Hydro Work Management Process

SUMMARY

This standard establishes the requirements and responsibilities for using Hydro Generation's Work Management Process (WMP) and provides guidance on its implementation. The WMP has been established to assure that work on Hydro assets and equipment is managed safely and effectively.

NOTE

Always OBTAIN the latest version of the guidance document from the Guidance Document Library (GDL).

If using an existing copy, COMPARE the publication date AND version number on your working copy of this document against the most recently published electronic version to verify that it is current.

TARGET AUDIENCE

All personnel from Power Generation and supporting Lines of Business (LOBs) whose work involves hydro assets, hydro compliance, or work management process.

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REQUIREMENTS

1 **Work Management Process (WMP) Requirements**

1.1 For procedure details and process maps, reference the following implementing procedures:

- PG-1101P-02, "Power Generation Compliance Management Work Process Flows"

- PG-2498P-01, "Hydro Generation Work Management Process (WMP) for Recurring and Corrective Work"

- PG-2498P-02, "Hydro License Compliance Work Management Process (WMP)"

1.2 WMP Exclusions

1. The following work is not required to follow the processes outlined in this standard or to use the SAP Work Management (WM):

   - Administrative and long-term planning

   - Strategic planning

   - Budget development and management

1.3 WMP Elements

1. The WMP is designed to assist personnel in maintaining facilities and equipment through a continuous process encompassing six interrelated elements.

   a. The following elements are required to be performed, to some extent, to allow the process to function efficiently:

      - Work identification

      - Work planning

      - Work scheduling

      - Work execution

      - Work completion

      - Work analysis

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1.3 (continued)

    2.   Implementation Procedures:

          a.   Each procedural step of the WMP is described in PG-2498P-01, "Hydro Generation Work Management Process (WMP) for Recurring and Corrective Work."

          b.   Each procedural step of the Compliance WMP is described in PG-2498P-02, "Hydro License Compliance Work Management Process (WMP)."

    3.   Leadership Engagement:

          a.   Power Generation leadership from the Vice President through First Line Supervisor levels must maintain daily oversight of the performance of the WMP, as a core business function, using Operational Reviews and Visual Management.

          b.   Power Generation leaders at the Manager through First Line Supervisor levels must be involved daily with the identification and prioritization of work, as defined in the implementation procedures.

          c.   Power Generation Supervisors are responsible for the timely completion and quality closure of work in the WMP process.

    4.   Risk-Based Work Prioritization:

          a.   All notifications must be given a Priority Code to indicate the level of importance and urgency, based on the work group's assessment of likelihood and consequence of a defect or failure.

               (1)   Safety of employees, the public, and facilities is the highest priority work.

               (2)   Quality, Delivery, Cost, and Morale are also drivers for prioritization.

          b.   Corrective work (H1 Notifications) assumes an equipment defect is present and is therefore prioritized based on urgency to minimize or prevent adverse consequences.

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1.3.4.b (continued)

> (1) The Priority Codes for an H1 Notifications (H080 Orders) are summarized below (additional detail is provided in PG-2498P-01, "Hydro Generation Work Management Process (WMP) for Recurring and Corrective Work"):
>
> - Priority 1 - Emergency Work/Forced Outage (actual or imminent)
>
> - Priority 2 - Urgent Work/Maintenance Outage
>
> - Priority 3 – Essential Work/Planned Outage
>
> - Priority 4 - Discretionary Work

c. Recurring maintenance work (H3 Notifications) is planned work designed to prevent defects and is therefore prioritized based on importance of completing the work on schedule.

> (1) The Priority Codes for an H3 Notifications (H180 Order) are summarized below (additional detail is provided in PG-2498P-01, "Hydro Generation Work Management Process (WMP) for Recurring and Corrective Work"):
>
> - Priority 1 – External: Employee/Public/Facility Safety, Environmental, and Reliability Compliance Requirements
>
> - Priority 2 – Internal: Implementation of Internal Standards/Procedures, or Work Required for Critical Asset health (that are not considered external compliance requirements)
>
> - Priority 3 – Internal: Continuous Improvement on Quality, Efficiency, Affordability
>
> - Priority 4 – Internal: Discretionary Work

d. Power Generation leaders must approve work before planning, scheduling, and work execution proceeds, as defined in the implementation procedures.

e. The level of detailed planning and documentation of the plan should be commensurate with the complexity of the work and resources required.

f. Work must be scheduled in effort to timely accomplish all regulatory requirements and commitments, and to prioritize the most urgent and important work.

