

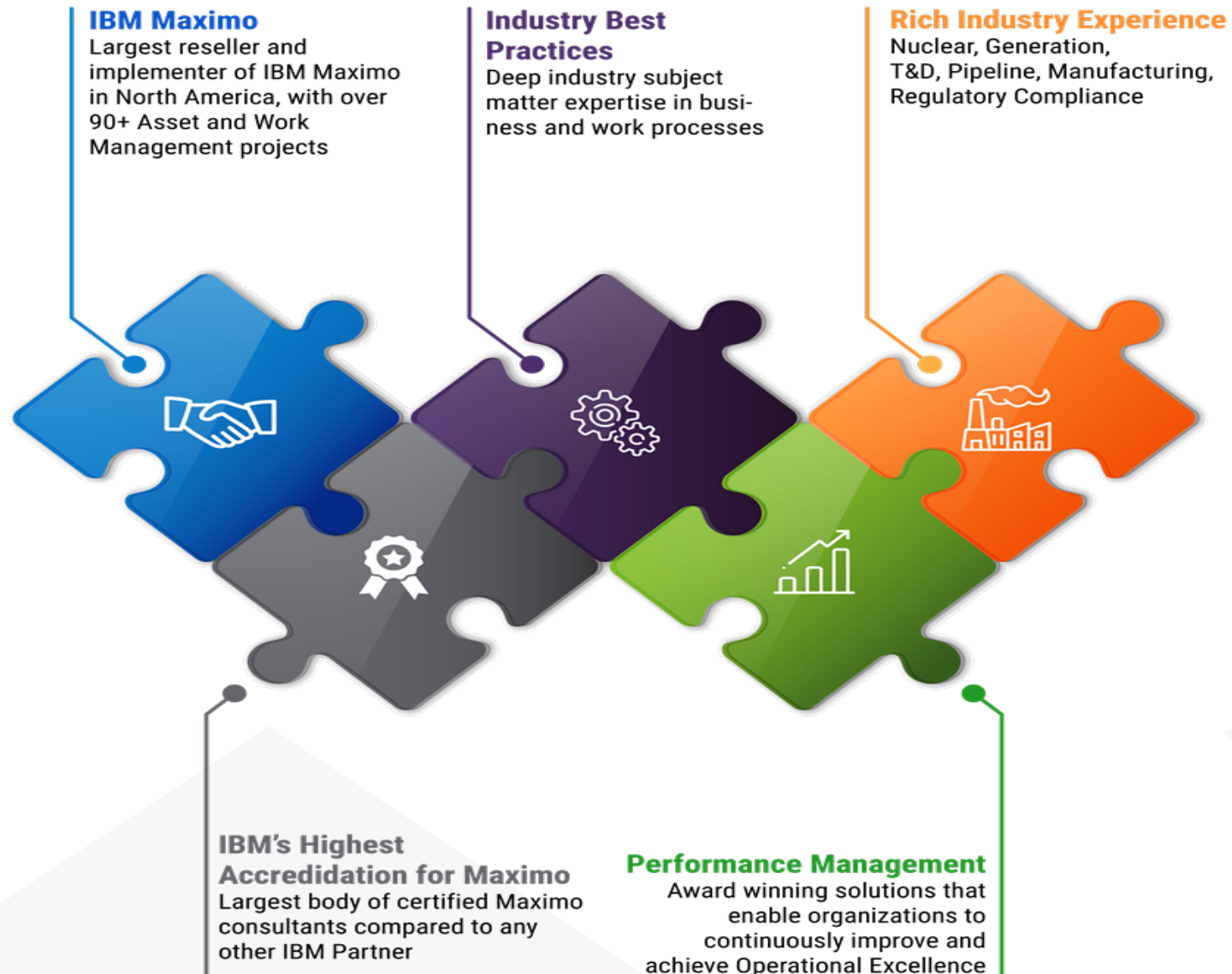
COHESIVE
solutions

RCM Extension for Maximo

Lance Morris, CFO, Founding Partner and Senior
Business Process Consultant



Company Highlights



Presenter

Lance Morris of Cohesive Solutions

- **CFO, Founding Partner and
Senior Business Process Consultant**



Lance is a seasoned consultant and Maximo solution architect supporting engagements involving mission critical technology initiatives for asset intensive industrial customers. Currently he is acting as a practice leader for EAM system projects encompassing work management, supply chain, and financial applications. His responsibilities include analyzing business processes, developing systems requirements, guiding system selection, reconciling commercial application functionality to business processes requirements, and application configuration solutions design.

