



Holly A. Hopkins
Senior Policy Advisor

1220 L Street, NW
Washington, DC 20005-4070
USA
Phone: 202-682-8439
Fax: 202-682-8426

Email hopkinsh@api.org
www.api.org

May 11, 2018

Doug Morris
Chief Office of Offshore Regulatory Programs
Bureau of Safety and Environmental Enforcement
U.S. Department of the Interior
1849 C Street, NW
Washington, DC 20240

Via email

Dear Mr. Morris:

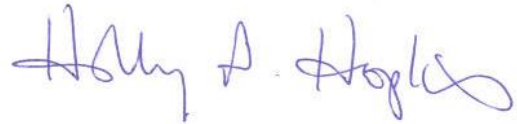
As part of API and Industry's commitment to improving training, operating procedures, technology and industry standards, attached is a detailed and comprehensive update showing progress of the voluntary actions taken by Industry to address issues related to subsea bolts and fasteners. As we have discussed, this is ongoing work and progress will be reported as new information becomes available. Notably we have made progress on the near-term commitment, which entails replacing all critical bolting having a hardness greater than 35HRC. One hundred percent of our BOPs have the required replacement bolting ordered and 65% have completed the replacement for all active BOPs in the Gulf of Mexico. The attached documents show progress made by Industry on the following bolting topics:

- Research sponsored by API related to this topic;
- Activity by the standards task groups and subcommittees to implement the recommendations in the API Multi Segment Task Group Report on Bolting Failures;
- Voluntary industry adoption of API 20 E/F for critical BOP bolting;
- Voluntary industry replacement of critical bolting having a hardness of >35 HRC;
- Enhanced QAQC of 3rd party manufactured bolting (i.e., sampling, 20 E/F requirements);
- Updated make-up procedures, with additional engineering rigor and oversight;
- Elimination of electroplated Zinc coatings for subsea/marine applications; and
- Enhanced failure reporting with wider distribution.

API appreciates the opportunity to work with BSEE to continue discussing our shared objective of safe operations. As can be seen by the significant progress we've made as an Industry since 2016, we believe that by working in a spirit of cooperation, we can better understand how to best achieve our common goals and, thus, implement actions to help reach our shared safety objectives. We look forward to

discussing this report in detail during our May 22, 2018, webex. If you have any questions in the meantime, please contact me by phone at (202)682-8439, or by e-mail at hopkinsh@api.org.

Sincerely,

A handwritten signature in blue ink that reads "Holly A. Hopkins". The signature is written in a cursive style with a large, looping "H" and "K".

Holly A. Hopkins

cc: Lars Herbst, GOM Regional Director

Attachment



AMERICAN PETROLEUM INSTITUTE

May 2018

API 1Q 2018 UPDATE ON INDUSTRY ACTIVITIES ON SUBSEA BOLTS AND CONNECTORS

Background

On August 11, 2014 the Bureau of Safety and Environmental Enforcement (BSEE) released a technical Review of Connector and Bolt Failures following the failure of connectors and bolts used in critical equipment. The technical review, entitled Evaluation of Connector and Bolt Failures, was completed by the bureau's Quality Control-Failure Incident Team (QC-FIT) and submitted to BSEE Director Brian Salerno. The objective of the technical assessment was to document and evaluate failures of the connectors, studs and other components used in critical equipment and determine if there were industry wide issues that need to be addressed by the industry or BSEE. This report addressed a December 2012 incident which prompted a global recall of the bolts associated with the H4 connector bolts.

In response to the QC-Fit Report, API held a Technical Session during the API Exploration and Production Winter Standards Meeting in New Orleans on January 27, 2015. BSEE was invited by API to present their report findings and recommendations. After the Technical Session, an API multi-segment task group was formed to review the detailed recommendations in the report and determine next steps. The final report of the task group was shared with BSEE in March of 2016 and is now being implemented.

An incident in February of 2014 involving a lower marine riser package (LMRP) connector leak prompted BSEE to issue an Addendum to the QC-FIT report, with the new information from this incident.

As a result of these ongoing incidents BSEE issued a Safety Alert regarding Connector and Bolt Failures on February 2, 2016. Additionally, BSEE held a public forum on offshore connector equipment failures, including connector bolt failures that have occurred on the OCS, on August 29, 2016, in Washington, DC.

To address the February 2016 safety alert API formed a workgroup which has met with BSEE numerous times to improve safety offshore as it relates to bolts. This work focuses on subsea BOP bolting and 4 specific areas: 1) Materials/Standards; 2) QA/QC – API Monogram Program; 3) Operations; and 4) Research.

API provides this detailed and comprehensive update to track the progress and implementation of the voluntary industry actions to address the issues related to subsea bolts and connectors. This is ongoing work that may evolve as new information becomes available and this is the seventh of regular quarterly reports.

Progress on Research, Materials/Standards and QA/QC

		Topic	Discussion
1	Research	API sponsored research	<p>API has approved a 2017 project to perform testing to determine susceptibility to environmental hydrogen embrittlement of selected materials and coatings. Testing has begun on API 20E bolting material for susceptibility to hydrogen embrittlement under cathodic protection in simulated seawater. Specimen preparation is in progress for the testing of alternatives to zinc electroplating coatings.</p> <p>In addition, API has conducted 4 projects related to hydrogen embrittlement and 21 projects related to corrosion resistant alloys.</p>
2	Materials and Standards	API 6A 21st Edition	Being drafted and is expected to require API 20E bolts.
		API 6D 25th Edition	Being drafted. Inclusion of API 20E and 20F to be considered for use on possible higher class rating valve such as 1500 and 2500.
		API 6DSS 3rd Edition	Requires API 20E and API 20F for all pressure boundary bolts in the document published August 2017.
		API 16A 4th Edition	Bolting conforming to API 20E or API 20F is a requirement for pressure controlling bolting, closure bolting and pressure retaining bolting in the document published April 2017.
		API 16AR 1st Edition	Bolting conforming to API 20E or API 20F is a requirement for pressure controlling bolting, closure bolting and pressure retaining bolting in the document published April 2017.
		API 16B 1st Edition	Currently under development and is expected to adopt the TGR-3 bolting recommendations and text to meet 20E or 20F.
		API 16C 3rd Edition	Currently under development. For subsea bolting, the draft document requires BSL3 as per 20E or 20F as applicable; however, the document is silent on zinc electroplating.
		API 16F 2nd Edition	Published November 2017. Requires API 20E or API 20F bolting.
		API 16ST 2nd Edition	Currently under development and is expected to adopt the TGR-3 bolting recommendations and text to meet 20E or 20F.

