01 REMOTE OILFIELD MONITORING OVERVIEW

Remote oilfield monitoring collects available field data from multiple wells and production equipment, integrates the information by well, and provides centralized monitoring and production management. It supports operation review, production tracking, and coordinated management of field resources.

REMOTE OILFIELD MONITORING SYSTEM



Well A
Sucker Rod Pump



Well B
PCP System



Well C
Well Production Data

Field Data Collection and Integration
Available equipment signals · Well measurements · Operating records

Centralized Monitoring Platform
Multi-well data organization and remote access

Production Management and Operational Review
Production tracking · Equipment operation review · Field operation coordination

MONITORING SCOPE BY WELL AND EQUIPMENT

Production Asset	Available Information	Management Purpose
Oil Wells	Well operating and production records	Well production monitoring
Gas Wells	Available gas production and operating records	Gas well operation review
Water Wells	Operating and measurement records	Well operation management
Rod-Pumped Wells	Dynamometer and pumping-unit information	Artificial lift monitoring
PCP Wells	Controller and equipment data (e.g., motor parameters)	PCP operating review

KEY APPLICATIONS

Multi-Well Monitoring
Centralized view of multiple wells and equipment.

Production Tracking
Review available production data and changes.

Equipment Operation Review
Check operating status and key parameters.

Field Operation Coordination
Support inspection, maintenance and operating arrangements.

TECHNICAL NOTE

Remote monitoring provides a centralized view of connected wells and available equipment information. The monitoring scope is determined by installed measurement devices, configured acquisition points, and the data interfaces supported by the system.

02 MULTI-WELL MONITORING STRUCTURE AND DATA INTEGRATION

This page explains how data from different wells is organized and associated within a centralized monitoring platform. Each record should remain linked to the correct production area, well, equipment, measurement point, and operating history so that multi-well review is technically meaningfull.

MULTI-WELL DATA INTEGRATION STRUCTURE







Oilfield / Production Area

Production Block A
Well Group A

Production Block B
Well Group B

Well A1 / A2 / A3
Well and equipment records

Well B1 / B2 / B3
Well and equipment records

Well-Level Data Integration
Equipment ID · Measurement Point · Operating Data · Historical Records

Central Multi-Well Monitoring

MULTI-WELL DATA ASSOCIATION

Data Level	Information Managed	Management Purpose
Production Area	Field and block identification	Organizes well groups
Well	Well ID, well type and operating records	Identifies individual wells
Equipment	Equipment ID and technical information	Associates equipment with wells
Measurement Point	Parameter name and measurement source	Identifies data origin
Operating Data	Values, units and timestamps	Supports trend review
Historical Records	Operating events and maintenance records	Provides operational context

MULTI-WELL MONITORING DASHBOARD

Well ID	Lift Type	Operating Status	Latest Data	Review Item
Well A01	Rod Pump	Running	Available	Load trend
Well A02	Rod Pump	Running	Available	Stroke data
Well B01	PCP	Running	Available	Controller data
Well B02	PCP	Delayed	Delayed	Data verification

Illustrative example only; actual displayed items depend on configured instruments, acquisition points, and system interfaces.

TECHNICAL NOTE

Cross-well comparison should consider measurement method, engineering unit, acquisition time, and production condition. Load data from rod-pumped wells and controller data from PCP wells should not be treated as the same indicator without classification. Platform capacity should be evaluated by connected wells, measurement points, acquisition intervals, concurrent access, and historical data retention requirements.

03 OILFIELD PRODUCTION DATA MANAGEMENT AND HISTORICAL RECORDS

This page describes the classification, processing workifow, integrity control, and historical management of production data. The goal is to build a consistent, traceable, and analysable data foundation for multi-well production management, operational review, and performance evaluation.

1. PRODUCTION DATA CLASSIFICATION



Data Category	Typical Information	Data Source	Management Purpose
Equipment Operating Data	Load, displacement, stroke, motor parameters	Dynamometer and configured equipment terminals	Equipment operating review
Well Condition Data	Acoustic liquid-level measurements	Acoustic liquid-level tester	Well condition evaluation
Production Measurement Data	Oil, gas and water rates or volumes	Configured meters and well-test records	Production reporting and verification
Operational Event Data	Downtime, maintenance and intervention records	Operating and maintenance records	Historical analysis

Note Equipment operating data and production measurement data are different in nature and should be managed separately.

