



# Information Guide for Substation Operator Knowledge Test (Verbal)

Test Number: 8501

Human Resources  
Talent Planning & Programs  
Southern California Edison  
An Edison International Company

REV022715

## Introduction

The **8501 Substation Operator Knowledge Test (Verbal)** was designed to assess technical knowledge necessary to perform the Substation Operator job. This guide contains strategies and study references to prepare for the test.

### Verbal Test Session

During the verbal test session, a panel of test administrators will ask you a series of technical, job-related questions pertaining to the Substation Operator job. The test administrators will score your responses to the test questions using a standardized scoring key. Your test administrators will provide you with all of the materials necessary to complete the test.

It is important that you follow the directions of the administrators exactly. During the testing session, you may **NOT** leave the testing area, talk, smoke, eat, or drink.

Since this testing will take approximately **90 minutes**, you should consider these factors before the test begins.

**All cellular/mobile phones, pagers or other electronic equipment will NOT be allowed in the testing area.**

### Information Guide Feedback

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.

## Testing Strategies

### Introduction

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 interview begins.

<b>Technique</b>	<b>Remarks</b>
<i>Be confident</i>	<ul style="list-style-type: none"> <li>- If you feel confident about passing this test, you may lose some of your anxiety.</li> <li>- Think of the test as a way of demonstrating how much you know, the skills you can apply, your abilities, the problems you can solve, and your good judgment capabilities.</li> </ul>
<i>Be punctual</i>	<ul style="list-style-type: none"> <li>- Arrive early enough to feel relaxed and comfortable before the test begins.</li> </ul>
<i>Concentrate</i>	<ul style="list-style-type: none"> <li>- 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.</li> <li>- If the test area becomes noisy or there are other distractions or irregularities, mention them to the administrators immediately.</li> </ul>
<i>Understand the question</i>	<ul style="list-style-type: none"> <li>- Listen carefully to each of the questions and follow all directions provided by the administrators.</li> </ul>
<i>Answer questions</i>	<ul style="list-style-type: none"> <li>- Ensure your answers are precise, complete, unambiguous and succinct.</li> </ul>

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

## **Job Knowledge Categories**

The **8501 Substation Operator Knowledge Test (Verbal)** requires you to answer technical questions that assess specific knowledge required to perform the job. The test will require you to demonstrate your knowledge of performing switching and substation inspection, including: **equipment inspection, switching procedure, personal protective equipment, substation status, switching overview, formal communication, safe work practices, switching completion, flag equipment status, documentation, securing the grounds, hotline tools inspection, routine maintenance, and abnormal conditions.**

Below are the major job knowledge areas (topics) covered on the **8501 Substation Operator Knowledge Test (Verbal)** and the associated study references. You can use this information to prepare for the test.

### **A. Fundamentals**

Knowledge of AC and DC electrical theory; substation equipment's basic configuration and operations; types, function, and operation of substation computers; and power flow. Ability to communicate information clearly, concisely, and accurately (i.e., communicates with impact) and to input data into a database, spreadsheet, and/or word document.

### **B. Prints and Diagrams**

Knowledge of schematics and diagrams and how to interpret one line (single line) diagrams.

### **C. Switching Devices**

Knowledge of the function and operation of substation switching devices (i.e., reclosers, secondary switches, relays, circuit breakers/switchers); circuit breakers, such as operating mechanisms, bushings, terminals, oil levels, gas/air pressure, and disconnects; how to record counters and pressures for substation equipment (i.e., oil levels, gas pressure, air pressure, hydraulic pressure, moisture levels, compressor motors, counter meters, and vacuum readings). Ability to confirm operation of equipment as expected.

### **D. Transformers and Regulators**

Knowledge of types/function/operation/voltage ratings of transformers, load tap changers (LTC), regulators, capacitors, and reactors; common practices for transformer loading and regulator operation; how to inspect cooling system; and how to inspect regulators. Ability to read gauges and meters, including pressure monitoring systems.

### **E. Substation Instrumentation and Alarms**

Knowledge of types of substation instrumentation, function, operation, and ratings; the effects of Potential Transformers (PTs) and Current Transformers (CTs); types of alarms, categories, and priorities; testing alarms and annunciators; obtaining peak readings; and auxiliary substation equipment.

### **F. System Protection**

Knowledge of the function, operation, and settings of protective relays; making protective relays automatic/non-automatic; how to inspect, record, and reset protective relays; how to read and perform initial assessment of relay targets and analyze relay target information.

### **G. Normal Operations**

Knowledge of common practices for performing substation inspections; electrical parallels; planned loading limits; how to interpret substation equipment historical data (i.e., battery voltage readings, amp meter readings). Ability to clearly communicate daily activities (e.g., abnormal status, switching operations, equipment inspection status, security issues) to the relief operator.

### **H. Switching, Tagging, and Clearances**

Knowledge of safe switching practice; clearances, tags, warning blocks, and lockout/tag-out; isolating and grounding substation equipment; creating/checking switching programs; how to identify clearance boundaries and potential hazards; how to positively identify each device before operating substation equipment; how to perform a final check after completion of switching and tagging activities.

### **I. Emergency and Abnormal Operations**

Knowledge of how to identify the cause of an emergency or abnormal condition.

### **J. Logging and Documentation**

Knowledge of logging substation activities (i.e., switching, abnormal conditions).

### **K. Safety Protocols**

Knowledge of Personal Protective Equipment (PPE); safe work distances to energized equipment. Ability to identify hazardous conditions and follow the rules and practices of a safety manual/procedures.

### Sample Questions

The following sample questions will give you familiarity with the test format.

#### Question #1

*What information is collected to verify a switching procedure will work correctly?*

Correct Answers:

- ✓ Station Status
- ✓ Load Reading
- ✓ Abnormal Conditions

#### Question #2

*What information is recorded on the clearance / lock-out tag-out documents?*

Correct Answers:

- ✓ Name
- ✓ Date
- ✓ Time

### Study References

You can use the following references to guide your preparation.

- ✓ Department of Industrial Relations. *Cal/OSHA - Title 8 Regulations*.
  - Section 3380. Personal Protective Devices.
  
- ✓ E Powerline Trades, LLC. <http://epowerlinetrades.com/>.
  
- ✓ Henry, T. (1992). *Ohm's Law, Electrical Math and Voltage Drop Calculations*. Tom Henrys Code Electrical.
  
- ✓ North American Electric Reliability Council (NERC).
  - Standard COM-002. Communication and Coordination.
  
- ✓ United States Department of Labor. Occupational Safety & Health Administration (OSHA).
  - Section: 1910.269. Electric Power Generation, Transmission, and Distribution.

### Information 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 – Talent Planning & Programs  
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1515 Walnut Grove Avenue  
Rosemead, CA 91770

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