

INFORMATION GUIDE

CONTROL OPERATOR

TEST #2467

INTRODUCTION

The **2467 Control Operator Test** is a job knowledge test designed to cover the major knowledge necessary to perform the job. This Guide contains strategies to use for taking tests and a study outline, which includes knowledge categories and study references.

TEST SCHEDULING

Employees who apply for positions, bids, and transfers requiring testing before March 9, 2009, will be scheduled for testing by their Supervisor through Human Resources. For those who apply after March 9, 2009, both the employee and their Supervisor will be notified of a scheduled test date by Human Resources. Test times and dates for positions requiring testing will be specified in the bid/transfer/requisition/job posting. Employees should be prepared to test on the specified dates. Only employees who apply for positions requiring testing, and who meet basic qualifications, will be invited to test. Applicants will be scheduled through the recruiter. If you have any questions, please call 626-302-9830.

TEST SESSION

It is important that you follow the directions of the Test Administrator *exactly*. If you have any questions about the testing session, be sure to ask the Test Administrator before the testing begins. During testing, you may not leave the room, talk, smoke, eat, or drink. Since some tests take several hours, you should consider these factors before the test begins.

All questions on this test are multiple-choice with four possible answers. Prior to March 9, 2009, your answers to the questions are indicated by filling in a circle on an answer sheet with a special mark-sense pencil. For your answers to be read accurately by the scanner, you must fill in the circles completely and erase completely any answer you wish to change. After March 9, 2009 you will take the exam on a computer. For more information on this, please see the next section of this study guide, Computer Based Testing. You will receive a Test Comment form so that you can make comments about test questions. Write any comments you have and turn it in with your test when you are done.

TEST AIDS

You are allowed to use a non-programmable scientific calculator for the Control Operator Test. **Calculators will be provided by the Test Administrator, and will be one of the following three models: Casio fx-250HC, Texas Instruments TI-30XA, TI 36-X.**

At the end of this Guide you have been provided with an Information Guide Feedback page. If a procedure or policy has changed, making any part of this Guide incorrect, your feedback would be appreciated so that corrections can be made.

TEST TAKING STRATEGIES

INTRODUCTION

The Control Operator Test contains multiple-choice questions. The purpose of this section is to help you to identify some special features of a multiple-choice test and to suggest techniques for you to use when taking one.

Your emotional and physical state during the test may determine whether you are prepared to do your best. The following list provides common sense techniques you can use before the test begins.

CONFIDENCE

If you feel confident about passing the test, you may lose some of your anxiety. Think of the test as a way of demonstrating how much you know, the skills you can apply, the problems you can solve, and your good judgment capabilities.

PUNCTUALITY

Arrive early enough to feel relaxed and comfortable before the test begins.

CONCENTRATION

Try to block out all distractions and concentrate only on the test. You will not only finish faster but you will reduce your chances of making careless mistakes. If possible, select a seat away from others who might be distracting. If lighting in the room is poor, sit under a light fixture. If the test room becomes noisy or there are other distractions or irregularities, mention them to the Test Administrator immediately.

BUDGET YOUR TIMES

Pace yourself carefully to ensure that you will have enough time to complete all items and review your answers.

READ CRITICALLY

Read all directions and questions carefully. Even though the first or second answer choice looks good, be sure to read all the choices before selecting your answer.

MAKE EDUCATED GUESSES

Make an educated guess if you do not know the answer or if you are unsure of it.

CHANGING ANSWERS

If you need to change an answer when testing on a computer, be sure that the new answer is selected instead of the old one.

RETURN TO DIFFICULT QUESTIONS

If particular questions seem difficult to understand, make a note of them, continue with the test and return to them later.

DOUBLE CHECK MATH CALCULATIONS

Use scratch paper to double check your mathematical calculations.

REVIEW

If time permits, review your answers. Do the questions you skipped previously. When testing on a computer, make sure each multiple choice question has a dot next to the correct answer.

Remember the techniques described in this section are only suggestions. You should follow the test taking methods that work best for you.

JOB KNOWLEDGE CATEGORIES

Below are the major job knowledge categories that are covered on the Control Operator Test.

ELECTRICAL, MECHANICAL, AND STEAM OPERATION

Includes AC/DC theory, single line and elementary diagrams, piping and instrumentation drawings (P&IDs), electrical symbols, use of basic electrical test instruments (e.g., multimeter), terminology, basic math (e.g., multiplication, division), general principles of physics and water chemistry including thermal dynamics and fluid flow. Electrical transmission and the generating system operations including alternate and parallel routes, system power demand, generator output, and the total effect of changes in system operation on KVA output.

INSPECTION CRITERIA AND EQUIPMENT FUNCTION AND TERMINOLOGY

Standards of physical equipment integrity, instrumentation for operational checks and regulations and restrictions that apply to steam plant and combustion turbine operation specifically in the areas of steam turbine, combustion turbine and heat recovery steam generator (HRSG) start up, shut down and loading procedures. Knowledge related to purpose and function of steam plant equipment and electrical generation equipment as it relates to electrical generator loading following the manufacturer's recommended capability curve and the Grid Control Center VAR (voltage) schedule.

EMERGENCY AND STANDARD OPERATING PROCEDURES

Procedures established for normal routine operation and emergency situations as set forth in standard station orders and operating instructions used for monitoring and diagnosing turbine-generator operation and the control and safe operation of high pressure power plant boilers. Includes knowledge of steam plant and electrical transmission operating procedures.

SAFETY AND CLEARANCE PROCEDURES

First aid, firefighting, accident prevention programs, and methods of switching and clearing equipment and operating components. Knowledge of environmental rules and regulations and their application to power plant operation. Lockout/Tagout-Work Authorizations Cal/OSHA CCR Title 8 Section 3314 and Fed/OSHA Regulations Standard 29 CFR Section 1910.147. Accident Prevention Cal/OSHA General Industry Sections (3200-6184).

