

TRAINING

1. GENERAL

1.1 Description

- .1 This Section contains requirements for training the City's Personnel, by persons retained by the THPS Supplier specifically for the purpose, in the proper operation and maintenance of the equipment and systems installed under this Contract.
 - .2 Two categories of training sessions are required under this Contract: one prior to or concurrent with the System Operational Testing (initial training), and one during the warranty period, approximately six (6) months after award of Substantial Performance of the Work Package (final training). The intent of the latter training session is to enable The City's personnel to ask particular questions on the operation of the specified equipment, based on their actual experience.
 - .3 The NEWPCC requires six (6) separate operator crews to be trained plus two (2) mechanical maintenance crew training sessions as well as two (2) electrical and instrumentation & automation and industrial controls sessions.
 - .4 .The training scope includes "Operator Classroom Training", "Operator Hands-On Training", "Mechanical Maintenance Classroom Training", "Mechanical Maintenance Hands-On Training", "Electrical & Instrumentation and Automation & Industrial Controls Classroom Training", and "Electrical & Instrumentation and Automation & Industrial Controls Hand-On Training".
 - .5 Allow for presenting the training material up to ten (10) times during initial training and up to ten (10) times during final training. Training may not occur on consecutive days. Allow for three (3) separate Site visits during initial training and three (3) separate Site visits during final training for a total of six (6) Site visits for training. Limit each training session to 4 hours.
 - .6 The intent is that the City's Personnel should receive sufficient training on the equipment system that they are going to operate and maintain. The City shall have the authority to determine the duration and content of each training session required.
- .1 Additional general training requirements:
- .1 Training will be designed in conjunction with the City to allow operators to obtain Continuing Education Units (CEUs) where possible.
 - .2 All training sessions regardless of length must include a demonstration of learning by the participants. Assessment methods should reinforce learning, monitor progress and provide feedback on progress. Assessments should be based on course objectives and may include quizzes, learning reviews or other methods used to test the understanding of course materials by course delegates.
 - .3 Attendance registers will be completed for each training course.

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1.2 Quality Assurance

- .1 Where required by the equipment specifications, provide on-the-job training of the City's Personnel. Training sessions will be conducted by qualified factory-trained representatives of the various equipment suppliers with a minimum of two (2) years of experience.
- .2 The trainer(s) proposed by the THPS Supplier shall be experienced in "training" plant operators and shall have relevant experience in similar work.

1.3 Submittals

- .1 Submit the following information in accordance with Section 01300.
- .2 The material will receive a "NO EXCEPTIONS TAKEN" or "MAKE NOTED CORRECTIONS" status no later than four (4) weeks prior to delivery of the training:
 - .1 Lesson plans and training manuals, handouts, visual aids, and other reference materials for each training session to be conducted by the THPS Supplier's trainer(s).
 - .2 Coordinate with Treatment Training Coordinator to arrange training dates as required.
 - .3 Training schedule.

1.4 Location

- .1 Training will take place at the NEWPCC.

1.5 Lesson Plans

- .1 Prepare formal written lesson plans for each training session. Lesson plans to contain an outline of the material to be presented along with a description of visual aids to be utilized during the session. Each plan will contain a time allocation for each subject. Furnish ten (10) copies of necessary training manuals, handouts, visual aids and reference materials at least two (2) weeks prior to each training session.

1.6 Format and Content

- .1 Include time in the classroom and at the location of the equipment or system for each training session. As a minimum, cover the following topics for each item of equipment or system:
 - .1 Familiarization
 - .2 Safety
 - .3 Operation
 - .4 Troubleshooting
 - .5 Preventive maintenance

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- .6 Corrective maintenance
- .7 Parts
- .8 Local representatives
- .9 Training on all relevant SWPs/SOPs provided by the project.

1.7 Video Recording

- .1 The City will record each training session. After recording, the material may be edited and supplemented with professionally produced graphics to provide a permanent record for the City's use.

1.8 Equipment Training

- .1 Coordinate with the City and Design Builder on class scheduling. Schedule classes such that classroom sessions are interspersed with field instruction in logical sequence, with no more than four (4) hours of classes scheduled for any working day.
- .2 Provide one (1) copy of necessary training manuals, handouts, visual aids and reference materials for each trainee at least three (3) weeks prior to each scheduled training session.

1.9 Operator Classroom Training

- .1 As a minimum, classroom equipment training for operations personnel will include:
 - .1 The equipment's specific location in the plant and an operational overview. Use slides and drawings to aid discussion.
 - .2 Purpose and plant function of the equipment.
 - .3 The operating theory of the equipment.
 - .4 The operating strategy of the equipment.
 - .5 Design and operating parameters.
 - .6 Equipment power requirements.
 - .7 Start-up, shutdown, normal operation, and emergency operating procedures, including system integration and electrical interlocks, if any.
 - .8 Navigation tree chart applicable to the system control interface, if applicable.
 - .9 Description of the control logic for site specific programming, if applicable.
 - .10 Screen shots with description of site specific operator interface screens, if applicable.
 - .11 Description of operator interface screen icons, color schemes and functions, if applicable.

