decommissioning of offshore gravel island-based oil and gas exploration and production facilities.

The analysis is presented first and resulting recommendations follow in the next section. To simplify reference, the Gap Analysis is formatted in the same paragraph order as 30 CFR § 250 Subpart Q with any significant gaps identified. Sections with no gap noted are identified as such.

30 CFR § 250 SUBPART Q GAP ANALYSIS

GENERAL

§ 250.1700 DEFINITIONS

No gaps identified.

§250.1701 ENTITY RESPONSIBLE FOR DECOMMISSIONING OBLIGATIONS

No gaps identified.

§250.1702 ACCRUAL OF DECOMMISSIONING OBLIGATIONS

No gaps identified.

§250.1703 GENERAL REQUIREMENTS FOR DECOMMISSIONING

No gaps identified.

§250.1704 TIMING FOR SUBMITTAL OF DECOMMISSIONING APPLICATIONS AND REPORTS

No gaps identified.

§250.1705 BLOWOUT PREVENTER EQUIPMENT INFORMATION

BSEE includes an unusual degree of detail for blowout preventer (BOP) reporting as a section of decommissioning regulations. Most other regulatory bodies define BOP requirements in drilling regulations, and if mentioned at all in decommissioning standards they are incorporated by reference.

Gap Analysis
E15PD00165 - Decommissioning Methodology Gap Analysis

§250.1706 BLOWOUT PREVENTER EQUIPMENT SPECIFICATIONS

No significant variations between BSEE requirements and regulations from other government entities were identified with respect to the regulations for BOP equipment. However, the requirement to have an independent third party verify the capability of the blind shear rams in the BOP is a more onerous requirement than that identified in any other standard or regulation. Most regulations recognize API Standard 53 as a minimum requirement for BOP qualifications [12, 13, 55, 56].

§250.1707 BLOWOUT PREVENTER SYSTEM TESTING

The test pressures detailed in §250.1707 correspond adequately to those found in other standards. BOP test frequency is only specified in the U.S. regulations.

§250.1708 BLOWOUT PREVENTER SYSTEM INSPECTION AND MAINTENANCE

The reference in §250.1708 is an outdated reference to API RP 53 which has changed to, API Standard 53 [13].

§250.1709 WELL CONTROL FLUID REQUIREMENTS

The degree of detail of reporting described in §250.1709 is unique to U.S. federal regulations.

PERMANENTLY PLUGGING WELLS

§250.1710 PERMANENTLY PLUGGING TIME REQUIREMENT

No gaps identified.

§250.1711 MANDATED PLUGGING

No gaps identified but regulation (§ 250.1710.b) states that it *“is not useful for lease operations and is not capable of oil, gas, or sulfur production in paying quantities.”* This phrase is not entirely clear due to lack of definition of *“paying quantities.”*

§250.1712 PLUGGING PLAN INFORMATION REPORTING

BSEE’s requirement for Registered Professional Engineer certification of design required in this section is not found in the other documents reviewed.

Gap Analysis
E15PD00165 - Decommissioning Methodology Gap Analysis

§250.1713 NOTIFICATION OF PLUGGING OPERATIONS

No gaps identified.

§250.1714 OBJECTIVE OF PLUGGING

While no gap is identified in §250.1714, this goal-oriented statement of objective might serve better if it were at the beginning of the section.

§250.1715 PLUGGING SPECIFICATION

While none of the requirements listed in BSEE's table are significantly different from other prescriptive standards reviewed, additional definition around zonal isolation and the intent of the requirements is found in many of the international regulations and standards. For example, the Petroleum Safety Authority of Norway's *Guidelines Regarding the Activities Regulations* (regulation) makes direct reference to NORSOK D-010 (standard) [17]. This standard defines independent well barrier envelopes to achieve wellbore isolation and elimination of leak/cross flow paths. Each barrier envelope must be correctly assessed and designed to handle the possible load cases that it may experience throughout its life rather than merely meeting a specified height and length of cement plugs and mechanical barriers. The *Guideline for Abandonment of Wells* by Oil & Gas UK also presents a discussion of the objectives and design considerations for zonal isolation that is more complete and transparent than those found in this paragraph [44].

§250.1716 WELLHEAD AND CASING REMOVAL

No significant differences concerning the removal of wellhead equipment and casing were noted in the international requirements from BSEE requirements. The Alaska AOGCC requirement is notably lower at one foot below mud line for platform well abandonment and 5 feet below mud line for wells drilled by mobile units [5].

§250.1717 PLUGGING REPORTING REQUIREMENTS.

No gaps identified.

TEMPORARY ABANDONED WELLS

§250.1721 QUALIFICATION FOR TEMPORARY ABANDONMENT

No gaps Identified.

Gap Analysis
E15PD00165 - Decommissioning Methodology Gap Analysis

§250.1722 SUBSEA PROTECTIVE DEVICE REQUIREMENTS

No gaps Identified.

§250.1723 END OF TEMPORARY ABANDONMENT REQUIREMENTS

No gaps Identified.

REMOVING PLATFORMS AND OTHER FACILITIES

§250.1725 REQUIREMENTS FOR PLATFORM REMOVAL TIMING

No gaps Identified.

§250.1726 CONTENT OF PLATFORM REMOVAL APPLICATION

No gaps Identified.

§250.1727 PLAN CONTENT FOR FINAL PLATFORM REMOVAL APPLICATION

No gaps Identified.

§250.1728 PLATFORM REMOVAL DEPTH REQUIREMENTS

No gaps Identified.

§250.1729 PLATFORM POST-REMOVAL REPORTING

No gaps Identified.

§250.1730 QUALIFICATION FOR PARTIAL REMOVAL

No gaps Identified.

§250.1731 QUALIFICATION FOR ALTERNATE USE

No gaps Identified.

SITE CLEARANCE FOR WELLS, PLATFORMS, AND OTHER FACILITIES

§250.1740 VERIFICATION OF SITE CLEARANCE

No gaps Identified.

Gap Analysis
E15PD00165 - Decommissioning Methodology Gap Analysis

§250.1741 DRAG TRAWL SITE CLEARANCE

No gaps Identified.

§250.1742 ALTERNATE VERIFICATION OF SITE CLEARANCE

No gaps Identified.

§250.1743 CERTIFICATION OF SITE CLEARANCE

No gaps Identified.

PIPELINE DECOMMISSIONING

§250.1750 QUALIFICATION FOR DECOMMISSIONING A PIPELINE IN PLACE

No gaps Identified.

§250.1751 PROCEDURE FOR DECOMMISSIONING A PIPELINE IN PLACE

No gaps Identified.

§250.1752 REMOVAL OF A PIPELINE

No gaps Identified.

§250.1753 PIPELINE DECOMMISSION REPORT

No gaps Identified.

§250.1754 REQUIREMENT FOR REMOVAL OF A PIPELINE DECOMMISSIONED IN PLACE

No gaps Identified.

CONCLUSIONS

30 CFR § 250 Subpart Q is in general alignment with other standards reviewed and is similar to other standards reviewed as to the extent Arctic offshore gravel islands are addressed; relatively few specific technical gaps were identified. There are areas in which clarity of intent or technical specification might be improved, and recommendations are offered to that end. Recommendations are presented in the order of the six sections of 30 CFR § 250 Subpart Q concerning particular paragraphs as needed for clarity.

30 CFR § 250 SUBPART Q RECOMMENDATIONS

GENERAL: § 250.1700 THROUGH § 250.1709

- This section of the regulation begins with definitions and statements applicable to the regulation as a whole, then ends with five very distinct paragraphs concerning Blowout Preventer Equipment and Well Control Fluids. It is recommended that these sections be relocated to the subsequent section on well abandonment procedures. Alternatively, these paragraphs might be incorporated by reference as they appear to be previously stated in other Subparts of 30 CFR § 250 [1].
- It is recommended that the reference to “API RP 53” found in §250.1708 be updated to reflect the new nomenclature of this document which is “API standard 53.”

