Solutions at work.

Wintershall’s Migration to Remote Controlled Operations

H. Reijn, Wintershall
Dr. P. Bullemer, Human Centered Solutions
Abstract

Wintershall Noordzee B.V. (WINZ) operates a number of gas and oil production facilities on- and offshore in The Netherlands. WINZ recently completed the implementation of a Remote Controlled Operations Project to consolidate gas production control functions into a Central Control Room (CCR) located in a new Production Coordination & Control Center (PCC) in Den Helder (The Netherlands).

The business objective for the Remote Controlled Operations Project was to lower costs associated with operating the offshore platforms and at the same time improve the effectiveness of the operations and maintenance teams. To achieve these improvements, WINZ made significant organizational, management system and technology changes that included the migration of the individual platform control systems.

This presentation summarizes key elements of the project approach to the paradigmatic changes that have enabled the successful migration of essential control functions to the CCR, coordination of production operations from the PCC and the resulting realization of significant business benefits.
Hans Reijn

Manages the production support department of Wintershall Noordzee

More than 15 years experience in Process Engineering & Process Automation

Project Manager, Various projects including RCO project Wintershall Noordzee

Wintershall Noordzee BV
Remote Controlled Operations
www.Wintershall.com
Dr. Peter Bullemer

Senior partner, North American, human factors consulting group

Specializes in human performance in process industry operations

Former Director and Principal Investigator of Honeywell’s Abnormal Situation Management® (ASM®) Consortium

Human Centered Solutions
Helping People Perform
www.applyHCS.com
Introduction to Wintershall Noordzee B.V.

Company Data:

Wintershall Noordzee BV
Personnel: 250 Onshore & 150 Offshore

Head office based in Rijswijk, Netherlands, is a wholly-owned subsidiary of Wintershall AG.

Wintershall AG

Head office based in Kassel, Germany, is a wholly-owned subsidiary of BASF Aktiengesellschaft in Ludwigshafen.

The company has been active in the exploration and production of crude oil and natural gas for over 75 years.

Core regions are Europe, North Africa, South America, as well as Russia and the Caspian Sea region.
Hans: You are in much better position to introduce your company and specifically what you would like to highlight to this audience
Peter Bullemer, 9/25/2007
Introduction to Wintershall Noordzee B.V.

Wintershall Noordzee operates in the Southern North Sea (NL, D, UK, DK)
Definition Facility Types

Main Production Facilities

Satellite Production Facility

Pipe Line Service Facility
## Facilities Included into the RCO Concept

<table>
<thead>
<tr>
<th>Year</th>
<th>Facilities</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>L/8-P4 Main Platform + Satellite Platforms</td>
</tr>
<tr>
<td></td>
<td>A/6-A Main Platform</td>
</tr>
<tr>
<td></td>
<td>F/16-A Main Platform</td>
</tr>
<tr>
<td></td>
<td>P/6-A Main Platform + Satellite Platforms</td>
</tr>
<tr>
<td></td>
<td>K/13-A Pipeline Platform</td>
</tr>
<tr>
<td>2008</td>
<td>Hoorn Main Platform + Satellite Platforms</td>
</tr>
</tbody>
</table>
Presentation Purpose

Share key elements of Wintershall’s project approach to achieving a paradigmatic shift in production effectiveness through the migration to remote controlled operations
Main Project Goals

Reduce operational costs by Enhancement of Production Operations through appropriate automation and improvement of communication between production management, certain production related disciplines and the offshore operations.

