

Inspection and Corrective Maintenance Governance

SUMMARY

This document provides guidance on new inspection programs and establishes a method for assessing and improving existing inspection programs over time. Covered facilities include assets that transport, store, or generate energy and utility communication infrastructure. Inspection programs include ongoing monitoring of the condition of the asset or location by using physical, visual, or measurement assessments, and any corrective maintenance activities that result from these inspections.

Inspection programs must be assessed for risk, failure modes, environmental consequences, and other impacts. Inspections follow the principles of Plan-Do-Check-Act to ensure continuous improvement.

TARGET AUDIENCE

Any Pacific Gas and Electric Company (PG&E or Company) utility organization that performs asset inspections.

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REQUIREMENTS

1 Inspection Requirements Overview

- 1.1 Inspection programs ensure safety and compliance by supporting and improving knowledge of asset condition and the risk associated with owning and operating utility assets.
- 1.2 This document applies to existing assets. It does not apply to inspections for assets under construction.

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- 1.3 New inspection programs must be established in compliance with this standard.
 1. IF the requirements of this standard cannot be met on a new program,

THEN new inspection programs must use Form GOV-1038S-F01, "Inspection Process Self-Assessment," and Form GOV-1038S-F02, "Inspection Process Action Plan," to establish an action plan.
- 1.4 Asset condition is assessed, monitored, and maintained by using the following structure:
 1. Plan: Determining and documenting the technical basis for inspection method, scope, and frequency.
 2. Do: Executing the inspection and correcting deficiencies found by the inspection, and maintaining traceable, verifiable records.
 3. Check: Validating inspection results, confirming corrective work is to standard, and providing feedback to the inspection and asset management programs.
 4. Act: Reviewing program results and adjusting plan and execution based on the findings.
- 1.5 Form GOV-1038S-F01 must be used to assess existing inspection programs and identify gaps. The Risk and Compliance Committee reviews and approves GOV-1038S-F01 and any gaps identified.
 1. High-priority gaps require an action plan per Form GOV-1038S-F02 to ensure expedient compliance with this standard. Progress and the adequacy of completion is monitored by the Risk and Compliance Committee.
 2. Medium- and low-priority gaps are addressed as the technical basis document is developed and implemented.

2 Roles and Responsibilities

- 2.1 The asset family owner is responsible for managing the risk associated with the asset family as follows:
 1. Facilitating the creation of the inspection program technical basis document and its approval.
 2. Assessing inspection results and incorporating these into asset management plans.
- 2.2 The inspection process owner is responsible for managing the inspection process by ensuring the following:
 1. A documented process governs inspections end to end.

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2.2 (continued)

2. The program meets minimum risk objectives, regulatory requirements, and Company commitments.
3. There is adequate funding and staffing of qualified personnel to execute the program.
4. Inspections are documented and traceable to the asset.
5. Corrective maintenance or replacement actions flow completely and accurately in to the maintenance process.

2.3 The maintenance process owner is responsible for managing the corrective maintenance or replacement work identified by the inspection process and ensuring the following:

1. There are standards and timelines for corrective maintenance and replacement work.
2. There is adequate funding and staffing of qualified personnel to execute the corrective maintenance or replacement work.
3. Corrective maintenance or replacement work is documented and traceable to the asset inspection record.

3 Plan: Inspection Methods, Scope, and Frequency

- 3.1 Inspection methods should be able to detect anticipated or potential failure modes and detect equipment degradation before failure.
- 3.2 Inspection methods should consider the consequence of a failure, including location or environment-driven consequences.
- 3.3 A technical basis document must be established for the asset.
 1. The technical basis document must include the following:
 - Asset inventory, location, environment, and attributes
 - Identification of assets that cannot be inspected for anticipated or potential failure modes and determination of their replacement or renewal frequency
 - The consequences of a failure on asset safety and reliability, including an understanding of single-point failures and potential failures by failure modes and effects analysis (FMEA) or equivalent techniques
 - Risk assessment to identify consequence of failure, including expected and worst-case scenarios
 - The consequences of a failure in the environment where the asset is located

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3.3 (continued)

- Regulatory requirements and Company commitments
 - Manufacturer inspection and maintenance recommendations
 - Inspection methods for the asset and for the asset's environment where applicable
 - Inspection frequency
 - Benchmarking asset performance targets
 - Level of quality assurance (QA) and quality control (QC)
 - Identify equipment required for inspection and ensure the equipment is appropriate for the inspection
 - The training, skill, and knowledge needed to conduct inspections and consistently identify asset deficiencies
 - Objective inspection criteria at a component level, including physical measurements for acceptance criteria
 - If as-found photographs are required
 - The criteria to trigger further vetting with subject matter experts (SMEs) is necessary
 - The need for special inspections of high-consequence failure modes or sites
 - Corrective maintenance scope and timeframe for repair or replacement
2. A knowledgeable independent party must review the technical basis document as part of the approval of the technical basis document. The independent party can be external or internal.
 3. A management of change process must be used when changing the technical basis document.
 4. A process for how to follow record retention requirements for technical basis documents must be determined.

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3.4 Inspection procedures and training must be developed by using the technical basis document and must include the following:

- Photos of “acceptable” conditions and “unacceptable” deficient conditions
- Corrective execution timeframe, where appropriate
- Personnel training requirements

4 Do: Conducting an Inspection and Corrective Maintenance

4.1 An enterprise work management system such as SAP or equivalent must be used for the scheduling and documentation of inspections, corrective maintenance, or replacement to qualified personnel.

4.2 System Requirements

1. The work management system must be able to create inspection records with:
 - Unique asset identification numbers
 - A record of findings including measurements, as-found conditions, as-found photographs, equipment used, its calibration status as applicable, the date of the inspection, and the inspector
 - Predefined inspection findings that trigger additional field investigation or documentation
 - An escalation process for SME review to determine corrective maintenance and replacement work.