PERMANENTLY PLUGGING WELLS: §250.1710 THROUGH §250.1717

- Paragraph §250.1711 Mandated Plugging is unclear due to lack of definition of “*paying quantities*” and requires clarification. If there is reference elsewhere in the CFR, it is recommended that it be noted here.
- Paragraph §250.1714 presents a statement of the objectives of plugging wells. It is recommended that this statement be moved to the beginning of this section.
- Paragraph §250.1715 prescribes well-plugging requirements based on a set of traditional practices. The lengths and placement of these plugs were developed reactively through industry experience and have minimal engineering basis. As such, literal adherence to the requirements for a specified height and length of cement plugs and mechanical barriers hinders innovation and operational efficiency. Well plugging standards such as Norway’s *NORSOK D-010* [17] and the United Kingdom’s *Guideline for Abandonment of Wells* [44] create a more definitive process for zonal isolation and require that each abandonment plan be

Conclusions
E15PD00165 - Decommissioning Methodology Gap Analysis

individually engineered to assess the possible load cases that the well and the formations penetrated may experience throughout their production life cycle. It is recommended that this zonal isolation approach to abandonment design be evaluated for adoption.

TEMPORARY ABANDONED WELLS: §250.1721 THROUGH §250.1723

- As the applicability of this section to decommissioning of Arctic offshore gravel islands is minimal, there is no recommendation for change.

REMOVING PLATFORMS AND OTHER FACILITIES: §250.1725 THROUGH §250.1731

- It is recommended that new sections relating to the decommissioning of man-made Arctic offshore gravel islands be adopted.
- Removal or reduction of islands by natural ablation should be evaluated. It is recommended that existing islands that have been abandoned to natural ablation be surveyed to assess the results and impact of the method.
- Guidelines for abandonment of offshore gravel islands should be developed to address removal of slope protection, monitoring of the rate of gravel erosion and to provide measures for mitigating hazards to navigation.
- It is recommended that the requirement for removal of all structural elements including wellbore casings, structural supports, and pipeline risers to a depth of 15 feet below original seabed be retained.

SITE CLEARANCE FOR WELLS, PLATFORMS, AND OTHER FACILITIES: §250.1740 THROUGH §250.1743

- Site clearance criteria for Arctic offshore gravel islands will need to be developed in conjunction with the facilities removal criteria.

PIPELINE DECOMMISSIONING: §250.1750 THROUGH §250.1754

- A provision for removal of pipelines in zones of coastal erosion should be considered.
- Criteria for abandonment in place of buried pipelines need to be addressed.

ORGANIZATIONS ADDRESSED

GLOBAL

INTERNATIONAL ORGANIZATION FOR STANDARDIZATION (ISO)

ISO is an independent, non-governmental international organization who shares knowledge and develops voluntary, consensus-based, market relevant international standards that support innovation and provide solutions to global challenges.[4, 11, 19, 20]

www.iso.org

UNITED NATIONS (UN)

The Charter of the United Nations was signed on June, 26 1945, in San Francisco, at the conclusion of the United Nations Conference on International Organization, and came into force on 24 October 1945. The Statute of the International Court of Justice is an integral part of the Charter.

Its mission is maintaining International peace and security. [9]

www.un.org/en

WORLD BANK

The World Bank is a vital source of financial and technical assistance to developing countries around the world. [57]

www.worldbank.org

INTERNATIONAL

AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)

As the voice of the U.S. standards and conformity assessment system, the American National Standards Institute (ANSI) empowers its members and constituents to strengthen the U.S. marketplace position in the global economy while helping to assure the safety and health of consumers and the protection of the environment.

The Institute oversees the creation, promulgation, and use of thousands of norms and guidelines that directly impact businesses in nearly every sector: from acoustical devices to construction equipment, from dairy and livestock production to energy distribution, and many more. ANSI is also actively engaged in accreditation - assessing the competence of organizations determining conformance to standards. [11]

www.ansi.org

Organizations Addressed
E15PD00165 - Decommissioning Methodology Gap Analysis

AMERICAN PETROLEUM INSTITUTE (API)

The American Petroleum Institute (API) is the only national trade association that represents all aspects of America's oil and natural gas industry. [11-13]

www.americanpetroleuminstitute.com

ASTM INTERNATIONAL

Over 12,000 ASTM standards operate globally. ASTM standards enhance performance and help everyone have confidence in the things they buy and use. [15]

www.astm.org

NORWEGIAN SHELF'S COMPETITIVE POSITION (NORSOK)

The root of the acronym NORSOK (Norsk Søkkel Konkuranseposisjon) loosely translates as 'the Norwegian shelf's competitive position', and it was initiated in 1994 to cut costs and improve competitiveness on the Norwegian continental shelf. [16, 17]

www.standard.no/en

OFFSHORE TECHNOLOGY CONFERENCE (OTC)

The Offshore Technology Conference (OTC) is where energy professionals meet to exchange ideas and opinions to advance scientific and technical knowledge for offshore resources and environmental matters. Founded in 1969, OTC's flagship conference is held annually in Houston. OTC has expanded technically and globally with the Arctic Technology Conference, OTC Brazil, and OTC Asia. [58]

www.otcnet.org

OSLO PARIS CONVENTION (OSPAR)

OSPAR is the mechanism by which 15 Governments & the EU cooperate to protect the marine environment of the North-East Atlantic. [40]

www.ospar.org

PENNWELL BOOKS

PennWell Books publishes technical & nontechnical books for the petroleum, power and fire services industries. Written by selected industry experts, PennWell Books are designed to broaden expertise in an area of study, understand other related disciplines, provide quick-glance references as topics arise in daily routine, and make excellent classroom and training texts. [59]

www.pennwellbooks.com

Organizations Addressed
E15PD00165 - Decommissioning Methodology Gap Analysis

SOCIETY OF PETROLEUM ENGINEERS (SPE)

The largest individual-member organization serving managers, engineers, scientists and other professionals worldwide in the upstream segment of the oil and gas industry. [56]

www.spe.org

INSTITUTIONS

BROOKINGS INSTITUTION

The Brookings Institution is a non-profit public policy organization based in Washington, DC. Their mission is to conduct high-quality, independent research and, based on that research, to provide innovative, practical recommendations that advance three broad goals: strengthen American democracy, foster the economic and social welfare, security and opportunity for all Americans; and secure a more open, safe, prosperous, and cooperative international system.

Brookings is consistently ranked as the most influential, most quoted and most trusted think tank. [24]

www.brookings.edu/about#research-programs/

DET NORSKE VERITAS (DNV GL)

Driven by its purpose of safeguarding life, property, and the environment, DNV GL enables organizations to advance the safety and sustainability of their business. They provide classification and technical assurance along with software and independent expert advisory services to the maritime, oil & gas and energy industries. They also provide certification services to customers across a wide range of industries. Operating in more than 100 countries, they have 15,000 professionals dedicated to helping their customers make the world safer, smarter and greener. [49, 50]

www.dnvgl.com

GEOLOGICAL SOCIETY OF AMERICA

Established in 1888, The Geological Society of America provides access to elements that are essential to the professional growth of earth scientists at all levels of expertise and from all sectors: academic, government, business, and industry. [60]

www.geosociety.org

INTERNATIONAL ASSOCIATION OF OIL & GAS PRODUCERS (IOGP)

The International Association of Oil & Gas Producers (IOGP) is the voice of the global upstream industry. Oil and gas continue to provide a significant proportion of the world's energy to meet growing demands for heat, light, and transport. Members produce more than half of the world's oil and over a third of its gas. They operate in all producing

Sub: SolstenXP, Inc.

Prime: Bratslavsky Consulting Engineers, Inc.

Client: Bureau of Safety and Environmental Enforcement

Date Issued: 1/15/2016

Final v2

Page | 18

Organizations Addressed E15PD00165 - Decommissioning Methodology Gap Analysis

regions: the Americas, Africa, Europe, the Middle East, the Caspian, the Arctic, Asia, and Australia. Members identify and share knowledge and good practices to achieve improvements in health, safety, the environment, security, and social responsibility. [14, 19, 21]

www.iogp.org

NATIONAL PETROLEUM COUNCIL (NPC)

The National Petroleum Council (NPC), a federally chartered and privately funded advisory committee, was established by the Secretary of the Interior in 1946 at the request of President Harry S. Truman. In 1977, the U.S. Department of Energy was established, and the NPC's functions were transferred to the new Department. The purpose of the NPC is solely to advise, inform, and make recommendations to the Secretary of Energy with respect to any matter relating to oil and natural gas, or to the oil and gas industries submitted to it or approved by the Secretary. The NPC does not concern itself with trade practices, nor does it engage in any of the usual trade association activities. [25]

www.npc.org

NETHERLANDS ORGANISATION FOR APPLIED SCIENTIFIC RESEARCH (TNO)

