

**THE BUREAU OF OCEAN ENERGY MANAGEMENT,
REGULATION AND ENFORCEMENT**

Investigations and Review Unit



**BP'S ATLANTIS OIL AND GAS PRODUCTION PLATFORM:
AN INVESTIGATION OF ALLEGATIONS THAT OPERATIONS
PERSONNEL DID NOT HAVE ACCESS TO ENGINEER-APPROVED
DRAWINGS**

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BP’s Atlantis Oil and Gas Production Platform: An Investigation of Allegations That BP Did Not Have Access to Engineer-Approved Drawings

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EXECUTIVE SUMMARY

BP Exploration and Oil, Inc. (BP) operates the Atlantis oil and gas production facility in the Gulf of Mexico. In April 2009, Kenneth A. Abbott, a former BP contractor, filed a lawsuit against BP under the False Claims Act, alleging that BP did not maintain copies of engineer-approved drawings for the Atlantis facility, as required under regulations promulgated by the Bureau of Ocean Energy Management, Regulation and Enforcement (BOEMRE). Mr. Abbott alleges that this lack of documentation has created imminent and significant safety risks on the Atlantis facility.

BOEMRE conducted an extensive investigation of the engineering drawings and documents depicting the relevant components of the Atlantis facility. BOEMRE also evaluated safety concerns raised first by Mr. Abbott and then by certain members of Congress.

Our investigation found that the electronic document database that BP used to store documents developed during the design, construction, and installation of the Atlantis production facility was disorganized and inadequate to handle the large volume of documents generated by BP and its third-party contractors. In addition, BP used a confusing labeling system for engineering drawings contained in the project files. Those drawings also had other defects and deficiencies, including undated and missing stamps and signatures, and inconsistent titles for types of drawings.

Although many of the documents and drawings contained in the electronic database had these deficiencies, the documents in the electronic database were not the materials relied upon by Atlantis operations personnel. We found that BP's process for transferring the drawings and documents used by operations personnel on the Atlantis facility involved the use of "systems handover packages." The systems handover packages, which included engineering documents and drawings, were compiled by a team of BP personnel that included engineers with knowledge of each type of component being handed over and then transferred to the Atlantis facility prior to the start of production.

Our investigation found that Mr. Abbott's allegations that Atlantis operations personnel lacked access to critical, engineer-approved drawings are without merit. Mr. Abbott and a colleague were working on a document-update project during Mr. Abbott's time working for BP. We found no evidence that the

document control deficiencies, which were being addressed in 2008 and 2009 by Mr. Abbott and his team, created specific unsafe conditions on the Atlantis production platform. Nor did we find any evidence suggesting that, at the time he and his team were working to correct documentation issues, Mr. Abbott was in a position to evaluate whether these documentation deficiencies affected the safety of operations on the Atlantis facility. Our investigation further concluded that Mr. Abbott's allegations about false submissions by BP to BOEMRE are unfounded.

Although Mr. Abbott's core allegations are unsupported by the evidence, our investigation determined that BP failed to file with BOEMRE certain drawings depicting changes to a number of production safety system components, in violation of 30 C.F.R. § 250.802. BOEMRE has issued an incident of non-compliance (INC) to BP as a result of this finding.

Based upon our investigation, prior inspections, and review of documents submitted by BP during the permitting process, we concluded that there is no evidence to suggest that documents and drawings submitted by BP fail to accurately reflect the production safety systems installed on the Atlantis facility.

Based on all evidence developed during our investigation, as well as prior inspections and a thorough review by BOEMRE of documents and drawings produced by BP, we found no grounds for suspending the operations of the Atlantis pursuant to 30 C.F.R. § 250.168 or revoking BP's designation as an operator under 30 C.F.R. § 250.135.

I. Background

A. BP and the Atlantis Production Facility

1. BP's Deepwater Production Operations

BP has invested over \$14 billion in deepwater projects in the Gulf of Mexico since 1994, and is one of the most significant industry participants in the Gulf. Over the past 15 years, the company has significantly increased its deepwater production in the Gulf of Mexico. Deepwater production presents a host of challenges, including high pressures, high reservoir temperatures, low water temperatures, long distances between wells and production facilities, and heavy crudes. These challenges increase the complexities associated with subsea production and have demanded sophisticated technological solutions. In the Gulf of Mexico, BP produces from more than twenty deepwater fields, including Pompano, Marlin, Horn Mountain, Na Kika, Holstein, Mad Dog, Atlantis and Thunder Horse.

2. The Atlantis Field

The Atlantis field (also known as the Green Canyon 743 field) includes Green Canyon blocks 699, 700, 742, 743, and 744 and is located in the Central Gulf of Mexico about 190 miles south of New Orleans, Louisiana. BP and BHP Billiton jointly acquired leases on these blocks under OCS Sale 152 (held on May 10, 1995). BHP retains a 44% working interest in the project, and BP is the designated operator.

BP has estimated that the Atlantis field contains recoverable reserves of approximately 635 million barrels of oil equivalents in sixteen different production wells. The Atlantis field also contains four water injection wells.

3. Design, Fabrication and Installation of the Atlantis Production Platform

BP contracted with GVA Consulting, a division of KBR, to design a 58,700 metric ton semi-submersible platform to produce in the deepwater Atlantis field. Mustang Engineering was retained as the structural engineering design firm for the Atlantis field, and their services included providing engineering support during shipyard construction.

The fabrication and integration of the components of the Atlantis platform occurred in several steps, and those components were completed in 2005. Daewoo Shipbuilding and Marine Engineering Co., Ltd. (DSME) fabricated the hull of the Atlantis platform in Pusan, Korea.¹ The three topside modules were fabricated by McDermott International, Inc. in Morgan City, Louisiana. KBR performed the integration work at a yard near Ingleside, Texas.

ABS was the independent Certified Verification Agent (CVA) responsible for assessing the design, fabrication, and installation of the Atlantis production platform.

4. The Atlantis Facility's Subsea System

The Atlantis platform's subsea system is comprised of subsea trees, pipeline end terminations (PLETs), manifolds, flowlines, risers, umbilicals, jumpers, and other components. In the Atlantis subsea system, there are sixteen production wells that are (or are planned to be) connected to four production manifolds. Each production manifold is designed to serve four wells.

The configuration of the Atlantis subsea system is depicted in Exhibit 2 attached to this Report. Each subsea tree is connected to a riser and the Atlantis platform by a series of flowlines, manifolds, and jumpers. The production trees are equipped with remotely actuated, adjustable chokes to provide flow and pressure control. The subsea trees are operated by an electro-hydraulic multiplexed control system. Flying leads provide electrical power, control signals, hydraulic power, and chemical supplies to the subsea trees. A subsea control module (SCM) decodes electrical signals and directs hydraulic power to various subsea tree functions. The umbilicals and leads function as a distribution network for the subsea control system. All control functions are managed from a control station located on the production platform.

The Atlantis subsea components were manufactured by a number of different contractors that BP selected for its major deepwater projects in the Gulf of Mexico – including Thunder Horse, Mad Dog, and Holstein. Technip USA, Inc. was the primary engineering consulting firm for subsea pipeline development. FMC Corporation provided detailed design of the subsea equipment, including wellhead equipment, tree systems, manifold systems,

¹ Exhibit 1 provides a list of acronyms used in this Report.

PLET assemblies, flowline jumper assemblies, subsea control system, topside control equipment, and ROV docking.²

5. Refurbishment and Reinstallation of the Atlantis Subsea Equipment

In April 2006, BP discovered a metallurgical anomaly in the manifold systems that were part of the Thunder Horse subsea system. This discovery caused BP to become concerned about potential corrosion in the Thunder Horse manifold systems. As a result, BP decided to replace the Thunder Horse manifold systems to prevent the inadvertent discharge of hydrocarbons into the Gulf of Mexico. After diagnosing the problem with the Thunder Horse manifold systems, BP decided to reconstruct the Atlantis manifold systems to avoid similar potential problems with the Atlantis facility.

BP evaluated a number of options to address the potential problems with the Atlantis subsea equipment. BP developed a plan to reconstruct the Atlantis manifolds and PLETs and to build new PLEMs. These changes to the Atlantis subsea system were designed to eliminate the problematic metallurgy combination that had been identified in the subsea system installed in the Thunder Horse facility. BP concluded that these changes would significantly reduce the risk of internal corrosion in Atlantis's subsea components.

BP retrieved the four Atlantis manifolds that had already been installed on the sea floor. These manifolds, which were designed to include multi-function valves, were modified to be "valveless." The modified manifolds offered less flexibility in well production operations, but were generally easier to operate than the originally installed manifolds.

The switch-out of the Atlantis manifolds, PLETs, and PLEMs created a number of design and plan document control challenges. BP attempted to avoid confusion in its document control system (at times referred to as the "Atlantis Documentum") by referring to the original set of manifolds, PLETs, and PLEMs

² Other contractors for the Atlantis subsea system included: Nexans Norway AS (umbilical engineering and fabrication); Subsea 7 (installation of umbilicals); Stress Engineering Services, Inc. (engineering and technical services and verification services); Acute Technical Services, Inc. (welding technical services); Omega Natchiq Inc. (fabrication of PLEMs); Cameron Flow Control (subsea chokes); Honeywell, Inc. (control system software); the Bayou Companies (pipe fabrication for flow lines and risers) and Heerema Marine Contractors (flowline and riser installation).

as “SS-0” and to the first generation of refurbished subsea equipment as “SS-1.” The equipment included in SS-1 is anticipated to have a useful life through 2012. BP plans to install “SS-2” subsea equipment, which BP believes will have an extended useful life, during 2012.

