

Preventative Maintenance from Source to Tap

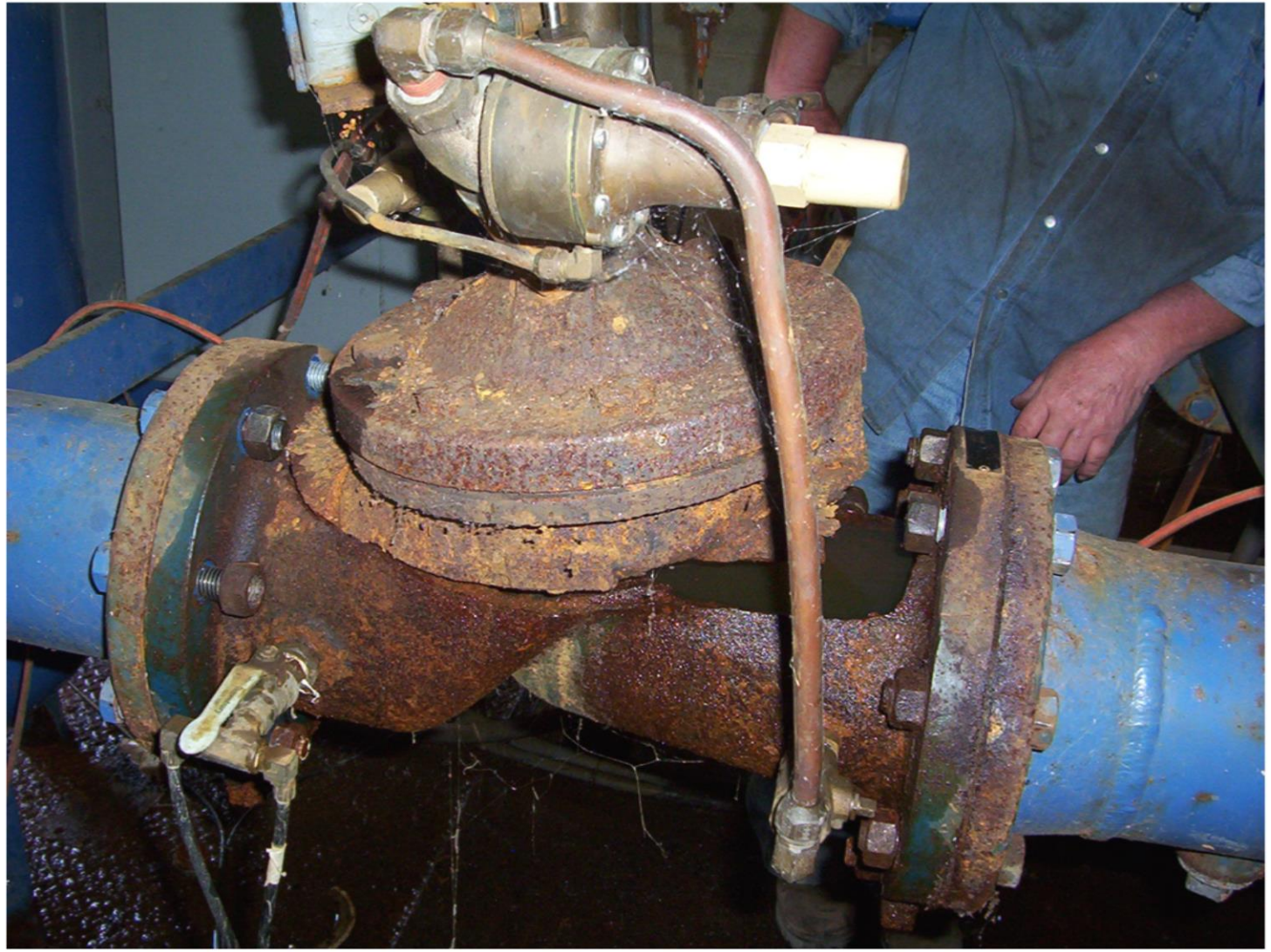
Most find that a planned program of preventative maintenance is less costly than a program of corrective maintenance.



Usually...the cost of repairing equipment under emergency situations or when you are least prepared is more costly than the replacement of parts which have a documented record of some type of wear pattern | or intermittent problems.

Continued unchecked use of equipment will often cause complete failure.

Preventative Maintenance from Source to Tap



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Why do we not do preventative maintenance?

Ideally...a preventative maintenance program would prevent failure before it occurs.

Objective of a preventative maintenance checklist and program is to assure equipment is working at its highest efficiency over a longer period of time.

Preventative Maintenance from Source to Tap

MONEY \$\$\$

As system managers we are pressured to keep costs down.

MANPOWER

1. Too many fires to put out
2. Personnel not knowledgeable of process and procedures.
3. Not enough help.
4. Lack of expertise in staff

TIME

Too much to do and too little time

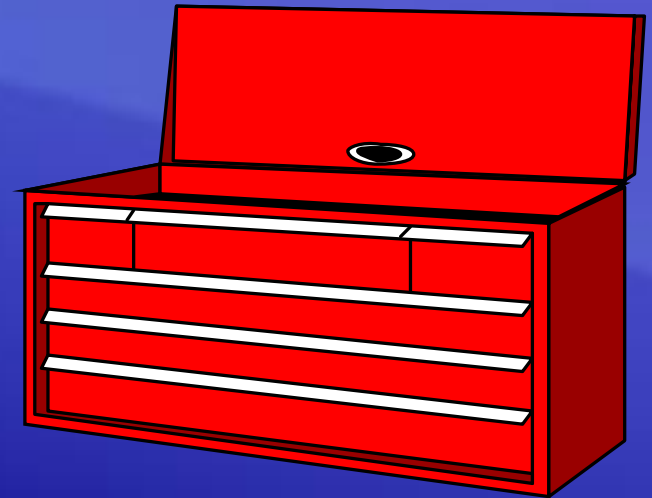


Preventative Maintenance from Source to Tap

EQUIPMENT

Don't have the necessary tools to really perform a complete program.

- Lubrication Equipment
- Testing Equipment
- Diagnostic Equipment



Preventative Maintenance from Source to Tap

Why do we change the oil in our vehicles or check tires and clean the vehicle?

We don't wait for the oil light to come on before we check the oil ... or a tire to blow...so why maintain your water system any differently.

A well thought out program of testing, inspection and record keeping is within the abilities of every water agency.

Awareness of the problem and initiation of a plan of action will lead to many years of great performance.

Wells

Keep area clean!!

- Spilled lubrication
- Weeds and brush cleared away
- Pits and vaults cleaned and sealed
- Control panels cleaned and painted

Repair any leaks immediately.