Progress on Research, Materials/Standards and QA/QC

Topic	Discussion
API 17D 3rd Edition	Being drafted and is considering the TGRs.
API 17G 3rd Edition	Ballot did not meet consensus. New draft being developed. Requires API 20E or API 20F for fasteners.
API 17TR8 2nd Edition	Published March 2018.
API 20E 2nd Edition	Published February 2017. An addendum providing clarification of several points was sent out for ballot (closed 2/21/18). An additional addendum to permit use of continuous cast is now out for ballot.
API 20F 2nd Edition	Ballot closed 9/13/2017 and comment resolution is complete. Final was recirculated. Expected to be published 2Q2018.
API 53 5th Edition	5th edition comment resolution finalized; expect a full re-ballot due to changes. Has proposed requirements for the periodic replacement of existing bolting that conforms to the latest editions of 16C and 16A.
API 64 3rd Edition	Published August 2017. Addendum balloted to clarify 20E/F bolting requirements (closed April 5 th).
API Q1, 9th Edition, Addendum 2	New addendum sent to ballot (#4214) and closed 10/11/2017. Expected to be published 2Q2018.

Progress on Research, Materials/Standards and QA/QC

		Topic	Discussion
3	TG Recommendations	<p style="text-align: center;">TGR-1 - SC21</p> <p>TG notes that there is conflict between B633 and F1941 related to requirements for hydrogen embrittlement mitigation. B633 requires stress-relief and bake for product greater than 31 HRC. F1941 does not require stress-relief and requires bake for product greater than 39 HRC. API should contact ASTM to request resolution of this conflict. If this cannot be achieved through ASTM, then API needs to issue an equivalent document under API through SC21. In either case, the revised or new document will then need to be adopted by product SCs. This work should also include requirements for maximum hardness on bolting material.</p>	<p>ASTM Committee B08 issued a B08 Main Committee ballot to add process controls and returned B633 to the 39 HRC bake threshold. Ballot received, as expected, several negative votes. The negative votes were considered at the ASTM Committee B08 meeting in November in Atlanta. Ballot item sponsors present arguments and data to address the objections raised by the negative voters. A motion to begin to override the negatives fell one vote short of the required two thirds majority. As a result, the task group supporting the proposal plans to rework the item and hold some information meetings intended to gain the added support needed to re-ballot the proposal. This is expected to occur before the next subcommittee meeting in May 2018. (See also actions under TGR-4 and TGR-18.)</p>
		<p style="text-align: center;">TGR-3 - SC21</p> <p>TG recommends prohibiting Zinc electroplating for Subsea/Marine application. TG further recommends that an investigation be conducted under the direction of SC21 to determine a better short term (storage) corrosion protection system that would not create hydrogen in service. The results of this study would then need to be adopted into product standards.</p>	<p>Phase 1 testing (SnZn, ZnNi, Zn Flake, TDC Zn Alloy, NiCo Electroplated Zn) has been contracted and specimen preparation is now in progress.</p>

Progress on Research, Materials/Standards and QA/QC

Topic	Discussion
<p>TGR-4 - SC21 TG recommends consideration of an overarching document issued by API through SC21 in cooperation with product SCs covering selection of proper bolting materials for different environments (including subsea) would be helpful.</p>	<p>The document was reviewed by API staff and some editorial changes were made. The document is expected to be sent out for comment ballot in SC21 within the next two weeks. Once comments are complete the document will be ready for publication.</p>
<p>TGR-8 - SC21 Do not allow use of B7 or L7 grades above 2.5" in diameter.TG recommends that this be included as part of the overarching document under SC21.</p>	<p>Completed. Do not allow the use of ASTM A320 L7/ASTM A193 B7 bolting for diameters above 2 ½ inches unless the DI of the material is intentionally modified. (The recommendation has been provided to SC6, SC16 and SC17 and will also be covered in the overarching document.)</p>
<p>TGR-18 - SC21 Product subcommittees should review and consider incorporating 20E and 20F requirements (resolve existing conflicting properties specified in product specifications such as hardness).</p>	<p>*Ties into TGR-1* (This work is in response to the TGR-1 request to establish maximum hardness for bolting material.) Objective is to identify hardness and associated yield limit to prevent HISC in subsea fasteners. The contract for testing has been issued and specimen preparation has begun. Testing is now in progress. Additionally, related to this recommendation a new Subgroup was formed at the Summer 2017 Conference with a charge to provide recommendations for improved accuracy of hardness testing and calculation of test uncertainty. The group has met several times is making progress and will be presenting a report at the 2018 Summer Conference in June.</p>
<p>TGR-2 - SC20 TG recommends that API expand 20E to more adequately cover the requirements of plating and coating as well as move the supplemental requirements for plating and coating into the body of the document, making them standard requirements.</p>	<p>Done.</p>
<p>TGR-9 - SC20 TG recommends that volumetric examination where bolt diameter exceeds 2.5" should be added as a requirement to 20E, 20F, BSL-2, and BSL-3.</p>	<p>Done for API 20E. Covered in API 20F Second Edition (Expected to be published 2Q2018).</p>

Progress on Research, Materials/Standards and QA/QC

Topic	Discussion
<p align="center">TGR-11 - SC20 Revise 20F to restrict use of sulfur based lubricants during manufacture of bolting.</p>	<p>Requirements added API 20F Second Edition (Expected to be published 2Q2018).</p>
<p align="center">TGR-17 - SC20 Strengthen heat treating and furnace loading requirements in 20E and 20F (more prescriptive requirements related to: spacing, QTC location, and thermocouple placement). Include requirements for oven calibration for pre and post bake operations.</p>	<p>Done for API 20E. Added to API 20F Second Edition (Expected to be published 2Q2018).</p>
<p align="center">TGR-20 - SC20 SC20 review the supplier controls in 20E and 20F to ensure these adequately cover required controls for subcontracted processes. SC 20 should also monitor the API Q1 revisions.</p>	<p>Done for API 20E. Added to API 20F Second Edition (Expected to be published 2Q2018).</p>
<p align="center">TGR-19 - SC18 SC18 to form a TG to review the BSEE FIT-QC Report on connector bolt failures to determine if the current requirements of API Spec Q1 has the provisions needed to ensure that system control features are in place, and clearly stated, to eliminate these type of failures in the future.</p>	<p>Done, TG formed.</p>
<p align="center">TGR-3 - SC17 TG recommends prohibiting Zinc electroplating for Subsea/Marine application. TG further recommends that an investigation be conducted under the direction of SC21 to determine a better short term (storage) corrosion protection system that would not create hydrogen in service. The results of this study would then need to be adopted into product standards.</p>	<p>Completed. 17D, 3rd Edition is adopting 20E/20F in the Normative Reference, for which TGR-3 has been incorporated.</p>

