



# A Tivoli Field Guide Nuclear Industry Solution, Release 7.5.1

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# About the Tivoli Field Guides

## Sponsor

Tivoli Customer Support sponsors the Tivoli Field Guide program.

## Authors

Those who write field guides belong to one of these three groups:

- Tivoli Support and Services Engineers who work directly with customers
- Tivoli Customers and Business Partners who have experience using Tivoli software in a production environment
- Tivoli developers, testers, and architects

## Audience

The field guides are written for all customers, both new and existing. They are applicable to external audiences including executives, project leads, technical leads, team members, and to internal audiences as well.

## Types of Field Guides

Two types of Tivoli Field Guides describe how Tivoli products work and how they are used in real life situations:

- Field Guides for technical issues are designed to address specific technical scenarios or concepts that are often complex to implement or difficult to understand, for example: endpoint mobility, migration, and heartbeat monitoring.
- Field Guides for business issues are designed to address specific business practices that have a high impact on the success or failure of an ESM project, for example: change management, asset Management, and deployment phases.

## Purposes

The Field Guide program has two major purposes:

- To empower customers & business partners to succeed with Tivoli software by documenting and sharing product information that provides accurate and timely information on Tivoli products and the business issues that impact an enterprise systems management project
- To leverage the internal knowledge within Tivoli Customer Support and Services and the external knowledge of Tivoli customers and Business Partners

## Availability

All completed field guides are available free to registered customers and internal IBM employees at the following Web site:

[http://www.ibm.com/software/sysmgmt/products/support/Field\\_Guides.html](http://www.ibm.com/software/sysmgmt/products/support/Field_Guides.html)

Authors can submit proposals and access papers by e-mail:

[mailto:Tivoli\\_eSupport\\_Feedback@us.ibm.com](mailto:Tivoli_eSupport_Feedback@us.ibm.com)

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# Services Ready Guide for Nuclear Industry Solution, Release 7.5.1

**Services Ready** has multiple components:

- Knowledge of the new functionality regarding why it exists
- Knowledge of the business process wherein the functionality would be utilized
- Knowledge of the data required to enable the functionality

This Services Ready Guide, series of Tivoli Field Guides, is meant to support the implementation project life-cycle, from initial planning on through to configuration. It will not tell you what to do, but will provide background information and insight that can be combined with knowledge of the project and MAXIMO to effectively implement the Nuclear Industry Solution in an efficient manner.

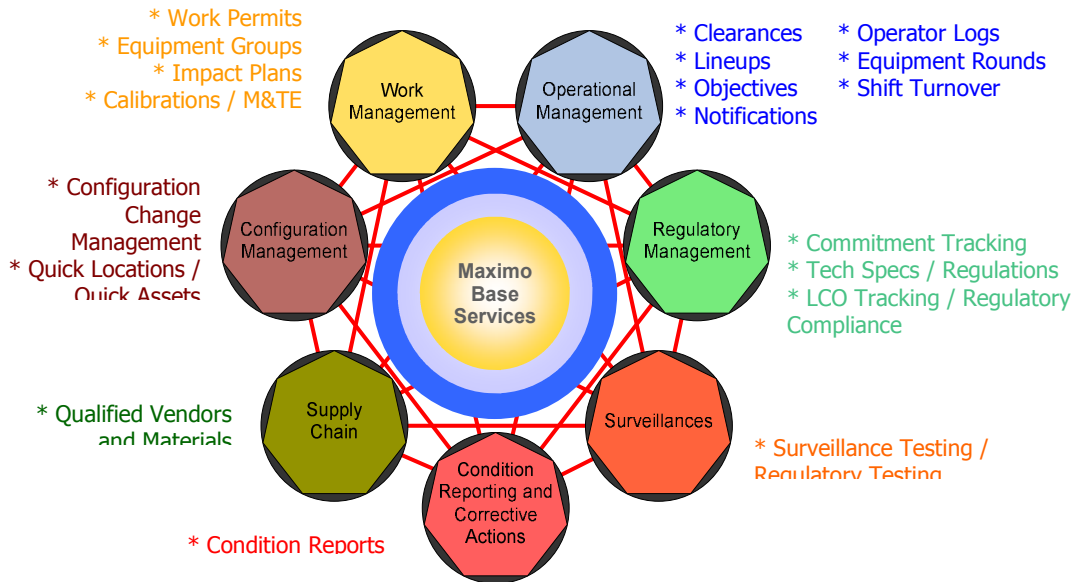
Information provided in this document is not meant to replace any standard documentation typically provided with the software (e.g. end-user doc's or help file info) that would typically be referred to during any implementation.

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# Overview – Nuclear Industry Solution (Nuclear IS)

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## Nuclear Process Support Extends Core Maximo





# Process Support: Mapping of Key Nuclear Power Process Areas to Maximo Nuclear

|  |  |
|--|--|
| <b>1. Work Management</b>                          | <ul style="list-style-type: none"> <li>• Work Order Tracking (Nuc)</li> <li>• PMs (Nuc)</li> <li>• Clearances (Nuc)</li> <li>• Sign On/Off (Nuc)</li> <li>• Impact Plans (Nuc)</li> <li>• Permits (Nuc)</li> <li>• Job Plans (Nuc)</li> <li>• Programmatic data on Locations and Assets propagated to work objects</li> <li>• Support for the 13 week schedule</li> <li>• Equipment Groups (Nuc) manage FEGs and Boundary Groups on WO, PMs, Lineups, Permits, Clearances, and Tags</li> </ul> |
| <b>2. Operational Management</b>                   | <ul style="list-style-type: none"> <li>• Clearances (Nuc) – also Work Management</li> <li>• Clearances Kiosk (Nuc)</li> <li>• Lineups (Nuc) and Lineup Plans (Nuc)</li> <li>• Lineups Kiosk (Nuc)</li> <li>• Duty Stations (Nuc) and Duty Station Plans (Nuc) with Narrative Logs, Operator Rounds, and Shift Turnover</li> <li>• Objectives (Nuc)</li> <li>• Reading Frequencies (Nuc)</li> <li>• Notifications (Nuc)</li> </ul>  |
| <b>3. Engineering Configuration Management</b>     | <ul style="list-style-type: none"> <li>• Configuration Change Designer (Nuc)</li> <li>• Change (Nuc) and Release (Nuc)</li> <li>• Locations (Nuc), Assets (Nuc), and Configuration Items (Nuc)</li> <li>• Quick Locations (Nuc) and Quick Assets (Nuc)</li> </ul>  |
| <b>4. Condition Reports</b>                        | <ul style="list-style-type: none"> <li>• Condition Reports (Nuc) and Corrective Actions</li> <li>• Condition Reporting (Nuc)</li> <li>• Corrective Action Templates (Nuc)</li> <li>• SPOE Work Flows (Nuc)</li> <li>• Solutions Library (Nuc)</li> </ul>   |
| <b>5. Regulatory Tracking</b>                      | <ul style="list-style-type: none"> <li>• Commitment Tracking (Nuc)</li> <li>• LCO Tracking (Nuc) – Q4 2012</li> <li>• Tech Specs (Nuc)</li> <li>• Surveillances (Nuc)</li> <li>• Events (Nuc)</li> <li>• Notifications (on CAs)</li> </ul>   |
| <b>6. Supply Chain</b>                             | <ul style="list-style-type: none"> <li>• Companies (Nuc) with Vendor Qualifications</li> <li>• Request For Quotation (Nuc), Purchase Request (Nuc) and Purchase Order (Nuc)</li> <li>• Quality Terms (Nuc), Items (Nuc) and Inventory (Nuc)</li> </ul>   |
| <b>7. Surveillances functionality for PM (Nuc)</b> | <ul style="list-style-type: none"> <li>• Regulatory Frequency, Regulatory Dates, and Grace Frequencies (Nuc)</li> <li>• Estimated Regulatory Dates</li> <li>• Tracking Equipment Surveillances: Completion Codes, Failures, and Retest</li> <li>• Surveillance Requirements reference</li> <li>• Grouping PMWOs onto Clearances during WOGEN</li> <li>• PM Sequencing</li> </ul>   |

The functions delivered within release 7.5.1 of the Nuclear Industry Solution are:

1. Commitment Tracking
2. Equipment Reliability (Standard Nuclear Performance Model Data)
3. Vendor Qualification
4. SNPM/Nuclear Content
5. Equipment Groups
6. Calibration\*
7. Line Ups
8. Duty Stations
9. Configuration Change Management
10. LCO Tracking
11. Permits
12. Condition Reports
13. Clearances
14. Impact Plans
15. Surveillance Features

\*Note: The standard Calibration functionality has been packaged with the Nuclear IS. For information on Calibration see separate documentation available.

Some of these functions simply provide the ability to define static data to be used for trending, reporting, and benchmarking. Other functions are driven by operational and maintenance business process requirements and are critical to sustaining better/best practices within the nuclear industry.

Each of these functions will be further described and discussed in this Field Guide and related Field Guides.

This Tivoli Field Guide covers the following functions; Commitment Tracking, Vendor Qualifications, Equipment Reliability, Equipment Groups and SNPM/Nuclear Content.

In addition to this Field Guide the following Field Guides are available:

- Impact Plans
- Clearances
- Configuration Change Control
- Surveillance Features
- Lineups
- LCO Tracking
- Duty Stations
- Condition Reporting

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## Commitment Tracking

This functionality is provided by two applications: Commitment Tracking (NUC) and Asset List (NUC).

You use these applications to maintain work records and report the status of work performed to accomplish tasks identified as a commitment to various external agencies, for example, NRC, OSHA, EPA, etc.

MAXIMO lets you perform the following tasks using the Commitment Tracking (Nuc) application:

Identify assets affected by the commitment

Determine the work that needs to be accomplished to meet the commitment

Track the work required to meet the commitment

Note: You can track internal commitments as well or almost anything that requires tracking.

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## Surveillances Features

This functionality is provided by two applications: Preventive Maintenance (NUC) and Frequency (NUC).

Frequency (NUC):

Use this application to create standardized frequencies for the performance of recurring maintenance work in the Preventative Maintenance (Nuc) application. These frequencies, such as those found in Technical Specification—Surveillance

Requirements, aid in defining the 'regulatory frequency' as compared to a convenient scheduling-based time interval. You can apply a given frequency to multiple PM instances.

Preventive Maintenance (NUC):

This application is used to satisfy requirements for the performance of preventive maintenance, routinely performed tasks and surveillances. **PM Type** and **Work Type** data fields facilitate queries in support of, among others, Tech Spec driven PMs. The inclusion of **Mode** and **Mode Entry Requirement (MER)** data fields aid scheduling and operations department personnel in assuring that the transitions between plant modes is accomplished without Tech Spec infringement. Bindings to Clearance and Impact Plans allow for truly complete work order execution planning (including Permits).

Any PM under restriction of modification due to a commitment is identified to help ensure that no PM is accidentally changed in contradiction to an existing active plant commitment.

**PM Sequencing** provides the ability to enable work planners and schedulers to link, or stagger surveillance tests within or across units. Many of the licensing or surveillance tests require accurate staggering across multiple assets or units within a nuclear station. This is for efficiency and safety purposes.

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## Equipment Reliability (Standard Nuclear Performance Model Data)

### **Equipment Reliability (Standard Nuclear Performance Model Data)**

This functionality is provided by the addition of a new Tab, SNPM, on Locations, Equipment, Work Order, Quick Reporting, Item Master, and Inventory applications. The SNPM (Standard Nuclear Performance Model) Data tab is used to identify data relevant to the application in support of:

**equipment reliability**  
**materials and services**  
**procurement engineering**

Each application will contain some or all of these areas depending upon the relevance to the application.

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## Vendor Qualifications (Approved Vendors List)

Many of the materials and services procured and used within a nuclear operation require vendors to meet certain qualifications and tests that range from material quality to payment terms. Organizations require support for a process that stretches from work planning to materials management to procurement and vendor management.

Multiple enhancements to enable identification of vendors providing quality level items, along with QA audit dates and expirations to drive vendor management processes.

Vendor status enables inventory / procurement managers to drive spend via an evaluated supplier list.

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## Impact Plans

Impact Plans help nuclear station staff manage risks associated with maintenance as well as addressing the aspects of work order planning and execution (beyond the parts and steps) to support the requirements of highly regulated and coordinated work management approaches. Impact Plans allow management of the complex operational and maintenance requirements associated with performing maintenance in the nuclear power environment. Once known requirements are identified and the potential for exposure to unwanted consequences are recognized, proactive action may be directed to avoid and mitigate the probability and extent of unwelcome consequences.

Nuclear power station staff is motivated to adopt risk identification and management processes for a number of reasons.

