

1 Q. Please provide details on how the JD Edwards system facilitates Hydro's Asset Management
2 processes.

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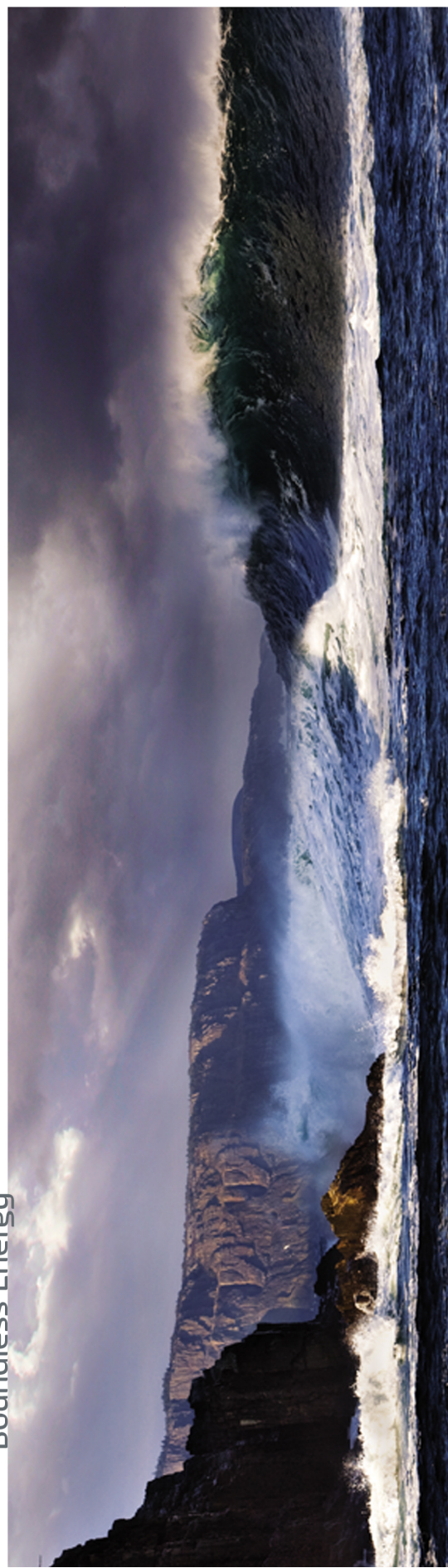
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5 A. Please refer to PUB-NLH-031, Attachment 1: "Nalcor Maintenance Model Enterprise
6 Software Implementation."

Nalcor Maintenance Model

Enterprise Software Implementation

Boundless Energy



Nalcor's Corporate Vision and Goals

- Our Core Purpose
 - ***“To build a strong economic future for successive generations of Newfoundlanders and Labrador”***
- Our Corporate Goals
 - Safety – to be a world class safety leader
 - Environment – to be an environmental leader
 - Business Excellence – through operational excellence, to provide exceptional value to all customers of our energy
 - People – to ensure a highly skilled and motivated team of employees who are strongly committed to our success and future direction
 - Community – to be a valued corporate citizen in Newfoundland and Labrador

Nalcor's Corporate Values

Nalcor Energy is a proud, diverse energy company, whose people are committed to building a bright future for Newfoundland and Labrador, unified by our core values of ...

- Open Communication – fostering an environment where information moves freely in a timely manner.
- Accountability – holding ourselves responsible for our actions and performance.
- Safety – relentless commitment to protecting ourselves, our colleagues, and our community
- Honesty and Trust – being sincere in everything we say and do.
- Teamwork – sharing our ideas in an open and supportive manner to achieve excellence.
- Respect and Dignity – appreciating the individuality of others by our words and actions.
- Leadership – empowering individuals to help guide and inspire others.

What is Asset Management?

Asset management is the comprehensive management of asset requirements, planning, procurement, operations, maintenance, and evaluation in terms of life extension or rehabilitation, replacement or retirement to achieve maximum value for the stakeholders based on the required standard of service to current and future generations.

