



Corrosion Control/Cathodic Protection for Aboveground Storage Tanks

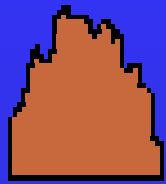
***Presented by:
James T. Lary
Corrpro Companies, inc.
1090 Enterprise Drive
Medina, Ohio 44256
jlary@corrpro.com
330-723-5082***



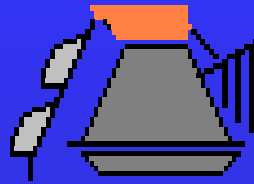
Why is Corrosion Control Important?

- **Preserve Assets**
- **Reduce Maintenance Costs**
- **Reduce Inspection Cost**
- **Company/Government Requirement**
- **Preserve The Environment**

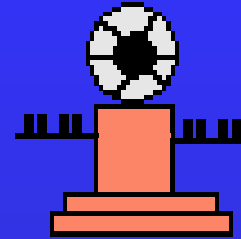




IRON OXIDE



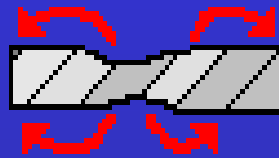
REFINING



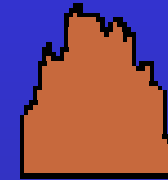
MILLING



STEEL



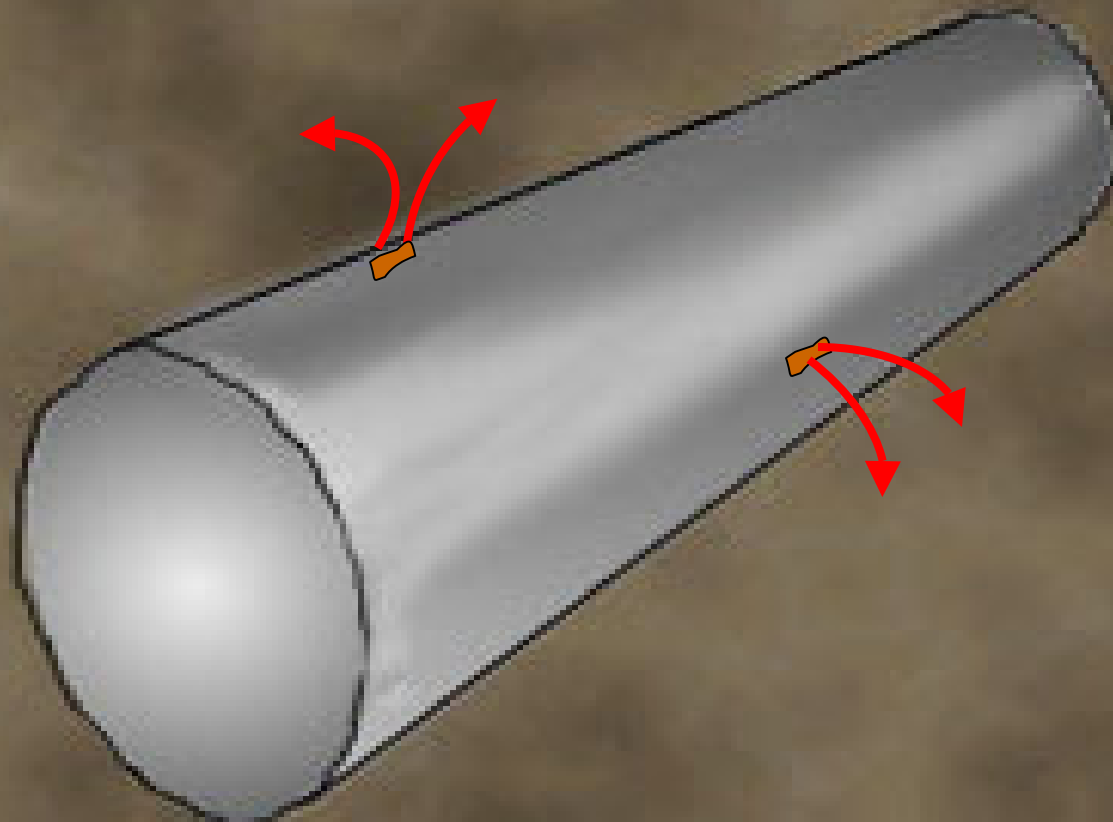
CORROSION



IRON OXIDE

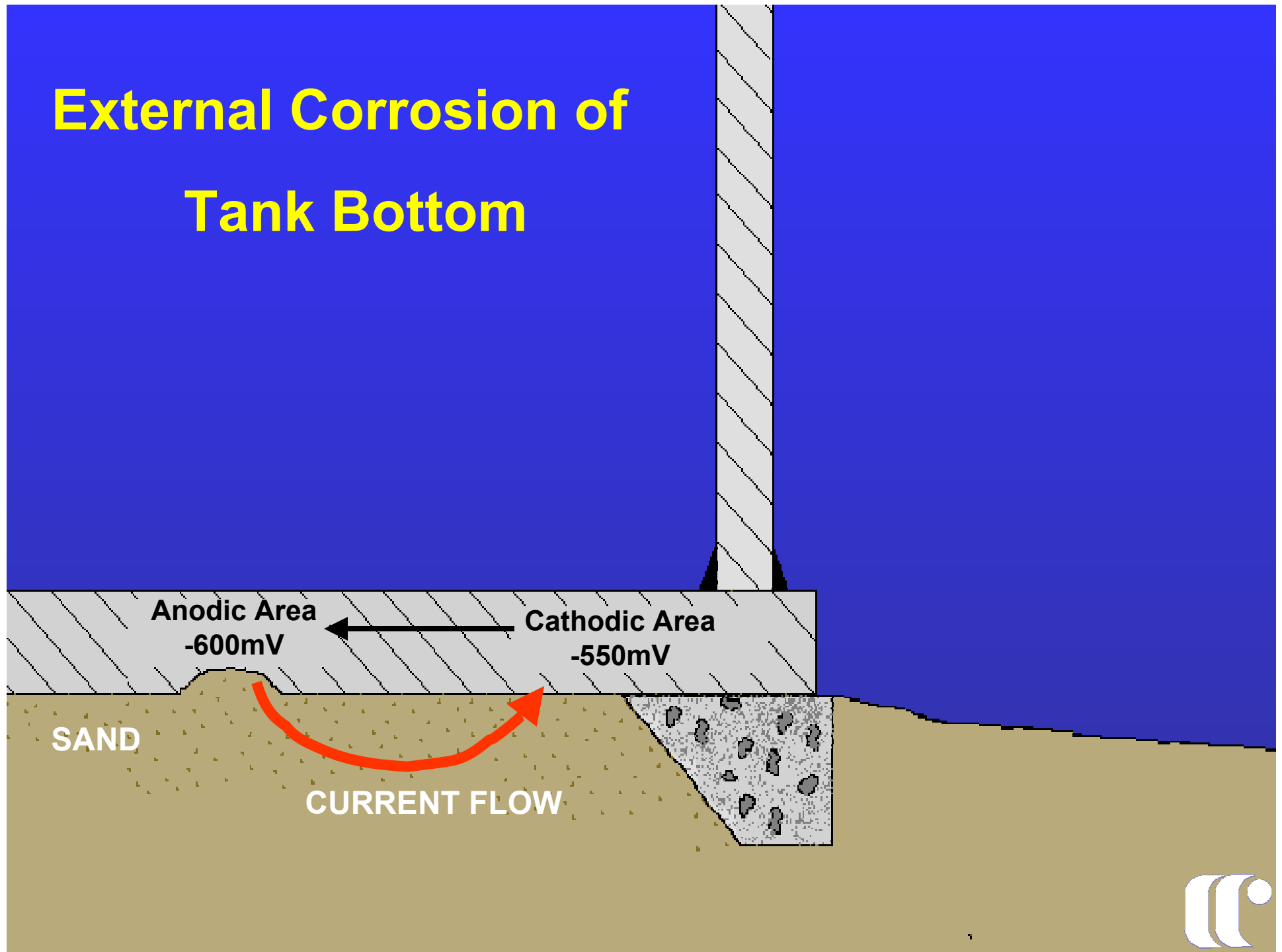


Corrosion of Metallic Structure



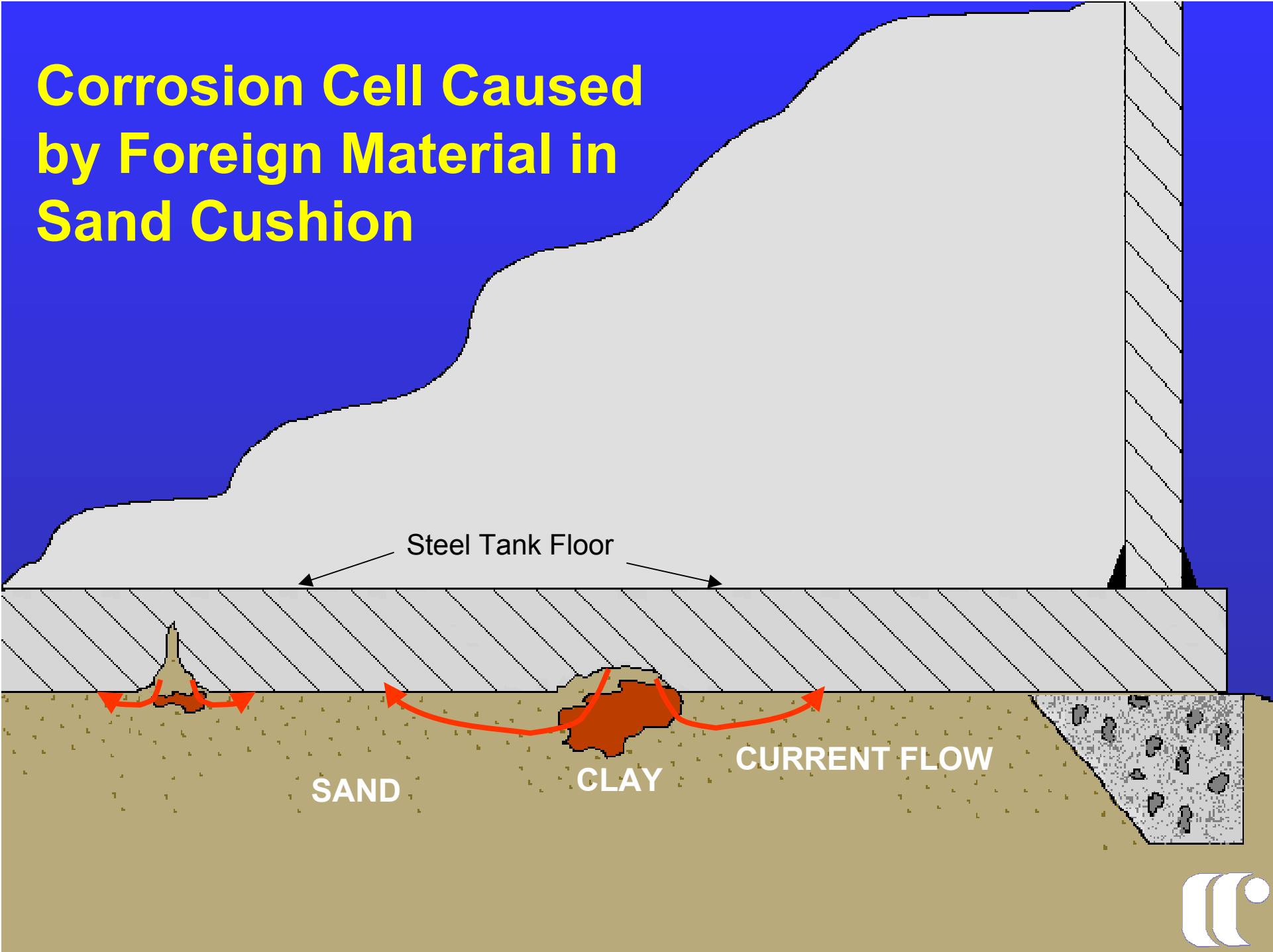


External Corrosion of Tank Bottom

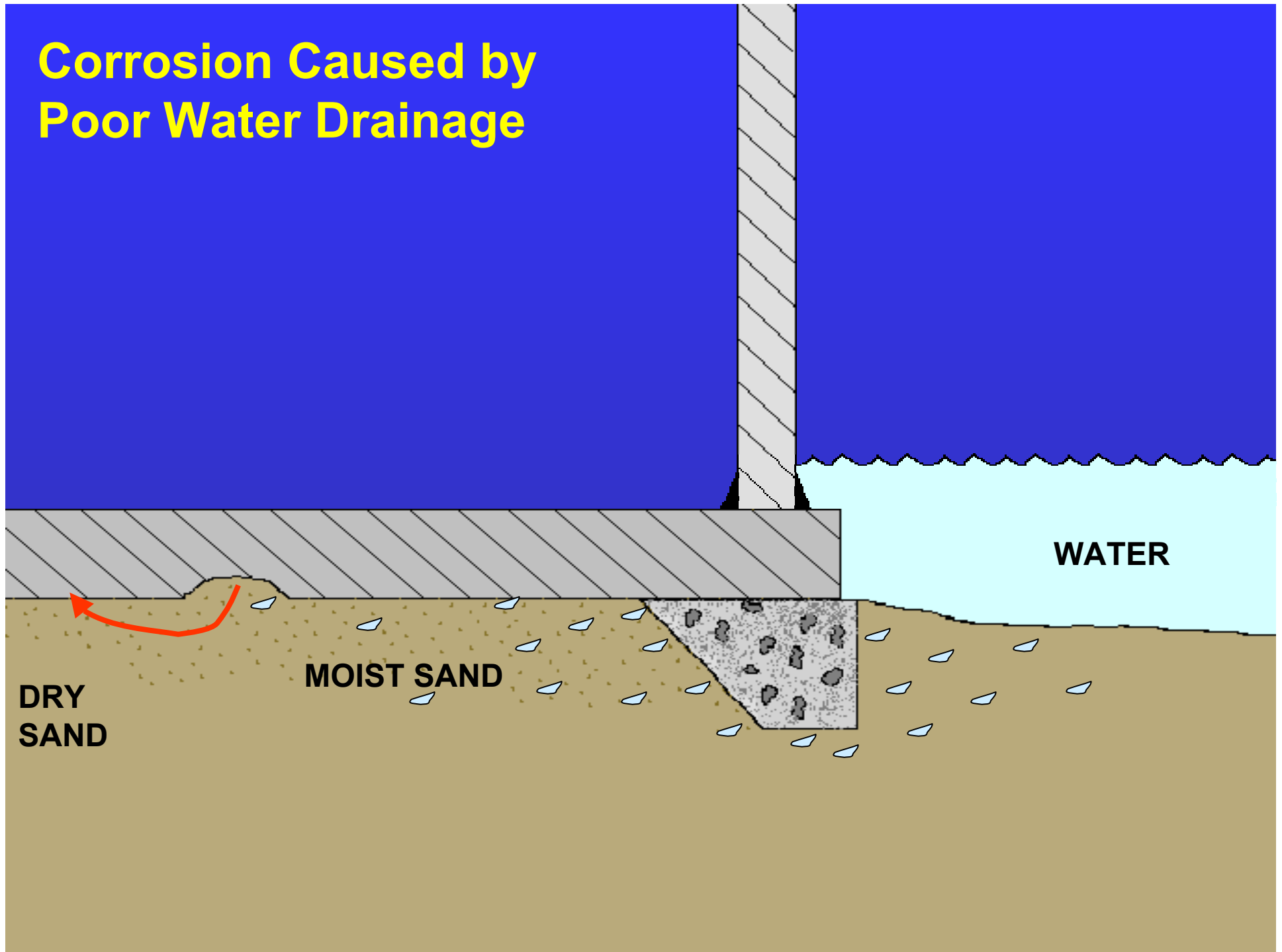




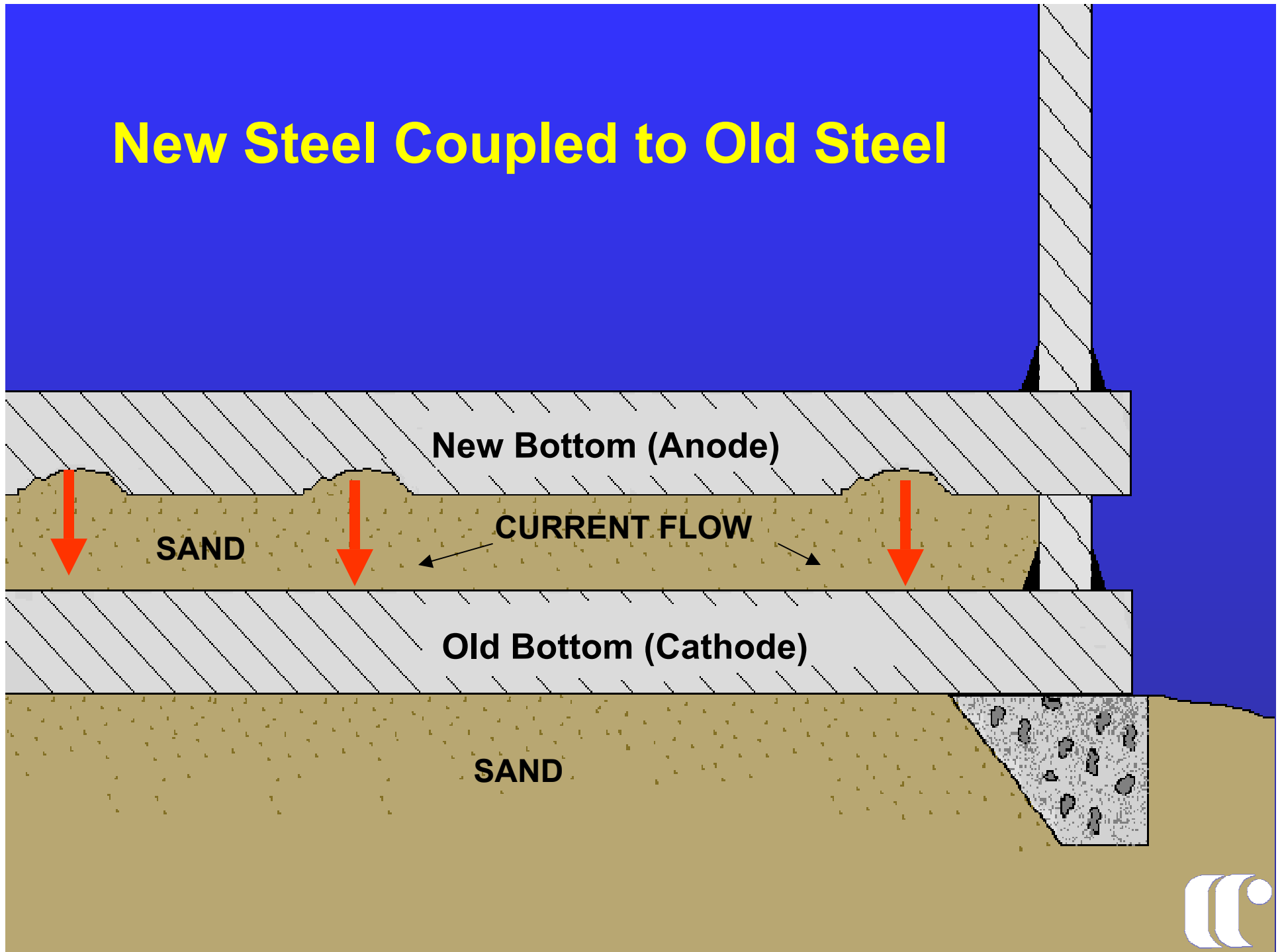
Corrosion Cell Caused by Foreign Material in Sand Cushion