TNO connects people and knowledge to create innovations that boost the sustainable competitive strength of industry and well-being of society. [61]

www.tno.nl/en/

NUNAVUT

Formally the Nunavut Petroleum Workshop, the focus of the bi-annual event is changing, and the format will now be the Oil & Gas Summit. The Summit's purpose is to share information and identify issues, concerns, and gaps that need to be addressed in order to develop a consensual path forward for future oil and gas exploration and possible development. Participants are invited as representatives of identified stakeholders (communities, organizations, governments) to help to determine the readiness for Oil & Gas Development or if Nunavut is not ready, determining next steps to assure readiness. [10]

www.nunavutminingsymposium.ca

OIL & GAS UK

Oil & Gas UK is the leading representative body for the UK offshore oil and gas industry. It is a not-for-profit organization, established in April 2007 but with a pedigree stretching back over 40 years. [44, 62]

<http://oilandgasuk.co.uk/>

Sub: SolstenXP, Inc.
Prime: Bratslavsky Consulting Engineers, Inc.
Client: Bureau of Safety and Environmental Enforcement

Date Issued: 1/15/2016
Final v2
Page | 19

Organizations Addressed
E15PD00165 - Decommissioning Methodology Gap Analysis

OILFIELD REVIEW

Oilfield Review, published by Schlumberger, provides authoritative, relevant, and informative articles and other content on technology, innovation, history, and the science of exploration and production. [63]

www.slb.com/resources/oilfield_review.aspx

OILFIELD TECHNOLOGY MAGAZINE

Global coverage of the upstream oil and gas sector. [18]

www.palladian-publications.com/publications/oilfield-technology

THE PEW CHARITABLE TRUST (PEW)

The Pew Charitable Trusts is an independent non-profit organization – the sole beneficiary of seven individual trusts established between 1948 and 1979 by two sons and two daughters of Sun Oil Company founder Joseph N. Pew and his wife, Mary Anderson Pew.

From its first day in 1948, and as the country and the world have evolved, they have remained dedicated to their founders' emphasis on innovation. Today, Pew is a global research and public policy organization, still operated as a non-partisan, non-governmental organization dedicated to serving the public. [23]

www.pewtrusts.org

PROTECTION OF THE ARCTIC MARINE ENVIRONMENT WORKING GROUP (PAME)

PAME is one of six Arctic Council working groups. PAME was first established under the 1991 Arctic Environmental Protection Strategy and was continued by the 1996 Ottawa Charter that established the Arctic Council.

PAME is the focal point of the Arctic Council's activities related to the protection and sustainable use of the Arctic marine environment and provides a unique forum for collaboration on a wide range of activities in this regard. PAME's mandate is to address policy and non-emergency pollution prevention and control measures related to the protection of the Arctic marine and environment from both land and sea-based activities. [22]

www.pame.is

THE WAY AHEAD

The Way Ahead is an SPE publication for young professionals in the oil and gas industry. Since 2005, three issues per year have been published on a variety of subjects relevant to young professionals and students. [64]

<http://www.spe.org/twa/>

Sub: SolstenXP, Inc.

Prime: Bratslavsky Consulting Engineers, Inc.

Client: Bureau of Safety and Environmental Enforcement

Date Issued: 1/15/2016

Final v2

Page | 20

JOINT INDUSTRY PROJECTS

ARCTIC OPERATIONS HANDBOOK

This joint industry project (JIP) intends to contribute to the international Arctic community by providing recommendations for guidelines to enhance safe, reliable, and sustainable operations in the Arctic. The focus of the JIP is on the operational activities for transport and installation of fixed, floating and subsea units, as well as for dredging, trenching, pipe laying and floating oil and gas production.

It also concentrates strongly on related aspects common to all Arctic operations of this type such as weather monitoring and forecasting, environmental impact assessment, logistics, equipment preparation, vessel operations, training and health and safety management.

The Arctic Operations Handbook JIP was set up by 16 participating companies in February 2012, consisting of offshore contractors, engineering companies, knowledge institutes, and Arctic consultants, under a subsidy from the Dutch Ministry of Economic Affairs. The results are made public in December 2013. [65]

www.arctic-operations-handbook.info

BARENTS 2020

The Russian-Norwegian Barents 2020 project was established in 2007 in order to assess the standards needed for safeguarding people, environment, and asset values in the Barents Sea. This project organized seven teams of leading international experts working together to make common recommendations on selected safety critical issues.

The objective of the Barents 2020 project was to recommend standards for oil and gas activities in the Barents Sea, which would ensure that the safety level would be at least as good as in the North Sea.

Project sponsors for Phase 4 were: Gazprom, Rosneft, and Norwegian Ministry of Foreign Affairs, DNV GL, Statoil, SDAG, ENI, Total, and OGP. More than 30 Russian and international companies participated in the project. The project was supported by Russian and Norwegian authorities and by the Russian, Norwegian and international oil and gas industry. Russia has discontinued its involvement in response to EU sanctions based on unrelated political issues.

DNV GL was managing the international element of the project. [49, 50]

www.dnvgl.com

OPERATORS CONFERRED

CONOCOPHILLIPS

ConocoPhillips operates in 25 countries with over 17,800 men and women to find and produce oil and natural gas. Conoco Phillips is committed to the efficient and effective exploration and production of oil and natural gas. Producing oil and natural gas and getting them to market takes ingenuity, technology, and investment. Their innovative, collaborative efforts yield products that improve the quality of life globally while producing economic benefits with far-reaching influence. [2]

www.conocophillips.com

HILCORP

Hilcorp, founded in 1989, is one of the largest privately held oil and natural gas exploration and production companies in the United States and is the largest oil producer in Louisiana. Headquartered in Houston, TX, Hilcorp has over 1,350 employees in multiple operating areas including the Gulf Coast of Texas and Louisiana, the Northeast United States, and Alaska's Cook Inlet and North Slope.

Hilcorp's formula is to grow the company by leveraging their core competencies and operational expertise. Their proficiency in these key areas has resulted in significant growth over the last several years. Hilcorp is consistently acknowledged for its culture, values, and ethics. In fact, we have been recognized by multiple, local and national, publications as one of the best places in America to work. [66-75]

www.hilcorp.com

STATOIL

In 1972, the Norwegian State Oil Company, Statoil, was formed, and two years later the Statfjord field was discovered in the North Sea. In 1979, the Statfjord field commenced production, and in 1981 Statoil was the first Norwegian company to be given operator responsibility for a field, at Gullfaks in the North Sea.

Statoil merged with Norsk Hydro's oil and gas division on October 1, 2007. The new company was given the temporary name of StatoilHydro, and the new company reached a size and strength for considerable international expansion. The company changed its name back to Statoil on November 1, 2009.

[20]

www.statoil.com

NORTH AMERICA

USA

FEDERAL

BUREAU OF OCEAN ENERGY MANAGEMENT (BOEM)

BOEM promotes energy independence, environmental protection, and economic development through responsible, science-based management of offshore conventional and renewable energy and marine mineral resources. [76, 77]

www.boem.gov

BUREAU OF SAFETY AND ENVIRONMENTAL ENFORCEMENT (BSEE)

The Bureau of Safety and Environmental Enforcement (BSEE) works to promote safety, protect the environment, and conserve resources offshore through vigorous regulatory oversight and enforcement. [76-79]

www.bsee.gov

CONGRESSIONAL SUBCOMMITTEE

Subcommittees are formed by most committees to share specific tasks within the jurisdiction of the full committee. Subcommittees are responsible to and work within the guidelines established by their parent committees. In particular, standing committees usually create subcommittees with legislative jurisdiction to consider and report bills. They may assign their subcommittees such specific tasks as the initial consideration of measures and oversight of laws and programs in the subcommittees' areas. Service on subcommittees enables members to develop expertise in specialized fields. Subcommittees diffuse the legislative process. For the most part, they are independent, autonomous units with written jurisdictions, and, pursuant to longstanding practice, most bills are referred by a full committee to them. [80]

www.house.gov/committees

DEPARTMENT OF THE INTERIOR (DOI)

The U.S. Department of the Interior protects America's natural resources and heritage, honors our cultures and tribal communities, and supplies the energy to power our future. [78, 79, 81, 82]

www.doi.gov

ENVIRONMENTAL PROTECTION AGENCY (EPA)

Born in the wake of elevated concern about environmental pollution, EPA was established on December 2, 1970, to consolidate in one agency a variety of federal

Organizations Addressed
E15PD00165 - Decommissioning Methodology Gap Analysis

research, monitoring, standard-setting and enforcement activities to ensure environmental protection. Since its inception, EPA has been working for a cleaner, healthier environment for the American people. [83-86]

www.epa.gov

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION (NOAA)

NOAA is an agency that enriches life through science. Our reach goes from the surface of the sun to the depths of the ocean floor as we work to keep citizens informed of the changing environment around them.