The Central Control Room (CCR) will be implemented to:

**Enhance Operations**

The Production Coordination & Control Center (PCC) will be implemented to:

**Improve Communication**
Enhance Operations

Central Control Room

- Optimize working methods
- More effective use of Human Resources by application of appropriate automation
- Control of Wintershall production facilities from a central location
Improve Communications

Production Coordination & Control Center

- Develop and build an office building (PCC) that supports all the communication requirements of the Production Operations
- Consolidate Production Coordination Roles to Den Helder Air Port Location
- Install and use latest (video) communication technology
Changing Roles and Responsibilities

- Central Control Room Operations
- Platform Operations
- Facility Maintenance
- Production Coordination
Central Control Room Operations

Key Responsibilities

- Assurance of Production according to Contract Specifications
- Report to Facility & Production Management
- Act on Process Upsets & Abnormal Conditions
- Watch over Facility Status & Ship Traffic

12 operators
- 6 shifts of 2 operators
- 1 Coordinator
Platform Operations

- Ensure Safety, Integrity & Availability.
- Visual Checks & Startup after Shutdown.
- Operate the Production Process in case the CCR is not available.
- Planning, Logistics, Maintenance & Standard Operational Tasks.
- Provide Support to all Offshore Activities

- Standard Crew of 4 Persons.
- Platform Manager, Operator/Mechanic, E&I Technician & Cook/Steward.
Shift in Production Operations

Facility Maintenance

- Routine Maintenance (Maintenance Intervention Team)
- Campaign Maintenance (Maintenance Intervention Team & Crew)
- Breakdown Maintenance (Crew)
Shift in Production Operations

Production Coordination

- Improve Interaction between Onshore Coordination and Offshore Execution (Plan)
- Evaluate Results after Execution of Jobs (Check)
- Improved Planning & Communication
Platform Manning

Manpower trends on offshore installations

- 1980: 25
- 1990: 12
- 2000: 8
- 2005: 4
Content

- Introduction
- Project Goals
- Implementation
- Status & Results
Project Challenge

Significant Changes on Multiple Levels

- Organizational Structure
- Work Processes
- Procedures
- Training
- Automation Platform
- Operator Interface
- Control Room Environment
- Production Work Environment
Project Approach

Phased Project Structure

– Phase 1: Conduct Feasibility Study
– Phase 2: Define Requirements
– Phase 3: Design Solution Concepts
– Phase 4: Implement Solutions

Use of Industry Experts across all Phases
– Discovered Human Centered Solution (HCS) as a comprehensive solution provider across the key project development areas

Adopted the Not By Technology Alone philosophy
HCS Role

- Conducted educational workshops on effective industry practices
- Facilitated working sessions to make key decisions on philosophy and functional requirements
- Produced conceptual designs based on system and functional requirements
- Provide critical review of the solution implementation
Not by Technology Alone

Organization

Production Center Design

Control Room Design

Console Design

Alarm Management

Automation and Tools

Work Processes

Staffing

Procedures

Training

Operator Interface Design
Phase 1 Feasibility Study

Develop preliminary plans:
- organization model and business processes
- communication and automation infrastructure
- central control building functional needs

Collaborate with industry experts to validate plans and identify gaps, as well as:
- Identify opportunities to automate human functions and tasks
- Produce a conceptual functional design of the central control room (CCR)
- Develop a projects master schedule and action plan
- Conduct risk assessment of implementation plan
Phase 2, 3 and 4

For each of the 11 development areas,
- Detailed requirements definition
- High level design
- Vendor selection and procurement
- Detailed design and implementation

Executed program plan
- 18 months: January 2006 → July 2007
Organization and Work Processes

Functional Integration Strategy

- Explicit mapping of key work flows and functional roles
- Identify inefficiencies and coverage gaps
- Revised work flow and job roles
# Operator Job Complexity Analysis

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Interaction</th>
<th>Systems</th>
<th>Communication</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Max**: Indicates the maximum complexity level for one operator and two operators.
- **Min**: Indicates the minimum complexity level for one operator and two operators.

The table compares the complexity of operator job tasks across different categories (Equipment, Interaction, Systems, Communication) and operators (One Operator, Two Operators) for both maximum and minimum scenarios.
Procedures

Lifecycle Strategy

Strategic objectives in philosophy definition

Risk-based classification for specifying procedure use

Style guide and training for consistent development

Wintershall Noordzee B.V.

