



***INPEX***



**BP/Chevron/INPEX/Shell/Statoil/Total/Woodside**

**Obsolescence Management for  
Subsea Production Control Systems**

**Joint Operator Specification 3428A**

**Version 1.5**

## Revision History

Revision Number	Date	Brief Description of Change	Author(s) of Change
1	12-Sept-2011	Incorporation of changes agreed at the Joint Operator Meeting held in New Orleans 2011-Sept-12	TB/MPC
2	5-July-2012	Included legacy equipment requirements as agreed at the Joint Operator meeting 2012-Feb-27, 2012-Jun-04 and teleconferences	TB
3	16-Sept-2013	Notice text added. INPEX and Woodside logos added. Document number 3428A assigned.	OTM
4	12-Nov-2013	Notice text amended to permit document's wider industry distribution (incl. other operators)	OTM
5	20-Jan-2015	Removal of duplicate sentence in Notice (page 2) and rewording of paragraph 1, Purpose and Scope (page 4)	OTM

### Notice

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## 1. Purpose and Scope

This specification has been developed as a joint effort between BP, Chevron, INPEX, Shell, Statoil, Total, and Woodside in order to address the obsolescence issues of subsea equipment in a consistent manner. This specification may be used by any operator. This specification is a supplement to IEC 62402 (Obsolescence management - Application guide).

The IEC 62402 international standard offers two complimentary definitions of obsolescence:

- Transition from availability from the original manufacturer to unavailability.
- Permanent transition from operability to non-functionality due to external reasons.

Obsolescence is inevitable and cannot be avoided. However, with sufficient foresight and careful planning, the negative impacts of obsolescence on subsea production control systems can be successfully mitigated and controlled.

The IEC 62402 international standard offers the following definition of Obsolescence management:

- Co-ordinated activities to direct and control an organization with respect to obsolescence.

The purpose of this document is to define the pro-active Obsolescence Management Process as it applies to subsea production control systems and detail minimum subsea equipment Supplier requirements to manage the risks of obsolescence through activities associated with:

- Preventing
- Predicting
- Resolving

The combination of these tasks will help reduce the risks, costs and impact to the business caused when components, tooling, suppliers, process and knowledge become obsolete through the continued management of the equipment Obsolescence Management Plan. These requirements are applicable during the different phases of the complete product life cycle:-

- Concept and definition
- Design and development
- Manufacturing
- Installation
- Operation and maintenance
- Long term support and sustainability throughout the project lifecycle
- Decommissioning
- Disposal

In this document the word “component” is used to reference all elements of the Bill of Materials (BoM) such as electronic components, mechanical components, product, tooling, processes, software and firmware. The non-availability of any of these components can potentially have an impact on the sustainability of the equipment and result in financial implications to the field operations of the Operator. Therefore, the subsea equipment Supplier shall ensure that pro-active Obsolescence Management is fully integrated within

their internal processes and procedures and relevant knowledge, experience and skill base sets are maintained and available.

This revision of the specification is intended to cover the complete subsea production control system both on new deliveries and on equipment that has already been delivered, i.e. legacy equipment. Even new deliveries may include existing designs of equipment, hence particular consideration must be given to remediate any deviations from the early phases of the product life cycle. Application of this specification on legacy equipment require gathering of accurate information as a basis for a recovery plan. Legacy equipment recovery plan may result in a product upgrade before proactive obsolescence management will be effective.

The scope of this specification includes, but is not limited to:

- Electrical and electronic assemblies
  - Subsea
  - Topside
  - Test equipment
  
- Firmware and software (This includes all supplied software and firmware, both internally and externally developed firmware/software and associated development tools)
  - Subsea
  - Topside
  - Test equipment

Subsea production control system obsolescence issues shall be considered early in contract negotiations regardless of specific Supplier including Operator provided items.

## 2. Reference Documentation

The key guidance document in managing obsolescence is the IEC 62402: Obsolescence Management - Application guide. The relevant sections pertain to supporting a cost-effective pro-active obsolescence management process that is applicable through all phases of the product life cycle.

Informative references are also included which serve to provide additional guidance in support of a pro-active obsolescence management plan.

The latest edition of all standards shall apply.