Definition of Reliability Centered Maintenance:

If you ask ten Maintenance Professionals for their definition of RCM, you would likely get ten different answers. Most of them would encompass some of the simple principles listed below.

- Identify activities that are important to the business and why
- Identify potential events that prevent those activities from occurring and the resulting consequences
- Identify what can be done to prevent or mitigate the risk
- Apply continuous improvement to monitor the effectiveness of the risk prevention measures

Apply those Principles to Maximo:

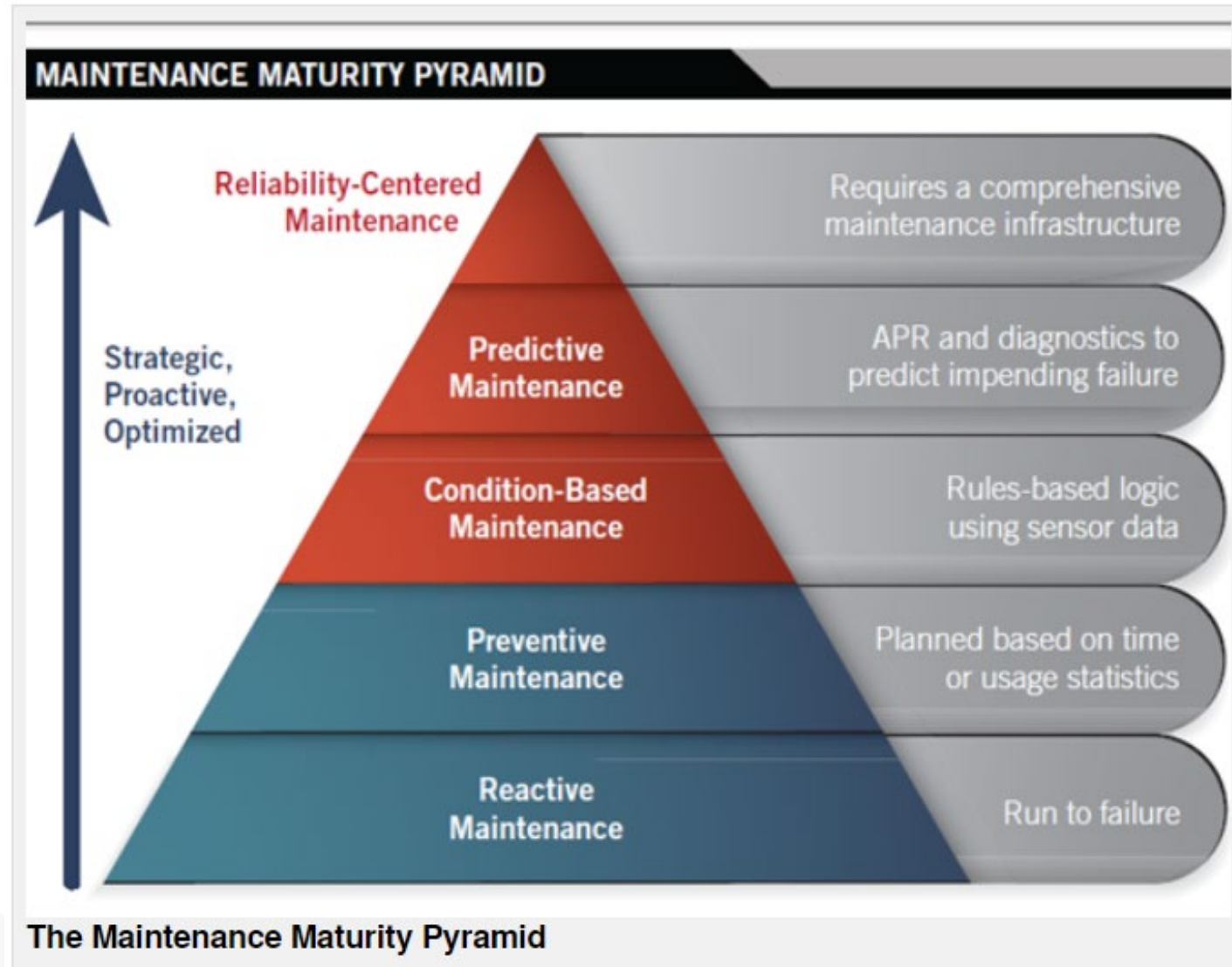
Maximo is a Work and Asset Management application. If you apply the principles from that context, you should be able to:

- Identify what equipment is important and why
- Identify how it fails and the resulting consequences
- Identify what will be done to prevent or mitigate the risk
- Capture and automatically disposition feedback on the effectiveness of those actions

RCM Progression

RCM is the pinnacle of the maintenance maturity model and will organize all levels into a comprehensive strategy

- ✓ Doing the right activities
- ✓ To the right assets
- ✓ At the right time



Considerations

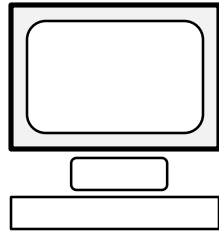
- How do you know you are performing the right PMs?
- and at the right frequency?
- What if the maintenance personnel have knowledge regarding asset performance but it is not being properly captured?
- What if the data being captured is all textual format?
- What if you are missing foundation data, e.g. locations, assets, failure/problem codes?
- What if your assets are not ranked in terms of criticality?
- Move to the end and reword

Defining what is important

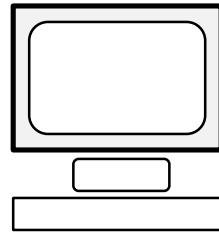
- We should understand and capture the design function of the Operating Location (what is it supposed to do)?
- How critical is the Operating Location to the process?
- If critical, how does it fail and what are the consequences of each failure?
- And what other considerations might affect the performance of the equipment?

Cohesive RCM Extension

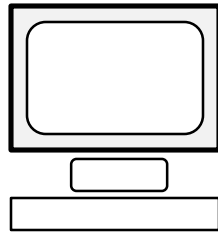
There are no new screens, but **alterations** to existing Maximo screens have been made, such as adding new tabs.



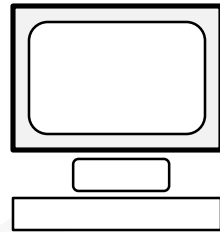
Locations,
RCM FMEA



Locations,
RCM
Streamline

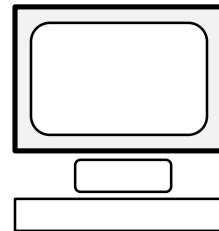


Work Order
Work
Completion

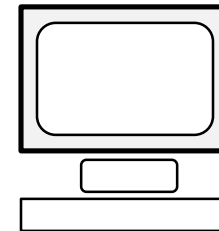


Work Order
Planning and
task or
equipment
feedback

Standard Tools used:
*Application Designer, Database
Configuration, Domains, Escalations,
Notifications, Workflow*



Master PM



PM main,
RCM tab

No customization to Maximo is required which means this solution is easily upgradable.

RCM FMEA Tab on Locations/Assets

Locations
Lance Morris

Find Location

List View
Location
Assets
History
Safety
Meters
Specifications
RCM FMEA
RCM Stream
Service Address
Map

Location:

CISPUMP1 Feed Water Pump- Centrifugal/100GPM/60FTHD

Site:

BEDFORD

Design Function:

Provide main feedwater makeup to the boiler.

Failure Class:

PUMPS >>

Criticality:

1 Critical

Environment:

CONTROLLED Temperature and Humidity Controlled

Duty Cycle:

CONTINUOUS Equipment operated on a continuous basis during operation

Problem Modes and Effects (FMEA) > 1 - 4 of 4

Problem	Consequences	Functional Failure?	Personnel Safety?	Environmental?	
LEAK	Leaks that don't affect pressure or volume should have minimal impact to load	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
LOWPRES	Reduction in pressure could affect high pressure turbine inlet pressure.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
LOWVOL	Reduction in volume could result in power reduction.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
STOPPED	Reduction in load capacity by at least 40 percent.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