- In some cases, nuclear operators are legally required to identify risks, such as when maintenance activities force entry into Technical Specification LCOs, or as required by government authorities such as Occupational Safety and Health Administration (OSHA).
- Nuclear operators give their commitment to important industry programs closely tied to risk-significant work management activities, such as the Equipment Reliability program described in AP-913.
- Nuclear managers recognize the business imperative of preplanning in the effective use of maintenance resources.

Identification of the additional supporting departments, expected changes and required permits provides the complete picture of the work effort required.

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## Permits

Numerous supporting processes are needed to control work in a safe manner and in accordance with numerous codes, laws and policies. The permits process manages many of these needs. Many still use a paper based system although some have databases to track the “paper”. Typically they are independent of the work management system and require manual updates or custom interfaces. There is no repository of standard permits and with these independent schemes there is no simple mechanism that auto generates standard permit requests in support of PMs.

There are actually many phases and steps in a permit lifecycle:

- 1) Document need
- 2) Schedule execution / coordinate usage
- 3) Plan specific requirements
- 4) Setup Job site / Establish Baseline conditions (e.g. Air Sampling)
- 5) Approve Initial Permit Parameters
- 6) Approve Permit
- 7) Control Users of Permit / Monitor Permit Requirements & Conditions
- 8) Terminate permit use
- 9) Authorize demobilization
- 10) Demobilize

11) Update any permit information and close permit / Update any permit job plans

Maximo's overall permit process can support any range of complexity and integration from a simple "tracking number only" which would leverage and provide connectivity into Maximo from external process to a fully embedded and integrated process as presented in the Permits application. Additionally, the Quick Permits application is provided as both an example of a less complex Permit process as well as one that might be more suitable for the permit user / process execution.

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## LCO Tracking

Personnel at nuclear power plants need the ability to track compliance to a number of technical and administrative requirements associated with plant operational status.

The primary role responsible for this management role is the licensed Senior Reactor Operator (SRO) accountable for directing shift reactor operations.

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## Duty Stations

Maintaining records of facility activities is both mandated by law and a good practice. In normal operations at Nuclear plants there may be as many as 8-10 logs being maintained. The logs typically are either a position name or a physical portion of the facility e.g. Shift Manager, Control Room Supervisor, Balance of Plant, Nuclear Side, Water Factory, Condensate Polisher, Watch HP, Watch Maintenance, Watch I&C. In addition, occasionally logs are created for unique needs, some being one time use, while others may be for special plant modes or operations.

During outages there may be many other logs established to support outage positions and roles.

Logs can be required to be reviewed by superiors and also are used in the turn-over process to document the information exchange and transfer of responsibility to the new individual.

Logs are valuable source of information and viewed by many. Frequently logs are viewed thru facility web portals

The shift / log process drives the routine administrative requirements and as such the manual recording and analysis of plant equipment data is contained in this process as well.

In addition to posted plant schedules and work process facility management can formally communicate via "written" directives to the shift personnel

In addition to becoming qualified before assuming a duty station, incumbents must maintain awareness of changes to plant processes, design and management directives.

A review of “Notifications” and “Objectives” is how those expectations communicated and acknowledged

Maximo needs to be able to create and manage the logs for a facility. It needs to mimic the control processes established by the facilities log keeping.

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## Configuration Change Management

Nuclear operators need to have complete revision control capabilities for all assets in their facilities. They need to be able to plan configuration changes, approve and execute those changes and keep a full lifecycle record of the configuration change process. Changes to Facility Configuration Information (FCI) can come about from field updates to “fill in missing” FCI data, planned modifications and installation or discovery of undocumented facility changes.

Although no specific approach to a client CM process is assumed, Locations and Assets are the focus of this process. CI’s are enhanced to allow (but not require) a client to leverage a CI in a Maximo Configuration Object relationship for the purposes of supporting any IT approach and or enterprise wide concept of CM.

Following engineering approval of the change and implementation in the plant the change becomes the approved Location / Asset / CI information. Change and Release functionality are used to encapsulate engineering approvals and in-plant implementations prior to promoting the new versions of configuration data.

A new application, Configuration Control Designer, allows a configuration change management process to be designed at a System, Org or Site level.

Nuclear versions of Release, Change and CI and revisions to existing Applications; Assets (Nuc), Location (Nuc), Work Order (Nuc), have been made to support this process.

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## Clearances

The clearance and tagging process impacts three principal asset management activities. It is used to establish safe boundaries that support maintenance and other work on plant equipment; it is one of the fundamental mechanisms for control of plant configuration; and its efficiency is an underlying contributor to the overall effective performance of maintenance. These three aspects of clearance and tagging are discussed below.

The primary purpose of a clearance is to provide a safe boundary within which plant personnel perform assigned tasks. The clearance and tagging program establishes reliable administrative control over the plant components identified as needed for the specific safety boundary. Plant components are then placed in the required state and position, and maintained in that configuration until the completion of maintenance. Following completion of work and functional testing, the clearance is released and the system components are restored to their normal operational lineup.

Changing the configuration of plant components can impact system availability and operability, which in turn may affect the overall plant operational status. Clearances remove plant systems from their normal operational configurations. Clearances are therefore approved and implemented in close coordination with plant operations. The plant operations staff requires accurate information regarding clearances, tagging status, and plant configuration at all times.

To make the most of equipment or system outages, attention is focused on the managing, grouping, and scheduling of compatible work tasks under the required clearances. Maintenance on live plant systems cannot begin until the applicable work boundary is established and active systems are de-energized and rendered safe. Process fluids are drained, mechanical systems isolated, and electrical systems de-energized. Therefore, the time for both planning effective clearances, and the time for actual component repositioning and tagging in preparation for maintenance represents a significant fraction of the total maintenance effort.

Consideration must also be applied to maintaining control and accountability of the technicians working under clearance protection. In many instances, multiple resources representing several different crafts work under the clearance over multiple work shifts.

The clearance and tagging program is therefore critical for personnel safety, for the control of plant configuration, and for the effective performance of maintenance.

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## Equipment Groups

This is standard nuclear power functionality that facilitates flexible grouping of many Maximo Nuclear objects for the purpose of increasing the effectiveness of work performance. In many nuclear stations, these grouping are known as (and limited to) Functional Equipment Groups (FEGs). Benefits include:

- Enhanced work scheduling of related work to minimize system down time.
- Managing plant risk by grouping together the maintenance of multiple components that share the similar risk consequences.
- Developing categorizations and relating plant components to multiples of these categorizations for multiple purposes, such as long term system health programs, PM optimization programs, corrective action program activities, and spare parts strategies.
- Improved overall equipment reliability by targeting resources at the most significant subsets of components.

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## Condition Reporting

A Corrective action program at a nuclear power station includes the measures taken to identify, document, determine extent of condition, evaluate, trend and rectify conditions adverse to quality and where necessary, to preclude repetition. Maximo Nuclear's Condition Reporting Application is fully embedded throughout Maximo and provides both the entry point and entire corrective action control process. In addition, condition

reporting and the corrective action program is a critical element in the way a nuclear power staff improves performance and addresses issues that appear during ongoing maintenance and operations.

Regulators like the US Nuclear Regulatory Commission (NRC) and the International Atomic Energy Agency (IAEA) and industry excellence groups like the World Association of Nuclear Operators (WANO) recognize the importance of effective station programs to identify and correct problems, and to capture and use operating experience. Assessment of the adequacy of a station's ability to correct problems and to identify causes is frequently validated by outside authorities. Failure to adequately identify plant problems and resolutions can itself be justification for citation as a cross-cutting issue, which is considered an important plant problem in its own right.

As in many industrial environments, successful nuclear power activities depend on the correct performance and interactions of equipment, people, and processes. Incorporating a corrective action program native to Maximo provides the unique capability to leverage current component, work management, and operational management process flows and data with extended corrective action capabilities.

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## Calibration

Calibration has been included although it is normally a separate product. Calibration plays a large role in any generation facility and particularly in a Nuclear Power Plant. Including Calibration addresses many of the maintenance and surveillance needs of a nuclear facility.

See separate documentation available for the Calibration add on.



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## Function details

The following functions are detailed in this section:

Commitment Tracking

Equipment Reliability

Vendor Qualifications

Equipment Groups

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## Commitment Tracking

Organizations are often responsible for maintaining and reporting the status of work to external agencies (i.e. Department of Transportation (DOT), American Association of Rail (AAR), Federal Aviation Authority (FAA), Nuclear Regulatory Commission (NRC)). These agencies and the methods of communication come in many forms; however the requirements are all very similar. Facilities are required to track certain work and maintain status until the work is completed, implemented, or in some cases for the life of the affected assets. If an owner of regulated assets is not able to provide accurate information on “directed” activities, there are often significant fines imposed as well as potential further investigation (down time) of any assets in question. The Commitment Tracking application allows organizations who operate in highly regulated environments to effectively manage these critical processes.

Here are a few examples of work that must be tracked:

- Commitments
- NRC Bulletins
- NRC Generic Letters (GL)
- INPO (Institute of Nuclear Power Operations)
- Licensee Event Reports (LER)
- Responses to NRC Notices of Violations (NOV)
- Federal Regulatory Guides (RG)
- Industry Codes and Standards
- Changes in the Utilities Practices and/or procedures

Examples:

1. A nuclear power station makes a commitment to the NRC to ensure that at least 25% of the maintenance personnel have been trained in confined space rescue. A work order (work order type ‘ACTION’) is generated to track the progress and completion of the training. This requirement for training is a recurring issue

which must be complied with until a review by the station and concurrence from the NRC relaxes the requirement and the subsequent commitment is no longer valid. Maintaining the commitment as an “Open” or “Active” commitment is necessary to provide the nuclear station the tracking tool to ensure that subsequent revisions to the training program do not inadvertently remove the confined space rescue training and therefore usurp the requirement of the commitment.

2. After incurring a License Event Report (LER) from an unplanned turbine trip and reactor scram due to a major steam valve disc to stem separation, the generating station commits to the NRC that a comprehensive inspection program will be established and the remaining 7 in-kind valves will be evaluated and modified within 12 months to prevent recurrence of the event. The commitment requirements will include maintenance work performed on the asset, the establishment of inspection and corrective maintenance procedures, quality control procedures and vendor-provided training to the maintenance personnel. Station management is required to report to the NRC quarterly and upon discovery of any anomalies. Engineering, Maintenance, Procurement, Procedure and Training department managers require status updating for reports to senior station management. Data collected will be required to input to Location or Equipment databases for configuration control and component maintenance history.

Here is how the application will be used:

1. User receives a directive or commitment from an external agency.
2. User creates a work request to address the commitment. This work request will contain the reference to the source document (if one exists), as well as any additional information required. Here are a few key elements:
  - a. Source (i.e. NRC Bulletin 200-02).
  - b. Target finish date.
  - c. Responsible commitment/project manager
3. The user must then determine what assets are affected by the commitment. Here are a few examples:
  - a. Equipment
  - b. Locations
  - c. Job plans
  - d. Preventive maintenance schedules
  - e. Design documents
4. In MAXIMO today, a user can create a route and ‘Apply’ the route to a work order. That is not sufficient for a commitment, since the list of assets must be reviewed and approved before generating work orders or PMs. We will store the selection criteria (aka query) created using the Asset List application, with the commitment.
5. Once the assets are identified, the user must determine what work is required to satisfy the commitment. This will be accomplished by identifying/creating a job plan.

6. Once the work plan exists, the user must determine if it is a 'one time' requirement or recurring. If the work is only required once, a work order will be generated. If the work is recurring, the user will create a PM based upon the required schedule.
7. User routes the commitment to the proper personnel/groups for review and approval.
  - a. Note: We realize that not all clients use workflow. Thus, we must support the following two scenarios:
    - i. Small organization where workflow is not used
    - ii. Large organization where workflow is used
8. Once the work is completed (Completion may be defined as a work order status of COMPLETE or enabling of a required PM), the external agency is notified.

Commitment status will differ based upon implementation and can be used to drive workflow in accordance with local procedures. A few thoughts on possible statuses:

| STATUS                 | DESCRIPTION   | MAXSTATUS |
|------------------------|---|-----------|
| DRAFT                  | Commitment has been created, yet has not been approved and/or assigned. | WAPPR     |
| UNASSIGNED             | Draft has been completed.   | WAPPR     |
| ASSIGNED               | An owner has been identified for the commitment.                        | APPR      |
| EVALUATION IN PROGRESS |   | INPRG     |
| IMPLEMENT ACTIONS      |   | INPRG     |
| ACTIONS COMPLETE       |   | COMPLETE  |

Note:

The Commitment Tracking (Nuc) application is a clone of Work Order with a Work Type = 'CMT' and with restrictions applied reciprocally to Work Order (Nuc).