It is a holistic, cradle-to-grave lifecycle view on how we manage our assets.

Asset Management Functions

| FUNCTION | KEY ACTIVITIES |
|--|--|
| <p>Long-term Asset Planning</p> | <ul style="list-style-type: none"> • Focus on asset lifecycle – cradle to grave. • Develop and continually refresh 20+ year asset plan that reflects: asset rehabilitation/overhauls to major assets; asset renewal requirements – what needs to be replaced, when and with what. • Create and maintain accurate and complete asset listing/ hierarchies with supporting detail, location, history and financial information. • Translate 20 year asset plan into detailed 5-year and annual asset work plans; update as required. • Recognizing the dynamic nature of long and short-term asset work plans and the expertise of others, obtain input from work execution and operations functions when developing/refreshing long-term, 5-year and annual asset work plans. • Participate in technical councils and use technical councils to test long-term plans and promote their role in operational trouble-shooting. • Develop high-level implementation strategy including financial leveling, resource planning for each year of the long-term asset plan. • Drive development 20 year capital plan inputs for assets. • Check/ensure alignment with corporate long-term asset planning practices led by the office of asset management. |

Asset Management Functions

| FUNCTION | KEY ACTIVITIES |
|--|--|
| <p>Long-term Asset Planning (<i>cont'd</i>)</p> | <ul style="list-style-type: none"> • Ensure project scope, estimates and quality are acceptable. • Identify and monitor asset reliability/service level requirements. • Develop and monitor asset performance metrics and develop/ execute actions to address performance issues. • Complete root cause failure analysis and remedial action plans. • Complete risk assessment and reliability monitoring. • Develop, monitor and continuously improve preventative and predictive maintenance programs. • Develop and implement condition assessment tools and monitoring techniques and incorporate results into planning activities. • Monitor and incorporate industry and technology trends impacting long-term asset plan. |

