RECOMMENDED PRACTICE

DNV-RP-E101

Recertification of Well Control Equipment for the Norwegian Continental Shelf

JANUARY 2012

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FOREWORD

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CHANGES

General

This document supersedes DNV-RP-E101, October 2008.

It has undergone a process to improve and clarify aspects related to a recertification.

Reference Standards have been implemented as a separate section 2, and are divided into normative and informative standards.

CONTENTS

1. Introduction **5**
2. Normative and Informative References **5**
2.1 Normative references 5
2.2 Informative references 5
3. Definitions and Abbreviations **7**
3.1 Verbal forms 7
3.2 List of abbreviations 7
3.3 Definitions 7
4. Recertification Process **8**
4.1 General description 8
4.2 Acceptance criteria for assemblies and components 8
4.3 Recertification process – used equipment 9
4.4 Recertification process – unused equipment 9
5. Equipment Subject to Recertification **9**
5.1 Equipment description 9
6. Qualification Requirements **10**
6.1 Qualification of alternative contractor/subcontractor 10
6.2 Qualification of Third Party 10
7. Recertification Activities **10**
7.1 Kick off meeting 10
7.2 Quality Plan (QP) and Inspection and Test Plan (ITP) for the recertification process 10
7.3 Documentation review and evaluation of history 11
7.4 Personnel 11
7.5 Dismantling and cleaning of equipment 12
7.6 Identification of components 12
7.7 Inspection and NDT requirements 12
7.8 Repair of components 12
7.9 Replacement of components 13
7.10 Reassembly 13
7.11 Test requirements 13
7.12 Coating 13
7.13 Preservation 13
7.14 Final documentation 13
7.15 Issuance of Third Party recertification compliance certificate 14
8. Insufficient Equipment Documentation **14**
8.1 Establishing acceptable documentation 14
8.2 Material testing laboratory 15
8.3 Remarking 15
Appendix A.Equipment Description **16**
Appendix B.Flow Chart for the Recertification Process **17**
Appendix C.Recertification Compliance Certificate (Example) **19**

1. Introduction

The purpose of this document is to describe DNV's recommendations for a recertification process of well control equipment for the Norwegian Continental Shelf. This recertification process can be applied also for other Shelf states.

It is DNV's recommendation that recertification of Blow Out Preventers and other well pressure control equipment used for drilling, completion, workover and well intervention operations, should be performed at least every five years.

The purpose of a recertification process is to verify and document that the equipment condition and properties are within the specified acceptance criteria as well as the specified recognized codes and standards. The recertification shall ensure that documentation of the condition of the equipment is available.

If repair/modification is performed during a recertification interval, the methodology described in this recommended practice may be used to prepare for a future recertification process. Alternatively, a complete recertification process may be appropriate and included in addition to the repair/modification scope to reschedule the future recertification intervals.

For design and fabrication of new equipment, the methodology and requirements described in this recommended practice may be used to determine guidelines and recommendations regarding documentation and traceability requirements for later recertification processes.

2. Normative and Informative References

The following standards given in Sec.2.1 include provisions and guidelines, which through reference in this text, constitute provisions and guidelines of this recommended practice. Latest issue of the references shall be used unless otherwise agreed. Other recognized standards given in Sec.2.2 may be used provided it can be shown that they meet or exceed the requirements and guidelines of the standards referenced below.

2.1 Normative references

ISO 9606	Approval testing of welders - Fusion welding – Part 1: Steels.
ISO 9712	Non-destructive testing – Qualification and certification of personnel.
ISO 10423	Petroleum and natural gas industries – Drilling and production equipment – Wellhead and Christmas tree equipment.
ISO 13628-7	Design and operation of subsea production systems – Part 7: Completion and workover riser systems.
ISO 15614-1	Specification and qualification of welding procedures for metallic materials – Welding procedure test – Part 1: Arc and gas welding of steels and arc welding of nickel and nickel alloys.
ISO 15614-3	Specification and qualification of welding procedures for metallic materials – Welding procedure test – Part 3: Fusion welding of non-alloyed and low-alloyed cast irons.
ISO 15614-7	Specification and qualification of welding procedures for metallic materials – Welding procedure test – Part 7: Overlay welding.
ISO 17025	General requirements for the competence of testing and calibration laboratories.
EN 473	Non–destructive testing – Qualification and certification of NDT personnel – General principles.
NORSOK D–001	Drilling Facilities.
NORSOK D–002	System requirements for well intervention equipment.
NORSOK D–010	Well integrity in drilling and well operations.
NORSOK M–001	Materials Selection.
NORSOK M-101	Structural steel fabrication.
NORSOK M–501	Surface preparation and protective coating.
NORSOK M-601	Welding and inspection of piping.
NS–EN 287-1	Qualification test of welders – Fusion welding – Part 1 Steels.
NS–EN 13306	Maintenance terminology.
NS 477	Welding – Rules for qualification of welding inspectors.
NS 476	Paints and coatings – Approval and certification of surface treatment inspectors.

