

Support Technical Exchange: Preventive Maintenance and Condition Monitoring

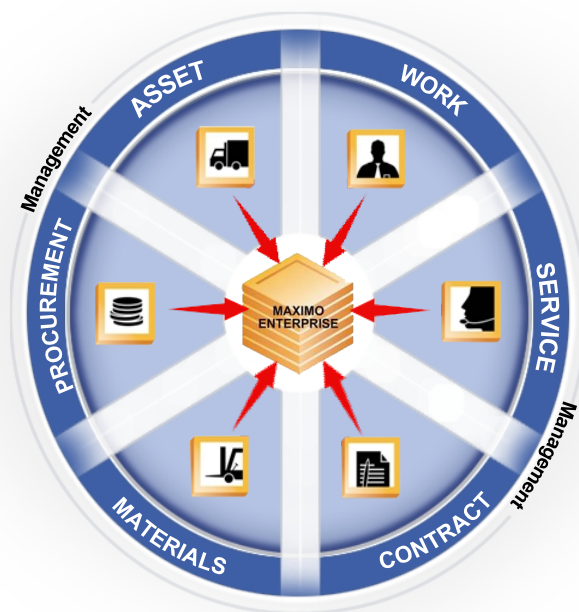
Ed Jones
23 Aug 2012



Introduction

- Abstract:

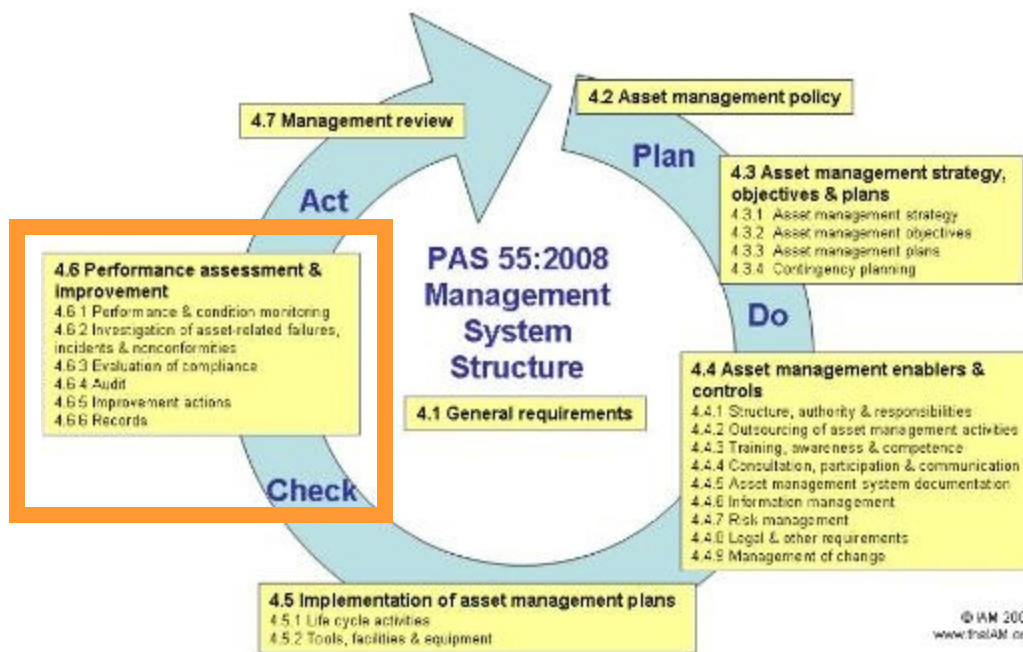
To provide an overview of the Preventive Maintenance and Condition Monitoring applications in Maximo 7.5 and point out the changes since Maximo 6



Definitions

- Preventive maintenance (PM) is a maintenance program with activities initiated at **predetermined intervals**, and intended to reduce the probability of failure, or the degradation of the functioning of an item. (Linear and Nonlinear Preventive Maintenance Models, Wu)

- It is typically divided into
 - Planned
 - Condition-based



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Maximo Applications

- Preventive Maintenance
 - Org App
 - Preventive Maintenance
 - NEW Forecasting
 - Master PM

- Condition Monitoring

Preventive Maintenance (PM) Application – (Org App)

PM Options

Sites: Filter > 1 - 5 of 8 > Download

Site	Description
TEXAS	SAN ANTONIO TEXAS SITE OF EAGLE NA
NASHUA	Nashua Site of Eagle Inc. North America
MCLEAN	McLean IT Operations Center
LAREDO	MEXICO SITE OF EAGLE NA
HARTFORD	Hartford, CT Site of Eagle Inc. North America

PM Options

Generate WOs Due on the Current Date Plus This Number of Days:

Use Priority from Job Plans on Sequenced PMs?

Use Frequency Criteria?

Base Work Order Generation on Meter Reading Only (Do Not Estimate)?

Generate PM Alerts for Assets When Corrective Maintenance Work Order Status is:

Stand-alone PM Work Order Generation Process Settings

Automatic PM WO generation?

WO Generation Where Clause:

E-mail Address Notification:

Stand-alone Condition Monitoring Work Order Generation Process Settings

Automatic MeasurePoint WO generation?