Progress on Research, Materials/Standards and QA/QC

Topic	Discussion
<p>TGR-5/TGR-12 - SC17</p> <p>-TG recommends that the product specifications require equipment manufacturers to specify acceptable thread compounds for bolting applications based on material, plating and service.</p> <p>-TG recommends adding requirements to API product specifications to restrict combining these elements in thread compounds.</p>	<p>Completed. 17D 3rd Edition Annex G is addressing:</p> <ol style="list-style-type: none"> 1. Written procedures, incorporating the features of these provisions and specifying the thread lubricant to be used shall be developed for use by the qualified connection assemblers 2. The applied torque/tension in the written procedures shall be validated for some relevant bolt sizes with actual material, coating and lubrication
<p>TGR-6 - SC17</p> <p>Torqueing requirements should be reviewed to determine if standardization among product specifications is needed.</p>	<p>Completed. 17D 3rd Edition Annex G is addressing:</p> <ol style="list-style-type: none"> 1. Standard closure bolting shall be assembled using torque or other validated bolt preload method that is calculated to achieve a nominal tensile stress of 67 % of the bolt's minimum specified material yield strength (SY). This is to ensure gasket seating during make-up and increase face-to-face contact preload in excess of separation forces at rated working pressure.
<p>TGR-13 - SC17</p> <p>Guidance should be issued by API on when and how to perform fatigue sensitivity analysis on bolting.</p>	<p>CSOEM approved 2 year research project in SC21 to investigate fatigue properties of bolting. Contracts for research are being developed.</p>
<p>TGR-14 - SC17</p> <p>Involved API SC's should address guidance issued in the product specs to require use of BSL-3 in fatigue sensitive applications.</p>	<p>CSOEM approved 2 year research project in SC21 to investigate fatigue properties of bolting. Contracts for research are being developed.</p>
<p>TGR-16 - SC17</p> <p>TG recommends API issue a document to provide guidance on derating of bolting. There are several specifications on material derating due to elevated temperature.</p>	<p>SC17 currently in ongoing discussion with 17D HPHT Annex.</p>

Progress on Research, Materials/Standards and QA/QC

		Topic	Discussion
		<p style="text-align: center;">TGR-18 - SC17</p> <p>Product subcommittees should review and consider incorporating 20E and 20F requirements (resolve existing conflicting properties specified in product specifications such as hardness).</p>	<p>Completed. 17D 3rd Edition is adopting 20E/20F in the Normative Reference</p>
		<p style="text-align: center;">TGR-3 - SC16</p> <p>TG recommends prohibiting Zinc electroplating for Subsea/Marine application. TG further recommends that an investigation be conducted under the direction of SC21 to determine a better short term (storage) corrosion protection system that would not create hydrogen in service. The results of this study would then need to be adopted into product standards.</p>	<p>16C - For subsea bolting, the draft document requires BSL3 as per 20E or 20F as applicable; however, the document is silent on zinc electroplating.</p> <p>16A - Completed</p> <p>16ST - The 2nd Edition of API RP 16ST is currently under development and is expected to adopt the TGR-3 bolting recommendations and text to meet 20E or 20F.</p> <p>16B - The 1st Edition of API Spec 16B is currently under development and is expected to adopt the TGR-3 bolting recommendations and text to meet 20E or 20F.</p> <p>16D - Will discuss this in the 4th Edition or via addendum if deemed necessary.</p> <p>16F - Completed</p>

Progress on Research, Materials/Standards and QA/QC

Topic	Discussion
<p style="text-align: center;">TGR-5/TGR-12 - SC16</p> <p style="text-align: center;">TG recommends that the product specifications require equipment manufacturers to specify acceptable thread compounds for bolting applications based on material, plating and service.-TG recommends adding requirements to API product specifications to restrict combining these elements in thread compounds.</p>	<p>16C – Is expected to be addressed in the 4th edition (next revision).</p> <p>16A - Completed</p> <p>16ST - The 2nd Edition of API RP 16ST is currently under development and is expected to reference the recommendations to be contained in operating manuals of Spec 16B equipment, including assembly and disassembly information, as well as flange make-up procedure (requirements for lubricant, torque, tightening pattern, percentage increments for torque, etc.)</p> <p>16B - The 1st Edition of API Spec 16B is currently under development and is expected to contain the following requirement for all operating manuals of 16B equipment: assembly and disassembly information that includes flange make-up procedure that includes requirements for lubricant, torque, tightening pattern, percentage increments for torque, etc.</p> <p>16D - Will discuss this in the 4th Edition or via addendum if deemed necessary.</p>
<p style="text-align: center;">TGR-6 - SC16</p> <p style="text-align: center;">Torqueing requirements should be reviewed to determine if standardization among product specifications is needed.</p>	<p>16C - Will be addressed in the 4th edition (next revision).</p> <p>16A - Completed</p> <p>16ST - The 2nd Edition of API RP 16ST is currently under development and is expected to reference the recommendations to be contained in operating manuals of Spec 16B equipment, including assembly and disassembly information, as well as flange make-up procedure (requirements for lubricant, torque, tightening pattern, percentage increments for torque, etc.)</p> <p>16B - The 1st Edition of API Spec 16B is currently under development and is expected to contain the following requirement for all operating manuals of 16B equipment: assembly and disassembly information that includes flange make-up procedure that includes requirements for lubricant, torque, tightening pattern, percentage increments for torque, etc.</p> <p>16D - Will discuss this in the 4th Edition or via addendum if deemed necessary.</p>

Progress on Research, Materials/Standards and QA/QC

		Topic	Discussion
		<p align="center">TGR-13 - SC16 Guidance should be issued by API on when and how to perform fatigue sensitivity analysis on bolting.</p>	<p>16A - API 16A 4th edition does not currently contain requirements for fatigue analysis. The HPHT sub-group may consider this requirement.</p> <p>16ST - The 2nd Edition of API RP 16ST is currently evaluating the specific locations within the assembly of well control components where fatigue analysis of bolting is needed, especially in assembly of coiled tubing and snubbing well control components.</p> <p>16B - The 1st Edition of API Spec 16B is currently evaluating the need for fatigue analysis of bolting, especially in assembly of coiled tubing and snubbing well control components.</p> <p>16D – Completed - Task group has not noted any areas where fatigue sensitivity analysis is deemed necessary.</p> <p>16F - API 16F does not currently contain requirements for fatigue analysis.</p>
		<p align="center">TGR-14 - SC16 Involved API SC's should address guidance issued in the product specs to require use of BSL-3 in fatigue sensitive applications.</p>	<p>16C - Completed</p> <p>16A - Completed</p> <p>16ST - BSL-3 is expected to be required in the 1st Edition of API Spec 16B for all closure bolting and pressure retaining bolting intended for offshore applications.</p> <p>16B - BSL-3 is expected to be required in the 1st Edition of API Spec 16B for all closure bolting and pressure retaining bolting intended for offshore applications.</p> <p>16D – Completed - Task group has not noted areas of fatigue sensitive applications to date.</p> <p>16F - Completed</p>