### 2.1. Normative reference

IEC 62402                      Obsolescence Management - Application guide

### 2.2. Informative references

PD 6667                      Obsolescence management. Code of practice for obsolescence notification and support from suppliers of electronic components

COG                              Component Obsolescence Group Guidance Booklets  
<http://www.cog.org.uk>

IEC/TS 62239                Process management for avionics – Preparation of an electronic components management plan

IEC 62309                      Dependability of products containing reused parts – Requirements for functionality and tests

Energy Institute              Guidelines for the management of obsolescence in Subsea Facilities

## 3. Abbreviations

BOM	Bill of Material
COG	Component Obsolescence Group
COTS	Commercial Off The Shelf
EOL	End of Life Notice
FFF	Fit Form and Function
IEC	International Electrotechnical Commission
IPR	Intellectual Property Rights
LTB	Last Time Buy
LTS	Long Term Storage
OEM	Original Equipment Manufacturer
OMP	Obsolescence Management Plan
OCP	Obsolescence Communication Plan
PCN	Product Change Notice
PDN	Product Data Notice

## 4. General Terms and Definitions

For the purposes of this specification, the terms and definitions provided in IEC 62402 shall apply. In addition, the following definitions are applicable:

Component:	In this specification the term "component" is used to reference all elements of the Bill of Materials (BoM) such as electronic components, mechanical components, product, tooling, processes, software and firmware.
Supplier:	The company designated on the purchase order form as being the contracted Supplier of materials and services to the Operator
Sub-Supplier:	Provider of products and/or services to Supplier.
Shall:	Indicates a mandatory requirement.
Should:	Offers a guideline or recommendation that follows good engineering practice and might be used or be helpful in assuring compliance to this Specification.
Operator:	The person, group, or organization who is the client / customer of Supplier.
May:	Indicates an optional provision.
Legacy equipment:	Equipment that is delivered to the Operator, and may be in operation

## 5. Proactive Obsolescence Management

The requirements for subsea equipment Supplier are summarised below, outlining the necessary components that are defined as a pro-active obsolescence management plan for subsea control systems.

- Introduce a pro-active obsolescence management process that can adequately influence activities throughout the product lifecycle as required in IEC 62402.
- Design products that will be tolerant of component obsolescence.
- Recommend the use of standard or preferred components and interfaces for the products.
- Define the process for component monitoring with the supply chain.
- Define the process of reporting obsolescence information back to the Operator and the frequency of the obsolescence status risk report.
- Provide proposed solutions to mitigate obsolescence through the obsolescence report and OMP.
- Define the product life cycle diagram.
- Participation in the exchange of information including obsolescence solutions and resolutions.
- Use cost effective and innovative methods to resolve obsolescence risks.
- Ensure any design evolution due to obsolescence is managed in accordance with the product lifecycle process and that it is sustainable.