For mobile facilities that are registered in a national ship's register DNV-OS-E101, Ch.2 Sec.5 C100 to 500 may be used as an alternative.

2.2 Informative references

ISO 3834-2	Quality requirements for fusion welding of metallic materials – Part 2: Comprehensive quality requirements.
ISO 9001	Quality management systems – Requirements.
ISO 10432	Petroleum and natural gas industries – Downhole equipment – Subsurface safety valve equipment.

ISO 13533	Drilling and production equipment – Drill-through equipment.
ISO 13628–1	Design and operation of subsea production systems – Part 1: General requirements and recommendations.
ISO 13628–4	Design and operation of subsea production systems – Part 4: Subsea wellhead and tree equipment.
ISO 15156–1	Petroleum and natural gas industries – Materials for use in H2S containing environments in oil and gas production – Part 1: General principles for selection of cracking-resistant materials.
API RP 53	Recommended Practices for Blowout Prevention Equipment Systems for Drilling Wells.
API Spec 16C	Choke and Kill System.
API Spec 16D	Specification for Control Systems for Drilling Well Control Equipment and Control Systems for Diverter Equipment.
API Spec 16F	Specification for Marine Drilling Riser Equipment.
API RP 16Q	Design, Selection, Operation and Maintenance of Marine Drilling Riser Systems.
API Spec 16R	Marine Riser Drilling Couplings.
API Spec 17D	Specification for Subsea Wellhead and Christmas Tree Equipment.
API RP 17G	Recommended Practice for Design and Operation of Completion/Workover Riser Systems.
NORSOK U–001	Subsea Production Systems.
DNV-OS-E101	Drilling Plant.

3. Definitions and Abbreviations

3.1 Verbal forms

Shall	Verbal form used to indicate requirements strictly to be followed in order to conform to this RP and from which no deviation is permitted, unless accepted by all involved parties.
Should	Verbal form used to indicate that among several possibilities one is recommended as particularly suitable, without mentioning or excluding others, or that a certain action is preferred but not necessarily required.
May	Verbal form used to indicate a course of action permissible within the limits of this RP.

3.2 List of abbreviations

BOP	Blow Out Preventer
COC	Certificate of Conformance
CRA	Corrosion Resistant Alloy
DNV	Det Norske Veritas
EDP	Emergency Disconnect Package
PT	Penetrant Testing
ET	Eddy Current Testing
ITP	Inspection and Test Plan
LMRP	Lower Marine Riser Package
LRP	Lower Riser Package
LS	Landing String
LV	Lubricator Valve
LWRP	Lower Workover Riser Package
MT	Magnetic Particle Testing
MWP	Maximum Working Pressure
NDT	Non Destructive Testing
OEM	Original Equipment Manufacturer
PMI	Positive Material Identification
PWHT	Post Weld Heat Treatment
QA	Quality Assurance
QC	Quality Control
RCC	Recertification Compliance Certificate
RP	Recommended Practice
QP	Quality Plan
RT	Radiographic Testing
RV	Retainer Valves

SFT	Surface Flow Tree
SSTT	Subsea Test Tree
THRT	Tubing Hanger Running Tool
UT	Ultrasonic Testing
WCP	Well Control Package
WO	Work Over
WOCS	Work Over Control System
WOR	Work Over Riser
WOS	Work Over System
WPQR	Welding Procedure Qualification Record
WPS	Welding Procedure Specification

3.3 Definitions

Well Control Equipment	All equipment used to control well pressure during drilling, well testing, completion, workover and well intervention activities.
Contractor	Firm undertaking the contract and any sub contractors engaged in work covered by this RP.
Owner	Owner company or the engineering agency in charge of equipment. The Owner may act through a consultant, an inspector or other authorized representative.
Third Party	Independent part that can verify compliance to this RP, and if required issue a RCC. Independent part shall be organisationally independent of Owner and Contractor.
Recertification	A complete inspection and overhaul to verify and document that the equipment condition and properties are within the specified acceptance criteria as well as the specified recognized codes and standards.
Repair	Correct or mend an item that is damaged, or does not meet the specified acceptance criteria.
Heat treatment	Controlled heating and cooling of materials for the purpose of changing physical or mechanical properties.
Component	Individual piece used in the assembly.
Critical component	Individual piece used in the system that is critical for the system's safety level, and/or exposed to well pressure or stresses caused by well pressure and/or load bearing functionality.

4. Recertification Process

4.1 General description

It is DNV's recommendation that recertification of Blow Out Preventers and other well pressure control equipment used for drilling, completion, workover and well intervention operations, should be performed at least every five years.

Guidance note:

The start date for the five year interval is the date of the Certificate of Conformance (COC) for new produced equipment or the date of Recertification Compliance Certificate (RCC) for used and recertified equipment.

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The purpose of a recertification process is to verify and document that the equipment condition and properties are within the specified acceptance criteria as well as specified and recognized codes and standards. The basis for the acceptance criteria and governing codes and standards shall be agreed upon in a project kick off meeting.

The extent of inspection/repair shall be based by the following parameters:

Original documentation, including latest revision/version of original design specification.