Progress on Research, Materials/Standards and QA/QC

		Topic	Discussion
		<p align="center">TGR-15 - SC16 TG recommends revision to API S53 to define a standard method for calculating watch circle.</p>	<p>Completed - S53 Will not incorporate this recommendation as it is outside the scope of S53.</p>
		<p align="center">TGR-16 - SC16 TG recommends API issue a document to provide guidance on derating of bolting. There are several specifications on material derating due to elevated temperature.</p>	<p>16A - Currently, this is only addressed in: API TR 6AF1 Technical Report on Temperature Derating on API Flanges Under Combination of Loading. Note: 16A, 3rd edition only has temperature ratings up to 250F. The referenced 6AF1 provides guidance for derating based on temperature beginning at 350F. Temperature derating is primarily a concern in HPHT applications. This is expected to be addressed in the new 16A HPHT annex.</p> <p>16ST - The 2nd Edition of API RP 16ST is currently evaluating the need for derating of bolting due to bending stresses and temperature, especially in assembly of coiled tubing and snubbing well control components.</p> <p>16B - The 1st Edition of API Spec 16B is currently evaluating the need for derating of bolting due to bending stresses and temperature, especially in assembly of coiled tubing and snubbing well control components.</p> <p>16D – Completed – Task group has not identified any areas of our specification that would be effected by elevated temperatures.</p> <p>16F - HPHT is expected to be addressed in the next edition.</p>

Progress on Research, Materials/Standards and QA/QC

Topic	Discussion
<p style="text-align: center;">TGR-18 - SC16</p> <p>Product subcommittees should review and consider incorporating 20E and 20F requirements (resolve existing conflicting properties specified in product specifications such as hardness).</p>	<p>16C - Completed</p> <p>16A - Completed</p> <p>16ST - The 2nd Edition of API RP 16ST is expected to incorporate 20E and 20F requirements.</p> <p>16B - The 1st Edition of API Spec 16B is expected to incorporate 20E and 20F requirements.</p> <p>16D - Completed - Decided not to require them for the 3rd edition. Manufacturers will be required to provide documented bolting specifications where applicable.</p> <p>16F - Completed</p>
<p style="text-align: center;">TGR-3 - SC6</p> <p>TG recommends prohibiting Zinc electroplating for Subsea/Marine application. TG further recommends that an investigation be conducted under the direction of SC21 to determine a better short term (storage) corrosion protection system that would not create hydrogen in service. The results of this study would then need to be adopted into product standards.</p>	<p>API 6A 21st to consider results of investigation. Note identifies risk of hydrogen charging during plating.</p> <p>API 6DSS 3rd - Completed</p>
<p style="text-align: center;">TGR-5/TGR-12 - SC6</p> <p>-TG recommends that the product specifications require equipment manufacturers to specify acceptable thread compounds for bolting applications based on material, plating and service.</p> <p>-TG recommends adding requirements to API product specifications to restrict combining these elements in thread compounds.</p>	<p>6A 21st edition in development, is expected to address thread compounds in Annex E.</p> <p>6DSS 3rd – Completed.</p>

Progress on Research, Materials/Standards and QA/QC

Topic	Discussion
<p>TGR-6 - SC6 Torqueing requirements should be reviewed to determine if standardization among product specifications is needed.</p>	<p>6A 21st edition in development, is expected to address torqueing practice in Annex E.</p>
<p>TGR-7/TGR-10 - SC6 TG recommends modification of 6A to require impact testing at or below design temperature w/ acceptance criteria for larger cross section bolting (over 2.5").</p>	<p>6A 21st edition is expected to address impact testing. 6DSS 3rd – Completed.</p>
<p>TGR-13 - SC6 Guidance should be issued by API on when and how to perform fatigue sensitivity analysis on bolting.</p>	<p>See TGR-14</p>
<p>TGR-14 - SC6 Involved API SC's should address guidance issued in the product specs to require use of BSL-3 in fatigue sensitive applications.</p>	<p>6A 21st – Completed. Fatigue loading is outside the document scope. Annex B guides purchaser to define fatigue application of a product.</p>
<p>TGR-16 - SC6 TG recommends API issue a document to provide guidance on derating of bolting. There are several specifications on material derating due to elevated temperature.</p>	<p>6A 21st edition in development, is expected to address de-rating due to temperature. 6DSS 3rd – Not applicable to this specification.</p>

Progress on Research, Materials/Standards and QA/QC

		Topic	Discussion
		<p style="text-align: center;">TGR-18 - SC6</p> <p>Product subcommittees should review and consider incorporating 20E and 20F requirements (resolve existing conflicting properties specified in product specifications such as hardness).</p>	<p>6A 21st Same as TGR-14</p> <p>6D 25th Plans are to make 20E BSL-1 mandatory for class rating 900 and higher on the next revision in late 2019.</p> <p>6DSS 3rd – Completed.</p>
4	QAQC	API Q1 9th Edition, Addendum 2	New addendum sent to ballot (#4214) and closed 10/11/2017. Expected to be published 2Q2018.