Asset Management Functions

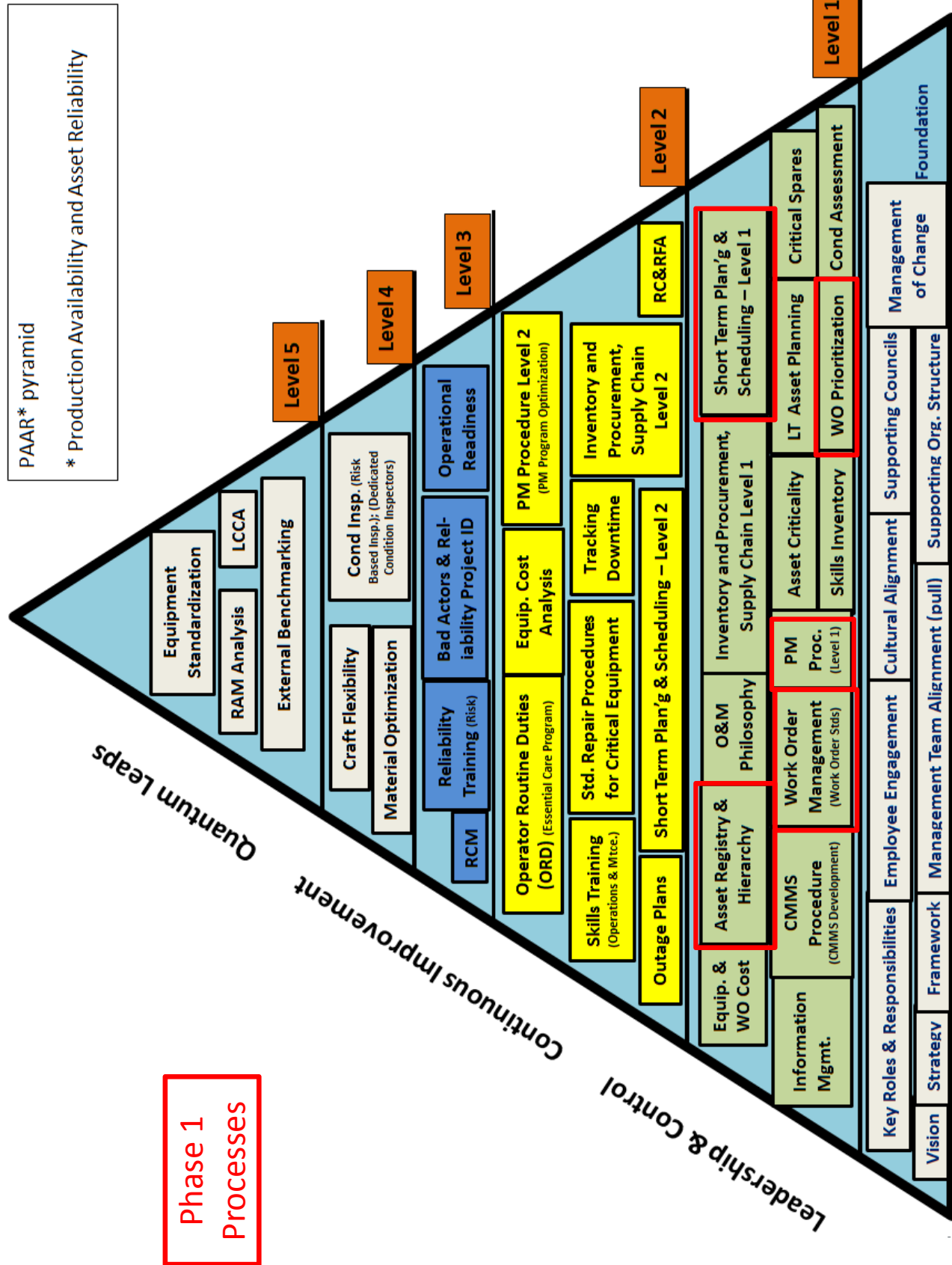
| FUNCTION | KEY ACTIVITIES |
|--|---|
| <p>Critical Spares Management</p> | <ul style="list-style-type: none"> • Use critical spares framework established by the Office of Asset management to identify critical equipment/tools spares based on criteria including: acceptable downtime/service levels; impact to reliability; delivery time; failure history; and repair duration. • Determine quantity, lead times, and optimum inventory levels. • Initiate the procurement of critical spares and ensures correct equipment is specified, ordered and received. • Develop necessary inspection/review/maintenance/ location requirements on critical equipment/tools spares to ensure readiness including monitoring OEM supplier support and equipment/tools availability. |

Asset Management Functions

| FUNCTION | KEY ACTIVITIES |
|---|---|
| <p>Work Execution <i>(includes corrective maintenance (emergencies); preventative maintenance (including maintenance backlog); and project (capital and operating))</i></p> | <ul style="list-style-type: none"> • Focus on safe, environmentally friendly and effective (quality, cost, schedule) execution of weekly, monthly and annual asset work plans. • Manage trades, tools and equipment resources required for work completion. • Integrate capital and operating project work including resource provisioning and associated commissioning coordination. • Prioritize work and monitor actual work completed against schedule; take action as necessary. • Supervise frontline workers. • Maintenance budget cost control. • Monitor maintenance execution productivity and effectiveness and monitor and report on work execution metrics. • Management and renewal of major contracts for equipment overhauls and minor service contracts. • Maintain effective record keeping (work order history and other work execution related documentation). • Recognizing the dynamic nature of long and short-term asset work plans and the expertise of others, provides input to long-term planning function (developing/refreshing long-term, 5-year and annual asset work plans). |

Asset Management Functions

| FUNCTION | KEY ACTIVITIES |
|-----------------------------------|---|
| <p>Short-term Planning</p> | <ul style="list-style-type: none"> • Manage and update detailed annual asset work plan. Scope includes preventative maintenance; predictive maintenance; quality assurance activities; asset overhauls; asset replacements and project work (capital and operating) based on long-term plan. • Recognizing the dynamic nature of long and short-term asset work plans and the expertise of others, provide input to long-term planning function (developing/refreshing long-term, 5-year and annual asset work plans). Determine resource, materials, tools and equipment requirements for the annual asset work plan. • Coordinate asset work plan timing to reflect outage schedule. |
| <p>Work Scheduling</p> | <ul style="list-style-type: none"> • Focus on development of 7 and 30 day work schedule. • Review resource allocation to ensure resources support completion of scheduled work. • Coordinate work execution schedule with Operations. • Prepare work orders that are ready to implement in terms of people, equipment/tools and materials. • Generate performance metrics to assess effectiveness of work planning. |