From daily weather forecasts, severe storm warnings and climate monitoring to fisheries management, coastal restoration and supporting marine commerce, NOAA's products, and services support economic vitality and affect more than one-third of America's gross domestic product. NOAA's dedicated scientists use cutting-edge research and high-tech instrumentation to provide citizens, planners, emergency managers and other decision makers with reliable information they need when they need it. [87]

www.noaa.gov

NATIONAL RESEARCH COUNCIL (NRC)

NRC's mission is to improve government decision making and public policy, increase public understanding, and promote the acquisition and dissemination of knowledge in matters involving science, engineering, technology, and health.

Seven major programs of the National Academies of Sciences, Engineering, and Medicine conduct studies, facilitate workshops, and undertake other activities: Behavioural and Social Sciences and Education; Earth and Life Studies; Engineering and Physical Sciences; Institute of Medicine; Policy and Global Affairs; Transportation Research Board; and the Gulf Research Program. [55]

www.nationalacademies.org/nrc

UNITED STATES GEOLOGICAL SURVEY (USGS)

The USGS is a science organization that provides impartial information on the health of our ecosystems and environment, the natural hazards that threaten us, the natural resources we rely on, the impacts of climate and land-use change, and the core science systems that help us provide timely, relevant, and useable information. [88]

www.usgs.gov

Organizations Addressed
E15PD00165 - Decommissioning Methodology Gap Analysis

ALASKA

ALASKA OIL AND GAS CONSERVATION COMMISSION (AOGCC)

The Commission oversees oil and gas drilling, development and production, reservoir depletion and metering operations on all lands subject to the state's police powers.

The Commission acts to prevent waste, protect correlative rights, improve ultimate recovery and protect underground freshwater. It administers the Underground Injection Control (UIC) program for enhanced oil recovery and underground disposal of oil field waste in Alaska. It serves as an adjudicatory forum for resolving certain oil and gas disputes between owners, including the state. The Commission carries forth statutory mandates consistent with the protection of health, safety, and the environment. It strives for cooperation with industry while maintaining well-defined and essential regulatory requirements. [5]

<http://doa.alaska.gov/ogc>

DEPARTMENT OF NATURAL RESOURCES (DNR)

The Department of Natural Resources manages all state-owned land, water, and natural resources, except for fish and game, on behalf of the people of Alaska. When all land conveyances from the federal government are completed, the people of the state will own land and resources on 104 million acres: Approximately 100 million acres have been conveyed so far. The state owns approximately 60 million acres of tidelands, shorelands, and submerged lands and manages 40,000 miles of coastline. The state also owns the freshwater resources of the state, a resource that equals about 40 percent of the entire nation's fresh water flow. [89]

<http://dnr.alaska.gov/>

DIVISION OF OIL AND GAS (DOG)

The Alaska Division of Oil & Gas is responsible for the leasing of state lands for oil, gas, and geothermal exploration. We do this by implementing innovative new programs to encourage exploration on state and private lands, and by working with other agencies, local communities, and industry to fulfil the Alaska Constitution's mandate to "encourage the settlement of its land and the development of its resources by making them available for maximum use consistent with the public interest." The Alaska Constitution also calls on us to utilize and develop our natural resources "on the sustained yield principle, subject to preferences among beneficial uses." [89]

www.dog.dnr.alaska.gov

Organizations Addressed
E15PD00165 - Decommissioning Methodology Gap Analysis

CALIFORNIA

DEPARTMENT OF CONSERVATION

The Department of Conservation provides services and information that promote environmental health, economic vitality, informed land-use decisions and sound management of our state's natural resources. [8]

www.conservation.ca.gov

DEPARTMENT OF FISH AND WILDLIFE

The Mission of the Department of Fish and Wildlife is to manage California's diverse fish, wildlife, and plant resources, and the habitats upon which they depend on, for their ecological values and their use and enjoyment by the public. [6]

www.wildlife.ca.gov

DIVISION OF OIL, GAS AND GEOTHERMAL RESOURCES (DOGGR)

The Division oversees the drilling, operation, maintenance, and plugging and abandonment of oil, natural gas, and geothermal wells. The regulatory program emphasizes the wise development of oil, natural gas, and geothermal resources in the state through sound engineering practices that protect the environment, prevent pollution, and ensure public safety. [8]

www.conservation.ca.gov/dog

STATE LANDS COMMISSION

The State Lands Commission is an independent Commission consisting of two Constitutional Officers; the Lieutenant Governor and the State Controller, and the Governor's Director of Finance. Established in 1938, the Commission manages the state's 4 million acres of tidelands and submerged lands and the beds of navigable rivers, streams, lakes, bays, estuaries, inlets, and straits. These lands, often referred to as sovereign or public trust lands, stretch from the Klamath River and Goose Lake on the north to the Tijuana Estuary and Colorado River on the south, and from the Pacific Coast 3 miles offshore on the west to world-famous Lake Tahoe on the east, and includes California's two longest rivers, the Sacramento and San Joaquin. The Commission also monitors sovereign lands granted in trust to approximately 75 local jurisdictions and administers the mineral rights on lands under the jurisdiction of other agencies. The Commission also manages lands granted by Congress to support California's public schools.

The Commission works to protect and enhance these lands and natural resources by issuing leases for use or development, resolving boundaries between public and private lands, promoting public access, and implementing regulatory programs to shield state

Organizations Addressed
E15PD00165 - Decommissioning Methodology Gap Analysis

waters from oil spills and invasive species introductions. Through its actions, the Commission secures and safeguards the public's access rights to waterways and the coastline and preserves irreplaceable natural habitats for wildlife, vegetation, and biological communities. [7]

www.slc.ca.gov/

CANADA

FEDERAL

CANADA NATIONAL ENERGY BOARD (NEB)

The National Energy Board (NEB or Board) is an independent federal regulator established in 1959. Our mandate is to promote safety and security, environmental protection and economic efficiency in the Canadian public interest, in the regulation of pipelines, energy development, and trade. The Board reports to Parliament through the Minister of Natural Resources. [28-32, 35]

www.canada.ca/en/national-energy-board

DEPARTMENT OF JUSTICE

The Department of Justice is headed by the Deputy Minister, who provides advice and support to the Minister and acts as the main interface between the political and administrative functions of government.

The Department of Justice is a medium-sized department with around 5,000 employees. Roughly one-half of the departmental staff are lawyers. The other half is made up of a broad range of professionals, including paralegals, social scientists, program managers, communications specialists, administrative services personnel, computer service professionals, and financial officers.

The Department delivers services through a mix of co-located departmental legal services units, specialized branches located within the Department of Justice and a network of six regional offices located across the country. [26-29, 31-35, 39]

www.justice.gc.ca/eng/abt-apd/org.html

PROVINCE

ALBERTA ENERGY REGULATOR

The Alberta Energy Regulator is responsible for regulating the life cycle of oil, oil sands, natural gas, and coal projects in Alberta from application and construction to production, abandonment, and reclamation. [36]

Organizations Addressed
E15PD00165 - Decommissioning Methodology Gap Analysis

www.aer.ca

BRITISH COLUMBIA (BC) OIL & GAS COMMISSION

The BC Oil and Gas Commission (Commission) is an independent, single-window regulatory agency with responsibilities for overseeing oil and gas operations in British Columbia, including exploration, development, pipeline transportation, and reclamation.

The Commission was created as a Crown Corporation through the enactment of the Oil and Gas Commission Act. In October 2010, the Commission transitioned to the Oil and Gas Activities Act. This regulatory model is designed to provide a streamlined one-stop regulatory agency. Regulatory responsibility is delegated to the Commission through the Oil and Gas Activities Act and includes specified enactments under the Forest Act, Heritage Conservation Act, Land Act, Environmental Management Act, and Water Act. The cost of operating the Commission is funded through the application of industrial fees and levies on a cost recovery basis. [37]

www.bcogc.ca

CANADA–NEWFOUNDLAND AND LABRADOR OFFSHORE PETROLEUM BOARD (C-NLOPB)

The C-NLOPB was created in 1986 through the Atlantic Accord for the purposes of regulating the oil and gas industry offshore Newfoundland and Labrador. The Board operates at arms-length from governments and reports to both the Federal and Provincial Ministers of Natural Resources. Decisions of the Board, referred to in legislation as ‘Fundamental Decisions’, are referred to government for approval or rejection.