BP has estimated that the refurbishment and installation of the subsea equipment (through SS-2) will cost in excess of \$115 million. The company concluded that the changes were necessary to prevent a possible manifold failure that could have resulted in hydrocarbons leaking into the Gulf of Mexico. *See* Exhibit 3 (MOC request dated 9/7/07).

6. The Atlantis Handover Process

BP developed a set of detailed procedures called “Guidance on Certification.” These procedures are intended to ensure that, prior to the start of the production of oil (often referred to as “first oil”), personnel with responsibility for operations of a production platform are provided with access to the documentation and drawings that BP believes are necessary to ensure safe operation of the platform and the associated subsea system. The following is a description of the applicable procedures (for both topside and subsea equipment):

- Certificate of Compliance. This procedure requires that the company that fabricates a piece of equipment, part, or component has inspected the item to ensure that it meets all contract requirements.
- Inspection Release Certificate. This procedure requires BP personnel to inspect and sign off on a piece of equipment, part, or component after personnel conclude that the item is ready for service.
- Well Handover Certificate. This procedure requires that the well completions supervisor and the offshore subsea supervisor certify that certain documents – including well schematics, well fluid summaries, datasheets, ROV surveys, and safety valve certifications – are complete. After the well site leader authorizes a certificate stating that all documents are complete, the subsea team lead reviews the certification. Finally, the offshore installation manager (OIM) signs the certification, which states that the well is ready for initial production.

- Mechanical Completion. This procedure requires BP personnel to function test all equipment and systems to verify that they were constructed, installed, and maintained in accordance with design drawings and maintenance schedules. After this verification, the pre-commissioning manager signs the document accepting that the systems have been properly handed over for pre-commissioning.
- System Handover. This procedure requires the pre-commissioning manager to state that all systems have been commissioned and that they are ready for operations. The subsea team leader and the OIM then sign a document accepting the handover. After this step, the transfer of documents to the platform is complete and production operations can begin.

For the Atlantis project, BP followed each of the above procedures prior to the start of production. In addition, with respect to the subsea handover process, the Atlantis subsea team designed a more detailed process to specifically determine how the subsea systems would be handed over to operations personnel. This included work on how the Mechanical Completion packages and the System Handover Packages would be structured, and Atlantis operations personnel provided input on how the subsea handover process should work.

The subsea Systems Handover Packages for the Atlantis facility included drawings that had been reviewed by the subsea team leader to ensure that the drawings depicted the systems and equipment as they were installed. Drawings that had been revised or needed to be revised were identified on an “incomplete work list.” BP had a procedure in place designed to ensure that updated drawings from the incomplete work list were provided to operations personnel. *See Exhibit 4 (Atlantis Systems Handover Procedure).*

All system handover packages were transferred to the Atlantis operations team before first oil and signed by the OIM. The system handover packages included drawings depicting both topside and subsea structures.

7. Atlantis Operations

The Atlantis platform operates in more than 7,000 feet of water, deeper than any other moored semi-submersible platform in the world. The Atlantis facility is also one of the largest moored semi-submersible platforms in the

world. The Atlantis field size, water depth and reservoir structure have made it a technologically challenging deepwater oil production project.

The Atlantis platform began production from two wells in October 2007. By 2010, there were twelve production wells in operation in the Atlantis field. The Atlantis facility's current production capacity is estimated at 200,000 barrels of oil and 180 million cubic feet of gas per day. Oil and gas is transported to existing Outer Continental Shelf (OCS) and onshore interconnections via the Mardi Gras Transportation System. Exhibit 5 shows the Atlantis production flow process.

8. Problems with the Atlantis Facility's Subsea Documentation

The design, fabrication, installation, testing, commissioning, start-up, and operation of the subsea system for the Atlantis facility has, to date, generated over 13,000 documents and drawings. These documents and drawings have been generated by BP as well as its third-party contractors. In the early stages of the project, Mustang Engineering had the responsibility for organizing the Atlantis project subsea documents. Most of these documents had been provided to Mustang by Technip. By all accounts, the Atlantis project documents were not organized well. These documents, which included drawings of various sectors of the Atlantis production and subsea systems, were stored in an electronic database that lacked adequate organizational structure.

In 2007, BP's Gulf of Mexico operations began implementing a document control standards system called "Documentum." The Documentum system was a database in which all project documents could be stored, including all documents that had been included in the System Handover Packages. Both Atlantis and Thunder Horse project documents were stored in Documentum.

The complete universe of subsea project documents related to the Atlantis facility is much more expansive than the handover packages that were delivered to BP Atlantis operations personnel. For example, project documents include early drafts and notes, as well as superseded or obsolete items. All of these project documents were maintained in Documentum.

The changes to the Atlantis subsea manifolds, PLETs, and PLEMs, as well as the plan to add additional wells to the subsea system after first oil, further complicated the process of organizing the Atlantis subsea documents. Typically,

project files do not need to be updated following the beginning of production and all relevant drawings and documents are transferred to operations before first oil. However, with the Atlantis facility, there were a number of “project phases” that were initiated long after first oil, resulting in the continued addition of documents and drawings to the Atlantis Documentum.

BP’s efforts to organize and track Atlantis drawings and documents were further complicated by BP’s practice of not labeling certain drawings “as built,” even when those drawings depicted a structure or system as it was installed. BP decided that it was unnecessary to update drawings with an “as built” stamp or label if the drawing had not been revised from earlier versions (e.g., Issued for Design, Issued for Construction, etc.).

In 2008, Barry Duff, project services lead for the Atlantis facility, and Tinikka Curtis, a document management clerk, began work on organizing the Atlantis project documents contained in Documentum. Mr. Duff and Ms. Curtis used a Technip-generated register of documents to build a spreadsheet listing documents and drawings by “sector” or type of equipment (e.g., risers, controls, jumpers, trees, etc.).

In August 2008, Mr. Duff began transitioning to a new position, and BP retained Kenneth Abbott, a third-party contractor, to replace Mr. Duff as a project controls lead for the Atlantis project. On August 15, 2008, Mr. Duff sent an e-mail to his supervisors expressing concern about transferring any Atlantis project documents to operations personnel prior to the re-organization of the Documentum. Mr. Duff stated that transfer of documents to operations personnel prior to re-organization of Documentum “could lead to catastrophic Operator errors.” See Exhibit 6.

Mr. Duff’s e-mail was prompted by a request by BP operations employee Nita Oza for the transfer of the remaining Atlantis project documents. Ms. Oza was working with 2H, a third-party contractor, on a Gulf of Mexico-wide maintenance and inspection plan for installed subsea equipment. The contractor requested access to all Atlantis project documents, regardless of whether they had already been formally handed over to operations personnel.

Mr. Duff wanted to re-organize the project documents before sending them to operations, and he informed Mr. Abbott of this when he transferred his responsibilities to Mr. Abbott.

When Mr. Abbott began his work on the Atlantis project, he focused on project scheduling and budgeting, which were his main responsibilities as project controls lead. Ms. Curtis continued to work on re-organizing the Documentum database. In November 2008, Bill Broman, Atlantis subsea delivery manager, sent an e-mail to the BP Atlantis project engineering team leads attaching spreadsheets organized by “sector” of the overall Atlantis system. In this e-mail, Mr. Broman encouraged each of the leads to work with Ms. Curtis to update Documentum. *See Exhibit 7.*

Mr. Abbott’s contract with BP ended before Ms. Curtis completed work updating and organizing the BP Atlantis documents in Documentum. In 2009, a team led by Bob Peloubet, Engineering Manager, and John McDougal, Subsea Document Control Manager, took over this work and oversaw the reorganization of the Atlantis subsea documents in Documentum. This team instituted new folder structures and document naming conventions within Documentum. By 2010, the Atlantis subsea document control process had improved significantly.³ *See Exhibit 8* for an overview of the improvements made to the Atlantis document control process.

B. Applicable BOEMRE Regulations

BOEMRE regulates companies engaged in offshore production of oil and gas on the OCS and is responsible for ensuring compliance with federal regulations that govern the design, fabrication, installation, and operation of production facilities, as well as certain documentation requirements. Applicable documentation regulations require that: (1) BOEMRE be provided with complete, accurate, and detailed information about each production platform on the OCS; and (2) operators have access to the documents and drawings necessary to ensure safe operations and documents necessary for contingency planning. These requirements are important to ensuring safe production operations on the OCS.

Because not all components of complex oil and gas production facilities – particularly those on the seafloor – can be physically inspected, it is important that operators maintain engineering drawing sets representing those components

³ Atlantis operations personnel can access Atlantis project documents from the platform, or in Houston, by logging onto the Documentum system. The documents and drawings housed in Documentum currently are better labeled than they were in during the 2008 to 2009 and are now contained in a better organized folder structure.

and that those drawings are complete and accurate, and can be readily located. Failure to maintain such drawings for platform structures that are weight-bearing is a violation of BOEMRE regulations. These regulations are intended to ensure the structural integrity of platforms and associated facilities operating on the OCS.