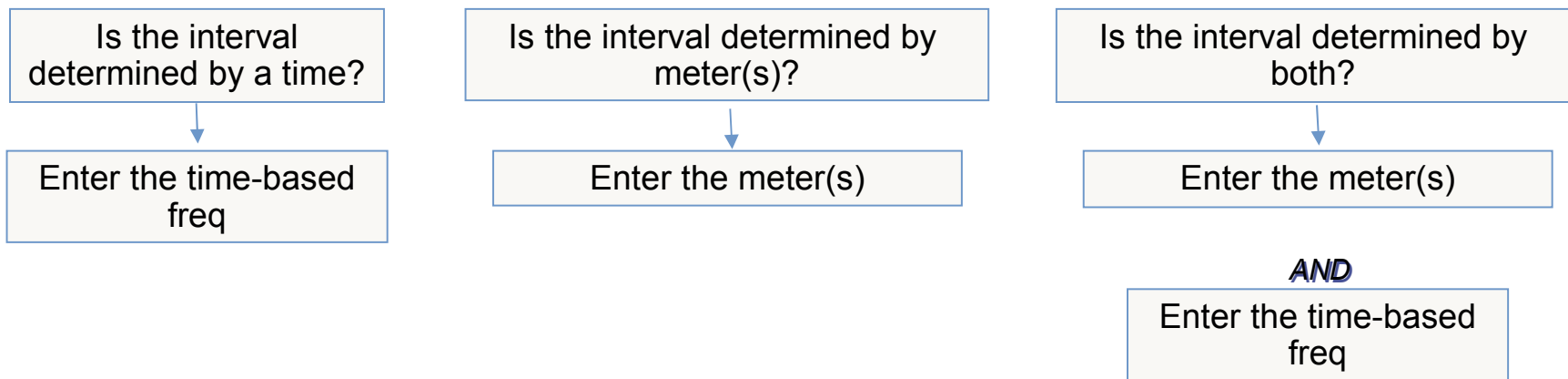
Use Action Limits as Work Order Generation Criteria?

E-mail Address Notification:

PM Application

The screenshot displays the 'Preventive Maintenance' application interface. At the top, there is a navigation bar with 'Bullets: (0)', 'Go To', 'Reports', 'Start Center', 'Profile', 'Sign Out', and 'Help'. Below this is a search bar with 'Find:' and 'Select Action' options. The main interface is divided into several sections: 'List' (with tabs for PM, Frequency, Seasonal Dates, Job Plan Sequence, PM Hierarchy, Forecast), 'Details', 'Work Order Information', 'Resource Information', and 'Responsibility'. The 'Details' section includes fields for Location, Asset (CAL101), Route, and Job Plan (JPCAL101). The 'Work Order Information' section shows Job Plan (JPCAL101), Work Type (CAL), Work Order Status (APPR), Priority (2), and various dates. The 'Responsibility' section shows the Supervisor (DASHELL). A 'Generate Work Orders' dialog box is open in the foreground, featuring a 'Generate WOs Due Today Plus This Number of Days' field (set to 0), a 'Use Frequency Criteria?' checkbox (checked), a 'Run Work Order Generation in the Background?' checkbox (unchecked), and a 'Notification E-mail for Work Order Generation' field. The dialog box has 'OK' and 'Cancel' buttons at the bottom right. An orange box highlights the 'Lead Time (Days): 0' field in the 'Details' section.

PM Application – (Frequency Tab)



Note: All meters require an average calculation, even if you plan to use exact meter readings to drive PMs. The average is used for forecasting purposes.

PM Application – (Frequency Tab)

Preventive Maintenance

Bulletins: (0) Go To Reports Start Center Profile Sign Out Help IBM.

Find: Select Action

List PM Frequency Seasonal Dates Job Plan Sequence PM Hierarchy Forecast

PM: 1008 Calibration 101 Site: BEDFORD Status: ACTIVE Forecast Exists?

Work Order Generation Information

Use Last Work Order's Start Date to Calculate Next Due Date?

Generate Work Order Based on Meter Readings (Do Not Estimate)?

Generate Work Order When Meter Frequency is Reached?

Time Based Frequency Meter Based Frequency

Use Last Work Order's Start Date to Calculate Next Due Date?

Extended Date:

Adjusted Next Due Date?



Check this option to keep a fixed schedule. Uncheck it to have a 'floating' schedule (for example if the PM work will keep the asset will be in the shop for a number of days)

PM Application – (Frequency Tab)

Preventive Maintenance

Bulletins: (0) Go To Reports Start Center Profile Sign Out Help IBM.

Find: [] Select Action []

List PM Frequency Seasonal Dates Job Plan Sequence PM Hierarchy Forecast

PM: 1008 Calibration 101 Site: BEDFORD Status: ACTIVE Forecast Exists?

Work Order Generation Information

Use Last Work Order's Start Date to Calculate Next Due Date?

Generate Work Order Based on Meter Readings (Do Not Estimate)?

Generate Work Order When Meter Frequency is Reached?

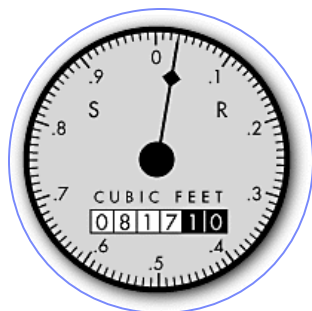
Time Based Frequency Meter Based Frequency

• Frequency []

• Frequency Units: DAYS Estimated Next Due Date: [] Adjust Next Due Date?

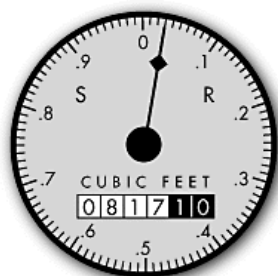
A bit about meters...