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# Equipment Reliability (Standard Nuclear Performance Model – SNPM – Data)

In the Nuclear Power industry, equipment reliability is broken down into six areas of focus (AP-913 p. 7):

1. Scope and Identification of Critical Components
2. Performance Monitoring
3. Corrective Action
4. PM Implementation
5. Continuing Equipment (Component) Reliability Improvement
6. Life Cycle Management

## Scope and Identification of Critical Components

### Identify Critical Components – locations

While MAXIMO provides the ability to perform PMs and corrective maintenance, we have no way of identifying critical components. The classification of these components is utilized to continuously improve PM performance and frequency and aids in the determination of appropriate 'spend' of Operations and Maintenance budgetary dollars.

AP-913 (Equipment Reliability) requires that all components be identified based upon importance to safety function, safe shutdown capability, and power generation capability (AP-913 revision 1, p.2 – Equipment Performance Objectives).

NOTE: For the purpose of this guide, standard industry references to "Equipment" is construed to be "Components" which in Maximo terminology is "Locations".

### Example:

Corrective Maintenance is required to be performed on an ECCS pump's lube oil cooler. Disassembly of the cooler uncovers severe corrosion and degradation of the tube sheet. The pump is classified as a 'Critical' component. The failure is correctly identified as a reportable key component failure in accordance with Equipment Performance and Information Exchanges System (EPIX) reporting requirements. This is made possible by reviewing all CM work orders based upon Critical Component Classification, and an engineering analysis is undertaken to improve the component's reliability.

### Application use:

Identify locations as Critical, Non-critical, and Run-to-Failure to facilitate the work management process.

Added a field to the Locations application to identify the components as Critical, Non-critical, and Run-to-Failure.

Added a field to the work order application to display the data from the Locations application.

If an audit trail is necessary, the user may activate e-audit for this field.

### Identify the components as Tech Spec Related

The identification of components that are governed by Technical Specifications, allows Operations and Maintenance personnel to ensure when work is performed on these components, that a full or partial Surveillance is performed. This specialized post-maintenance testing provides for compliance to license requirements. The identification of a Location as Tech Spec related, is also useful when determining quality requirements for replacement Items.

#### Example:

Maintenance Planning receives a Work Request from the plant's work review group with the Location identified as a Tech Spec component. The planner creates the job plan and work tasks and includes after the post-maintenance test task, a requirement for the performance of a Surveillance Test. The work package is work flowed (routed) to the Operations Work Support group for determination of the appropriate post-maintenance surveillance to be performed. This determination results in attaching a PM to the CM task list and a full Surveillance Test is performed resulting in a restoration of Operability to the component at the completion of all work. A work package is planned on a Tech Spec component with the addition of a Surveillance Test requirement. When Items are Issued from the warehouse, the issuing clerk identifies the quality level of the Items and notices the Location is designated as Tech Spec. The issuing clerk notifies the planner that the Items on the Planned Materials Tab on the Work Order are non-Q and questions the planner. Further review uncovers the error, and the Items are changed to reflect the Q level requirement for Tech Spec Locations.

#### Application Use:

A field has been added to the Locations application to identify the components as Tech Spec Related.

A field has been added to the Work Order to copy the Tech Spec flag from the Locations application.

### Identify PRA and GRA components - locations

In the Nuclear Power industry, all components are evaluated for their impact on the plant and the health and safety of the general public. Further, since it has become increasingly important to monitor components which do not affect the safety of the reactor or the public, but which have a direct influence on the generation of electricity.

A long-standing practice in the nuclear industry is to perform a Probabilistic Risk Assessment (PRA) to determine the components impact on safety. Now there is a new evaluation being performed, the Generation Risk Assessment (GRA), which identifies a components' impact on the generating capability of the plant.

The ability to easily identify Locations which have been evaluated as a PRA and/or a GRA component is useful when determining scheduling of PM and CM type of work. When the need arises to delay the performance of work due to resource constraints, the identification of these components by their PRA and/or GRA value permits a more informed decision.

#### Example:

Due to emergent work required to be inserted into an already resource strained work week, decisions need to be made to delay the performance of non-essential PM and CM work. The Schedulers review the planned work, and utilizing the information from the PRA and GRA values, reschedule PM and CM work on Locations with a lower impact on plant safety and generation capability.

Application use:

Added a field to the Locations application to identify the components' value for PRA

Added a field to the Locations application to identify the components' value for GRA

Added corresponding PRA and GRA fields to the work order and preventive maintenance applications to copy the data loaded from the corresponding Location record.

#### Identify Maintenance Rule Components

The effectiveness of maintenance must be assessed on an ongoing basis in a manner that provides reasonable assurance that key Structures, Systems and Components (SSCs) are capable of performing their intended functions.

The intent of the Maintenance Rule is to monitor the effectiveness of maintenance practices.

MAXIMO does not have a place to hold the maintenance rule at the location level.

Application use:

Add a field to the Location application to identify that the location is covered by the maintenance rule. Display the maintenance rule in the work order tracking application.

#### Identify Quality category of components

##### ITEM / Asset level "Procurement Class"

All new and replacement Items/Assets in a nuclear facility are classified by a 'quality level'. The specific designators differ between licensees, but all contain, as a minimum, the following generic types:

"Q" – The highest quality level: is nuclear safety-related and is used in the most critical components.

"A" – Augmented quality: is used to identify equipment which has an elevated importance to safety, such as critical components of the fire protection system.

"N" – Non-Q: designates that the Item can be used in Balance Of Plant (BOP) components which either have no direct impact on nuclear safety or are of a low risk to generation capability. These Items may be placed into a 'Commercial Grade Dedication' program, and utilizing the Quality Assurance program of the licensee and its testing resources, will in turn elevate the quality level to "Augmented" or "Quality" for safety-related.

"NX" – This is the lowest quality level and applies to non-plant component spare parts (e.g. office supplies, commercial plumbing fixtures, etc.).

"CG" – Commercial Grade (dedication): Components purchased at one level and raised to a higher quality level through QC capabilities. Unlike 'Augmented Quality,' CG components place the accountability for performance on the utility, not the vendor.

Additionally, the identification of quality classification at the component level (Location/Asset), is important for planning and replacement part usage.

Typically, the Procurement Engineering Group (PEG) in consort with System/Component Engineering and Reliability Engineering organizations will identify the quality level requirements for replacement parts (Items/Assets) purchased for the plant. Not all spare parts for a safety-related component are 'Q' because not all parts of a component, if failed, will prevent the component from performing its designated safety-related function. The identification of replacement parts by their quality classification is a 'quick and easy' identifier for storeroom, maintenance, planner and procurement engineering personnel which provide 'defense-in-depth' (typical of the conservative approach applied by the nuclear industry).

#### Location "Safety Class":

The indicator of the safety class on Location is utilized by engineering, operations and planning in the determination of numerous work process requirements and in the plant modification process.

This designation is different from the Item/Asset identifier. It is used in conjunction with the 'Attributes' designators to further refine engineering and work management processes. The designator is contained on the Location application as a value list.

#### Application use:

ITEM level / ASSET quality, "PROCUREMENT CLASS"

Added a Procurement Class field (Value List) to the Item Master (Data entered on the ITEM MASTER and populated down to the ITEM level). Added a Procurement Class field (Value List) to the ASSET application. It is editable at ITEM MASTER level with the appropriate security and displayed on Work Order Tracking Planned/Actuals Materials table window and the Select Materials and Select spare parts dialogs. The Asset Quality Level is displayed on the Asset Application page as well.

Further, this field is a required field to be completed when creating a new Item; it defaults to blank (null value) and may be changed ONLY through a security controlled event.

#### LOCATION "SAFETY CLASS"

Added a Safety Class field (value list) to the Location application.

#### Performance Monitoring

##### As-Found Condition Code on Work Orders

While MAXIMO provides the ability to perform PMs and corrective maintenance, an as-found condition code is needed to assist with Performance Monitoring.

#### Basis:

"Trend as-found equipment condition codes to identify patterns of degradation by component type and the need to adjust PM tasks and frequencies" (AP-913, p. 22).

#### Examples:

1. Maintenance personnel arrive at a Location to perform PM work and discover that the component is in pristine condition. The PM has a 3-month frequency. They document the 'As-Found' condition and perform the PM. On a weekly basis, the site PM coordinator is reviewing the completed PM's from the prior week and

discovers the 'As-Found' condition code on the aforementioned Location. A review of the last 4 performances of the PM reveals that the 'As-Found' has been very high (7's and 8's), indicating that the component's reliability is very good for the installed design. After reviewing any Commitments placed against the PM and the Location and a thorough review of the Vendor's PM recommendations, in cooperation with the system engineer, the PM coordinator is able to relax the PM frequency from 3 months to 6 months. This results in a halving of the PM performance and a reduction in total O&M costs, as well as a reduction in the REM Number, CM Backlog, Deferred PMs, Issue/Return Efficiency and Monthly Average Jobs KPIs.

2. Maintenance personnel arrive at a Location to perform a semi-annual PM calibration and discover that the component is once again out of tolerance. The 'As-Found' values on the calibration data sheet reflect this and annotate the 'As-Found' condition on the PM work order. The I&C work package coordinator reviews the performed Calibrations for the week and determines that the instrument is consistently out of tolerance. Further review and conversations with the vendor uncovers no conclusive evidence as to why the instrument is behaving in this fashion. The PM coordinator, during a review of the week's PM's, uncovers the 'As-Found' condition of the equipment, reviews the last 6 performances of the PM and initiates a conversation with the I&C coordinator. The result of the discussion is a determination that the frequency for the calibration is too infrequent, and both concur that the likely resolution is to adjust the PM frequency to a 3 month interval and impose temporary increased monitoring of the process and instrument performance.

**Application Use:**

A new Domain (Valuelist) for as-found condition codes has been added. The following table was taken from AP-913 Appendix E.

| Condition Code | Description  | Details  |
|----------------|--|--|
| 1              | Unanticipated Failure  | <ul style="list-style-type: none"> <li>▼ Failure not associated with normal wear or aging discovered at time of activity.</li> <li>▼ Condition Report required to address condition.</li> <li>▼ Potentially misapplied structure, system, or component requiring engineering solution</li> </ul> |
| 2              | Repair/Replacement Required, Not necessarily Due to Normal Wear or Aging | <ul style="list-style-type: none"> <li>▼ Failure not definitely attributable to normal; wear or aging; can be repaired with replacement in kind material, parts, or components</li> <li>▼ May require engineering solution</li> </ul>  |
| 3              | Repair/Replacement Required, Due to Normal Wear or Aging                 | <ul style="list-style-type: none"> <li>▼ Failure that was obviously due to normal wear or aging that can be repaired without engineering evaluation</li> <li>▼ Consider performing the PM task more frequently</li> </ul>  |
| 4              | Measured Parameter Outside Specified Tolerance                           | <ul style="list-style-type: none"> <li>▼ Component has not failed, but adjustment is required</li> <li>▼ No replacement parts other than those dictated by the PM task required</li> <li>▼ Consider performing the PM task more frequently</li> </ul>  |
| 5              | Reliability Degraded   | <ul style="list-style-type: none"> <li>▼ Component has not failed, but replacement or repairs recommended due to normal wear or aging to ensure reliable operation until next inspection</li> <li>▼ Consider performing the PM task more frequently</li> </ul>                                   |



|   |  |   |
|---|--|---|
| 6 | Measured Parameter Within Tolerance, but Adjustment Required | <ul style="list-style-type: none"> <li>▼ Adjustments required due to normal wear, aging, or drift</li> <li>▼ No replacement parts other than those dictated by the PM task required</li> </ul>  |
| 7 | Satisfactory   | <ul style="list-style-type: none"> <li>▼ Observed wear considered normal</li> <li>▼ No adjustments required</li> <li>▼ No replacement parts other than those dictated by the PM task required</li> </ul>  |
| 8 | Superior   | <ul style="list-style-type: none"> <li>▼ Observed wear less than would be expected</li> <li>▼ No adjustments required</li> <li>▼ No replacement parts other than those dictated by the PM task required</li> <li>▼ Consider performing the PM task less frequently</li> </ul> |
| N | As-Found Condition Not Applicable                            | <ul style="list-style-type: none"> <li>▼ Administrative task</li> <li>▼ One-time performance</li> <li>▼ Condition monitoring task</li> </ul>  |

### Identify Items for Review Bypass – ‘Auto-Buy’ flag

Procurement Engineering (PEG) establishes requirements for suppliers and spare parts that are procured for use in a nuclear station. The use of procurement engineering varies among licensees, but at some sites, the procurement engineering group reviews most of the safety-related and augmented safety Items prior to letting a PO. There are some Items, which due to their inherent nature or throughput rate in the warehouse, the PEG has sufficient confidence in during the procurement process to eliminate the need for individual purchase review. It is for these circumstances that the ‘Auto-Buy’ indicator is used.