BOEMRE regulations governing offshore oil and gas operations on the OCS are contained in part 250 of title 30 of the Code of Federal Regulations (30 C.F.R. part 250). Specific regulatory requirements apply to particular components of an offshore oil and gas production facility. For example, certain requirements apply only to the floating platform itself and associated structures, while other requirements apply to pipelines that transport oil or gas between structures or to shore. The regulations are divided into subparts applicable to the specific components:

- Subpart H applies to Oil and Gas Production Safety Systems, 30 C.F.R. §§ 250.800-808 (Exhibit 9);
- Subpart I applies to Platforms and Structures, 30 C.F.R. §§ 250.900-921 (Exhibit 10); and
- Subpart J applies to Pipelines and Pipeline Rights-of-Way, 30 C.F.R. §§ 250.1000-1019 (Exhibit 11).

Below is a summary of the current BOEMRE regulations applicable to production safety systems, platforms and structures, pipelines and pipeline rights-of-way.

1. Production Safety Systems

BOEMRE requires that production safety equipment be designed, installed, used, maintained, and tested in a manner to assure the safety and protection of the human, marine, and coastal environments. There are no specific “as-built” documentation requirements for production safety systems in the BOEMRE regulations. Subpart B, 30 C.F.R. § 250.293, requires the submission and approval of a Deepwater Operations Plan (DWOP) before production from a deepwater oil and gas platform may begin. Subpart H, 30 C.F.R. § 250.800, requires BOEMRE approval of the production safety systems.

BOEMRE regulations also require that lessees comply with certain American Petroleum Institute (API) recommended practices (RPs). *See* 30 C.F.R. § 250.198. Particularly relevant to production safety systems are two API RPs that address hazard analyses: API RP 14C, Recommended Practice for Analysis, Design, Installation, and Testing of Basic Surface Safety Systems for Offshore Production Platforms; and API RP 14J, Recommended Practice for Design and Hazards Analysis for Offshore Production Facilities. The entirety of API RP 14C is incorporated into 30 C.F.R. § 250.802(b), which states that operators must protect all platform production facilities with a basic and ancillary surface safety system designed, analyzed, installed, tested, and maintained in operating condition in accordance with API RP 14C. Specific figures and subsections from API RP 14C are incorporated into other sections of the regulations governing production and safety systems:

- 30 C.F.R. § 250.292(j): The DWOP must contain “Flow schematics and Safety Analysis Function Evaluation (SAFE) Charts (API RP 14C, subsection 4.3c, incorporated by reference in § 250.198) of the production system from the Surface Controlled Subsurface Safety Valve (SCSSV) downstream to the first item of separation equipment.”
- 30 C.F.R. § 250.802(e)(2): An operator must receive BOEMRE approval of safety-systems design and installation features, including “[a] schematic piping flow diagram (API RP 14C, Figure E, incorporated by reference as specified in § 250.198) and the related Safety [A]nalysis Function Evaluation Chart (API RP 14C, subsection 4.3c, incorporated by reference as specified in § 250.198).”

The other relevant incorporated recommended practices, API RP 14J, contain procedures and guidelines for planning, designing and arranging offshore production facilities and performing a hazards analysis. API RP 14J is specifically incorporated into 30 C.F.R. § 250.800(b)(1) as a general requirement for new floating production systems. API RP 14J defines a hazard analysis as “a systematic procedure for identifying, evaluating, and controlling potential hazards on a facility.” API RP 14J (Exhibit 12). Hazard analyses can be accomplished by using any of the methodologies identified in Section 7 of API RP 14J.⁴ One such methodology is called a “Hazard and Operability Study” (HAZOP).

⁴ API RP 14J was not incorporated into Minerals Management Service (MMS) regulations until 2005, which was after the initial design of the Atlantis facility had already begun. Therefore,

With respect to Mr. Abbott's specific allegations that are the subject of this investigation, it is important to note that neither API RP 14C nor API RP 14J, as incorporated into BOEMRE's regulations, requires "as built," "approved for design," or "approved for construction" engineering documents before production may begin. Generally speaking, a hazard analysis does not require engineering documents. A hazard analysis is "a systematic procedure for identifying, evaluating and controlling potential hazards in a facility." API RP 14J at 35. The purpose of this analysis is "to identify undesirable events that might pose a threat to safety, and define reliable protective measures that will prevent such events or minimize their effects if they occur." API RP 14C at 7. A hazard analysis is an on-going process that might culminate in the preparation of an "as-built" document, but that document is not specifically required as an element of the analysis. API RP 14J explains that "[h]azards analysis is applicable to all phases in the life cycle of a facility: from project inception through design, construction, operation and abandonment." API 14C at 36. In other words, hazard analyses may properly be done before anything associated with a facility is "as built." API RP 14C and API RP 14J do not specifically mention the terms "as built," "approved for design," or "approved for construction" anywhere in their text.

2. Platforms and Structures

BOEMRE requires that lessees design, fabricate, install, use, maintain, inspect, and assess all platform and related structures on the OCS so as to ensure their structural integrity for the safe conduct of drilling, workover, and production operations. 30 C.F.R. § 250.900.

The provision titled "What records must I keep?," at 30 C.F.R. § 250.903(a)(1), requires that "as-built" documents be maintained at a location

BP was not required to comply with API RP 14J. Nevertheless, BP's compliance with API RP 14C also is sufficient to demonstrate compliance with API RP 14J. According to API RP 14J, "There are two fundamental steps associated with a hazards analysis of any process. The first step is *hazard control* through compliance with standard practice. The second step is *predictive hazard evaluation*, which is required for processes without sufficient previous experience or that present an unusually high risk." API RP 14J at 36 (emphasis in original). API RP 14J then identifies API RP 14C as "[a] good example of safety through standard practice," the first step identified in API RP 14J. *Id.* At 37. The second step, the predictive hazard evaluation, is only required when new or unconventional materials, equipment, processes or procedures are involved. *Id.*

provided in the certification required by § 250.905(k). BOEMRE has historically interpreted this requirement to apply to structures that are weight-bearing on the platform, including the following:

- (1) Drilling, production, and pipeline risers, and riser tensioning systems;
- (2) Turrets and turret-and-hull interfaces;
- (3) Foundations, foundation pilings and templates, and anchoring systems;
- and
- (4) Mooring or tethering systems.

See 30 C.F.R. § 250.910(b)(1). Subsea production equipment, such as manifolds, pipeline end terminations (PLETs) and pipeline end manifolds (PLEMs), are not specifically covered by the scope of the BOEMRE regulations requiring the maintenance of “as built” documents.

3. Pipelines

With respect to pipelines, 30 C.F.R. § 250.1008(b) requires an operator to provide as-built location plats showing the location of the pipeline after construction. This section also requires that a registered engineer or land surveyor certify the pipeline right-of-way “as-built” location plats. This requirement refers to the physical location of a pipeline after installation, not to the pipeline’s design or construction.

4. Other Relevant Regulatory Provisions

BOEMRE regulations also require that a CVA review the design, fabrication, and installation of a production platform. *See* 30 C.F.R. § 250.916 - .918. The CVA is required to use “good engineering judgment” to ensure that the production platform has been built according to the approved design and fabrication plans. 30 C.F.R. § 250.917(a).

BOEMRE has the authority, under 30 C.F.R. § 250.172(b), to suspend operations or production at a facility if the operator’s activities pose a threat of serious, irreparable or immediate harm or damage. Pursuant to 30 C.F.R. § 250.135, BOEMRE can revoke a company’s designation as an operator if its operating performance is determined to be unacceptable. BOEMRE considers the following factors in evaluating whether an operator’s performance is unacceptable: accidents and their nature; pollution events and environmental damage and their nature; incidents of noncompliance; civil penalties; failure to

adhere to OCS lease obligations; or any other relevant factors. *See* 30 C.F.R. § 250.136.

II. Inspection and Review of the Atlantis Facility

A. BOEMRE's Regulatory Review

To verify BP's compliance with the requirements of 30 C.F.R. subparts B and H, BOEMRE reviewed the DWOP and production safety system applications submitted by BP for the Atlantis facility. In its production safety system application, BP submitted all of the information required for a complete analysis under API RP 14C. *See* 30 C.F.R. § 250.802(e)(1)-(3). BP also certified that the design for the Atlantis facility's mechanical and electrical systems was approved by registered professional engineers, as required by 30 C.F.R. § 250.802(e)(5) (regarding approval of safety-system design and installation features).

As noted previously, "as-built" P&IDs for subsea equipment are not required as part of the BOEMRE approval process, but BOEMRE does require a complete analysis of safety flow diagrams and SAFE charts. *See* 30 C.F.R. § 250.802(e)(1)-(3). BOEMRE reviewed the safety flow diagrams and SAFE charts for the Atlantis facility in conjunction with completed P&IDs from BP before granting the required approvals. Before the first production of oil by the Atlantis platform, BOEMRE conducted four inspections of the Atlantis facility's production safety systems. These inspections included a review of the surface and subsea safety system function logic. During the course of these pre-production inspections, BOEMRE engineers and inspectors documented areas of concern and required BP to take corrective actions prior to first oil.

The BOEMRE safety system review included verification of the installation of certified subsurface safety valves, underwater safety valves, and boarding shutdown valves, along with a review of the closure times and build-up leakage tests associated with these valves. These valves comprise the critical components of the production safety system. Since commencement of production by the Atlantis facility, BOEMRE Houma District personnel have conducted three inspections onboard the facility – on February 12-14, 2008; April 1-3, 2009; and May 5-7, 2010. No incidents of non-compliance were issued during the first two inspections. BOEMRE issued one incident of non-compliance during the most recent inspection because a leaking boarding shutdown valve failed to form a bubble-tight internal seal. BP isolated the incoming flow line associated with this valve. The valve was greased immediately and retested. BOEMRE allowed BP to return the valve to service after BP showed that the leak had been fixed and the valve had passed a leakage test.