They will not get better.....

Wells

- Piping painted
- Routine testing of check valves for leaks
- Routine flow performance testing of each well
- Perform these tests at different times of the year
- When water table levels change

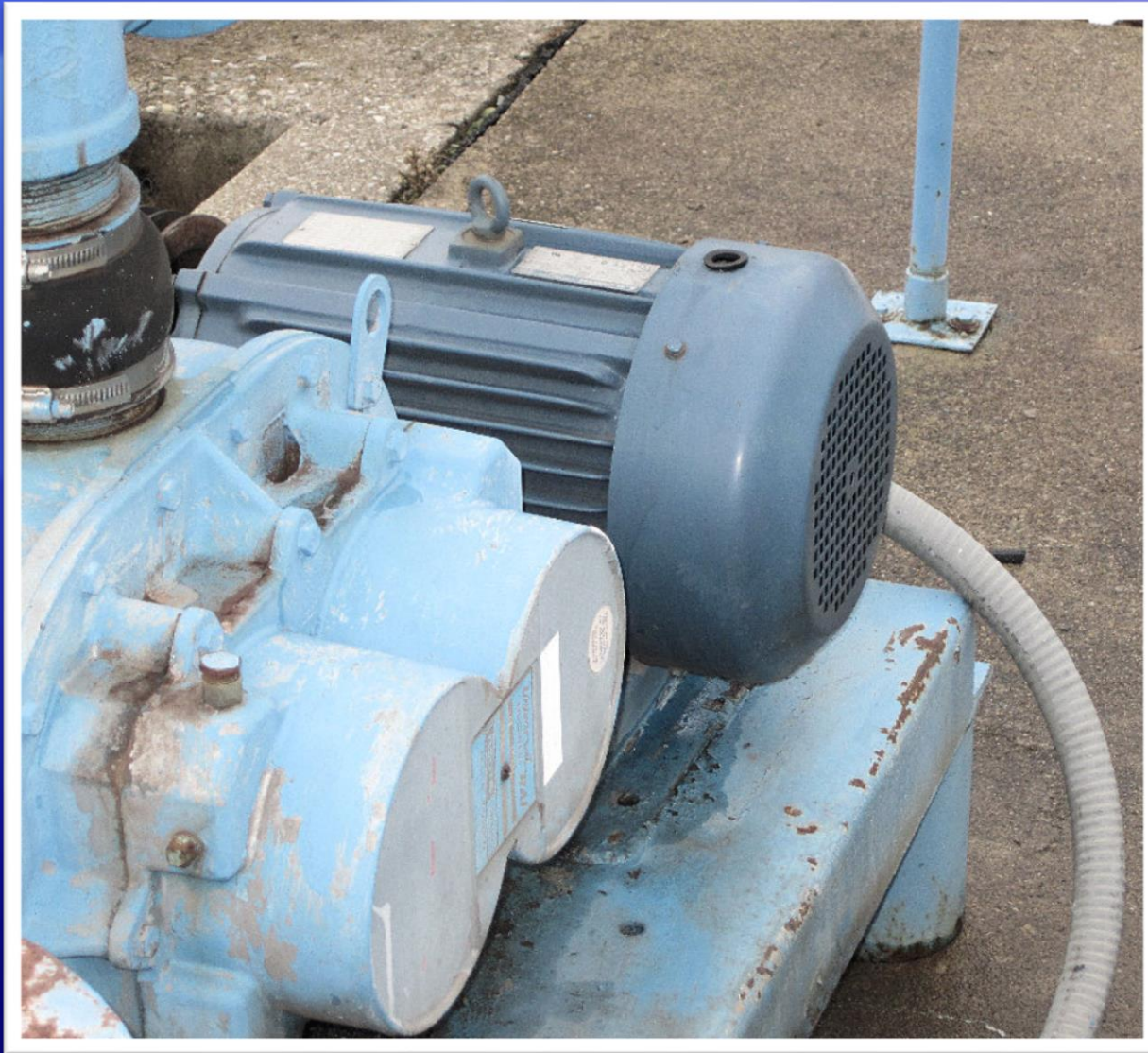
Wells

- Do routine water tables levels
- Flow meter calibration/perform tests that confirm your pump performance and well condition
- Operate valves that isolate wells from system
- Check air relief/vacuum relief valves when used
- Check lighting around wells

PLANT

Depending upon the size and degree of treatment you perform will not determine the need for a preventative maintenance program. Whether you have 2 or 20 pumps they will need maintained and they will break down.