— repair history
— maintenance history
— operational history
— original procedures
— Owner's procedures
— standards and codes
— changes in the Norwegian petroleum safety authorities regulations or Owner's governing documents.

This document describes the role of a Third Party with the responsibility to carry out independent verification. If equipment has been recertified according to this RP and the independent verification has documented compliance with the defined acceptance criteria, a Third Party recertification compliance certificate (RCC) can be issued.

4.2 Acceptance criteria for assemblies and components

Acceptance criteria shall give confidence with margins to failure. The basis for acceptance criteria shall be documented.

The acceptance criteria shall be based on the latest revision/version of original design specification, engineering documentation, as well as the latest revision of selected and recognized codes and standards. If two standards are considered, the standard with the strictest requirements shall be selected.

Guidance note:

All safety bulletins/ safety alerts/ recommended component upgrades/ design changes etc (if any). issued by the design responsible shall be documented as a part of the latest revision/version of original design documentation.

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If a equipment is built according to standards and codes which are not longer valid, the gap between regulations, standards and codes used originally and current regulations standards and codes shall be identified. The risk of the identified gap shall be analysed. The result from the risk analysis shall be discussed between the contact parties and further the necessary actions needed to reduce critical risks for the equipment to be recertified shall be agreed upon.

For all equipment an NDT plan with acceptance criteria shall be prepared to cover both fabrication and operational related type of defects (e.g. corrosion/erosion/fatigue).

The NDT-plan shall clearly identify critical areas to be inspected and the type of failures inspected for.

Guidance note:

The NDT plan shall cover all highly stressed areas. The locations and number of the critical areas may differ from the original fabrication inspection plan. It shall be noted that fatigue type of defects may be very critical as the equipment is aging.

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The set of acceptance criteria, for each recertification, shall be defined between Owner, Contractor, and Third Party.

4.3 Recertification process – used equipment

For equipment that have been used in operation a recertification process shall include, but is not limited to, the following steps:

— kick off meeting
— prepare a Quality Plan (QP) with Inspection and Test Plan (ITP) which describes the scope of work of the recertification process
— review of latest revision/version of original documentation with special focus on traceability
— review of latest revision/version of original design specification
— carry out gap analysis, or provide results from gap analysis
— review of maintenance history/records, to verify the amount of operational history and extent of maintenance
— review of registered non-conformances (if any)
— design responsible and qualified EN 473 level 3, or ISO 9712, NDT inspector, to evaluate the extent and methods of NDT required
— stripping/dismantling of equipment
— visual inspection
— dimensional inspection
— NDT
— evaluation of inspection reports
— repair (if any findings above)
— reassembly
— load/pressure testing and functional testing
— recoating and preservation
— finalize and organize the recertification documentation
— Contractor is to issue a recertification CoC
— Owner and Third Party to review the recertification documentation
— if a Third Party has verified a successful completed recertification the Third Party is to issue a RCC.

4.4 Recertification process – unused equipment

For equipment that have been properly preserved and stored since fabrication or the last recertification, a limited recertification scope may be possible. It shall be agreed upon, in each case, between Owner, and Third Party the extent of the recertification scheme to be followed.

5. Equipment Subject to Recertification

All equipment used to control well pressure during drilling, well testing, completion, workover, and well intervention activities should be subject to a recertification scheme. Equipment to be included in the well barrier envelope and recertification scope should be defined between the contract parties (e.g. Owner, and Third Party).

5.1 Equipment description

The following list gives examples, but is not limited to, main equipment that should be subject to a recertification scheme:

— Drilling BOP and Well Intervention BOP including WCP/LRP
— Drilling and WO Riser including LMRP/EDP
— Surface Flow Tree (SFT)
— strippers
— Pressure Control Head/Stuffing box
— lubricator
— Back Pressure Check Valve
— kill- and choke lines (including supply and return lines) with manifold and valves
— control system.

For detailed examples, see Appendix A.

6. Qualification Requirements

6.1 Qualification of alternative contractor/subcontractor

If a contractor other than the design responsible is to be used for the recertification scheme, then following evaluations shall be made by the owner/design responsible and verified by a third party:

— experience and competence
— the quality system (QA/QC)
— the workshop and facilities
— acceptance criteria basis (ref. section. 4.2)
— procedures needed for repair (welding, NDT, coating etc.)
— subcontractors (if any).

If the above evaluation is found acceptable by the owner and third party, the use of a contractor or a subcontractor other than the design responsible shall be decided and approved by the owner.

6.2 Qualification of Third Party

If a Third Party is to verify compliance to this RP the organization shall as minimum comply with the following:

— Determine the necessary competence for personnel performing work affecting quality.
— Provide training or take other actions to satisfy these needs.
— Evaluate the effectiveness of the action taken.
— Ensure that its personnel are aware of the relevance and importance of their activities and how they contribute to the achievement of the quality objectives, and maintain appropriate records of education, training, skills and experience.

The use of Third Party shall be approved by Owner, and Third Party is also normally contracted by Owner.

