

Chemical Product Lifecycle (CPL)

Reference No. : OPT-T-2016-002

Version : 1.0

Release Date : April 15, 2016

Author : John Xiao

Approval : John Xiao

Use : Segment and Area President

FETC, Research Center

MPL, HSE, Marketing

Revision History

Version	Date	Description	Comments
1.0	April 15, 2016	Initial Release	

Contents

1. Introduction	3
2. Concept and Feasibility	3
2.1 Preliminary Gateway: Technical Audit.....	4
2.2 Deliverables	4
2.3 Major Gateway: Concept and Feasibility Approval Meeting.....	4
2.4 Deliverables	4
3. Development.....	5
3.1 Gateway: Field Test Launch	5
3.2 Deliverables	5
4. Field Test.....	6
4.1 Gateway: Field Test Review and Commercialization Meeting	7
4.2 Deliverables	7
5. Commercialization.....	7
5.1 Gateway: Responsibility Transfer	7
5.2 Deliverables	8
6. Mature and Obsolescence.....	8

Copyright © 2016 OPT Oilfield Services, Unpublished Work for internal management use. All rights reserved.

This articles may contains confidential and proprietary intellectual property of OPT Oilfield Services and may not be copied or stored in an information retrieval system, transferred, used, distributed, translated or re-transmitted in any form or by any means, electronic or mechanical, in whole or in part, without the express written permission of the copyright owner.

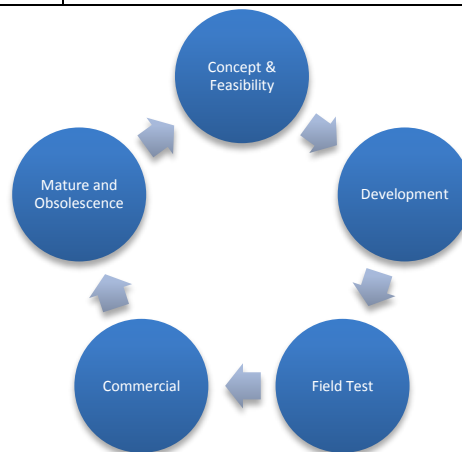
1. Introduction

This document describes standards that apply to research, development and application of oilfield chemical products.

The CPL identifies the five phases listed below, which cover the lifetime of a oilfield chemical product. Gateway meetings are held at the end of each phase, where management weighs the risks and rewards in deciding whether to continue to the next phase. Not all projects will result in commercial products. The gateway meeting serve as the contract among the parties for the next phase.

All gateway meeting minutes will be archived electronically. Management decisions taken during the meetings must be documented for future references.

CPL Phase	Gateway Meeting
1. Concept and Feasibility	Concept and Feasibility Approval
2. Development	Field Test Launch
3. Field Test	Field Test Review and Commercialization Meeting
4. Commercialization	Responsibility Transfer
5. Mature and Obsolete	



2. Concept and Feasibility

Research input process (gathering ideas across whole organization) are held in the first quarter of each year for opportunities of new product development.

The input review committee, including Segment President, Chief Engineers and Scientists, Research Center and FETC Managers and Research Project Managers, will then screen the ideas to decide whether a project starts with Concept and Feasibility Phase.

The technical basis for the product based on the initial user specifications must be approved. At the end of this phase, management should know the product definition, the market addressed, the product's risks and potential benefits, the product cost, revenue and profitability.

The initial risk assessment should identify environmental, safety, operational, legal, financial or regulatory issues. The performance and reliability of key chemical components should be proved with a thorough testing program.

Intellectual Property (IP) should be protected from the inception, especially when third parties are involved. Information Technology (IT) security must be maintained during the cycle.

2.1 Preliminary Gateway: Technical Audit

A Technical Audit is held before the Concept and Feasibility Approval Meeting. In the Technical Audit, selected experts from Field Operations, Research & Development, MPL, QHSE, Marketing review the proposed product in detail. A Technical Audit Report must summarize any concerns and areas of risk identified by the experts, and a plan for addressing them.

2.2 Deliverables

- Proposed user specifications
- Coding strategy/assessment sheet
- Technical Audit Report: studies of scientific and technical bases
- Initial HSE and regulatory assessment
- Patent and/or intellectual property protection strategy
- Resources
- Is the concept viable?

2.3 Major Gateway: Concept and Feasibility Approval Meeting

The persons attending the gateway meeting include Segment President, Chief Engineers and Scientists, Research Center and FETC Managers and Research Project Managers (or their designees). Other attendees may include MPL, QHSE and IP representatives. In addition, all technology driven projects must have a marketing plan and the appropriate level of marketing support prior to launch.

2.4 Deliverables

- Coding strategy/assessment sheet
- Initial HSE and regulatory assessment
- Technical Audit report
- Business plan: requirements, competitive analysis, tentative product position, links to other projects, initial risk analysis
- Initial market/financial analysis, ROI assessment
- Initial product user specifications
- Development plan: staff, years, and cost

-
- Design document: feasibility issues, cost vs. performance
 - Strategy for patent protection
 - Chemical registration plan
 - Waste management plan
 - Hazcom plan
 - Initial wellsite delivery review
 - Initial review for process modeling and equipment
 - Documentation
 - Meeting minutes showing the management decisions and action items
 - Marketing representative assigned

3. Development

In this phase, the project team completes performance, environmental and analytical characterization and testing to allow implementation of the product in the field. This includes laboratory studies, field mixing and pumping procedures and on-site QA/QC guidelines.

