

OUTLINE OF 880/881 SYSTEM TRAINING PROGRAM

1 week 880/881 system training program to be conducted at the Metropolitan Edison Company, Three Mile Island Nuclear Station. The program will be conducted twice. The Bailey Meter Technical Training Center will provide one instructor (see attached summary of qualifications) and course books and materials for up to 10 attendees per course. The Metropolitan Edison Company will provide a suitable meeting room with chalk boards and an overhead projector, also a Bailey 880 system and a Bailey 881 system for demonstration. The program is designed to teach the student the operation, maintenance, and calibration procedures of the modules and components, also the function of the systems, as outlined in the attached course description. The evaluation of the students will be accomplished by a test to be given at the conclusion of each program. These evaluations will be documented and made available to the training specialist at Three Mile Island Nuclear Station within one week after the completion of the second 1 week program.

MET ED SPECIAL 880/881

DAY #1

A.M. Introduction and Functional Description of the Bailey 880 system
The functional description and maintenance procedures for
nuclear detectors.

12:00-1:00 Lunch

P.M. Reactor trip assembly to include the trip sequence, module
interlocks, 2 out of 4 trip logic, and 1 out of 2 x 2 logic.
Theory of operation of system power supplies and their
interlock logic.

DAY #2

A.M. Theory of operation of the Bis-Stable Module, Auxiliary Relay,
Detector, and Auxiliary Power Supply.

12:00-1:00 Lunch

P.M. Description of the source range channel including the pre-amp,
associated interlocks and calibration procedures.

DAY #3

A.M. Description of the intermediate range channel and calibration
procedure to include compensation voltage adjustments.
Description of the power range channel and calibration procedures

12:00-1:00 Lunch

P.M. Description of the reactor coolant flow channel and calibration
procedure for the Δ flux to flow function generator.

MET ED SPECIAL 880/881

DAY #4

A.M. Description of the Reactor outlet temperature channel
Description of the Reactor pressure channel to include
pressure-temperature compensator

12:00-1:00 Lunch

P.M. Description of the Pump Power Monitor
An Explanation of Response Time and a procedure for obtaining
this information.

DAY #5

A.M. A functional and detailed description of the Bailey 881 system
and
P.M.

OUTLINE OF 721 SYSTEM TRAINING PROGRAM

1 week 721 system training program to be conducted at the Metropolitan Edison Company, Three Mile Island Nuclear Station. The program will be conducted twice. The Bailey Meter Technical Training Center will provide one instructor (see attached summary of qualifications) and course books and materials for up to 10 attendees per course. The Metropolitan Edison Company will provide a suitable meeting room with chalk boards and an overhead projector, also a Bailey 721 system for demonstration. This program is designed to teach the student the function of each of the sub-systems (listed in the attached description) and how it is accomplished. The evaluation of the students will be accomplished by a test to be given at the conclusion of each program. These evaluations will be documented and made available to the training specialist at Three Mile Island Nuclear Station within one week after the completion of the second 1 week program

MET ED SPECIAL 721

DAY #1

A.M. Introduction to the Bailey 721 system and its documentation to include the cabinet layout, power supplies, and a definition of the symbols used in the documentation.

A detailed explanation of the make-up seal water flow.

12:00-1:00 Lunch

P.M. A detailed explanation of the core flood tank level

DAY #2

A.M. Description of the pressurizer heater control circuit, level temperature compensation, and associated circuitry

Introduction and brief description of the integrated control system to include unit load, integrated master, reactor control and feedwater control.

12:00-1:00 Lunch

P.M. Description of automatic dispatch system to include auto/manual contact logic.

Description of high load limits of the feed pumps, reactor coolant pumps, asymmetric rod, and reactor coolant flow.

DAY #3

A.M. Continuation of the high load limits discussion started in the P.M. of DAY #2

Description of low load limits of the feed pumps, reactor coolant pumps, asymmetric rod, and reactor coolant flow.

12:00-1:00 Lunch

P.M. Demonstration of the high load limits and the low load limits

MET ED SPECIAL 721

DAY #4

A.M. Description of frequency control and tracking

12:00-1:00 Lunch

P.M. Demonstration of the frequency control and the conditions that cause tracking.

DAY #5

A.M. Description of the integrated master sub-system to include Modes of Operation, Turbine Control, Megawatt Effect on Pressure Control, Megawatt Error Effect on Unit Load Demand, Throttle Pressure Effect upon Unit Load Demand, and Turbine By-Pass.

12:00-1:00 Lunch

P.M. Demonstration of integrated master sub-system.

Note: All demonstrations will be of a dry run nature with the instructor pointing out locations of the equipment and controls.