- There are three types of meters in Maximo
 - Continuous (aka counters)
 - Numeric
 - Odometer, etc
 - Gauge (aka fluctuating)
 - Numeric
 - Thermometer, etc
 - Characteristic (aka observation)
 - Domain (list of values)
 - Oil color, etc

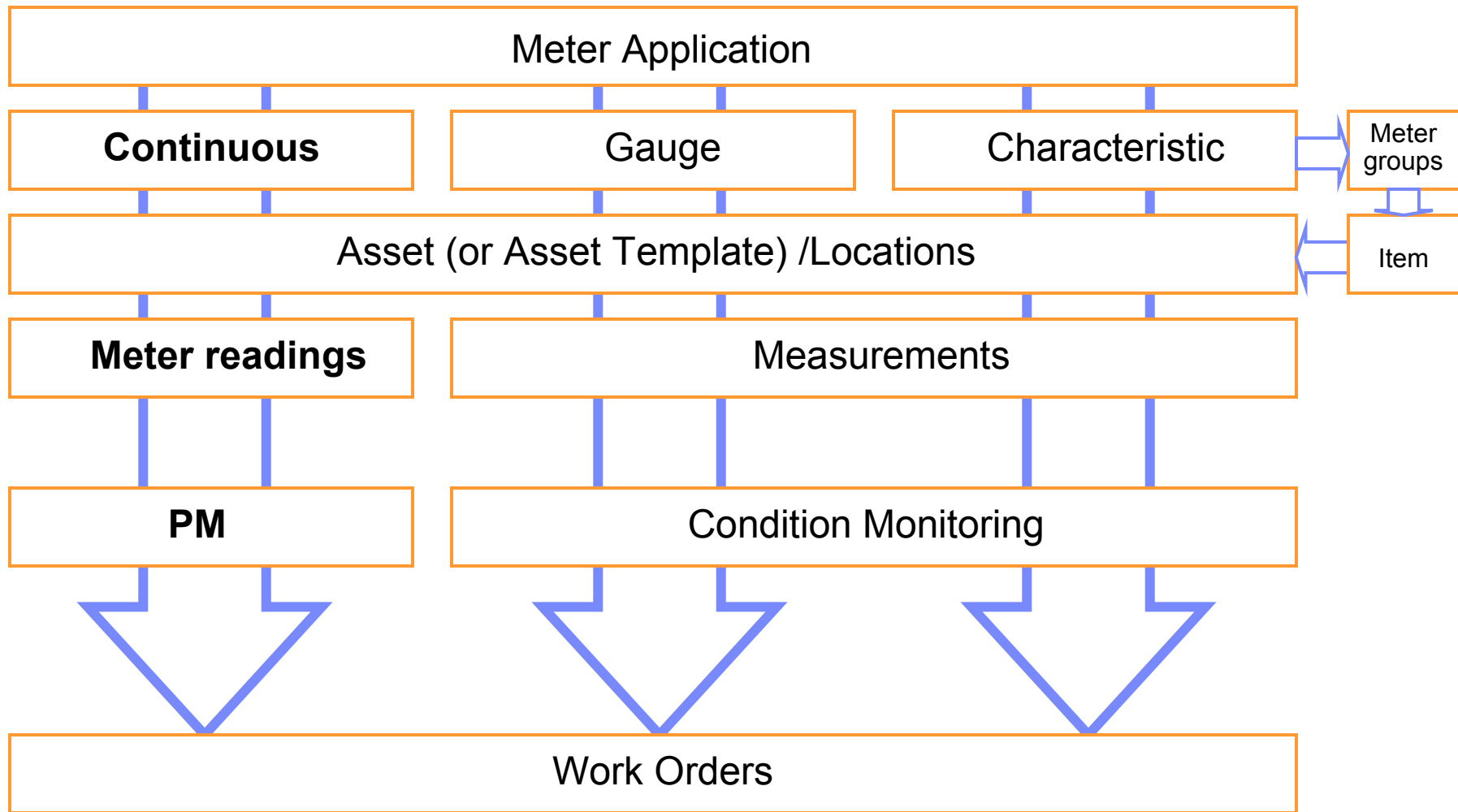


A bit about meters...

- They are all 'abstract' meters, typically a (non-asset) component of an asset (e.g. a car odometer) or non-existent (e.g. tracking run hours manually)
- If you have a physical meter that you are managing, create it as an asset
 - This is the approach for utility meters