Topic	Discussion	OEM 1	OEM 2	OEM 3	OEM 1 Comments	OEM 2 Comments	OEM 3 Comments	
2017 Deliverables								
1	Bulletin Identifying critical BOP bolting > 35 HRC	Attach any EB/PNI identifying critical bolting > 35 HRC	Completed - February 2016	Completed - February 24, 2016	Completed - October 2016	Product Notification & Improvement 16-008 issued 9/2016 Product Notification & Improvement 16-009 issued 9/2016 Product Notification & Improvement 16-010 issued 10/2016	Product Information Bulletin D4516545916 Released February 24, 2016	PA 40832 was generated in response to BSEE Safety Alert 318. Company does not provide bolts for pressure containing/pressure controlling with hardness greater than 35 HRC. See attachment. Revision 2 of PA 40832 was released in 12/2016 to communicate that Engineering Bulletin 962D (Torque guidance for critical bolting) was released and Company uses FPR to investigate field issues and uses Product Advisory or Product Safety Alerts to communicate issues to Company equipment owners.
2	Part Numbers for API 20 E/F replacement Bolting for critical BOP bolting > 35 HRC	Attach any EB/PNI identifying part numbers for critical bolting > 35 HRC	Completed - NA	Completed - 2016	Completed - October 2016	Product Notification & Improvement 16-008 issued 9/2016 Product Notification & Improvement 16-009 issued 9/2016 Product Notification & Improvement 16-010 issued 10/2016	All replacement bolting for critical BOP bolting meet API 20E BSL-3	Company has generated critical bolting part numbers for compliance to API 20E, BSL-3. These are available to our customers and more are being generated as needed. A few part numbers have been set up for 20F at this moment as CRA bolting is not normally provided in BOP equipment for critical bolting. See attachment with sample bolting part numbers.
3	Bulletin updating Torque Application	Attach any EB/PNI identifying updated Torque guidance for critical bolting	Completed - March 2016	Completed - February 24, 2016	Completed	Torque procedures issued. Operating procedures updated.	D4516545916 Released February 24, 2016. Torque requirements outlined in	EB-962D, released on March 2016. See attachment.
4	Internal process for enhanced failure reporting of critical bolting	Attach any example of updated failure reporting process. Attach any example of enhanced failure reporting related to critical BOP bolting	Completed - 1990's	Completed	Completed	Failure reporting and tracking through our system. This provides feedback to customers through responses, and drive analysis required. External communication through Engineering Bulletins, Product Notifications, Product Improvement Letters, etc.	Customer has already received communications on this issue. Attached is an excerpt from PIB 16545916. Customers should also refer to our Company Product Information Bulletins and Safety Alerts for any additional information related to this issue and information regarding safe operation, maintenance, and inspection criteria by signing in to your MyCompany account and then searching with the Product Bulletin Search available below the heading 'Application Groups'. For information on registering, please visit company website. Please contact your local Service Center if you have any questions regarding this bulletin.	Company has internal procedure called Field Performance Report (FPR) for capturing field performance failures of Company equipment. This FPR is the mechanism used to initiate an investigation and determine the Root Cause of the failure. In addition, Company has a system to communicate Product Advisories (PA) and Safety Alerts (SA) as well as Engineering Bulletins (EB) to our customers if deemed necessary resulting from an FPR investigation or internal reviews. The guidelines for these procedures are outlined in Company Engineering Procedure EP-307 (FPRs), CEP-030 (SAs/PAs) and EP-204 (EBs). These procedures are considered "Confidential" and cannot be distributed outside of Company.
5	Updated QAQC standards for bolt manufacturing	Attach any example of updated QA process	Completed - 1990's	Completed	Completed - October 2016	QMS procedure improvements regarding supplier qualification. 20E vendor qualification and audit per family of fasteners, subtler supplier audit, review of mill audits. The supplier manufacturing process is locked and audited annually. Improved process incorporates supplier quality, engineering, quality teams and product documentation compliance to original qualification. Increased overall scrutiny on critical bolting incorporates engineering lockdown of parts and 3rd party onsite reviews.	Bolts specified to API 20E BSL-3. All our BSL bolting is only manufactured by vendors our QA department has physically audited and approved for critical fasteners. Per API 20E the manufacture of the finished part has to audit the mill producing the material for BSL. The documentation required of these vendors are as follows: Full Dimensional Inspection Report, Manufactures Material Test Report (Chemical and Mechanical), MPI Test Report, Ultrasonic Test Report, 100% Hardness Testing (If Serialized), Steel Certificate of Test from the Mill, Mechanical Testing by independent Lab to ensure the product from the mill meets the BSL Requirements (Only if manufacture did not buy direct from mill), Heat Treat Certification, Micro-Structure Examination with Photo, Macro-Structure Examination with Photo, and Plating Certification.	Quality Plans (QP-000112-09) have been created for Pressure Containing and Primary Load Bearing Oil and Gas Equipment Used in Subsea Applications: API 6a, API 17D and API 20E. Bolting Specification BSL-3. QP-000112-09 is considered "Confidential" and cannot be distributed outside of Company.
2018+ Deliverables								
A1	Part numbers for API 20 E/F replacement bolting for all critical BOP bolting	Attach any EB/PNI identifying part numbers for critical bolting	Completed - December 2016	Completed	Completed - October 2016	Product Notification & Improvement 16-008 issued 9/2016 Product Notification & Improvement 16-009 issued 9/2016 Product Notification & Improvement 16-010 issued 10/2016	16543557-001, 16569565-001, 16569606-001, 165004, 16587680-001, 16587681-001, 16587682-001. All part numbers referenced in PIB D4516545196	Company has generated critical bolting part numbers for compliance to API 20E, BSL-3. These are available to our customers and more are being generated as needed. A few part numbers have been set up for 20F at this moment as CRA bolting is not normally provided in BOP equipment for critical bolting. See attachment with sample bolting part numbers. PA 40832 Rev 02 addresses this item.
A2	Replacement bolting coating specified	Attach any EB/PNI identifying replacement coating	Completed - December 2017	Completed	Completed - October 2016	Product Notification & Improvement 16-010 issued 10/2016	Zinc-Nickel Plate - Plate to ASTM F1941	Company is engaging different vendors to find alternatives to electrodeposited zinc plating. Update 04/19/2017: Action still in progress. Estimated completion date: End of May 2017. Update 06/30/2017: Action still in progress. Estimated completion date: end of August 2017. Update 10/15/2017: We have identified and qualified replacement coating. We are currently working to qualify vendors. Update 01/02/2018: we have qualified the vendors with replacement coating.

100% Complete

**Summary of Progress on Equipment Owner Operations
(Q1, 2018)**

Total Number of Active BOPs = 34			Not Started		In-Progress		Completed	
			Number	Percent	Number	Percent	Number	Percent
Item	Topic	Discussion						
2017 Deliverables								
1	Replacement 20 E/F bolts for all > 35 HRC critical bolting ordered	List by rig the % of API 20 E replacement bolts ordered	0	0%	0	0%	34	100%
2	Replacement 20 E/F bolts for all > 35 HRC critical bolting installed	List by rig the % of API 20 E bolts installed on the BOP	0	0%	12	35%	22	65%
3	Rig Procedure for torquing of critical bolting	Can include example rig procedure	0	0%	2	6%	32	94%
4	Internal process for enhanced failure reporting of critical bolts (IOGP Failure reporting procedure)	Can include example procedure for compliance with IOGP Failure reporting	0	0%	0	0%	34	100%
5	MTR review for installed critical bolting:	Can include letter from OEM, example of MTR audit	2	6%	4	12%	28	82%
	- OEM SOF critical bolting per relevant specification		2	6%	2	6%	30	88%
	- MTRs per relevant specification		0	0%	4	12%	30	88%
	- Bolting audit to verify MTR information		0	0%	6	18%	28	82%
6	Preventative maintenance (PM) for BOP bolting API Std 53	Can include PM for BOP bolting maintenance. Example of NDE performed on BOP bolts	0	0%	2	6%	32	94%
2018+ Deliverables								
A1	Critical bolting API 20 E/F replacement bolts ordered	List by rig % of bolts ordered	10	29%	10	29%	14	41%
A2	Critical bolting API 20 E/F replacement bolts installed	List by rig % of bolts installed/replaced	17	50%	17	50%	0	0%

Progress on Equipment Owner Operations

Item	Topic	Discussion	Rig 1 BOP 1	Rig 2 BOP 1	Rig 3 BOP 1	Rig 4 BOP 1
			Status	Status	Status	Status
2017 Deliverables						
1	Replacement 20 E/F bolts for all > 35 HRC critical bolting ordered	List by rig the % of API 20 E replacement bolts ordered	100%	100%	100%	NA
2	Replacement 20 E/F bolts for all > 35 HRC critical bolting installed	List by rig the % of API 20 E bolts installed on the BOP	100%	In-progress	100%	NA
3	Rig Procedure for torquing of critical bolting	Can include example rig procedure	In-progress	Completed - July 15, 2014	In-progress	NA
4	Internal process for enhanced failure reporting of critical bolts (IOGP Failure reporting procedure)	Can include example procedure for compliance with IOGP Failure reporting	2015 Training in Rig maint. Sys. 100% participation in GOM	Completed - July 20, 2016	2015 Training in Rig maint. Sys. 100% participation in GOM	NA
5	MTR review for installed critical bolting: - OEM SOF critical bolting per relevant specification - MTRs per relevant specification - Bolting audit to verify MTR information	Can include letter from OEM, example of MTR audit	Completed	Completed - July 15, 2014	Completed	NA
			PA 40832 from OEM	Completed - July 15, 2014	PA 40832 from OEM	NA
			Completed - October 2016	Completed - July 15, 2014	Completed - October 2016	NA
			Completed - October 2016	Completed - July 15, 2014	Completed - October 2016	NA
6	Preventative maintenance (PM) for BOP bolting API Std 53	Can include PM for BOP bolting maintenance. Example of NDE performed on BOP bolts	Completed - 2015	Completed - March 15, 2016	Completed - 2015	NA
2018+ Deliverables						
A1	Critical bolting API 20 E/F replacement bolts ordered	List by rig % of bolts ordered	Being Quoted	0%	Being Quoted	NA
A2	Critical bolting API 20 E/F replacement bolts installed	List by rig % of bolts installed/replaced	0%	0%	0%	NA

