Field-Erected AST Secondary Containment Options

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NISTM National Institute for Storage Tank Management

AET Compliance LLC

Industry Reference Standards – The Technical Foundation of Good Tank Construction and Operations

- **ACI - American Concrete Institute.**
- **API - American Petroleum Institute.**
- **ASME - American Society of Mechanical Engineers**
- **ASTM - American Society for Testing and Materials.**
- **NACE - National Association of Corrosion Engineers.**
- **NFPA - National Fire Protection Association.**
- **PEI - Petroleum Equipment Institute.**
- **SSPC - Society for Protective Coatings.**
- **STI - Steel Tank Institute.**
- **UL - Underwriters Laboratories.**

Field-Erected ASTs

Do the job right!

Do the job right with Qualified Personnel!

Welding

Quality work is essential!

Tank Shell

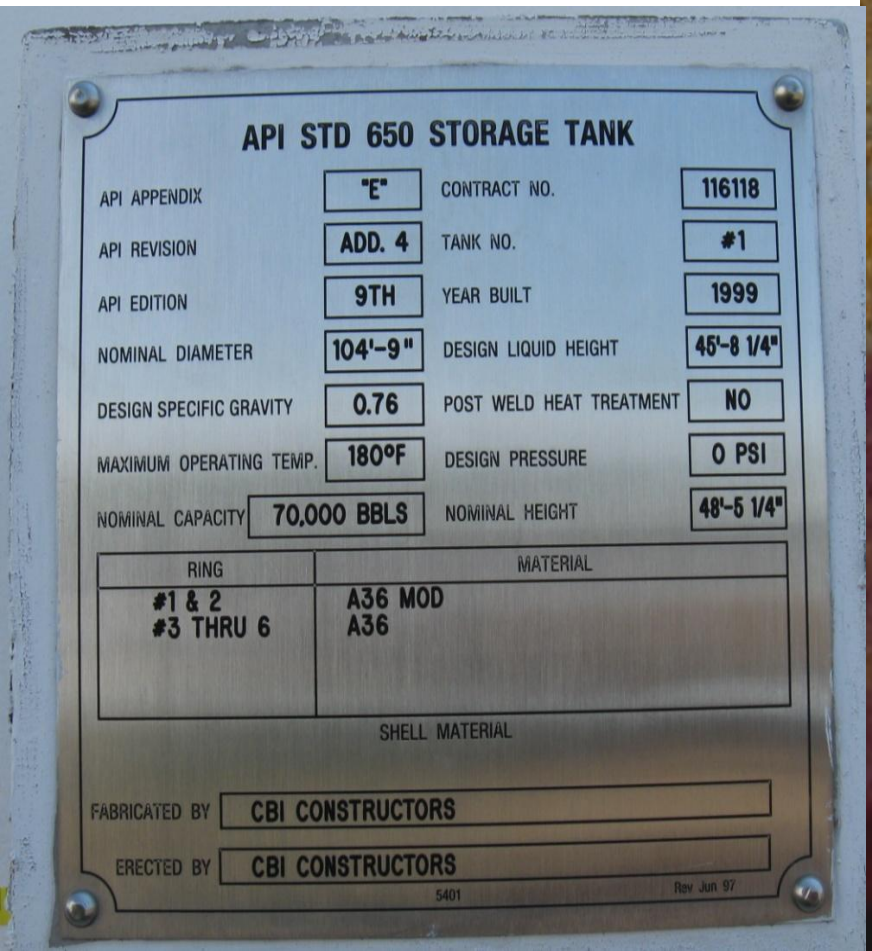
Bottom plates

Piping Connections and Sumps

Manways

Shell Penetrations and Valves

Reference Standards- API-650




Secondary
Containment
for Tanks

API 650 Optional/Traditional Double-Bottom Designs

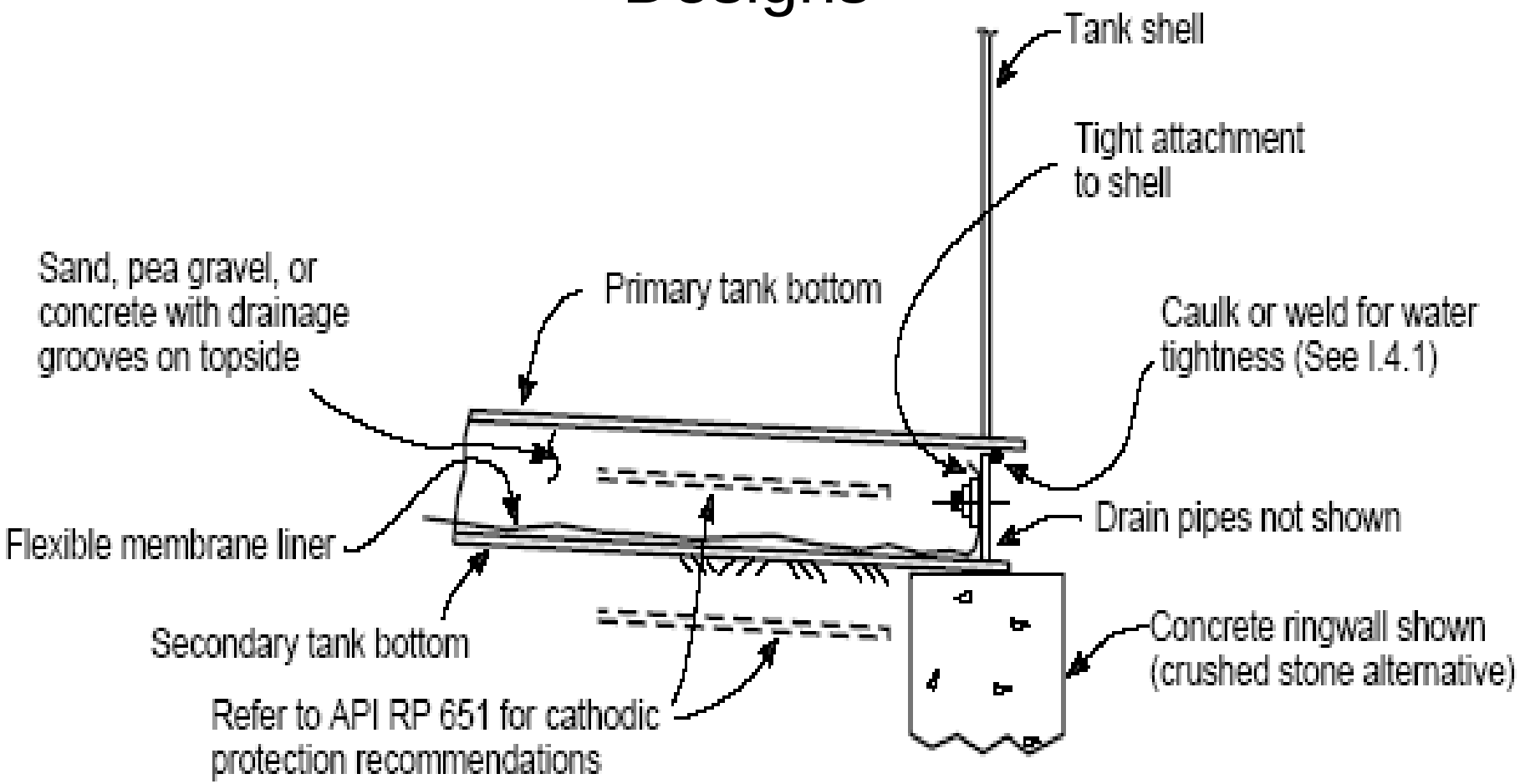


Figure I-4—Double Steel Bottom with Leak Detection at the Tank Perimeter (Typical Arrangement)