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1.3.4 (continued)

g.   Work execution should proceed in accordance with the plan and schedule by qualified workers, with a particular emphasis on performing the work safely.

h.   Details of all work performed on equipment must be thoroughly and accurately documented, as defined in the implementation procedures.

i.   Analysis of WMP records must be an integral part of the Asset Management Plans and asset lifecycle decisions for Power Generation asset families.

2   Hydro Asset Registry Requirements

2.1   See Appendix A, SAP WMP Functions and Description, for descriptive/supporting information for Asset Registry.

2.2   Implementation Procedures:

1.   Procedure steps related to maintenance of the Asset Registry are described in PG-2498P-01, "Hydro Generation Work Management Process (WMP) for Recurring and Corrective Work."

2.3   Overview and Governance

1.   Edits to the Hydro Asset Registry Hydro maintenance planners should maintain changes to database structure and equipment to enforce standardization.

2.   In certain cases, IT may perform mass or bulk updates to asset data as described in PG-2498P-01, "Hydro Generation Work Management Process (WMP) for Recurring and Corrective Work."

a.   Prior to bulk update of asset data, spreadsheet information must be validated by Asset Management and Hydro Planning Manager (or Delegate).

3.   Transmission/Substation Assets and IT Assets must be excluded from Hydro Asset Registry database.

2.4   Asset Hierarchy

1.   Functional Locations contain eight cascading tiers (see Appendix A, SAP WMP Functions and Description, for description of tiers).

2.   Equipment record granularity should consider:

a.   Equipment record should exist for equipment tied to regulatory requirements or reporting.

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2.4.2 (continued)

      b.   Equipment record should exist to facilitate preventative maintenance plans.

      c.   Equipment record may facilitate ease of access to maintenance history.

    3.   Deleted Records within Hydro must be saved in a dedicated location at each Area level.

3   Training

3.1   All personnel responsible for using SAP to implement the following procedures/standards must complete "Hydro Work Management/SAP" training, PGEN-9200 course code:

- PG-2498P-01, "Hydro Generation Work Management Process (WMP) for Recurring and Corrective Work"

- PG-2498P-02, "Hydro License Compliance Work Management Process (WMP)"

- PG-2498S, "Hydro Generation Work Management Process"

4   Roles and Responsibilities

4.1   Hydro O&M Organization

    1.   Generation Supervisors (or delegates) are responsible for:

      a.   Prioritizing preventative maintenance (PM) work against corrective work for all outages, with appropriate input from maintenance supervisors.

    2.   Work Center Supervisors are responsible for executing PG-2498P-01, "Hydro Generation Work Management Process (WMP) for Recurring and Corrective Work" and PG-2498P-02, "Hydro License Compliance Work Management Process (WMP)."

    3.   Maintenance Planner is responsible for:

      a.   Performing various roles to support long-term efforts to integrate WMP into department's work methodology, including:

- Supporting work supervisors and their teams with reporting, analysis, trending, planning and scheduling work, and keeping strong records in SAP.

- Maintaining Asset Registry hierarchy and Equipment Records to reflect current state of installation.

- Providing training to system users as needed.

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4.1.3.a (continued)

- Supporting SAP WM software upgrades and revisions as needed.

- Gathering and evaluating process measurement data to verify participants use WMP and that it is effective.

- Spot checking closed notifications/orders to validate completion notes and required attachments.

- Assisting is various task and initiatives within SAP as directed by WM leadership.

