



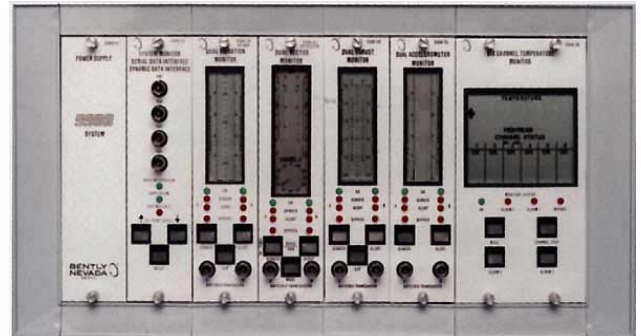
Course Information Letter ---- TG516

BENTLY NEVADA 3300 MONITORING SYSTEM

TG516

COURSE DESCRIPTION

Why does the turbine expand? Knowing why and how the turbine expands is invaluable knowledge when it comes to interpreting the information provided by a Turbine Supervisory Instrumentation System. The modular, programmable Bently Nevada 3300 Monitoring System provides this information concerning not only the expansion of the turbine but vibration as well. This course provides a thorough working knowledge of the criteria involved in turbine expansion along with the many reasons for abnormal vibration levels, which may not be even related to the bearings. Once the physical attributes of the turbine are discussed, the Bently Nevada 3300 Monitoring System is thoroughly discussed from the aspect of programmable options, calibration, operation, and troubleshooting (interpretation of the front panel LEDs and the error codes). With the added bonus of having a BN 3300 rack (as shown in picture) in the classroom, the requisite skills can be acquired.



With this knowledge, the participant has the information needed to reliably calibrate, maintain, and troubleshoot the Bently Nevada 3300 Monitoring System. Additionally, this information enables the participant to qualify the accuracy of the TSI indications to an operator; thereby providing confidence to the operator when important decisions have to be made.

A **topical outline** includes: Review of Steam Turbine Fundamentals, Use and Interpretation of Turbine Supervisory Instruments, Power Supply, System Monitor, Signal Input Relay Module, Dual Vibration X/Y Gap Monitor, Maintenance and Calibration Issues.

Recommended for technicians, electricians, and/or engineers who have a responsibility to maintain this equipment at any fossil or nuclear turbine generator installation. Turbine experience is desirable but not necessary.

COURSE DATES/LOCATION/FEE (3-DAY COURSE LENGTH)

For current dates / locations / prices, please see HPC's website, www.hpcnet.com.

RECENTLY SATISFIED CUSTOMERS:

Doosan Heavy Industries, Korea East West Power, Korea Western Power Company

OBJECTIVES: Upon completion of this course the participant will be able to:

1. Explain how the turbine expands and why this is important.
2. Explain the purpose of each turbine supervisory instrument.
3. State the general physical location of each turbine supervisory instrument.
4. Name the components along with their location that make up the BN 3300 Monitoring System.
5. Identify the proper programming configuration within the Power Supply in selecting the required transducer voltage and the data communication interface.
6. Describe the functions associated with the System Monitor.
7. State the programming requirement between the Power Supply module and the System Monitor module.
8. Identify the module to which the signal from the transducer is wired.
9. State the difference between a Dual Relay and Quad Relay within the Signal Input Relay module.
10. Identify the proper programming configuration within the Signal Input Relay in selecting the proper functionality of the ALERT and/or DANGER Relay.
11. Explain the condition that represents the status of the LEDs when given a snapshot of the front panel LEDs on the Dual Vibration XY/Gap Monitor.
12. Identify the proper programming configuration when given specified user-define features for the Dual Vibration XY/Gap Monitor.
13. Explain the programmable option Trip Multiply, and state its purpose.
14. Identify the error code number that indicates an incorrect jumper configuration on the Dual Vibration XY/Gap Monitor.

COURSE OUTLINE

Day One

- I. Steam Plant Fundamentals
 - A. Introduction
 - B. The Plant Cycle
 - C. Basic Turbine Theory
 1. Nozzles
 2. Turbine Blading
 3. Turbine Arrangements
 - D. Turbine Sections
 - E. Turbine Components
 1. Rotor
 2. Blading
 3. Nozzles
 4. Steam Seals
 5. Journal Bearings
 6. Thrust Bearing
 7. Standards
 8. Valves
 9. Auxiliary Valves
- II. Turbine Supervisory Instruments
 - A. Introduction
 - B. Description of Turbine Supervisory Instruments
 1. Eccentricity
 2. Speed
 3. Valve Position
 4. Vibration Recorder
 5. Shell Expansion
 6. Differential Expansion
 7. Steam and Metal Thermocouples