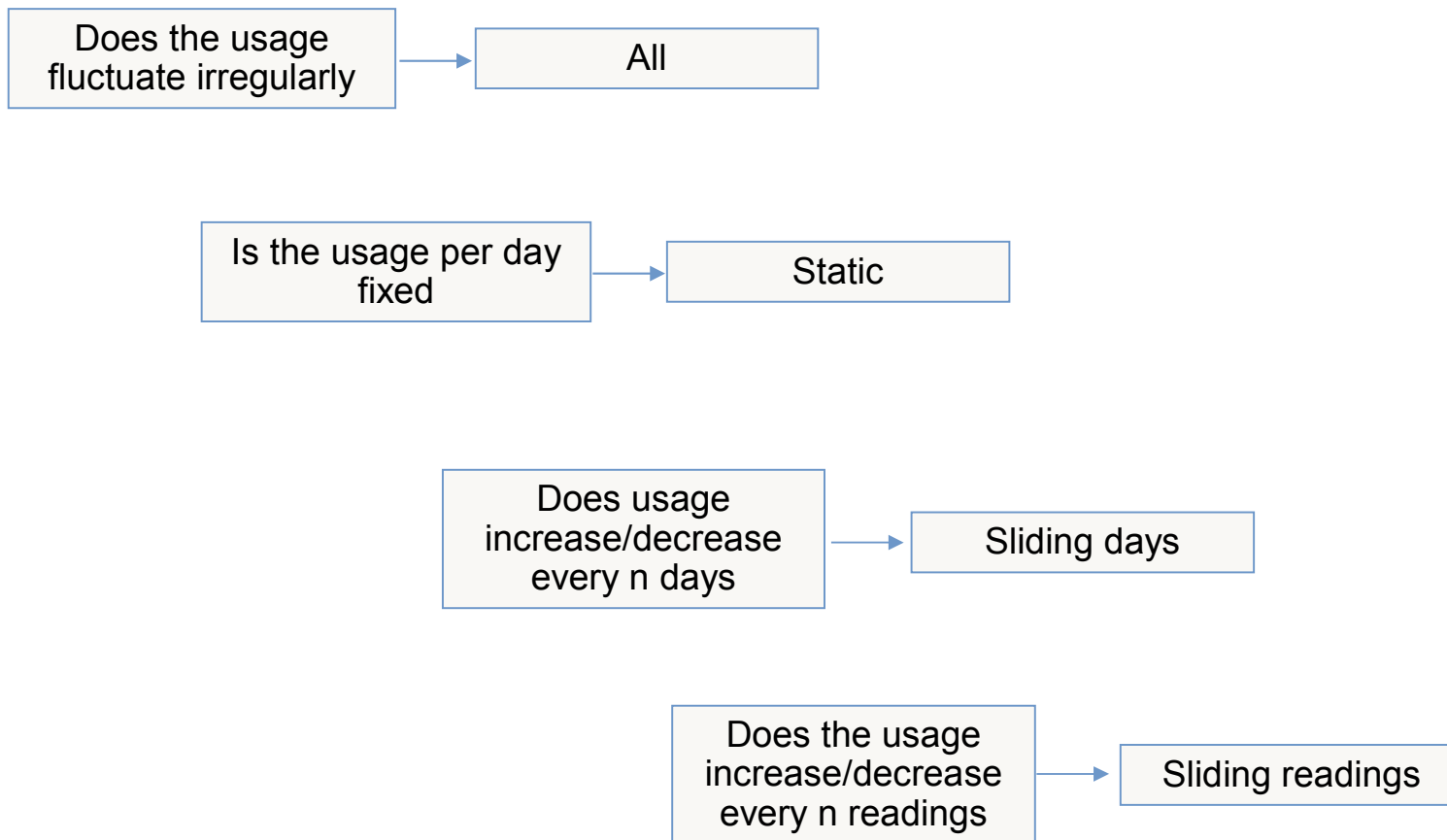


A bit about meters...



PM Application – (Frequency Tab)

Meter average calculation methods (Asset App)



PM Application – (Frequency Tab)

- Meter-based PMs allow users to generate work orders with greater accuracy by leveraging usage in lieu of time-based estimates.
- Accuracy is only achieved, however, if the meter readings in Maximo kept in sync with the meter readings of the asset. This means entering readings into Maximo as soon as possible after they are obtained.



To further increase accuracy, the 'Do Not Estimate' option should be used. Average meter readings were used for work order generation prior to the existence of meter reading history, and are now only recommended for forecasting resources.

PM Application – (Seasonal Dates Tab)

Preventive Maintenance

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

Find: Select Action

List PM Frequency **Seasonal Dates** Job Plan Sequence PM Hierarchy Forecast

PM: 1008 Calibration 101 Site: BEDFORD Status: ACTIVE Forecast Exists?

Active Days

Sunday? Monday? Tuesday? Wednesday? Thursday? Friday? Saturday?

Schedule Early on Frequency Conflict?

Active Time

Target Start Time: 12:00

Active Dates Filter 0 - 0 of 0 Download

Start Month	Start Day	End Month	End Day
...No rows to display...			

New Row

Want PMs only to be generated M-F? Then use active days

PM Application – (Seasonal Dates Tab)

Preventive Maintenance

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

Find: Select Action

List PM Frequency Seasonal Dates Job Plan Sequence PM Hierarchy Forecast

PM: 1008 Calibration 101 Site: BEDFORD Status: ACTIVE Forecast Exists?

Active Days

Sunday? Monday? Tuesday? Wednesday? Thursday? Friday? Saturday?

Schedule Early on Frequency Conflict?

Active Time

Target Start Time: 12:00

Active Dates: Filter 0 - 0 of 0 Download

Start Month	Start Day	End Month	End Day
...No rows to display...			

New Row

Want to ensure work orders for inactive days are pulled in, and not pushed out?

Check **Schedule Early on Frequency Conflict?**



PM Application – (Seasonal Dates Tab)

Want to set a start time on the work orders?

Set the Target Start Time:



PM Application – (Seasonal Dates Tab)

Preventive Maintenance

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

Find: Select Action

List PM Frequency **Seasonal Dates** Job Plan Sequence PM Hierarchy Forecast

PM: 1008 Calibration 101 Site: BEDFORD Status: ACTIVE Forecast Exists?

Active Days

Sunday? Monday? Tuesday? Wednesday? Thursday? Friday? Saturday?

Schedule Early on Frequency Conflict?

Active Time

Target Start Time: 12:00

Active Dates: Filter 0 - 0 of 0 Download

Start Month	Start Day	End Month	End Day
...No rows to display...			

New Row



Did you know that by creating a PM with a frequency of 1 day, an ‘Active Date’ window for each month, from 1-7, and setting the ‘Active Days’ to Monday, you’ll get a PM on the first Monday of each month?

PM Application – (Job Plan Sequence Tab)

Preventive Maintenance

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

Find: Select Action

List PM Frequency Seasonal Dates Job Plan Sequence PM Hierarchy Forecast

PM: 1008 Calibration 101 Site: BEDFORD Status: ACTIVE Forecast Exists?

Location: Storeroom:

Asset: CAL101 Calibration 101 Storeroom Site: BEDFORD

Job Plan: JPCAL101 JP Calibration 1101

Job Plan Sequence Filter 1 - 1 of 1 Download

Job Plan	Description	Sequence
JPCAL101	JP Calibration 1101	1

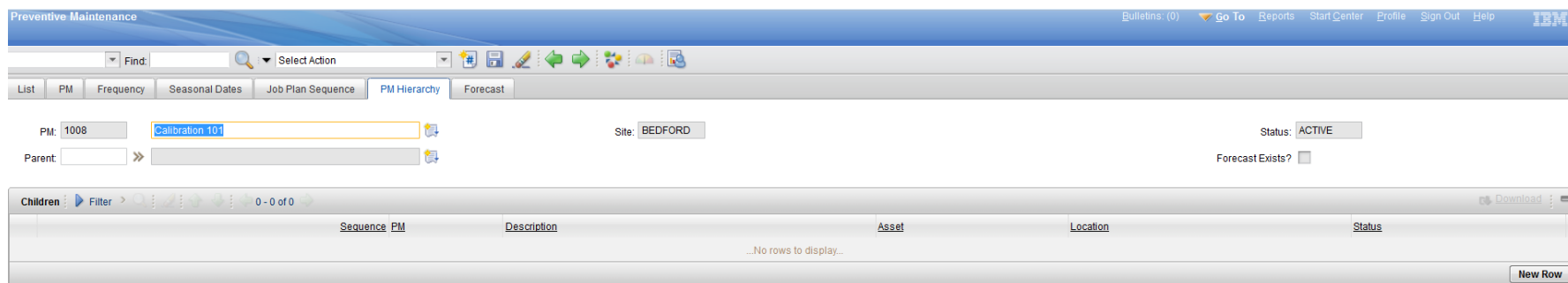
New Row

Used to rotate through a series of job plans (e.g. Monthly, Quarterly, Annual)