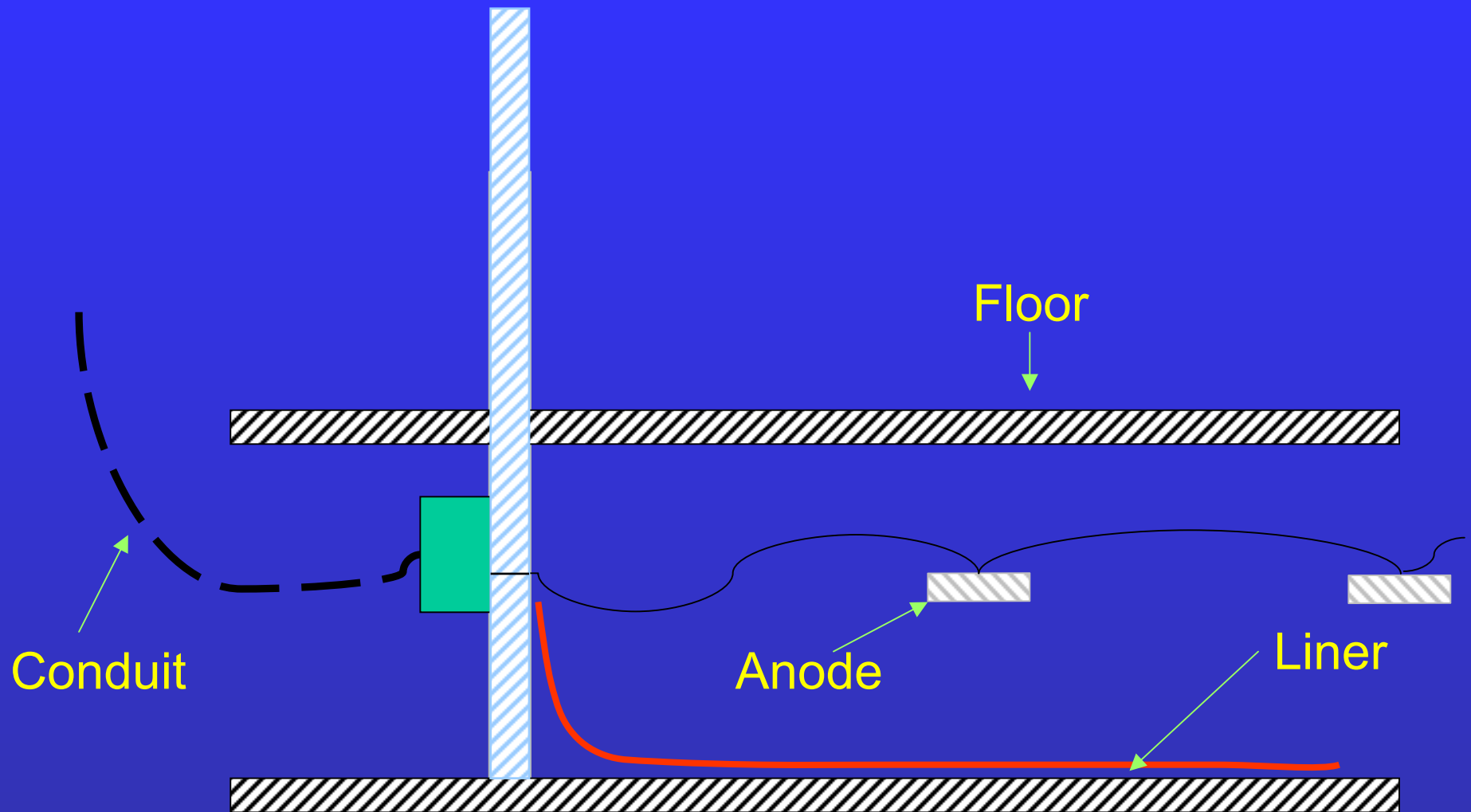


Corrosion Caused by Poor Water Drainage



New Steel Coupled to Old Steel

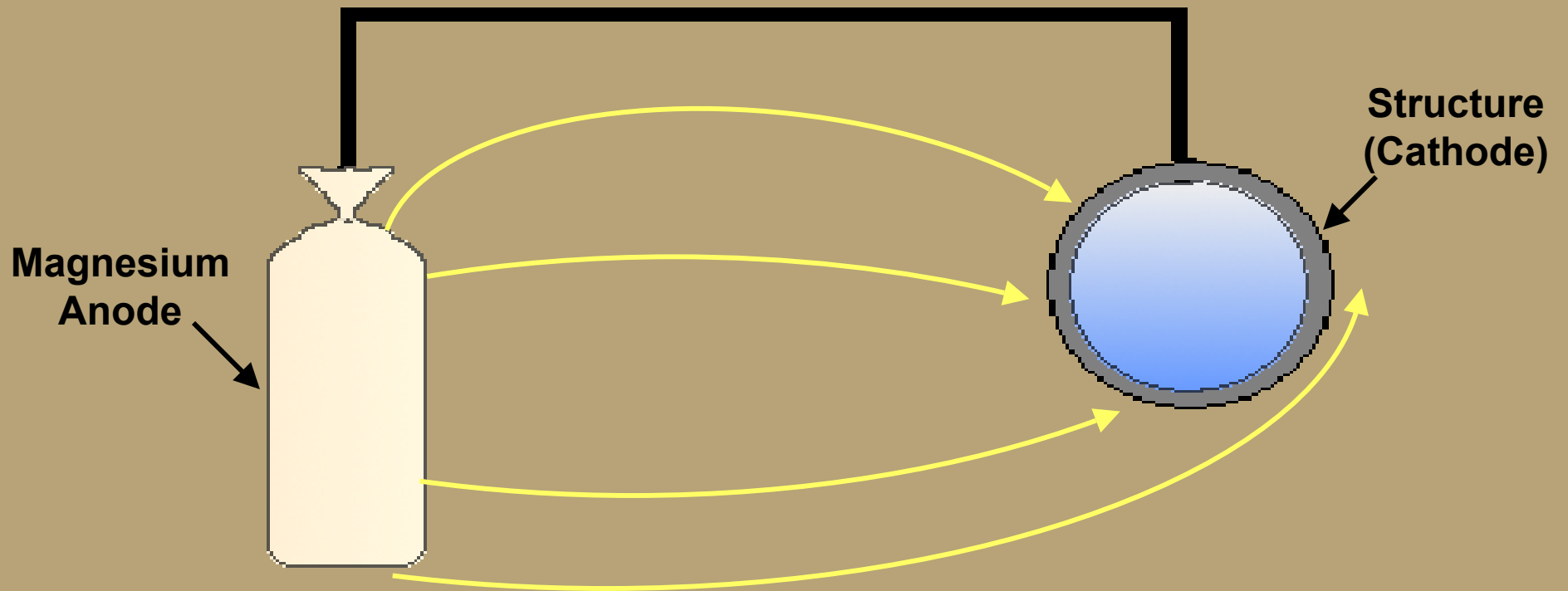


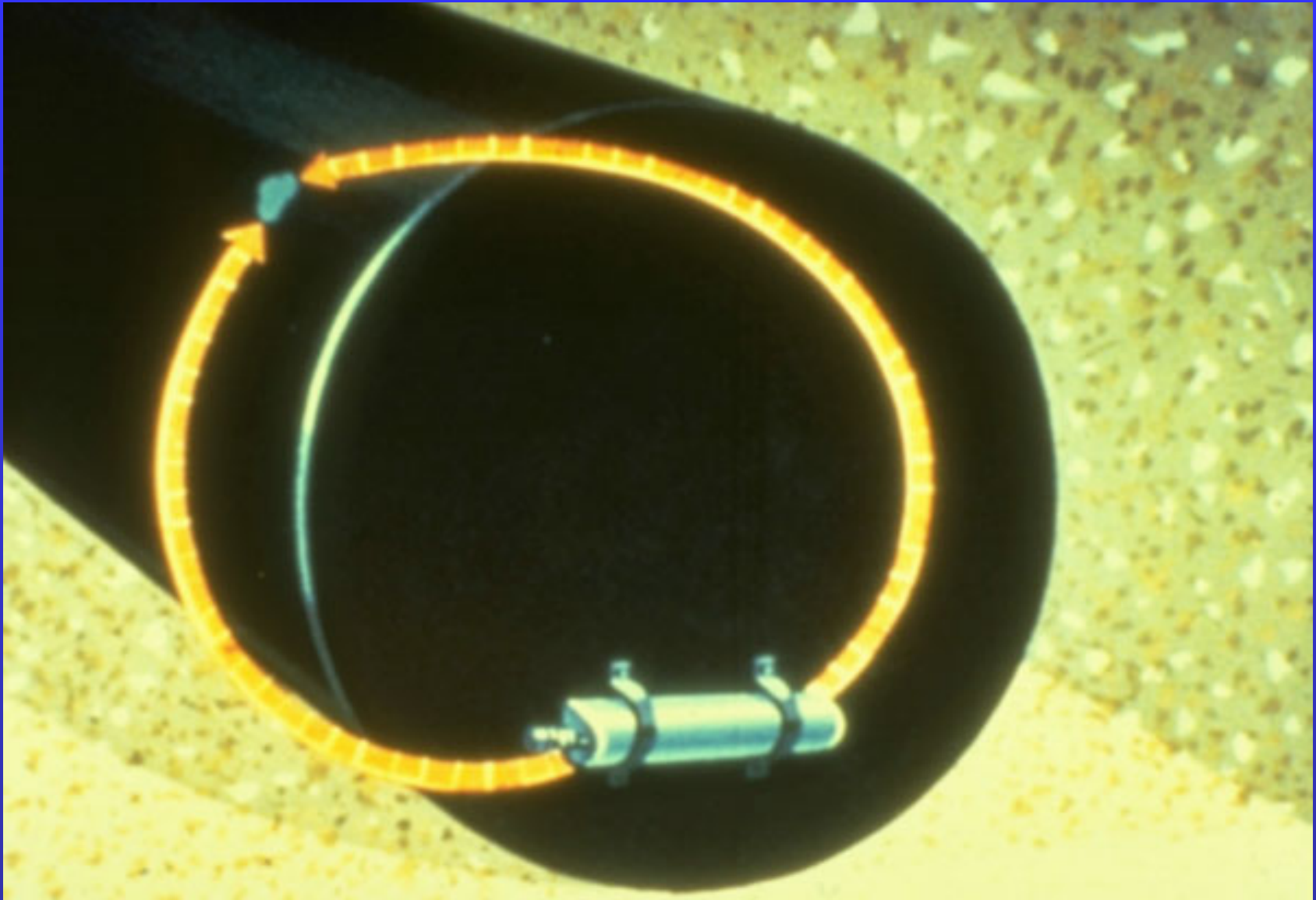


CP Installation on Double Bottom Tank



Galvanic Cathodic Protection





Recommended Practices

API-651 - Cathodic Protection of Aboveground Petroleum Storage Tanks:

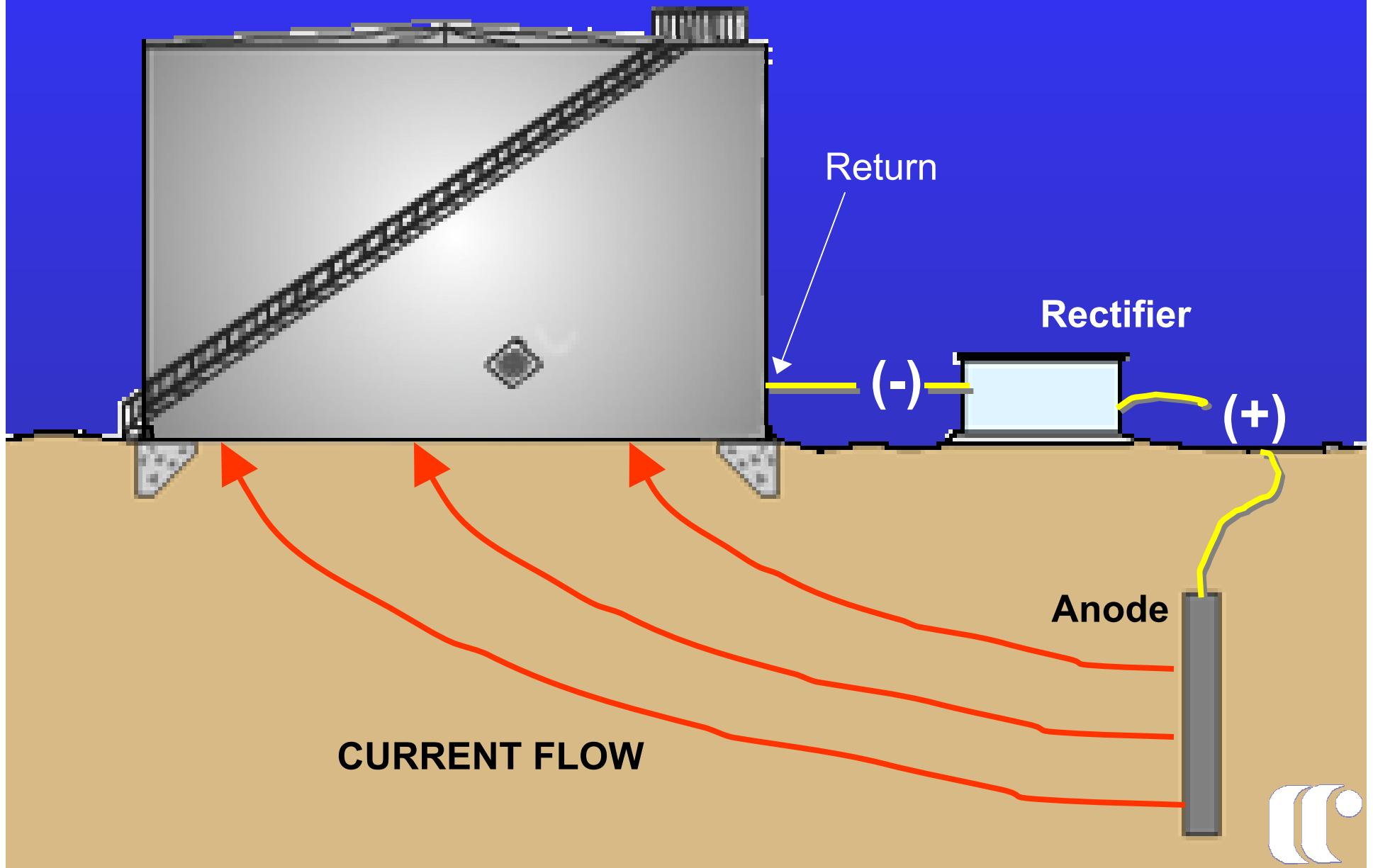
“Galvanic anodes method is not practical for protection of large bare structures.”

NACE RP0193-2001 - External Cathodic Protection of On-Grade Carbon Steel Storage Tank Bottoms:

“Galvanic protection systems can be applied to tank bottoms where the metallic surface area exposed to the electrolyte can be minimized through the application of a dielectric coating or the area is small due to the tank size or configuration.”