Pursuant to the legislation, the C-NLOPB has four regulatory mandates: Safety, Environmental Protection, Resource Management, and Industrial Benefits. The Board regulates exploration licenses, significant discovery licenses, and production licenses covering an area of 7,365,000 hectares; that is an area of about two-thirds of the size of the island portion of the Province of Newfoundland and Labrador. [32, 33, 38, 39]

www.cnlopb.ca

CANADA–NOVA SCOTIA OFFSHORE PETROLEUM BOARD (CNSOPB)

The Canada-Nova Scotia Offshore Petroleum Board (CNSOPB) is the independent joint agency of the Governments of Canada and Nova Scotia responsible for the regulation of petroleum activities in the Nova Scotia Offshore Area. It was established in 1990 pursuant to the Canada-Nova Scotia Offshore Petroleum Accord Implementation Acts (Accord Acts). [34, 35, 38]

www.cnsopb.ns.ca

EUROPE

UK

DEPARTMENT FOR ENVIRONMENT, FOOD & RURAL AFFAIRS

The UK government department responsible for safeguarding UK's natural environment, supporting their world-leading food and farming industry, and sustaining a thriving rural economy. [41, 42]

www.gov.uk/government/organisations/department-for-environment-food-rural-affairs

DEPARTMENT OF ENERGY & CLIMATE CHANGE

The Department of Energy & Climate Change (DECC) works to make sure the UK has secure, clean, affordable energy supplies and promote international action to mitigate climate change. [41, 42, 90]

www.gov.uk/government/organisations/department-of-energy-climate-change

NORWAY

NORWEGIAN ENVIRONMENT AGENCY

The Norwegian Environment Agency's primary task is to reduce greenhouse gas emissions, manage Norwegian nature, and prevent pollution. they play a key role in shaping Norwegian environmental policy. [45-48, 91]

www.miljodirektoratet.no

PETROLEUM SAFETY AUTHORITY

The Petroleum Safety Authority is an independent government regulator with responsibility for safety, emergency preparedness, and the working environment in the Norwegian petroleum industry. [45 - 48, 92]

www.psa.no

RUSSIA

GOSGORTEKHNADZOR OF RUSSIA

According to the Russian legislation, industrial safety regulation control is carried out by the Federal executive body - Federal Service of Technological Inspectorate of Russia (former title - Gosgortekhnadzor of Russia). That institution is responsible for preparing industrial safety law, elaborating _ official standard sanction acts, and standard technical documentation. It also approves regulatory documents related to its competence. Gosgortekhnadzor is authorized to coordinate the activity of other Federal

Organizations Addressed
E15PD00165 - Decommissioning Methodology Gap Analysis

executive bodies which carry out industrial safety regulation control according to their competence. [51, 52]

www.gost-r.info

MINISTRY OF JUSTICE OF THE RUSSIAN FEDERATION

The Ministry of Justice (Minyust) is a federal executive body responsible for drafting and implementing government policy and legal regulation in its field of competence, including the penal system, registration of non-profit organisations, including branches of international organisations and foreign non-profit non-governmental organisations, political parties, other public associations and religious organisations, the bar and notary system, state registration of vital statistics, compliance of courts with the established operating procedure and implementation of court decisions and enactments by other agencies, free legal and legal literacy assistance to the public, as well as law-enforcement and control powers in the field of registration of non-profit organisations, including the branches of international organisations and foreign non-profit non-governmental organisations, political parties, other public associations and religious organisations, control of compliance of non-profit organisations' activities to their charter goals and the legislation of the Russian Federation, control and oversight of the bar and notary system and state registration of vital statistics.

The President of the Russian Federation oversees the activity of the Ministry. [53]

<http://government.ru>

MINISTRY OF NATURAL RESOURCES

The Ministry of Natural Resources and Environment of the Russian Federation (Minprirody of Russia) shall be a federal executive authority performing functions of public policy making and statutory regulation in the field of the study, use, renewal, and conservation of natural resources, including the subsoil, water bodies, forests located in designated conservation areas, fauna and their habitat, in the field of hunting, hydrometeorology and related areas, environmental monitoring and pollution control, including radiation monitoring and control, and functions of public environmental policy making and implementation and statutory regulation, including issues of production and consumption waste management (hereinafter waste), conservation areas, and state environmental assessment.

The Ministry of Natural Resources and Environment of the Russian Federation shall organize and, within the limits of its authority, ensure compliance with the obligations arising from international agreements of the Russian Federation on matters, which fall within the scope of activity of the Ministry. [54]

www.mnr.gov.ru

ACRONYMS

ANSI	American National Standards Institute
AOGCC	Alaska Oil and Gas Conservation Commission
API	American Petroleum Institute
BOEM	(U.S.) Bureau of Ocean Energy Management
BSEE	(U.S.) Bureau of Safety and Environmental Enforcement
BSEE	(U.S.) Bureau of Safety and Environmental Enforcement
CFR	(U.S.) Code of Federal Regulations
DECC	(UK) Department of Energy and Climate Change
DNR	(Alaska) Division of Natural Resources
DOG	(Alaska) Division of Oil and Gas
DOGGR	(California) Division of Oil, Gas, and Geothermal Resources
DOI	(U.S.) Department of Interior
EPA	(U.S.) Environmental Protection Agency
EU	European Union
IOGP	International Association of Oil & Gas Producers
ISO	International Standards Organization
JIP	Joint Industry Project
NEB	(Canada) National Energy Board
NOAA	(U.S.) National Oceanic and Atmospheric Administration
NORSOK	Norwegian Shelf Competitive Position
NPC	(U.S.) National Petroleum Council
NRC	(U.S.) National Research Council
OCS	Outer Continental Shelf
OSPAR	Oslo Paris Convention

Acronyms
E15PD00165 - Decommissioning Methodology Gap Analysis

OTC Offshore Technology Conference
PAME Protection of the Arctic Marine Environment Working Group
SPE Society of Petroleum Engineers
TNO Netherlands Organisation for Applied Scientific Research
UN United Nations
UNCLOS United Nations Convention on the Law of the Sea
USGS United States Geological Survey

Appendix A
E15PD00165 - Decommissioning Methodology Gap Analysis

BIBLIOGRAPHY

- [1] *Oil and Gas and Sulphur Operations in the Outer Continental Shelf*, Department of the Interior, 30 CFR § 250, www.ecfr.gov.

- [2] Michael A. Winfree, "UK Oil and Gas Guidelines for abandonment," Steve Lewis, Ed., ed, 2015.

- [3] Craig Leidersdorf, "Gravel Island Natural Errosion," Steve Lewis, Ed., ed, 2015.

- [4] B. Eng. Jonathan Venalainen, "ISO/TC67/SC8: ISO 19906: 2010 Section 10, Man-made Islands," Steve Lewis, Ed., ed, 2015.

- [5] *Alaska Oil & Gas Laws And Regulations*, Alaska Oil and Gas Conservation Comission, 20 AAC 25, <http://doa.alaska.gov>.

- [6] *California Marine Resources Legacy Act*, California Department of Fish and Wildlife, <http://leginfo.legislature.ca.gov/>.

- [7] *Oil and Gas Drilling Regulations*, California State Lands Commision, 2 CCR § 2101-2124, govt.westlaw.com.

- [8] *California Statutes and Regulations for Conservation of Oil, Gas, and Geothermal Resources*, California Department of Conservation, 10 PRC 2, www.conservation.ca.gov.

- [9] *United Nations Convention on the Law of the Sea*, United Nations, UNCLOS, www.un.org/depts/los/.

- [10] "2015 Nunavut Oil & Gas Summit," Department of Economic Development & Transportation: Nunavut, 2015.

- [11] "ANSI/API Recommended Practice 2N," in *ISO 19906:2010 (Modified), Petroleum and natural gas industries - Arctic offshore structures*, ed. Washington, DC: American Petroleum Institute, 2015.

