Australian Government

Department of Education, Employment and Workplace Relations

FPPSTM440A Troubleshoot and rectify boiler plant systems

Release: 1

FPPSTM440A Troubleshoot and rectify boiler plant systems

Modification History

Not Applicable

Unit Descriptor

Unit descriptor

This unit describes the outcomes required to troubleshoot and rectify boiler plant systems in the pulp and paper industry

General legislation, regulatory, licensing and certification requirements applicable to this unit are detailed in the range statement

Specific high risk licensing requirements for this unit may be applicable and are to be met separately and prior to the achievement of this unit

Application of the Unit

Application of the unit

This unit applies to persons who troubleshoot and rectify boiler plant systems in the pulp and paper industry. This work typically involves complex integrated equipment and continuous operations

This unit generally applies to those who:

- identify and diagnose causes of faults
- rectify faults, and
- record and report operational data

to meet safety, quality and productivity requirements

It does not include managing steam boiler startup, monitoring and controlling boiler operations or shutting down and banking steam boiler/s

Licensing/Regulatory Information

Refer to Unit Descriptor

Pre-Requisites

Not Applicable

Employability Skills Information

Employability skills This unit contains employability skills

Elements and Performance Criteria Pre-Content

Elements describe the essential outcomes of a unit of competency.	Performance criteria describe the performance needed to demonstrate achievement of the element. Where bold italicised text is used, further information is detailed in the required skills and knowledge section and the range statement. Assessment of performance is to be consistent with the evidence guide.

Elements and Performance Criteria

ELEMENT	PERFORMANCE CRITERIA
1. Identify and diagnose causes of faults	1.1. Causes of faults are identified and diagnosed within Occupational Health and Safety (OHS) regulations, environmental and safe working requirements/practices, Standard Operating Procedures (SOP), and housekeeping requirements
	1.2. Abnormal plant conditions and system alarms are interpreted to determine fault type and location
	1.3. Physical inspections of plant and processes are made to identify faults
	1.4. Cause and source of fault is identified and located
	1.5. Faulty plant is isolated, if possible, and confirmed with production and maintenance
	1.6. Diagnosis is confirmed by access and reference to relevant historical data
	1.7. Diagnoses are communicated to relevant personnel
2. Rectify faults	2.1. Faults are rectified within OHS regulations, environmental and safe working requirements/practices, SOP, and housekeeping requirements
	2.2. Shutdown and isolation procedures are implemented as required
	2.3. Faulty equipment is repaired or replaced
	2.4. Adjustments to process and systems are made to restore normal operations
	2.5. Normal operation is communicated to relevant personnel
3. Record and report operational data	3.1. Operational data is recorded and reported within OHS regulations, environmental and safe working requirements/practices, SOP, and housekeeping requirements
	3.2. Variations from standard specification and boiler operation faults are documented
	3.3. Troubleshooting process and corrective actions are recorded
	3.4. Relevant information is communicated to appropriate personnel

Required Skills and Knowledge

REQUIRED SKILLS AND KNOWLEDGE

This describes the skills and knowledge required for this unit.

Required skills

- Identifies, accesses and interprets relevant historical and operational data and information
- Uses required forms of communication in troubleshooting and rectifying boiler plant systems
- Reads and interprets required documentation, procedures and reports within level of responsibility
- Accesses, navigates and enters computer-based information
- Interprets instruments, gauges and data recording equipment
- Communicates effectively with personnel to assist with analysis and resolution of operational problems
- Assists others to identify and resolve operational problems in the workplace
- Identifies and actions systems, quality and equipment faults within level of responsibility
- Identifies causes and effects of faults and corrective action on associated processes
- Identifies and responds to causes of shutdowns
- Determines quality faults, effects and causes
- Selects and uses appropriate troubleshooting methods
- Uses troubleshooting guides and processes
- Takes timely corrective action to maximise safety, quality and productivity
- Undertakes necessary calculations to aid troubleshooting as required
- Identifies and monitors process control points
- Maintains situational awareness in the work area
- Perform tests and interpret and record results as required
- Confirms and maintains required production throughput after restart
- Initiates isolations in accordance with SOP
- Conducts routine checking procedures during plant and systems operation
- Maintains plant operation within specification
- Uses measuring equipment as required
- Operates high risk equipment as required
- Analyses and uses sensory information to adjust process to maximise safety, quality and productivity
- Uses electronic and other control systems to control equipment and processes as required

REQUIRED SKILLS AND KNOWLEDGE

Required knowledge

- Procedures, regulations and legislative requirements relevant to steam generation operations including OHS, environmental including relevant sustainability requirements/practices, SOP, isolation procedures, safe working requirements, risks and hazard identification and housekeeping
- Relevant forms of communication
- Detailed knowledge of steam generation system, processes and associated services sufficient to troubleshoot including:
  - plant layout
  - theory of operation
  - causes and effects of adjustments made to steam generation plant and processes
  - relationships between steam generation system, processes and associated services
- An appropriate range of troubleshooting methods
- Types, causes and effects of plant shutdowns
- Impact and effect of inappropriate responses to shutdown
- Plant startup and shutdown procedures
- Plant operation and control mechanisms
- Boiler water treatment system and reasons for treatment
- Application of high risk equipment as required
- Sensory information that indicates a deviation from standard operating parameters
- Sufficient knowledge of electronic and other control systems, operation and application to make appropriate adjustments that control boiler plant operations, within level of responsibility

Evidence Guide

EVIDENCE GUIDE

The evidence guide provides advice on assessment and must be read in conjunction with the performance criteria, required skills and knowledge, range statement and the Assessment Guidelines for the Training Package.