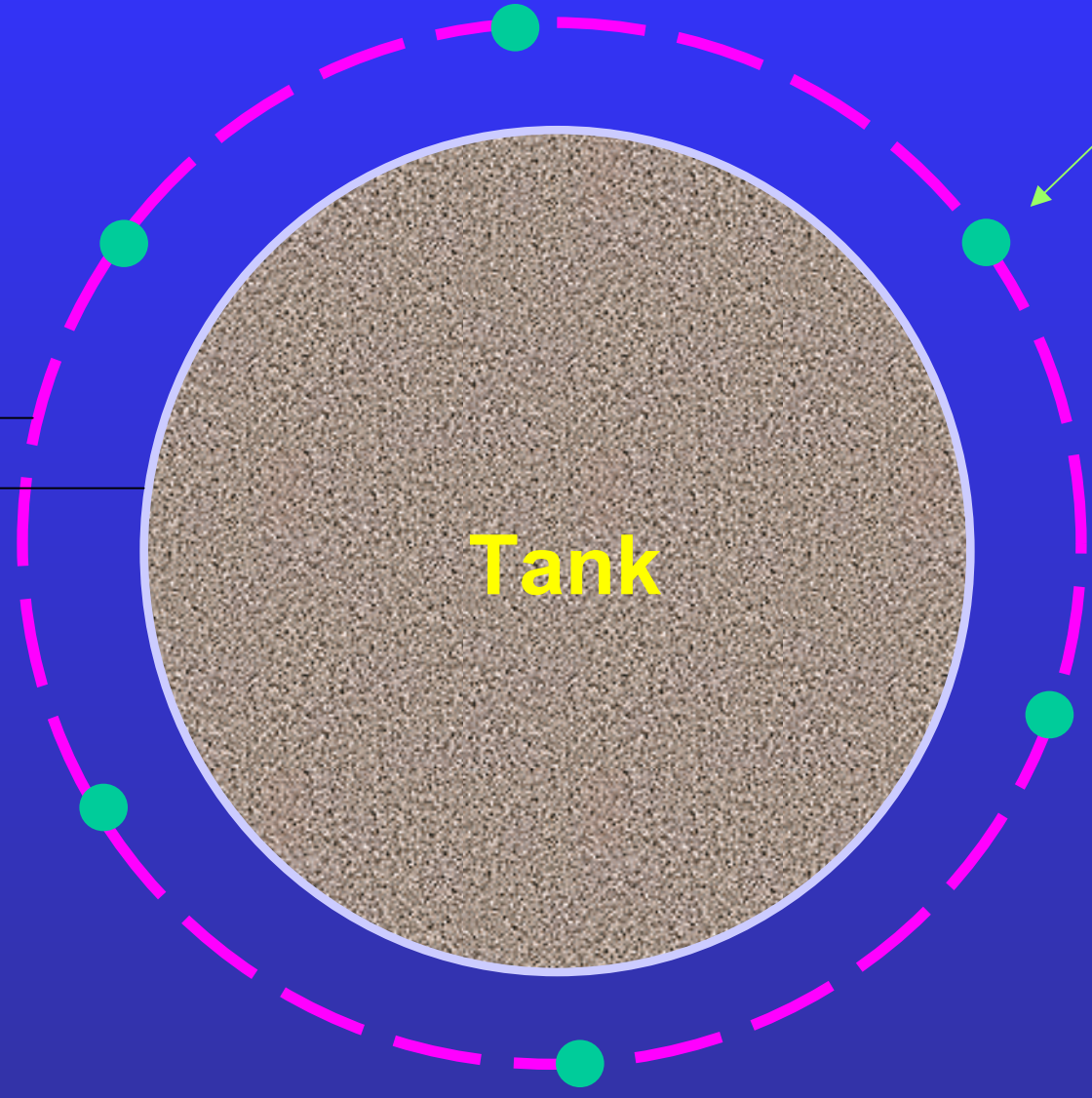
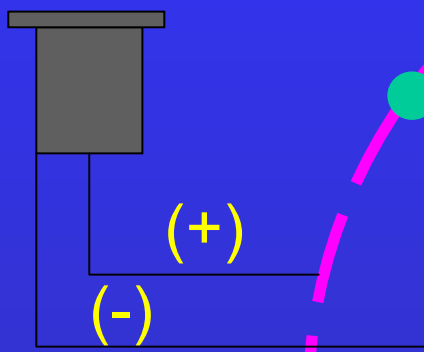


Impressed Current Cathodic Protection



Rectifier

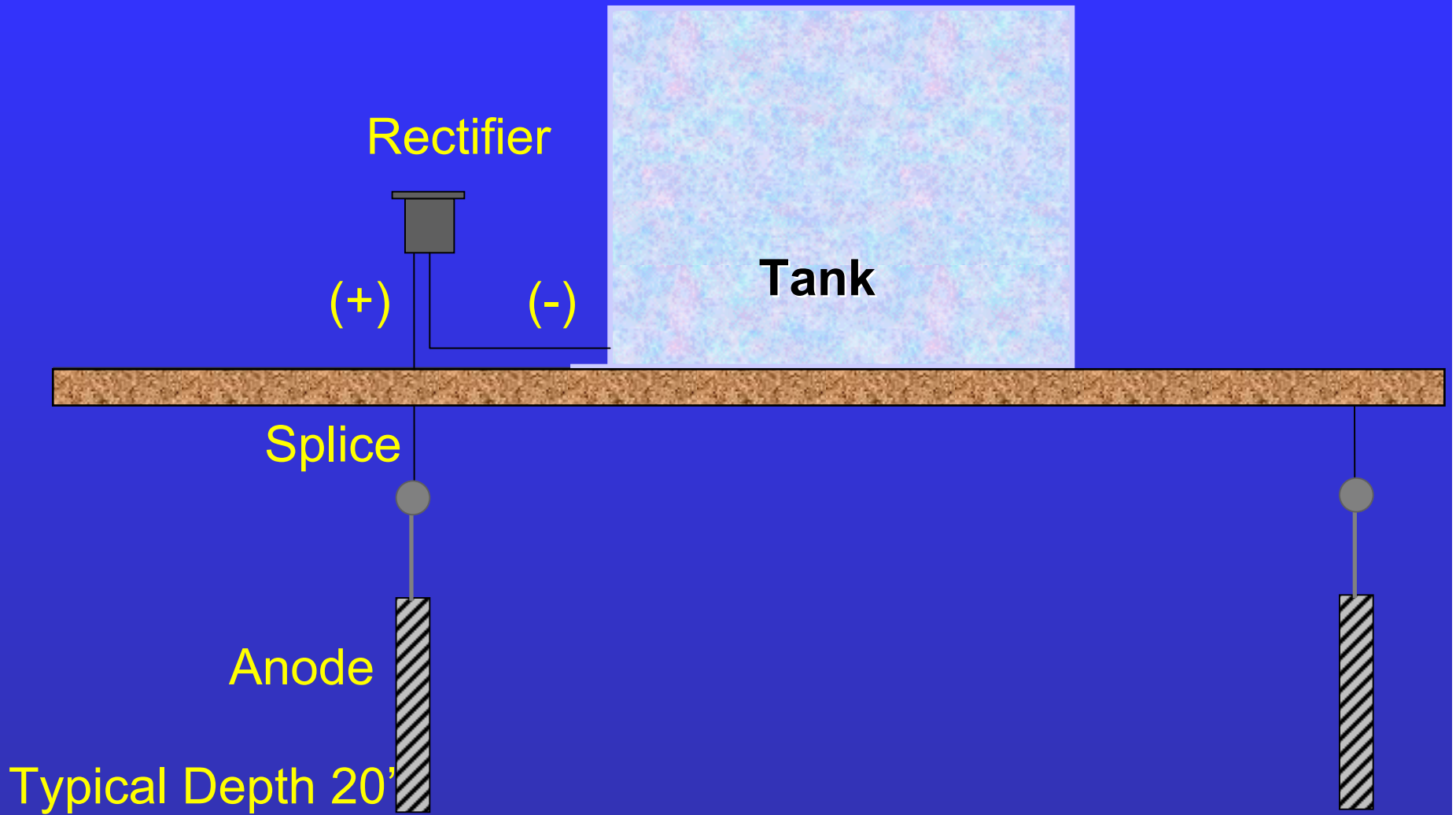
Anode



Tank

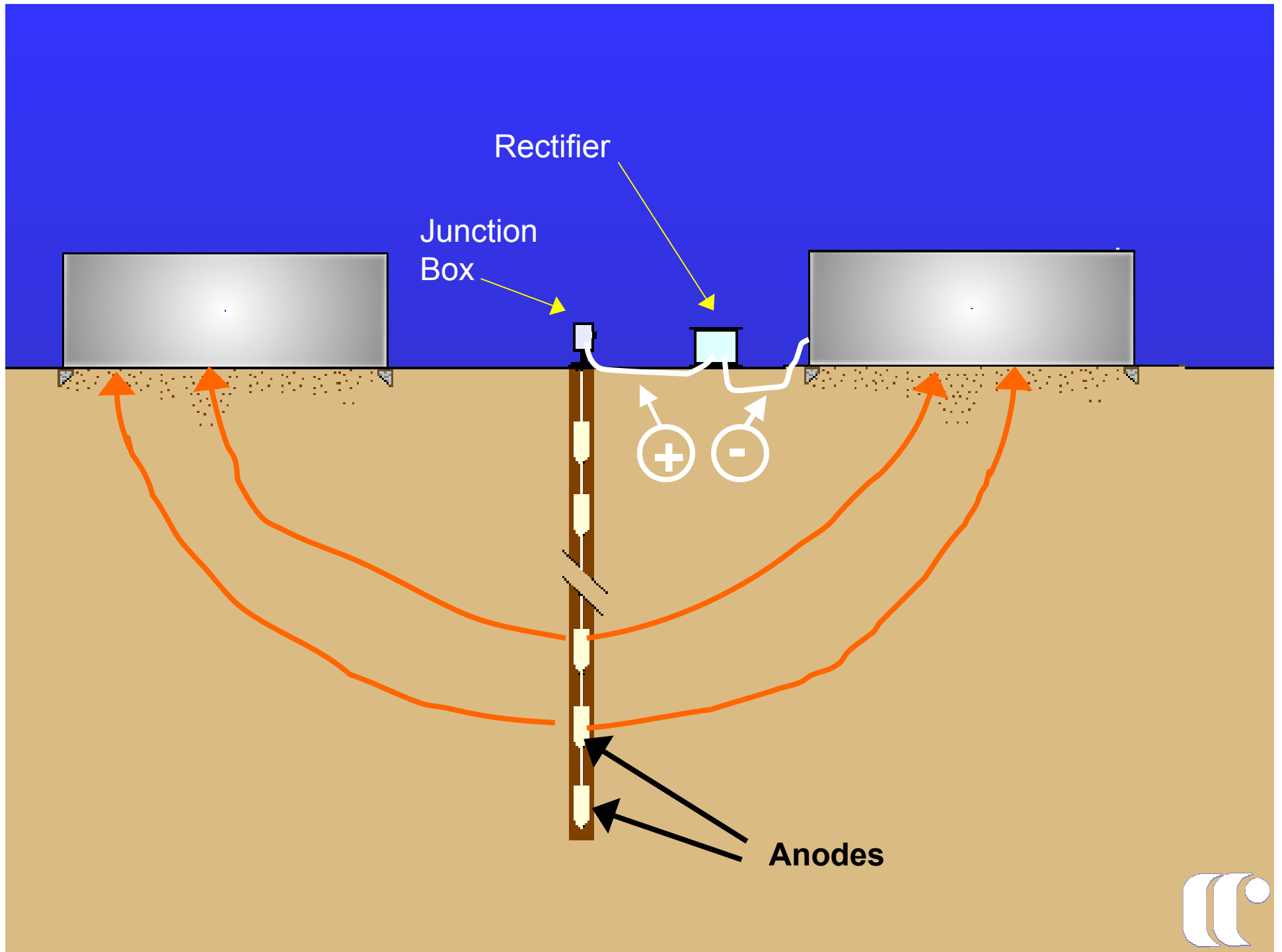
Shallow Anodes





Shallow Anodes



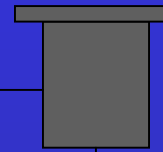




(+)

(-)