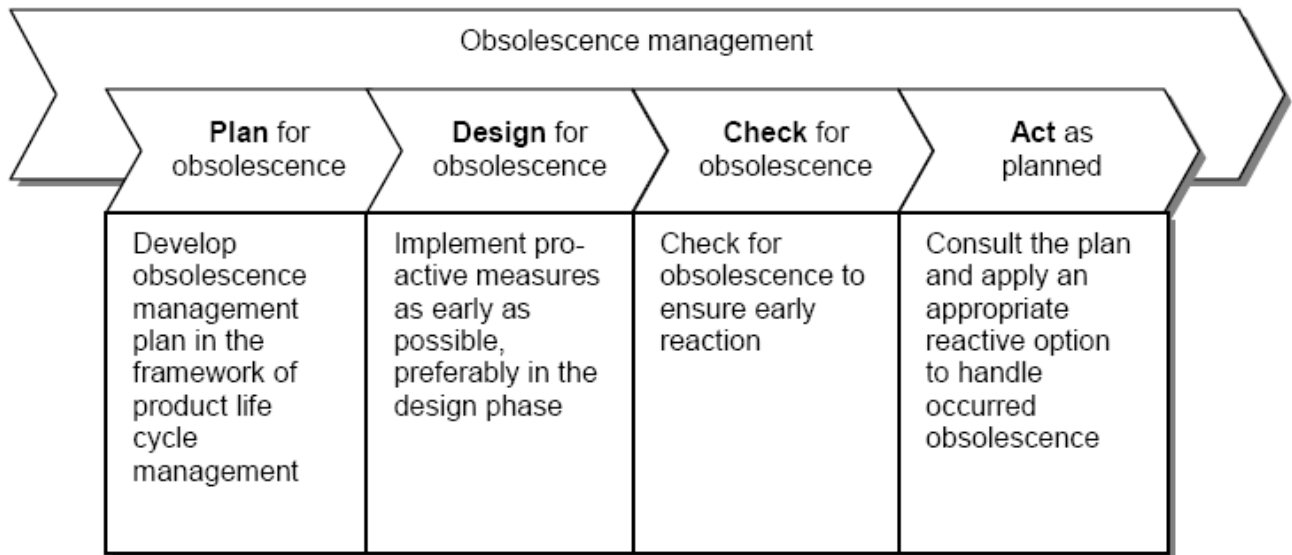
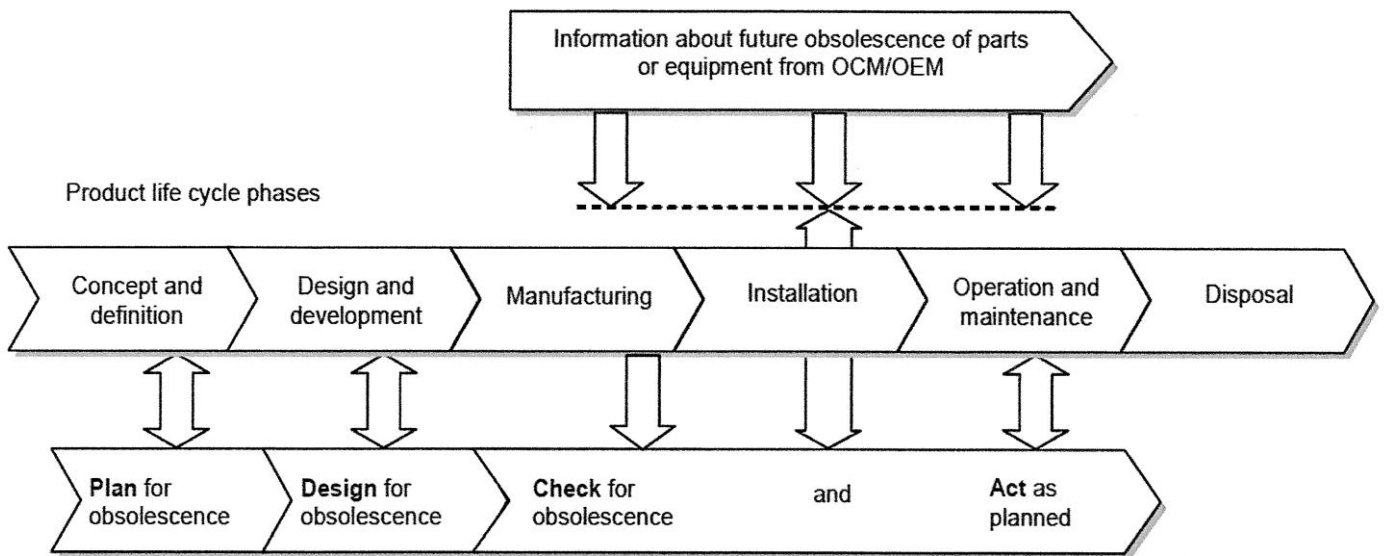


Figure 5.1: IEC 62402 - Process steps for managing obsolescence





**Figure 5.2: IEC 62402 - Obsolescence management versus product life cycle**

## **6. Minimum Requirements**

### **6.1. General**

All relevant requirements shall be propagated in contracts to sub-suppliers (flow down of requirements).

### **6.2. Obsolescence Management Plan**

Subsea equipment Supplier shall provide an Obsolescence Management Plan describing the strategies for identification and mitigation of the effects of obsolescence through all stages of the life of the product. This document shall be maintained throughout the product lifecycle. The OMP content shall include as a minimum the following items:

- Objectives
- Legacy equipment recovery plan
- Applicability including a complete list of units covered by OMP
- Organisation
- Roles and responsibilities
- Skill base management
- Obsolescence strategies
- Communication plan
- Process activities
- Obsolescence mapping
- Obsolescence monitoring
- Critical components
- Supply chain
- Stock level management philosophy
- Metrics
- Deliverables
- Product life cycle diagrams

### **6.3. Communication Plan**

A communication plan is required to support the OMP. It shall be implemented and updated to communicate product obsolescence and associated risks and issues both internally within subsea equipment Supplier organisations and with the Operator. It will also define the flow of obsolescence information, reporting and meetings criteria.