Procedural Work Instruction Development Workbook and Style Guide

1.0 Define Title and Purpose.........................................................5
2.0 Collect Technical Information..................................................5
3.0 Determine the Qualifications of the Work Instruction User..........6
4.0 Develop Task Structuring.........................................................6
5.0 Classify Work Instruction.......................................................8
6.0 Select Work Instruction Format............................................15
7.0 Complete Header...................................................................15
8.0 Review General Guidelines....................................................16
9.0 Complete the Introduction Section........................................17
10.0 Develop Work Instruction Action Steps...............................17
11.0 Complete Work Instruction Step Support Information.............21
12.0 Update Document History Section........................................22
13.0 Complete Appendices..........................................................23
14.0 Ensure Accuracy and Completeness....................................23
15.0 Complete Checklist...............................................................24
16.0 Submit to Work Instruction Management System Cycle.....25
Training

Competency Driven

- Company and job-specific competencies definition
- Training program definition to develop competencies
  - Foundational and cross functional modules
  - Production and operations modules
  - Automation and tools modules

Wintershall CCR Operator Competency Model and Training Master Plan

<table>
<thead>
<tr>
<th>Function Specific Competencies</th>
<th>Communication: Shift Handover</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Valued Behavior</strong></td>
<td><strong>Training Module</strong></td>
</tr>
<tr>
<td>Access key process parameter values for entire process area to conduct virtual round</td>
<td>Console Operator Interface: DCS Displays</td>
</tr>
<tr>
<td>Access shift report and/or log book to review contents ...</td>
<td>Console Operator Interface: E-Logbook</td>
</tr>
</tbody>
</table>
## Console Operator Interface

### Comprehensive Support

<table>
<thead>
<tr>
<th>Requirement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Process and task-driven interaction requirements</td>
</tr>
<tr>
<td>Common look and feel in style guide definition</td>
</tr>
<tr>
<td>Multi-level, simultaneous view framework</td>
</tr>
</tbody>
</table>

- **Interaction Requirements**
  - Information requirements
  - Collaboration requirements
  - Action requirements
### Integrated Platform Strategy

<table>
<thead>
<tr>
<th>Integrated automation and tools platform – Experion PKS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dynamic object library for consistent implementation of look &amp; feel</td>
</tr>
<tr>
<td>Comprehensive, integrated tool suite</td>
</tr>
<tr>
<td>- Electronic Logbook</td>
</tr>
<tr>
<td>- Maintenance Management System</td>
</tr>
<tr>
<td>- Production Management System</td>
</tr>
<tr>
<td>- Information Management System</td>
</tr>
<tr>
<td>- Document Management System</td>
</tr>
</tbody>
</table>
Communication Infrastructure

TOUGH Network
Alarm Management

Lifecycle Strategy

- Performance metrics and tools
- Alarm configuration standards for consistent alarm rationalization
- Continuous monitoring and maintenance

Performance Levels

1. Overloaded, 
2. Reactive, 
3. Stable, 
4. Robust, 
5. Predictive
## CCR Console Functions

- Operator Task Assignment
- Desktop / Interface Control
- Alarm Management
- Phone, Video & Intercom Control
- Access to Information
Central Control Room
Production Coordination & Control Center
Content

- Introduction
- Project Goals
- Implementation
- Status & Results
Project Status

Production Coordination and Control Center in operation since 16-05-2007

Central Control Room in Operation since 25-06-2007

Currently working on Process Control Interfaces & Production Information Management system optimization

CCR is operating 16 installations 2007 & 18 installations in 2008
Project Outcomes

- Improved Operator Effectiveness
- Improved Safety & Availability
- Faster Response on Process Upsets & Abnormal Conditions
- Higher Job Satisfaction
- Extension of Field Life plus Opportunities to Operate for OPCO’s
- CCR is “Platform” for Further Development