7. Recertification Activities

The following recertification activities are intended to be a step by step procedure for running a recertification process.

7.1 Kick off meeting

All recertification jobs shall start with a kick–off meeting, where all relevant parties attend, and the scope of work is agreed upon. The Contractor shall present a preliminary Quality Plan (QP) and Inspection and Test Plan (ITP) for the recertification process. The following topics shall be discussed:

— type of equipment and area of application
— define equipment to be included in the well barrier envelope and recertification scope
— equipment history
— current Norwegian regulations regarding well control equipment

— governing QA/QC documentation
— agree on standards and codes applicable for the recertification
— define acceptance criteria
— review of original documentation
— review of latest revision/version of original design specification
— document handling regime and responsibility
— gap analysis
— non-conformances handling
— recertification documentation requirements and delivery schedule
— the involvement from Owner and Third Party
— contact points between Contractor, Owner, and Third Party
— project administration (e.g. time schedule, purchase order, and invoicing).

Requirements to archiving systematic for the recertification documentation shall be defined. The documentation will be an important part of future recertification processes.

After the kick-off meeting the Contractor shall finalize the Quality Plan (QP), Inspection and Test Plan (ITP), and the master index for the recertification documentation.

7.2 Quality Plan (QP) and Inspection and Test Plan (ITP) for the recertification process

The plans shall be prepared prior to starting the work on the equipment, and shall include details for the recertification activity. The QP and ITP shall be approved by the involved parties prior to starting the work on the equipment.

The QP and/or ITP shall include, but is not limited to, the following items:

— Description of equipment, including date/year of manufacture.
— Description of system to secure traceability requirement of components.
— Reference to drawings of equipment, inducing modifications or safety bulletins (if any).
— Listing of codes and standards selected for the recertification, including revision number. Contractor’s specifications can only be used where these unambiguously refer to selected codes and standards, and the Contractor’s specifications are equivalent or stricter than the specified codes and standards.
— Description of system for evaluation and follow-up of sub suppliers (if applicable).
— The Inspection and Test Plan (ITP) shall describe the activities to be performed during the recertification process (e.g. disassembly, control of marking, visual and dimensional inspection, NDT etc.). The ITP shall specify acceptance criteria to be applied in the recertification process.
— The ITP shall clearly state hold, witness and review points for Owner, Contractor and Third Party. Requirements for notification of involved parties shall be described in the plan. It is Contractor's responsibility to have the plan completed with signatures for hold, witness and review points.
— Review of equipment documentation, this item may have significant influence on the recertification activity (for further details see section 7.3).
— Non-conformance handling.
— Description of actions to be taken when documentation is missing (for further details see Section 8).
— Description of test procedures (e.g. pressure tests, functional tests etc.).
— Document control.
— Project communication (e.g. meetings, schedule, and contact points).

7.3 Documentation review and evaluation of history

Original documentation shall be available and traceable to the components.

The following activities shall be included, but is not limited to, in the documentation review:

Review of:

— the latest revision/version of original design specification (e.g. relevant procedures and design lifetime).
— original documentation, including verification of traceability.
— operational history.
— maintenance and inspection history/records to verify that equipment has been subject to regular maintenance /inspection.
— modification history (if any).
— previously registered non-conformances (if any).
— latest revision/version of original specifications for service and repair.
— possible changes in Norwegian petroleum safety regulations or Owner’s governing documents.

It is important to consider the design lifetime of the equipment as part of the documentation review. When the equipment has limited remaining design lifetime, it shall be specified on the Recertification Compliance Certificate (RCC). For equipment that has exceeded its design lifetime, recertification and further use may only be possible after special considerations. The scope of work will then have to be agreed upon in each case.

Guidance note:

The original design specification shall describe the design lifetime.

Design lifetime should take into account defined design loads and relevant degradation mechanisms.

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7.4 Personnel

Personnel performing dismantling, repair, reassembly and testing shall be qualified in accordance with written requirements of the Contractor, which include specified minimum training and qualification requirements.

Personnel performing visual quality control shall be at least qualified in accordance with EN 473 level 2 Visual Inspector or NS 477.

Personnel performing welding shall be certified according to ISO 9606 and/or NS–EN 287, or equivalent.

Personnel performing visual inspection, for all welding activities shall be certified according to NS 477, and/ or IWI-S – rules for approval of international welding inspector.

Personnel performing NDT inspections shall be qualified to minimum ISO 9712 level 2/EN 473 level 2, or equivalent.

Personnel, who are responsible to evaluate the NDT methods regarding fatigue/corrosion/erosion, shall be qualified to ISO 9712 level 3 and/or EN 473 level 3, or equivalent.

Coating inspectors shall be qualified to minimum NS 476 level 2, or equivalent.

All welders/inspectors shall have valid certificates, in accordance with codes and standards specified for the recertification process.

Personnel performing heat treatment shall be qualified to follow Contractor's procedures for heat treatment.

7.5 Dismantling and cleaning of equipment

The equipment shall be dismantled and cleaned in accordance to the original maintenance procedure or Owner's procedures. Necessary control measures shall be included to avoid mixing/mismatching of parts. The extent of dismantling shall be defined in the ITP.