German
Double-
Bottom
Design

El Segundo Bottoms

Cone-Down

Cone-down

Cone-down

Shovel-bottom

Double-Wall Tanks


Port of
Palm Beach


Germany


Port Canaveral

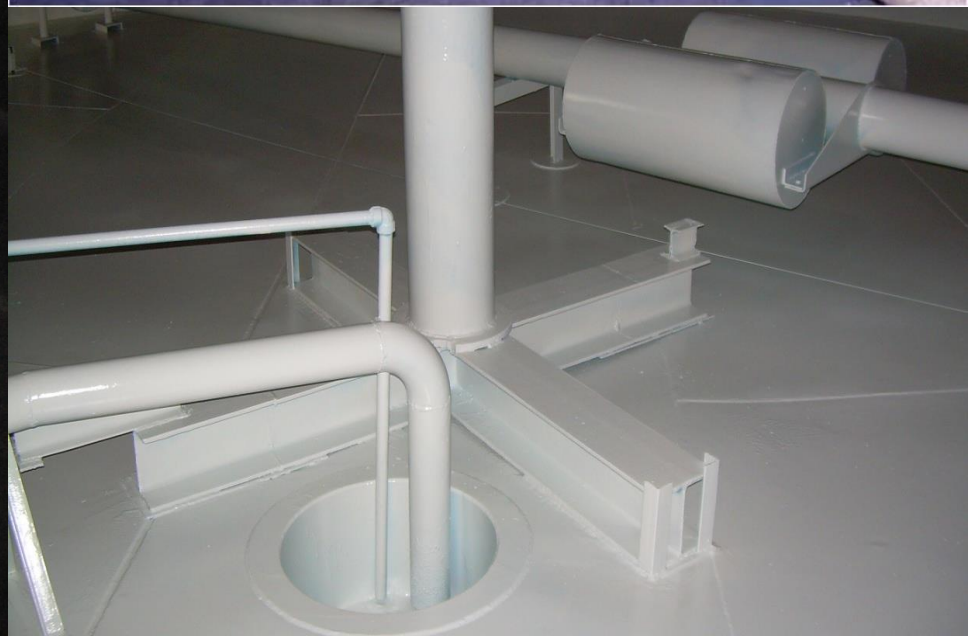
Impervious Synthetic Liners Beneath the Tank