Acronyms
E15PD00165 - Decommissioning Methodology Gap Analysis

- [12] "API Specification 16 D, Specification for Control Systems for Drilling Well Control Equipment and Control Systems for Diverter Equipment," ed. Washington, DC: American Petroleum Institute, 2005.
- [13] "API STANDARD 53, Blowout Prevention Equipment Systems for Drilling Wells," ed. Washington, DC: American Petroleum Institute, 2012.
- [14] "Arctic Standards," *International Association of Oil & Gas Producers*, vol. 2012, 2012.
- [15] ASTM Committee D-18 on Soil and Rock., *ASTM standards on ground water and vadose zone investigations : drilling, sampling, well installation, and abandonment procedures*. West Conshohocken, PA: ASTM, 1996.
- [16] Garry Brewster and Svein Inge Rafoss, "D-010 Rev 4 Chapter 9 Abandonment activities," 4 ed: NORSOK Standard, 2013.
- [17] NORSOK, "D-010 Well integrity in drilling and well operations," ed. www.standard.no/petroleum: NORSOK Standard, 2013.
- [18] "D-010: The story of the world's well integrity standard," *Oilfield Technology Magazine*, 2014.
- [19] "Global standards used locally worldwide, List of ISO TC67 standards and their status with API, CEN and various other standards developing organisations," International Association of Oil & Gas Producers, 2011.
- [20] Hermod Ole Johansen, "International Standardization Arctic Operations (ISO TC67 SC8)," 1 ed. www.norskoljeoggass.no: Statoil, 2014.
- [21] "Well Integrity Best Practices," *International Association of Oil & Gas Producers*, vol. 2014, 2014.
- [22] "Arctic Offshore Oil and gas Guidelines," Protection of the Arctic Marine Environment, www.pame.is, 2009.

Acronyms
E15PD00165 - Decommissioning Methodology Gap Analysis

- [23] "Arctic Standards Recommendations on Oil Spill Prevention, Response, and Safety in the U.S. Arctic Ocean," The PEW Charitable Trusts, www.pewtrusts.org, 2013.
- [24] John P. Banks Charles Ebinger, Alisa Schackmann, "Offshore Oil and Gas Governance in the Arctic," Brookings, www.brookings.edu, 2014.
- [25] J. Daniel Arthur, "Plugging and Abandonment of Oil & Gas Wells," in *Prepared by the Technology Subgroup of the Operations & Environment Task Group*, ed. www.npc.org/Prudent_Development-Topic_Papers: National Petroleum Council, 2011.
- [26] *Canada Petroleum Resources Act*, Minister of Justice, R.S.C. 1985 c. 36 (2nd Supp.), <http://laws-lois.justice.gc.ca>.
- [27] *Canada Oil and Gas Operations Act*, Minister of Justice, R.S.C., 1985, c. O-7, <http://laws-lois.justice.gc.ca>.
- [28] *National Energy Board Act*, Minister of Justice, R.S.C., 1985, c. N-7, <http://laws-lois.justice.gc.ca>.
- [29] *National Energy Board Act Part VI (Oil and Gas) Regulations* Minister of Justice, SOR/96-244, <http://laws-lois.justice.gc.ca>.
- [30] "Backgrounder Regulation of Offshore Drilling on the Canadian Arctic," Canada National Energy Board, 2010.
- [31] *Canada Oil and Gas Drilling and Production Regulations*, Canada National Energy Board, C.R.C., c. 1517, <http://laws.justice.gc.ca/>.
- [32] *Newfoundland Offshore Petroleum Drilling and Production Regulations*, Canada National Energy Board, SOR/2009-316, <http://laws-lois.justice.gc.ca>.
- [33] *Newfoundland Offshore Petroleum Installations Regulations*, Minister of Natural Resources, SOR/95-104, <http://laws.justice.gc.ca/>.

Acronyms
E15PD00165 - Decommissioning Methodology Gap Analysis

- [34] *Nova Scotia Offshore Petroleum Drilling and Production Regulations*, Minister of Justice, SOR/2009-317, <http://laws-lois.justice.gc.ca>.
- [35] "Nova Scotia Offshore Petroleum Installations Regulations," Canada National Energy Board: Minister of Justice. <http://laws-lois.justice.gc.ca>, 2012.
- [36] *Well Abandonment*, Alberta Energy Regulator, Directive 020, www.aer.ca.
- [37] *Well Completion, Maintenance And Abandonment Guideline*, BC Oil & Gas Commission, www.bcogc.ca.
- [38] *Drilling and Production Guidelines*. www.cnlopbc.ca: Canada-Newfoundland and Labrador Offshore Petroleum Board and Canada-Nova Scotia Offshore Petroleum Board, 2011.
- [39] Canada Newfoundland Offshore Petroleum Board, "Guidelines for Drilling Equipment," ed. <http://laws-lois.justice.gc.ca/>: Minister of Justice, 2000.
- [40] *Convention for the Protection of the Marine Environment of the North-East Atlantic*, OSPAR, OSPAR 2007,
- [41] "Oil and gas: offshore emergency response legislation," Department of Energy & Climate Change: Oil & Gas UK Environmental Legislation. www.gov.uk, 2015.
- [42] "Oil and gas: offshore environmental legislation," Department of Energy & Climate Change: Oil & Gas UK Environmental Legislation. www.gov.uk, 2015.
- [43] "Well Abandonment and Suspension," *Oil & Gas UK*, vol. Environmental Legislation, 2014.
- [44] "Guideline for the Abandonment of Wells," *Oil & Gas UK*, 5 July 2015 2015.
- [45] *Act 29 November 1996 No. 72 Relating to Petroleum Activities*, Norwegian Environment Agency, www.psa.no/regulations.

Acronyms
E15PD00165 - Decommissioning Methodology Gap Analysis

- [46] *Guidelines Regarding the Facilities Regulations*, Norwegian Environment Agency, www.psa.no/regulations.
- [47] *Regulations Relating to Design and Outfitting of Facilities, Etc. in the Petroleum Activities*, Norwegian Environment Agency, www.psa.no/regulations.
- [48] *Regulations Relating to Technical and Operational Matters at Onshore Facilities in the Petroleum Activities, Etc.*, Norwegian Environment Agency, www.psa.no/regulations.
- [49] "Assessment of International Standards for Safe Exploration, Production and Transportation of Oil and Gas in the Barents Sea," Barents 2020, www.dnvgl.com/oilgas, 2010.
- [50] "Assessment of International Standards for Safe Exploration, Production and Transportation of Oil and Gas in the Barents Sea," Barents 2020, www.dnvgl.com/oilgas, 2012.
- [51] "Instruction on the Procedure of liquidation, Preservation of Wells and Equipment," GOSGORTEKHNADZOR OF RUSSIA. www.gosthelp.ru, 2001.
- [52] "Requirements for the Elimination of drilling wells," GOSGORTEKHNADZOR OF RUSSIA. Moscow, 2010.
- [53] "Federal mining and industrial supervision of Russia," Ministry of Justice of the Russian Federation. <http://soyuzproekt.ru>, 2002.
- [54] "Elimination, Conservation and Use of Different Borehole (EXCEPT FOR THE OIL AND GAS)," Ministry of Natural Resources. Moscow, 2010.
- [55] National Research Council (U.S.). Committee on the Analysis of Causes of the Deepwater Horizon Explosion Fire and Oil Spill to Identify Measures to Prevent Similar Accidents in the Future., and National Research Council (U.S.). Board on Environmental Studies and Toxicology., *Macondo well Deepwater Horizon blowout : lessons for improving offshore drilling safety*. Washington, D.C.: National Academies Press, 2012.

Acronyms
E15PD00165 - Decommissioning Methodology Gap Analysis

- [56] Terry Brittenham David Watson, Preston L. Moore, *Advanced Well Control* vol. 10. Richardson, TX: SPE, 2003.
- [57] World Bank, "Towards Sustainable Decommissioning and Closure of Oil Fields and Mines: A Toolkit to Assist Government Agencies," ed. www.worldbank.org, 2010.
- [58] L. M. Anderson and C. B. Leidersdorf, "Arctic Island Abandonment: Planning and Implementation for Mukluk Island," in *Offshore Technology Conference*, Houston, TX, 1988.
- [59] Dwight K. Smith, *Handbook on well plugging and abandonment*. Tulsa, Okla.: PennWell Books, 1993.
- [60] "Geology of the Eastern Bering Sea Contentional Shelf," Geological Society of America, 1994.
- [61] Tjirk Benedictus, "Well Abandonment Practices," in *IEA GHG Wellbore Integrity Network Meeting*, ed. www.ieaghg.org: TNO, 2009, p. 30.
- [62] "Guidelines for the suspension and abandonment of wells," *Oil & Gas UK*, 2012.
- [63] Praful Desai Lucas W. Abshire, Dan Mueller, William B. Paulsen, Robert D. B. Robertson, Torodd Solheim, "Offshore Permanent Well Abandonment," *Oilfield Review*, vol. 24, pp. 42 - 50, 2012.
- [64] Kenny Campbell and Rod Smith, "Permanent Well Abandonment," *The Way Ahead*, vol. 9, pp. 25 - 27, 2013.
- [65] "Arctic Marine Operations Challenges & Recommendations," Arctic Operations JIP, www.arctic-operations-handbook.info, 2013.
- [66] "Liberty Development Project," 1 ed: Hilcorp Alaska, LLC, 2015.
- [67] "Liberty Development Project - Appendix A," 1 ed: Hilcorp Alaska, LLC, 2015.
- [68] "Liberty Development Project - Appendix B," 1 ed: Hilcorp Alaska, LLC, 2015.