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- .12 Operator adjustable control settings or parameters, if applicable.
- .13 Alarm set-points and shutdowns.
- .14 Operator response to alarms and shutdowns.
- .15 Safety items and procedures.
- .16 Routine preventive maintenance, including specific details on lubrication and corrosion protection of the equipment and ancillary components.
- .17 Operator detection, without test instruments, of specific equipment trouble symptoms.
- .18 Adverse operating conditions.
- .19 Operator response to typical adverse operating conditions.
- .20 Required equipment exercise procedures and intervals.
- .21 Routine disassembly and assembly of equipment if applicable for purposes such as operator inspection of equipment.
- .22 Local representative(s) and company information.
- .23 Recommended spare parts.

1.10 Operator Hands-On Training

- .1 As a minimum, hands-on equipment training for operations personnel will include:
 - .1 Identifying instrumentation: Location of primary element; location of instrument readout; discuss purpose, basic operation, and information interpretation.
 - .2 Discuss and demonstrate operation of equipment in all modes of control (local- manual, remote-manual, and remote-automatic as appropriate).
 - .3 Demonstrate Human Machine Interface (HMI) navigation through operator interfaced screens, if applicable
 - .4 Discuss and demonstrate all local panel operations and functions.
 - .5 Discuss and demonstrate operator adjustment of control settings and parameters.
 - .6 Discussing, demonstrating, and performing recommended operating methods and daily visual inspection of system operation.
 - .7 Discussing and performing the preventive maintenance activities.
 - .8 Discussing and performing start-up and shutdown procedures.
 - .9 Performing the required equipment exercise procedures.

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- .10 Performing routine disassembly and assembly of equipment if applicable.
- .11 Identifying and reviewing safety items and performing safety procedures, if feasible.

1.11 Maintenance Classroom Training

- .1 Classroom equipment training for the maintenance and repair personnel will include:
 - .1 Basic theory of operation.
 - .2 Description and function of equipment.
 - .3 Routine start-up and shutdown procedures.
 - .4 Electrical power requirements.
 - .5 Lockout procedures and the location of lockouts.
 - .6 Normal and major repair procedures.
 - .7 Equipment inspection and troubleshooting procedures including the use of applicable test instruments and the "pass" and "no pass" test instrument readings.
 - .8 Routine and long-term calibration procedures.
 - .9 Safety procedures.
 - .10 Preventive maintenance.
 - .11 Local representative(s) and company contact information.
 - .12 Recommended spare parts.

1.12 Mechanical Maintenance Hands-On Training

- .1 Hands-on equipment training for maintenance and repair personnel will include:
 - .1 Locating and identifying equipment components.
 - .2 Reviewing the equipment function and theory of operation.
 - .3 Reviewing normal repair procedures.
 - .4 Performing routine start-up and shutdown procedures.
 - .5 Reviewing and performing the safety procedures.
 - .6 Performing Owner-approved practice maintenance and repair job(s), including mechanical adjustments and calibration and troubleshooting equipment problems.
 - .7 Reviewing and using THPS Supplier's manuals in the hands-on training.

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1.13 Electrical & Instrumentation and Automation & Industrial Controls Training

- .1 Electrical, instrumentation, and controls (I&C) training shall be provided in the classroom and in the field, as required to convey required concepts to City staff.
- .2 Training shall include the following items in general.
 - .1 Overview of the electrical and instrumentation components included.
 - .2 Review of the equipment function and theory of operation.
 - .3 Overview of field instrumentation.
 - .4 Component by component review.
 - .5 Required maintenance activities.
 - .6 Troubleshooting.
 - .7 Configuration and calibration for each type of instrument and control device supplied.
 - .8 Control panel operation.
 - .9 Sequence of operation.
 - .10 Performing Owner-approved practice maintenance and repair job(s), including electrical adjustments and calibration and troubleshooting equipment problems.

1.14 Equipment and Systems for Training

- .1 Provide initial training just prior to or concurrent with the seven (7) successful day System Operational Test for the following equipment and Systems:
 - .1 THPS equipment
- .2 Coordinate and finalize with the Design Builder on training schedules and duration of each training session.

1.15 Training Completion Forms and Payment

- .1 Form T1: To be completed for initial training.
- .2 Form T2: To be completed for final training during the Warranty Period.
- .3 Samples of Forms T1 and T2 are attached to this Section.
- .4 Once training sessions are completed the THPS Supplier will compile all training materials to form a complete training package. This package is to be supplied to the City for use in training future staff.

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1.16 Training Completion Forms and Payment

- .1 Form T1: To be completed for initial training before commissioning.
- .2 Form T2: To be completed once the City has had the opportunity to operate the equipment.
- .3 A sample of Forms T1 and T2 are attached to this specification section.
- .4 One copy of Forms T1 and T2 will be required for each major piece of equipment.

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**CERTIFICATE OF SATISFACTORY TRAINING
FORM T1**

We certify that the initial training for the equipment listed below has been provided as per the Specifications.

PROJECT: _____

ITEM OF EQUIPMENT: _____

TAG NO: _____

**REFERENCE
SPECIFICATION:** _____

(Authorized Signing Representative of the Design Builder)

Date

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**CERTIFICATE OF SATISFACTORY TRAINING
FORM T2**

We certify that the final training for the equipment listed below has been provided as per the Specifications.

PROJECT: _____

ITEM OF EQUIPMENT: _____

TAG NO: _____

**REFERENCE
SPECIFICATION:** _____

(Authorized Signing Representative of the Design Builder)

Date

END OF SECTION