As required by 30 C.F.R. § 250.802(e)(5), which governs approval of safety-system design and installation features, BP certified that the Atlantis facility's mechanical and electrical systems were installed consistent with the approved design. BOEMRE inspections, conducted in 2008, 2009, and 2010, verified that the production safety systems were installed correctly, as approved, and that these systems functioned properly.

B. U.S. Coast Guard Regulatory Review

The U.S. Coast Guard (USCG) also has an important role in reviewing and approving floating production systems. The USCG typically inspects, among other things, general vessel specifications, all structures other than conventional hull vessels, operating manuals and environmental conditions for Mobile Offshore Drilling Units (MODUs), and a number of operating certificates. The USCG is also responsible for lifesaving and fire protection system equipment, electrical machinery and miscellaneous system and equipment, cargo systems and equipment, and boilers and pressure vessels. *See* 33 C.F.R. Subchapter N.

The USCG conducted the required reviews of the Atlantis floating production system and reviewed reports of inspections done by the American Bureau of Shipping (see below). After its review, the USCG granted a series of approvals to BP to operate the Atlantis facility.

C. Review by the Certified Verification Agent

The American Bureau of Shipping (ABS) acted as the Certified Verification Agent for the Atlantis facility. ABS approved the design and fabrication of the pile foundation system, the mooring system, the hull, and the topsides of the Atlantis platform. ABS also witnessed and approved the installation of the Atlantis platform at Green Canyon block 787. Part of ABS's review included analysis of engineering documents and drawings that are the subject of this investigation.

III. Abbott Litigation and Related Inquiries

A. Kenneth Abbott's Lawsuits

In April 2009, Kenneth W. Abbott, a former BP contractor, brought a lawsuit as a relator on behalf of the United States against BP under the False Claims Act. *United States of America ex rel. Kenneth W. Abbott v. BP Exploration and Production et al.* (S.D. Tex.). Claims under the False Claims Act must be brought in the name of the government and filed under seal to allow the government time to investigate the allegations and to determine whether to intervene and take over the action. 31 U.S.C. § 3760(b). In his lawsuit, Mr. Abbott alleged that BP submitted false certifications that induced MMS (now BOEMRE) to approve production from the Atlantis facility.

In his complaint, Mr. Abbott asserted that BP failed to maintain documents depicting the "as built" condition of the Atlantis facility's subsea system. Mr. Abbott's complaint also focused on the alleged absence of documents marked "approved for design" and "approved for construction," which he claimed would show the configuration of the equipment as it was designed or intended to be constructed. Mr. Abbott's complaint claimed that many critical documents and drawings were missing from a BP Atlantis document database and that there was no record that certain engineering work on the Atlantis platform was actually performed. Mr. Abbott alleged that, without these safety documents, oil and gas cannot be safely produced by the Atlantis facility.

In January 2010, Mr. Abbott voluntarily dismissed his lawsuit, but it remained under seal. On May 17, 2010, Mr. Abbott and a non-profit organization, Food and Water Watch, filed a second lawsuit against the Department of the Interior and MMS seeking to obtain an injunction compelling MMS to shut-in the Atlantis facility due to the alleged absence of engineering documents relating to the Atlantis platform's subsea system.

On May 20, 2010, on Mr. Abbott's motion, the court lifted the seal on his False Claims Act lawsuit and reopened that case. On June 18, 2010, the injunctive suit was voluntarily dismissed without prejudice. On September 10, 2010, Mr. Abbott and Food and Water Watch filed an amended complaint against BP that again alleged that BP was operating the Atlantis facility without engineer-approved documents. Neither BOEMRE nor the U.S. Department of

the Interior is a defendant in this case. Mr. Abbott's amended complaint seeks both injunctive relief and damages under the False Claims Act. On December 13, 2010, the United States filed an *amicus* brief in this case regarding the proper scope of the False Claims Act. BP has filed a motion to dismiss, which is currently pending.

B. Congressional Inquiries

In 2009, several members of Congress asked MMS to provide information regarding the Atlantis production facility. At that same time, MMS was reviewing Mr. Abbott's allegations regarding the Atlantis facility. However, because Mr. Abbott's lawsuit was under seal, MMS was barred from sharing with Congress the details of its inquiry into Mr. Abbott's allegations.

On February 24, 2010, United States Representative Raul M. Grijalva and eighteen other members of Congress wrote to then-MMS Director S. Elizabeth Birnbaum urging her to direct "a full investigation of whether British Petroleum [sic] had a complete and accurate set of required engineering drawings for the BP Atlantis platform and its associated subsea components prior to the start of production from that platform, and to report back to Congress on the results of that investigation as soon as possible" (a copy of the letter is attached as Exhibit 13).

On June 17, 2010, Mr. Abbott testified before the House Subcommittee on Energy and Mineral Resources. In his testimony, Mr. Abbott alleged the following deficiencies relative to the Atlantis facility:

- The oil and gas products under high pressure are managed, contained and transported to the floating surface vessel by the wellhead, the tree, the manifolds, pipelines and flowlines, controls and risers. According to Mr. Abbott, less than 10% of these systems were certified as approved by engineers.
- The wellhead is the equipment that controls pressures inside the well at the upper end of the casing and below the tree – none of the documents for this equipment ever had any engineering approval, according to Mr. Abbott.
- The tree is a series of valves immediately above the well which have the same function as the BOP stack during drilling; they control pressures and can be used to shut down the well if needed; they are a

critical part of the Safety Shutdown System. On Atlantis, they also include valves to control flows related to the manifolds. Of these critical components, 98% never received any engineering approval, according to Mr. Abbott.

- The software logic for the safety shutoff system does not have engineering approval.
- Welding procedures for such critical items as manifolds do not have engineering approval.

See Exhibit 14. Mr. Abbott's allegations appeared to be based upon his review – and a review conducted by an engineer, Michael Sawyer, hired to assist in Mr. Abbott's litigation – of a spreadsheet reflecting the Atlantis subsea project drawings.

Mr. Abbott testified that the above problems were similar to the problems that led to the *Deepwater Horizon* tragedy. He further testified that he believed that the Atlantis facility could be a "ticking time bomb" and that BP Atlantis operations personnel might be "flying blind" because they lack critical, engineer-approved documents.

C. BP's Ombudsman

BP has an Office of the Ombudsman (the Ombudsman) that is charged with investigating allegations of misconduct by company personnel. In early 2009, Mr. Abbott contacted the Ombudsman and alleged that BP had: (1) breached its contract with him; and (2) illegally terminated him in retaliation for his defense of a female employee who had allegedly been harassed. Mr. Abbott did not raise concerns about missing engineering documents or lack of engineer approval of documents in his initial complaint. In March 2009, after he was no longer working as a third-party contractor for BP, Mr. Abbott e-mailed the Ombudsman regarding his allegations that the Atlantis facility was operating without certain "as built" engineering drawings.

The Ombudsman's two-page response to Mr. Abbott, dated April 13, 2010, rejected Mr. Abbott's allegations that he had been wrongfully terminated. The response also addressed Mr. Abbott's allegations regarding the Atlantis engineering documents. Mr. Abbott has claimed that the Ombudsman's response contains statements that support his allegations. The response states:

Your concerns about the project not following the terms of its own Project Execution Plan were substantiated, and addressed by a BP Management of Change document. The Project Execution Plan is a BP internal document, and not a regulatory requirement. We did not do a comprehensive document audit regarding the documentation issues on the Atlantis. As you know, you did not raise that issue until after the initial investigation of your concerns was completed, and only reviewed the issue you raised to us;

The concerns that you expressed about the status of the drawings upgrade project were not unique to you. It was a challenge to the Project and of concern to others who raised the concern before you worked there, while you were there, and after you left. You did not “blow the whistle” on the problem until, apparently, after you left employment at BP. Your raising the issue did not result in any change to the schedule of BP addressing the issue.

See Exhibit 15.

The BP Management of Change document referred to by the Ombudsman (“MOC document”), dated April 24, 2009, stated:

Due to the extended time frame for Atlantis Subsea Project operations at DC1 from the Manifold changeout and ongoing development, the completion and final handover of a complete set of Subsea project documentation to Operations has been delayed as a result of continual updates on many documents. Currently the documentation files are maintained in the Operations and Project document storage systems depending upon the stage of completion while at all times still available to any interested party within Atlantis. This is a deviation from the intent of the project to have had a complete set of documentation handed over after start-up of Atlantis. There is an ongoing program to complete and move documents to Operations as they are available.

See Exhibit 16. The MOC document describes the steps that BP planned to take to address the Atlantis project document problems:

It is proposed to formalize the existing process of only transferring to Operations the Subsea Project documentation that has been completed and will not need to be updated in the next couple of years of the ongoing Subsea Project as a result of currently identified project scope. At all times the documentation will be available, in updated form, in either the Project or Operations document storage systems. The intent of this proposal is to eliminate the need for repeated document handovers between the Project and Operations. This proposal will have no impact on access to documents by the Atlantis project and will not impact access to documentation required for any regulatory purposes. As previously mentioned, this proposal is to maintain the current process being used by Operations and the Subsea project for Subsea Project documentation handover.