JOB ACTIVITIES

Below are the major job activities covered on the Control Operator Test.

MAINTENANCE

Receives orders from and transmits data to Grid Operations Center and Switching Center for clearance of circuits and equipment for operation and maintenance of station generating and substation equipment. Performs remote control switching, tags controls to show equipment status, issues step-by-step disconnect switching orders and transmits clearances on equipment to work party, in accordance with operations. Performs functions of other Plant Operating personnel as required, including manual operation valves, pumps, dampers and other equipment as necessary. Operates remote controls for starting, stopping, actuating or regulating compressors, pumps, circulating water system, soot blowers, draft fans, air preheaters, fuel systems, 500kv and lower voltage switchgear, excitation and voltage regulation equipment, automatic boiler burner control and combustion control systems, communication equipment, feedwater conditioning and water quality monitoring, and other equipment arranged for remote operation from the control room. Analyzes data to help identify maintenance or regulatory compliance problems in the plant (e.g., CEMS equipment, hazardous waste). Performs general cleaning and housekeeping as necessary.

MONITORING/TROUBLESHOOTING

Inspects the recording and indicating instruments on centralized control room panels and consoles. Inspects equipment and performs local inspection and operations outside of Control Room as necessary. Observes instruments to note abnormal operating conditions indicating possible system or station trouble and determines nature and cause of trouble from evidence available and takes appropriate corrective action. Performs safety inspections.

OPERATIONS

Controls and directs loading of generators. Determines operating status of station equipment from previous shift personnel and log book entries. Directs the operation of equipment for starting, stopping, or regulating boiler-turbine generator units and auxiliary equipment. Assists, instructs, and trains other personnel as required. Directly administers the Work Authorization process following safety and environmental regulations, policies, and procedures that apply to the work site.

DOCUMENTATION

Maintains chronological logbook record of operations, maintenance, and other activities that affect the plant. Compiles records and reports.

STUDY REFERENCES

The following books may be purchased by accessing the internet's various book sellers or at a local technical book dealer or used book store.

Combined Cycle Gas, Steam Turbine Power Plants, Second Edition By: Rolf Kehlhofer

The Control of Boilers By: Sam Dukelow

TPC Training Systems: Electrical Systems Series 201-210

Monitoring and Diagnosis of Turbine-Driven Generators By: Avelino J. Gonzalez

High Pressure Boilers, Second Edition By: Frederick M. Steingress and Harold J. Frost

Electricity One-Seven, Revised Third Edition, By: Harry Mileaf

Physics The Easy Way, Third Edition, By: Robert L. Lehrman

Math The Easy Way, Third Edition, By: Anthony Prindle and Katie Prindle

Electric Machines, Drive, and Power Systems, Fifth Edition, By: Theodore Wildi

The following reference material requires Internet Access.

General Electric Steam Turbines for Combined Cycle, Conventional Fossil and Nuclear, Electric Power Production, From Google type: G.E. Steam Turbines, Click on the link: "G.E. Power Systems Steam Turbines"

Combustion Turbines and How They Work, From Google type: Combustion Turbines and How They Work, Click on the link: "How Gas Turbine Engines Work"

Nitrogen Oxides NOx Emission Reduction Systems, From Google type: "Selective Catalytic Reduction", Click on and review the many links on this website

Lockout/Tagout-Work Authorizations, California Occupational Safety and Health Administration, From Google type: www.dir.ca.gov. Click on the link: Department of Industrial Relations Home Page, Click Regulations, Click on CAL/OSHA, Enter Query: Title 8 Section 3314, Click Search, Click on: CCR Title 8 Section 3314, This brings up 3314, Cleaning, Repairing, Servicing and Adjusting Prime Movers, Machinery and Equipment. Click on and review the many links on this website

Lockout/Tagout-Work Authorizations, US Department of Labor, Occupational Safety and Health Administration, From Google type: www.osha.gov, Click on the link: Occupational Safety and Health Administration Home Page, On the Fed/OSHA mission statement page type "Lockout/Tagout" in the search window and click "go". In the Document Section type:

Lockout/Tagout, In the Title Section type: 1910.147, Limit search to Regulations Standards 29 CFR only, Click on the above link. Listing appears 1910.147 The Control of Hazardous Energy (Lockout/Tagout), Open Document: The Control of Hazardous Energy (Lockout/Tagout) 1910.147. View and research other links on this website.

Waste Minimization, From Google type: <http://www.epa.gov/wastemin/>, Click on link: Minimization-Home Page, Welcome to the National Waste Minimization Program link will appear. Review related links on this website.

Accident Prevention, From Google type: www.dir.ca.gov, Click on link: California Department of Industrial Relations-Home Page. Click on regulations, Click on Cal/OSHA, In the query section type: Accident Prevention. Limit search: General Industry Sections (3200-6184). Review related links on this website.

Fire Protection, From Google type: www.dir.ca.gov, Click on link: California Department of Industrial Relations-Home Page, Welcome to California-The Department of Industrial relations will appear. Click on Regulations. Click on Cal/OSHA. In the query section type: Fire Protection. Limit search to: General Industry (Sections 3200-6184). Review related links on this website.



STUDY GUIDE FEEDBACK

Please use this page to notify us of any changes in policies, procedures, or materials affecting this guide. Once completed, return to:

Southern California Edison Human Resources - Performance Assessment Services G.O. 4, Ground Floor 8631 Rush St. Rosemead, CA 91770

TEST NAME: CONTROL OPERATOR

If you have encountered any discrepancies in the test, please provide an explanation and the page number below.

COMMENTS