PLANT



PLANT



PLANT



PLANT



PUMPS

Centrifical

Vertical Turbine

Piston Pumps

Meter Pumps

Diaphragm Pumps

PUMPS

Preventative maintenance on pumps is based on several indications

Sound – Loud, quiet, unusually different

Look – Water leaks, oil or lubrication leak,
unusual dust forming on motor

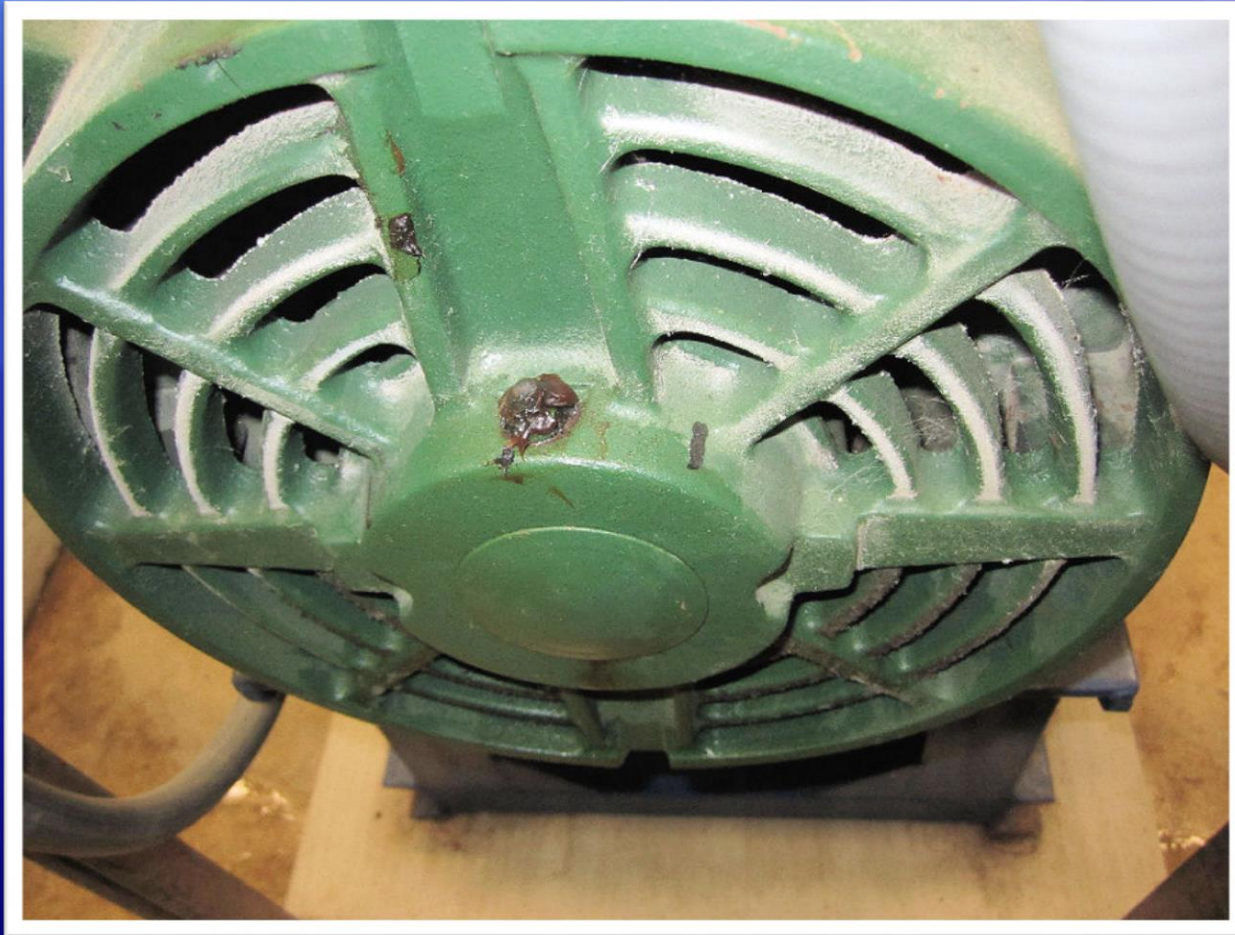
Listen – Rumbling or grinding

Smell – Hot

Touch – Too cold or too hot...just right

PUMP-Lubrication

What's too much?



PUMP - Lubrication

What's not enough?



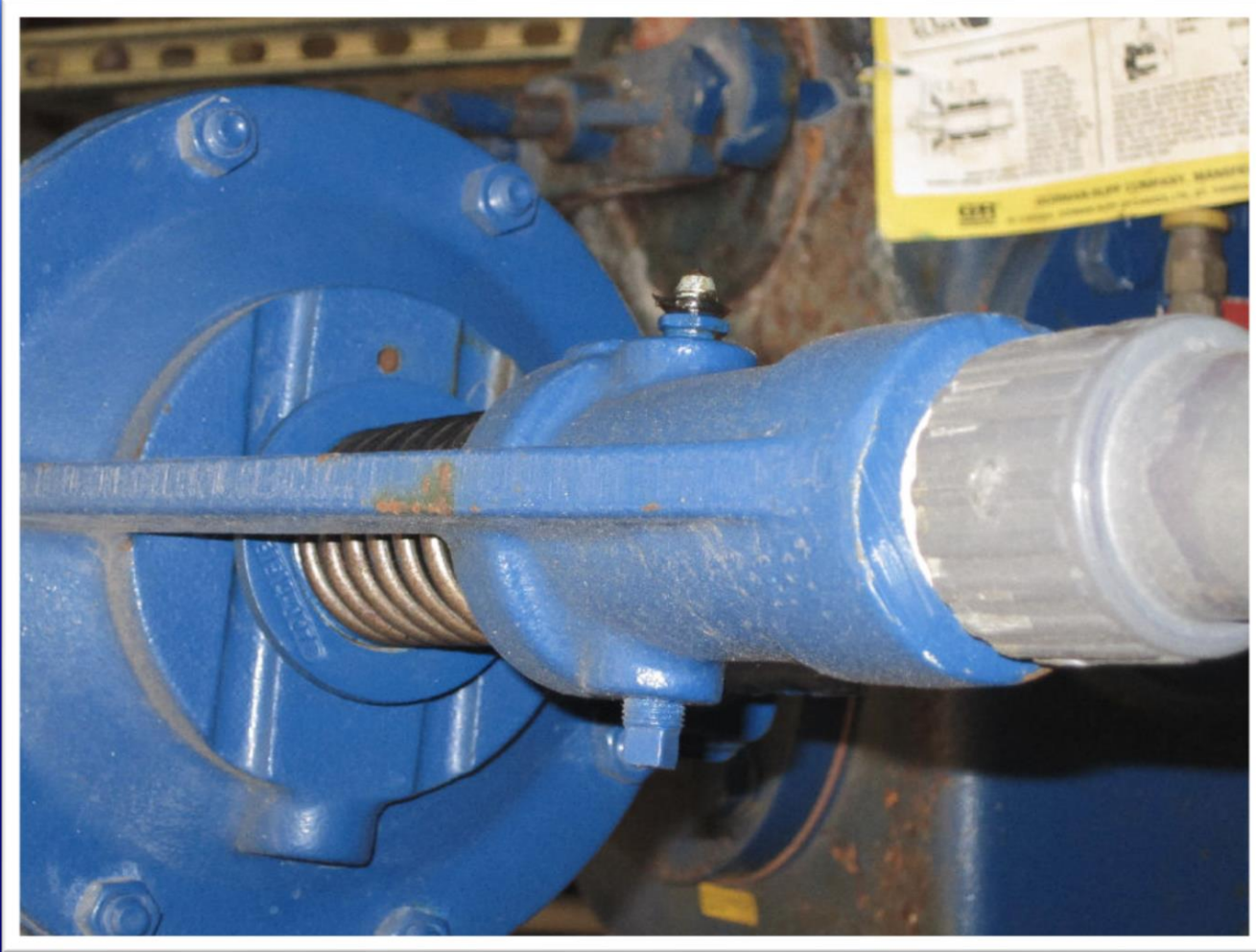
PUMP - Lubrication

Is it right for application?