4. All PGEN coworkers are responsible for:

   a. Creating Notifications using SAP WM when they have identified a problem or opportunity for improvement associated with equipment or assets.

   b. Timely documenting completion of their work within SAP WM and completing Notifications.

   c. Searching SAP WM to retrieve current backlog and work history.

   d. Providing feedback to their supervisor regarding the clarity, quality, or effectiveness of the work they are assigned, to improve the effectiveness of the WMP.

5. Owners of Compliance Requirements, Standards, Procedures, Maintenance Manuals, and other governance of asset-related operation and maintenance activities must:

   a. Consult with maintenance leadership to determine best practices prior to standardizing them.

   b. Ensure all activities defined in governance documents are appropriately translated into SAP Work Management (working with maintenance planners).

6. Project Managers, Project Management Analysts, Hydro Construction Supervisors, Foreman, and Maintenance Planners, and Inspectors, may be responsible for:

   a. Transitioning work from maintenance to project when the work exceeds maintenance scope.

   b. Identifying alternatives and solutions for issues identified in the WMP process.

   c. Involvement with coordination or management of outage work, involving use of multiple PM orders assigned to multiple work groups.

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4.1.6 (continued)

    d.   Planning and executing construction or major maintenance projects in coordination with O&M and others in accordance with PM-4500P-01, "Power Generation Project Management Procedures."

    e.   Supporting Asset Registry Maintenance as described in PG-2498P-01, "Hydro Generation Work Management Process (WMP) for Recurring and Corrective Work."

7.   License Coordinators, Dam Safety License Coordinators, and Compliance Analysists, are responsible for:

    a.   Using SAP WM to manage Hydro compliance work in accordance with Hydro License Compliance Management Process as described in PG-2498P-02, "Hydro License Compliance Work Management Process (WMP)."

8.   Power Generation Engineering is responsible for:

    a.   Supporting long-term planning steps of future project identification and associated economic justifications.

    b.   Managing assigned short-term engineering work activities (e.g., corrective and assigned compliance work) within SAP in accordance with:

-     PG-2498P-01, "Hydro Generation Work Management Process (WMP) for Recurring and Corrective Work"

-     PG-2498P-02, "Hydro License Compliance Work Management Process (WMP)"

9.   Asset Management Organization is responsible for:

    a.   Supporting long-term planning steps of future project identification and associated economic justifications.

    b.   Managing assigned short-term engineering work activities (e.g., corrective and assigned compliance work) within SAP in accordance with:

-     PG-2498P-01, "Hydro Generation Work Management Process (WMP) for Recurring and Corrective Work"

-     PG-2498P-02, "Hydro License Compliance Work Management Process (WMP)"

END of Requirements

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DEFINITIONS

Backlog: A storage place for work orders that have not been closed or cancelled. All orders in the "RELEASED" system status.

Compliance Item: PG&E defined grouping or generic term for Compliance Requirements, Commitments and Obligations. See PG-1101S, "Power Generation Compliance Management Program" for further definition.

Corrective Work (H1): A specific notification created by a user to identify an abnormal condition on equipment that needs to be corrected.

Recurring Work (H3): A system generated notification initiated at a specific recurring frequency to implement a Compliance Item, inspection, walkdown, or preventative maintenance.

Engineering and Asset Management Corrective Work: A specific notification created in response to an abnormal condition that requires engineering or Asset Management review and analysis to determine corrective action.

Equipment Record: A piece of equipment is an individual, physical object that is to be maintained independently and which can be installed in a technical system or system part. Rules have been identified to assist record creation.

Extension of Time Request (EOTR): An EOTR must be filed if the due date required by FERC regulation or license condition OR made through commitments by PG&E (including for commencement OR completion of a construction project OR other modification approved by FERC) cannot be met. The EOTR must be filed in accordance with PG-2100P-02, "Power Generation Regulatory Agency Submittal Process."

Functional Location Structure (FLS): A hierarchal structure that is created by associating functional location elements with a superior functional location. This is used to "drill down" to the equipment record.

Main Work Center (MWC): Identifies the person or group responsible for a notification or order. The MWC identifies the person responsible for completing the notification. The MWC receives all SAP-originated email associated with a notification, such as when a task is completed.