See Exhibit 16. The MOC document detailed the changes BP planned to implement to “eliminate the need for repeated document handovers between Project and Operations” (after first oil). The MOC document did not address the systems handover process that BP follows (detailed on pages 6-7 of this Report) to transfer documents to operations prior to first oil.

IV. BOEMRE's Investigation

A. Overview of the Investigation

Our investigation focused on whether BP maintained a complete and accurate set of engineering drawings for the Atlantis platform (and associated subsea components), as required by BOEMRE regulations. We also investigated Mr. Abbott's allegations regarding (1) missing or unapproved engineering drawings; (2) false or incomplete BP submissions to BOEMRE; and (3) unsafe operating conditions on the Atlantis facility.

The investigation was conducted by a team of eight BOEMRE engineers, and, beginning in September 2010, was led by BOEMRE's Investigations and Review Unit. The investigative team also received input and assistance from the Department of the Interior Solicitor's Office regarding the interpretation and application of BOEMRE regulations. The investigation team reviewed more than 3,400 engineering drawings and related documents concerning the Atlantis facility. The team's review of the drawings submitted by BP included an in-depth analysis of drawings depicting the Atlantis platform's production safety systems and its structural systems.

To assist in our review and interpretation of these drawings and documents, we interviewed a number of people with in-depth knowledge of the operations of the Atlantis facility and the engineering drawings depicting those operations. BOEMRE interviewed 29 individuals who were either employees of, or contractors for, BP. We interviewed personnel from contractors including KBR, Technip, ABS and Mustang Engineering. We also interviewed Mr. Abbott and Michael Sawyer, an engineer retained by Mr. Abbott to analyze material related to his allegations.

We also reviewed ROV footage of the Atlantis subsea system (filmed in 2010) and witnessed a real-time demonstration of current capabilities of the BP Atlantis Documentum database, which is accessible to BP Atlantis operations personnel.

B. The Scope and Timing of the Investigation

MMS (now BOEMRE) first began reviewing BP's compliance with regulatory requirements for as-built engineering documents in May 2009,

following the filing of Mr. Abbott's lawsuit. As part of this investigation, BOEMRE reviewed regulations, certifications, and engineering documents.

By July 2009, MMS had received inquiries about the Atlantis from members of Congress, the press, and advocacy groups. The fact that the False Claims Act lawsuit had been filed under seal limited MMS's ability to communicate with Congress and the public about the allegations regarding BP's compliance with regulatory requirements for as-built documents.

On March 26, 2010, MMS Director Birnbaum responded to the February 24, 2010 Congressional letter, stating that MMS "will conduct a full investigation of this situation" and will complete its report by the end of May 2010. During the first week of April, MMS investigators interviewed BP employees regarding BP's document control process for the BP Atlantis project. After the interviews, MMS investigators traveled to Houston to review Atlantis facility documents and drawings.

On April 19, 2010, three MMS investigators arrived at BP's office in Houston, Texas, to review documents and drawings associated with the Atlantis platform and its subsea system. The following day, on April 20, 2010, the explosions occurred on the *Deepwater Horizon* drilling rig on another BP lease in the Gulf of Mexico. MMS directed the personnel involved in the investigation to assist in the *Deepwater Horizon* response and temporarily suspended the Atlantis investigation.

In mid-May 2010, MMS resumed its Atlantis investigation, with a focus on (1) whether there were immediate safety concerns that would necessitate the shut-in of the Atlantis platform; and (2) the status of the Atlantis engineering drawings. After analysis of the documents, data, and other information regarding the operation of the Atlantis facility identified no safety issues requiring an immediate shut-in of the platform, the investigation focused on issues related to BP's maintenance of required engineering drawings. To that end, on July 21, 2010, BOEMRE sent a letter to BP requesting production of the engineering documents that BOEMRE regulations required BP to maintain. In August 2010, BP produced over 3,400 documents and drawings depicting the Atlantis's production safety systems and its structural systems.

V. Allegations, Evidence, and Findings

A. Production Safety Systems

As discussed above, BOEMRE regulations do not require the submission of “as-built” documentation for production safety systems. However, based on our investigation and several inspections of the Atlantis facility’s production safety systems, we concluded that the flow schematics and SAFE charts maintained by BP accurately reflect the equipment and systems that are installed on the facility.⁵

B. Violation of 30 C.F.R. § 250.802

Our investigation found that certain operations related to the Atlantis facility were not being conducted pursuant to BOEMRE-approved plans and drawings. We concluded that BP failed to submit drawing revisions, in violation of 30 C.F.R. § 250.802. On October 4, 2010, BOEMRE issued a Notice of Incidents of Non-Compliance to BP listing the plans and drawings that BP had failed to submit for approval.⁶ BP responded to this Notice on October 20, 2010 and submitted the required drawings (*see* Exhibit 17 for a copy of the Notice and BP’s response). BOEMRE has since reviewed and approved these drawings.

C. ROV Inspection of Subsea Structures

To investigate the allegations that the lack of critical engineering drawings depicting subsea structures created immediate safety hazards, BOEMRE requested that BP produce materials related to a 2010 ROV inspection of the

⁵ Atlantis operations personnel rely upon a computer system called the “Human Machine Interface” (HMI) or the System Control and Data Acquisition (SCADA). This system functions as a diagnostic tool and an early warning system for potentially catastrophic events. Given the importance of these computer systems, BOEMRE is currently evaluating whether to expand its regulations to include specific requirements related to the functionality and performance of such systems.

⁶ BOEMRE issued this Notice prior to the publication of this report because it determined that BP’s violations needed to be corrected immediately. To effectively regulate the production activities in the OCS, BOEMRE must have accurate, up-to-date drawings of production safety systems.

Atlantis subsea structures.⁷ Because subsea structures cannot be inspected in-person, ROV inspections are the only means to review installed subsea components.

The inspection report on the 2010 ROV footage was prepared by 2H Offshore Inc. in January 2011. The actual ROV inspection was conducted by Wood Group Integrity Management and Oceaneering International. The report concluded that the Atlantis subsea equipment is in good condition, with the exception of jumper insulation, which was shown to have a number of cracks. The report suggested that BP further test the thermal integrity of the well and flowline jumpers where the insulation cracks are located. 2H did not recommend replacement of the jumpers or other remedial actions because the jumpers are scheduled to be removed in 2012 when BP plans to install the SS-2 subsea components. *See Exhibit 18 (copy of the 2H report).*⁸

D. Documentation Problems in the BP Atlantis Project Files

1. Electronic Database Problems

As described above, the BP Atlantis project files are stored in an electronic database called the Documentum. The Documentum database contains documents and drawings generated by BP and its third-party contractors. Until BP reorganized Documentum in 2009 and 2010, documents related to the Atlantis project were not well organized. All of the BP witnesses we interviewed admitted that the documentation related to the Atlantis project's subsea components required significant "clean up," updating, and reorganization. Among other things, a significant problem was that the project documents should have been better organized before being transferred to Atlantis operations personnel before production began.⁹

⁷ BP contracts with third-party firms to conduct ROV inspections on an annual basis and to provide a report analyzing the condition of the subsea components.

⁸ Performance of a full audit of the present condition of all subsea components was not within the scope of this investigation. BOEMRE is continuing its regulatory review of the performance and integrity of the Atlantis facility's subsea components, including wellheads, jumpers, and other components, and will take any appropriate action necessary to ensure the safe operation of the Atlantis facility and its subsea systems and components.

⁹ As described in this report, this was a document management problem that was separate from the system handover process, which involves a set of procedures BP followed to transfer

By June 2010, the Atlantis subsea document control process had improved significantly. BP upgraded Documentum to include a more organized file structure and generally to allow searches for relevant materials by BP operations personnel or others at BP to be conducted more efficiently.

2. Engineering Drawings – Labeling and Related Problems

We found that BP's engineering drawings relating to the Atlantis facility, which were prepared by a number of different contactors, were inconsistently labeled. BP acknowledged these labeling problems in a letter accompanying its submission of documents to BOEMRE. The letter, dated August 9, 2010, stated:

Because the enclosed drawings were prepared by several different engineering firms, the nomenclature used to indicate the revision status of drawings differs among the numerous drawings contained in the enclosed books. For example, drawings by DSME used "Rev. 60" to denote an "as built" drawing, while "as built" drawings by FMC Technologies were typically labeled "design" because FMC builds equipment and structures to design.

See Exhibit 19. Thus, the "as built" drawings depicting the Atlantis facility's topside and subsea structures were inconsistently labeled and did not always carry the label "as built."

Our review of the Atlantis engineering drawings also found that some drawings had inconsistent, undated, or missing engineer stamps. Other drawings had missing drawing numbers. We found that at least one of the subsea field architecture drawings was inconsistent with a subsea start-up chronology provided by BP.

These problems arose because BP did not require its Atlantis subsea contractors to conform engineering drawings and documents to a single, uniform set of standards established by the company. BP instead allowed its contractors to develop drawings and documents under their own respective documentation

key documents and drawings (including subsea documents and drawings) to operations personnel.

systems. Because there were a significant number of contractors involved in the Atlantis project, this led to a proliferation of inconsistent labeling conventions and the other document identification problems that we observed.

These labeling and documentation problems alone do not constitute a violation of BOEMRE's regulations. Current BOEMRE regulations do not address how engineering drawings are to be stamped, organized and labeled.¹⁰ We find that BP complied with the requirements of 30 C.F.R. § 250.903(a)(1) and 30 C.F.R. § 250.905(d). We note, however, that BP's use of a multitude of labels and the failure of BP to coordinate the drawing labeling systems used by its contractors has made it difficult to evaluate whether BP, in fact, complied with BOEMRE regulators. Where operators such as BP rely on contractors to design, fabricate, and install critical structures, they should implement and oversee a document labeling system that allows BOEMRE – and the operator -- to more readily determine whether the materials reflect the “as built” systems on the facility.