The communication plan shall include as a minimum the following items:

- Obsolescence mitigation planning
- Periodic report, typical frequency annually

- Summary of solved problems
- The spare stock status including revision control of equipment
- Estimation of impact on operators assets specifying which wells are affected
- New design consideration
- Product Change Notice (PCN), Product Data Notice (PDN), End of Life Notice (EOL): how they are managed and how component information is updated e.g. updated BoM.
- Obsolescence status of critical components including analysis of the risk impact to equipment operation, impact on availability and the cost of mitigation.
- Obsolescence status of components in the BoM including analysis of the risk impact to equipment operation, impact on availability and the cost of mitigation.
- Technology Insertion – the product roadmap and the planned programme for system updates including development and qualification schedules.
- Management of “Commercial off the Shelf” Product (COTS).
- The product and/or component stock level status at all sites within the Supplier organisation.
- Regular meeting, typical frequency quarterly
  - Current status of OMP
- Obsolescence alerts
- Emergency meeting
  - PCN/PDN/EOL Documents
  - Report of parameters
  - Management of bridge buy
  - List of alternatives
  - List of FFF
  - Resolution options

#### 6.4. Product Life Cycle Diagram

The purpose of an Product Life Cycle diagram is to show, for the component technologies used in the design, the combination of obsolescence management with planned product improvements. At delivery of the equipment there should not be any components obsolete. The diagram shall describe the product life cycle of the component technologies used in the design and updated at design reviews. Any planned product improvements shall be co-ordinated with other product changes and enhancements. These changes shall require discussion and agreement with the Operator.

#### 6.5. Obsolescence strategies - Availability of Obsolescence Information

Subsea equipment Supplier shall ensure that the latest obsolescence information is available to all relevant personnel throughout the entire product life cycle from product design and development to field service.

The component information system shall serve to provide the product designer with information related to component selection to minimize the impact of obsolescence including part technologies, future packaging expectations, life cycle information, longevity of part and the cost derived from commodity roadmaps.

Predictive obsolescence information shall be included in subsea equipment Supplier component database

The subsea equipment Supplier shall demonstrate a pro-active obsolescence management process throughout the product life cycle.

#### 6.6. Obsolescence mapping and monitoring - Management of Obsolescence Prediction

Obsolescence prediction includes the research of information mapped to the BoM to validate the impact. A component obsolescence issue is typically identified when a component manufacturer provides notification of product discontinuance or the components are unavailable when needed.

Subsea equipment Supplier shall demonstrate how they continuously monitor the availability of components and technologies used in the design and manufacturing of the equipment and the pro-active steps to manage these occurrences.

This shall include as a minimum:

- Having strategies and procedures in place to identify and to react to every occurrence of component discontinuance.
- Having access to all component obsolescence information.
- Periodically (at least twice a year) review components BoMs and lists to proactively address discontinuance.

#### 6.7. Obsolescence strategies - Management of Obsolescence Resolution

Subsea equipment Supplier shall define the metrics of monitoring and predicting obsolescence occurrences. Subsea equipment Supplier shall develop, implement and manage processes to solve all occurrences of product obsolescence during the product life cycle.

Solutions addressing components should result in a form, fit and functional replacement in order to minimise the certification, manufacturing and in-service impact. The need for requalification shall however be evaluated in each case.

Any Product redesign proposed as mitigation to an obsolescence issue shall require common interest and agreement with the Operator.

Subsea equipment Supplier options to resolve component obsolescence shall include the following as a minimum:

- Use an alternative source – subsea equipment Supplier shall qualify the alternative source for the same part.
- Substitution – subsea equipment Supplier shall identify a functional replacement for the obsolete part using the following:

- Alternate part – Use of a similar part but not identical component that satisfies the application function. This may include the original suppliers next model that is backwards compatible.
- After Market Suppliers – Use of suppliers that specialize in manufacturing or distribution of parts that the original manufacturer has ceased to provide. Selected suppliers shall be approved by the Operator in accordance with agreed quality processes, and all replacement components offered shall be qualified and conform to the Operator specifications and specific requirements.
- Emulation and Reverse Engineering – The process of developing fit, form and function, (FFF) replacements for obsolete parts using available technical data and methods.
- Last Time Buy (LTB) – Subsea equipment Supplier shall purchase the predicted number of parts that will be required:
  - As a bridge buy until redesign or alternate solutions can be implemented.
  - For the life of the equipment being manufactured and supported.
  - Inventories from LTB to bridge buy shall be managed to prevent unplanned shortages.
  - Long term storage shall be managed in accordance with the appropriate standards including periodic inspection to verify integrity.
- Redesign at higher assembly level:
  - In situations where the use of an alternate or substitute part is not possible, then the redesign of the next higher assembly may be required. If a redesign is initiated all potential short life parts should be designed out of the product at that time. The new design shall comply with the design requirements to address product obsolescence.

Subsea equipment Supplier shall evaluate the impact on the product for the option selected and this shall be in accordance with the OMP and communicated to the Operator containing the associated obsolescence contingency plan.