The engineering team must be adequately funded and staffed to accomplish the development schedule.

The documentation required for MPL must be completed at this phase. These include manufacturing process, raw material and product specifications and quality assurance standards. Due to the proprietary nature of chemical products, a Confidentiality Code must be assigned to the product.

A final data acceptability review for modeling and field equipment must be performed.

A marketing representative should be already assigned.

3.1 Gateway: Field Test Launch

After the product has successfully passed qualification, the decision to begin field testing in field locations is made in the Field Test Launch meeting, which is attended by the Segment President, FETC and Research Center Managers, MPL, QHSE, Wellsite Delivery Manager, Project Manager and Product developer, Marketing Representative. Area operations representatives (for field testing) should attend to discuss deployment, financial responsibility, and how to assure rapid field testing.

3.2 Deliverables

- Creation of product and raw material specifications
- QA standards and product coding
- Review Technical Audit action items
- Implement HSE and regulatory follow-up plan
- Field Test Plan

- Update risk analysis
- Review ROI assessment
- Training Plan
- Review for process modeling and field equipment
- Draft Product and Engineering Manual
- HSE justification, MSDS, labeling
- Client PPT and communication package
- Field Test Launch meeting minutes showing management decisions and action items
- Field test material planning
- Hazcom implementation plan

4. Field Test

The purpose of this phase is to validate the technical and marketing components such as product performance vs. specifications, manufacturing, quality assurance, logistics, safety, applications, operational issues, perceived value.

The Segment and selected Geomarkets are responsible for performing the required number and type of field tests in a timely manner.

FETC together with Research Center is responsible for organizing the actual field tests. Initiatives are needed to achieve rapid completion of the field test plan, including:

- (1) The roles and responsibilities of the Area and Segment are defined and clearly communicated.
- (2) The Area and Segment share common objectives regarding the introduction of new technologies (number of jobs, revenue, reliability).
- (3) In Areas selected for field testing, the operations manager is assigned field test objectives, including assigning a local technical engineer.
- (4) The representatives from Research Center chooses field test locations and clients coordinating with the Area technical engineer.
- (5) The Segment retains ownership of the product and covers initial field test costs.
- (6) The Area client covers the cost of the chemical product for further field tests.
- (7) The Segment may introduce a Incentive Program to reward Areas.
- (8) Prior to field testing, the product should be evaluated by regional FETC.

During field tests, the development team makes necessary product specification modifications, verifies scale-up, and trains the technical engineers. The marketing representative provides any necessary support for operations and marketing.

A field test review meeting is held to determine if the new product is performing to specifications, and to evaluate the client response to the product and service. The FETC Managers, Marketing Representatives and Product Developers must attend.

4.1 Gateway: Field Test Review and Commercialization Meeting

A field test review meeting is held to determine if the new product is performing to specifications, and to evaluate the client response to the product and service. The FETC Managers, Marketing Representatives and Product Developers must attend.

The Commercialization meeting is the final major gateway, as the decision to launch products is made. The Segment President, FETC and Research Center Managers, Segment Chief Engineers and Scientists must attend this meeting. Other participants generally include Area Marketing, MPL, and QHSE. Field test results, customer response, marketing strategy, business plan, training for the field and clients, and other issues related to the commercial service are discussed.

4.2 Deliverables

- Field Test Report
- Corrective Action Plan: deficiencies, target dates, responsible parties, reiteration of specifications as needed and action items
- Commercialization Meeting with minutes showing management decisions and action items
- Sign Commercialization Authorization

5. Commercialization

In the commercialization phase, the marketing team implement the business plan and product introduction plan. The product is transferred to the sustaining group (Area operations, FETC, MPL). The goal is the successful growth of a profitable business.

5.1 Gateway: Responsibility Transfer

The Segment and Area Operations are responsible for sales and local support, the FETC is responsible for the timely design improvements, continued development of new products, publishing technical papers, educating clients, and providing technical and operational support. MPL is responsible for coordinating product supply and logistical support. Marketing representatives and technical engineers are responsible for product introduction such as field roll out and field training. The team also need to be retained to track revenue and market share, demonstrate the value of the product via client seminars, papers, monitor the competition and prepare strategies to limit their penetration.

5.2 Deliverables

- Final wellsite delivery review
- Final user specifications
- Final product and raw material specifications
- Verify HSE and regulatory compliance
- Verify Hazcom completion
- Review risk analysis
- Patent status report
- Business Plan updated
- Product Introduction Plan (pricing, areas)
- Field documentation and training
- Document project financial expenses
- Transfer to sustaining group

6. Mature and Obsolescence

When the product is stable after responsibility transfer, the Sustaining group (FETCs, Marketing, MPL and Operations) maintains the product, including replacing obsolete, high cost, or unreliable products, and updating the documentation.

Case histories, best practices and training documentations are maintained in the FETCs.

Eventually, the product may no longer be commercially viable. This occurs when a newer product addresses the same market needs, or the market has changed and the original product is no longer required.

Obsolescence can be initiated by anyone, but requires approval by the Research Centers, Product Developer (or representative), Marketing, and Procurement. Once obsolete, the product will no longer be purchased or manufactured. A decision is made whether to provide any further support or the schedule for phasing out support.

Deliverables

- Obsolete the product?
- Letter to Area and Segment Operations that the product is no longer supplied.