New Row

Maintenance Strategy for Problem LEAK > 1 - 1 of 1

PM	Description	Frequency	Frequency Units	Estimated Next Due Date
CISPM01	Inspect pump and surrounding area for any evidence of leaks.	1 MONTHS		4/27/17

RCM FMEA Tab on Locations/Assets – FMEA Table

Problem Modes and Effects (FMEA) [Filter](#) 1 - 4 of 4

	Problem	Consequences	Functional Failure?	Personnel Safety?	Environmental?	
	LEAK	Leaks that don't affect pressure or volume should have minimal impact to load	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
	LOWPRES	Reduction in pressure could affect high pressure turbine inlet pressure.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	LOWVOL	Reduction in volume could result in power reduction.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
	STOPPED	Reduction in load capacity by at least 40 percent.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

Details

* Problem:

LEAK

Consequences:

Leaks that don't affect pressure or volume should have minimal impact to load

Job Plan:

Functional Failure?

☐

Personnel Safety?

☒

Environmental?

☐

Production Impact:

5,000.00

Repair Impact:



5,000.00

New Row

RCM FMEA Tab on Locations/Assets – Strategy Table

Maintenance Strategy for Problem LEAK

[Filter](#) >     1 - 1 of 1  

	PM 	Description	Frequency	Frequency Units	Estimated Next Due Date
	CISPM01	Inspect pump and surrounding area for any evidence of leaks.		1 MONTHS	4/27/17

Details

PM:

CISPM01



Pump Inspection



Strategy Description:

Inspect pump and surrounding area for any evidence of leaks



Frequency:

1

MONTHS

Estimated Next Due Date:







4/27/17

Last Completion Date:

RCM Tab on Preventive Maintenance

Preventive Maintenance

Find PM



List View

PM

Frequency

Seasonal Dates

Job Plan Sequence

PM Hierarchy

RCM


Forecast

Forecast Cost

PM:

CISPM01

Pump Inspection




Location:

CISPUMP1


»

Feed Water Pump- Centrifugal/100GPM/60FTHD




Asset:

»




PM Basis:

Inspect the pump, seals and surrounding area for any leaks or abnormal behavior



Frequency Basis:

Inspect monthly for any pumps that operate continuously.



Site:

BEDFORD

Status:

ACTIVE










Failure Class:





PUMPS

Forecast Exists?

☐

Problem Codes and Strategy


 Filter >     1 - 2 of 2    

	Problem	Description	
	LOWPRES	maintain pressure boundary	
	LEAK	Inspect pump and surrounding area for any e	

Details


Problem:

LEAK



Description:

Inspect pump and surrounding area for any evidence of leaks.





A Streamlined Approach

Design Considerations:







- It may not be justified to do a detailed **FMEA** on each critical or important Location
- How do we capture meaningful data at an equipment type level as a starting point?
- Leverage Master PM's

Master PM



Master PM

Find Master PM



List View

Master PM

Frequency


Seasonal Dates

Job Plan Sequence

Master PM:


CISPMP1

Pump Inspection




Criticality:


1




Environment:



Duty Cycle:




Attachments




Organization:

EAGLENA




Failure Class:

PUMPS




Item:



Item Set:

SET1



Create Associated PMs for Item's Location?

☒

Create Associated PMs for Item's Asset?

☒


Work Order Information

Lead Time

Update Work Order Information on Existing PMs?


Work Type:

PM



Work Order Status:

WSCH



Work Order Priority:

0

Lead Time (Days):

0

Lead Time Active?

☒

Interruptible?

☐

Problem Codes for Master PM

Filter

1 - 1 of 1

Problem	Description
LEAK	Observation and management of Leaks as we

New Row

RCM Streamline on Locations/Assets

Home

Menu

Locations

Find Location

List View

Location

Assets

History

Safety

Meters

Specifications

RCM FMEA

RCM Stream

Service Address

Map

Location:

CISPUMP1

Feed Water Pump- Centrifugal/100GPM/60FTHD

Site:

BEDFORD

Design Function:

Provide main feedwater makeup to the boiler.