E. Engineering Drawings – Allegedly Unapproved or Not “As Built”

1. Allegations

In his lawsuit, and in our interview of him during this investigation, Mr. Abbott alleges that various materials – including engineering designs, components for construction, and “as built” engineering documents – related to critical Atlantis subsea systems “such as risers, P&IDs, and installation engineering documents” never received the necessary approvals. Mr. Abbott further alleges that the deficiencies in the Atlantis document database (*e.g.*, missing drawings and documents) demonstrate that: (1) necessary engineering work was not completed; (2) production equipment was not constructed according to approved construction documentation; and (3) requisite testing could not be confirmed.

¹⁰ As discussed in Section I.B.2 above, there is a requirement that operators maintain copies of certain “as built” drawings, but there is no requirement that such drawings carry the label “as built” or that they be maintained in a specified manner.

2. Evidence Cited by Mr. Abbott

a. The Duff Spreadsheet

A central piece of evidence upon which Mr. Abbott's allegations are based is an Excel spreadsheet that depicts the different types of subsea structures associated with the Atlantis production platform. The spreadsheet was created by Mr. Abbott's predecessor, Barry Duff, and Tinikka Curtis, who reported to Mr. Duff (and then later to Mr. Abbott). Mr. Abbott claims that one can tell that critical engineering drawings and documents were not approved by engineers by looking at the labels used for the drawings and documents in this Excel spreadsheet.

Mr. Abbott does not claim to have reviewed all of the underlying drawings referred to in the spreadsheet to assess whether the drawings, in fact, accurately depict the Atlantis facility's subsea system. He claims to have "spot checked" between 300 and 400 documents and that his spot-check supported the conclusions that he drew based upon his review of the spreadsheet.

b. E-mails

Mr. Abbott claims that a number of BP e-mails support his allegations that BP Atlantis operations personnel lacked certain subsea engineering documents that they needed to safely operate the facility.

First, Mr. Abbott claims that an August 15, 2008 e-mail from Mr. Duff to Mr. Broman and Mr. Naseman regarding "P&IDs For Operation" is evidence that BP Atlantis operations personnel did not have access to critical, engineer-approved, "as built" drawings.

In the August 15, 2008 e-mail, Mr. Duff expressed concern about turning over the Atlantis project documents to BP operations personnel without prior review by the document control team. In the e-mail, Mr. Duff states that "[t]he Operator will assume the drawings are accurate and up to date. This could lead to catastrophic Operator errors due to their assuming the drawing is correct." See Exhibit 6.

Second, Mr. Abbott claims that an August 14, 2008 e-mail from Andrew Gregg (BP contractor) to Mr. Duff and Mike Garland shows that BP operations personnel did not have access to Atlantis SS-1 drawings and that BP was

unwilling to spend \$2 million to transfer critical engineering drawings to BP operations personnel.

Third, Mr. Abbott claims that a November 28, 2008 e-mail from Bill Broman to a number of BP Atlantis project engineers entitled “Atlantis Document Control – Path Forward” shows that BP engineers had not approved, and BP operations personnel did not have access to, critical subsea engineering documents and drawings. This e-mail attached a number of Excel files that referred to Atlantis documents and drawings by “sector” (i.e., type of subsea system).

c. Conversations with BP Employees

Mr. Abbott claims that he raised his concerns about the lack of critical documentation regarding the Atlantis facility with a number of BP employees and that a number of these employees agreed that there was a problem. He claims – in Congressional testimony, interviews with BOEMRE personnel, and in a letter to the Inspector General for the Department of the Interior – that he discussed the missing engineering drawings and documents with Ron Berger, a systems engineer on the subsea delivery team, and that Mr. Berger acknowledged that Atlantis operations personnel did not have critical “as built” drawings. Specifically, during an interview with BOEMRE investigators, Mr. Abbott asserted that Mr. Berger said “I’ve got no [as-built drawings].” When asked whether Mr. Berger mentioned anything about a system handover package, Mr. Abbott stated that Mr. Berger said “where is my system handover package?” See Exhibit 20 (cited portions of a transcript of BOEMRE interview of Mr. Abbott) at 25.

Mr. Abbott also claims that he told BP employees Ryan Malone, Bill Naseman, Bill Broman, Tinikka Curtis, John Hughes, John Mack, David Whitehead, Bernie Kirkham, Rick Weber and John Schweibel that BP operations personnel lacked access to critical “as built drawings.”

3. Findings

We find that Mr. Abbott’s allegations regarding “as built” engineering drawings and the lack of engineering approvals are not supported by credible evidence. With regard to each of the above outlined categories of evidence, we find as follows:

a. Spreadsheet

At most, the spreadsheet relied upon by Mr. Abbott reveals that BP had a number of problems with both the organization of the Atlantis subsea project documents and with the labeling of subsea drawings depicting the systems and equipment as they were installed. However, the spreadsheet alone is not a reliable source for determining the engineering drawings that, in fact, were completed and transferred to operations personnel prior to first oil. BP used a detailed set of procedures that governed the transfer of drawings and documents to Atlantis operations personnel. The spreadsheet Mr. Abbott relied upon did not indicate whether the drawings at issue had been transferred to Atlantis operations personnel pursuant to these procedures.

The spreadsheet purported to list the Atlantis subsea project documents that needed to be properly organized and labeled for proper transfer to operations personnel.¹¹ This spreadsheet did not, however, address whether critical engineering documents and drawings had been transferred to Atlantis operations personnel prior to first oil. Numerous BP documents, and every BP employee and contractor interviewed as part of our investigation, confirmed that there was a transfer of systems handover packages prior to first oil and that these packages included engineering drawings and documents depicting what had been installed. Moreover, the transfer of drawings and documents that was to occur after the Documentum problems were addressed was a typical transfer of project files that takes place some time after the initial handover process has occurred.

We reviewed documents and drawings contained in the seven volumes of system handover packages to confirm that the handover process had taken place prior to first oil. We also reviewed numerous drawings and documents within the handover packages and verified that certifying documents (Certificates of Compliance, Inspection Release Certificates, Well Handover Certificates, and Mechanical Completion documents) were included. However, the systems

¹¹ Several BP employees explained that all project documents are ultimately transferred to operations even though many of these same documents would already have been transferred with the systems handover packages. The reason is that, after the “project” phase is completed (*i.e.*, after first oil), project personnel typically move to the next project while the operations personnel continue to work on production from the platform. A complete transfer of project files and documents eventually should be made to ensure that the documents (even the superseded drafts that do not reflect “as built” designs) are retained during production.

handover packages did not contain all of the documents and drawings that had been saved in the Atlantis Documentum database.

We did not find any evidence that BP's handover process was flawed. But even if there was some mistake or omission in the delivery of engineering drawings in the handover packages, we found no evidence that any mistake or omission created unsafe operating conditions. In any event, BP has improved the organization and searchability of the Atlantis Documentum database substantially, and BP operations personnel have ready access to Documentum.

b. E-mails

We reviewed each of the e-mails relied upon by Mr. Abbott and interviewed a number of BP employees and contractors regarding these e-mails.

In particular, we focused on Mr. Duff's e-mail that referred to potential "catastrophic Operator errors." BOEMRE investigators questioned Mr. Duff at length about the e-mail. Mr. Duff stated that he never believed that BP Atlantis operations personnel lacked access to critical engineering documents. He explained that his concern, at the time that he wrote the e-mail, was that operations personnel should not be given the entire, unorganized set of the Atlantis project documents without some quality checks and controls around the documents provided.

Mr. Duff told us that, notwithstanding the strong language in his e-mail, he never considered the unorganized state of the Atlantis project drawings and documents to be a major problem. He was aware that a formal handover process had occurred and that BP had a detailed set of procedures that govern the materials to be included in the handover packages. When pressed to explain why he had chosen to refer to possible "catastrophic Operator errors," Mr. Duff said that he was probably frustrated that his project services group was being saddled with the Documentum database re-organization process and that BP operations personnel expected re-organization to be completed very quickly. He said that he was appealing to his bosses (Naseman and Broman) to give his group more time to complete the project and therefore used far more dramatic language than the facts justified.

Mr. Broman, who was one of two recipients of the e-mail, said that he did not understand Mr. Duff to be saying that BP operations personnel lacked access to critical engineering documents. Mr. Broman explained that Mr. Duff and Ms

Curtis were charged with “cleaning up the Atlantis project file cabinet.” The e-mail exchange reflected Mr. Duff’s concerns about that process – not about the prior systems handover process that had already taken place. Mr. Naseman, who Mr. Duff reported to and who was the other recipient of the e-mail, similarly said that Mr. Duff was, notwithstanding his use of alarming language, essentially communicating that “the work is not done” on the database of Atlantis project documents. Mr. Naseman said he was not alarmed by Mr. Duff’s e-mail because he knew that a formal handover process had occurred and that he did not believe that BP Atlantis operations personnel were missing any critical documents.

The e-mail from Mr. Gregg to Mr. Broman and Mr. Naseman is, similarly, not evidence that BP operations personnel lacked access to critical engineering documents or that BP was unwilling to spend \$2 million to ensure such access. Contrary to Mr. Abbott’s assertions, Mr. Turner (who was mentioned in the e-mail) did not have any responsibility for the Atlantis subsea systems and was not in a position to know whether BP operations personnel had access to the Atlantis “SS-1” documents and drawings.

