



Information Guide for System Operator Knowledge Test (Verbal)

Test Number: 8502

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

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Introduction

The **8502 System Operator Verbal Knowledge Test** was designed to assess technical knowledge necessary to perform the job. This guide contains strategies and other information to prepare for the verbal 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 System Operator position. The 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 verbal test, you may **NOT** leave the testing area, talk, smoke, eat, or drink.

Since this test 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 verbal test may determine whether you are prepared to do your best. The following list provides common sense techniques you can use before the verbal test begins.

Technique	Remarks
<i>Be confident</i>	<ul style="list-style-type: none">- If you feel confident about passing this verbal test, you may lose some of your anxiety.- Think of the verbal 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.
<i>Be punctual</i>	<ul style="list-style-type: none">- Arrive early enough to feel relaxed and comfortable before the verbal test begins.
<i>Concentrate</i>	<ul style="list-style-type: none">- Try to block out all distractions and concentrate only on the verbal test. You will not only finish faster but you will reduce your chances of making careless mistakes.- If the verbal test area becomes noisy or there are other distractions or irregularities, mention them to the test raters immediately.
<i>Understand the question</i>	<ul style="list-style-type: none">- Listen carefully to each of the questions and follow all directions provided by the test raters.
<i>Answer the questions</i>	<ul style="list-style-type: none">- Ensure your answers are precise, complete, unambiguous and succinct.

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

The **8502 System Operator Verbal Knowledge Test** requires you to answer technical questions that assess specific technical knowledge required to perform the job. The following section provides an overview of the major job activities and knowledge domains covered in the verbal test. You can use this information to assist in preparation for your test session.

The major job duties covered in this verbal test are:

1. System Monitoring and Response
2. Routine and Planned Switching
3. Program/Procedure Writing
4. Emergency Switching
5. Safety Procedures

Below are the major job knowledge areas (topics) covered in this verbal test:

1. Voltage Control Actions

Knowledge of: electrical theory including voltage control principles and power flow; practices for monitoring system status; effects on voltage by load and generation; voltage control equipment; and practices for transformer loading and tap changers (LTC)/regulator operations.

2. Lockout/Tagout

Knowledge of: substation equipment's basic configuration and operation; system status; potential safety hazards when working on equipment; and methods for identifying clearance (lockout/tagout) boundaries.

3. Load Generation Changes

Knowledge of: practices for system restoration; equipment protection; power flow; and effects of voltage by load and generation. Ability to: identify abnormal conditions; troubleshoot and analyze abnormal situations; prioritize and respond to alarms; recognize power flow system conditions; and interpret MW, amps, voltage readings, tap positions, and equipment settings.

4. Responding to Overload

Ability to: perform basic math (multiplication and division); identify abnormal conditions; and interpret historical data.

5. Respond to Abnormal Conditions

Knowledge of: basic field equipment and its operations, including equipment limitations and equipment protection. Ability to: identify abnormal conditions and troubleshoot/analyze abnormal situations.

6. Identifying Operating Limits

Knowledge of: practices for monitoring power system status; the application of planned loading limits; power flow; methods for isolating sections of power systems; methods to test and operate equipment; substation equipment's basic configuration and operation; types of bus configurations, conductors, and grounding equipment; basic field equipment and its operations; equipment limitations; and equipment protection. Ability to: identify abnormal conditions; troubleshoot and analyze abnormal situations; recognize power flow system conditions; read and interpret schematics and diagrams.

7. Verifying Expectations

Knowledge of equipment protection and the ability to identify abnormal conditions.

8. Assessing and Prioritizing Resources

Knowledge of: practices for monitoring power system status; the application of planned loading limits; basic field equipment and its operation; system status; power flow; Ability to: identify abnormal conditions; prioritize and respond to alarms; read and interpret schematics and diagrams; general pre-work discussion procedures (e.g. pre job brief or tailboard).

9. DC Knowledge

Knowledge of: practices for DC system emergencies; how to test and operate equipment; substation equipment's basic configuration and operation; ratings, types of bus configurations, conductors, and grounding equipment; equipment protection; and potential safety hazards when working on equipment. Ability to: identify abnormal conditions; troubleshoot and analyze abnormal situations; and prioritize and respond to alarms.

10. Emergency Switching

Knowledge of: the application of planned loading limits; how to test and operate equipment; practices for system restoration; procedures and requirements for synchronizing, phasing, and paralleling sources; how to test and operate equipment; substation equipment's basic configuration and operation; ratings, types of bus configurations, conductors, and grounding equipment; basic field equipment and its operations; equipment limitations; system status; equipment protection; power flow; and types of alarms, categories, and equipment processing. Ability to: identify abnormal conditions; recognize power flow system conditions; and read and interpret schematics and diagrams.

11. Program Writing

Knowledge of: the application of planned loading limits; how to test and operate equipment; substation equipment's basic configuration; ratings, types of bus configurations, conductors, and grounding equipment; basic field equipment and its operation; equipment limitations; practices for isolating and grounding substation equipment; and practices for creating/checking switching procedures. Ability to: identify abnormal conditions; read and interpret schematics and diagrams.

12. Tailboard

Knowledge of potential safety hazards when working on equipment and general pre-work discussion procedures (e.g. pre job brief or tailboard).

13. Outage Requests

Knowledge of: substation equipment's' basic configuration and operation; equipment limitations; practices for creating/checking switching programs. Ability to read and interpret schematics and diagrams.

Sample Questions

The following sample questions should give you some idea of the form the test will take.

Question #1:

While checking a distribution program, a System Operator notices that the program would de-energize a phase to phase transformer attached to line with underground primary cable. This creates a possible ferroresonance condition. What actions must the System Operator take to address this issue?

Correct answers:

- ✓ Assess the switch that will be used to de-energize the transformer.
- ✓ Check loading of the transformer.
- ✓ Determine if the transformer and cable can be de-energized separately.
- ✓ Determine the length of the underground section.

Question #2:

What criteria is used to identify load carrying capabilities of a 220v line?

Correct answers:

- ✓ Conductor size.
- ✓ Status of system.
- ✓ Equipment current carrying capacity.
- ✓ Weather conditions.

Study References

You may refer to the following references in preparation for your verbal test.

- ✓ Anderson, Paul M. Power System Protection. Institute of Electrical and Electronics Engineers (IEEE), 1999.
- ✓ Blackburn, Lewis & Domin, Thomas J. Protective Relaying: Principles and Applications. CRC Press, Taylor & Francis Group, 2007.
- ✓ Kundur, Prabha. Power System Stability and Control. McGraw Hill, 1994.
- ✓ Machowski, Jan; Bialek, Janusz; & Bumby, Jim. Power System Dynamics: Stability and Control. Wiley, 2008.
- ✓ Miller, Robert, & Malinowski, James. Power System Operation. McGraw Hill, 1994.
- ✓ 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
Talent Planning and Programs
G.O. 5, 1st Floor
1515 Walnut Grove Ave.
Rosemead, CA 91770

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