Upgrading Existing Single-Bottom ASTs with Secondary Containment

Internal Secondary Containment Using Parabeam

Tankbau (Germany) Internal Secondary Containment System

Steel Internal Secondary Containment



Tank-Jacking to Install Secondary Containment

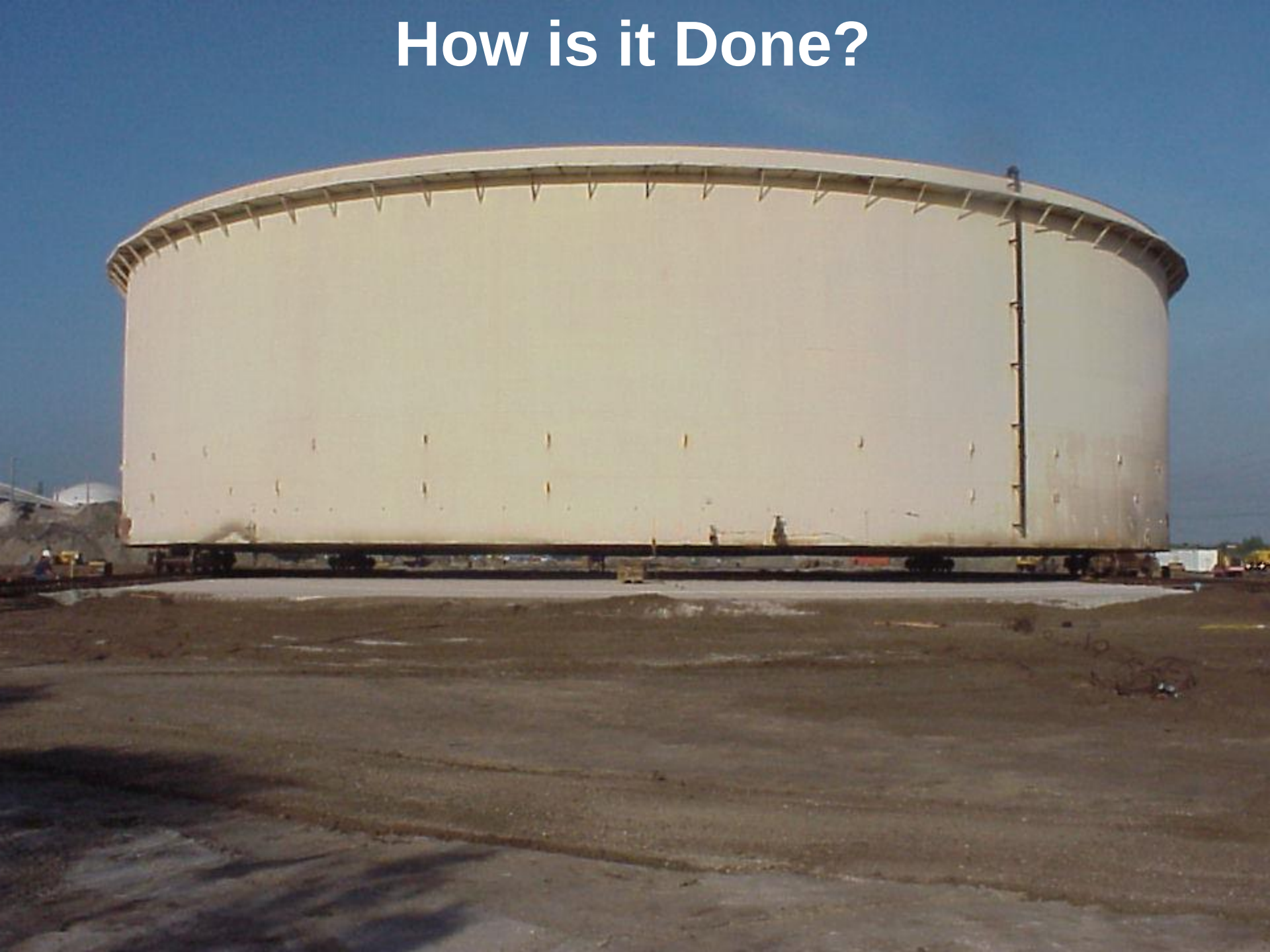

Field-erected AST Lifting for secondary containment installation beneath the tank
2005 4 27


RSC


A.R. WATSON, USA
(800) 294-5102

Moving Tanks to Different Locations

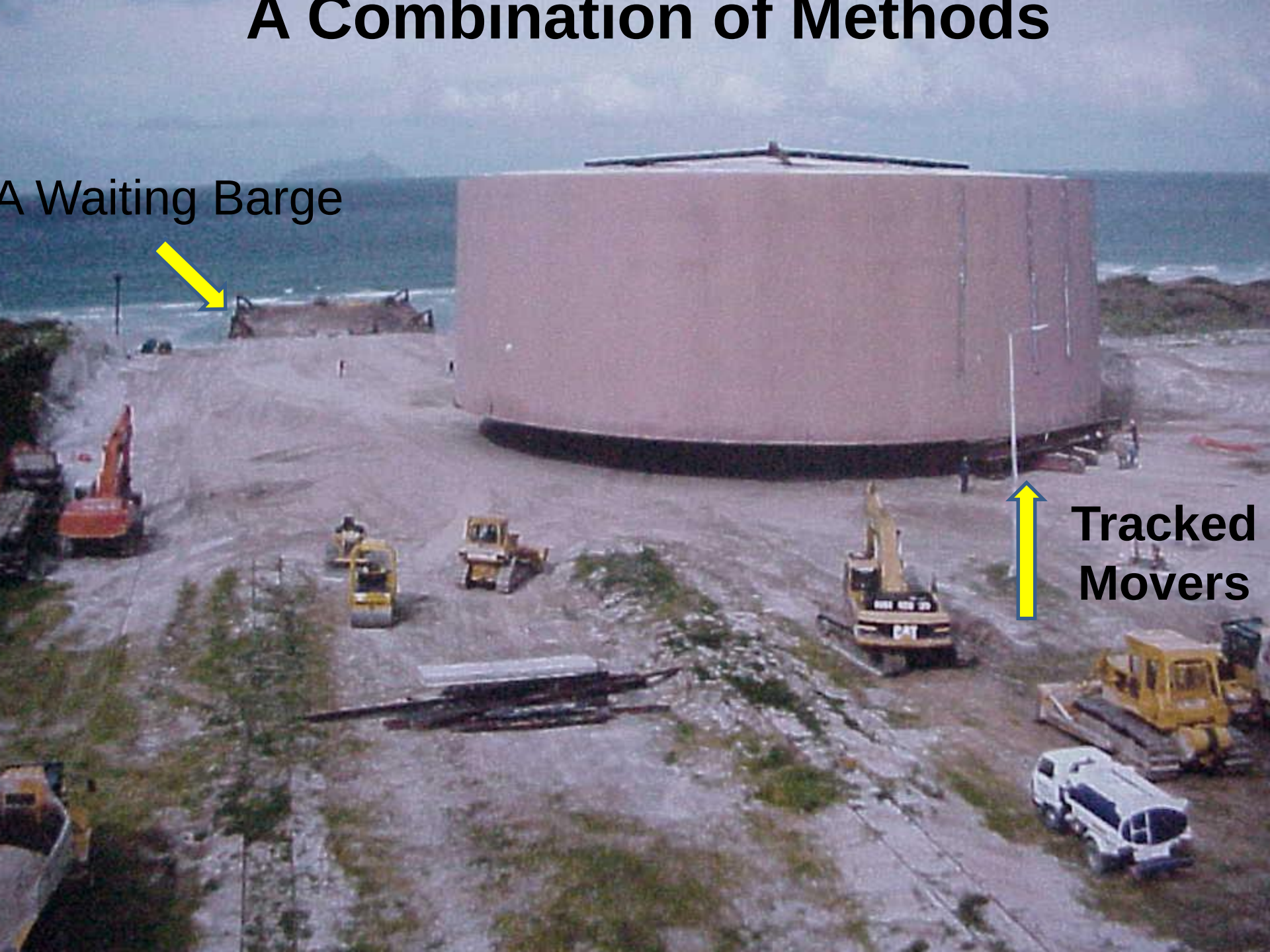
How is it Done?