OUTLINE OF COMBINED CONTROL OPERATION TRAINING PROGRAM

1 week combined control operation training program to be conducted at the Metropolitan Edison Company, Three Mile Island Nuclear Station. The program will be conducted twice. The Bailey Meter Technical Training Center will provide one instructor (see attached summaries of qualifications) and course books and materials for up to 10 attendees per course. The Metropolitan Edison Company will provide a suitable meeting room with chalk boards and an overhead projector, also the necessary Bailey systems and controls for the demonstrations outlined in the attached course description. This program is designed to teach the student, that portion of reactor control, where Bailey and Diamond controls are used in various combinations of hand and auto control. The evaluation of the students will be accomplished by a test that will be given at the conclusion of each one week program. These evaluations will be documented and made available to the training specialist at the Three Mile Island Nuclear Station within two weeks after the completion of the second one-week program.

MET ED SPECIAL COMBINED CONTROL OPERATION

DAY #1

A.M. Description of Reactor Control to include different combinations of Bailey and Diamond in hand'auto., cross limits, and TAVE control.

12:00-1:00 Lunch

P.M. Demonstration of the reactor control sub-system discussed in the A.M. lecture

DAY #2

A.M. Description of the feedwater control sub-system to include feedwater temperature compensation, cross limits, and main and start-up feedwater valve circuitry.

12:00-1:00 Lunch

P.M. Demonstration of that portion of the feedwater control sub-system discussed in the A.M. lecture.

DAY #3

A.M. Description of Δ RC flow, Δ TC control, and feedwater ratio circuit.

12:00-1:00 Lunch

P.M. Demonstration of the controls discussed in the A.M. lecture

MET ED SPECIAL COMBINED CONTROL OPERATION

DAY #4

A.M. Description of BTU limits, and S. G. low level and high level limits

12:00-1:00 Lunch

P.M. Demonstration of the controls discussed in the A.M. lecture

DAY #5

A.M. Description of S. G. Level, start-up, operating and feedwater valve Δ P

12:00-1:00 Lunch

P.M. Demonstration of the controls discussed in the A.M. lecture and review.

Note: All demonstrations will be of a dry run nature with the instructor pointing out locations of equipment and controls.

JEFFREY L. MARSH

Educational Background

Jeffrey has a BS Degree in Electrical Engineering from Purdue University.

Technical Experience

Jeff joined Bailey Meter in 1969 as a Field Service Engineer in our Philadelphia Office. Jeff has been working as a start-up engineer on Bailey analog systems (pneumatic and electric), as well as assisting in computer start-ups and 880/881 systems start-ups. Jeff is presently in training to become a nuclear project service supervisor.

ROBERT S. RAND

Educational Background

Robert has a BS Degree in Electrical Engineering from Rensselaer Polytechnic Institute.

Technical Experience

Bob joined Bailey Meter in 1962 as a Field Service Engineer in our Atlanta Office. In 1969 Bob transferred to Nuclear Sales in Lynchburg and in 1972 was made a Nuclear Project Service Supervisor. Bob has both sales and service experience in all Bailey systems and instrumentation. He is presently the Project Service Supervisor for Three Mile Island Nuclear Station, Unit #1.

JOHN H. McCURDY

Educational Background

John graduated from A.T.E.S. Technical School, Erie, Pennsylvania, where he was second in his class studying electronic engineering technology.

Technical Experience

John joined Bailey Meter in 1970 as an instructor in the Pneumatic Measurement and Control Courses. He has since had instructing and coordinating responsibilities in the Bailey 880/881 programs as well as the Bailey 820 Electric Analog Control and Bailey 5000 and 7000 Electric Analog Control Courses.

John has five years technical teaching experience and has conducted many of our programs on the customers job site.

W. JOHN CRUMB

Educational Background

John has an Associated Degree in Applied Science from the State University of New York, Canton, New York, class of 1963. He has attended Clarkson College of Technology, Potsdam, New York for two years, with a Business Administration major and State University of New York, Potsdam, New York for one semester with a Liberal Arts major.

Technical Experience

John joined Bailey Meter in 1963 as an instructor in the Technical Training Section. From 1963 to 1969, John instructed in various customer and employee courses, covering measurement, pneumatic and electric analog control and fixed wire logic digital systems. In 1969 John transferred to the Software Engineering Group, where he wrote and implemented the 855 software for the Direct Digital Control installed at Louisiana Power & Light Co., Ninemile Unit #4. In 1973 John returned to the Technical Training Section and assumed the responsibility for measurement, pneumatic control, analog control seminars and 855 software training.