Rectifier



Deep Anode

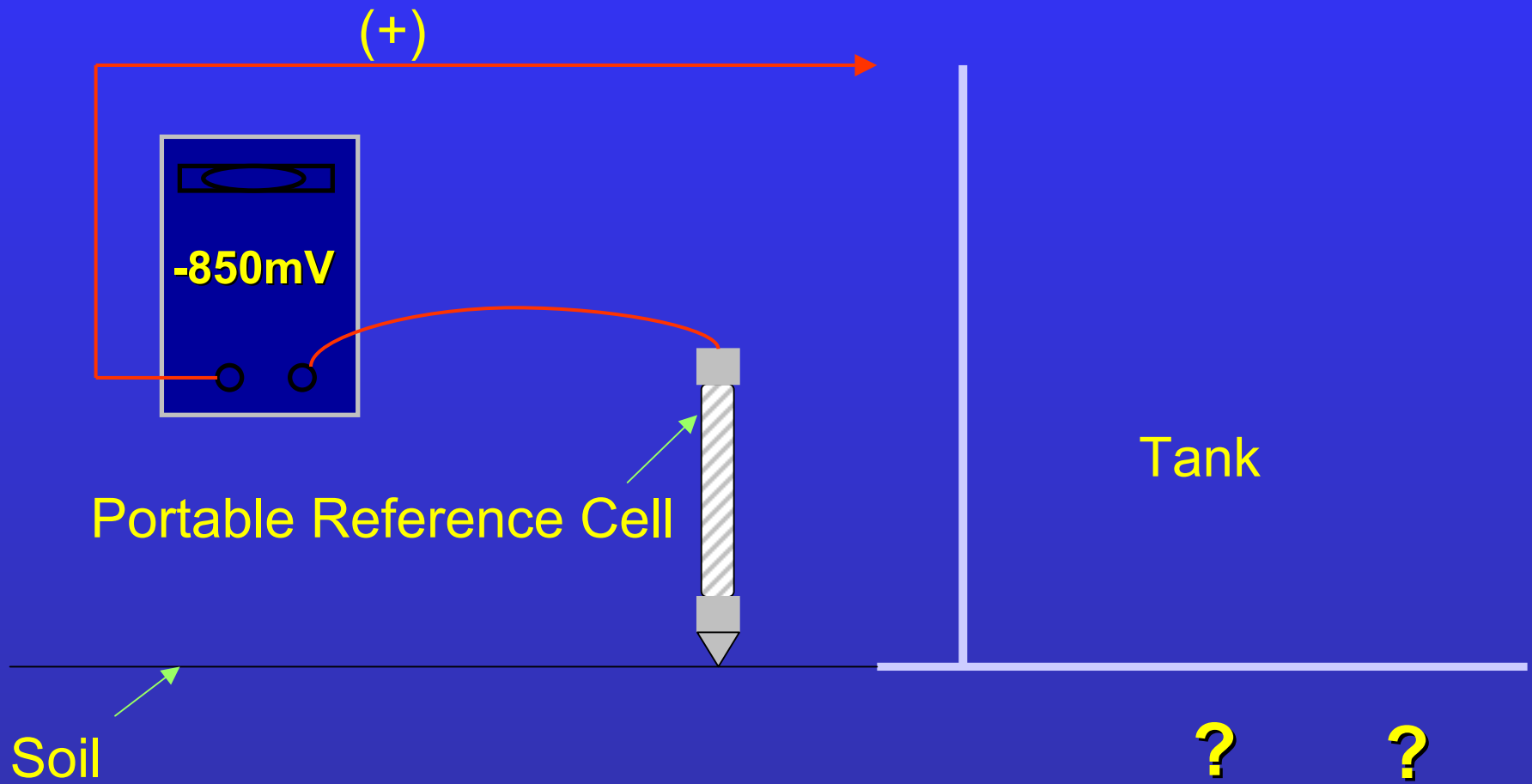


MFL Floor Inspection



Cathodic Protection Monitoring





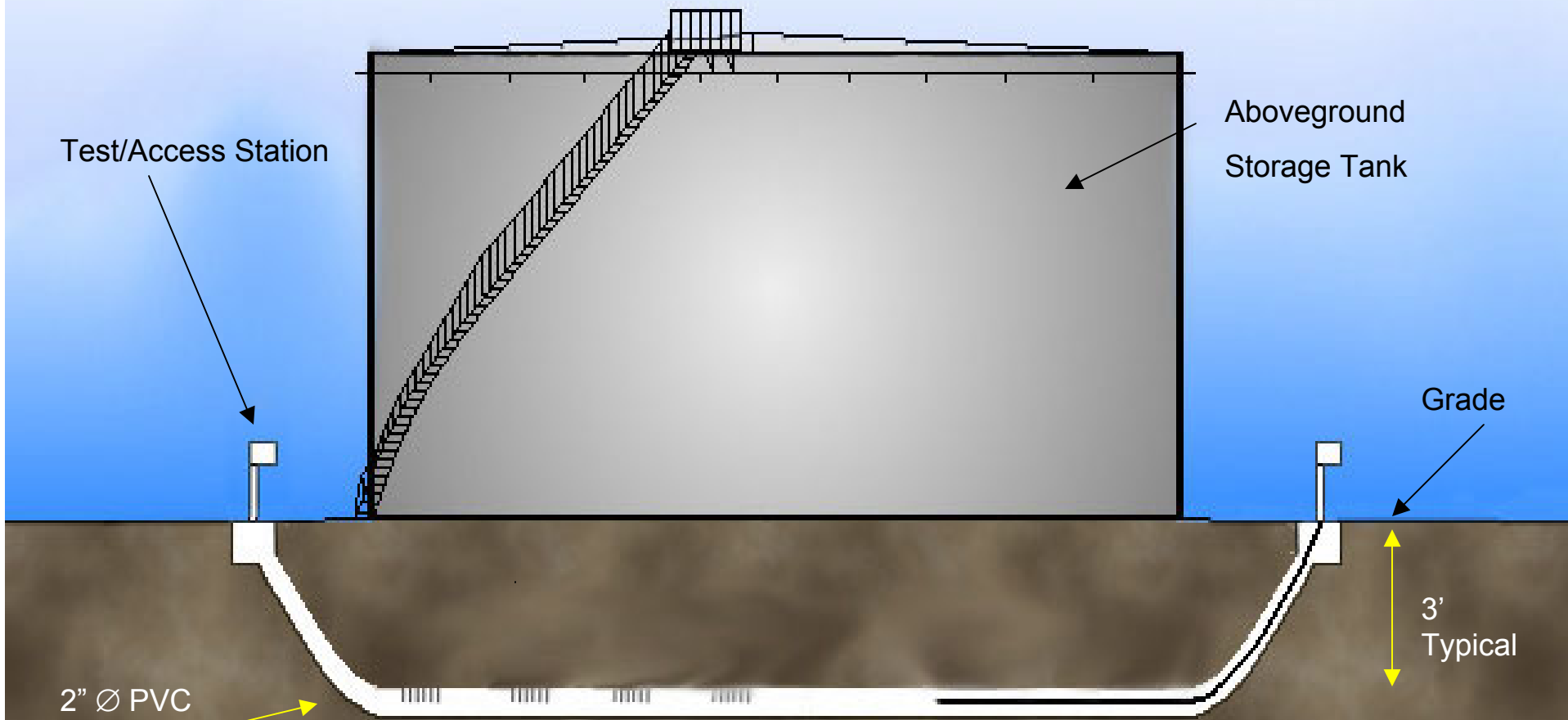
Rim Potential Measurements





Directional Boring Under Existing AST





Test/Access Station

Aboveground Storage Tank

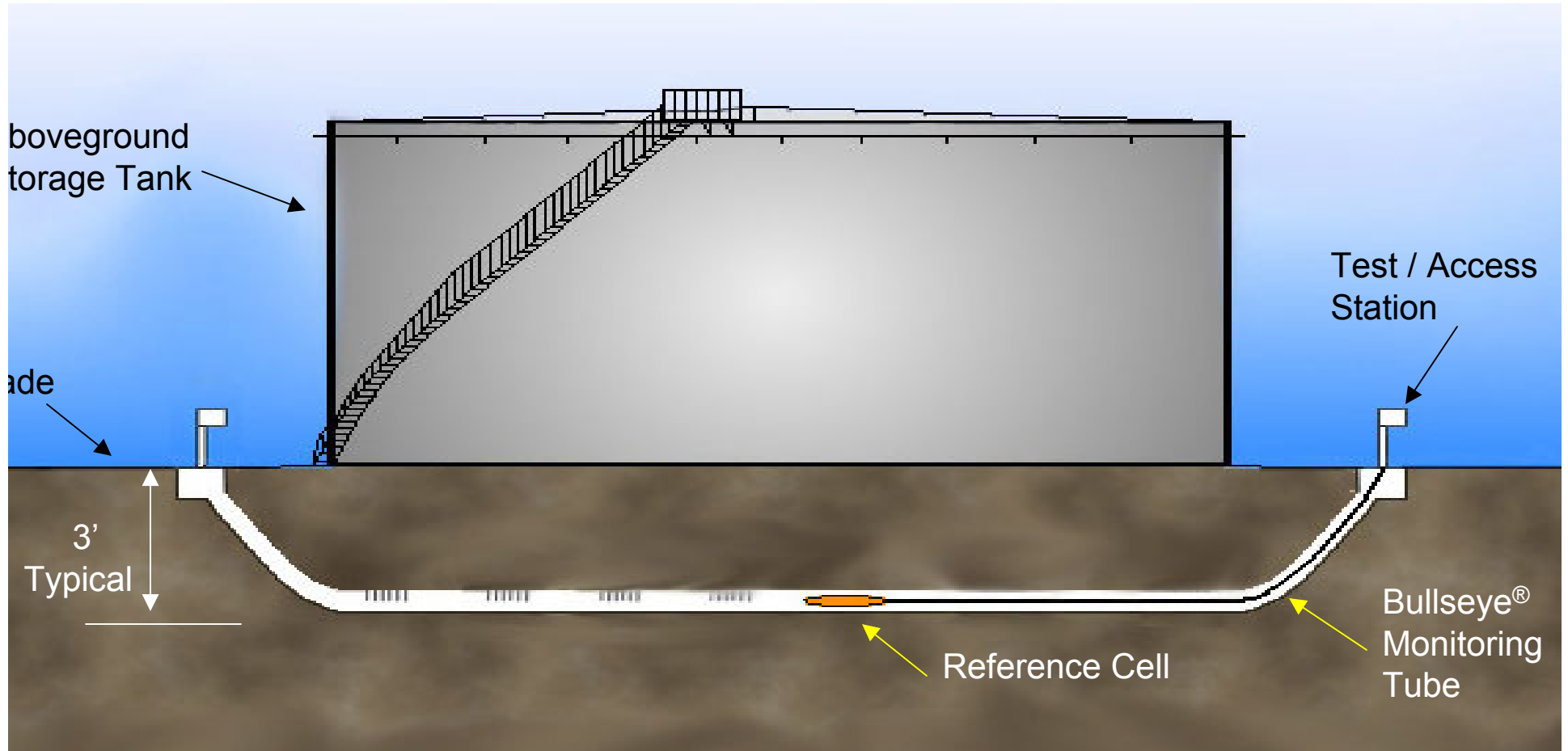
Grade

3' Typical

2" Ø PVC Monitoring Tube

REFERENCE CELL MONITORING TUBE

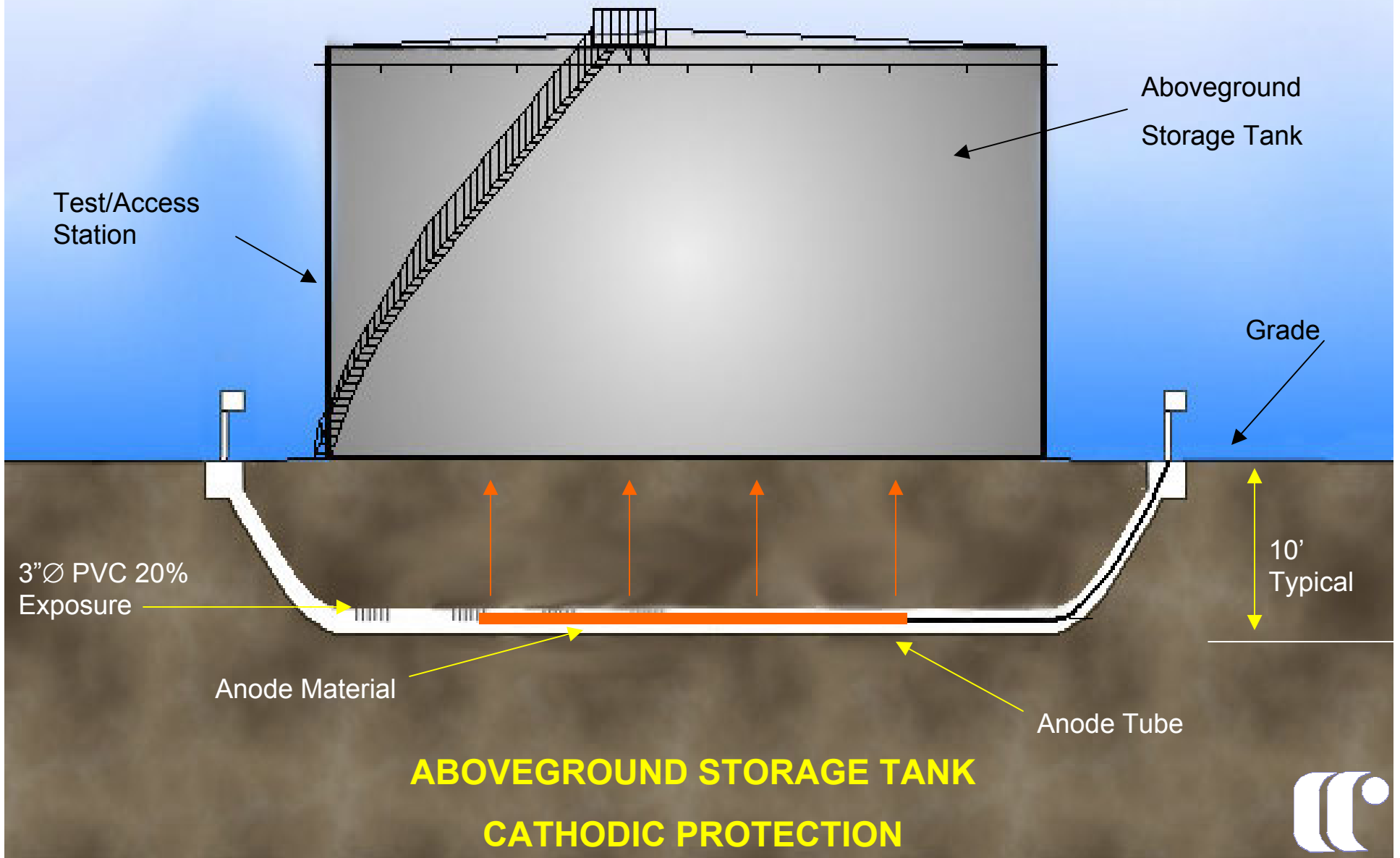




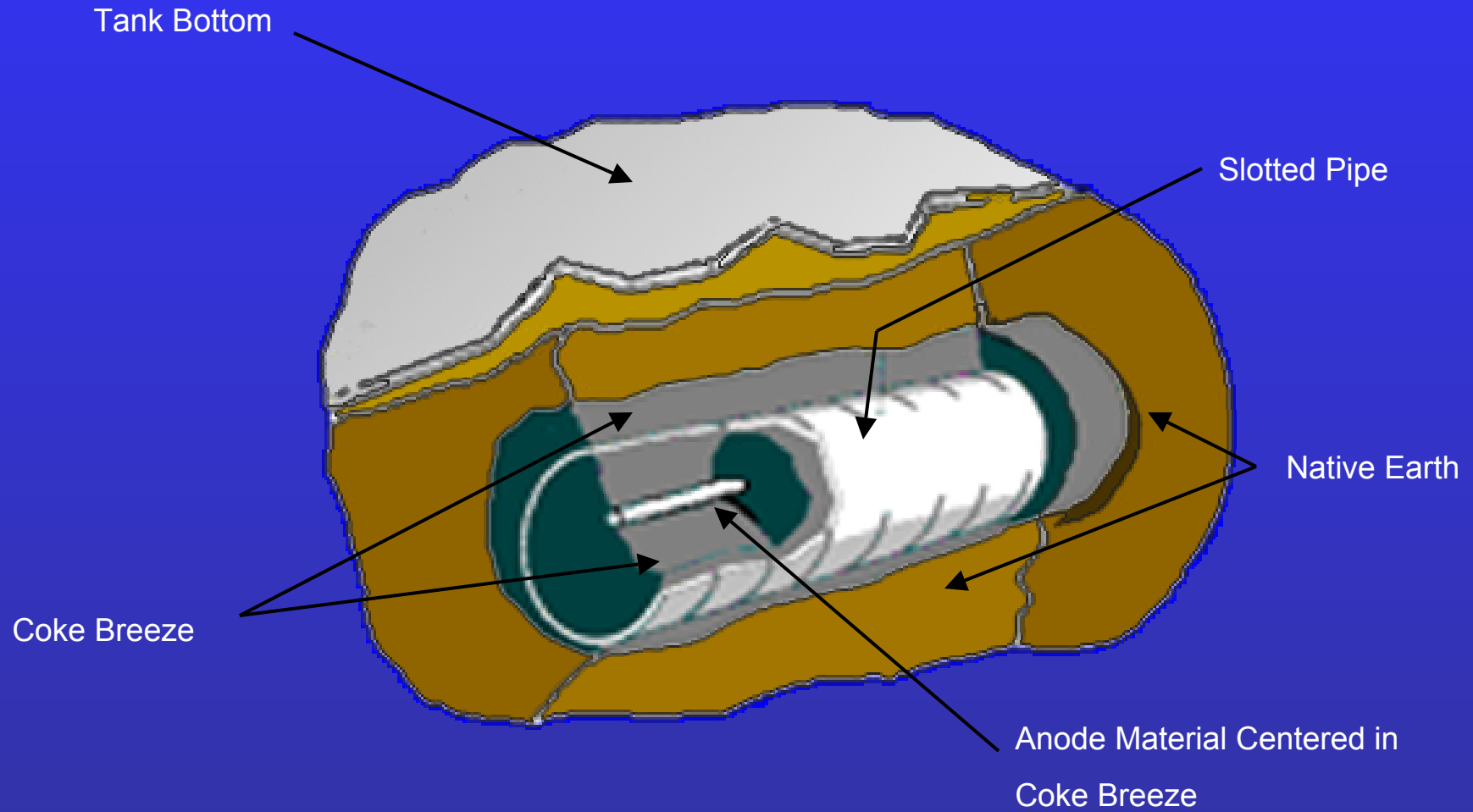
	Rim	25'	Center	55'	Rim
On	-1411	-698	-404	-601	-1455
Off	-902	-664	-402	-578	-911

Potentials (mV)