With Railway Wheels in
Tandem (Bogies or Trucks)

With Flatbed Trucks and Highway Tires and Wheels

A Combination of Methods




Short Distance
Tank Relocation

Movement on Railway Tracks


513

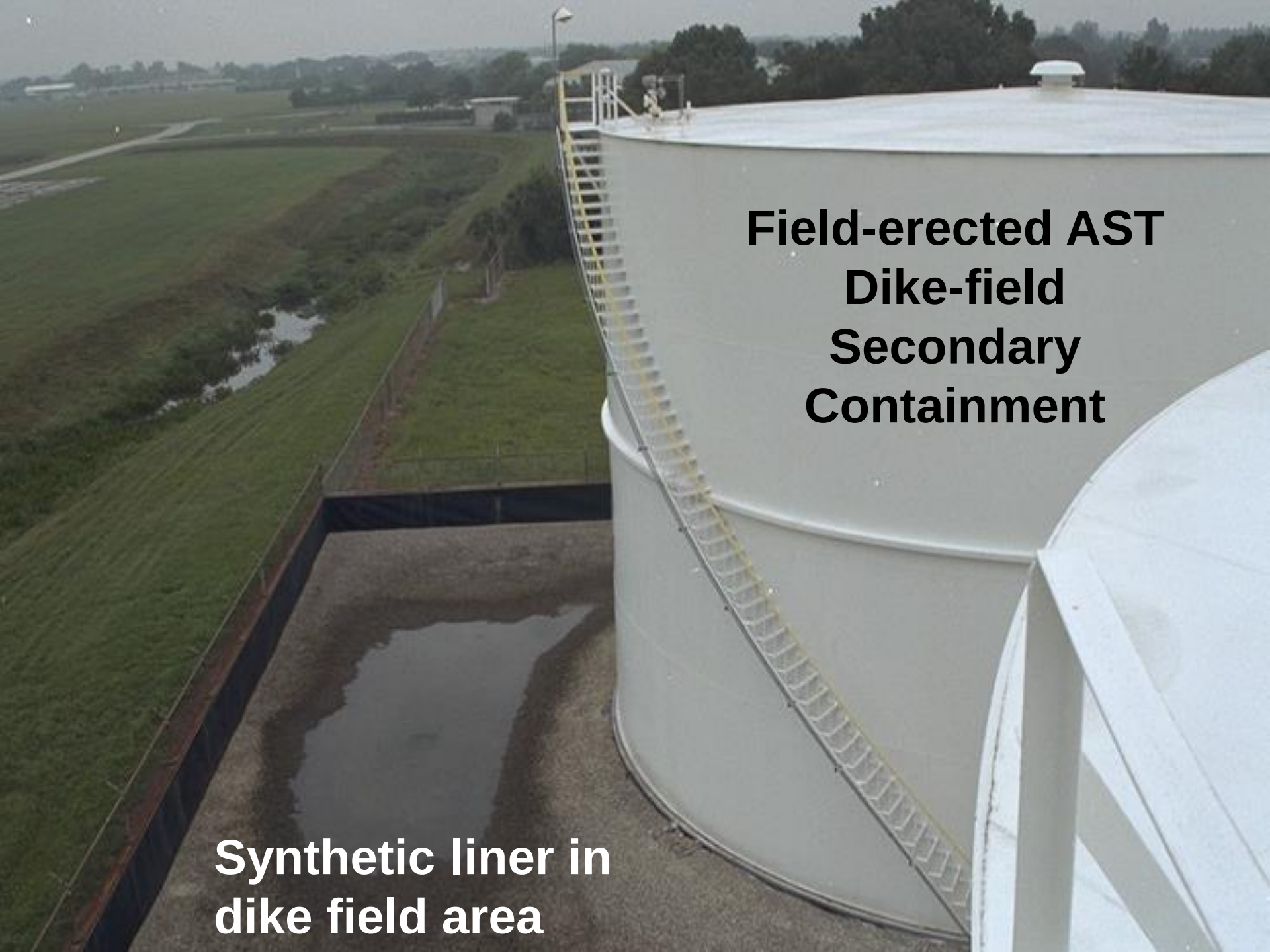

TANKS


SKYTRAK

Long Distance Relocation


Gull
New Zealand's
Independent Spirit

5

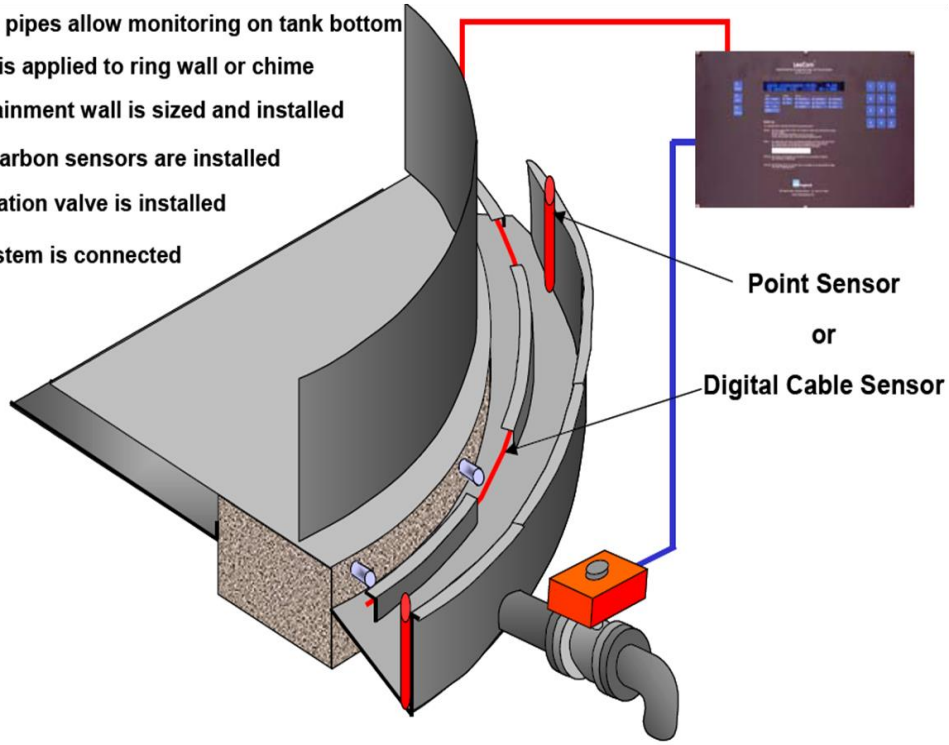

Field-erected AST
Dike-field
Secondary
Containment
Synthetic liner in
dike field area