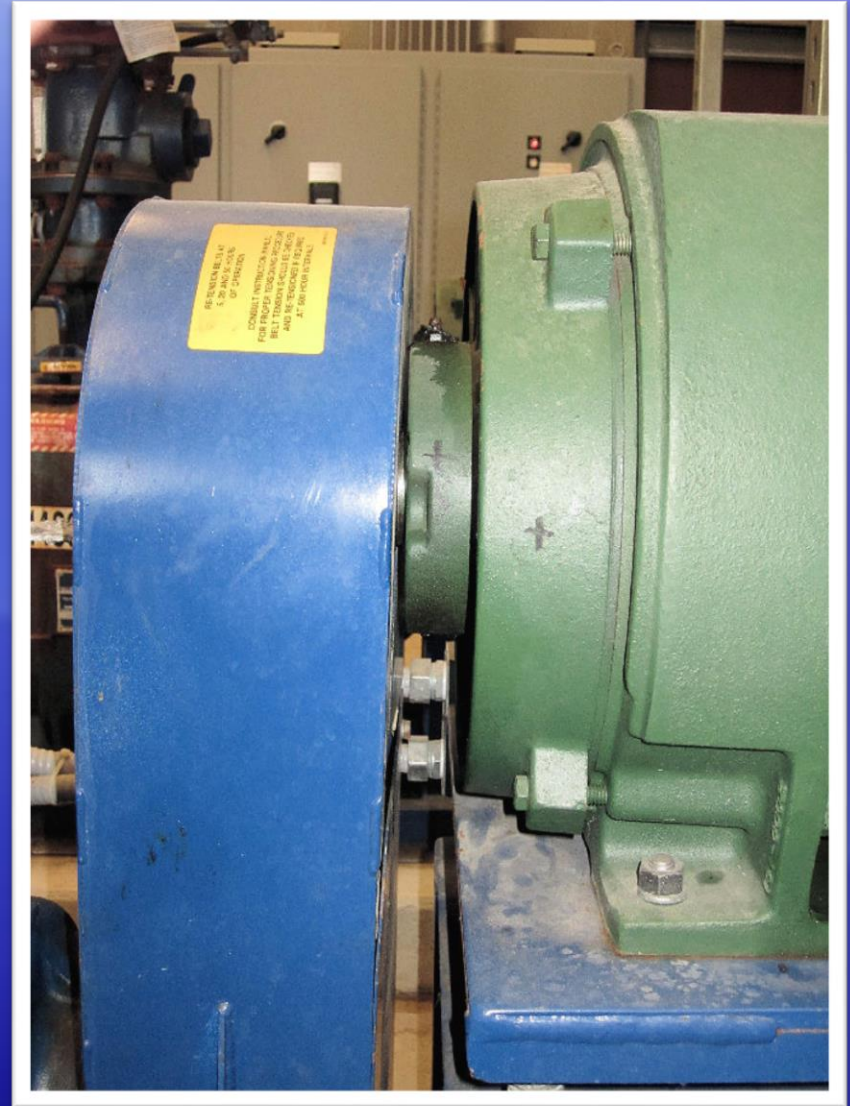
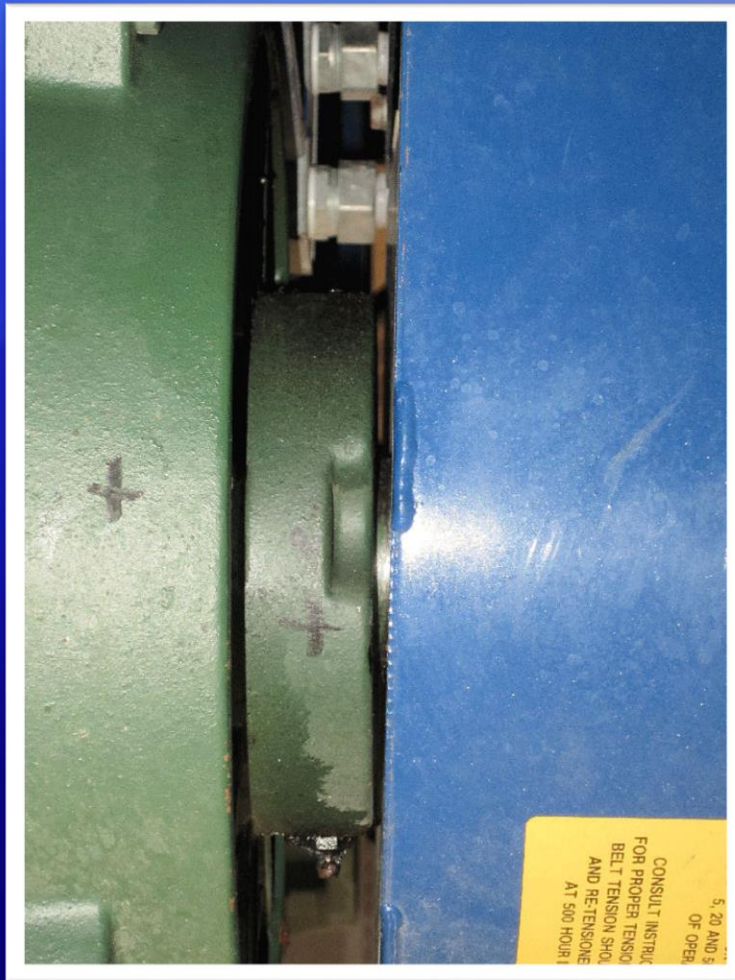
PUMP - Lubrication

Removal of relief port



PUMP - Lubrication

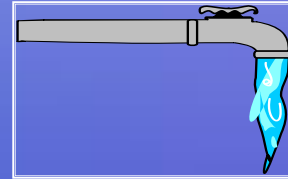
Removal of relief port



PUMPS – Shaft Seal

- Packing or mechanical seal

- Is it leaking excessively?



- Is it too tight...causing damage to shaft?



PUMPS

BEARINGS

- Are they operating at design temperature and speed?
- Are you using the correct lubrication?

PUMPS

Inspection of Internal Parts

How much wear is on the volute?

Impeller – Do you know what the spec was when it was new?

It helps you determine longevity of the pump.
Also tells you if you have supply problems such as low pressure or low pressure on discharge.



PUMPS

Pump pressures should be recorded daily suction and discharge.

Runtime meters should be checked for accuracy and logged daily.