The Job Plan is selected by dividing the PM Counter by the Sequence #. The largest, divisible sequence # will be selected.

PM Application – (PM Hierarchy Tab)



Used to as a means of creating a hierarchy of work orders



*You can determine which PMs in the hierarchy trigger the hierarchy when they become due via the **Use this PM to Trigger PM Hierarchy?** Checkbox on the main tab*

PM Application – (PM Forecast Tab)



Preventive Maintenance

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

Find: Select Action

List PM Frequency Seasonal Dates Job Plan Sequence PM Hierarchy Forecast

PM: 1008 Calibration 101 Site: BEDFORD Status: ACTIVE

Forecast Dates Locked? Reforecast Subsequent Dates?

Forecast Details Filter 0 - 0 of 0 Download

Forecast Date	Job Plan	New Date	Changed By	Changed Date	Remarks	Reforecast Pending?
...No rows to display...						

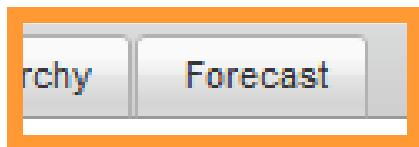
Process Pending Reforecast

Used to project resource requirements without generating actual work orders



Meter-based forecasts will use the average meter units per day calculation – even when the PM itself will use the exact meter reading...Remember – this is a forecast...

PM Application - Forecast



Preventive Maintenance

Find: [] Select Action []

List PM Frequency Seasonal Dates Job Plan Sequence PM Hierarchy **Forecast**

PM: 1008 Calibration 101

Master PM: []

Site: BEDFORD Status: ACTIVE

Override Updates from Master PM? Forecast Dates Locked? Attachments [] Forecast Exists?

Details

Location: [] Asset: CAL101 Calibration 101 Route: []

Lead Time (Days): 0 Lead Time Active?

Work Order Information

Job Plan: JPCAL101 Description: JP Calibration 1101

Work Type: CAL Last Start Date: 2/15/11

Work Order Status: APPR Last Completion Date: []

Priority: 2 Earliest Next Due Date: 8/20/12

Interruptible? Start Constraint Offset: []

Require Asset Downtime? Finish Constraint Offset: []

Responsible

Supervisor: DASHIELL

Resource Information

GL Account: [] Store room: []

Use this PM to Trigger PM Hierarchy? Child Work Orders and Tasks Will Inherit Status Changes?

Forecast Exists?

Forecast Dates Locked?

Include this PM in the Forecast?

PM Application - Forecast

Generate Forecast

Enter the period of time for which to forecast preventive maintenance records. The forecast can be run in the background. Forecasted dates will appear on the Forecast tab.

Last Forecast Date:

* Forecast Until:

* Forecast For (Days):

Run Forecast Generation in the Background?

Notification E-mail for Forecast Generation:

NOTE: If reforecast is pending, forecast dates will be adjusted appropriately when this action is executed.

Preventive Maintenance

Find:

List PM Frequency

PM: 1008

Master PM:

Details

Location:

Asset: CAL101

Route:

Work Order Information

Resource Information

GL Account:

Storeroom:

Use this PM to Trigger PM Hierarchy?

Child Work Orders and Tasks Will Inherit Status Changes?

PM Application – (PM Forecast Tab)

■ Time-based PMs

- First Forecast Date = Estimated Next Due Date
 - where Estimated Next Due Date = Current Date + Frequency (Frequency/Units)
- Subsequent Forecast Dates = Previous Forecast Date + Frequency