#### Examples:

1. A stocked Item, a Viton Seal used in the scram solenoid valves, is replaced on a given frequency. As the work order reaches the APPR status and the planned materials tab containing the Item number for the seals, the material reservation process identifies that there is insufficient stock remaining in the warehouse to satisfy the planned materials quantity. Since the procurement engineering group has identified this Item as ‘Auto-Buy’, the buyer adds the purchase requisition to a purchase order and the procurement process moves forward without procurement engineering involvement.
2. A control rod drive water filter is found to be clogged and in need of replacement. The Item is non-stocked, and prior to the buyer letting the P.O., since the ‘Auto-Buy’ flag is NOT set, the procurement request is found and routed to the Procurement Engineering Group (PEG) for determination of technical requirements for the Item and the Vendor.
3. A stocked Item for the rebuild of ‘Q’ level (safety-related) valve operators is now out of stock. The replenishment purchase request lands in the buyers queue, and since the ‘Auto-Buy’ indicator prohibiting the buyer from completing the procurement is not set, the purchase requisition is forwarded to the PEG for vendor and Item technical requirements determination.

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## Vendor Qualifications (aka Approved Vendors List)

Since the establishment of a qualified vendor occurs by the performance of periodic audits, it is necessary to quickly and easily identify that a vendor is currently within the audit cycle and therefore approved to supply the nuclear safety related spare part(s). When the date of a purchase order is beyond the date of the 'next due' audit performance, that vendor is assumed to no longer be 'qualified' to supply nuclear safety-related spare parts. This must be brought to the attention of cognizant personnel for determination of appropriate action.

Not all manufacturers and suppliers maintain a 100% compliant program at all times, hence the need to conduct periodic QA audits and capture the results of these audits. Should an audit reveal programmatic weaknesses or non-compliance in audited areas, the audit will produce 'findings'. These findings may result in temporary restrictions imposed on the company to ensure quality of spare parts is not compromised.

When nuclear safety quality spare parts are procured, special quality requirements are invoked upon the vendor that are not invoked upon the same vendor for non-quality spare parts. It is therefore necessary to provide for the inclusion of these 'quality clauses', which are similar to the commercial terms and conditions. The difference of these quality clauses from commercial T&C's is that they are typically vendor-specific. There is a further requirement to maintain these clauses with a status, revision identifier and security controlled beyond the commercial T&C's. This requirement is due to the fact that there is a separation of roles and responsibilities between the QA and Procurement Engineering groups who maintain the audit data and quality clauses and the purchasing department who normally maintain the commercial T&C's. These quality clauses are imposed upon the vendor at the PO header level, as opposed to the PO line item level. They are required to be presented to the vendor on an RFQ as well due to the necessity of obtaining accurate pricing proposals from all vendors.

As stated earlier, the results of audits may impose additional, temporary restrictions upon vendors, and these restrictions are captured by the creation or addition of quality clauses. It is therefore important to have the dynamic capability to add and remove quality clauses, but there is the restriction by roles and responsibilities as to who may perform this function.

Vendor qualifications will allow users to control which vendors can supply which items. In addition, it will allow Terms and Conditions (T&C) to be "statusable" to accommodate a review and revision process for T&C.

### Typical Business Process

Users will enter companies that will become the qualified vendors. As part of this process, and on an on-going basis, users will enter/update the following VQ-related information:

- Quality T&C's for the company – only "approved" Quality T&C's can be associated with a company. These T&C's will be administered in T&C (Nuc).

- Audit information for the company – a company must have at least one audit recorded to become eligible to supply items with a Procurement Class (PC) of Q (Quality) or A (Augmented Quality). The PC for items is administered in Item Master (Nuc).
- Items that the company can supply.
- Quality Status for the company – The Quality Status for a company determines the PC of items that the company is allowed to supply. The quality status for a company will be modified via the Change Quality Status dialog box which is accessible via an Action Menu item. This is to allow this option to be secured via Signature Security.

Once a company has been added and appropriate VQ information is entered for the company, the company can then be used to supply items with an appropriate PC. Once this company is placed as the vendor on a PO, the Quality T&C's associated with the company will be added to the PO. These T&C's will be associated with the PO and cannot be edited or removed. Removing the vendor from the PO will cause the Quality T&C's for the vendor to be removed. If the vendor is being changed and not just removed, any Quality T&C's for the new vendor will be associated with the PO instead.

Seven applications have been created to implement this functionality:

Companies (NUC)  
 Terms & Conditions (NUC)  
 Item Master (Nuc)  
 Inventory (Nuc)  
 Purchase Requisitions (Nuc)  
 Request for Quotes (Nuc)  
 Purchase Orders (Nuc)

## Companies (NUC)

2 New tabs have been added to Companies (Nuc) as follows:

- Qualifications
- Items

A new Action menu item has been added to allow the user to change the quality status for the company. Vendor status enables inventory / procurement managers to drive spend via an evaluated supplier list.

## Terms & Conditions (NUC)

This new application will allow Terms and Conditions to be statusable in a similar manner to Purchase Orders and Work Orders. Since the existing T&C application is a "single page" application, additional columns in the Terms table window have been added to support the requirements of VQ. Some of these columns will not contain data but instead will contain an action button to allow the user to perform some action on the selected row (e.g. View History and Change Status). Other fields will contain more traditional data fields.

## Item Master (NUC)

The procurement of spare parts imposes further requirements to ensure that the part will perform satisfactorily under nuclear safety challenges. These requirements, as examples, may be non-destructive examination (NDE) results such as dye-penetrant tests for surface porosity, certified material tests reports (CMTR) for the identification of material composition, or merely a certificate of compliance (C of C) to the manufacturer's established description for form, fit and function. Obviously, these requirements are Item-specific and must be identified on an Item-per-Item basis. They also must be communicated to the vendor with the PO and RFQ on the line item. These 'technical clauses' also parallel commercial T&C's but are most closely aligned with the requirements specified for 'quality clause', including the necessity for status, revision identification and security controls.

### Typical Business Process:

Users will enter items and as part of this process, and on an on-going basis, users will enter/update the following VQ-related information:

Technical T&C's for the item – only "approved" Technical T&C's can be associated with an Item. These T&C's will be administered in T&C (Nuc).

Qualified Vendor information for the item. This flag determines if the item can only be generally purchased from a qualified vendor. This flag is editable at any time by the user with the exception of items where the Procurement Class has been set to Quality. In this instance the Qualified Vendor flag is set to Y and the checkbox becomes read-only.

**Note: This field must be checked for Quality Terms, to be added to a PR or PO.**

If an attempt to purchase an item flagged as normally being purchased only from a qualified vendor from an un-qualified vendor is made, the value of the Maxvar PLUSQUALCOMP will determine the response. This is set as follows: Organizations (Nuc) -> Select Action ->Nuclear Options -> Nuclear System Options: Item Qualified Vendor.

The responses are as follows:

- Do Nothing – the transaction is allowed with no warning
- Warn – the user is warned but is allowed to continue with the transaction if they choose to
- Prohibit – the user is prohibited from continuing with the transaction

Once an item has been added and appropriate VQ information is entered for the item, the item can then be used and purchased. Once this item is placed on a PR/RFQ/PO, the Technical T&C's associated with the item will be added to the PR/RFQ/PO. These T&C's will be associated with the PO and cannot be edited or removed. Removing the item from the PO will cause the Technical T&C's for the item to be removed. If the Item is being changed and not just removed, any Technical T&C's for the new item will be associated with the PO instead.

## PR (NUC)

Users can create PR's in a number of ways – e.g. manually via the PR (Nuc) application or via the re-order functionality. However a PR is created, a vendor may be added to the PR and as the vendor is added, quality terms associated with the vendor may be added to the PR. If this vendor is removed, any quality terms associated with the vendor are removed from the PR. Likewise, if the vendor on a PR is changed, any terms associated with the vendor are removed and any terms associated with the new vendor may be added to the PR. This occurs however the PR is created and however the vendor is added to or removed from the PR.

In a similar fashion, as items are added to a PR, any technical terms associated with the items are added to the PR. If the item is removed from the PR, so are any technical terms associated with the item. Changing an item will result in the original item's technical terms being removed and any technical terms for the new item being added to the PR. There will also be a menu option to allow for the manual addition and deletion of technical terms. The use of a menu option will allow for this option to be controlled via security.

## RFQ (NUC)

Users can create RFQ's and add RFQ Lines in a number of ways – e.g. manually via the RFQ (Nuc) application or via a PR. However a RFQ is created or lines are added, a vendor or vendors may be added to the RFQ and as a vendor is added, any quality terms associated with the vendor may be added to the RFQ. If this vendor is removed, any quality terms associated with the vendor are removed from the RFQ. Likewise, if a vendor on a RFQ is changed, any terms associated with the vendor are removed and any terms associated with the new vendor may be added to the RFQ. This occurs however the RFQ is created and however a vendor is added to or removed from the RFQ.

In a similar fashion, as items are added to a RFQ (by whatever method), any technical terms associated with the items are added to the RFQ. If the item is removed from the RFQ, so are any technical terms associated with the item. Changing an item will result in the original item's technical terms being removed and any technical terms for the new item being added to the RFQ.

## PO (NUC)

When a PO is created, a vendor will be added to the PO at some point prior to the PO being approved, and as the vendor is added, any quality terms associated with the vendor may be added to the PO. If this vendor is removed, any quality terms associated with the vendor are removed from the PO. Likewise, if the vendor on a PO is changed, any terms associated with the vendor are removed, and any terms associated with the new vendor may be added to the PO.

In a similar fashion, as items are added to a PO, any technical terms associated with the items are added to the PO. If the item is removed from the PO, so are any technical terms associated with the item. Changing an item will result in the original item's technical terms being removed and any technical terms for the new item being added to the PO.

Quality Items and Non-Quality Items are not allowed to be mixed on the same PO. When a PO is created from a PR that has mixed quality items two POs will be created for the same vendor, one with the quality items and one with the non-quality items.

## Re-Order Process

An Option (MAXVAR) has been added to allow users to define whether or not Quality items (i.e. as denoted by the Qualified Vendor flag being set for an item) are to be included in the re-order process. This flag is in addition to the stocked/non-stocked flag which also determines if an item is included in the re-order process. This will allow an item to be listed as being stocked but also as a quality item and thus it may or may not be included in the re-order process, as denoted by the value of the Quality Item re-order Option. This is accessed as follows: Organizations (Nuc) -> Select Action ->Nuclear Options -> Nuclear System Options: Re-order Quality Items.

As items are added to PRs/POs as part of the re-order process, Technical Terms and, if applicable, Quality Terms will be added to the PR/PO.

### Typical Business Process

Users will enter items and select the Qualified Vendor check box for items as appropriate. In addition, Technical Terms will be associated with the item as appropriate. Users will then run the re-order process (either the regular re-order process or the re-order of direct issue items process) and as part of this process, Technical Terms and, if applicable, Quality Terms will be added to the PR/PO.

Note: Quality and Non-Quality Items can be listed on the same PR. However, they are not listed on the same PO. If the reorder process is configured to generate POs then separate POs will be created for the same vendor, one with the Quality items and one with the Non-Quality items. This also applies when creating POs from PRs.

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## Equipment Groups

Nuclear power plants typically group maintenance tasks by tech spec consequences, unavailability consequences, or for various other reasons. These groupings are commonly made around key pieces of equipment and are known as Functional Equipment Groups. This practice minimizes nuclear plant system unavailability by identifying work tasks for the same FEG and working the compatible tasks in parallel when a given system, subsystem, or group of systems is removed from service. To satisfy this need, an Equipment Group is established. For example Division 1 Diesel Generator is designated an Equipment Group. All Locations associated with the Division 1 Diesel Generator are added to this system. When a Work Order is subsequently created for one or more of these Locations, or for Assets associated with one of these Locations, the Equipment Group attribute is associated to the WO. WOs in the plant backlog can then be easily identified and scheduled for the appropriate system or plant outage.

Other Maximo primary work records, such as the PMs, Permits, Lineups, and Clearances, can also be grouped with WOs based on their Equipment Group.