Finally, the e-mail from Mr. Broman to Atlantis project engineering personnel entitled “Atlantis Document Control – Path Forward” was an e-mail about, not surprisingly given its title, the Atlantis subsea document control system. It did not purport to identify critical engineering documents that were not accessible by BP Atlantis operations personnel. No BP Atlantis operations personnel were copied on or mentioned in the e-mail. This communication simply did not address access to documents and drawings by operations personnel.

c. Conversations with BP Employees

We interviewed each of the individuals Mr. Abbott claimed to have spoken to about his concerns that BP operations personnel lacked access to critical engineering documents and drawings and that many of these documents and drawings were never approved by a BP engineer.

Each of these individuals described the documentation problems that Mr. Abbott and Ms. Curtis were addressing as “cleaning up” and organizing the Documentum database. None of them said they recalled any discussions with Mr. Abbott in which Mr. Abbott stated that he believed that BP operations personnel lacked access to critical engineering documents and drawings or that

many of these documents and drawings were never approved by an BP engineer. Mr. Abbott's contentions, and his responses during his interview, demonstrate that, at a minimum, Mr. Abbott does not have a complete understanding of the process BP used to transfer documents and drawings to Atlantis operations personnel.¹²

A central allegation that Mr. Abbott has made – to Congress, to BOEMRE and to the Inspector General of the Department of the Interior – is that Mr. Berger, who had responsibility for Atlantis subsea operations, admitted to him in January 2009 (in a meeting also attended by Ms. Curtis) that BP Atlantis operations personnel lacked access to critical subsea documents and drawings. *See* Exhibit 20 at 24. During his interview with us, Mr. Berger strongly denied having had such a conversation with Mr. Abbott and told us that, if he had a concern about the lack of access to drawings by BP Atlantis operations personnel, he would have gone straight to those operations personnel and not to Mr. Abbott. Mr. Berger participated in the systems handover package process that was designed to ensure that Atlantis operations personnel had access to critical subsea documents prior to first oil. In light of Mr. Berger's denials and his role with the handover process, we find there is insufficient credible evidence to support the claim that Mr. Berger said, "Where is my systems handover package?" as alleged by Mr. Abbott.

Ms. Curtis told us that she did not recall Mr. Berger saying anything during the meeting with Mr. Abbott about Atlantis operations personnel's access to engineering drawings and documents. Both Mr. Berger and Ms. Curtis stated that they believed that the meeting was held to address the ongoing Documentum database clean-up project, not the handover of documentation to Atlantis operations personnel in advance of first oil.

We fully explored Mr. Abbott's other specific allegations about his conversations with other personnel. We resolve them as follows:

¹² When asked about this process, Mr. Abbott said that "[t]here is a subsea handover procedure, but that procedure originates with the document control clerk, and those drawings are all bundled up or sent – either bundled up as hard copies or sent electronically by her to the operators, period. That's the only way I know that that works." *See* Exhibit 20 at 50-51. Every other individual interviewed, including those who actually worked to ensure the appropriate drawings and documents were included in the systems handover packages, described the process outlined on pages 6-7 of this report. This process was much more than review and production of documents and drawings by a document control clerk.

- Mr. Abbott claimed that Mr. Broman told him that necessary “as built” documents were not available to personnel on the Atlantis platform. Mr. Abbott said that he asked Mr. Broman to put out an e-mail to fix this problem. *See Exhibit 20 at 32.* Mr. Broman said that his e-mail, entitled “Atlantis Document Control – Path Forward” was sent to encourage project engineering leads to help with the Documentum “file cabinet clean up” tasks being performed by Ms. Curtis under Mr. Abbott’s direction. Mr. Broman denies that he ever thought or said, to Mr. Abbott or anyone else, that the problem being fixed was the lack of access to critical, engineer-approved documents by BP Atlantis operations personnel. Mr. Broman told us that if he thought that BP Atlantis operations personnel were lacking critical, engineering-approved documents, he would have contacted operations directly and worked right away on getting them the documentation they needed.
- Mr. Abbott claimed the Ryan Malone, project manager for the Atlantis north flank who had an office next to Mr. Abbott’s office, expressed “concern” and “shock” about Atlantis documentation issues and that the documents were not in place to support installation of subsea well equipment. *See Exhibit 20 at 42.* Mr. Malone told us that he spoke to Mr. Abbott on a number of occasions about document control issues, but that those conversations were “matter of fact” and were not conversations in which Mr. Malone or Mr. Abbott expressed “concern” or “shock.” Mr. Malone said that he never heard Mr. Abbott say that operations personnel did not have the documents they needed to safely operate the Atlantis facility. Mr. Malone said that he understood the problem Mr. Abbott and Ms. Curtis were working on was a document database clean-up project.
- Mr. Abbott claimed that Ms. Curtis confirmed to him that a large number of engineering documents had not been transferred to BP Atlantis operations personnel. *See Exhibit 20 at 63.* Ms. Curtis explained to us that, at the direction of Mr. Duff, she had started the process of organizing the Atlantis project documents. She said that the documents were “all in one folder” and needed to be separated and labeled. Ms. Curtis said that she did not recall ever telling Mr. Abbott that personnel on the Atlantis platform did not have access to necessary engineering drawings and documents.

- Mr. Abbott claimed that while at BP he spoke to his boss, Mr. Naseman, about the fact that BP Atlantis operations personnel lacked access to certain engineer-approved drawings. Mr. Abbott said that he – in phone calls and staff meetings – asked for support from Mr. Naseman in getting the Atlantis project engineers to provide drawings and documents to Ms. Curtis. Mr. Abbott said that Mr. Naseman got angry and said that Mr. Abbott was “putting too much pressure on the engineers.” See Exhibit 20 at 23. Mr. Naseman acknowledged saying something like this, but told us that he also stated that the engineers needed to work on the database problem because it was their job to provide the drawings and documents to Ms. Curtis. Mr. Naseman, however, told us that he never recalled Mr. Abbott characterizing the problem as an operational issue (*i.e.*, that BP operations personnel lacked access to engineer-approved documents). Mr. Naseman characterized the project as the “subsea document clean-up.”
- Mr. Abbott claimed that, in meetings with Atlantis project engineer leads (John Hughes, John Mack, David Whitehead, Bernie Kirkham, Rick Weber, and John Schweibel) he expressed the view that BP operations personnel lacked access to as built, engineer-approved documents. See Exhibit 20 at 38-39. Each of these Atlantis project engineer leads strongly denied Mr. Abbott’s characterization and account of the meeting. Indeed, prior to the meeting, Mr. Broman sent an e-mail, which referred to the spreadsheet that forms the basis of most of Mr. Abbott’s allegations, regarding “Atlantis Document Control” and provided the topics to be discussed, none of which related to operational concerns. In short, we found no evidence corroborating Mr. Abbott’s description of this meeting.

F. Alleged False or Incomplete Submissions to BOEMRE –
Submission of Structural Drawings

1. Allegations

Mr. Abbott alleges that BP failed to comply with 30 C.F.R § 250.904(a) and (b) by failing to submit a complete set of structural drawings, including drawings of subsea systems. Mr. Abbott claims that “the vast majority of [subsea component] engineering drawings were not ‘approved for construction’” and that, as such, BP’s submission of drawings constituted a false claim to the United States government.

2. Evidence Cited by Mr. Abbott

As previously discussed, Mr. Abbott's allegations regarding the status of certain engineering drawings are based primarily on his characterization of a spreadsheet depicting the labels of drawings contained in the Documentum database. Mr. Abbott claims that conversations and e-mails with other BP personnel are evidence supporting his view of the status of the drawings.

3. Findings

We found no evidence that the "vast majority" of subsea component engineering drawings were not approved for construction. We did find, however, that BP's inconsistent use of labels and the failure of BP to coordinate the drawing labeling systems used by its contractors made it difficult to determine whether BP complied with the requirements of 30 C.F.R. § 250.903(a)(1) (requiring maintenance of as-built drawings for the functional life of the platform) and 30 C.F.R. § 250.905(d) (requiring submission of approved-for-construction fabrication drawings for the Platform Approval Program).

Despite these labeling and document organization problems, we found that BP followed a clearly defined process to transfer documents and drawings to Atlantis operations personnel prior to first oil. We found no evidence that BP operations personnel lacked access to critical, engineer-approved subsea system drawings.

Moreover, Mr. Abbott's claim, which is focused on the allegedly unapproved or missing subsea drawings, misstates the current requirements of BOEMRE regulations. The "as built" requirements in 30 C.F.R. 250.901(a) and 30 C.F.R. 250.905(d) apply only to structures associated with the platform. BOEMRE defines structures "associated with the platform" as those structures that are weight bearing on the platform. The following structures fall within the scope of 30 C.F.R. 250.901(a) and 30 C.F.R. 250.905(d): drilling, production, and pipeline risers and riser tensioning systems; turrets and turret-and-hull interfaces; foundations, foundation pilings and templates, and anchoring systems; and mooring or tethering systems. *See* 30 C.F.R. 250.910(b). BOEMRE's

regulations currently do not specifically require the submission and approval of “as built” drawings for subsea components.¹³

G. Alleged False or Incomplete Submissions to BOEMRE –
Verification by Certified Verification Agent (CVA)

1. Allegations

Mr. Abbott further alleges that BP violated 30 C.F.R. § 250.918 because the CVA final verification report must address “the adequacy of the entire installation phase, including recordkeeping.” Mr. Abbott contends that the CVA could not have rendered an accurate verification report without access to the “as built” drawings that he claims were missing.

