Irrigation Training Toolbox
Irrigation System Evaluation

Lesson Plan
Troubleshooting

National Employee Development Center
Natural Resources Conservation Service
Fort Worth, Texas
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COURSE: Pumping Plant Evaluation Training Sessions

Lesson Title: Troubleshooting

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Objectives: The student will be able to:
(a) Identify possible system problems
(b) Identify possible errors in data gathering which will produce inaccurate results
(c) Point out possible system problems to irrigators

Reference:
1. Leon New, Agricultural Engineer, Texas Agricultural Extension Service, Amarillo, Texas - personal communication
2. How To Adjust Vertical Turbine Pumps for Maximum Efficiency, Extension Service, University of Nebraska, EC 74-760.
3. Representatives of Energas and Peoples Natural Gas Co. - personal communication
4. Dr. Arland Schneider, Agricultural Engineer, USDA-ARS - personal communication
5. Field experience of Area and Field Office personnel.

Training Aids:

Total Time for Lesson: 15 Minutes

Trouble Shooting

Possible System Problems:

1. Underloading natural gas engine
   Example - Moline 6 cyl. pumping 85 gpm
2. Overloading of electric motors
   Most common on pivots and submersibles
3. Impellor adjustment is needed
   Caused by:
   a. sand pumping
   b. farmer adjusting of impellors
   c. shaft tightening after pump installation
   d. initial impellor adjustment may have been incorrect
4. Improper gas pressure at carburator
   Caused by:
   a. pressure drop in gas line
   b. farmer adjustment of pressure regulator on gas meter
   c. need 4 - 6 oz/in^2 at carborater
      3 - 5 lb/in^2 w/turbocharger
5. Improper timing, carburator adjustment, or worn spark plugs
6. Gas leaks — sniff and listen when you can. Kill the engine and check if you show a very low efficiency.

Possible Errors in Data Gathering:

1. Incorrect gas or electric meter reading. Usually easy to spot on electric system; not so easy on natural gas systems
2. You can run into problems when several wells are on one gas meter. Check discharge pressure with all wells runnings then run evaluation on one well at a time; putting the same discharge pressure on the running well that it had when

2. Continued
all wells were running. Use a squeeze down valve to do this.

3. Water meter errors

   a. insure all of underground line is full and flow has stabilized before taking readings.

   b. watch for air or sand in Cox Velocity meter.