■ Meter-based PMs

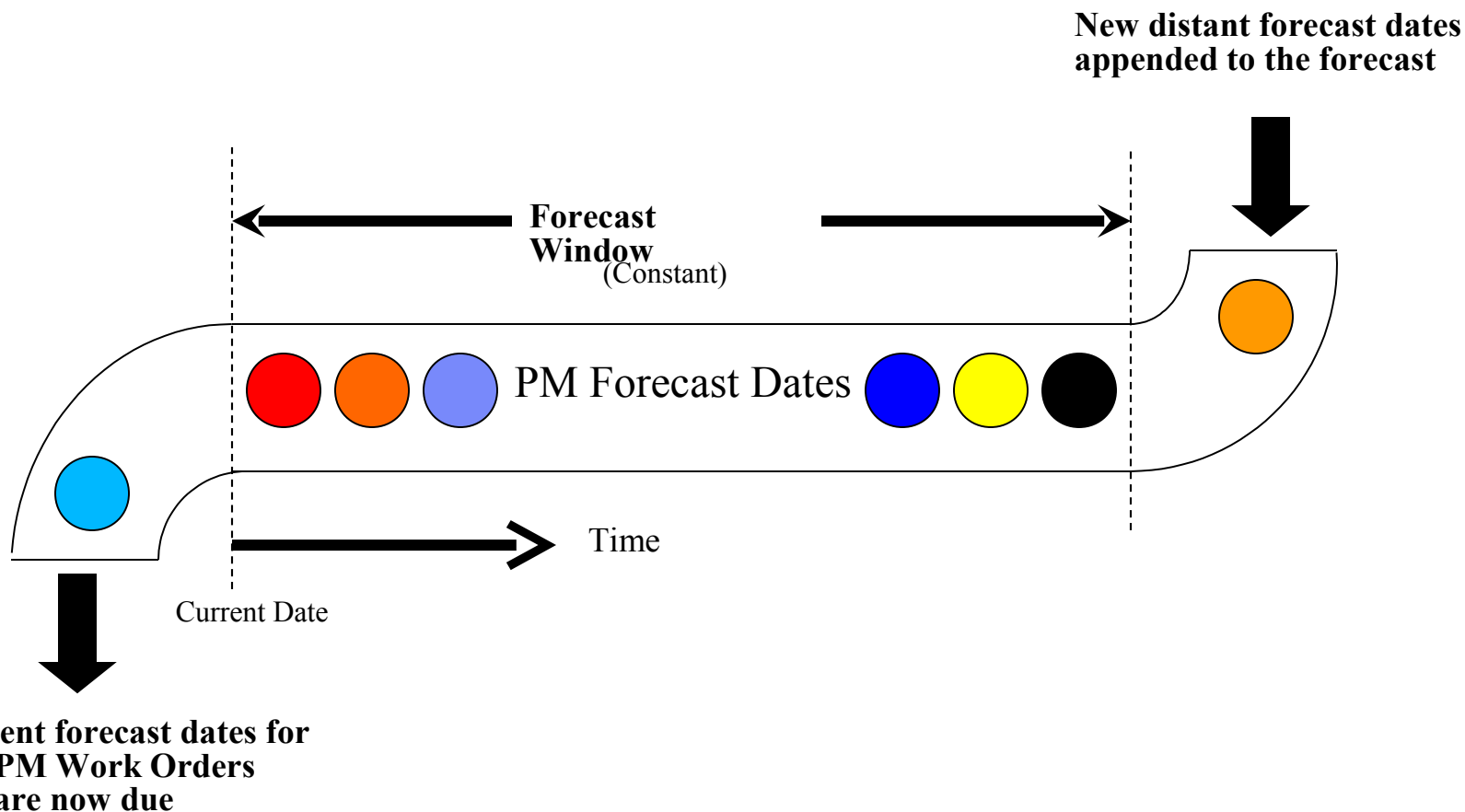
- Estimated Next Due Date = Last Start Date + (Meter Frequency days/Average Meter Units per Day)
- Subsequent Forecast Dates = Previous Forecast Date + (Meter Frequency days/Average Meter Units per Day)

PM Application – (PM Forecast Tab)

- Created to work in conjunction with Maximo Asset Management SchedulerSingle forecast for a PM
 - Utilizing the same PM criteria already used in the PM application
 - Definable forecast range
 - Respects Seasonality, Hierarchy, Job Plan Sequence just as the current PM application does
 - Editable forecast dates
 - Cron task to leverage an automated means to maintain the “forecast window”
 - Stays in lock step synchronization with the generation of PM WO from the PM application