Stormwater Management

Stormwater retention and removal, and dike field liners

AST Dike-field Secondary Containment - Field-Erected Tanks

- ✓ Telltale pipes allow monitoring on tank bottom
- ✓ A skirt is applied to ring wall or chime
- ✓ A containment wall is sized and installed
- ✓ Hydrocarbon sensors are installed
- ✓ An isolation valve is installed
- ✓ The system is connected



Alternative Dike Field Secondary Containment

Pre-Hydrated Bentonite Clay Liners – "Rawmat" by Rawell

Poly-Urea Liners

Shop-fabricated tank installation


GASOLINE


envirosafe
OVERSIZE LOAD


11:48AM

Stainless Steel Tank for Aviation Fuels

Issues in selecting the type of shop-fabricated tank best-suited for your needs:

- Storage volume needed
- Site security
- Available space
- Piping needs
- Dispensing needs
- Portability
- Regulation
- Cost
- Operation and maintenance issues
- Risk assessment – fire safety, hurricanes, etc

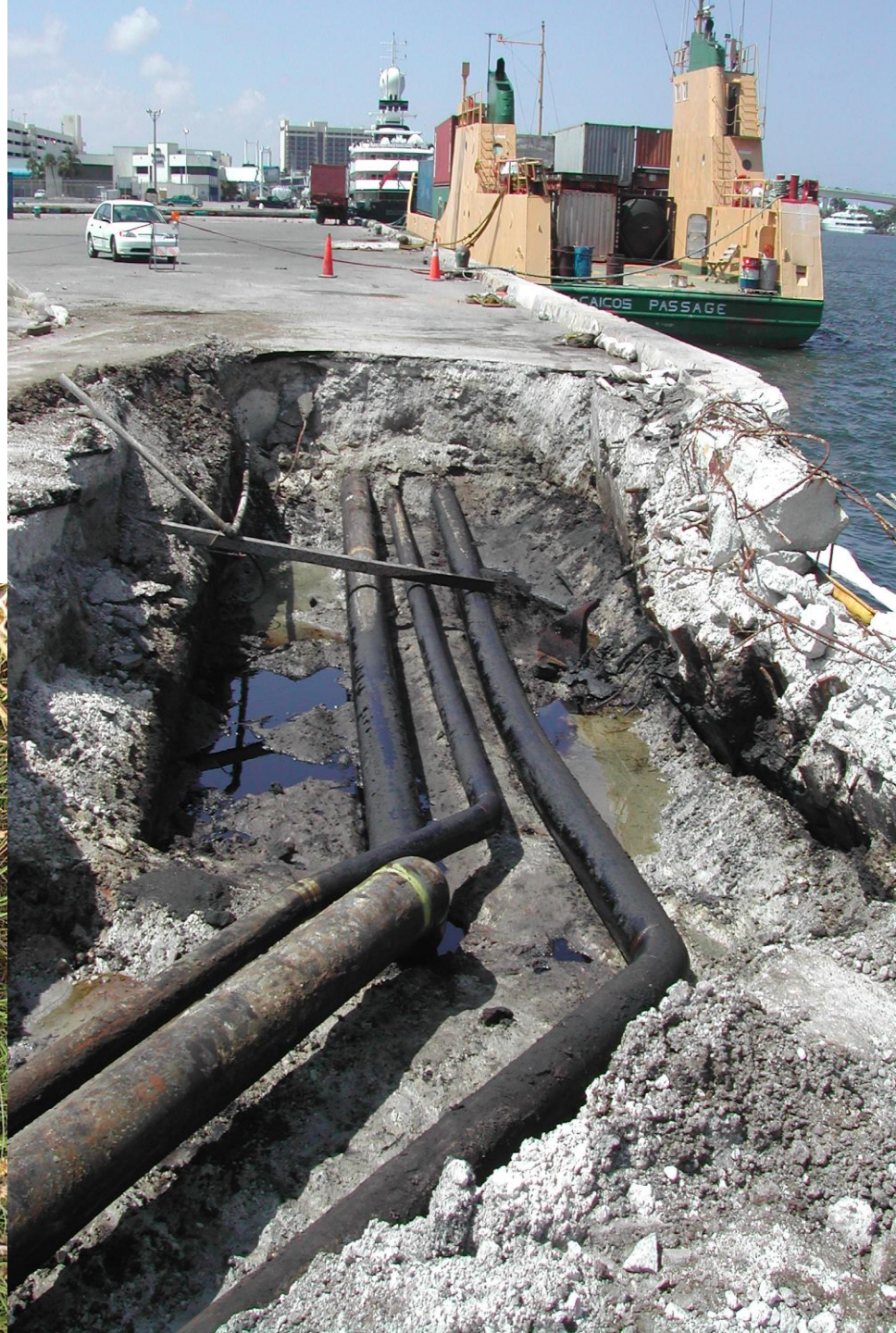
Shop-fabricated ASTs should have secondary containment at the time of installation