Failure Class:

PUMPS

Criticality:

1

Critical

Environment:

CONTROLLED

Temperature and Humidity Controlled

Duty Cycle:

CONTINUOUS

Equipment operated on a continuous basis during operation

Recommended Maintenance Strategy

[Filter](#)

1 - 3 of 3

	Master PM	Description	Frequency	Frequency Units
	CISPMP1	Pump Inspection	1 MONTHS	
	CISPMP10	Pump Service	6 MONTHS	
	CISPMP20	Pump Overhaul	60 MONTHS	

Current Maintenance Strategy

[Filter](#)

1 - 6 of 6



Work Order Post Work Tab

- Capture Details of work performed in searchable format
- Gather feedback on the quality of the planning process for continuous improvement
- Preventive Maintenance Work Order
 - Capture as found condition of the component
 - Gather feedback to scope and frequency adequacy
- Corrective Maintenance on Non-Run-To-Failure Component
 - Gather feedback on preventing a MPFF







Process is as important as technology


- Once feedback is captured, then routing of information begins
- Each plant/facility can setup routing unique to their organization e.g. escalations/notifications.
- Push actions versus pulling from reports
- Used to bootstrap or build missing data elements
- Continuous Improvement Accountability










Work Order Post Work Tab



Work Order Tracking

Lance Morris

Find Work Order



List View

Work Order

Plans

Assignments

Related Records

Actuals

Safety Plan

Log

Data Sheet

Post Work


Specifications

Service Address

Map

Work Order:

43005

11340 PM WORK


Site:

BEDFORD


Status:

APPR

Completion Code:



Actual Work Performed:










Planning Feedback

Corrective Feedback

Preventive Feedback

Failure Reporting

Planning Feedback

 Filter >  0 - 0 of 0 

Feedback ID	Recommendation	Type	Created By	Assigned To	Status
There are no rows to display.					

New Row

Work Order Planning Feedback

Planning Feedback [Filter](#) > 1 - 1 of 1

Feedback ID	Recommendation	Type	Created By	Assigned To	Status
403			LMORRIS		NEW

Feedback ID:

403

Created By:

LMORRIS >> 12/21/18

Type:

Recommendation:

Status:

NEW

Assigned To:

>>

Due Date:

Action Taken:

New Row

Work Order Corrective Feedback

Planning Feedback

Corrective Feedback

Preventive Feedback

Failure Reporting

Design Function:

Provide main feedwater makeup to the boiler.

Did the Equipment Fail to meet its design function:



Could the failure have been prevented:



What could prevent the failure:



Work Order Preventive Feedback

Planning Feedback

Corrective Feedback

Preventive Feedback

Failure Reporting

PM Basis:

Inspect the pump, seals and surrounding area for any leaks or abnormal behavior

Frequency Basis:

Inspect monthly for any pumps that operate continuously.

PM As Found Condition:

2

Repair/Replace - Not Due to normal wear

PM Adequate:

NO

PM Frequency OK:

YES

What needs to be improved:

Increase frequency of ceramic seal inspection to twice/month.

Failure Modes addressed by the PM

Filter

1 - 2 of 2

Problem	Strategy Description
LOWPRES	maintain pressure boundary
LEAK	Inspect pump and surrounding area for any e

Cohesive RCM Extension

Using Maximo to Build/Optimize the Process

- **Escalations** along with **Workflow/Notifications** help automate the review process and leverage the data.
- This feedback can be used to help build missing foundation data and fill in the blanks.
- Escalations/Workflow can be used to act on and track responses to feedback.
- Escalations can also be used to mine the data for anomalies which need follow up and provide Notifications.

Maximo Start Center

Welcome, Maximo

Bulletins: (0) [Go To](#) [Reports](#) [Start Center](#) [Profile](#) [Sign Out](#) [Help](#)

[Update Start Center](#)

Quick Insert

- [New Asset](#)
- [New Item](#)

Bulletin Board [Filter](#)

Subject	Message	Post Date	Expiration Date	Viewed
				N

There are currently no bulletin board messages to view.

Authorized Assets

- [Assets](#)
- [Receiving](#)
- [Item Master](#)
- [Inventory](#)
- [Locations](#)

Stocked IT Assets [Filter](#)

ITEMNUM	ASSETNUM	DESCRIPTION	LOCATION
D700	A8011	Standard Desktop Computer	HWSTOCK
D600	7500	Standard Laptop Computer	HWSTOCK
D600	7400	Standard Laptop Computer	HWSTOCK
D600	7300	Standard Laptop Computer	HWSTOCK
D600	7505	Standard Laptop Computer	HWSTOCK

Deployed Assets

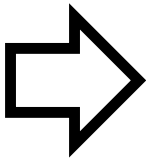
You do not have access to the selected actions.