Progress on Equipment Owner Operations

Item	Topic	Discussion	Rig 4 BOP 2	Rig 5 BOP 1	Rig 5 BOP 2	Rig 6 BOP 1
			Status	Status	Status	Status
2017 Deliverables						
1	Replacement 20 E/F bolts for all > 35 HRC critical bolting ordered	List by rig the % of API 20 E replacement bolts ordered	NA	100%	100%	NA
2	Replacement 20 E/F bolts for all > 35 HRC critical bolting installed	List by rig the % of API 20 E bolts installed on the BOP	NA	In-progress	In-progress	NA
3	Rig Procedure for torquing of critical bolting	Can include example rig procedure	NA	Completed - March 9, 2015	Completed - March 9, 2015	NA
4	Internal process for enhanced failure reporting of critical bolts (IOGP Failure reporting procedure)	Can include example procedure for compliance with IOGP Failure reporting	NA	Completed - July 20, 2016	Completed - July 20, 2016	NA
5	MTR review for installed critical bolting: - OEM SOF critical bolting per relevant specification - MTRs per relevant specification - Bolting audit to verify MTR information	Can include letter from OEM, example of MTR audit	NA	Completed-Mar 2018	In-progress	NA
			NA	Completed-Mar 2018	In-progress	NA
			NA	Completed-Mar 2018	In-progress	NA
			NA	Completed-Mar 2018	In-progress	NA
6	Preventative maintenance (PM) for BOP bolting API Std 53	Can include PM for BOP bolting maintenance. Example of NDE performed on BOP bolts	NA	Completed - March 15, 2016	Completed - March 15, 2016	NA
2018+ Deliverables						
A1	Critical bolting API 20 E/F replacement bolts ordered	List by rig % of bolts ordered	NA	0%	0%	NA
A2	Critical bolting API 20 E/F replacement bolts installed	List by rig % of bolts installed/replaced	NA	0%	0%	NA

Progress on Equipment Owner Operations

Item	Topic	Discussion	Rig 7 BOP 1	Rig 7 BOP 2	Rig 8 BOP 1	Rig 9 BOP 1
			Status	Status	Status	Status
2017 Deliverables						
1	Replacement 20 E/F bolts for all > 35 HRC critical bolting ordered	List by rig the % of API 20 E replacement bolts ordered	Completed - February 16, 2017	Completed - February 16, 2017	NA	100%
2	Replacement 20 E/F bolts for all > 35 HRC critical bolting installed	List by rig the % of API 20 E bolts installed on the BOP	Completed - July 1, 2017	60%	NA	100%
3	Rig Procedure for torquing of critical bolting	Can include example rig procedure	Completed - November 1, 2016	Completed - November 1, 2016	NA	Completed - Oct 4, 2016
4	Internal process for enhanced failure reporting of critical bolts (IOGP Failure reporting procedure)	Can include example procedure for compliance with IOGP Failure reporting	Completed - November 1, 2016	Completed - November 1, 2016	NA	IOGP Failure reporting
5	MTR review for installed critical bolting: - OEM SOF critical bolting per relevant specification - MTRs per relevant specification - Bolting audit to verify MTR information	Can include letter from OEM, example of MTR audit	Completed - November 1, 2016	Completed - November 1, 2016	NA	Completed - January 2017
			Completed - November 1, 2016	Completed - November 1, 2016	NA	Completed
			Completed - November 1, 2016	Completed - November 1, 2016	NA	Completed
			Completed - November 1, 2016	Completed - November 1, 2016	NA	Completed
6	Preventative maintenance (PM) for BOP bolting API Std 53	Can include PM for BOP bolting maintenance. Example of NDE performed on BOP bolts	Completed - December 1, 2017	Completed - December 1, 2017	NA	Completed - April 2017
2018+ Deliverables						
A1	Critical bolting API 20 E/F replacement bolts ordered	List by rig % of bolts ordered	11%	11%	NA	100%
A2	Critical bolting API 20 E/F replacement bolts installed	List by rig % of bolts installed/replaced	0%	50%	NA	80%

Progress on Equipment Owner Operations

Item	Topic	Discussion	Rig 9 BOP 2	Rig 10 BOP 1	Rig 10 BOP 2	Rig 11 BOP 1
			Status	Status	Status	Status
2017 Deliverables						
1	Replacement 20 E/F bolts for all > 35 HRC critical bolting ordered	List by rig the % of API 20 E replacement bolts ordered	100%	100%	100%	NA
2	Replacement 20 E/F bolts for all > 35 HRC critical bolting installed	List by rig the % of API 20 E bolts installed on the BOP	100%	In-progress	In-progress	NA
3	Rig Procedure for torquing of critical bolting	Can include example rig procedure	Completed - Oct 5, 2016	Completed - March 9, 2015	Completed - March 9, 2015	NA
4	Internal process for enhanced failure reporting of critical bolts (IOGP Failure reporting procedure)	Can include example procedure for compliance with IOGP Failure reporting	IOGP Failure reporting	Completed - July 20, 2016	Completed - July 20, 2016	NA
5	MTR review for installed critical bolting: - OEM SOF critical bolting per relevant specification - MTRs per relevant specification - Bolting audit to verify MTR information	Can include letter from OEM, example of MTR audit	Completed - January 2017	Completed-Mar 2018	In-progress	NA
			Completed	Completed-Mar 2018	In-progress	NA
			Completed	Completed-Mar 2018	In-progress	NA
			Completed	Completed-Mar 2018	75%	NA
6	Preventative maintenance (PM) for BOP bolting API Std 53	Can include PM for BOP bolting maintenance. Example of NDE performed on BOP bolts	Completed - 2017	Completed - March 15, 2016	Completed - March 15, 2016	NA
2018+ Deliverables						
A1	Critical bolting API 20 E/F replacement bolts ordered	List by rig % of bolts ordered	100%	0%	0%	NA
A2	Critical bolting API 20 E/F replacement bolts installed	List by rig % of bolts installed/replaced	20%	0%	0%	NA

