# Instrumentation
# Troubleshooting

## Course Objectives

1. Recall general troubleshooting process.
2. Explain the importance of communication between board control room operators and field operators when troubleshooting instrumentation problems.
3. Explain instrumentation troubleshooting process.
4. Explain the importance of process knowledge in troubleshooting.
5. Explain the methods used to determine if sensors, transmitters, controllers, or final control elements are malfunctioning.
6. Describe safety and environmental issues related to troubleshooting process instruments.
7. Identify typical malfunctions for sensors, transmitters, controllers, and final control elements.

## Key Terms (Define the following)

troubleshooting - _____

_____

simulated input signals - _____

_____

## Principles

### Troubleshooting Steps:

1) Recognize the abnormal situation.
2) List and evaluate potential causes.
3) Choose and verify the cause.
4) Correct the problem.
5) Track the effect of the action.

# Questions

1. For transmitters that include equalizing valves, you should follow this zeroing out process:

   - ☐ Open cross-over equalizing valve, open high side valve, zero out transmitter, close cross-over equalizing valve, open low side valve.
   - ☐ Close cross-over equalizing valve, open high side valve, zero out transmitter, open cross-over equalizing valve, close low side valve.
   - ☐ Open high side valve, close cross-over equalizing valve, zero out transmitter, open cross-over valve, open low side valve.
   - ☐ Close low side valve, open cross-over equalizing valve, zero out transmitter, close cross-over equalizing valve, open low side valve.

2. One of the best ways to begin isolating the cause of a problem in an instrumentation loop is to first:
   - ☐ Test the control valve.
   - ☐ Divide the loop in half.
   - ☐ Start signal tracing.
   - ☐ Check the sensor output.

3. Controller malfunctions often are the result of:
   - ☐ Software problems.
   - ☐ Improper tuning.
   - ☐ Faulty wiring.
   - ☐ Power surges.