Inbox / Assignments (13) [Refresh](#)

Next Assignment Due: 4/28/2009 12:00:00 AM














Description	Due Date	Start Date	Route
Review WO 1019 for failure mode not previously analyzed	6/18/07 2:00 PM	6/18/07 2:00 PM	
WO 1161 has suggestions to improve PM PM-PUMP	6/18/07 2:00 PM	6/18/07 2:00 PM	
Review WO 40093, maintenance strategy did not prevent LOWVOL as expected	6/18/07 2:00 PM	6/18/07 2:00 PM	
Review WO 31150 for failure mode not previously analyzed	6/18/07 2:00 PM	6/18/07 2:00 PM	
WO 1162 has suggestions to improve PM PM-PUMP	6/18/07 2:00 PM	6/18/07 2:00 PM	
WO 1163 has suggestions to improve PM PM-PUMP	6/18/07 2:00 PM	6/18/07 2:00 PM	
WO 3001 is a CM work order for Location BR200 which does not have a criticality assigned	6/18/07 3:00 PM	6/18/07 3:00 PM	
WO 1025 is a CM work order for Location BPM3100 which does not have a criticality assigned	6/18/07 3:00 PM	6/18/07 3:00 PM	
WO 1213 has suggestions to improve PM	4/19/09 10:06 AM	4/19/09 10:06 AM	

**Inbox
Messages
from
Workflow**



Maximo Start Center

Inbox - examples

Inbox / Assignments (13)			
Next Assignment Due: 4/28/2009 12:00:00 AM			
Refresh			
Description	Due Date	Start Date	Route
Review WO 1019 for failure mode not previously analyzed	6/18/07 2:00 PM	6/18/07 2:00 PM	
WO 1161 has suggestions to improve PM PM-PUMP	6/18/07 2:00 PM	6/18/07 2:00 PM	
Review WO 40093, maintenance strategy did not prevent LOWVOL as expected	6/18/07 2:00 PM	6/18/07 2:00 PM	
Review WO 31150 for failure mode not previously analyzed	6/18/07 2:00 PM	6/18/07 2:00 PM	
WO 1162 has suggestions to improve PM PM-PUMP	6/18/07 2:00 PM	6/18/07 2:00 PM	
WO 1163 has suggestions to improve PM PM-PUMP	6/18/07 2:00 PM	6/18/07 2:00 PM	
WO 3001 is a CM work order for Location BR200 which does not have a criticality assigned	6/18/07 3:00 PM	6/18/07 3:00 PM	
WO 1025 is a CM work order for Location BPM3100 which does not have a criticality assigned	6/18/07 3:00 PM	6/18/07 3:00 PM	
WO 1213 has suggestions to improve PM	4/19/09 10:06 AM	4/19/09 10:06 AM	
WO 1214 has suggestions to improve PM	4/20/09 7:21 AM	4/20/09 7:21 AM	
WO 1215 has suggestions to improve PM ML-PUMP	4/20/09 6:01 PM	4/20/09 6:01 PM	
WO 1216 has suggestions to improve PM ML-PUMP	4/21/09 9:27 AM	4/21/09 9:27 AM	
WO 1218 has suggestions to improve PM ML-PUMP	4/28/09 11:27 AM	4/28/09 11:27 AM	

1 to 13 of 13

RCM Extension - in Summary

- Cohesive Solutions helps organizations improve **equipment reliability** using technology, process and leading practices.
- The RCM Extension assists the Maintenance/Engineering staff by **storing** feedback, creating actionable data, setting up automated reviews.
- This analysis supports continuous improvement through enhanced PM/PdM strategies which in turn helps staff work on the right asset at the right time.

Questions

Inquiries and References

Additional Information

- [RCM Extension for Maximo](#)
- [RCM Blogs](#)

Contact Information

Lance Morris

lmorris@cohesivesolutions.com

www.cohesivesolutions.com

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