Notification: Created by an SAP user to track a one-time work action or an action that is performed at an irregular interval or is created by SAP through a recurring maintenance plan for a work action that repeats at a predictable interval.

Object Type: Sometimes referred to as an Equipment Type. The object or equipment type is a way to group equipment records by their individual characteristics. Each object type has a different set of characteristics.

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Recurring Maintenance Plan: Created by a Maintenance Planner to create a notification to perform a work action on a regular or predictable interval. The user defines the required end date and the period or frequency of recurrence. SAP then creates an associated notification at the frequency specified.

Work Order: Created by a SAP user or SAP system to monitor the execution of maintenance tasks or entering or settling costs incurred by maintenance tasks.

IMPLEMENTATION RESPONSIBILITIES

Director of Power Generation Hydro O&M is responsible for approving, issuing, and revising this standard. Hydro O&M director may delegate document issuing and revising responsibilities to a manager within the department.

Hydro area senior managers, project execution director, engineering director, senior manager licensing, and asset management manager are responsible for communicating this standard to the target audience and ensuring compliance with this standard. They may delegate compliance and monitoring measures to ensure effectiveness.

GOVERNING DOCUMENT

NA

COMPLIANCE REQUIREMENT / REGULATORY COMMITMENT

Records and Information Management:
PG&E records are company assets that must be managed with integrity to ensure authenticity and reliability. Each Line of Business (LOB) must manage Records and Information in accordance with the Enterprise Records and Information (ERIM) Policy, Standards and Enterprise Records Retention Schedule (ERRS). Each Line of Business (LOB) is also responsible for ensuring records are complete, accurate, verifiable and can be retrieved upon request. Refer to GOV-7101S, "Enterprise Records and Information Management Standard" for further records management guidance or contact ERIM at Enterprise_RIM@pge.com.

REFERENCE DOCUMENTS

Developmental References:

- PM-4500P-01, "Power Generation Project Management – Hydro Projects"

- PG-1410S, "Power Generation Asset Management Quality"

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Supplemental References:

- PG-1101S, "Power Generation Compliance Management Program"

- PG-1101P-01, "Hydropower Generation Compliance Management - Managing New or Changed Compliance Items"

- PG-1101P-02, "Power Generation Compliance Management Work Process Flows"

- PG-2498P-01, "Hydro Generation Work Management Process (WMP) for Recurring and Corrective Work"

- PG-2498P-02, "Hydro License Compliance Work Management Process (WMP)"

APPENDICES

Appendix A, SAP WMP Functions and Description

ATTACHMENTS

- Attachment 1, "Functional Location Structure"

- Attachment 2, "Hierarchy Functional System Boundaries Diagram"

- Attachment 3, "Powerhouse and Facility Systems List"

- Attachment 4, "Equipment Types List"

- Attachment 5, "Systems and Possible Equipment Type Matrix"

- Attachment 6, "Equipment Characteristics for Each Equipment Type"

- Attachment 7, "Hydro Equipment Add/Delete/Change – electronic smart form"

- Attachment 8, "Hydro Equipment Add/Delete/Change – Word Document

DOCUMENT RECISION

This document supersedes Power Generation Standard PG-2498S, "Hydro Work Management Process," dated 01/13/2022, Rev. 7.
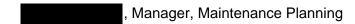
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Hydro Work Management Process