Overview of assessment

Critical aspects for assessment and evidence required to demonstrate competency in this unit	Evidence should be relevant to the work. It should satisfy the requirements of the elements and performance criteria and include consideration of: • the required knowledge and skills tailored to the needs of the specific workplace

EVIDENCE GUIDE

	• applicable OHS regulations, environmental and safe working requirements/practices, SOP and housekeeping requirements • applicable aspects of the range statement • practical workplace demonstration of skills in troubleshooting and rectifying boiler plant systems
Context of and specific resources for assessment	A workplace assessment must be used to assess: • the application of required knowledge on the job • the application of skills on the job, over time and under a range of typical conditions that may be experienced in steam generation operations Access to the full range of equipment involved in integrated continuous manufacturing of steam generation operations in a pulp or paper mill is required
Method of assessment	A combination of assessment methods should be used. The following examples are appropriate for this unit: • observation of applied skills and knowledge on the job • workplace demonstrations via a mock-up or simulation that replicate part/s of the job • answers to written or verbal questions about specific skills and knowledge • third-party reports from relevant and skilled personnel • written evidence e.g. log sheet entries, checklist entries, test results Assessment processes and techniques must be culturally appropriate and in keeping with the language and literacy capacity of the learner and the work being performed. This includes conducting an assessment in a manner that allows thoughts to be conveyed verbally so that the learner can both understand and be understood by the assessor (e.g. use plain English and terminology used on the job) A holistic assessment with other units relevant to the pulp and paper industry, mill and job role is recommended Additional information on approaches to assessment for the pulp and paper industry is provided in the Assessment Guidelines for this Training Package

Range Statement

RANGE STATEMENT

The range statement relates to the unit of competency as a whole. It allows for different work environments and situations that may affect performance. Bold italicised wording, if used in the performance criteria, is detailed below. Essential operating conditions that may be present with training and assessment (depending on the work situation, needs of the candidate, accessibility of the item, and local industry and regional contexts) may also be included.

Productivity requirements may include:

- energy efficiency
- waste minimisation
- evaporation minimisation, including landfill and waste water reduction
- environmentally safe waste disposal
- consideration of resource utilisation, including fibre efficiency
- minimising delays
- chemical recovery maximisation
- meeting key performance indicators
- line speed
- handovers
- quality checks
- meeting output targets i.e. net tonnes per employee per annum
- machine/process time availability i.e. time the machine or process is making product
- machine/process production rate

Boiler types may include:

- fire tube
- water tube

and may be operated in conjunction with other steam driven plant and operations including:

- paper making machines
- turbines
- digesters
- evaporators
- heating plant

Pre-operational checks may include:

- low water level alarm
- high water level alarm
- low water level alarm lockout

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	• hydrostatic test • burner management system • safety valve test
Materials and supplies may include:	• chemicals • coal • oil • gas • additives • air • water • wood waste • steam • recovery process products • power
Equipment may include:	• boiler and auxiliary plant • boiler heating systems • steam distribution system • fuel and fuel delivery system plant • dust removal and combustion waste • fuel management system • extraction systems • water distribution systems • compressed air systems • steam temperature control plant • chemical dosing system • water treatment system • flame detection equipment • hand and power tools • computer systems • electronic screens and alarms • process control systems • analogue and digital instrumentation • fully automated, semi-automated, manually operated plant and equipment appropriate to steam generation operations
Electronic control systems may include:	• Digital Control System (DCS) • touch screens • robotics
Legislation, regulatory, licensing and certification requirements	• OHS and environmental requirements (local, state and commonwealth)

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may include:	• activity or task specific high risk licensing requirements • appropriate boiler/pressure vessel operator certification • confined space standards and regulations
Documentation, procedures and reports may include:	• SOP • quality procedures • environmental sustainability requirements/practices • plant manufacturing operating manuals • oil or chemical spills and disposal guidelines • plant isolation documentation • safe work documentation e.g. plant clearance, job safety analysis, permit systems • enterprise policies and procedures • job sheets • manufacturer's specifications • maintenance documentation • statutory requirements • Materials Safety Data Sheets (MSDS) • operator's log • process and instrument diagrams
Maintenance may include:	• operator level maintenance as per site agreements • operator maintenance schedules • maintenance systems • maintenance suppliers • proactive maintenance strategies e.g. Total Productive Maintenance (TPM), Reliability Centred Maintenance (RCM)
Actions may include:	• process adjustments • reporting to authorised person • rectifying problem within level of responsibility
Communications may include	interaction with: • internal/external customers and suppliers • team members • production/service coordinators • maintenance services • operational management • statutory authorities

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Situational awareness may include	awareness of: • traffic • pedestrians • location of equipment • product • hazards • obstruction • unexpected movement
Forms of communication may include:	• written e.g. log books, emails, incident and other reports, run sheets, data entry • reading and interpreting documentation e.g. SOP, manuals, checklists, drawings • verbal e.g. radio skills, telephone, face to face, handover • non-verbal e.g. hand signals, alarms, observations • signage e.g. safety, access
Sensory information may include:	• visual • sound • feel • touch • smell • vibration • temperature

Unit Sector(s)

Not Applicable