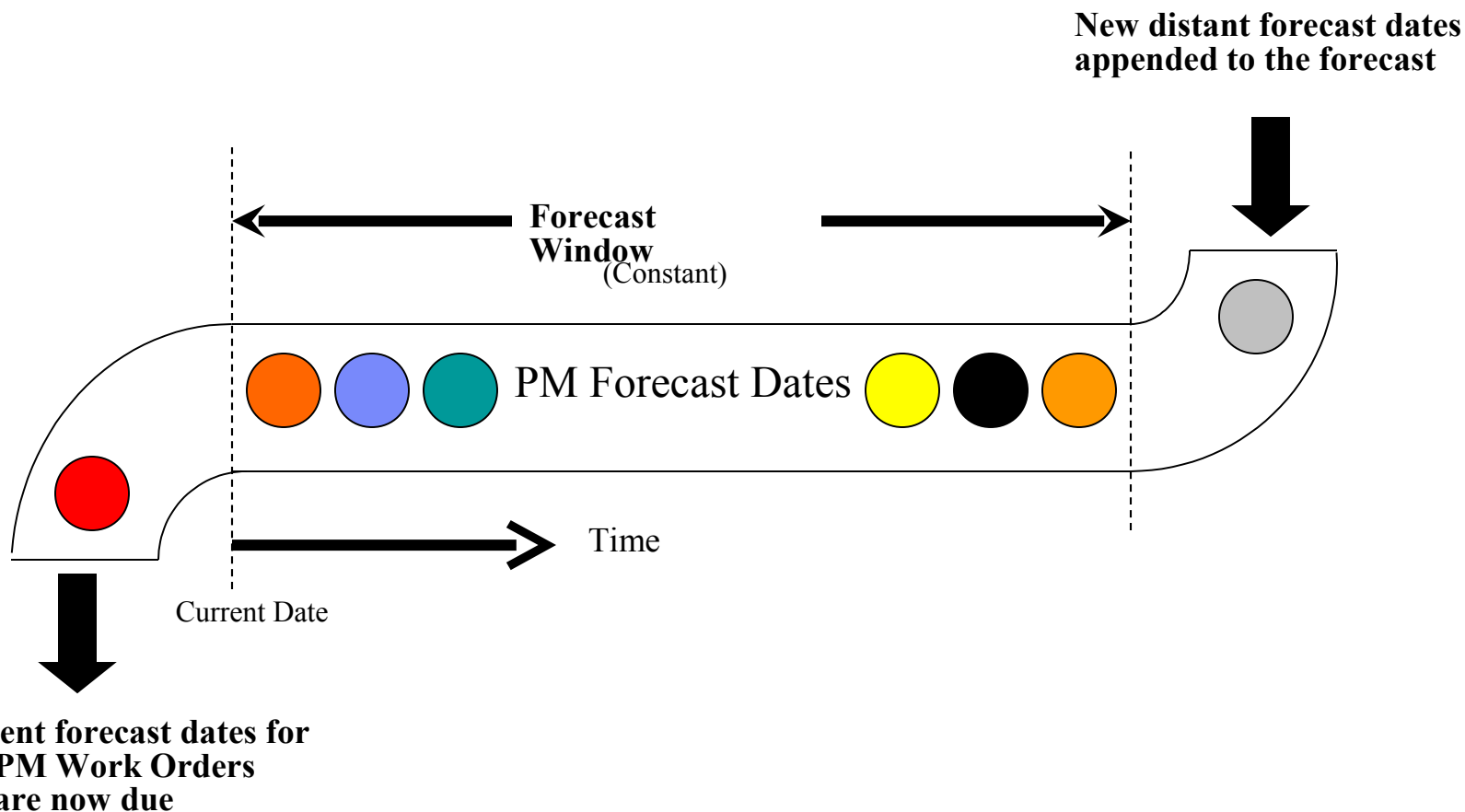
The "Sliding" Forecast Window

The forecast window "slides" consistently with time, as current PM dates are consumed and new ones added ... the forecast window is automatically maintained



The "Sliding" Forecast Window

The forecast window "slides" consistently with time, as current PM dates are consumed and new ones added ... the forecast window is automatically maintained

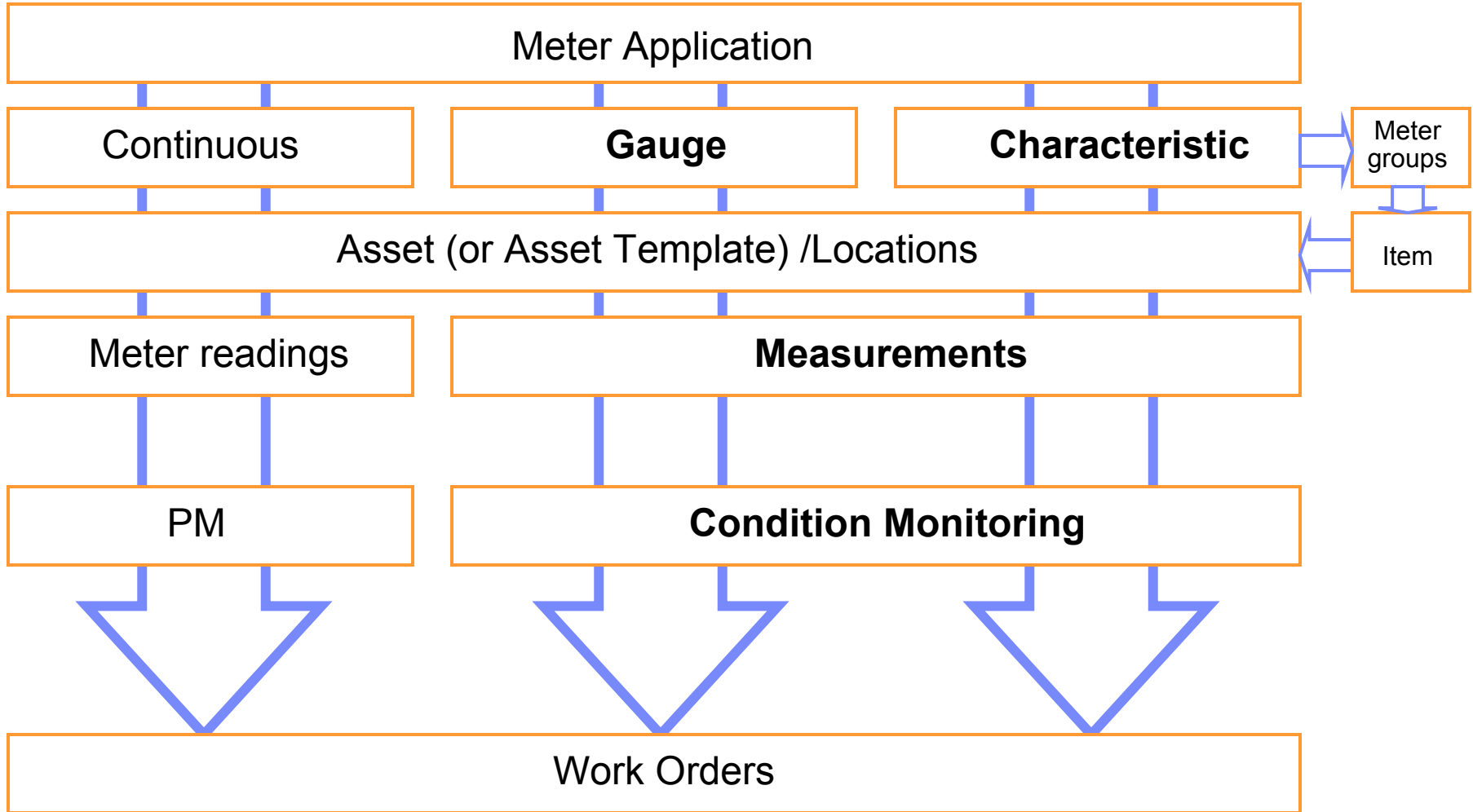


Master PM Application

The screenshot displays the Master PM application interface. At the top, there is a navigation bar with 'Bulletins: (0)', 'Go To', 'Reports', 'Start Center', 'Profile', 'Sign Out', and 'Help'. Below this is a search bar with 'Find:' and 'Select Action' dropdowns, and a toolbar with various icons. The main area features several tabs: 'List', 'Master PM', 'Frequency', 'Seasonal Dates', and 'Job Plan Sequence'. The 'Master PM' tab is active, showing search fields for 'Master PM: 1001' (with value 'xc') and 'Item: PUMP100' (with value 'Centrifugal Pump 100 GPM, 60 FT-HD'). There are also checkboxes for 'Create Associated PMs for Item's Location?' and 'Create Associated PMs for Item's Asset?'. Two panels are open: 'Work Order Information' with fields for 'Work Type', 'Work Order Status' (set to 'WSCH'), 'Work Order Priority' (set to '0'), and 'Interruptible?'; and 'Lead Time' with fields for 'Lead Time (Days)' and 'Lead Time Active?'.