PUMPS: Temperature readings should be taken regularly on:

Bearings:



PUMPS:

Temperature readings should be taken regularly on motor housings and bearings:



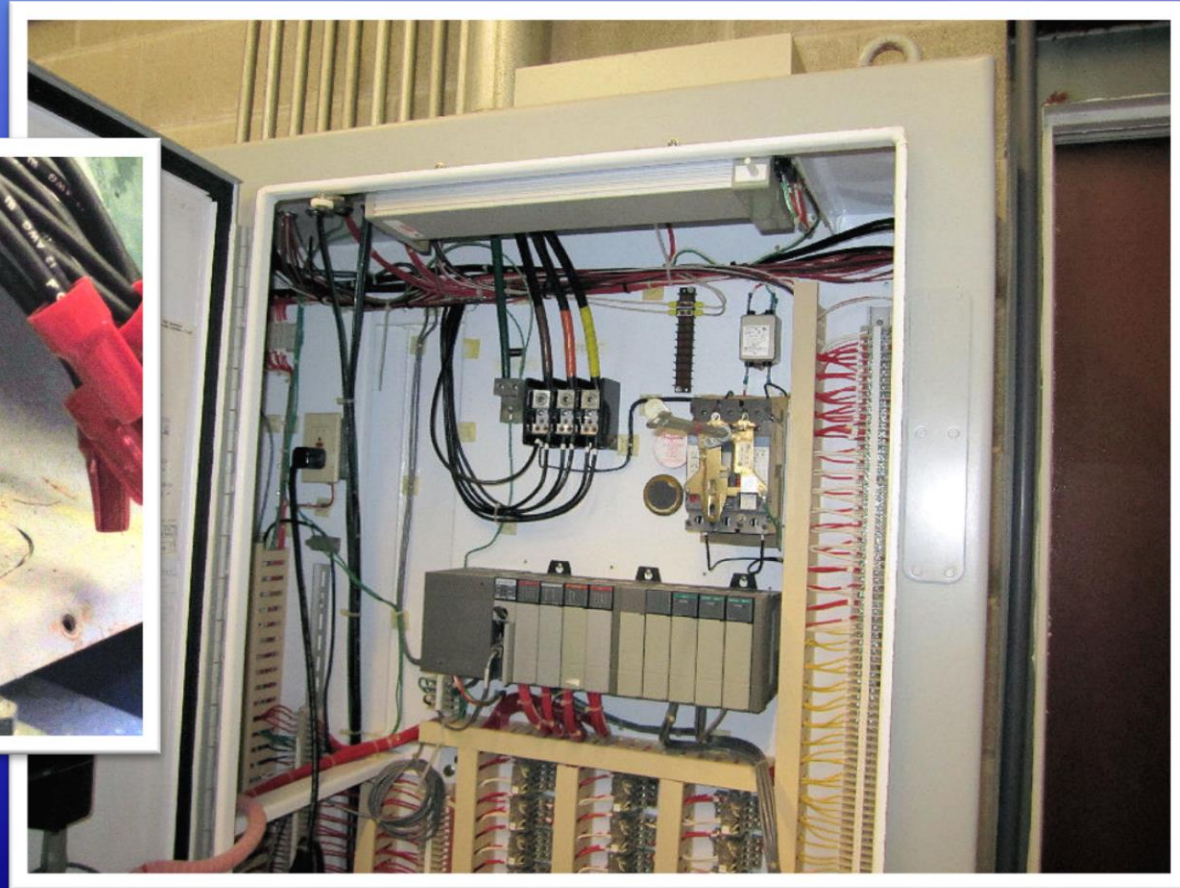
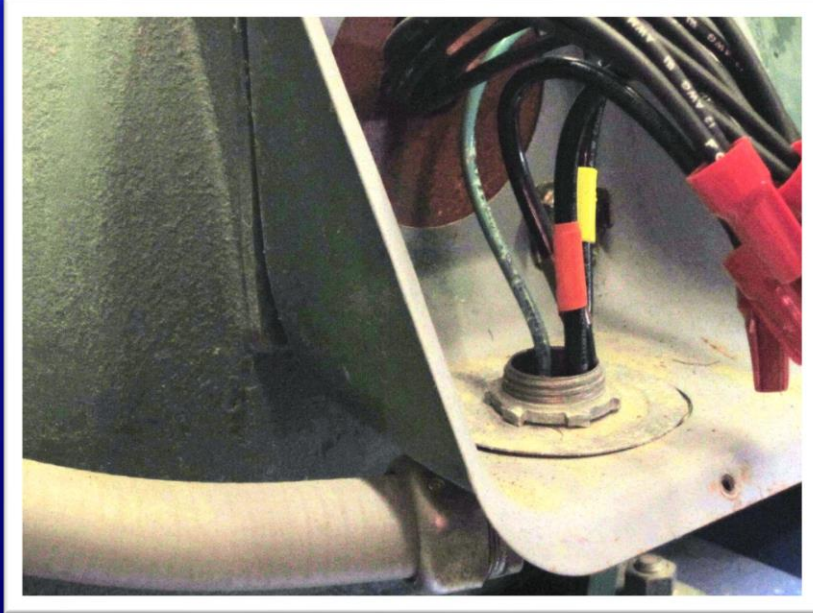
PUMPS: Temperature readings should be taken regularly on:

Breakers



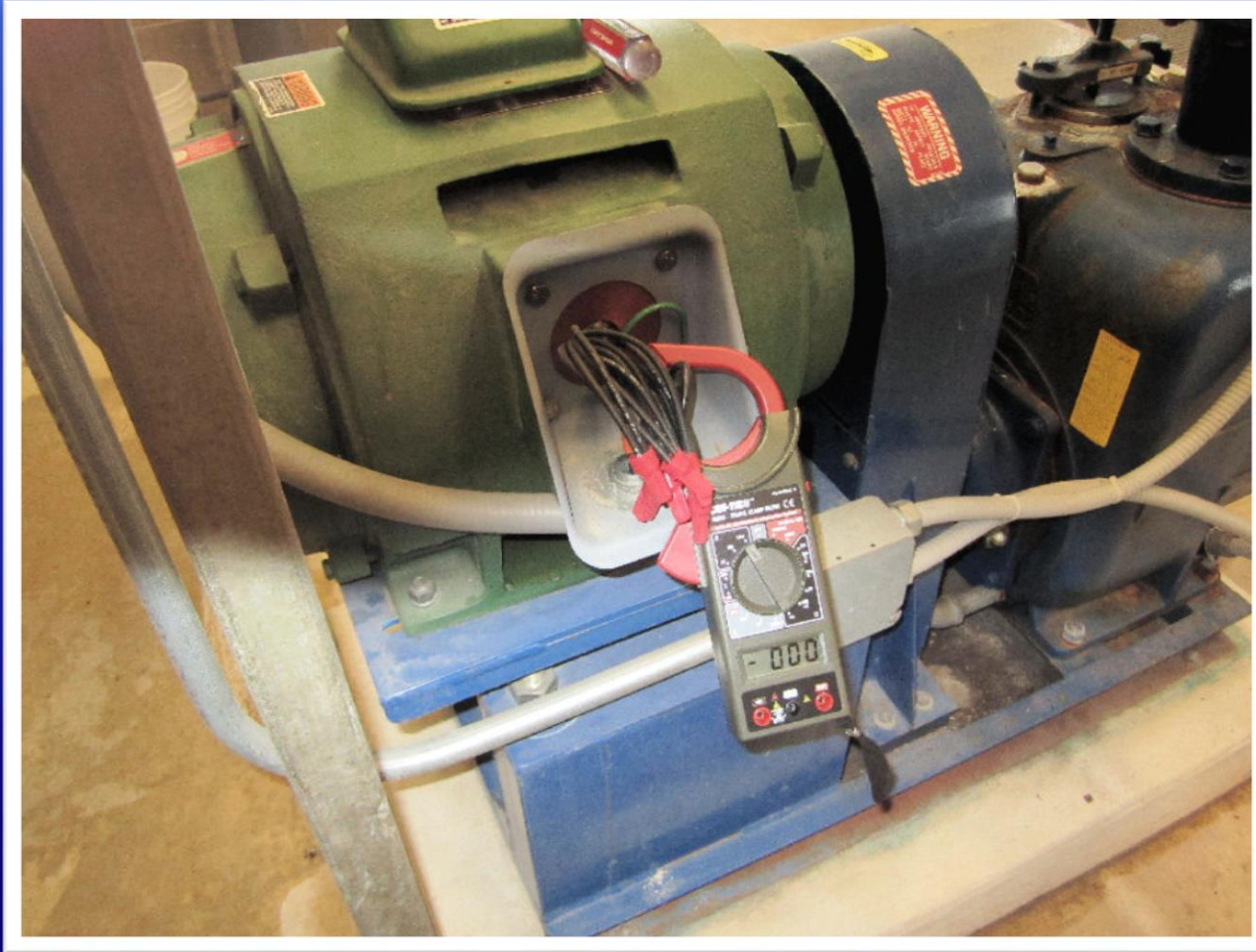
PUMPS

Voltage and AMP readings on each leg of each pump should be checked and recorded



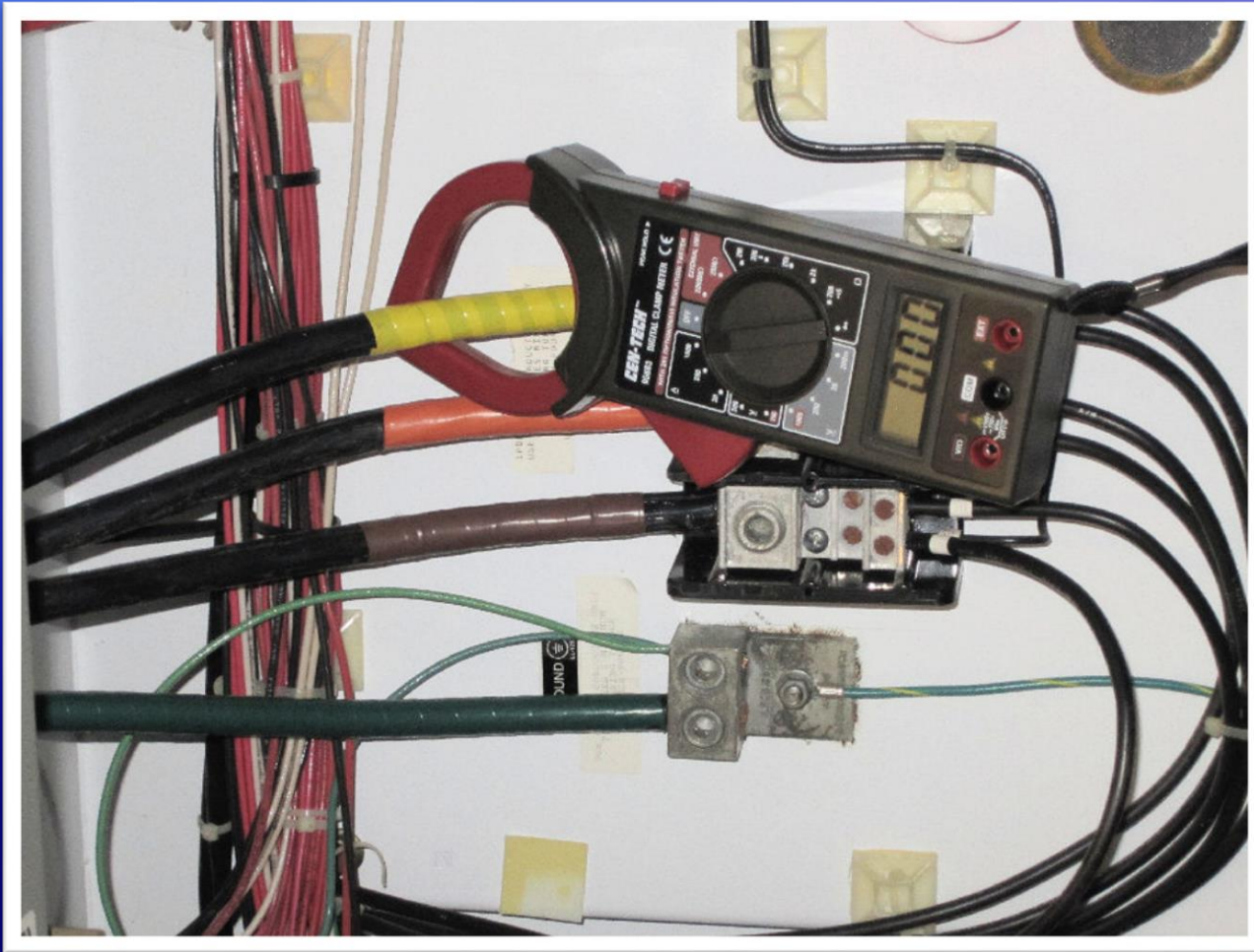
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PUMPS

Pump Packing Adjustments

- Most common maintenance job performed
- Packing is designed to wear out
- Packing should wear out with minimal wear on pump shaft
- Each pump application requires different types of packing. Know the difference.'
- Inspect on regular basis with small adjustments

PUMPS - Bearing Failure – Major Reasons

- Lack of lubrications
- Wrong lubrications
- Over lubrications ...
fail to remove relief port
- Uneven loading misaligned driver
- Poor maintenance of packing or seal



This can be prevented with good records and proper PM techniques

PUMPS

Control Valves

- Have you ever checked to see that they fully close without hesitation?
- Do you clean Y strainers regularly?
- Is your water such that it may cause problems with the control lines solenoid valve or speed control valve?

Hydrants

Fire hydrants are vital to the community fire protection and like other parts of the distribution they are neglected.

Like all other equipment they need some preventative maintenance before they fail.