Progress on Equipment Owner Operations

Item	Topic	Discussion	Rig 12 BOP 1	Rig 12 BOP 2	Rig 13 BOP 1	Rig 14 BOP 1
			Status	Status	Status	Status
2017 Deliverables						
1	Replacement 20 E/F bolts for all > 35 HRC critical bolting ordered	List by rig the % of API 20 E replacement bolts ordered	100%	100%	100%	100%
2	Replacement 20 E/F bolts for all > 35 HRC critical bolting installed	List by rig the % of API 20 E bolts installed on the BOP	100%	100%	100%	100%
3	Rig Procedure for torquing of critical bolting	Can include example rig procedure	Completed	Completed	Completed	Completed
4	Internal process for enhanced failure reporting of critical bolts (IOGP Failure reporting procedure)	Can include example procedure for compliance with IOGP Failure reporting	IOGP BOP Reliability Database	IOGP BOP Reliability Database	Completed - May 8, 2015	IOGP BOP Reliability Database
5	MTR review for installed critical bolting: - OEM SOF critical bolting per relevant specification - MTRs per relevant specification - Bolting audit to verify MTR information	Can include letter from OEM, example of MTR audit	Completed - December 2016	Completed - December 2016	In-progress	Completed - December 2016
			Completed	Completed	Completed - February 24, 2016	Completed
			Completed	Completed	Completed - May 4, 2016	Completed
			Completed	Completed	In-progress	Completed
6	Preventative maintenance (PM) for BOP bolting API Std 53	Can include PM for BOP bolting maintenance. Example of NDE performed on BOP bolts	Completed	Completed	Completed - December 9, 2015	Completed
2018+ Deliverables						
A1	Critical bolting API 20 E/F replacement bolts ordered	List by rig % of bolts ordered	80%	80%	0%	100%
A2	Critical bolting API 20 E/F replacement bolts installed	List by rig % of bolts installed/replaced	80%	80%	0%	90%

Progress on Equipment Owner Operations

Item	Topic	Discussion	Rig 14 BOP 2	Rig 15 BOP 1	Rig 15 BOP 2	Rig 16 BOP 1
			Status	Status	Status	Status
2017 Deliverables						
1	Replacement 20 E/F bolts for all > 35 HRC critical bolting ordered	List by rig the % of API 20 E replacement bolts ordered	100%	NA	NA	100%
2	Replacement 20 E/F bolts for all > 35 HRC critical bolting installed	List by rig the % of API 20 E bolts installed on the BOP	100%	NA	NA	100%
3	Rig Procedure for torquing of critical bolting	Can include example rig procedure	Completed	NA	NA	Completed
4	Internal process for enhanced failure reporting of critical bolts (IOGP Failure reporting procedure)	Can include example procedure for compliance with IOGP Failure reporting	IOGP BOP Reliability Database	NA	NA	IOGP BOP Reliability Database
5	MTR review for installed critical bolting: - OEM SOF critical bolting per relevant specification - MTRs per relevant specification - Bolting audit to verify MTR information	Can include letter from OEM, example of MTR audit	Completed - December 2016	NA	NA	Completed - December 2016
			Completed	NA	NA	Completed
			Completed	NA	NA	Completed
			Completed	NA	NA	Completed
6	Preventative maintenance (PM) for BOP bolting API Std 53	Can include PM for BOP bolting maintenance. Example of NDE performed on BOP bolts	Completed	NA	NA	Completed
2018+ Deliverables						
A1	Critical bolting API 20 E/F replacement bolts ordered	List by rig % of bolts ordered	100%	NA	NA	100%
A2	Critical bolting API 20 E/F replacement bolts installed	List by rig % of bolts installed/replaced	90%	NA	NA	37%

Progress on Equipment Owner Operations

Item	Topic	Discussion	Rig 17 BOP 1	Rig 17 BOP 2	Rig 18 BOP 1	Rig 18 BOP 2
			Status	Status	Status	Status
2017 Deliverables						
1	Replacement 20 E/F bolts for all > 35 HRC critical bolting ordered	List by rig the % of API 20 E replacement bolts ordered	100%	100%	Completed - February 16, 2017	Completed - February 16, 2017
2	Replacement 20 E/F bolts for all > 35 HRC critical bolting installed	List by rig the % of API 20 E bolts installed on the BOP	5%	In-progress	30%	Completed - May 1, 2017
3	Rig Procedure for torquing of critical bolting	Can include example rig procedure	Completed - March 9, 2015	Completed - March 9, 2015	Completed - November 1, 2016	Completed - November 1, 2016
4	Internal process for enhanced failure reporting of critical bolts (IOGP Failure reporting procedure)	Can include example procedure for compliance with IOGP Failure reporting	Completed - July 20, 2016	Completed - July 20, 2016	Completed - November 1, 2016	Completed - November 1, 2016
5	MTR review for installed critical bolting: - OEM SOF critical bolting per relevant specification - MTRs per relevant specification - Bolting audit to verify MTR information	Can include letter from OEM, example of MTR audit	Completed Dec 19, 2017	Completed Dec 19, 2017	Completed - November 1, 2016	Completed - November 1, 2016
			Completed Dec 19, 2017	Completed Sept 22, 2017	Completed - November 1, 2016	Completed - November 1, 2016
			Completed Dec 19, 2017	Completed - July 1, 2017	Completed - November 1, 2016	Completed - November 1, 2016
			Completed Dec 19, 2017	Completed - June 1, 2017	Completed - November 1, 2016	Completed - November 1, 2016
6	Preventative maintenance (PM) for BOP bolting API Std 53	Can include PM for BOP bolting maintenance. Example of NDE performed on BOP bolts	Completed - March 15, 2016	Completed - March 15, 2016	Completed - December 1, 2017	Completed - December 1, 2017
2018+ Deliverables						
A1	Critical bolting API 20 E/F replacement bolts ordered	List by rig % of bolts ordered	0%	20%	Completed - February 16, 2017	Completed - February 16, 2017
A2	Critical bolting API 20 E/F replacement bolts installed	List by rig % of bolts installed/replaced	0%	0%	50%	10%