2. Evidence Cited by Mr. Abbott

Mr. Abbott’s claim as to the allegedly false CVA verification appears to be dependent on and derived from his allegations regarding missing or unapproved Atlantis subsea drawings.

3. Findings

We interviewed the CVA for the Atlantis project, ABS, in connection with this investigation. Our investigation confirmed that ABS reviewed the design, fabrication and installation of the Atlantis production platform and complied with all of the applicable BOEMRE requirements governing certifications (see Exhibit 13 for details on the CVA process). BOEMRE found no evidence to support the allegation that ABS lacked access to engineering drawings when it conducted its verification of the design, fabrication, and installation of the Atlantis platform.

¹³ The Recommendations section of this Report contains proposed changes to BOEMRE regulations as applied to drawings depicting subsea components.

H. Alleged False or Incomplete Submissions to BOEMRE –
Statements About “As Built” Documents

1. Allegations

Mr. Abbott alleges that BP falsely certified that it had maintained a complete set of “as built” documents in violation of 30 C.F.R. 250.903(a)(1) and 30 C.F.R. 250.905(k).

2. Evidence Cited by Mr. Abbott

Again, these allegations appear to be premised on Mr. Abbott’s claims regarding missing and unapproved Atlantis subsea drawings. In addition, Mr. Abbott alleges that at least two different BP statements to BOEMRE (or MMS) dated August 1, 2005 and August 9, 2010, were false. *See* Exhibits 21 and 19.

3. Findings

BP’s August 1, 2005 letter accompanied a Production Platform Safety System Application required by BOEMRE regulations. In that letter, authored by Dennis Sustala, Atlantis Regulatory Compliance Coordinator, BP stated that:

[T]he designs for the mechanical and electrical systems to be installed were completed under the supervision of registered professional engineers. Maintenance of the system will be by qualified personnel. All design data shall be kept at BP’s Houston, Texas office.

See Exhibit 21. BP’s August 10, 2010 letter stated that:

The design of this structure has been certified by a recognized classification society, or a registered civil or structural engineer or equivalent, specializing in the design of offshore structures. The certified design and as-built plans and specifications will be on file at BP’s offices in Houston, Texas.

See Exhibit 19.

BP's August 10, 2010 letter provided a list of registered engineers associated with BP's August 1, 2005 statement regarding the supervision of the design of the mechanical and electrical systems on the Atlantis. BOEMRE found no evidence that there was false information contained in either of these letters.

I. Alleged False or Incomplete Submissions to BOEMRE – Deep Water Operations Plan (DWOP) and Safety Hazard Analysis (HAZOP)

1. Allegations

Mr. Abbott alleges that the Deep Water Operations Plan (DWOP) submitted pursuant to 30 C.F.R. 250.293 and the safety hazard analysis ("HAZOP")¹⁴ submitted pursuant to 30 C.F.R. 250.292 could not have been accurate if BP did not have certain engineer-approved drawings. Mr. Abbott also alleges that, as a condition precedent to beginning production, BP had to apply for and receive approval for its production safety system, which he claims required the submission of an accurate HAZOP and related piping and flow diagrams.

2. Evidence Cited by Mr. Abbott

Mr. Abbott claims that this allegation is supported by his claims regarding missing or unapproved Atlantis subsea drawings. He alleges that BP could not have submitted an accurate DWOP or HAZOP without the drawings he claims were never approved by BP engineers.

3. Findings

Mr. Abbott's allegations are premised on a fundamental misreading of BOEMRE regulations. Neither 30 C.F.R. § 250.292, which specifies the content of the DWOP, nor 30 C.F.R. § 250.802(e), which specifies the documents necessary for approval of the safety system design and installation, requires a hazard analysis. Furthermore, neither these sections of the regulations nor the API RPs most relevant to hazard analyses – API RP 14C and 14J – require "as-built,"

¹⁴ Mr. Abbott uses the term "HAZOP" to refer to a hazard analysis. A Hazard and Operability (HAZOP) Study is one method of hazard analysis, but there are others as well. See API RP 14J, Recommended Practice for Design and Hazards Analysis for Offshore Production Facilities at 38 (describing HAZOP as one method of hazard analysis). API RP 14J is discussed in more detail in footnote 4 and accompanying text.

"approved for construction," or "approved for design" engineering documents or certification of the existence of documents labeled in this manner. *See* section I.B.1 of this Report for a more detailed explanation of these regulations.

J. Alleged Unsafe Operating Conditions

1. Allegations

In his Congressional testimony, Mr. Abbott stated that the Atlantis production platform may be a “ticking time bomb” and that the BP Atlantis operations personnel may be “flying blind.” Mr. Abbott alleges that BP operations personnel do not have access to as built, engineer approved documents depicting the Atlantis subsea system. He claims that this creates immediate safety risks. He also testified that BP’s problems with the Atlantis facility are similar to issues that led to the *Deepwater Horizon* accident.

2. Evidence Cited by Mr. Abbott

Mr. Abbott bases these allegations on his claims and evidence summarized above.

3. Findings

Our investigation related to the Atlantis facility began before the *Deepwater Horizon* accident occurred. Since *Deepwater Horizon*, BOEMRE has conducted a thorough investigation to determine whether there was any evidence that supported Mr. Abbott’s allegations about unsafe operations on the Atlantis production facility. BOEMRE found no such evidence.

While at BP, Mr. Abbott was a project manager whose job included overseeing document control systems. There is no evidence that, during his employment with BP, Mr. Abbott raised concerns about unsafe conditions on the Atlantis facility. Mr. Abbott had no responsibility for operations of the Atlantis platform. Thus, he was never in a position to directly evaluate the safety of the Atlantis facility’s operations. Mr. Abbott’s allegations are premised entirely on concerns about the adequacy and availability of design and engineering documents. However, Mr. Abbott was unfamiliar with the handover process for providing documentation to operational personnel prior to first oil and, therefore, he lacked first-hand knowledge of the documents and drawings that were available to BP Atlantis operations personnel. None of the witnesses we

interviewed recalled that any BP operations personnel had ever expressed concern about access to engineer-approved drawings and documents necessary to safely operate the Atlantis facility.

If the facts warranted doing so, BOEMRE has the authority to suspend BP's operations or to revoke BP's designation as an operator. Because we find no basis to conclude that the document organization and labeling problems that BP admitted experiencing with the Atlantis facility amount to a threat of serious, irreparable or immediate harm or damage, suspension is not warranted at this time. Likewise, Mr. Abbott's allegations provide no basis that would support a finding by BOEMRE that BP's operating performance with respect to the Atlantis facility was unacceptable. Thus, revocation of BP's designation as an operator is not warranted at this time.

RECOMMENDATIONS

1. In light of the increasing complexity of production operations in deepwater, we recommend that BOEMRE evaluate:

(a) Expanding 30 C.F.R. § 250.905(d), or otherwise revising existing regulations, to require accurate, up-to-date, clearly labeled “as built” drawings for all structures that are connected in any way to oil or gas production platforms, including all subsea components. Operators would be required to maintain engineering drawings for all components and to label and organize those drawings in a way that will allow efficient review by platform personnel and BOEMRE.

(b) Implementing a requirement, through expansion of the scope of 30 C.F.R. § 250.916-.918 or some other means, that a CVA review the design, fabrication, and installation of all subsea components.

2. In light of the inherent difficulties in evaluating the condition of subsea components, we recommend that BOEMRE consider promulgating a rule that would require operators to perform annual ROV inspections of all subsea components and maintain ROV footage and inspection reports for review, as necessary, by BOEMRE.

CONCLUSION

To address allegations raised by Mr. Abbott and members of Congress, BOEMRE conducted an extensive investigation of the engineering drawings and documents depicting the relevant components of the Atlantis facility and carefully considered allegations that engineering documentation deficiencies created unsafe operating conditions on the Atlantis.

Our investigation found that the electronic document database that BP used to store documents developed during the design, construction, and installation of the Atlantis production facility was disorganized and inadequate to handle the large volume of documents generated by BP and its third-party contractors. In addition, BP used a confusing labeling system for engineering drawings contained in the project files. Those drawings also had other defects and deficiencies, including undated and missing stamps and signatures, and inconsistent titles for types of drawings.

Our investigation found that Mr. Abbott's allegations that Atlantis operations personnel lacked access to critical, engineer-approved drawings are without merit. We found no evidence that the document control deficiencies listed above created specific unsafe conditions on the Atlantis production platform. Our investigation further concluded that Mr. Abbott's allegations about false submissions by BP to BOEMRE are unfounded.

Our investigation, which went beyond the scope of Mr. Abbott's allegations and assessed BP's compliance with additional BOEMRE regulations regarding engineering drawings, determined that BP failed to file with BOEMRE certain drawings depicting changes to a number of production safety system components, in violation of 30 C.F.R. § 250.802. BOEMRE has issued an incident of non-compliance (INC) to BP as a result of this finding.

Based on all the evidence developed during our investigation, as well as prior inspections and a thorough review of documents and drawings produced by BP, we found no grounds for suspending the operations of the Atlantis pursuant to 30 C.F.R. § 250.168 or revoking BP's designation as an operator under 30 C.F.R. § 250.135.