Hydrants

Hydrants should be tested and inspected regularly

- Watch valve located and operated
- Packing on stem adjusted if needed
- Bolts checked for deterioration and tightness
- Caps checked for leaks



Hydrants

- Threads lubricated with food grade grease (non-corrosive)
- Pressure tested
- Flowed and flushed
- Check for unauthorized use or tampering
- Shaft lubricated if need be
- Oil reservoirs filled

Main Line Valves

- Exercise Exercise EXERCISE
- But do this with controlled flushing so that any debris that may be lodged in seat or that breaks loose is flushed out.
- Locate on maps
- Write down number of turns
- Depth of valve
- Any problems with valve

Water Tower Reservoirs Stand Pipes

- Check concrete footings for cracks
- Paint deterioration
- Set up for annual inspection inside and out
- Keep fencing repaired and cleaned
- Check valves for availability and location
- Exercise valves
- Check venting and lights

Water Tower Reservoirs Stand Pipes



Water Tower Reservoirs Stand Pipes



Water Tower Reservoirs Stand Pipes



Cathodic Protection

Water Tower Reservoirs Stand Pipes

- If at all possible...prevent the attachment of antennas, dishes and other non-water system related devices.
- Set up in the budget for water towers to be inspected and cleaned.
- Take photographs of all your facilities
- System flushing

Leak Detection

1. Allows for planned repairs
2. Gives you a good representation of your system
3. Familiarize personnel with systems

Preventative Maintenance

The results of a comprehensive preventative maintenance program is extended life of your equipment, minimize emergency breakdowns, allows for better budget planning and documentation for the money.