7.6 Identification of components

All critical components shall be traceable to material certificates, with reference to specific heat number or heat treat lot. Traceability shall be documented. Lack of traceability for critical components will require replacement if other means to prove fitness for purpose fails (ref. Section 8).

Material properties for critical components shall be verified, either by reviewing traceable certificates or compensating measures as described in Section 8.

7.7 Inspection and NDT requirements

Visual inspection shall be carried out on all components for examination of visible defects in material and workmanship. Visual inspection shall be documented, with reference to latest revision/version of original design specification and the latest revision of selected and recognized codes and standards.

Critical dimensions shall be defined, confirmed, and documented. The acceptance criteria shall be within latest revision/version of original drawings/machining tolerances or allowed wear limits.

Hardness testing, for critical components, shall be performed and the values shall meet the latest revision/ version of original design specification and or specified project requirements.

Moulded sealing assembly that are intended to be reused shall be inspected to be in accordance with the latest revision/version of original maintenance procedure.

NDT shall be performed in accordance with the requirements specified in the latest revision/version of original design specification and the agreed NDT plan, as well as codes and standards specified for the inspection. A NDT report shall be traceable to the component and clearly refer to the actual location and position on the component.

Guidance note:

NDT methods includes visual inspection, PT, ET, MT, RT, UT, and other relevant techniques.

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Equipment for positive material identification (e.g. spectrograph) and hardness testers etc, shall be calibrated.

7.8 Repair of components

Repair of components shall follow latest revision/version of original design specification and material specification, latest revision/version of original drawings and specified recognized standards or codes.

Before welding, an approved WPQR/WPS shall be presented by Contractor and the WPQR/WPS shall be in accordance with the specified standards or codes and approved by Owner and Third Party. Material certificates shall be available for review.

Guidance note:

Lack of traceability will require steps described in Section 8.

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Repair welding of Corrosion Resistant Alloy (CRA; e.g. Inconel): PMI or chemical analysis shall be carried out on surfaces welded with CRA after machining but prior to re–welding. The iron level shall be verified against the project requirements. Thickness measurement of the CRA layer shall be carried out, after machining but prior to re–welding. Remaining CRA thickness shall be equal to, or above the minimum qualified thickness described in the WPQR/WPS. Dissolved weight percent of iron in the CRA layer higher than the project specification, will possibly require a complete removal of the CRA layer and then re-welding. Re-welding will require a WPQR/WPS that cover CRA welding on the base material with subsequent PWHT. Prior to starting welding, the specified PWHT shall be verified and evaluated against the tempering temperature described in the original material certificate, and earlier used PWHT(s) (if any).

Welding that will include PWHT should have a WPQR/production test which can document the base material properties after welding.

Guidance note:

E.g. if a base material has undergone two earlier PWHT, then the WPQR intended to be used should be tested and qualified and/or a production test program should be performed to cover three PWHT.

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Heat treatment shall follow an approved WPS, and specified standard or code. Temperature recording instrument shall be used during the heat treatment process. Temperature and other recording instruments shall be calibrated at least every year.

Hardness testing, after heat treatment, shall be carried out and verified to be in accordance with the latest revision/version of original design and material specification and specified recognized standards or codes.

Machining (if applicable) shall be in accordance with latest revision/version of original drawing tolerances or specified standards.

NDT shall be performed in accordance with the requirements specified in the latest revision/version of original design specification, as well as codes and standards specified for the inspection.

All components that do not meet the specified acceptance criteria shall be subjected to a new repair scope or be replaced.

7.9 Replacement of components

Replacement components shall be in accordance to the latest revision/version of original design and material specification and specified standards and codes.

Replacement of a component made by other manufacturer than the design responsible shall be agreed upon between the contract parties (e.g. Owner, and Third Party) in each case. The replacement component shall be designed and produced according to the latest revision/version of original design and material specification. The component shall be fully documented (e.g. manufacturer’s certificate of conformance, material certificate, test reports etc.).

7.10 Reassembly

Latest revision/version of original design specification/procedure for reassembly shall be followed.

7.11 Test requirements

Unless the equipment has been subjected to repair e.g. welding and/or machining of pressure exposed components, the pressure/load test shall be limited to Maximum Working Pressure (MWP)/load, including low pressure seal test.

The equipment shall be function tested in accordance with an approved procedure and to the specified recognized standards or codes.

Welding with or without heat treatment, or machining, of pressure/load exposed components will require a body pressure test according to the design. The test pressure should normally be 1.5 times the maximum working pressure (MWP).

Guidance note:

Other test pressure might be agreed for welding without heat treatment dependent of the extent of the repair.

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Pressure recording instruments shall be used during testing. Recording instruments shall be calibrated at least once every year.

All test procedures shall be referenced in the Quality Plan (QP)/Inspection and Test Plan (ITP). Test reports and printouts shall be signed, time stamped and filed together with the final recertification documentation.

