ASME POM 101-2013

REAFFIRMED 2025

Performance-Related Outage Inspections

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

INTENTIONALLY LEFT BLANK

ASME POM 101-2013

Performance-Related Outage Inspections

AN AMERICAN NATIONAL STANDARD

The American Society of Mechanical Engineers

Two Park Avenue • New York, NY • 10016 USA

Date of Issuance: January 17, 2014

The next edition of this Standard is scheduled for publication in 2019. There will be no written interpretations of the requirements of this Standard issued to this edition.

Errata to codes and standards may be posted on the ASME Web site under the Committee Pages to provide corrections to incorrectly published items, or to correct typographical or grammatical errors in codes and standards. Such errata shall be used on the date posted.

The Committee Pages can be found at http://cstools.asme.org/. There is an option available to automatically receive an e-mail notification when errata are posted to a particular code or standard. This option can be found on the appropriate Committee Page after selecting "Errata" in the "Publication Information" section.

ASME is the registered trademark of The American Society of Mechanical Engineers.

This code or standard was developed under procedures accredited as meeting the criteria for American National Standards. The Standards Committee that approved the code or standard was balanced to assure that individuals from competent and concerned interests have had an opportunity to participate. The proposed code or standard was made available for public review and comment that provides an opportunity for additional public input from industry, academia, regulatory agencies, and the public-at-large.

ASME does not "approve," "rate," or "endorse" any item, construction, proprietary device, or activity.

ASME does not take any position with respect to the validity of any patent rights asserted in connection with any items mentioned in this document, and does not undertake to insure anyone utilizing a standard against liability for infringement of any applicable letters patent, nor assumes any such liability. Users of a code or standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, is entirely their own responsibility.

Participation by federal agency representative(s) or person(s) affiliated with industry is not to be interpreted as government or industry endorsement of this code or standard.

No part of this document may be reproduced in any form,
in an electronic retrieval system or otherwise,
without the prior written permission of the publisher.

The American Society of Mechanical Engineers
Two Park Avenue, New York, NY 10016-5990

Copyright © 2014 by
THE AMERICAN SOCIETY OF MECHANICAL ENGINEERS
All rights reserved
Printed in U.S.A.

CONTENTS

Foreword iv
Committee Roster v
Correspondence With the PTC Committee vi
Introduction vii

1 **Object and Scope** 1

2 **Acronyms** 1

3 **Guiding Principles** 1

4 **Specific Equipment Considerations** 2

5 **Instruments and Methods of Measurement** 2

6 **Report of Results** 2

Nonmandatory Appendices

A Air Heater (Tubular) 3
B Blowdown Tank 6
C Condenser Steam Side 8
D Condenser Water Box and Tube-Side Inspection Guidelines 11
E Cooling Tower Outage Inspection Guidelines 14
F Electrostatic Precipitator 19
G Feedwater Heaters and Deaerators 21
H Heat Recovery Steam Generators 24
I Boiler Setting Air In-Leakage and Regenerative (Rotary) Air Heater Inspection Guidelines 39
J Boiler Steam- and Water-Side Outage Inspection Guidelines 44
K Safety Considerations 48

FOREWORD

POM 101, Performance Related Outage Inspections, is the first standard in a planned series of power plant performance operation and maintenance standards. Related to and initially sponsored and staffed by the Performance Test Code Standards Committee, these standards do not prescribe testing activities, but if followed will assist in the improvement of power plant performance and reliability.

In June 2007, the Performance Test Code Standards Committee approved the charter for the series of standards on operation and maintenance activities related to power plant performance. The ASME Board on Standardization and Testing approved this Standard on October 7, 2013. It was approved as an American National Standard by the ANSI Board of Standards Review on December 4, 2013.

ASME PTC COMMITTEE
Performance Test Codes

STANDARDS COMMITTEE OFFICERS

P. G. Albert, *Chair*
J. W. Milton, *Vice Chair*
J. H. Karian, *Secretary*

STANDARDS COMMITTEE PERSONNEL

P. G. Albert, General Electric Co.
R. P. Allen, Consultant
J. M. Burns, Burns Engineering Services
W. C. Campbell, True North Consulting, LLC
M. J. Dooley, Alstom Power
G. J. Gerber, Consultant
P. M. Gerhart, University of Evansville
R. E. Henry, Sargent & Lundy
J. H. Karian, The American Society of Mechanical Engineers
D. R. Keyser, Survice Engineering
T. K. Kirkpatrick, McHale and Associates, Inc.
S. J. Korellis, EPRI
M. P. McHale, McHale & Associates, Inc.
J. W. Milton, Chevron Global Power Co.
S. P. Nuspl, Consultant
R. R. Priestley, Consultant
S. A. Scavuzzo, The Babcock & Wilcox Co.
T. C. Heil, *Alternate*
J. A. Silvaggio, Jr., Siemens Demag Delaval Turbomachinery, Inc.
W. G. Steele, Jr., Mississippi State University
T. L. Toburen, T2E3
G. E. Weber, Midwest Generation EME
W. C. Wood, Duke Power Co.