Day Two

- III. Bently Nevada 3300 Monitoring System Overview
 - A. Function
 - B. System Components
 - C. Applications
 - D. Features
 - E. Putting The System Together
- IV. Power Supply
 - A. Location
 - B. Options
 1. Input Voltage
 2. Data communication Interface
 3. Transducer Voltage
 - C. Testing and Troubleshooting
 1. Guideline
- V. System Monitor
 - A. Location
 - B. Function
 1. System Power-Up Inhibit
 2. Rack Inhibit
 3. Supply Voltages OK
 4. System Reset
 5. Trip Multiply
 6. OK Relay
 7. Alarm Setpoint Adjust
 8. Data Interface
 9. Keyphasor® Transducers
 10. Static Data Bus Buffer
 - C. Options
 1. Catalog (Ordering)
 2. Programmable
 - D. OK Relay Configuration
 - E. Operational Testing
 1. System Monitor
 2. Keyphasor®

Day Three

- VI. Signal Input Relay Module
 - A. Programmable Options
 1. Module With Dual Relays
 2. Module With Quad Relays
 - B. Relay Actuation Circuits
 1. Alert
 2. Danger
- VII. Dual Vibration XY/Gap Monitor
 - A. Introduction
 - B. Monitor Options
 - C. Operability
 1. Monitor Functions
 2. Interpretation of LEDs
 3. Vibration Monitoring
 4. Reading Gap Voltage/Full Scale Mills
 5. Reading Alert Setpoint Levels
 6. Reading Danger Setpoint Levels
 7. Self-Test
 - D. Maintenance
 1. Selecting User-Define Features
 2. Setpoint Adjustments
 3. Channel Bypass
 4. Danger Bypass

FREQUENTLY ASKED QUESTIONS

- Will HPC Technical Services bring this course to our location for our personnel only? YES, call or email Stephen Parker, stparker@hpcnet.com for a price quotation.
- Will HPC Technical Services customize the presentation at our site to suit our particular needs? Yes.
- Is HPC Technical Services' textbook available for purchase as a reference document? No, this book is not yet available for purchase.
- What is the cost for HPC Technical Service to deliver this course at our location? Well, of course that can vary, but generally speaking, if you're planning on having 6+ attend, when considering your T&L, it is to your advantage to perform the course at your plant (office). You gain from the customization and price.
- Can HPC Technical Services perform a functional checkout and calibration of your control system during the upcoming outage OR provide troubleshooting support should it be required? Yes we can. Call or contact Harold Parker, hparker@hpcnet.com for our rate sheets and any further information required.

WHAT YOU WILL RECEIVE:

1. 1 copy of HPC Technical Services' textbook, Bently Nevada 3300 System, as written by Mike Whisnant.
2. A "Certificate of Completion" with 1.9 CEUs, authorized for issue by the International Associate of Continuing Education/Training.

STEAM TURBINE I&C MAINTENANCE CERTIFICATION:

Those who attend this course are automatically qualified to take HPC Technical Services' Certification Examination. This examination is offered at no additional expense to the participant. An 80% passing grade is required. The examination length will not exceed 2-hours. Those who complete this examination will receive a revised "certificate of completion" that recognizes this accomplishment along with two-copies of a "To Whom It May Concern" letter that states their accomplishment. (Two copies are provided, one for the participants' employer and one for the participants' personal file.)

Consult HPC's website, www.hpcnet.com, for detail on this certification program.

HPC TECHNICAL SERVICES
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Website: www.hpcnet.com

REGISTRATION FORM

Company: _____

Plant: _____

Address: _____

City/State/Zip: _____

Telephone: _____ FAX: _____

Course Number/Title: _____

Course Dates: ____/____/____ Thru ____/____/____

Course Location: _____ Course Fee: _____

Please enroll the following individual(s) listed below:

Student #1: _____

Student #2: _____

Taking advantage of HPC's 3-4-2 Policy: Send 3, Pay for 2 when paying in advance.

Student #3: _____

Enrolled by: _____ **Date:** _____

METHOD OF PAYMENT

- Check to Follow
- Check Enclosed #: _____
- MC/Visa/AMEX #: _____
Expiration Date: _____ CV Code: _____
- Purchase Order #: _____

HOW DID YOU LEARN OF THIS COURSE?

- Attended other HPC Courses.
- Received Fax
- Email Promotion
- Website Search
- Received info from others in plant.