7.12 Coating

Latest revision/version of original design specification and/or the specified standards or codes for coating shall be followed.

7.13 Preservation

An approved preservation/maintenance procedure shall be followed if the equipment is placed onshore awaiting offshore shipment, or temporarily stored.

7.14 Final documentation

Repair documentation shall be traceable, and shall be included in the final recertification documentation. The final documentation should be organized in an agreed format. Recommended index:

1) Contractor's Certificate of Conformance for the recertification (COC)
2) Third Party Recertification Compliance Certificate (RCC)
3) as built drawings
4) part number list
5) earlier issued COCs regarding recertification or overhaul/inspection
6) earlier issued RCCs
7) OEM's COC (when new fabricated)
8) design specification
9) Third Party documentation (e.g. design verification report, type approval etc.)
10) equipment history log (operational use)
11) modification documentation
12) Quality Plan (QP)
13) Inspection and Test Plan (ITP)
14) inspection reports
15) NDT reports
16) repair documentation (including the applicable WPS etc.)
17) traceable material certificates for pressure exposed and load bearing components, as a minimum
18) non-conformances and compensating measures
19) test reports/ print outs
20) calibration certificates (e.g. pressure test equipment etc.)
21) welders' certificates, NDT inspectors' certificates, coating inspectors certificates etc.

7.15 Issuance of Third Party recertification compliance certificate

If a Third Party has verified a successful completed recertification according to this RP, the Third Party is to issue a RCC (e.g. in Appendix C). The report shall as a minimum include the following information:

— traceability to the recertified equipment with description (name) of the equipment
— OEM
— regulations, codes and standards used as basis for the recertification
— Owner of equipment and Contractor
— scope of work
— description of Third Party involvement
— Non–conformities and compensating measures.

A recertification certificate shall be issued to cover assembly/sub-assembly level.

8. Insufficient Equipment Documentation

Experience has shown that equipment often have insufficient or no documentation. This may cause a quite significant scope of work in order to verify compliance with the recertification requirements.

The objective is to ensure the same documented quality and safety of the equipment as achieved through normal recertification.

If relevant design specification is missing or cannot be made available, the equipment concerned cannot be recertified.

8.1 Establishing acceptable documentation

To establish documentation of material properties, and traceability to a material certificate, the following steps shall be performed (in addition to the activities described in section 7):

— Hardness measurements.
— Chemical composition analysis (spectrography).
— On site analysis, or plastic replica, of the microstructure should be carried out if a considerable gap between the result from hardness test and the latest revision/version of the original design specification.

Owner and Third Party shall verify that the component's material properties are within the latest revision/ version of original design and material specification.

Guidance note:

Hardness results, chemical analysis evaluation are, as a minimum, required to be able to reach a conclusion with respect to tensile properties.

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If the material certificate is missing then mechanical testing should be performed, in addition to the steps described above.

Guidance note:

Where components are exactly of the same design and origin, random selection of items for destructive testing would be sufficient to satisfy collective confidence levels for materials. In each case, the extent of the random selection shall be agreed upon, between contract parties. The minimum design temperature for the equipment shall be equal to or higher than the specified mechanical testing temperature.

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8.2 Material testing laboratory

A material testing laboratory with a documented quality assurance system according to ISO 17025 or an accepted equivalent, shall be used to perform testing and characterizations, interpret, and document the results from material testing.