4.3 Conducting and Documenting Inspections

1. The inspection workforce must be adequate for the work and have the appropriate level of training and have attained the required qualifications.
2. Inspection personnel must have resources available to answer questions about the inspection process.
3. Confirm calibrated equipment is available for use and is used.
4. Deviating from established inspection processes requires prior approval from the process owner and asset family owner.

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- 4.4 Corrective Maintenance or Asset Replacement in the Work Management System
1. Corrective maintenance and replacement work must be created with scope identified and schedule for completion.
 2. Controls must be established to ensure corrective maintenance and replacement work is completed on time.
 3. Corrective maintenance and replacement work documentation must include work performed, date completed, and the identifying the completing personnel.
 4. The vice president of internal auditing and the vice president of the assets being inspected must approve of the person authorizing extensions of due dates or cancellation of corrective maintenance and corrective work.
 - a. Controls must be established to ensure extensions and cancellation requests are routed to the correct authority.
 - b. A process must be established for how approval requirements are documented and communicated must be determined.
 5. A process must be established to allow field personnel to nominate asset replacement.
 6. A problem-reporting system must be used to report equipment failure or degradation that is not expected.

5 Check: Quality Control and Quality Assurance

- 5.1 The inspection process owner implements QC and QA for the following:
1. Qualifications and training are correct for those performing this type of work.
 2. Maintenance plans for the asset are complete and occur at the correct frequency.
 3. Field inspection findings are documented and identify the cause of the nonconformance.
 4. Inspection documentation is complete, accurate, and actionable.
 5. A feedback and rework process is triggered if inspection results are not clear.
 6. Corrective maintenance and replacement work is traceable to an inspection finding.
 7. Corrective maintenance and replacement work is completed on time and are appropriate to the identified asset deficiency.

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6 Act: Feedback Loop and Continuous Improvement

- 6.1 Processes must be established to update asset records if errors are found during inspection.
- 6.2 A feedback process for QC and QA findings must be established.
- 6.3 The inspection process owner and the maintenance process owner must conduct an annual self-assessment to incorporate improvements that are identified as part of the inspection program based on:
 - Inspection findings
 - Inspection methods and tools
 - Corrective maintenance or replacement work scope changes
 - QC and QA findings
- 6.4 The inspection process owner and the maintenance process owner must establish a 5-year review cycle to:
 - Conduct an end-to-end process review to update procedures, forms, and training
 - Update the technical basis document
- 6.5 The asset family owner must review program results compared to the technical basis document. The review must include the following:
 - 1. Review the annual and 5-year review results.
 - 2. Review inspection results for trends by asset, identifying assets that may require proactive mitigation activities.
 - 3. Assess inspection frequency and scope to maintain asset safety and reliability.
 - 4. Update asset management plans based on findings.

7 Record Retention

- 7.1 Records must be retained per the Record Retention Schedule.

END of Requirements

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DEFINITIONS

Asset: All utility facilities that are used to transport, store, or generate energy and the utility communication infrastructure.

Asset family owner: The senior-level person (manager or director level) who has the overall responsibility for managing asset performance.

Corrective maintenance: Activities that address a deficiency found during an asset inspection. For purposes of this standard, these activities are limited to those identified during an inspection.

Inspection: A visual check or check using tools that establishes the asset health or provides asset data for third-parties. Minor, routine maintenance activities can occur and be documented during an inspection.

Inspection process owner: The senior-level person (manager or director level) responsible for the day-to-day execution of an inspection program. In some cases, this may be the same individual as the maintenance process owner.

Maintenance process owner: The senior-level person (manager or director level) responsible for the day-to-day execution of the corrective maintenance or replacement program. In some cases, this may be the same individual as the inspection process owner.

Problem reporting: An enterprise system, such as the Material Problem Reporting Program or Corrective Action Program that allows material issues or unexpected asset failures to be investigated.

Subject matter expert (SME): An individual with relevant design, maintenance, or operational experience on an asset, and that provides technical input to inform asset inspection or maintenance.

Technical Basis Document: A document that describes the necessary elements of the inspection program and the technical or regulatory basis for the requirements.

IMPLEMENTATION RESPONSIBILITIES

The vice president of Asset Management and System Operations will communicate the publication of the procedure to Power Generation, Electric Operations, Gas Operations, Diablo Canyon Power Plant, and Information Technology and issue a general notification of the new standard. Each vice president will establish a compliance plan following this standard and communicate it to their organization.

GOVERNING DOCUMENT

NA

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COMPLIANCE REQUIREMENT / REGULATORY COMMITMENT

NA

REFERENCE DOCUMENTS

Developmental References:

Gas Plan GP-1100, "Strategic Asset Management Plan"

Institute of Nuclear Power Operations (INPO), AP-913 "Equipment Reliability Process Description," April 2018

International Standards Organization (ISO) 55001, "Asset Management Systems – Requirements," 2014

Publicly Available Specification (PAS) 55-2, "Asset Management," 2008."

Supplemental References:

NA

APPENDICES

NA

ATTACHMENTS

Form GOV-1038S-F01, "Inspection Process Self-Assessment"

Form GOV-1038S-F02, "Inspection Process Action Plan"

DOCUMENT REVISION

NA

DOCUMENT APPROVER

Christine Cowsert, Vice-President, Gas Asset Management and System Operations

DOCUMENT OWNER

Raymond Thierry, Director, Distribution Integrity Management

DOCUMENT CONTACT

Jennifer Lemus, Expert Gas Engineer, Standards Engineering

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REVISION NOTES

Where?	What Changed?
NA	New Standard