AMENDMENT NUMBER ONE
TO
LONG-TERM CONTRACT
FOR
TMI I NUCLEAR STATIONS UNITS I AND II
OPERATOR TRAINING

This Amendment Number One, effective as of August 1, 1976, by and between The Babcock & Wilcox Company (hereinafter referred to as COMPANY) and the Metropolitan Edison Company (hereinafter referred to as PURCHASER).

WITNESSETH THAT:

WHEREAS, the COMPANY and the PURCHASER have previously entered into a contract effective as of January 1, 1975, hereinafter referred to as the Long Term Training Contract, for PURCHASER'S Three Mile Island Nuclear Station Units 1 and 2:

NOW, THEREFORE, the COMPANY and the PURCHASER agree to modify the contract as follows:

A. Delete Article 1.0, Base Scope of Effort, and substitute the following

"1.0 Base Scope of Effort

During the term of this Contract, or any extension thereof, COMPANY shall furnish, subject to scheduling as set forth in Article 3.0, the following training services during each calendar year:

1.1 Annual training shall consist of the following hours of simulator instruction and associated classroom instruction:

<u>Calendar Year</u>	<u>Simulator Hours</u>	<u>Classroom Hours</u>
1975	280	280
1976	280	280
1977	80	80
1978	280	280
1979	280	280

A typical day's schedule would be four (4) hours of classroom instruction followed by four (4) hours of simulator instruction for groups of three (3) students each. Each student will be allowed to physically manipulate the control of the simulator. These programs shall be conducted at the B&W Training Center in Lynchburg, Virginia.

1.2 At PURCHASER'S option, this training shall consist of the following standard programs:

1.2.1 Requalification Training Course

Each course will consist of 40 hours of simulator instruction composed of evolutions recommended by the PURCHASER, as they may be agreed to by COMPANY, at least two (2) weeks prior to the commencement of the course; and 40 hours of classroom instruction supporting the simulator instruction. Simulator and classroom instruction will be duplicated for two (2) groups of three (3) students, for each course, such that each group receives 20 hours of simulator and 20 hours of classroom instruction.

1.2.2 Replacement Operator Training Course

This two-week program shall consist of forty (40) simulator instruction hours and forty (40) classroom instruction hours for a group of three (3) students. Each student will physically manipulate the control of the simulator to demonstrate as a minimum: (a) his/her ability to manipulate the controls and keep the reactor simulator under control during a reactor simulator startup, (b) his/her ability to predict instrument response and use the instrumentation during a reactor simulator startup, (c) his/her ability to follow the applicable startup

procedure, and (d) his/her ability to explain alarms and annunciators that may occur during the reactor simulator operation. Upon a student's satisfactory completion of the training outlined in paragraph 1.2, the COMPANY will provide the student and the PURCHASER with written certification, as defined in Article 15.1, of said satisfactory completion.

1.2.3 Standard Simulator Training Courses

Shall consist of any other standard simulator training course as may be mutually agreed.

B. Delete Attachments A and B and substitute the revised attachments attached hereto. Except as noted above, the terms and conditions of the Long-Term Training Contract remain unchanged.

IN WITNESS WHEREOF, PURCHASER and COMPANY have caused this Amendment Number One to the Contract to be executed in duplicate by their duly authorized representatives to be effective as of the date and year first mentioned above.

THE METROPOLITAN EDISON COMPANY

BY: *J. E. Quinn*

TITLE: Director - Materials Management

DATE SIGNED: September 29, 1976

THE BABCOCK & WILCOX COMPANY

BY: *J. J. Hill*

TITLE: Manager, Contracts-Legal, NPGD

DATE SIGNED: 6/21/76

WITNESSED BY:
M. A. Blaker
7/24/76

WITNESSED BY:

ATTACHMENT A

RATES FOR BASE SCOPE OF EFFORT

The below listed rates are firm for calendar years 1975, 1976, 1977, 1978, and 1979 and are subject to adjustment in accordance with Article 8.0 "Price Adjustments" of this proposal.

<u>Year</u>	<u>Total Annual Price for Base Scope of Effort</u>
1975	\$122,400
1976	\$122,400
1977	\$ 35,200
1978	\$123,200
1979	\$123,200

NOTE: Invoices for individual course for calendar years 1977, 1978 and 1979 shall be rendered at a base dated rate of \$440 per simulator hour.

ATTACHMENT B

RATES FOR TRAINING CONTRACT

The below listed rates are firm for the 1976 calendar year and are subject to change for the period after December 31, 1976.

Facilities (prices include instructor and associated classroom instruction)

Pre-scheduled simulator training	\$530 per simulator hour
Pre-scheduled simulator training (price is applicable to all simulator training for additional simulator commit- ments over 120 hours annually)	\$510 per simulator hour
Other simulator programs	\$570 per simulator hour

Procurement

Purchases	Total cost plus 15%
Travel and living expenses	At cost