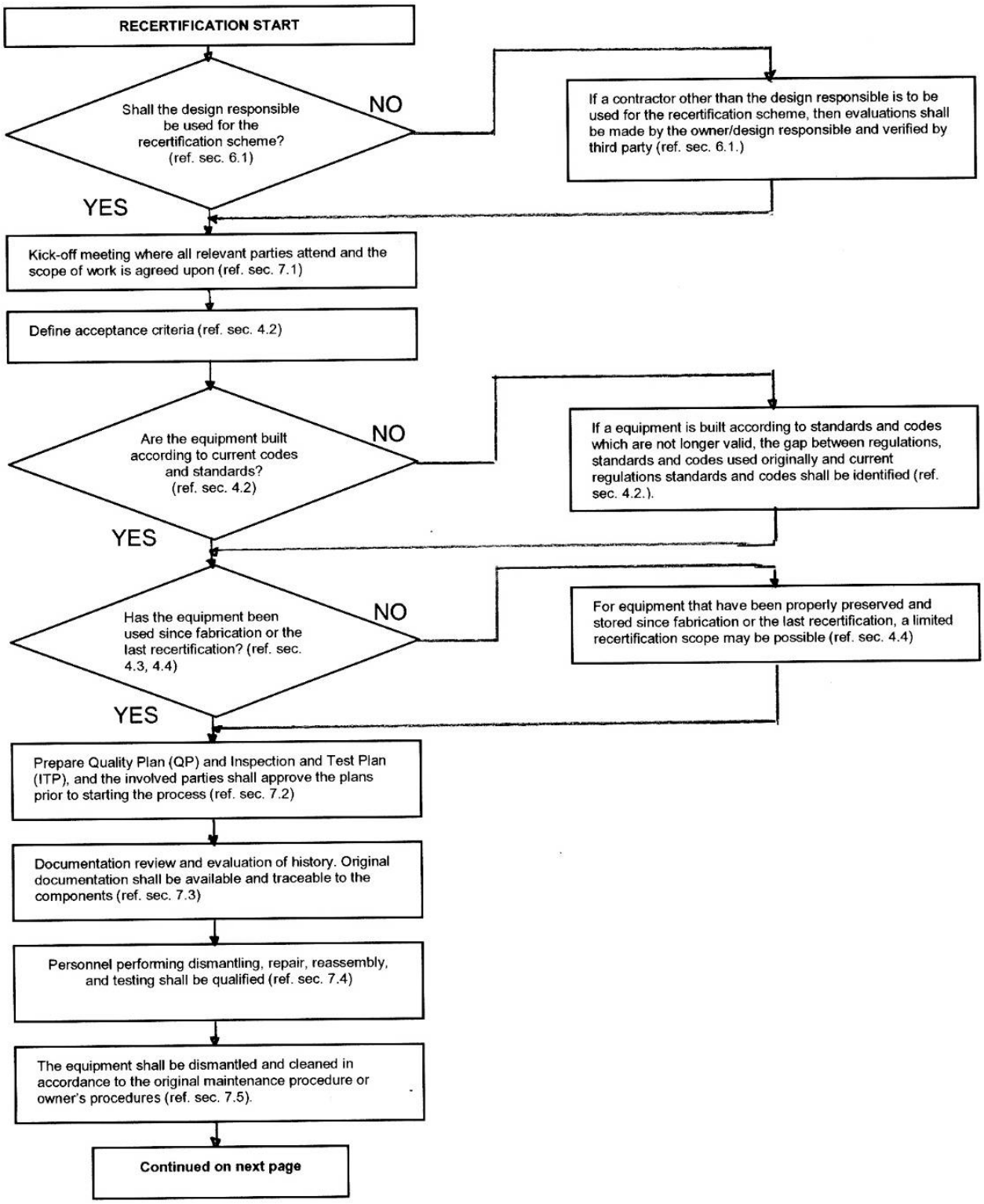
8.3 Remarking

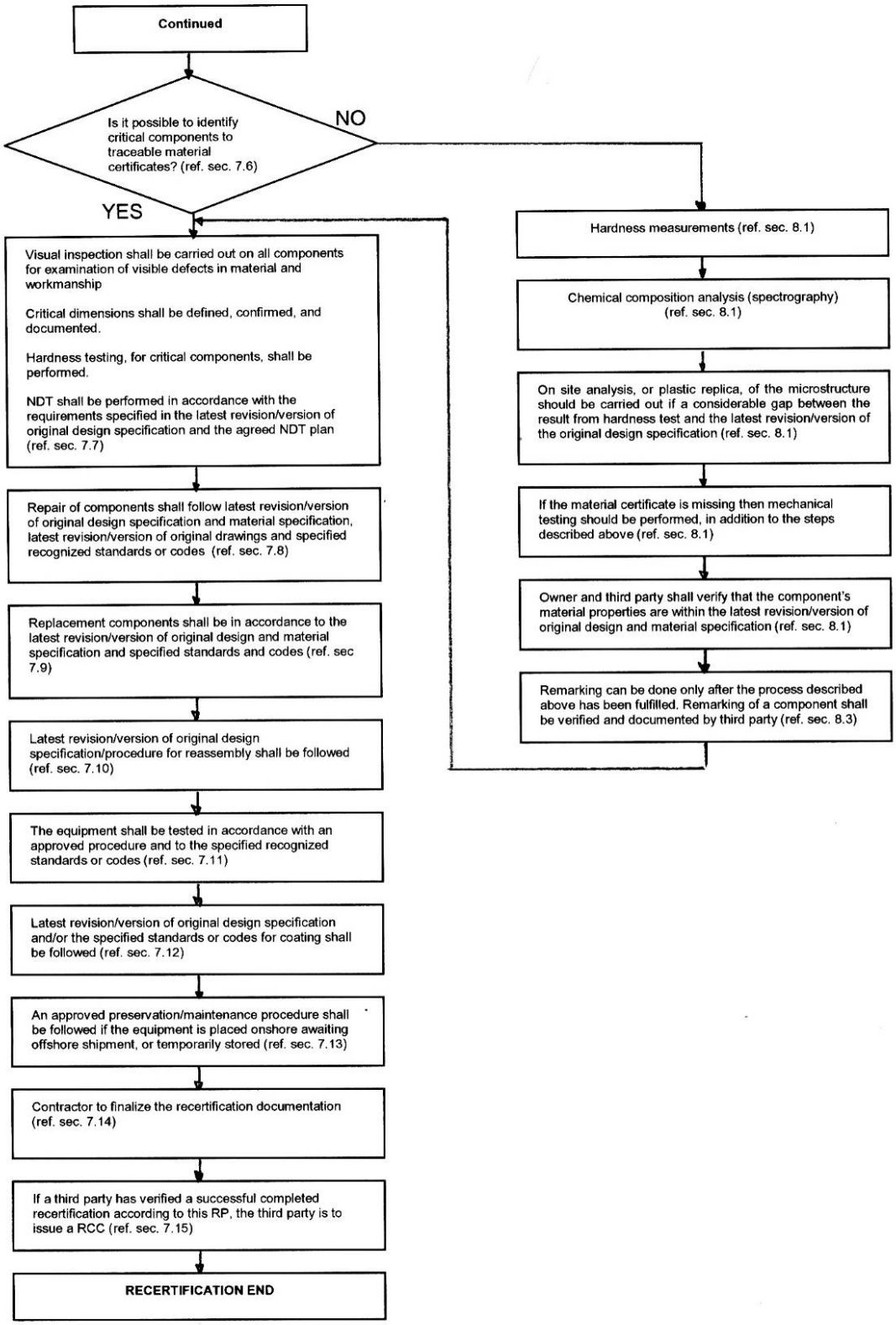
Remarking can be done only after the process described in Section 8.1 has been fulfilled. Remarking of a component shall be verified and documented by Third Party.