In the case of complex system clearances used during a plant refueling outage or shutdown, the ability to group tags for release prior to completion of all Clearance work provides the following advantages:

Groups of tags identified by common Boundary-type Equipment Groups may be added to a Clearance either on a new Clearance or by Clearance Revision. Once tags are on a CL, groups of tags may be sorted by their Boundary Equipment Group for the purpose of assisting the Ops resource in Releasing and Restoring groups of tags. These groups would typically be Released using a Clearance Revision. For example, tagged components can be identified with Boundary Equipment Groups such as Mechanical and Electrical. When the mechanical work on a system is completed and the system is buttoned up, and Operations is ready to Release the mechanical components such as isolation and vent valves and return them to service, the CL tags can be sorted by Boundary Equipment Group Mechanical; these tags would then be Released by means of a Clearance Revision. In this case the remaining Electrical components would be kept isolated and tagged, as necessary for the safe management of plant configuration.

For additional control, only Boundary-type Equipment Groups are available to tags. The remaining non-Boundary type Equipment Groups are available to WOs, Permits, Clearances, and PMs for work record grouping.

Maximo enhances this basic concept by adding Type and Owner Group to equipment groups which allows a more flexible and powerful use by more groups. Most application allow for both a Primary Equipment Group as well as a able window to support additional Equipment Groups, therefore it is capable of satisfying many concurrent user needs. Values for specific equipment groups are typically developed and used according to approved plant procedures.

- The groupings may be connected to plant system hierarchies, or may extend beyond the notion of system roll-ups to include other grouping concepts.

- The Attribute Equipment Group Type is used to support data differentiation.  
Examples:  
Functional, Operational, Operability, Availability, PM Generation, Power Supply, Schedule, Condition, Outage, PM Binding, Package Clearance, FEG Boundary.

## Approach

Equipment Groups are related to Locations in a many to many relationship.

- The standard Maximo multi-select dialogue boxes (Select Value, as well as Classification and Attribute-based search) are used to populate the Associated Locations table window in the Equipment Groups application.

Equipment Groups are differentiated as Boundary groups or non-Boundary groups in support of application filtering.

- Standard groups apply only to WOs, PMs, Permits, and Clearances.
- Boundary groups apply only to Tags.

Each Location may designate Default Equipment Groups

- A Location may have one Boundary Default and one non-Boundary Default Equipment Group.
- It is also possible to not designate a Default.
- This designation determines which Equipment Group defaults into a Maximo record, based on the record's Location.
- Default values facilitate data building on a given Maximo record. The user can replace the default value with any Equipment Group associated with the record.
- Default of an Equipment Group value applies to WOs, PMs, Permits, Clearances, and Tags.

Assets are related to Equipment Groups through the Asset's Location.

- If the record does not have a Location but does have an Asset, and the Asset is associated with a Location, then the default Equipment Group for this Location is defaulted onto the record.

An alternate Location-centric view displays the related Equipment Groups from the Location.

- A table window is provided on the Locations (Nuc) Program Data tab. Note that the former SNPM Data tab on Location is relabeled Program Data.

Other Equipment Group attributes such as Type and Mode assist data differentiation and Maximo record filtering.

## Functionality

The Equipment Groups (Nuc) application is located in the Planning module, at the bottom of the existing application list.

The following Select Actions are available for Equipment Groups (Nuc):

Change Status



## View History

-----  
Select Owner Group  
-----

Attachment Library/Folders  
-----

Duplicate Equipment Group  
Delete Equipment Group  
Add to Bookmarks  
-----

Run Reports

### Delete Equipment Group

Is only available for Equipment Groups in DRAFT or INACTIVE status, and which are not currently related to a Location.

### Duplicate Equipment Group

Duplicates all fields except:

- Equipment Group ID; the new EG has a unique EG ID.
- Default Group; for the new EG, PLUSEGLOC.DEFAULTTEG = N for all duplicated rows
- Status; the new EG is created in DRAFT status
- Associated Locations; in the Associated Locations table window

Standard Maximo Select Owner Group functionality, minus the Select Owner function.

### Select Equipment Groups Dialog

The Select Equipment Groups dialogue box is used in all the Maximo applications where Equipment Group is added to Maximo records. There are three variations on the Select Equipment Groups dialogue box, depending on where in Maximo it is used.

- Variation 1. The multi-select dialogue box is used for the Related Equipment Groups table windows in WO, PM, Permits, and Clearances. Only EGs where BOUNDARY = N are available.
- Variation 2. Similar to Variation 1, a multi-select dialogue box is also used for the Associated Equipment Group table window on Locations. However, the filter at the top of the dialogue box is not provided. Show All Equipment Groups is defaulted in the Locations application. EGs of both types are available: both BOUNDARY = Y and N.
- Variation 3. Similar to Variation 1, a Select Value dialogue box will be used for returning individual Equipment Group values where they appear on Maximo objects. In this case, the multi-select check boxes are not displayed. This is applicable for the Equipment Group fields on WO, PM, Permits, and Clearances, and the Boundary Group fields on the Tag rows of the Clearance Application tab and Restoration tab.
  - Boundary vs. non-boundary filtering applies, based on whether a Boundary Group is being selected for a Tag row, or a non-boundary group is selected for the Equipment Group field on WO, PM, Permits, and Clearances.

Status

| <b>Equipment Group Status Grid</b> |                              |   |
|------------------------------------|------------------------------|---|
| <b>Current Status</b>              | <b>Allowable Next Status</b> | <b>Notes</b>  |
| <b>N/A</b>                         | <b>DRAFT</b>                 | <ul style="list-style-type: none"> <li>• Default status for all new EGs upon initiation.</li> <li>• Equipment Groups in this status are not available for association or default onto Maximo WOs, PMs, Permits, CLs, Tags, or Locations.</li> </ul>                           |
| <b>DRAFT</b>                       | <b>ACTIVE</b>                | <ul style="list-style-type: none"> <li>• The EG is available for association with Maximo WOs, PMs, Permits, CLs, Tags and Locations.</li> <li>• Where designated as Default EG, available for defaulting onto Maximo records as described above.</li> </ul>                   |
|                                    | <b>INACTIVE</b>              | <ul style="list-style-type: none"> <li>• Equipment Groups in this status are not available for association or default onto Maximo WOs, PMs, Permits, CLs, Tags or Locations.</li> <li>• Once associated, an EG that goes to INACTIVE status may remain associated.</li> </ul> |
| <b>ACTIVE</b>                      | <b>INACTIVE</b>              | <ul style="list-style-type: none"> <li>• See description for INACTIVE above.</li> </ul>   |
| <b>INACTIVE</b>                    | <b>ACTIVE</b>                | <ul style="list-style-type: none"> <li>• See description for ACTIVE above.</li> </ul>   |

## Other Associated Applications

### Locations (Nuc)

The Locations (Nuc) application provides a reciprocal view of the Equipment Groups that are associated with a Location. In the Equipment Groups application, Locations can be associated with the Equipment Group. From the Locations application, the Equipment Groups already associated with a Location can be viewed, and Equipment Groups may also added or removed to the Location.

In addition, the Default Equipment Group relationship can be established or changed from the Location.

No Equipment Groups are copied when invoking duplicate action for Locations.

### Work Order Tracking (Nuc), PM (Nuc), Permits (Nuc), Clearances (Nuc)

This section is applicable to all non-Boundary Equipment Groups (PLUSEG.BOUNDARY = N).

Non-Boundary Equipment Groups are associated with the Maximo primary work objects WOs, PMs, Permits, and Clearances.

- Boundary Equipment Groups are only applicable to Maximo Tags, and are described elsewhere.

Equipment Groups are associated with the Maximo WO, PM, Permit, or Clearance when a Location is added to the object. If an Equipment Group is identified as a Default Group for the Location, it is defaulted into the Equipment Group field on the main tab (WO, PM, Permit, or Clearance tab).

When a new Location is associated with the work object, Maximo checks if the new Location is associated with a different Default Equipment Group. If so, a message is presented to the user to determine if the new Equipment Group should be added.

Equipment Groups may be deleted from the Equipment Group field on the main tab of the primary work object. Equipment Groups may be manually added using the filtered Select Equipment Groups dialogue box described in a section above (section 6.4).

Additional Equipment Groups may be related to the object by adding them to the Related Equipment Groups table window on the work object. The Select Equipment Groups dialogue box is also available for adding to the Related Equipment Groups table window.

Equipment Groups may also be related to Maximo primary work objects through their Assets. If an Asset is associated with the primary work object and there is no Location on the primary work object, and if the Asset is associated with a Location, then the Equipment Groups on the Asset's Location will be brought to the primary work object.

Only Equipment Groups in ACTIVE status may be associated with a Maximo primary work object.

Note: Standard Equipment Group rules described above also apply to Maximo primary work objects generated during the WOGEN or similar process. This includes PMWOs, including those generated using the various Route options, and Permits generated from Impact Plans, either by WOGEN or manually. In these cases, if an Equipment Group is identified as a Default Group for the Locations (or Assets) on the Route or Permit, it is defaulted into the Equipment Group field on the WO / Permit main tab.

#### PM (Nuc)

Only the Primary Equipment Group is copied when invoking duplicate action for PMs. Secondary equipment groups, maintained in a relationship to the PLUSEGPM table, are not duplicated.

#### Permits (Nuc)

Only the Primary Equipment Group is copied when invoking duplicate action for Permits. Secondary equipment groups, maintained in a relationship to the PLUSEGWO table, are not duplicated.

#### Clearances (Nuc)

The Select Equipment Groups dialogue box described above is applicable to CL (Nuc), with the following qualification:

- Clearances (Nuc), exclusive of the Application and Restoration tabs and dialogue boxes associated with Tags, can only access Equipment Groups where PLUSEG.BOUNDARY = N.
- The Application tab, Restoration tab, and the View Tag Information dialogue box can only access Equipment Groups where PLUSEQUIPGROUP.BOUNDARY = Y.
- Only the Primary Equipment Group is copied when invoking duplicate action for Clearances. This includes duplicating any Primary Equipment Group associated with the Clearance, and the Primary Boundary Equipment Group for each

duplicated Tag on the Clearance. Secondary equipment groups, maintained in a relationship to the PLUSEGCL table, are not duplicated.

#### Tags (Part of Clearances (Nuc))

Boundary Equipment Groups are associated with Tags on Maximo Clearances, and are labeled Boundary Groups.

- Non-Boundary Equipment Groups are applicable to Maximo WOs, PMs, Permits, and Clearances, and are described elsewhere in this specification

Boundary Groups are associated with Tags when a Location is added to the Tag. If a Boundary Group is identified as the Default Group for the Location, it is defaulted into the Boundary Group field on the object.

When a new Location is associated with a Tag, Maximo checks if the new Location is associated with a different Default Boundary Equipment Group. If so, a message is presented to the user to determine if the new Boundary Equipment Group should be added.

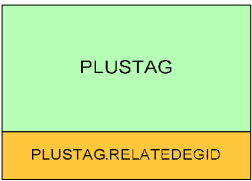
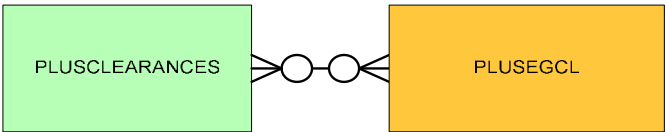
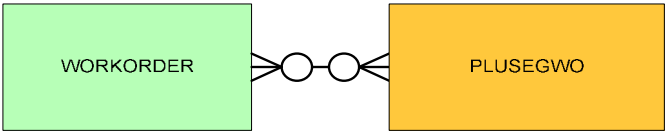
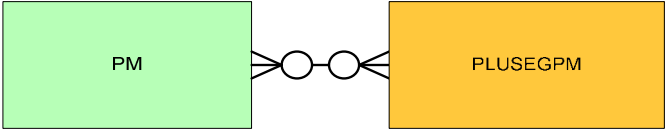
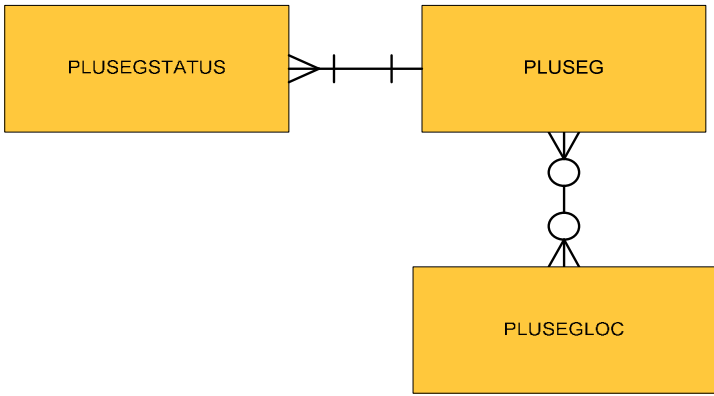
A Boundary Group may be deleted from the Boundary Group field on the Tag. A Boundary Group may be manually added using the filtered Select Equipment Groups dialogue box described in a section above (section 6.4).