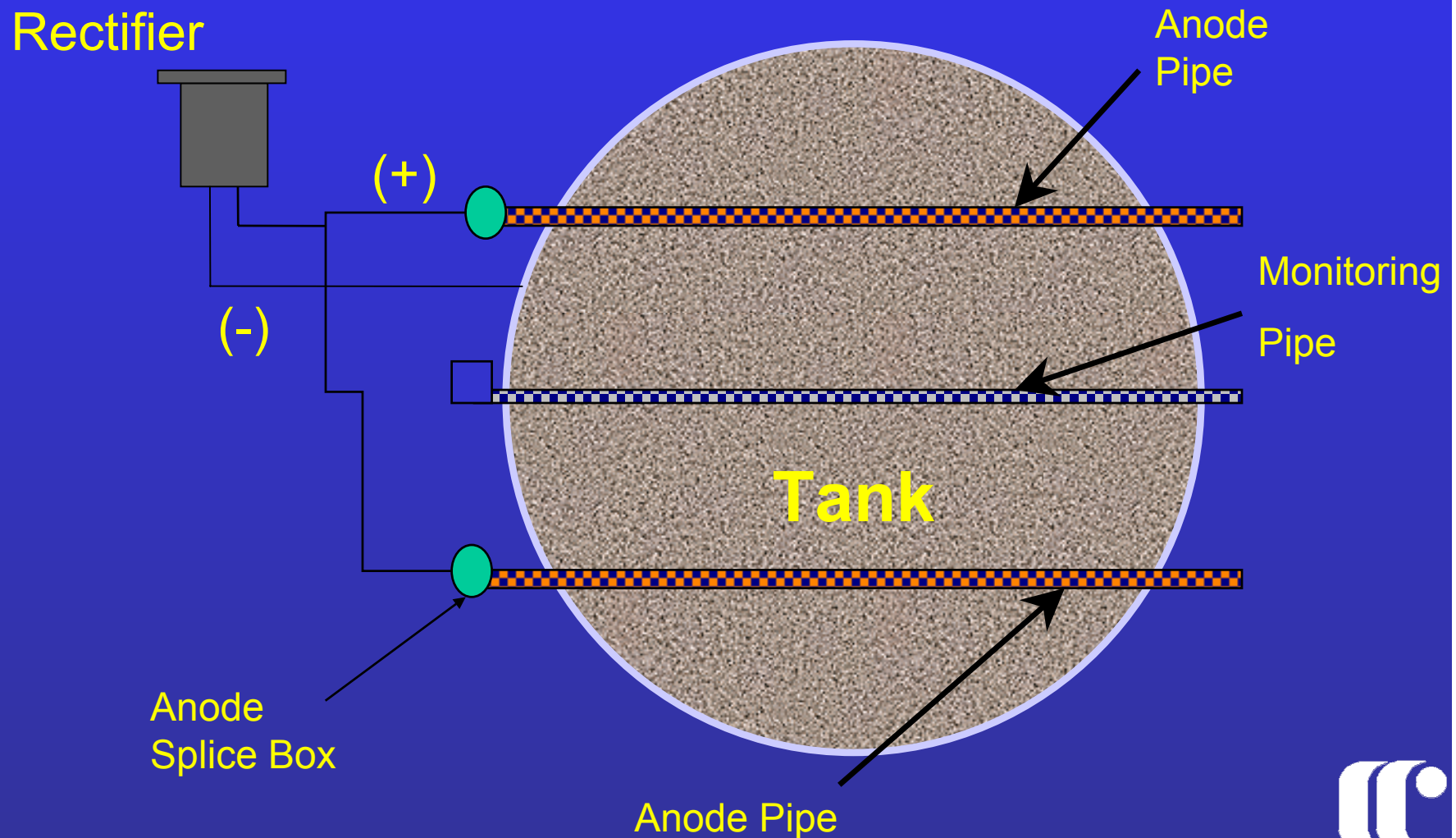




TYPICAL ANODE INSTALLATION



Computer Guided Horizontally Bored Anode System



Leak Detection Monitoring Station



CP Applications for Re-bottomed or New Tanks





New Floor Installation on Existing AST



CP Installation on Rebottomed Tank

**Above Ground
Storage Tank Bottoms
with or without
Secondary Containment**



Secondary Containment

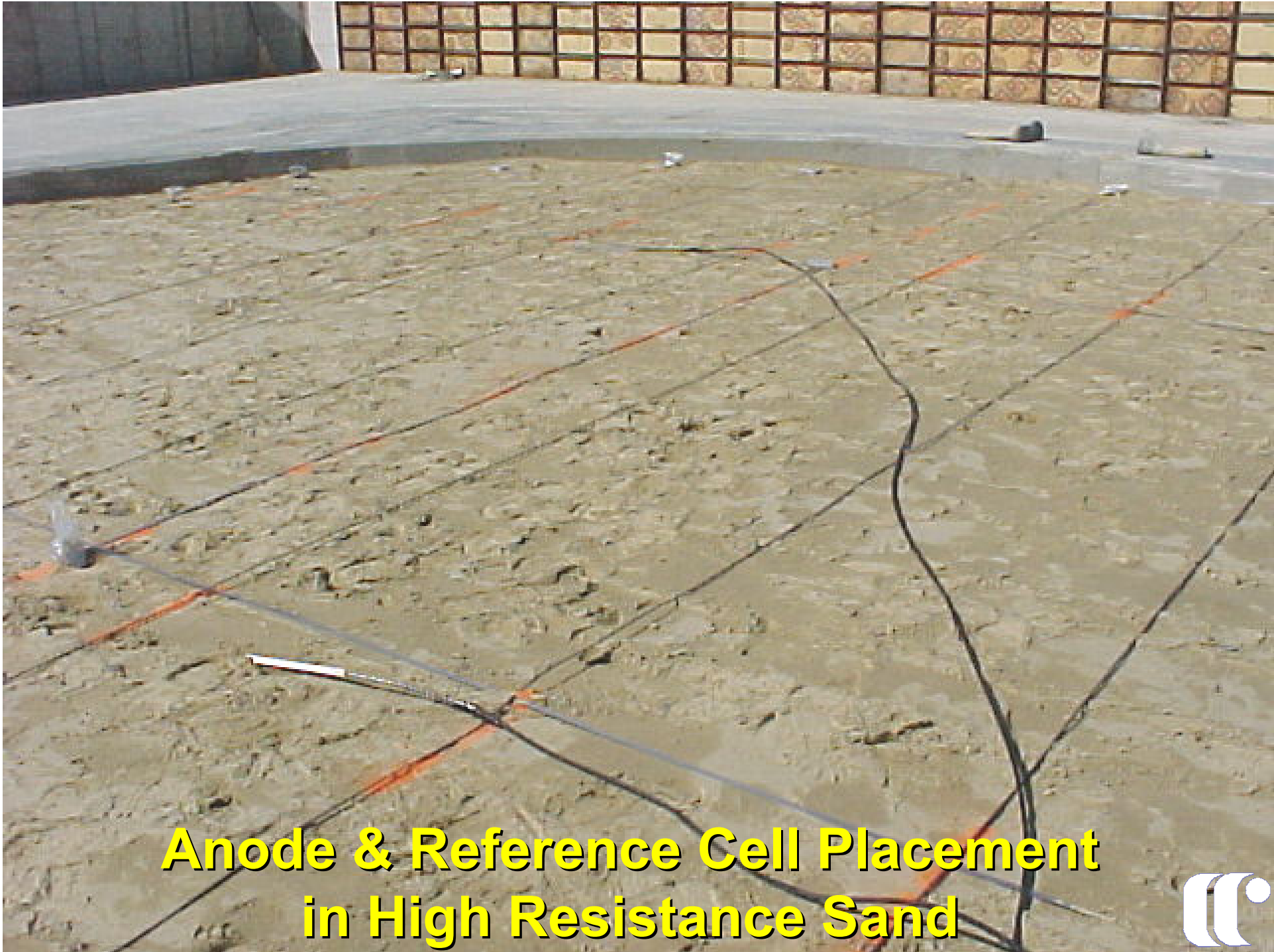
- ▶ **Environmental Protection**
- ▶ **Minimize Liability**
- ▶ **State and Local Regulations**