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REVISION NOTES

Where?	What Changed?
This Revision, Rev 8, (08/07/2023)	
Throughout	Converted to the new Guidance Document Management (GDM) template, including minor editorial updates.
	Eliminated redundancy with PG-2498P-01 and moved procedure steps to the procedure.
	Streamlined roles and responsibilities based upon common WMP use expectations between various PGEN work groups.
	Updated document contacts.
Revision 7, (01/13/2022)	
Throughout	Minor editorial updates for clarity.
Summary	Removed reference to guidance documents PG-1101S, PG1101P-01, and PG-2100P-02.
Target Audience	Updated
Step 1.1	Added PG-1101P-02, "Power Generation Compliance Management Work Process Flows" to bullet list.
Step 1.3.2.	Removed reference to PG-1101P-01; Moved reference to PG-1101S; Removed reference to HA Notification; other minor modifications.
Step 1.3.3.a.(3)	Moved content to a new Table, Table 2, "Recurring Work Priority and Descriptions for improved content flow and clarity."
Step 1.3.5	Added language on EOTs; Added language on prioritizing compliance items; Clarified HL responsibilities;
Step 3.2.2.b.	Added reference all construction/major maint. projects in accordance with PM-4500P-01.
Step 3.3.1.	Removed reference to PG-1101S and PG-1101P-01; Edited for clarity.
Step 3.4	Changed "Technical Services" to "Engineering" and add reference to working with Hydro Licensing to create HC Notifications.
Definitions	Added definitions for Compliance Item and EOTR.
Appendix A Step A.2. Step A.3.	Added Hydro Licensing and Power Gen Technical Services; Added new item f.

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Revision 6, (09/15/2021)	
Procedure Steps: Sections 1.3.1, 1.3.2b.1, 1.3.3, 1.3.4, 1.3.5. Definitions.	Added section for prioritization of work, including delineation of H1 vs H3 priority. Added completion requirements timeframes for H1, and expectations for completion of H3s by due date based on priority and importance. Added required documentation in SAP WM for deferral of H3 notifications. Added definitions for H1 and H3 priority.
Document Approver	Added ▮▮▮▮▮▮▮▮▮ as additional approver
No Rev Change, Editorial Note (06/02/2021)	
Document Ownership	Update Document Contact/Owner/Approver to current names & titles.
Revision 5, (05/12/2021)	
Summary, Section 1.3.2.b, and Section 3.3.1.a.	Added reference to guidance documents PG-1101S, "Power Generation Compliance Management Program," PG1101P-01, "Power Generation Compliance Management" and PG-2100P-02, "Power Generation Regulatory Agency Submittal Process."
Document Ownership	Updated to current names and titles.
Revision 4, (12/21/2020)	
Section 3.3.1.d.	Added new step with required compliance information.
Revision 3, (02/04/2019)	
Entire Standard	Converted to the new Guidance Document Management (GDM) template, including minor editorial updates.
	Combined Sections 1 and 2 and moved SAP WM descriptive information to new Appendix A.
Document ownership	Updated.
Attachments	Updated Attachments 1 and 7; added new Attachment 8

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A. SAP WMP Description

1. The WMP is facilitated by the use of Systems Applications and Products Work Management System (SAP WM) as the integrated tool to manage the following:

   - All routine recurring maintenance work.

   - All corrective work on equipment and facilities.

   - Engineering and Asset Management corrective work.

   - All equipment related corrective actions emanating from Corrective Action Program (CAP) analysis.

   - Compliance Items.

   - The Hydro asset registry and equipment characteristics.

2. The primary user groups of the WMP include:

   - Hydro Operations O&M

   - Project Execution

   - Hydro Licensing

   - Power Generation Technical Services

   - Asset Management

   - Dam Safety

3. WMP capabilities include the following:

   a   Operations and maintenance (O&M) work activities are managed through a common work management methodology.

   b   The SAP WM system provides a common platform for engineering and asset management activities that support generation facilities.

   c   Allows for enforcement of a consistent work prioritization methodology.

   d   A records library for maintenance plans that generate O&M and compliance work on pre-established frequencies.

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e Assets and equipment are organized in a consistent, standardized asset hierarchy.

f Providing a work history of maintenance for the assets and equipment.

g Equipment is organized by equipment type and includes standardized characteristics.

h Access security is controlled by SAP roles to maintain database standardization.

i Saves work management data in a shared-access database for later retrieval, assisting with future work planning, knowledge retention and transfer, and compliance recordkeeping.

 (1) Data saved includes:

- Most O&M work history

- Equipment records and characteristics

- Compliance records

- Work methods and standards

j Provides a tool to support the WMP methodology that incorporates work identification, planning, scheduling, performing, documenting and analysis as fundamental steps.