Used to create associate PMs for assets having the same item number as that on the Master PM

A reminder about meters ...



Condition Monitoring Application

Point: 1001 Outlet Pressure Monitor

Location: >>

Asset: 11430 Centrifugal Pump 100GPM/60FT HD

Meter: O-PRESSUR Outlet Pressure

Attachments

Site: BEDFORD

Meter Type: GAUGE

Unit of Measure: PSI

Upper Limits

- Upper Warning Limit: 5,000.000
- Upper Action Limit: 5,500.000
- Upper Limit PM: >>
- Upper Limit Job Plan: JPOUTPR Investigate Low/High Outlet Pressure
- Upper Limit Priority: 2

Lower Limits

- Lower Warning Limit: 3,500.000
- Lower Action Limit: 3,200.000
- Lower Limit PM: >>
- Lower Limit Job Plan: JPOUTPR Investigate Low/High Outlet Pressure
- Lower Limit Priority: 2

Characteristic Action Values Filter > 0 - 0 of 0

Value	PM	Job Plan	Priority
...No rows to display...			

Measurements Filter >

Measurement Date	Priority
12/2/04 7:49 AM	
12/9/04 7:51 AM	
12/16/04 7:51 AM	
12/23/04 7:52 AM	
12/30/04 7:53 AM	
1/5/05 7:53 AM	

History Filter > 0 - 0 of 0

Work Order	Effective Date	Description
------------	----------------	-------------

Using threshold values from gauge or characteristic meters to trigger generation of work orders

Condition Monitoring Application

The screenshot displays the Tivoli Condition Monitoring application interface. At the top, there is a navigation bar with the title "Condition Monitoring" and various menu items like "Bulletins (0)", "Go To", "Reports", "Start Center", "Profile", "Sign Out", and "Help". Below the navigation bar is a search and action bar with a "Find:" field and a "Select Action" dropdown. The main content area is divided into several sections:

- Point Information:** Point: 1001, Outlet Pressure Monitor.
- Location:** (Empty field)
- Asset:** 11430, Centrifugal Pump 100GPM60FT HD.
- Meter:** O-PRESSUR, Outlet Pressure.
- Attachments:** (Link icon)
- Site:** BEDFORD
- Meter Type:** GAUGE
- Unit of Measure:** PSI

Below this information are two panels for configuring limits:

- Upper Limits:**
 - Upper Warning Limit: 5,000.000
 - Upper Action Limit: 5,500.000
 - Upper Limit PM: (Empty field)
 - Upper Limit Job Plan: JPOUTPR, Investigate Low/High Outlet Pressure
 - Upper Limit Priority: (Empty field)
- Lower Limits:**
 - Lower Warning Limit: 3,500.000
 - Lower Action Limit: 3,200.000
 - Lower Limit PM: (Empty field)
 - Lower Limit Job Plan: JPOUTPR, Investigate Low/High Outlet Pressure
 - Lower Limit Priority: (Empty field)

A large, detailed view of the "Upper Limits" configuration is shown in the foreground, highlighting the following fields:

- Upper Warning Limit: 5,000.000
- Upper Action Limit: 5,500.000
- Upper Limit PM: (Empty field)
- Upper Limit Job Plan: JPOUTPR, Investigate Low/High Outlet Pressure
- Upper Limit Priority: 2

Condition Monitoring Application

Condition Monitoring Bulletins: (0) Go To Reports Start Center Profile Sign Out Help

Find: Select Action [Icons]

List **Condition Monitoring**

Point: 1003 Attachments

Location: Site: BEDFORD

Asset: TRACK 1 Meter Type: CHARACTER

Meter: HEAD LOSS1 Unit of Measure:

Upper Limits

Upper Warning Limit:

Upper Action Limit:

Upper Limit PM:

Upper Limit Job Plan:

Upper Limit Priority:

Lower Limits

Lower Warning Limit:

Lower Action Limit:

Lower Limit PM:

Lower Limit Job Plan:

Lower Limit Priority:

Characteristic Action Values Filter [Icons] 1 - 6 of 10 [Download]

Value	PM	Job Plan	Priority
1	<input type="text"/>	12 MPH RED	<input type="text"/>
1/2		40 MPH RED	
11/16		12 MPH RED	
13/16		12 MPH RED	
15/16		12 MPH RED	
3/4		12 MPH RED	

[New Row](#)

Measurements Filter [Icons] 1 - 4 of 4 [Download]

Measurement Date	Measurement	Observation	Start Measure	End Measure
2/7/11 12:00 AM	<input type="text"/>	1/8 <input type="text"/>	161,000.00	161,100.00
2/7/11 12:00 AM	<input type="text"/>	3/8 <input type="text"/>	210,200.00	210,400.00

Reference Materials

- Passport Advantage
 - [Maximo 7.5 download](#)
- Info Center
 - [Preventive Maintenance Module](#)
 - [PM Forecasting](#)
- RedBooks
 - [Maximo User Guide](#)
- Service Management Connect
 - [Asset Management](#)
 - [Maximo 7.5 Upgrade](#)
 - [Request For Enhancement \(RFE\) Community](#)
- DevelopWorks
 - [Maximo forum](#)
- Support
 - [Support home](#)

Wrap-Up

- To provide an overview of the Preventive Maintenance and Condition Monitoring applications in Maximo 7.5 and point out the changes since Maximo 6
 - Preventive Maintenance provides the ability to set up recurring work based on time or meter based frequencies.
 - PM Forecasting is new in 7.5
 - Condition Monitoring allows you to trigger work orders based on a gauge or characteristic meter threshold.

Questions?



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