

TROUBLESHOOTING A CP SYSTEM

GALVANIC SYSTEM

A. IF PREVIOUSLY OPERATED SATISFACTORILY

1. TEST ALL INSULATORS
2. INVESTIGATE FOR FOREIGN CONTACTS
 - A. UNDERGROUND WATER LINES
 - B. UNDERGROUND CABLES
 - C. GROUND CONNECTIONS TO
POWER/TELEPHONE/TV CABLES
3. DISCONNECTED OR DEPLETED ANODES
 - A. CHECK ABOVE GROUND
CONNECTIONS
4. POSSIBILITY OF ABNORMAL DRY SOIL
CONDITIONS

B. IF NEVER OPERATED SATISFACTORILY

1. VERIFY ALL REQUIRED INSULATORS WERE
INSTALLED

2. VERIFY ALL POSSIBLE UNDERGROUND
CONTACTS HAVE BEEN REMOVED

3. REVIEW COATING QUALITY
 - A. IS COATING OF POOR QUALITY?
 - B. IF POOR QUALITY COATING,
ADDITIONAL ANODES MAY BE REQUIRED
 - C. POOR QUALITY COATING MAY MAKE IT
IMPRACTICAL TO USE GALVANIC ANODES

4. REVIEW ANODE INSTALLATION
 - A. ANODES PROPERLY SIZED, INSTALLED
AND CONNECTED?

 - B. SUFFICIENT ANODES INSTALLED?

GUIDELINE FOR MAGNESIUM ANODE INSTALLATIONS

The following information is a guideline only. There may be situations whereby magnesium anodes are not an effective means for the application of cathodic protection. Such situations would include soils with a high electrical resistance, piping that is not coated, or installed in a common trench and contacting other metallic facilities. When soil characteristics, coating condition or possible presence of numerous metallic contacts with other facilities are not known it may be desirable to engage persons that are qualified to make the necessary investigation.

Magnesium anodes can provide economical protection from corrosion on buried steel piping. They are most effective when the pipeline is relatively well coated and not in contact with other metallic facilities. Except for relative short sections of pipe (50' or less) it may not be effective or economical to protect bare (uncoated) piping using magnesium anodes. The presence or condition of the coating (if any) can be estimated by excavating the piping at several places. Suggested excavation locations might be piping "T's" and valve locations.

GENERAL INSTALLATION GUIDELINES

1. Above ground piping and all buried metallic piping must be electrically isolated from the piping planned for cathodic protection. This may be accomplished by installing dielectric unions or other fittings that have the capability to electrically isolate piping. All underground contacts with other metallic facilities must be eliminated for cathodic protection to be effective. Protective current intended for your facility will be received by the facility in contact with your line. This will result in unnecessary costs to protect your line. Underground contacts can be "cleared" by placing thick rubber gasket material, sections of a rubber tire or thick plastic materials between the two facilities to eliminate metal to metal contact.
2. Magnesium anodes are commonly packaged in a prepared backfill material and have 10' of # 12 insulated lead wire.
3. Long lengths of pipe (approximately 300' or more) will require multiple anodes. When possible it is desirable to install the anodes away from the ends of piping and equally spaced from each other when more than one is required.
4. Anodes may be positioned either vertically or horizontally however they should always be at least 1' from the piping and at or below the bottom of the piping. Prompt operation may be assisted by flooding the anodes with water prior to backfilling.
5. Thermite (cadweld) connections are strongly recommended to attach

the anode lead wire to the piping. The use of underground pipe clamps to attach anode leads may result in ineffective connections.

All anode lead connections and other damaged coating should be repaired prior to backfilling. A common method to coat anode lead connections and repair the pipe coating is use a plastic pipe wrapping tape. The procedure is to clean the pipe surface thoroughly, prime it with the recommended primer for that particular pipe wrap and then to securely wrap the pipe avoiding wrinkles and voids as much as possible.

The anode lead wire must have sufficient slack to protect it from soil settlement stress and other damage during backfilling.

6. Suggested anode spacing and sizes for coated pipe is:

- | | | |
|--|----------|-------|
| 0 to 5' lengths of 3/4" thru 4" pipe
(Such as steel risers in plastic pipe systems) | 1-1 lb. | anode |
| 0 to 300' lengths of 3/4" thru 4" pipe
(position anode as near to pipe segment
mid-point as is possible) | 1-17 lb. | anode |

Lengths greater than 300' should have an anode for each 300' of piping and spaced approximately 300' apart.

Note: Other sizes of anodes may be used however their life expectancy will be increased or decreased depending upon their size. A larger anode will last longer than a smaller one. The average life will vary however a 10 to 20 year life can be expected for a correctly sized anode.

P/S potential measurements should be made at locations as far distant as possible from the anode. Otherwise the readings may indicate adequate protection when the pipe distant from the anode is not protected.

TYPICAL MAGNESIUM ANODE INSTALLATION

1. Anode may be installed either vertical or horizontal, however it should be as deep as the bottom of the pipe. Always remove anode from paper sack. Avoid handling by the lead wire as they are easily damaged.
2. It is recommended that the underground anode lead wire to pipe connection be made using the thermite process (Cadweld).
3. Coat the anode lead connection and repair any coating damage present in the excavation. Use an approved pipe coating material such as plastic pipe wrap and the primer supplied with it.
4. Care should be taken to prevent the anode lead wire from being stressed or broken during backfilling operations.
5. The anode may be flooded with water prior to backfilling to help it begin operating.
6. Backfill anode with native soil, not sand or rocks.

Typical Anode Installation

