

NERC System Operator Certification Examinations 2008 Study Guide

As stated in the [Program Manual](#), **the content outline for an examination is the best source for the subject material upon which questions on that particular examination are based.** It is the responsibility of each candidate to prepare for an examination on the subject material contained in the content outline for a particular examination.

The following description is taken from a document provided by Applied Measurement Professionals, a psychometric consultant:

Content Outlines

The Content Outlines are a comprehensive listing of job duties performed by the System Operator. These outlines were developed through a NERC-wide job analysis where system operators indicated the importance of the various job duties or tasks related to competent work. The outlines are divided into content categories such as Generation, Interchange, Transmission Operations, System Reliability, etc. and grouped within these broad areas of work activities are the individual task statements. These tasks that an individual may perform will vary in their complexity.

Cognitive Complexity of Questions

Some tasks are relatively easy to perform and require identification, recall, or mere recognition of words or concepts. Other tasks require a higher degree of reasoning or problem-solving to perform and might require classification, explanation, or differentiation. Then there are tasks of a more complex aspect perhaps involving evaluation, judgment, or inductive reasoning. For this reason questions on an examination are classified into three cognitive levels: Recall, Application, and Analysis.

Recall

Recall questions primarily test the recognition or recall of isolated information, which generally does not vary relative to the situation. Such questions predominantly require an effort of memory. This type of question will ask for information that could be directly found in a textbook or other source. They include the recall of specific facts, generalizations, concepts, principles, processes, procedures, or theories. Such a question might be asking: "What is X?"

Application

Application questions primarily test interpretation or application of limited data. Such questions require more than simple recall, but less problem solving in which

the response or outcome is situation dependent, but not overly complex. They include questions that require translation into another form of specific verbal, tabular, or graphical data, and recognition of the elements and relationships among such data. These questions might be asking: "Knowing X to be true, what would you expect to be true about Y?"

Analysis

Analysis questions require integration of a variety of concepts or elements to solve a specific problem and primarily test the evaluation of data, problem solving, or inductive reasoning. These questions will ordinarily require examinees to make judgments concerning the effectiveness, appropriateness, or best course of action for a particular situation. Many steps may be required in the examinees thought process. Examples of these questions are unusual situations where data does not fit the typical pattern or situations where complications prevent the candidate from selecting a typical response.

These three different cognitive levels represent increasing levels of difficulty due to the design of the question, not necessarily the subject matter. Recall type questions are the easiest to read because they are just straight questions. Application type questions are a little more difficult and require a little more reading because a set of data must be presented before the question can be asked. Analysis questions are the most difficult in structure in that a scenario must be presented followed by a question based on the scenario. Within each of these cognitive levels, the level of difficulty of an individual question can vary from extremely easy to extremely hard.

Example of:

A Recall type question:

Operating Reserve can be provided by:

- A. *tap changers*
- B. *capacitor banks*
- C. *voltage regulators*
- D. *interruptible loads*

Balancing Area A is sending Balancing Area B a schedule. Which of the following should both Balancing Areas verify?

- 1. *price*
- 2. *ramp rate*
- 3. *magnitude*
- 4. *start/stop times*

- A. *1, 2, and 3*
- B. *1, 2, and 4*
- C. *1, 3, and 4*
- D. *2, 3, and 4*

An Application type of question:

Generation is not sufficient to meet load, the Balancing Area is importing to its limits and voltage is decaying. Which of the following actions should be taken by the System Operator?

- A. shed load
- B. correct schedule deviation
- C. use the interconnection hotline
- D. schedule interchange transaction

If frequency is 60.00 Hz and a time error correction calling for 60.02 Hz is issued, a balancing authority with a frequency bias of 100 MW/0.1 Hz will...

An Analysis type of question:

A system is connected to neighboring systems and has interchange schedules. Tie-line metering is acceptable, but frequency indication has been lost. Which of the following is the best control mode to use?

Piloting Questions

Before a question can be used in a scored position on an examination its performance must first be piloted as an unscored question. Each of our examinations contains piloted questions that do not affect the score and are indistinguishable from the scored questions. The performance of a question includes: overall how many people answered it correctly and how many incorrectly; of those that answered the question correctly, were they predominantly high or low scorers on the overall examination; and, of those that answered incorrectly, were they predominantly high or low scorers on the overall examination. These, and other factors, determine the level of difficulty of the individual question.

Examination Specifications

An examination is built to a set of specifications that includes how many scored questions, how many pilot questions, how many of each type recall/application/analysis questions, and the overall level of difficulty. The overall level of difficulty is determined by averaging the individual levels of difficulty of each question.

For example, the examinations published in February 2005 each had 25 pilot questions and the following specifications:

Examination	Number of scored questions	Number of recall questions	Number of application questions	Number of analysis questions	Number correct required to pass
Reliability	125	55	66	4	93
Bal, Interch., and Transm.	125	57	64	4	93
Transmission	100	40	54	6	76
Balancing	100	48	52	0	76

The examinations that will be published in July 2008 also have 25 pilot questions, but the following specifications are a bit different:

Examination	Number of scored questions	Number of recall questions	Number of application questions	Number of analysis questions	Number correct required to pass
Reliability	125	36	64	25	96
Bal, Interch., and Transm.	125	38	74	13	96
Transmission	100	25	60	15	77
Balancing	100	33	61	6	77

By comparing the two sets of specifications it can be seen that the examinations to be published in July 2008 are more difficult because there are more Application and Analysis type of questions.

However, each of the questions on these examinations has been used on a previous examination, at least in an unscored position. While it is difficult, if not impossible, to predict the passing rate of an examination, in both cases the overall level of difficulty was/is set to produce a 75% passing rate for all four examinations. What all of this means is that, while there are more Application and Analysis questions that tend to make the examinations more difficult, the level of difficulty of each of the questions is such that the overall passing rate should stay about the same.

Study Guide

Solely as an aid in preparation for one of the system operator certification examinations, the Personnel Certification Governance Committee has authorized the release of the following information about the examinations. **The list below is NOT an all-inclusive list;** however, the following should be reviewed while preparing for one of the system operator certification examinations.

None of the examinations have questions from all of the references listed below, and an examination may include questions from other areas, but the list below, **in conjunction with the content outline for the examination**, can be used as a study guide.

There might be questions on any or all of the [Reliability Standards](#) that were effective on January 30, 2007, particularly the following: NERC Glossary of Terms, BAL 001 – 006; CIP 001; COM 001 and 002; EOP 001 – 006 and 008; INT 001, 003, 004, 006 – 009; IRO 001, 004 – 006, and 016; PRC 001 and 004; TOP 001 – 008; and VAR 001.

There might be questions on the Standards of Conduct.

There might be questions on any of the information contained in the *Power System Operation, Third Edition*, authors: Miller and Malinowski in particular Chapters 1, 2, 3, 5, 6, 10, 11, and 12.

There might be questions on any of the information contained in the *Electric Utility Systems and Practices*, Fourth Edition, author: Rustebakke, in particular Chapters 12, 13, 14 and 15.

There might be questions on any of the information contained in the **EPRI Power System Dynamics Tutorial* in particular the Glossary and chapters: 2, 3, 4, 5, 6, 7, 8, 9, and 11.

The *NERC System Operator Certification Manual* is available for download by clicking on the link above.

The *NERC Reliability Standards*, effective January 2007, are available for download by clicking on the link above.

The texts, *Power System Operation* and *Electric Utility Systems and Practices*, are available from commercial book sellers.

* If you go to www.epri.com and enter 1001983 in the Search window it should return the Tutorial. As for the price, EPRI is now charging \$500/copy.