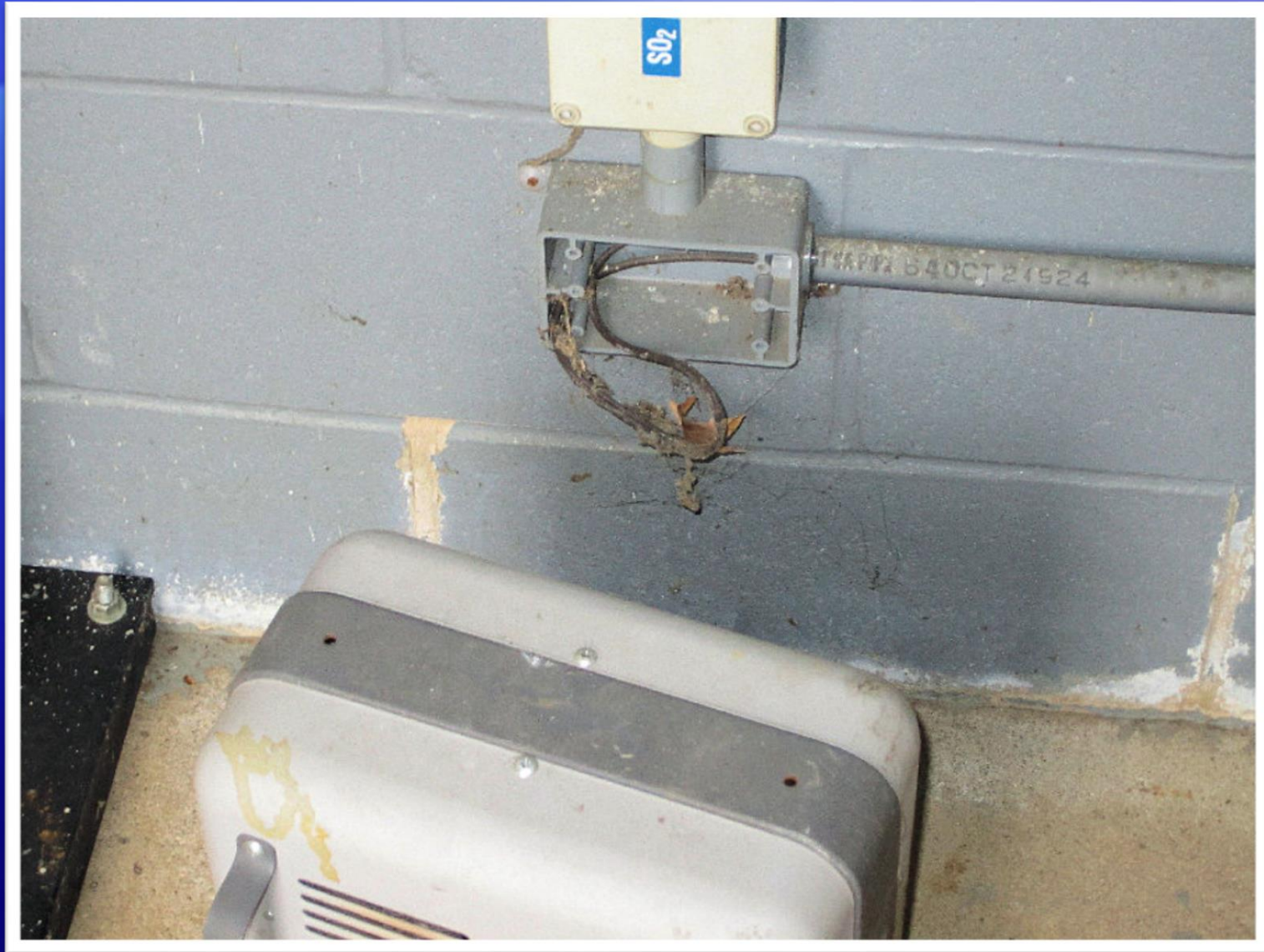
Preventative Maintenance



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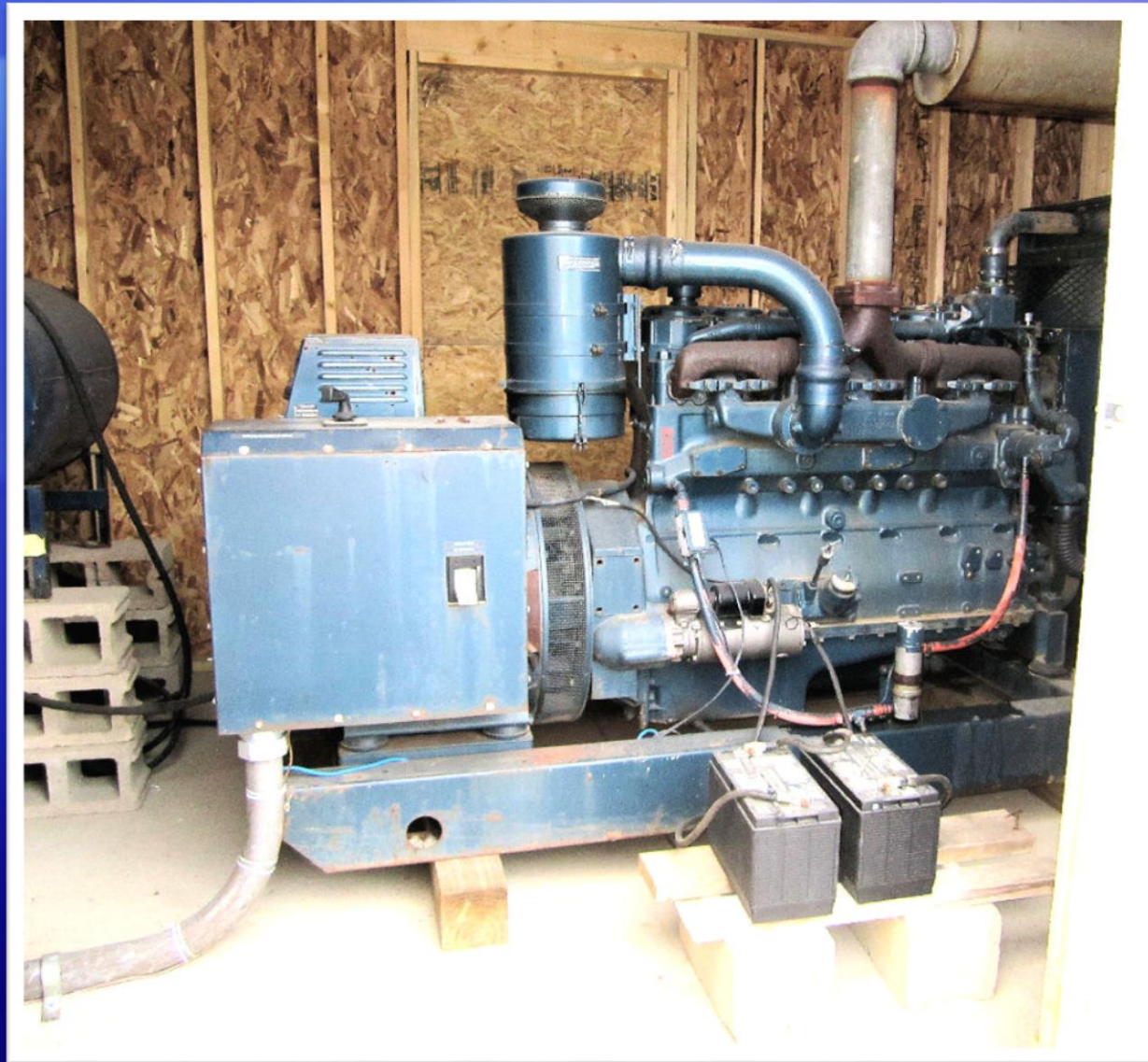
Preventative Maintenance



Preventative Maintenance



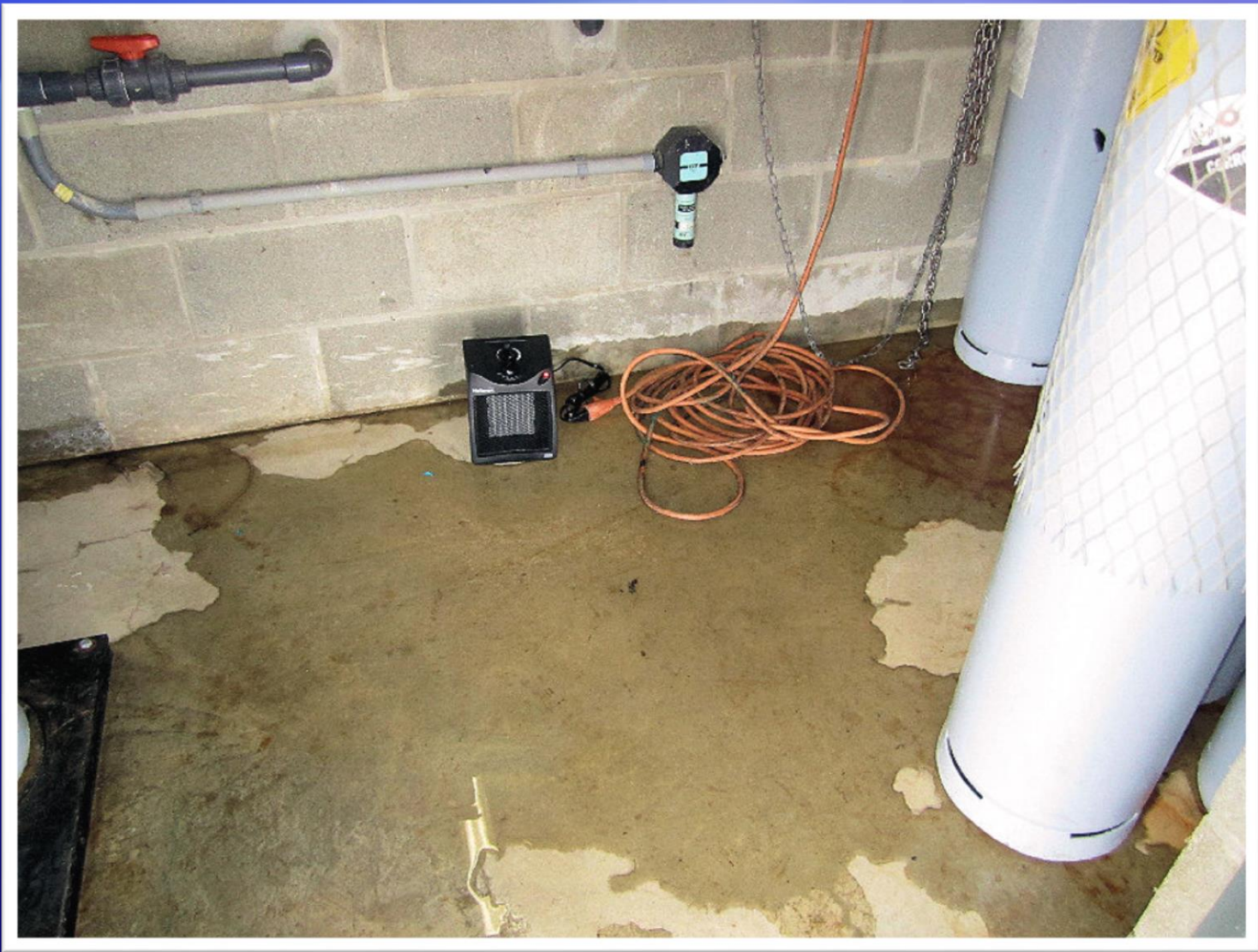
Back Up Power



Preventative Maintenance



Preventative Maintenance



Preventative Maintenance



Preventative Maintenance