A Boundary Group may also be related to a Tag through its Asset. If an Asset is associated with the Tag and there is no Location, and if the Asset is associated with a Location, then the Boundary Group on the Asset's Location will be brought to the Tag.

Only a Boundary Equipment Group in ACTIVE status may be associated with a Tag.

The Select Equipment Groups dialogue box described above is applicable to the Application and Restoration tabs with the following qualification:

- The Application tab and Restoration tab can only access Equipment Groups where PLUSEG.BOUNDARY = Y.
- A Select Value (similar to the multi-select dialogue box shown) will be used for returning individual Boundary Group values to Tag rows.



**Legend:**

NEW

EXISTING

Table Structure

---

---

# Nuclear Industry Solution Architecture

- New Applications
  - Frequency (NUC)
  - Impact Plans (NUC)
  - Events (NUC)
  - Tech Specs (NUC)
  - Surveillance Requirements (NUC)
  - Clearances (NUC)
  - Clearances Kiosk (Nuc)
  - Sign On/Off (NUC)
  - Sign On/Sign Off Kiosk (Nuc)
  - Line Ups (Nuc)
  - Line Up Plans (Nuc)
  - LCO Tracking (Nuc)
  - Duty Stations (Nuc)
  - Duty Station Plans (Nuc)
  - Objectives (Nuc)
  - Notifications (Nuc)
  - Reading Frequencies (Nuc)
  - Configuration Change Management Designer (Nuc)
  
- Cloned Applications
  - Organizations (NUC)
  - Commitment Tracking (NUC) – Work Order Tracking
  - Asset List (NUC) – Routes
  - Locations (NUC) – Locations
  - Quick Locations (Nuc) - Locations
  - Asset (NUC) – Asset
  - Quick Assets (Nuc) – Asset
  - Configuration Items (Nuc)
  - Work Order Tracking (NUC) – Work Order Tracking
  - Quick Reporting (NUC) – Quick Reporting
  - Item Master (NUC) – Item Master
  - Inventory (NUC) – Inventory
  - Preventive Maintenance (NUC) – Preventive Maintenance
  - Companies (NUC) – Companies
  - Terms & Conditions (NUC) – Terms & Conditions
  - Permits (Nuc)
  - Quick Permits (Nuc)
  - Job Plans (Nuc)

- Changes (Nuc)
- Releases (Nuc)

---

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# Implementation Considerations

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## Options (MAXVAR)

Commitment Tracking: When NIS is installed, it inserts a MAXIMO Variable (MAXVAR) 'PLUSWORKTYPECMT'. This MAXVAR must be created for each ORG in the database. The install uses the organizations from the MAXDEMO database, so be sure to check and correct the ORGID if necessary. If this MAXVAR is not set correctly, there will be errors using the Work Type field.

---

## Vendor Qualifications

The Vendor Qualifications functionality is based upon the concept of one Item Master for each Procurement Class. Check with the implementing organization and determine how they currently classify their items and services. Some organizations will classify items as either Safety Related or Non-Safety Related and rely on a Procurement Quality Specification (a group of specific Quality, Technical and Inspection Terms & Conditions) to identify how the item is procured, i.e. which Procurement Class applies. If so, this may require some configuration/enhancement.

The Quality and Technical Terms & Conditions are specified at the Item Master and Companies level. There may be the need to further identify the terms at the Site level. In this case, add a Site column to both the Terms & Conditions table in Companies (NUC) and Item Master (NUC) and in the Terms & Conditions (NUC) applications.

---

## Setting up MXES to support In-Storage Maintenance of Items in Storerooms

**In-Storage Maintenance (ISM)** - Those requirements associated with periodic maintenance, adjustment, or monitoring of items to prevent or detect deterioration while in storage.

In order to generate PM Work Orders to perform recurring work on items in inventory, you will need the following records: Rotating Item, Asset, PM, Route/Asset List.

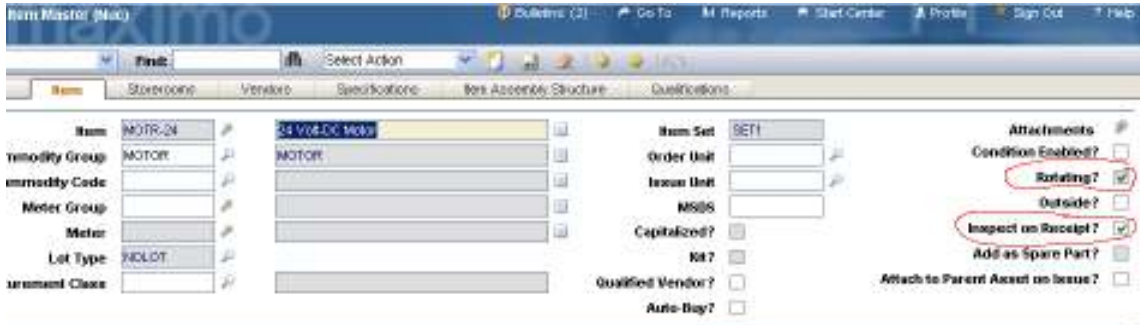
There are two methods to create Rotating Equipment. Method 1: receiving the items on a Purchase Order to a storeroom, and Method 2: create the asset in the Asset application.

### Method 1: Receiving Items

#### Creating the Item in Inventory

1. On the Item Master application, give the item a unique item id and description and check the box "Rotating?" and the box "Inspect On Receipt?" Fill in any other applicable field before saving the record.

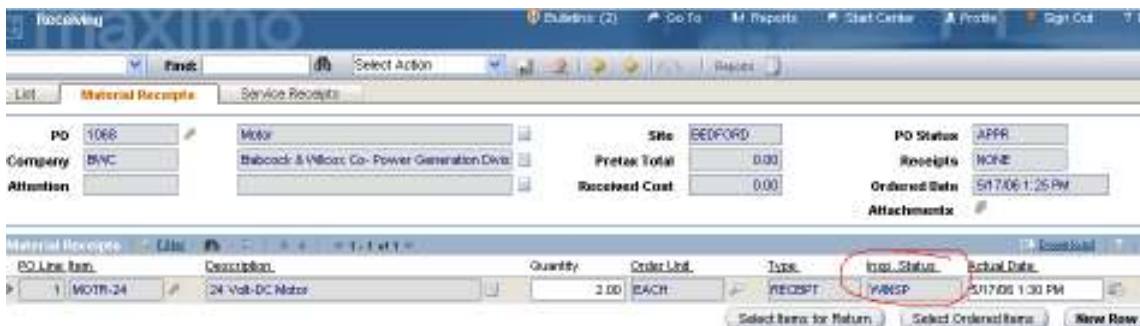




2. Select "Add Item To Storeroom" from the action menu. From the "Add Item To Storeroom" screen, populate the Storeroom field with the desired result. Save the record. At this point you have an item to associate equipment to, with the respective storeroom that they can be issued from.

## Receiving the Item

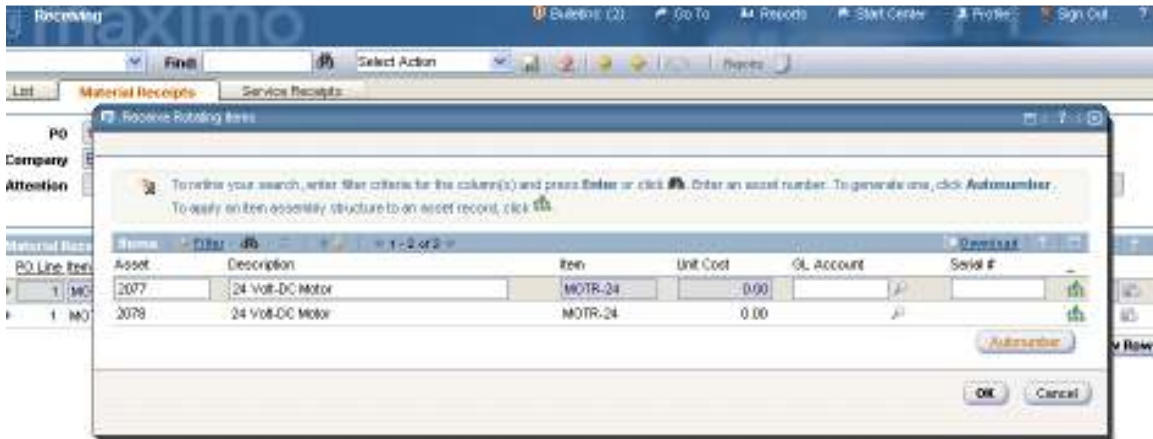
3. Using the 'Select Ordered Items' button, select the item to receive. Save the record; the inspection status is 'WINSP'.



4. Inspect the items. When finished, Select Action 'Change Inspection Status'. For rotating items, the status will change to 'WASSET'.

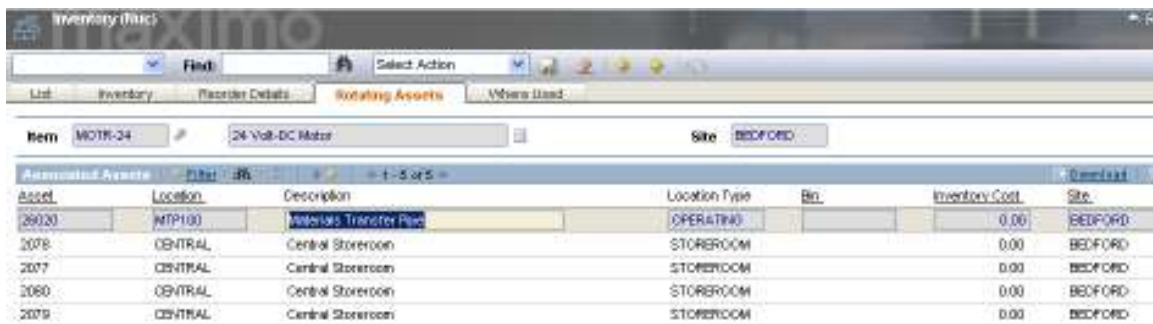


5. Select action 'Receive Rotating Items'. Click 'Autonumber All' or expand each row individually and add an asset number. All items will now have an asset number.



6. Fill in the appropriate information and save the item. The status will be 'COMP'.

MAXIMO will create an Asset record based upon the item being received and will associate the item with the asset. You now have a unique instance of the item in inventory.



## Creating a PM for this Equipment

7. In the PM application, create a new record for this equipment and enter the appropriate data for this equipment or create the PM record for the type of activity to be performed and use an Asset List to manage the rotating equipment. It is suggested that a new work type of 'ISM' be created for this purpose.

Preventive Maintenance (Max)

Find Select Action

List PM Frequency Seasonal Dates Job Plan Sequence PM Hierarchy SNPM Data References

PM 1012 In Storage Maintenance of MOTR-24 Site BECFORD Status DRAFT

Master PM Override Updates from Master PM? Attachments

Commitments?

Details

Location Asset Route/Asset List MOTR-24 In Storage Maintenance of MOTR-24

Lead Time (Days) 0 Counter

Lead Time Active? Use Job Plan Sequence?

Milestone Code Res Children?

Scheduling Comments

Details

PM Type OTH

Work Order Information Responsibility

Job Plan Description Supervisor

Work Type ISM Last Start Date Crew

Work Order Status APPR Last Completion Date Lead

Priority 1 Partial Start Date Work Group

8. Enter the appropriate frequency information and designate a First Start Date.

Preventive Maintenance (Max)

Find Select Action

List PM Frequency Seasonal Dates Job Plan Sequence PM Hierarchy SNPM Data References

PM 1012 In Storage Maintenance of MOTR-24 Site BECFORD Status DRAFT On Demand?

Work Order Generation Information

Use Last WO's Start Information to Calculate Next Due Frequency?  Generate WO Based on Meter Reading (Do Not Estimate)?

Generate WO When Meter Frequency is Reached?

Time Based Frequency Meter Based Frequency

PM Frequency Name

Regulatory Frequency 120

Frequency 120

Frequency Units DAYS

Grace Period (%) 0.00

Grace Days 0

3.25 Rule?

Estimated Next Due Date 11/17/08

Extended Date

Adjust Next Due Date?

## When converting data into MAXIMO

When setting up a new installation with legacy data, care must be taken to ensure that the Inventory balances and value reflect the legacy system. As with receiving new items, you need the following records: Rotating Items in a storeroom, Asset records to be associated with the rotating items, and PMs to generate Work Orders for the equipment. If there are multiple assets associated with an item, then you may also want to create a Route or Asset List record for that item with the associated equipment on it.

If the equipment will be associated with the rotating items after data conversion, then the inventory balance must be zero. When the item is associated to the equipment, MAXIMO will increase the balance accordingly.