Project Goals

- Develop a fully integrated equipment maintenance model using new defined practices with JDE software
- Develop model with the ability to capture true maintenance cost at the equipment level
- Model designed to track root cause failures at both equipment and component levels

Why Create an AM Model using one ERP System?

- Cost Savings
- Best Practice Sharing
- Fully Integrated Solution vs Interface to External Maintenance Systems
- Faster Upgrades
- Shorter Implementation Time
- Reduce use of external databases

Why JDE EnterpriseOne and Not a Maintenance-specific software?

- AP/AR, Purchasing & Inventory reside in ERP
- Functionality available in both systems are basically equivalent
- One set of hardware and software to support
- ERP is a fully integrated system
- Eliminate cost of building and supporting interfaces
- No roadblocks to system upgrade due to interface complexity

JDE Integration

- JDE Integrated Business System
 - Finance
 - G/L, AP, AR, Fixed Assets
 - Time Writing
 - Payroll and/or Recharge
 - Inventory and Purchasing
 - Replenishment, planned commitments, repair/restock
 - issues to cost centers or work orders
 - Purchasing from and to work orders; and to cost accounts
 - Equipment Management/Work Orders
- The Strength is in Integration!

Integration Strengths

Inventory and Purchasing

- Maintenance spare parts are recorded both to the work order and equipment, this can be used for Material requirement planning and cost tracking.

Manpower to the work orders

- Accurate history for future craft requirements, planning and scheduling.

Costs to the equipment

- Cost and frequency of repairs to help assess equipment viability or need for replacement.

Model's Conceptual Framework

Initial Model Concepts Based on Project Team's Experiences with Previous CMMS Implementations and Best Practices

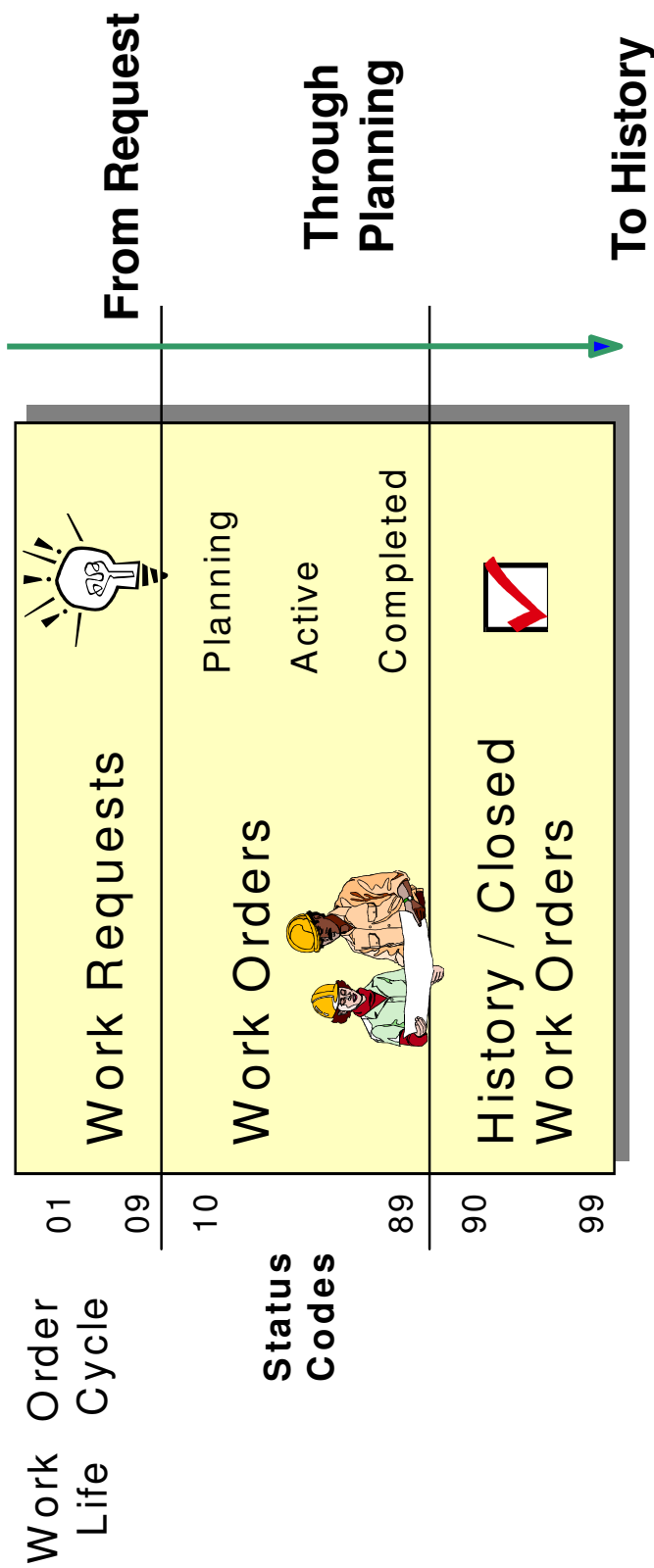
Model Design Scope:

- Work Order Processes
- Equipment Master Records
- Preventive Maintenance
- Supply Chain basic Integration
- Payroll basic Integration
- Finance & Project Cost Management basic Integration
- Customer Information System basic Integration
- Reporting

Work Order Process Deliverables

- Standard flow for WO's from cradle to grave
- Inventory issues from work order
- Labor tracking to work order
- Direct charge PO's tracked back to work order
- Build accurate historical information
- Reason for work/failure codes
- Work Order Prioritization & Backlog Mgmt.
- Definitions for WO Types

Typical Work Order Life Cycle



Equipment Master Records

- Limits the level of equipment detail down to the major component. (Systems, Pumps, Compressors, Vessels, ...)
- Tracking of minor components handled through the use of 3 levels of fault coding, enabling users to track failures of minor components associated with major equipment. Eg: Motor failures, Seal failures, calibrations, ...
- Giving ability to manage asset records to Asset Owners

Preventive Maintenance

- PM's setup by calendar date or meter readings.
- Ability to link existing procedure documents to PM's
- Ability to forecast PM's
- Tracking overdue PMs

Work Order Processes

- Move away from use of Standing Work Orders for equipment maintenance costs
- Gate Keeper role for prioritization
- Better backlog management
- Improved status flows for work order types
- Rationalization of WO Types

Inventory Processes

- Replenishment based on commitment
- Planned material commitments
- Inventory Issues to Work Orders
- Materials issues to cost accounts and WO's
 - WO Planned & Unplanned Issues
 - Sales Orders to cost accounts with & without markup
 - Direct inventory issue to cost account

Finance Processes

- Chart of Accounts simplification
- Elimination of need for Work Order for every transaction – code transactions to BU's/Projects
- Ability to report WO costs by WO Type, not cost code

Purchasing Processes

- On line requisitions

Reporting and Queries

- Equipment/Work Order costing
- Equipment/Work Order history
- Failure reporting
- Work Order backlog
- PM reporting
- Parts/labor reporting
- Metrics

What's Next for Maintenance

Sustaining the Processes

- Maintenance “Champions” to work with Office of Asset Management (OAM) to continue development of Equipment Maintenance model
- The OAM to work with Engineering, Finance and Supply Chain business process owners (BPOs) to develop integrated processes and remove roadblocks to performance
- OAM to provide guidance and support to operating areas to validate and support the implementation of the process and software models to meet maintenance business requirements
- Measure performance

Make new functionality available

- Weekly Scheduling
- Metrics reporting
- Mobility options for maintainers