PTC 100 COMMITTEE — POWER PLANT PERFORMANCE O & M ACTIVITIES

S. J. Korellis, *Chair,* EPRI
J. H. Karian, *Secretary,* The American Society of Mechanical Engineers
G. E. Fischer, Conco Systems, Inc.
R. D. Griebenow, GP Strategies Corp.
R. C. Booth, *Alternate,* General Physics Corp.
D. D. Hilleman, Aptech Engineering Services
D. Hutton, Delta-H Systems, LLC
Y. Lau, RRI Energy
S. A. Lefton, Aptech Engineering Services, Inc.
M. Mahendhra, GE Infrastructure — Energy
S. P. McEntee, Mitsubishi Power Systems
D. Reed, Premier Elevator Cab Co.
T. L. Toburen, T2E3
P. L. Webster, Black & Veatch
P. B. Woods, McHale & Associates, Inc.

CORRESPONDENCE WITH THE PTC COMMITTEE

General. ASME codes and standards are developed and maintained with the intent to represent the consensus of concerned interests. As such, users of this Standard may interact with the Committee by proposing revisions and attending Committee meetings. Correspondence should be addressed to:

Secretary, PTC Standards Committee
The American Society of Mechanical Engineers
Two Park Avenue
New York, NY 10016-5990

Proposing Revisions. Revisions are made periodically to the Standard to incorporate changes that appear necessary or desirable, as demonstrated by the experience gained from the application of the Standard. Approved revisions will be published periodically.

The Committee welcomes proposals for revisions to this Standard. Such proposals should be as specific as possible, citing the paragraph number(s), the proposed wording, and a detailed description of the reasons for the proposal, including any pertinent documentation.

Attending Committee Meetings. The PTC Standards Committee and PTC Committees hold meetings or telephone conferences, which are open to the public. Persons wishing to attend any meeting or telephone conference should contact the Secretary of the PTC Standards Committee.

INTRODUCTION

This Standard contains a series of sections, each pertaining to specific equipment and/or systems commonly found in power plants. Internal inspections covered in this document are intended to take place when the equipment is out of service. Each section of this Standard can be used independently and includes recommendations on what to look for during the inspection. For additional information on inspections that can be done when the unit is online, please consult ASME POM 102, Operating Walkdowns of Power Plants; it is the second standard in the planned series of POM standards and will be published soon.

INTENTIONALLY LEFT BLANK

PERFORMANCE-RELATED OUTAGE INSPECTIONS

1 OBJECT AND SCOPE

1.1 Object

This Standard provides guidelines for equipment inspections that are designed to ultimately improve the thermal performance or efficiency of the power plant. By following these guidelines, many issues identified during an inspection, upon resolution, will also improve the reliability of the plant.

1.2 Scope

This Standard provides guidelines for equipment inspections of power plants using fossil fuels during shutdown or outage periods. Some portions of this document may be applicable to other types of power plants.

2 ACRONYMS

The following acronyms are used in this Standard:

AH: Air Heater

ESP: ElectroStatic Precipitator

FD: Forced Draft

GT: Gas Turbine

HP: High Pressure

HRSG: Heat Recovery Steam Generator

IP: Intermediate Pressure

LOI: Loss On Ignition

LOTO: LockOut/TagOut

LP: Low Pressure

NDT: NonDestructive Testing

OEM: Original Equipment Manufacturer

P&ID: Process and Instrumentation Diagram

PPE: Personal Protective Equipment

SCR: Selective Catalytic Reduction system

SNCR: Selective NonCatalytic Reduction system

UBC: UnBurned Carbon

3 GUIDING PRINCIPLES

Equipment reliability and performance have parallels. Indications of poor performance are closely tied to those of reduced reliability. Abnormal wear patterns, poor cleanliness, increased corrosion and/or erosion, and mechanical failures, no matter how small, have effects on both unit reliability and unit performance. Identifying the sources and root cause(s) are the first steps in improving the overall performance of a piece of equipment and the power generating unit of which it is a part. While these inspection guidelines are written to ultimately enhance the plant's performance, all observations should be noted and acted upon.

Nonmandatory Appendices A through J provide details on activities to be completed prior to starting an outage inspection.

3.1 Safety Considerations

All plant safety procedures should be reviewed prior to inspecting equipment and shall be followed.

Prior to inspecting or entering any equipment, it is important to identify all potential hazards that may be encountered. All energy sources must be removed from service or isolated to ensure, without failure, that no energy can be released into the area or component inspected. Nearby equipment supporting sister units may remain in service. In sites with multiple units, ensure one is inspecting the correct piece of equipment. Maintain a safe distance from rotating equipment and moving parts that are encountered near the inspection area.

Refer to Nonmandatory Appendix K for some of the safety considerations.

3.2 Preinspection Activities

Prior to any inspection, the following documents and information should be gathered and reviewed:

(a) the last inspection report

(b) recent operating data from control system historian and other available archives

(c) recent operating history as recalled by current plant operations staff

(d) actual versus expected performance for the component(s) of interest

(e) as-built P&IDs and design specifications of the system(s) of interest

3.3 Inspection Plan

A plan or checklist for the inspection should be developed prior to starting the actual inspection, covering the objective of the inspection — whether this is a routine inspection or the specific details if a performance deficit has initiated the need for an extra inspection.