New Tank Construction with Liner





**Anode & Reference Cell Placement
in High Resistance Sand**





Ringwall Conduit for CP Wiring

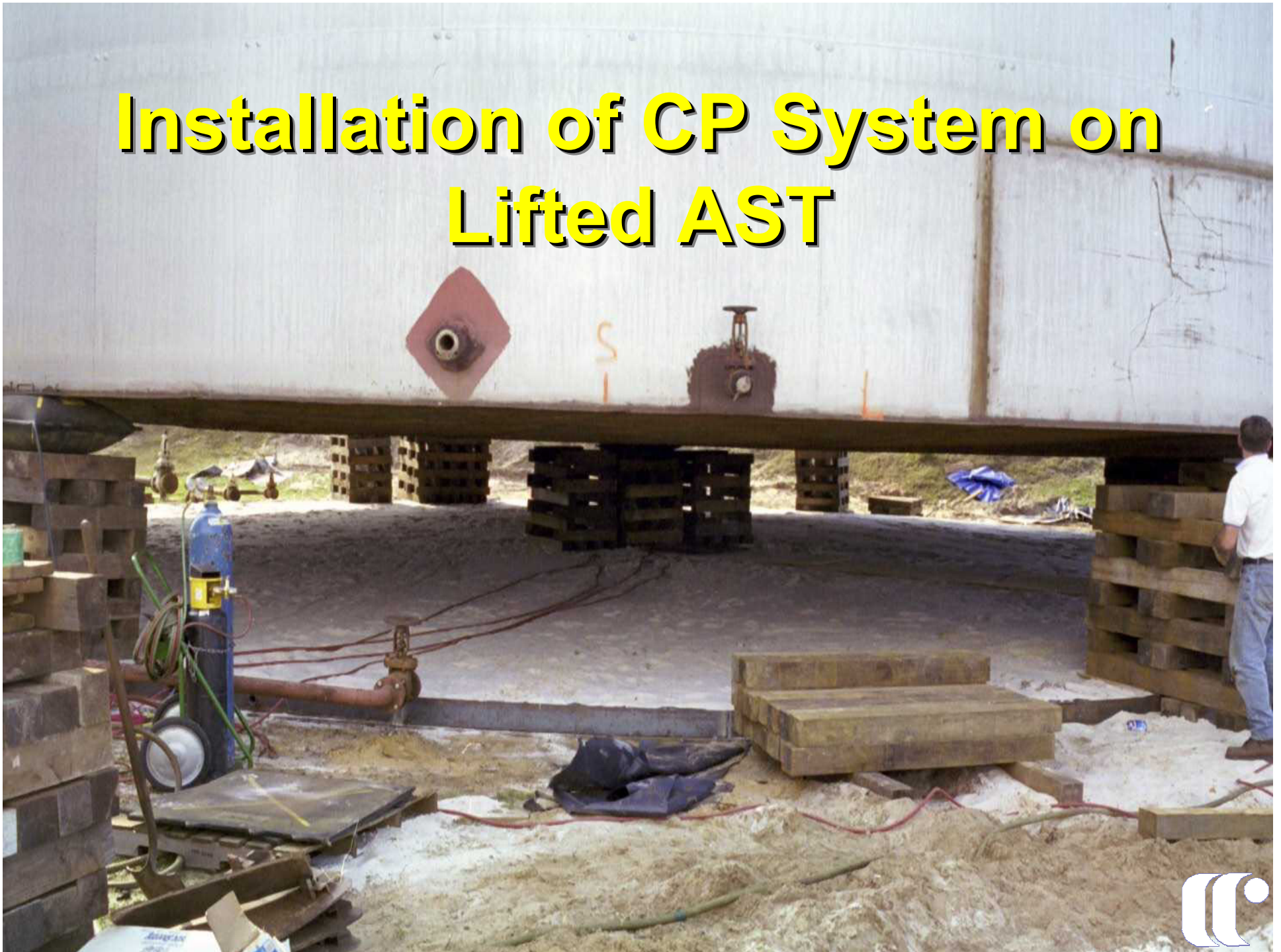




Floor Plate Installation



Installation of CP System on Lifted AST

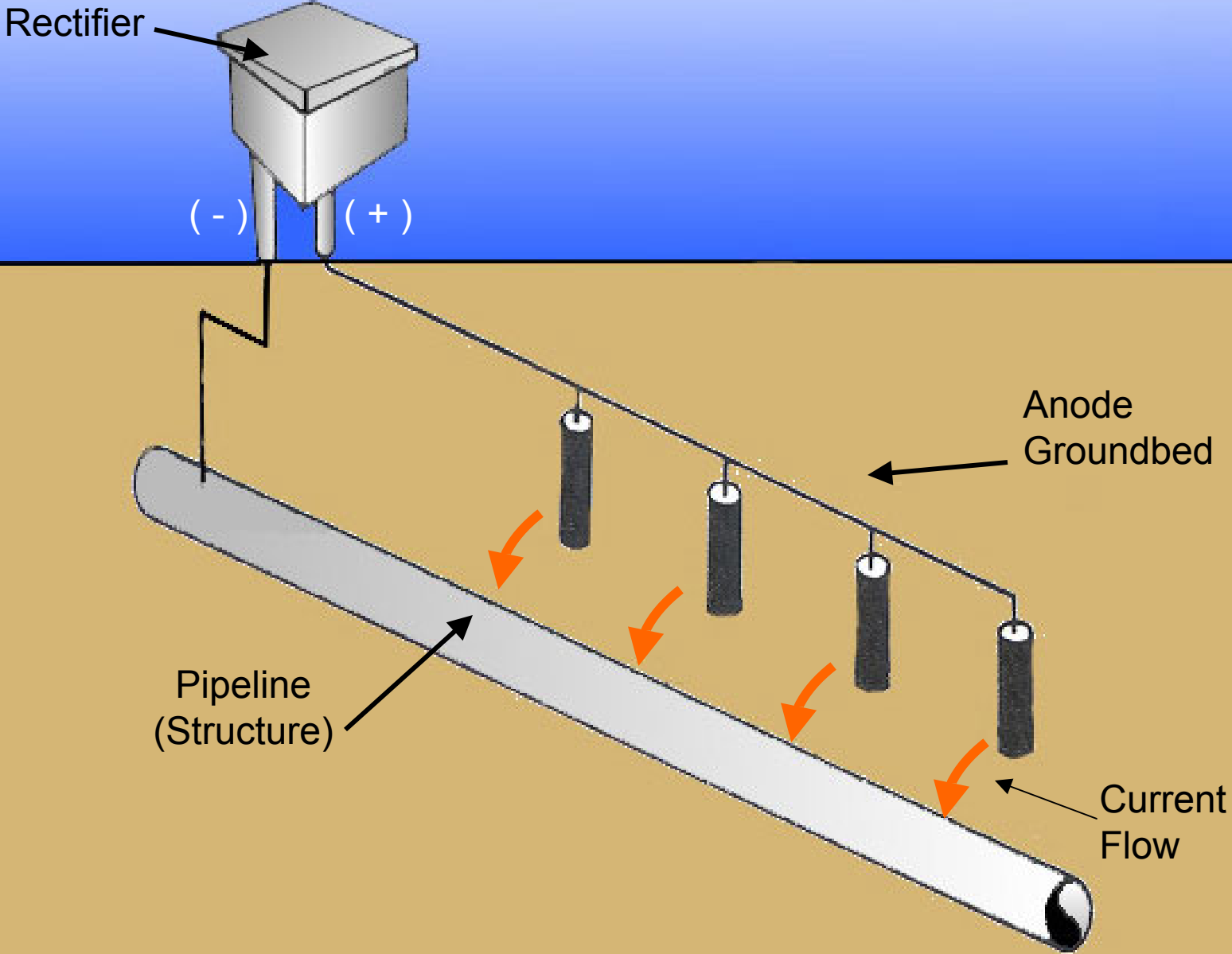




System Energization



Impressed Current System





Inspection of CP System



Remote Monitoring of CP



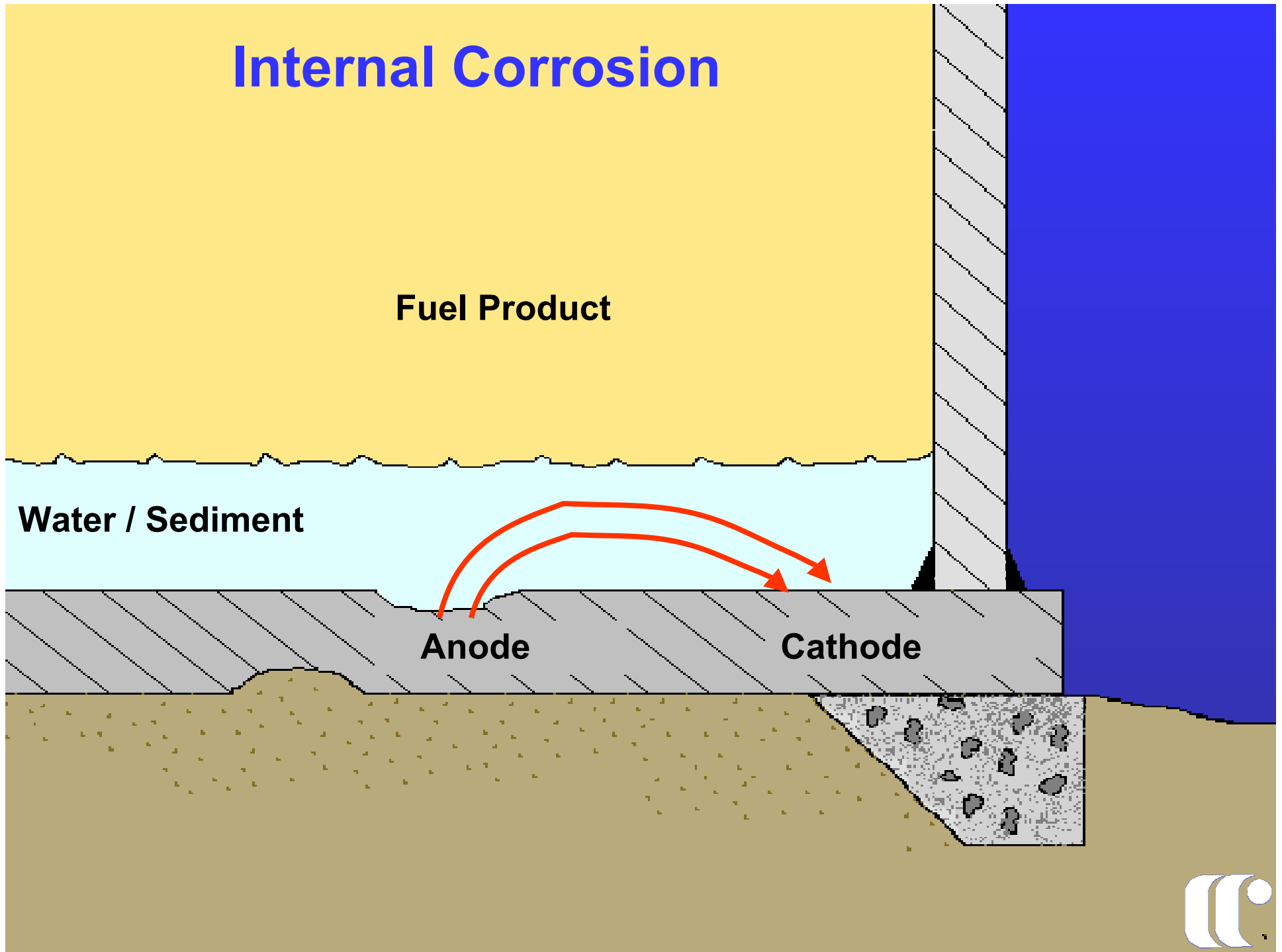
Internal Corrosion

Fuel Product

Water / Sediment

Anode

Cathode

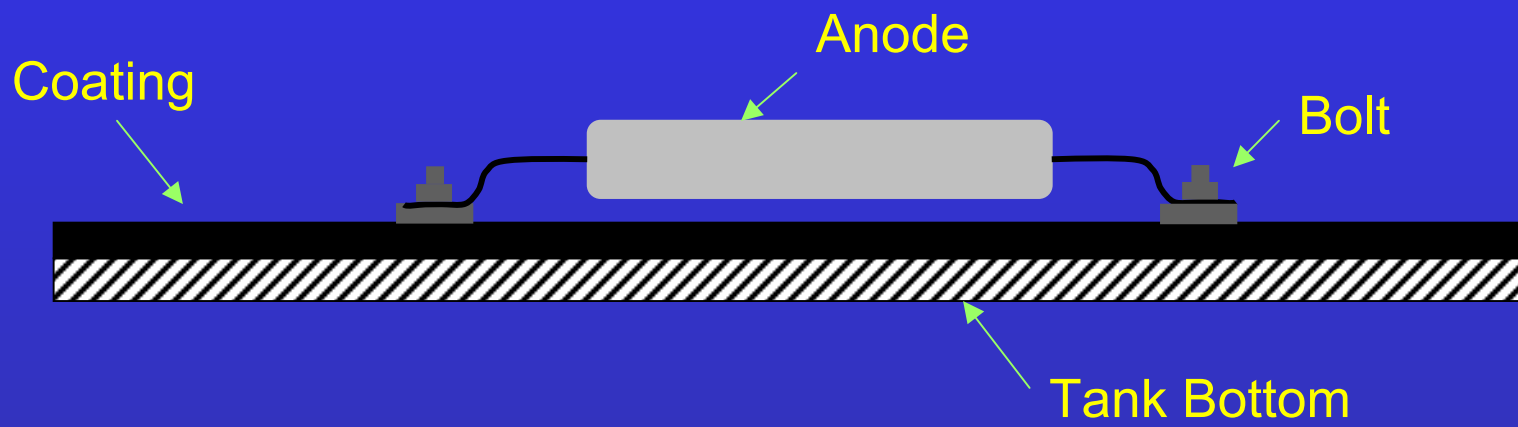




Internal Corrosion