## Method 2: Creating the Rotating Asset in the Asset Application

### Creating the Asset record

1. Create a new asset record using the Asset screen. Populate the Item field with the appropriate value. Populate all applicable fields before saving the record. You can associate the asset to the storeroom by populating the Location with the correct value before saving the record. If you save the record before entering a location, you must use the action menu "Move/Modify Asset" in the Asset application or move the asset in the Inventory application.

The screenshot shows the Maximo Asset Management application interface. The top navigation bar includes 'Assets (10)', 'Find', 'Select Action', and various icons. Below the navigation bar, there are tabs for 'List', 'Asset', 'Spares Parts', 'Safety', 'Meters', 'Specifications', and 'SNRN Data'. The main form displays the following information:

- Asset: 2077
- Item: 24 Volt-DC Motor
- Site: BEDFORD
- Status: NOT READY
- Type: [Empty]
- Attachments: Moved?

The 'Details' section contains several fields:

- Parent: [Empty]
- Maintain Hierarchy?: [Checked]
- Location: CENTRAL (highlighted with a red circle)
- Item: 24 Volt-DC Motor (highlighted with a red circle)
- Rotating Item: ROTR-24 (highlighted with a red circle)
- Condition Code: [Empty]
- Meter Group: [Empty]
- Usage: [Empty]
- Calendar: [Empty]
- Shift: [Empty]
- Priority: [Empty]
- Serial #: [Empty]
- Failure Class: [Empty]
- Item Type: ITEM
- Tool Rate: [Empty]

With this method there will be no asset cost in the inventory for these records. You will need to manually adjust the standard cost and average cost.

### Creating a PM for this Equipment

This is the same as in Method 1 above.

### In Storage Maintenance Enhancement

The methods described above use the Asset List application to group the unique instances of an item. This could impose more person time than a client wants to expend maintaining the In Storage Maintenance function. As items are received or issued, the associated Asset List must be maintained. Therefore, an option would be to automate this activity by creating a function that will automatically add and delete assets from the associated list as items come and go from the storeroom.

---

# Calibration

Calibration provides separate and distinct functionality and was developed independent of the Nuclear Industry Solution (NIS). There are no links or ties between Calibration and NIS. For example, when creating a PM for a tool, there is no link to the Asset (Cal) application from the Asset field on PM (NUC) or on PM. You will need to use the configuration tools in MXES to create links and ties where needed. Include these types of considerations during project planning and implementation.

## Setting up Maximo to support Calibration of Tools (Standards) to be issued by Inventory location (Storerroom or Tool crib) for use on a Work Order.

For tools to be issued from an inventory location with the ability to reserve the item in inventory, they are treated as rotating stock items. To perform this function, the following steps must be taken:

### Creating the Item in Inventory

1. In the Tools application, give the tool a unique ID and description, check the box “Rotating?” Fill in any other applicable field before saving the record.



The screenshot shows the Maximo Tools application form. The 'Tool' field is populated with 'SCORE' and 'TEXTROMEK SCORE'. The 'Item Set' is 'SET1', 'Lot Type' is 'ROLLOT', and 'Issue Unit' is 'EACH'. The 'Attachments' section includes 'Captained?' (checked), 'Rotating?' (checked and circled in red), 'Outside?' (checked), and 'Inspect on Receipt?' (checked). The 'City Group' is 'TOOLS' and 'City Code' is empty. The 'User Group' and 'Meter' fields are also empty.

2. Select “Add Tools to Storeroom” from the action menu. From the “Add Tools to Storeroom” screen, populate the Storeroom field with the desired result. Save the record. At this point you have an item to associate assets to, with the respective storeroom that they can be issued from.

### Creating the Asset record

3. Create a new Asset record using the Assets (Cal) screen. Populate the Rotating Item field with the value from the steps above. Populate all applicable fields before saving the record. You can associate the asset to the storeroom by populating the Location with the correct value before saving the record. If you save the record before entering a location, you must use the action menu “Move/Modify Assets” in the assets application or move the asset in the Inventory application.

Assets (Cal) | Tektronix (2) | Go To | Reports | Start Center | Profile | Sign Out

Asset: SCOPE1 | TEKTRONIX SCOPE #1 | Site: BEDFORD | Attachments: Moved?

Status: NOT READY | Type: [ ]

Details

Parent: [ ] | Calendar: [ ]

Maintain Hierarchy?  | Location: CENTRAL | Central Storeroom | Staff: [ ]

Bin: SCOPE | Rotating Item: SCOPE | TEKTRONIX SCOPE | Priority: [ ]

Condition Code: [ ] | Failure Class: [ ]

Meter Group: [ ] | Item Type: TOOL | Tool Rate: 15.00

Seage: [ ]

The result is a Rotating Asset in the Stocked Tools (Cal) application.

Stocked Tools (Cal) | Tektronix (2) | Go To | Reports | Start Center | Profile | Sign Out

Tool: SCOPE | TEKTRONIX SCOPE | Item Set: SET1

Reassociated Assets

| Asset  | Location | Description       | Type      | Bin   | Inventory Code | Site    |
|--------|----------|-------------------|-----------|-------|----------------|---------|
| SCOPE1 | CENTRAL  | Central Storeroom | STOREROOM | TOOLS | 0.00           | BEDFORD |

## Creating a PM for this Equipment

4. A PM needs to be created to establish the valid calibration date for a Standard. In the PM application, create a new record for this asset and enter "CAL" as the work type for this asset. If the work type is not "CAL", the next due date on the asset screen will not be updated.

Preventive Maintenance (PM) | Tektronix (2) | Go To | Reports | Start Center | Profile | Sign Out

PM: TEX001 | Tektronix Scope PM | Site: BEDFORD | Status: DRAFT

Master PM: [ ] | Override Updates from Master PM?  | Attachments: [ ]

Commitments?

Details

Location: [ ] | Lead Time (Days): 0 | Counter: [ ]

Asset: SCOPE1 | TEKTRONIX SCOPE #1 | Lead Time Active?  | See Job Plan Sequences?

Route/Asset List: [ ] | Minimum Code: [ ] | Has Children?

Scheduling Comments: [ ]

PM Type: [ ]

Work Order Information

Job Plan: [ ] | Description: [ ] | Supervisor: [ ]

Work Type: CAL | Last Start Date: [ ] | Crew: [ ]

Work Order Status: WSD1 | Last Completion Date: [ ] | Lead: [ ]

Priority: [ ] | Earliest Next Due Date: [ ] | Work Group: [ ]

- Enter the appropriate frequency information, taking note of the next due date. You can verify that this information has crossed over to the asset record after saving the PM record.

Proactive Maintenance (PM) | Bedford (2) | Go To | Reports | Start Center | Profile | Sign Out

Find: [Select Action]

List | PM | Frequency | Seasonal Dates | Job Plan Sequence | PM Hierarchy | S/PM Data | References

PM: TEX001 | Tektronix Scope PM | Site: BEDFORD | Status: DRAFT | On Demand?

Work Order Generation Information

Use Last WO's Start Information to Calculate Next Due Frequency?  | Generate WO Based on Meter Reading (Do Not Estimate)?   
 Generate WO When Meter Frequency is Reached?

Time Based Frequency | Meter Based Frequency

PM Frequency Name: [ ] | Grace Period (%): 0.00 | Estimated Next Due Date: 11/16/06  
 Regulatory Frequency: 190 | Grace Days: 0 | Extended Date: [ ]  
 Frequency: 190 | 3.25 Rule?:  | Adjust Next Due Date?:   
 Frequency Units: DAYS

Assets (CAL) | Bedford (2) | Go To | Reports | Start Center | Profile | Sign Out

Find: [Select Action]

List | Asset | Spare Parts | Safety | Meters | Specifications

Asset: SCOPE1 | Tektronix Scope | Site: BEDFORD | Attachments: Moved?   
 Status: NOT READY | Type: [ ]

Details

Parent: [ ] | Calendar: [ ]  
 Maintain Hierarchy?  | Shift: [ ]  
 Location: CENTRAL | Central Storeroom | Priority: [ ]  
 Site: Tools | Rotating Item: SCOPE | Tektronix Scope | Serial #: [ ]  
 Condition Code: [ ] | Failure Class: [ ]  
 Meter Group: [ ] | Item Type: TOOL  
 Usage: [ ] | Tool Rate: 15.00

Calibration Details

Is MSTE?  | Next Calibration Due Date: 11/16/06 12:00 AM  
 Is Contaminated?  | Asset Department: [ ]  
 Is Calibrated in House?  | Loop Number: [ ]

## Reserving the Item on a work order

- Create the work order with a work type of "CAL". There is functionality that will use this work type to verify the calibration status of any tool used. Populate all fields as necessary before moving to the "Plans" tab.

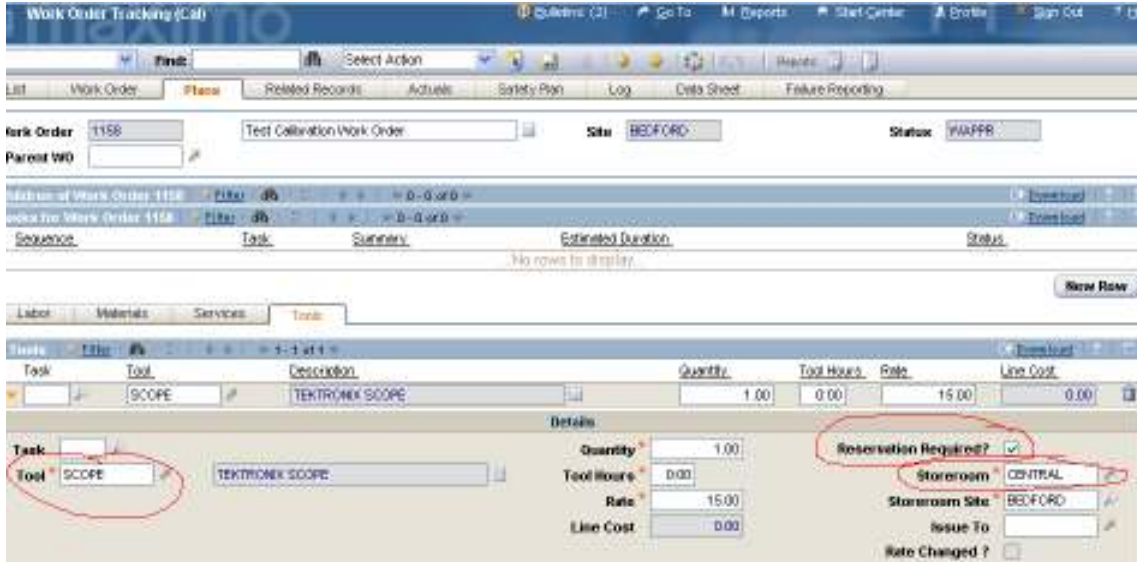
Work Order Tracking (CAL) | Bedford (2) | Go To | Reports | Start Center | Profile | Sign Out

Find: [Select Action]

List | Work Order | Plans | Related Records | Alerts | Safety Plan | Log | Data Sheet | Failure Reporting

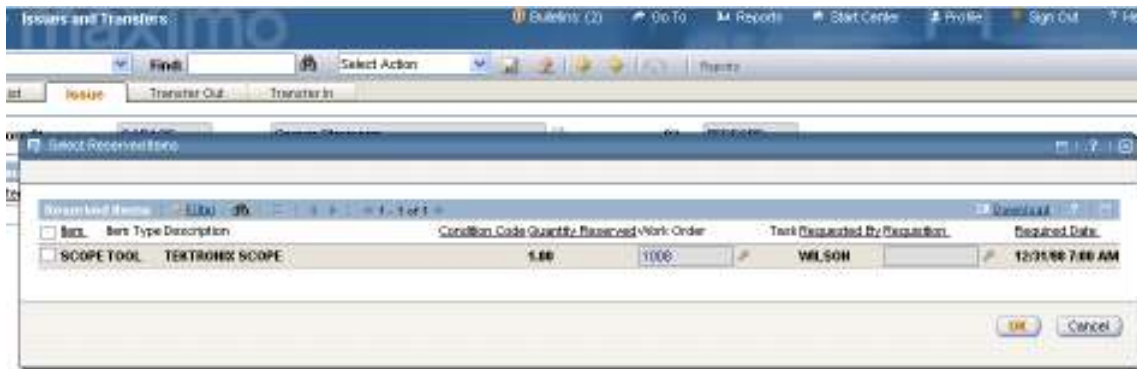
Work Order: 1158 | Test Calibration Work Order | Site: BEDFORD | Attachments: [ ]  
 Location: BN450 | Feed Water Pump - Centrifugal 100GPM 60FTH | Class: WORKORDER | Status: YAPFR  
 Asset: 11451 | Centrifugal Pump 100GPM 60FTH | Work Type: CAL | Status Date: 5/16/06 3:45 PM  
 Parent WO: [ ] | GL Account: 8900-003-000 | Inherit Status Changes?:   
 Classification: [ ] | Failure Class: PUMPS | Accepts Charges?:   
 Description: [ ] | Problem Code: [ ] | Is Task?:

- On the Plans screen, select the Tools tab. Populate the line with the Tool number, quantity of 1, and check the “Reservation Required?” field. When this field is checked, the storeroom field is editable and you can enter a storeroom. You should put a single line for each item that you need to reserve because you issue a single rotating item at a time. If you needed two of the same item, each line would have a different rotating asset number. Upon changing the status of the work order to “Approved”, the items will be reserved.