2. PRODUCTION DATA MANAGEMENT WORKFLOW

01 Data Acquisition
Collect available well and equipment data

02 Data Classification
Identify data types and sources

03 Data Validation
Check values and data quality

04 Data Association
Link data to wells and equipment

05 Historical Storage
Retain operating records

06 Data Retrieval
Support reporting and review

3. DATA INTEGRITY AND TRACEABILITY CHECKLIST

Verification Item	Information to Maintain	Why It Matters
Well Identification	Unique well ID	Prevents cross-well data errors
Equipment Identification	Equipment ID and type	Associates data with the correct asset
Measurement Source	Instrument or acquisition source	Establishes data provenance
Timestamp	Acquisition time and time basis	Aligns measurements and events
Measurement Unit	Parameter unit and measurement basis	Prevents unit conversion errors
Data Quality	Valid, missing or abnormal status	Identifies unreliable records
Acquisition Method	Measured, estimated or allocated	Distinguishes data origins

4. A TRACEABLE PRODUCTION DATA RECORD

Well ID **WELL-001**	Equipment ID **EQ-001**
Parameter **Polished Rod Load**	Measurement Unit **kN**
Acquisition Time **Recorded Timestamp**	Data Source **Configured Instrument**

5. ENGINEERING NOTE

- Historical production data is useful only when its source, measurement basis, timestamp, and associated well or equipment can be identified.
- Mixing measured, estimated, and allocated values without clear identification can lead to incorrect production comparisons.
- A standardized data model and quality rules are essential for reliable multi-well analysis and production evaluation.

TECHNICAL NOTE Ensure consistency of data definitions, units, and time bases across different wells and equipment. Data validation, association, and storage strategies should be aligned with production management and analysis requirements.

04 REMOTE EQUIPMENT OPERATION REVIEW AND PRODUCTION MANAGEMENT WORKFLOW

This page focuses on remote review of equipment operation, management and application of historical operating records, and a closed-loop production management workflow. It helps personnel identify operating changes, verify production, and arrange maintenance and field actions in a timely manner.

1. REMOTE EQUIPMENT OPERATION REVIEW



Pumping Unit



PCP System



Wellhead & Liquid Level

Review Item	Information Reviewed	Operational Purpose
Pumping Unit Operation	Running status and available operating records	Reviews pumping-unit operation
Dynamometer Data	Load, displacement and card trends	Identifies changes requiring investigation
PCP Operation	Available motor and controller parameters	Reviews PCP operating conditions
Well Liquid Level	Acoustic liquid-level measurements	Evaluates changes in well liquid level
Production Records	Recorded production measurements and test history	Reviews production changes

2. HISTORICAL OPERATING RECORDS



Well and Equipment Operating History

01 Initial Operating Records
Available equipment configuration and initial operating information

02 Routine Production Monitoring
Operating measurements, well conditions and production records

03 Operating Changes and Events
Recorded downtime, operating changes and maintenance events

04 Inspection and Maintenance
Field inspection findings and maintenance records

05 Post-Maintenance Review
Comparison of available operating data before and after intervention

3. OILFIELD PRODUCTION MANAGEMENT WORKFLOW

01 Data Collection
Available well and equipment information

→ **02 Centralized Review**
Review multiple wells and operating trends

→ **03 Exception Identification**
Identify missing data or operating changes

→ **04 Engineering Assessment**
Verify measurements and review operating context

→ **05 Field Action**
Arrange inspection, maintenance or authorized adjustments

→ **06 Result Verification**
Review subsequent data and update operating records

Continuous Production Management Review

4. DATA INTEGRITY AND TRACEABILITY CHECKLIST

Verification Item	Information to Maintain	Why It Matters
Well Identification	Unique well ID	Prevents cross-well data errors
Equipment Identification	Equipment ID and type	Associates data with the correct asset
Measurement Source	Instrument or acquisition source	Establishes data provenance
Timestamp	Acquisition time and time basis	Aligns measurements and events
Measurement Unit	Parameter unit and measurement basis	Prevents unit conversion errors
Data Quality	Vallid, missing or abnormal status	Identifies unreliable records
Acquisition Method	Measured, estimated or allocated	Distinguishes data origins

ENGINEERING NOTE

Remote oilfield monitoring connects well operating information, equipment records, and production history to support centralized production management. Its practical value depends on reliable field data, correct well and equipment associations, and the ability to verify operating changes through engineering review and field records.