Progress on Equipment Owner Operations

Item	Topic	Discussion	Rig 19 BOP 1	Rig 20 BOP 1	Rig 21 BOP 1	Rig 21 BOP 2
			Status	Status	Status	Status
2017 Deliverables						
1	Replacement 20 E/F bolts for all > 35 HRC critical bolting ordered	List by rig the % of API 20 E replacement bolts ordered	100%	100%	Completed - February 16, 2017	Completed - February 16, 2017
2	Replacement 20 E/F bolts for all > 35 HRC critical bolting installed	List by rig the % of API 20 E bolts installed on the BOP	100%	100%	Complete - Feb, 15, 2018	Complete - Mar, 15, 2018
3	Rig Procedure for torquing of critical bolting	Can include example rig procedure	Completed	Completed March 29, 2016	Completed - November 1, 2016	Completed - November 1, 2016
4	Internal process for enhanced failure reporting of critical bolts (IOGP Failure reporting procedure)	Can include example procedure for compliance with IOGP Failure reporting	IOGP BOP Reliability Database	Completed July 28, 2016	Completed - November 1, 2016	Completed - November 1, 2016
5	MTR review for installed critical bolting:	Can include letter from OEM, example of MTR audit	Completed - December 2016	Completed April 1, 2016	Completed - November 1, 2016	Completed - November 1, 2016
	- OEM SOF critical bolting per relevant specification		Completed	Completed February 18, 2016	Completed - November 1, 2016	Completed - November 1, 2016
	- MTRs per relevant specification		Completed	Completed April 1, 2016	Completed - November 1, 2016	Completed - November 1, 2016
	- Bolting audit to verify MTR information		Completed	Completed April 1, 2016	Completed - November 1, 2016	Completed - November 1, 2016
6	Preventative maintenance (PM) for BOP bolting API Std 53	Can include PM for BOP bolting maintenance. Example of NDE performed on BOP bolts	Completed	Completed April 1, 2016	Completed - December 1, 2017	Completed - December 1, 2017
2018+ Deliverables						
A1	Critical bolting API 20 E/F replacement bolts ordered	List by rig % of bolts ordered	0%	50%	Completed - March 1, 2018	Completed - March 1, 2018
A2	Critical bolting API 20 E/F replacement bolts installed	List by rig % of bolts installed/replaced	0%	30%	15%	15%

Progress on Equipment Owner Operations

Item	Topic	Discussion	Rig 22 BOP 1	Rig 23 BOP 1	Rig 23 BOP 2	Rig 24 BOP 1
			Status	Status	Status	Status
2017 Deliverables						
1	Replacement 20 E/F bolts for all > 35 HRC critical bolting ordered	List by rig the % of API 20 E replacement bolts ordered	100%	100%	100%	100%
2	Replacement 20 E/F bolts for all > 35 HRC critical bolting installed	List by rig the % of API 20 E bolts installed on the BOP	100%	100%	100%	In-progress
3	Rig Procedure for torquing of critical bolting	Can include example rig procedure	Completed	Completed	Completed	Completed
4	Internal process for enhanced failure reporting of critical bolts (IOGP Failure reporting procedure)	Can include example procedure for compliance with IOGP Failure reporting	IOGP BOP Reliability Database	IOGP BOP Reliability Database	IOGP BOP Reliability Database	Completed
5	MTR review for installed critical bolting:	Can include letter from OEM, example of MTR audit	Completed - December 2016	Completed - December 2016	Completed - December 2016	Not started
	- OEM SOF critical bolting per relevant specification		Completed	Completed	Completed	Not started
	- MTRs per relevant specification		Completed	Completed	Completed	In-progress
	- Bolting audit to verify MTR information		Completed	Completed	Completed	In-progress
6	Preventative maintenance (PM) for BOP bolting API Std 53	Can include PM for BOP bolting maintenance. Example of NDE performed on BOP bolts	Completed	Completed	Completed	In-progress
2018+ Deliverables						
A1	Critical bolting API 20 E/F replacement bolts ordered	List by rig % of bolts ordered	100%	100%	100%	100%
A2	Critical bolting API 20 E/F replacement bolts installed	List by rig % of bolts installed/replaced	50%	80%	80%	0%

Progress on Equipment Owner Operations

Item	Topic	Discussion	Rig 24 BOP 2	Rig 25 BOP 1	Rig 26 BOP 1	Rig 26 BOP 2
			Status	Status	Status	Status
2017 Deliverables						
1	Replacement 20 E/F bolts for all > 35 HRC critical bolting ordered	List by rig the % of API 20 E replacement bolts ordered	100%	NA	Completed - February 16, 2017	Completed - February 16, 2017
2	Replacement 20 E/F bolts for all > 35 HRC critical bolting installed	List by rig the % of API 20 E bolts installed on the BOP	In-progress	NA	Completed - December 5, 2017	Completed - May 1, 2017
3	Rig Procedure for torquing of critical bolting	Can include example rig procedure	Completed	NA	Completed - November 1, 2016	Completed - November 1, 2016
4	Internal process for enhanced failure reporting of critical bolts (IOGP Failure reporting procedure)	Can include example procedure for compliance with IOGP Failure reporting	Completed	NA	Completed - November 1, 2016	Completed - November 1, 2016
5	MTR review for installed critical bolting:	Can include letter from OEM, example of MTR audit	Not Started	NA	Completed - November 1, 2016	Completed - November 1, 2016
	- OEM SOF critical bolting per relevant specification		Not Started	NA	Completed - November 1, 2016	Completed - November 1, 2016
	- MTRs per relevant specification		In-progress	NA	Completed - November 1, 2016	Completed - November 1, 2016
	- Bolting audit to verify MTR information		In-progress	NA	Completed - November 1, 2016	Completed - November 1, 2016
6	Preventative maintenance (PM) for BOP bolting API Std 53	Can include PM for BOP bolting maintenance. Example of NDE performed on BOP bolts	In-progress	NA	Completed - December 1, 2017	Completed - December 1, 2017
2018+ Deliverables						
A1	Critical bolting API 20 E/F replacement bolts ordered	List by rig % of bolts ordered	100%	NA	11%	11%
A2	Critical bolting API 20 E/F replacement bolts installed	List by rig % of bolts installed/replaced	0%	NA	0%	15%

Progress on Equipment Owner Operations

Item	Topic	Discussion	Rig 27 BOP 1	Rig 28 BOP 1
			Comments	Status
2017 Deliverables				
1	Replacement 20 E/F bolts for all > 35 HRC critical bolting ordered	List by rig the % of API 20 E replacement bolts ordered	100%	100%
2	Replacement 20 E/F bolts for all > 35 HRC critical bolting installed	List by rig the % of API 20 E bolts installed on the BOP	In-progress	100%
3	Rig Procedure for torquing of critical bolting	Can include example rig procedure	Completed - July 15, 2014	Completed
4	Internal process for enhanced failure reporting of critical bolts (IOGP Failure reporting procedure)	Can include example procedure for compliance with IOGP Failure reporting	Completed - July 20, 2016	Completed - May 8, 2015
5	MTR review for installed critical bolting:	Can include letter from OEM, example of MTR audit	Completed - September, 2016	In-progress
	- OEM SOF critical bolting per relevant specification		Completed - September 15, 2016	Completed - February 24, 2016
	- MTRs per relevant specification		Completed - July 12, 2017	Completed - February 24, 2016
	- Bolting audit to verify MTR information		Completed - April 7, 2017	In-progress
6	Preventative maintenance (PM) for BOP bolting API Std 53	Can include PM for BOP bolting maintenance. Example of NDE performed on BOP bolts	Completed - March 15, 2016	Completed - December 9, 2015
2018+ Deliverables				
A1	Critical bolting API 20 E/F replacement bolts ordered	List by rig % of bolts ordered	0%	0%
A2	Critical bolting API 20 E/F replacement bolts installed	List by rig % of bolts installed/replaced	0%	0%