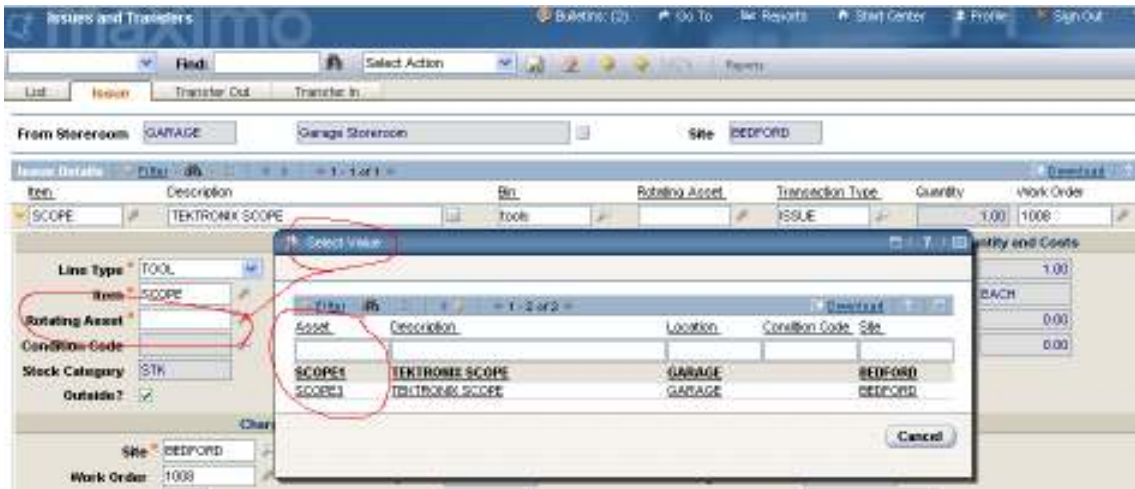
## Issuing the items from the Inventory Location

- Select the “Issues and Transfers” application. Enter in the desired Inventory Location.
- If the items were reserved against the work order, press the “Select Reserved Items” button and find the items by using the work order or item number to filter the requests.



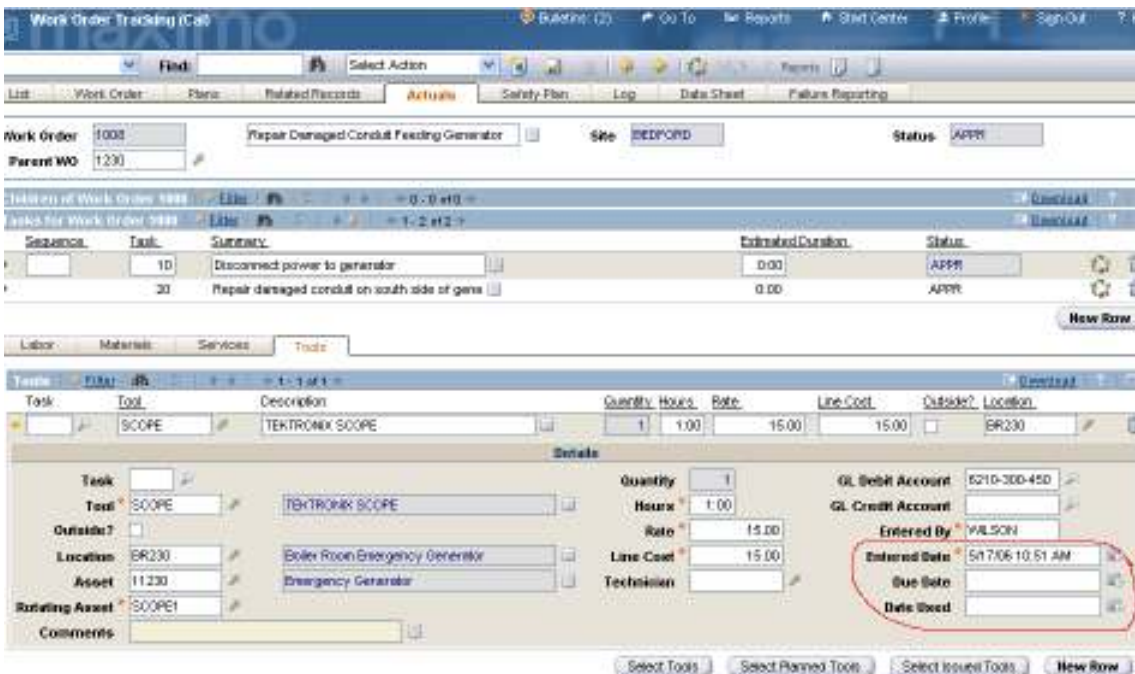
- Select the required items and press ok. This will return you to the Issue screen, where you will need to select the correct rotating asset for each line entry before saving the record. The items are now issued to the work order.





## Recording the tool usage against the work order

11. Select the work order in the “Work Order Tracking (Cal)” application that you are working with, ensuring that the status is “Approved”. You cannot record any “actual” data against the work order until this is done.
12. Select the “Actual” tab and then select the “Tools Tab”. Press either the “Select Tools”, “Select Planned Tools” or “New Row”. Expand the view to see all the fields for this line. Fill in the required information. When the Tool field is populated, the application will fill in other fields. Of interest are the three date fields in the bottom of this view. They are “Due Date”, “Enter Date”, and “Date Used”. The “Due Date” is a read only field that displays the next calibration date for the tool. The “Enter Date” is when the information is recorded, and the “Date Used” is the actual date the tool was used. If the Date Used is past the Due Date, the application will give you a warning when saving the tool transaction, stating that the tool has exceeded its calibration date, and not allow you to record the entry.

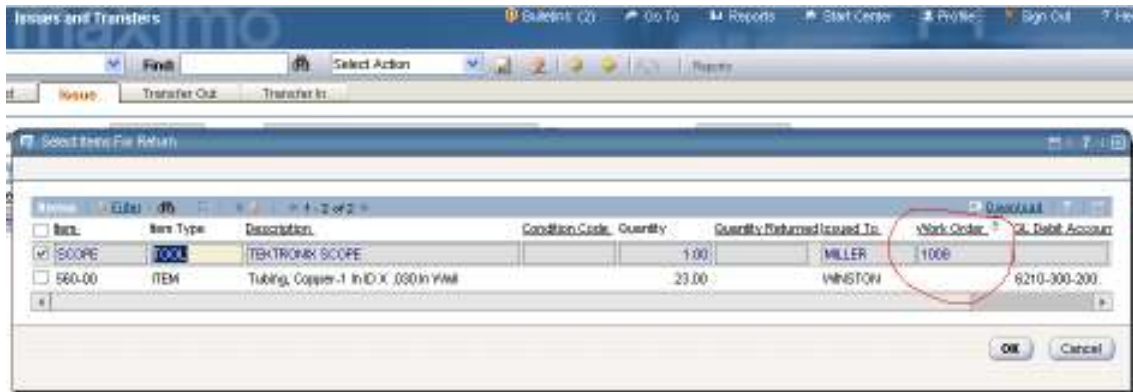


13. Once all the tool usage has been recorded, save the record.

## Returning the reserved items back to the Storeroom

14. When the rotating items were issued by the storeroom, entries were made in the “Actuals-Tools” record. To clear these entries, you need to return the items back to the Storeroom. Select the “Issues and Transfers” application. Enter in the desired Inventory Location.

15. Press the “Select Items for Return” button and find the items by using the work order or item number to filter the requests.



16. Select the required items and press ok. This will return you to the Issue screen, where you will see the rotating asset being returned. Save the record.

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# Reports Provided by the Nuclear Industry Solution

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## Clearances (NUC)

- **Clearance Tag Print**  
This report is used by operations to demonstrate a process for printing the tags which will be applied to the components as per a Clearance's direction. The data on and tag type inform plant personnel of the position, the clearance controlling its configuration and purpose of the tag.
- **2 reports: Clearance Configuration Change Order / Change Order IV (Independent Verification)**  
This report is used by operations to:
  - Provide the instructions for and allow temporary documentation for positioning & tag application / Independent Verification (IV) of a tags hung by this clearance.
  - Post Maximo input: Print out completed application / IV data for this Clearance
- **Work Against Tagged Devices**  
To provide Operations Planning & Work Management personnel the ability to review open work orders against the Locations or Assets that the current clearance will use in order to determine if any open work will impact a device's ability to perform a function required by the clearance or to determine if the boundary should be revised in order to accomplish the open work against that device.
- **Clearances Ready to Release**  
To display Clearances which may be ready to take to a Release status.
- **Tags In Field**  
This report provides a means to audit the position and presence of tags for components currently positioned under the control of a clearance. It will return the selected Unit's clearance tags by matching each clearance's location's unit with the user specified Unit as well as those clearances whose location has no specified unit
- **Clearances Needed**  
Lists work orders in need of a clearance.
- **Open Clearances Index**  
For a user's specified Site and Unit, provide a list of all clearances that are not closed or complete. To ensure no clearances are missed, the report will also display clearances where no Unit is indicated at that site. For each clearance found, other open revisions of that same clearance are displayed in order to provide the user with a complete picture of that clearance's life cycle.

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## Work Order (NUC)

- **Work Management Review List**  
The Single Point of Entry workflow uses Service Request to identify any condition or issue at a Nuclear Plant Site. When these SRs are written against plant Systems, Structures or Components they require screening and review. This report lists all new

requests that have passed the screening. The SR and any related Work Orders are listed on this report to support the daily review meeting.

- Start-up management review List  
This report lists work orders that have not yet been completed for the specified outage. The work orders are grouped by outage milestone. This facilitates the direction of resources to the work required to be completed before the next milestone can be entered.
- On-Line Material Condition Backlog by Age  
This report lists work orders that have not yet been placed in progress. It sorts the work orders from oldest to newest.
- Equipment Issues review List  
The Single Point of Entry workflow uses Problems to identify conditions or issues at a Nuclear Plant Site requiring Engineering review. When SRs are written against plant Systems, Structures or Components a Problem is generated to provide a method for the associated equipment to be reviewed in accordance with AP-913. The Problem and any related Work Orders that may have been generated from the associated SR are listed on this report to support this review.

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## Permits (NUC)

- All Permits and Permit Requests.  
A two part report that first displays all open permits by type and then all permits requests ( Each permit line in an Impact Plan that calls for a permit but does not have a permit number)

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## Lineups (NUC)

- 2 reports for Lineups: Execution and Execution IV (Independent Verification):  
This report is used by operations within a lineup but for a specific execution group selected to:
  - Provide the instructions for and allow temporary documentation for positioning & Independent Verification (IV) of components in this execution group for the current lineup.
  - Post Maximo input: Print out completed application / IV data for this execution group in the current lineup

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## LCO Tracking (NUC)

- LCO Tracking Management Report  
Provide a summary of the LCO information, including Tech Spec, Conditions, and Actions data, as well as accountability information and can be used for:
  - Provide a record archive copy of the LCO when an LCO has received its final review and promoted to CLOSED status.
  - Hard copy backup processing in the event of a system failure.
  - (Using the date fields parameters) A review of LCO tracking activity

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## Duty Stations (NUC)

- Duty Station Record Copy Print  
Supports a hard copy review and approval process for archiving each duty station's shift activities

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# Other Products Related to the Nuclear Industry Solution

## *IBM Maximo Calibration*

Calibration is included as part of the delivered Nuclear Industry Solution. Read the installation instructions before proceeding. Note that Calibration must be installed before Nuclear. Include calibration in the project plan and identify appropriate contacts to work with the project team.

You use Maximo® Calibration to:

- enter and track the calibration of instruments that measure process variables such as temperature, pressure, and flow.
- maintain a historical record of calibration measurements for instruments and measurement and test equipment.
- track a historical record of the calibration instrument (standard) used to calibrate a specific instrument or measurement and test equipment.

Maximo Calibration contains one application that is designed specifically for recording and tracking calibration data. Nine applications are enhanced versions of standard Maximo Asset Management applications. These enhanced applications include fields, features, and actions that are specific to calibration.