APPENDIX A
EQUIPMENT DESCRIPTION

Equipment	*Typical Components to be included in the recertification*
Drilling BOP and Well Intervention BOP including WCP/LRP	— safety head — ram blocks — pipe rams — shear rams — annular preventers — bonnets — body — connections — connector — by-pass and injection valves — cross-over valves — spools/body — methanol injection valves — kill and circulation lines — rotary swivel — load bearing clamps — load bearing blind hubs
Drilling and WO Riser including LMRP/EDP	— lubricator valve — riser joints with connectors — stress joint — tension joint — slick joint — subs and x-overs — ball joint — retainer valve
Landing String (LS) (THRT/SSTT/LV)	— connectors — ball valves — injection subs — retainer valves — tubing hanger running tool — lubricator valves — sub sea test tree
Surface Flow Tree (SFT)	— connector — surface production master and wing valves — swab valves — injection valves — body — adapter spools
Strippers	— connections — body
Pressure Control Head/Stuffing box	— connections — flow tubes — injection valves — line wiper — tool catcher — ball check valve
Lubricator	— body — connections
Back Pressure Check Valve	— flapper valve — subs
Kill- and choke lines (including supply and return lines) with manifold and valves	— body — connections

APPENDIX B
FLOW CHART FOR THE RECERTIFICATION PROCESS




Continued
Is it possible to identify critical components to traceable material certificates? (ref. sec. 7.6)
NO
YES
Visual inspection shall be carried out on all components for examination of visible defects in material and workmanship
Critical dimensions shall be defined, confirmed, and documented.
Hardness testing, for critical components, shall be performed.
NDT shall be performed in accordance with the requirements specified in the latest revision/version of original design specification and the agreed NDT plan (ref. sec. 7.7)
Repair of components shall follow latest revision/version of original design specification and material specification, latest revision/version of original drawings and specified recognized standards or codes (ref. sec. 7.8)
Replacement components shall be in accordance to the latest revision/version of original design and material specification and specified standards and codes (ref. sec 7.9)
Latest revision/version of original design specification/procedure for reassembly shall be followed (ref. sec. 7.10)
The equipment shall be tested in accordance with an approved procedure and to the specified recognized standards or codes (ref. sec. 7.11)
Latest revision/version of original design specification and/or the specified standards or codes for coating shall be followed (ref. sec. 7.12)
An approved preservation/maintenance procedure shall be followed if the equipment is placed onshore awaiting offshore shipment, or temporarily stored (ref. sec. 7.13)
Contractor to finalize the recertification documentation (ref. sec. 7.14)
If a third party has verified a successful completed recertification according to this RP, the third party is to issue a RCC (ref. sec. 7.15)
RECERTIFICATION END
Hardness measurements (ref. sec. 8.1)
Chemical composition analysis (spectrography) (ref. sec. 8.1)
On site analysis, or plastic replica, of the microstructure should be carried out if a considerable gap between the result from hardness test and the latest revision/version of the original design specification (ref. sec. 8.1)
If the material certificate is missing then mechanical testing should be performed, in addition to the steps described above (ref. sec. 8.1)
Owner and third party shall verify that the component's material properties are within the latest revision/version of original design and material specification (ref. sec. 8.1)
Remarking can be done only after the process described above has been fulfilled. Remarking of a component shall be verified and documented by third party (ref. sec. 8.3)

APPENDIX C
RECERTIFICATION COMPLIANCE CERTIFICATE (EXAMPLE)

Recertification Compliance Certificate

Certificate No:	Project No:		
Equipment/ assembly:	Assembly Part No: Part No:	Assembly Serial No: Serial No:	Manufacturer:
Contractor/ address/ country :		Owner of equipment/ Platform:	
Scope of work:			
Reference to regulations, standards and codes:			
Non conformities and compensating measures:			
Comments:			
DNV statement:			
Project Manager:	Stamp: Place and date	Head of Section:	