Acronyms
E15PD00165 - Decommissioning Methodology Gap Analysis

- [69] "Liberty Development Project - Appendic C," 1 ed: Hilcorp Alaska, LLC, 2015.
- [70] "Liberty Development Project - Appendix D," 1 ed: Hilcorp Alaska, LLC, 2015.
- [71] "Liberty Development Project - Appendix E," ed, 2015, p. 24.
- [72] "Liberty Development Project - Appendix F," 1 ed: Hilcorp Alaska, LLC, 2015.
- [73] "Liberty Development Project - Appendix G," 1 ed: Hilcorp Alaska, LLC, 2015.
- [74] "Liberty Development Project - Appendix H," 1 ed: Hilcorp Alaska, LLC, 2015.
- [75] "Liberty Development Project - Appendix I," 1 ed: Hilcorp Alaska, LLC, 2015.
- [76] "Reforms since the Deepwater Horizon Tragedy," Bureau of Safety and Environmental Enforcement and Bureau of Ocean Energy Management, 2015.
- [77] "Memorandum of Agreement Between the Bureau of Ocean Energy Management And Bureau of Safety and Enviornmental Enforcment," Department of the Interior: Bureau of Ocean Energy Managment And Bureau of Safety and Enviornmental Enforcment, 2011.
- [78] "Oil and Gas and Sulphur Operations in the Outer Continental Shelf—Blowout Preventer Systems and Well Control," Department of The Interior: Bureau of Safety and Enviornmental Enforcment, 2015.
- [79] "Oil and Gas and Sulphur Operations on the Outer Continental Shelf— Requirements for Exploratory Drilling on the Arctic Outer Continental Shelf," Department of the Interior: Bureau of Safety and Environmental Enforcement, 2013.
- [80] United States. Congress. House. Committee on Merchant Marine and Fisheries. Subcommittee on Oceanography Gulf of Mexico and the Outer Continental Shelf. and United States. Congress. House. Committee on Merchant Marine and Fisheries. Subcommittee on Fisheries Management., *Offshore oil and gas operations site clearance and rig disposal : hearing before the*

Acronyms
E15PD00165 - Decommissioning Methodology Gap Analysis

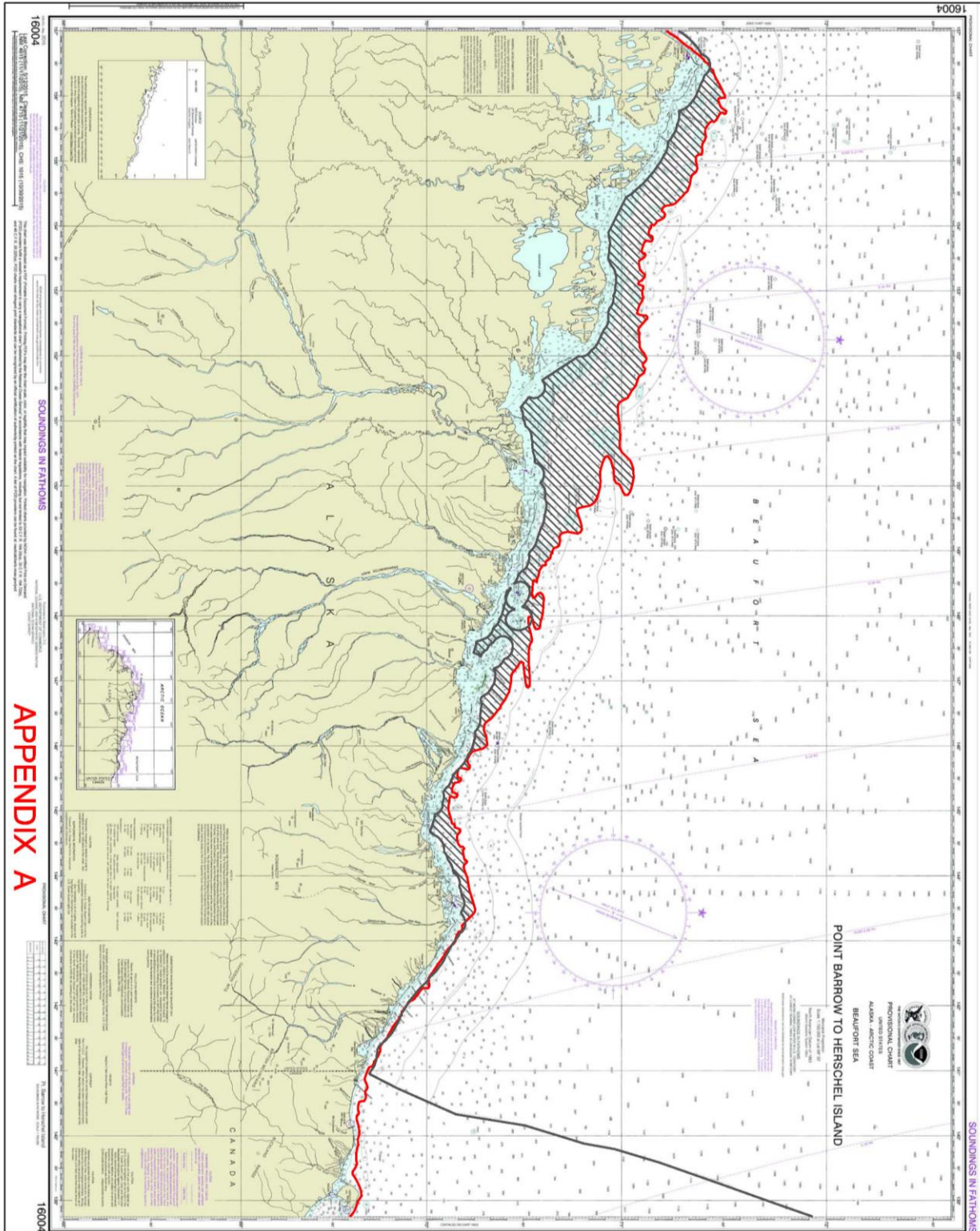
Subcommittees on Oceanography, Gulf of Mexico, and the Outer Continental Shelf and Fisheries Management of the Committee on Merchant Marine and Fisheries, House of Representatives, One Hundred Third Congress, first session ... June 29, 1993. Washington: U.S. G.P.O. : For sale by the U.S. G.P.O., Supt. of Docs., Congressional Sales Office, 1993.

- [81] Bureau of Ocean Energy Management, "Beaufort Sea - Outer Continental Shelf Lease Ownership," 1 ed: Department of the Interior, 2015.
- [82] Bureau of Ocean Energy Management, "Chukchi Sea - Outer Continental Shelf Lease Ownership," 1 ed: Department of the Interior, 2015.
- [83] *Underground Injection Control Program*, Environmental Protection Agency, 40 CFR §144, www.ecfr.gov.
- [84] *State UIC Program Requirements*, Environmental Protection Agency, 40 CFR §145, www.ecfr.gov.
- [85] *Underground Injection Control Program: Criteria and Standards*, Environmental Protection Agency, 40 CFR §146, www.ecfr.gov.
- [86] *State, Tribal, and EPA Administered Underground Injection Control Programs*, Environmental Protection Agency, 40 CFR §147, www.ecfr.gov.
- [87] "Federal and State Offshore Oil & Gas Leases Beaufort & Chukchi Seas," Department of Commerce, Ed., ed: National Oceanic and Atmospheric Administration, 2013.
- [88] "An Evaluation of the Science Needs to Inform Decisions on Outer Continental Shelf Energy Development in the Chukchi and Beaufort Seas, Alaska," Department of The Interior: U.S. Geological Society. <http://pubs.usgs.gov>, 2011.
- [89] "Decommissioning, Removal, and Restoration Regulatory Review," Division of Oil and Gas Department of Natural Resources: Arcadis. <http://dog.dnr.alaska.gov/publications/Documents>, 2014.