4. Procedure details and process maps may be found in the following implementing procedures:

- PG-2498P-01, "Hydro Generation Work Management Process (WMP) for Recurring and Corrective Work"

- PG-2498P-02, "Hydro License Compliance Work Management Process (WMP)"

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B. WMP Elements Supporting Information

1. Work Identification:

   a May come from a variety of sources, including, but not limited to:

   - Personnel

   - SAP WM maintenance plans for recurring O&M work

   - SAP WM maintenance plans for recurring compliance work

   - Regulatory directives

   - Correct Action Program (CAP) corrective actions

   - Engineering analysis

   - Inspections

   - Equipment testing

   - Asset management analysis

   - Audits

2. Work performance:

   a Includes, but is not limited to:

   - Job Safety Analysis (JSA) and safety tailboards

   - Preparing emergency site plan

   - Crew preparedness

   - Job site preparation

   - Material and equipment staging

   - Performing the work

   - Jobsite cleanup when work is completed

   - Job closure

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C.   Hydro Asset Registry Description

1.   Overview and Governance

a   The Hydro Asset Registry consists of a functional location hierarchy within the SAP WM.

b   This hierarchy cascades down to Equipment Records that contain standardized characteristics, maintenance plans, and a shared-access database for individual equipment history.

2.   Asset Hierarchy

a   Functional Locations contain eight cascading tiers as follows:

(1)   Level 1: Hydro

(2)   Level 2: Area

(3)   Level 3: Rivershed (includes Rivershed, License, and Area shared facility designations)

(4)   Level 4: Functional System (or type of Area shared facility)

(5)   Level 5 and 6 vary depending on type of asset (see Table 1, Asset Attributes)

Table 1, Asset Attributes

Asset Type	Level	Attribute
Powerhouses	5	Powerhouse Name
	6	Powerhouse # & Unit #
Water Storage	5	Type of storage (FBAB or RESV)
	6	Powerhouse Name + Reservoir Type (FB or AB) or Reservoir Name + Type (SR or DD)
Water Conveyance	5	Type of conveyance (CANL or TUNL)
	6	Canal Name + Type (WC, TN, CN, DD)
Support Facilities	5	Facility Name
	6	Facility Type (RD, CP, MS, TS, SF)

(6)   Level 7: Powerhouse or Facility System

(7)   Level 8: Equipment Type

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      b   Functional Locations are illustrated in Attachment 1, "Functional Location Structure."

      c   Functional Systems have five main parallel paths in the hierarchy.

- Water Collection/Storage (WS) - Reservoir, Forebay or Afterbay

- Water Conveyance (WC) - Power Tunnels, Canals

- Powerhouses & Switchyards (PH)

- Infrastructure and Support Facilities (SF) - Roads, Bridges, Service Centers, Maintenance Shops, Tech Shops, Support Facilities, Camps, Mountain-top Microwaves

- FERC Licenses

      d   Functional System Boundaries are illustrated in Attachment 2, "Hierarchy Functional Systems Boundaries Diagram."

3.   Systems

      a   Twenty-one different Systems describe the standardized systems in our powerhouses and other hydro facilities and are used to group related Equipment Types in the hierarchy.

      b   A list of Systems is illustrated in Attachment 3, "Powerhouse and Facilities Systems List."

4.   Equipment Types

      a   Eighty-one different Equipment Types are used to categorize similar equipment that share common characteristics.

      b   A list of all Equipment Types and a matrix showing the typical association of Equipment Types and Systems are found in Attachment 4, "Equipment Types List," and Attachment 5, "Systems and Possible Equipment Type Matrix."

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5.   Equipment Characteristics

      a   Standard Characteristics are used to identify specific attributes such as type of device or voltage, current, flow, pressure, or temperature ratings and can be used for advanced system wide search criteria within SAP WM.

      b   A list of Characteristics for each Equipment Type is found in Attachment 6, "Equipment Characteristics for each Equipment Type."