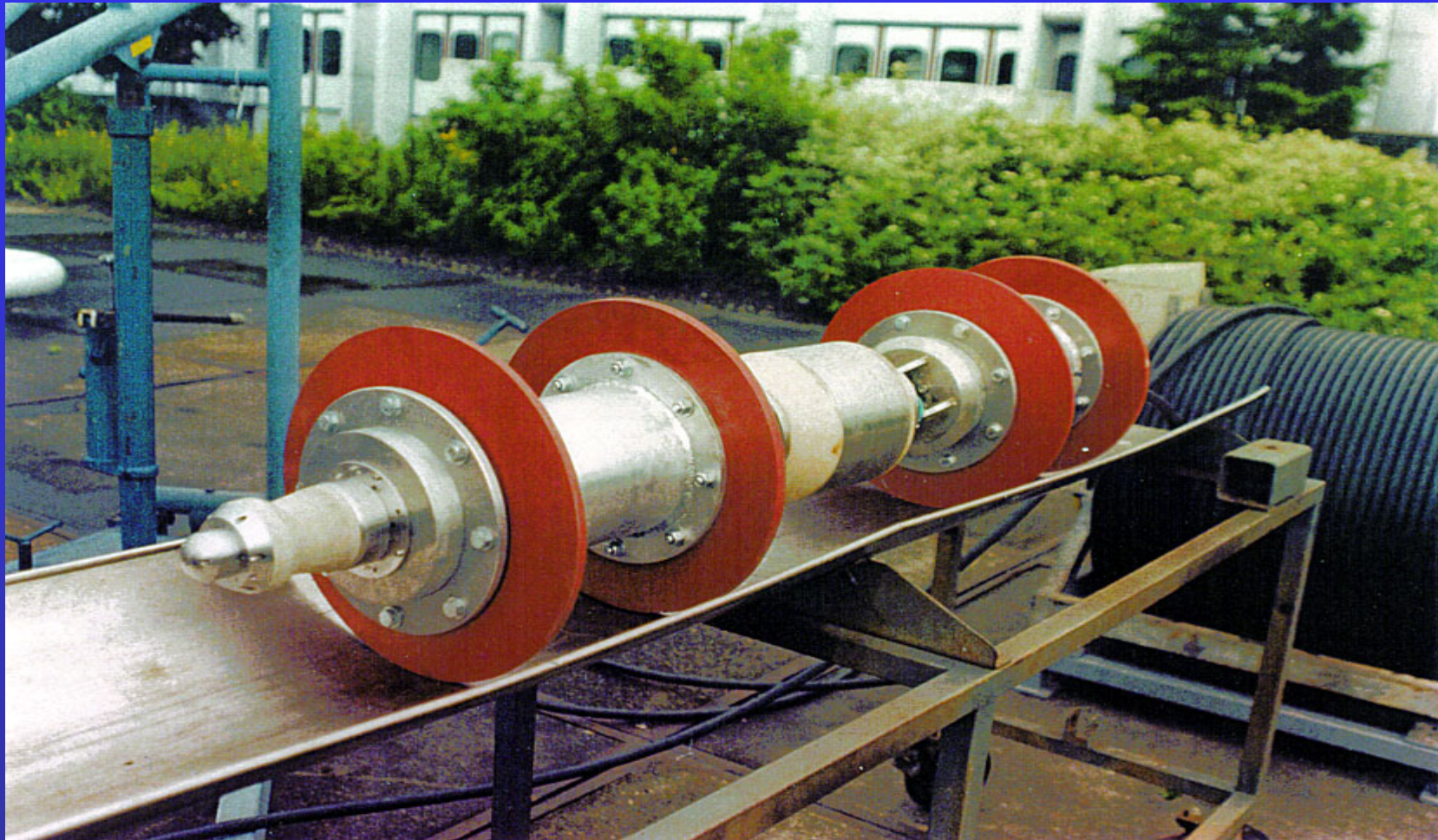
Recommended Practices

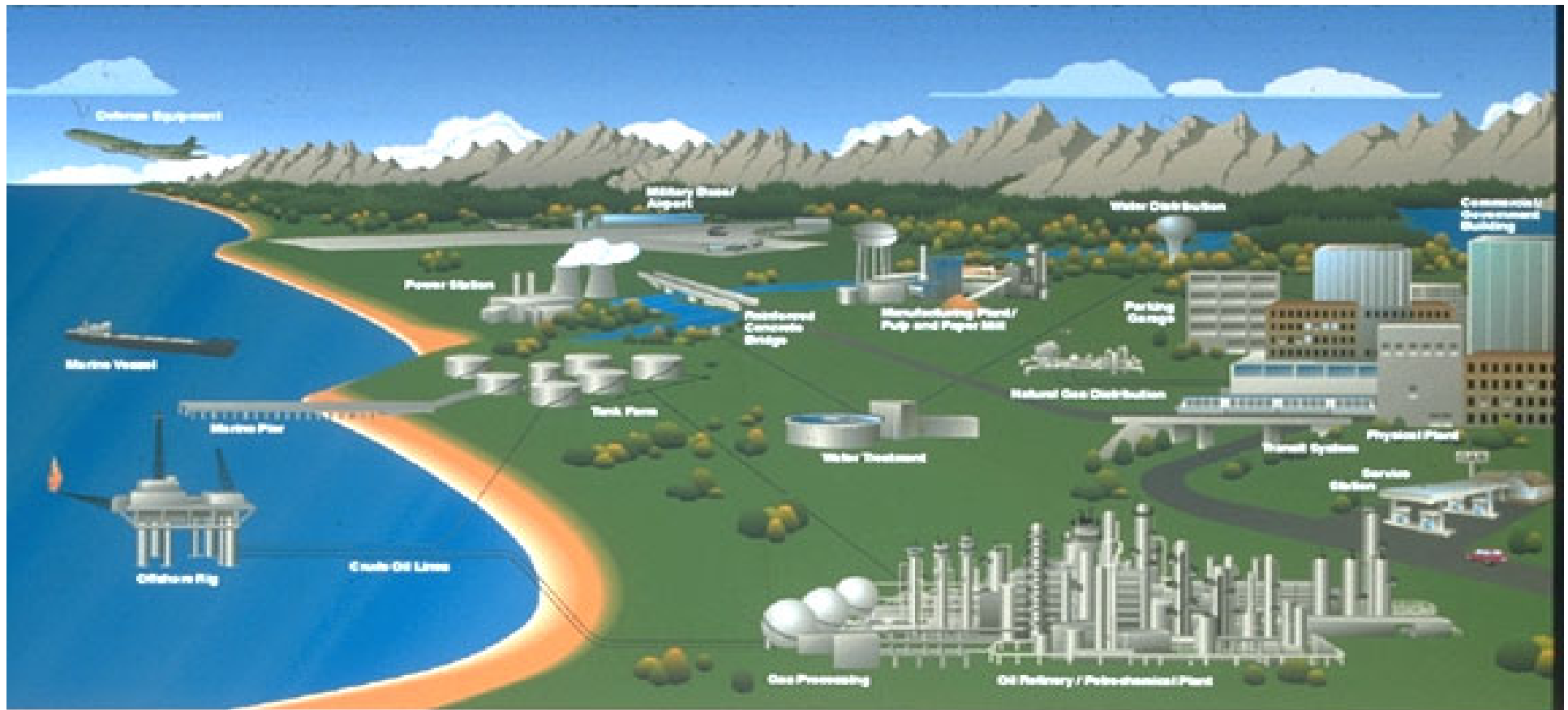
API-651 - Cathodic Protection of Aboveground Petroleum Storage Tanks:

NACE RP0193-2001 - External Cathodic Protection of On-Grade Carbon Steel Tank Bottoms:



Pipeline Inspection Tool





Worldwide Corrosion Control Source



**Corpro
Companies
Incorporated**

"A Commitment to Excellence"



GOOD-ALL ELECTRIC



CPS

Presented by:

James T. Lary
Corrpro Companies, Inc.
World Headquarters
1090 Enterprise Drive
Medina, Ohio 44256
Phone: 330-723-5082
Fax: 330-723-0694
Email jlary@corrpro.com