Acronyms
E15PD00165 - Decommissioning Methodology Gap Analysis

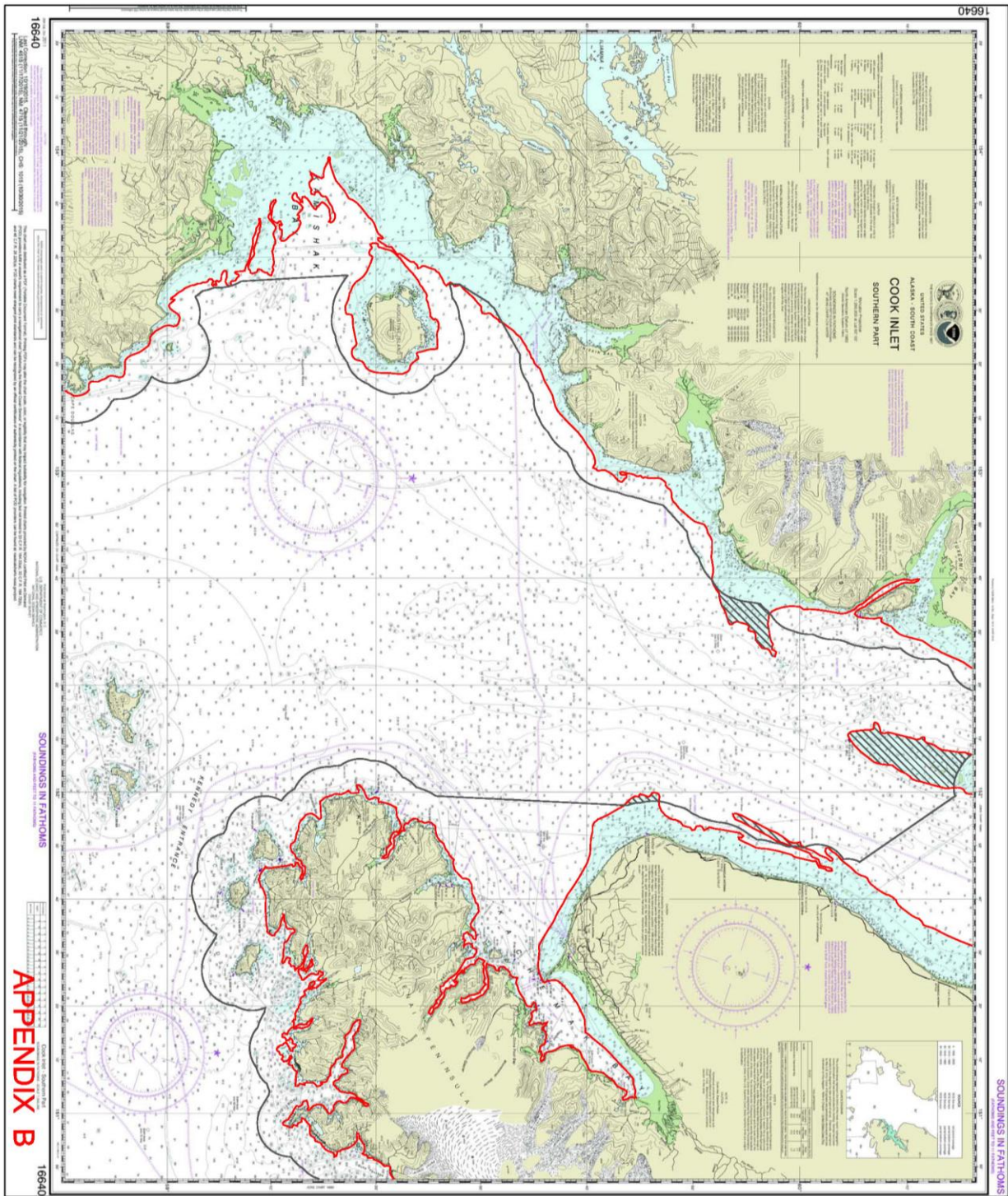
- [90] *Guidance Notes on the Offshore Petroleum Production and Pipelines (Assessment of Environmental Effects) Regulations 1999 (as Amended)*, Department of Energy and Climate Change, URN 11D / 856, www.gov.uk.
- [91] Signe Nåmdal, "Decommissioning of Offshore Installations," Ministry of the Environment: Climate and Pollution Agency, 2011.
- [92] Svein Anders Eriksson, "Standardization - Cooperation for Safety in the High North," Petroleum Safety Authority Norway. www.ptil.no, 2013.

Acronyms
E15PD00165 - Decommissioning Methodology Gap Analysis

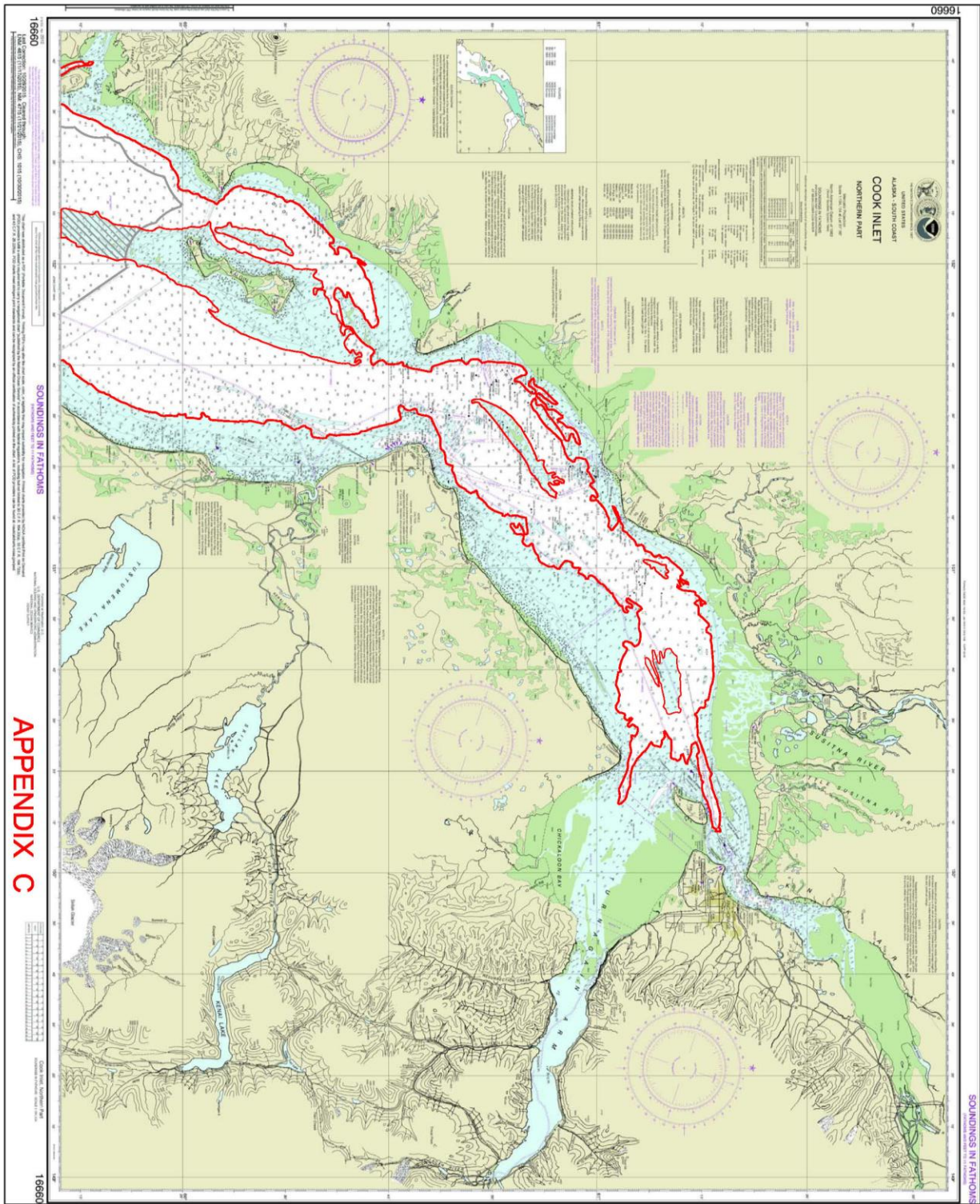


APPENDIX A

Appendix B
E15PD00165 - Decommissioning Methodology Gap Analysis



Appendix C
E15PD00165 - Decommissioning Methodology Gap Analysis



APPENDIX C