AST Secondary Containment - Shop-fabricated

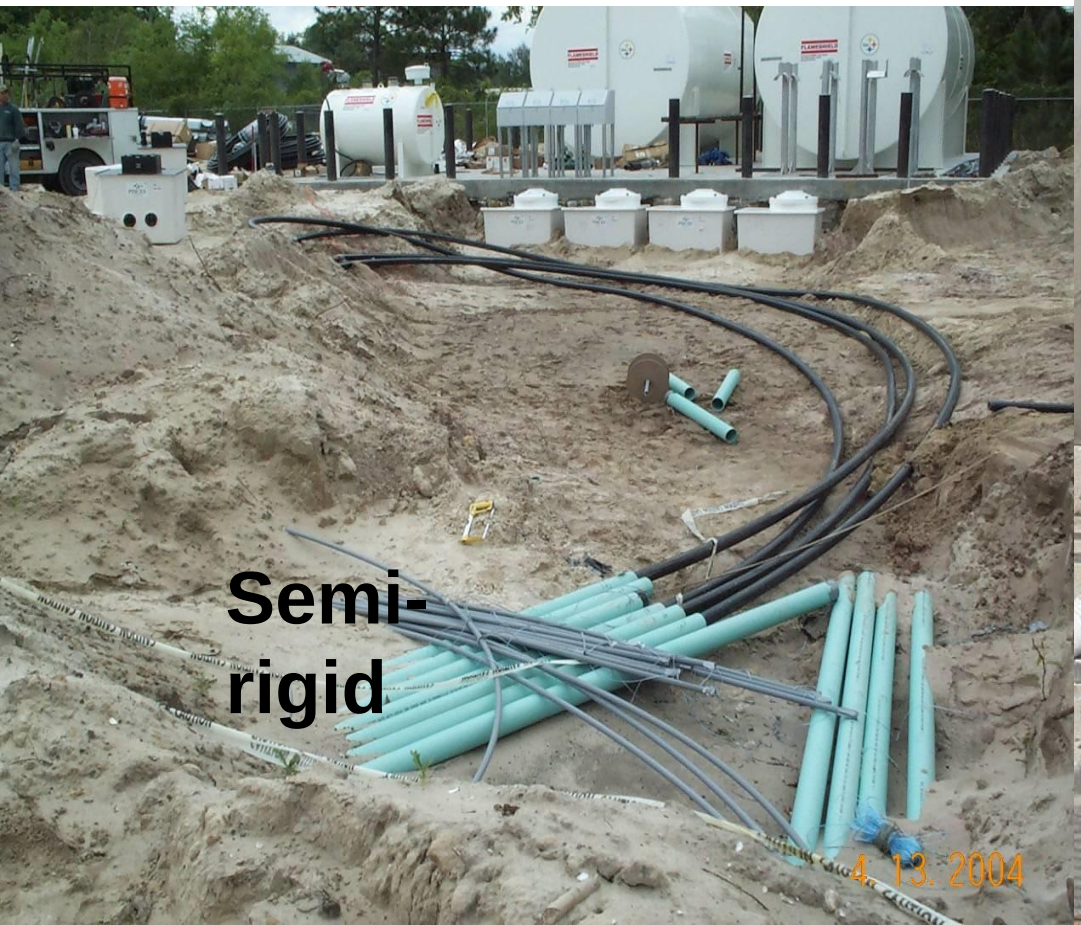
Piping

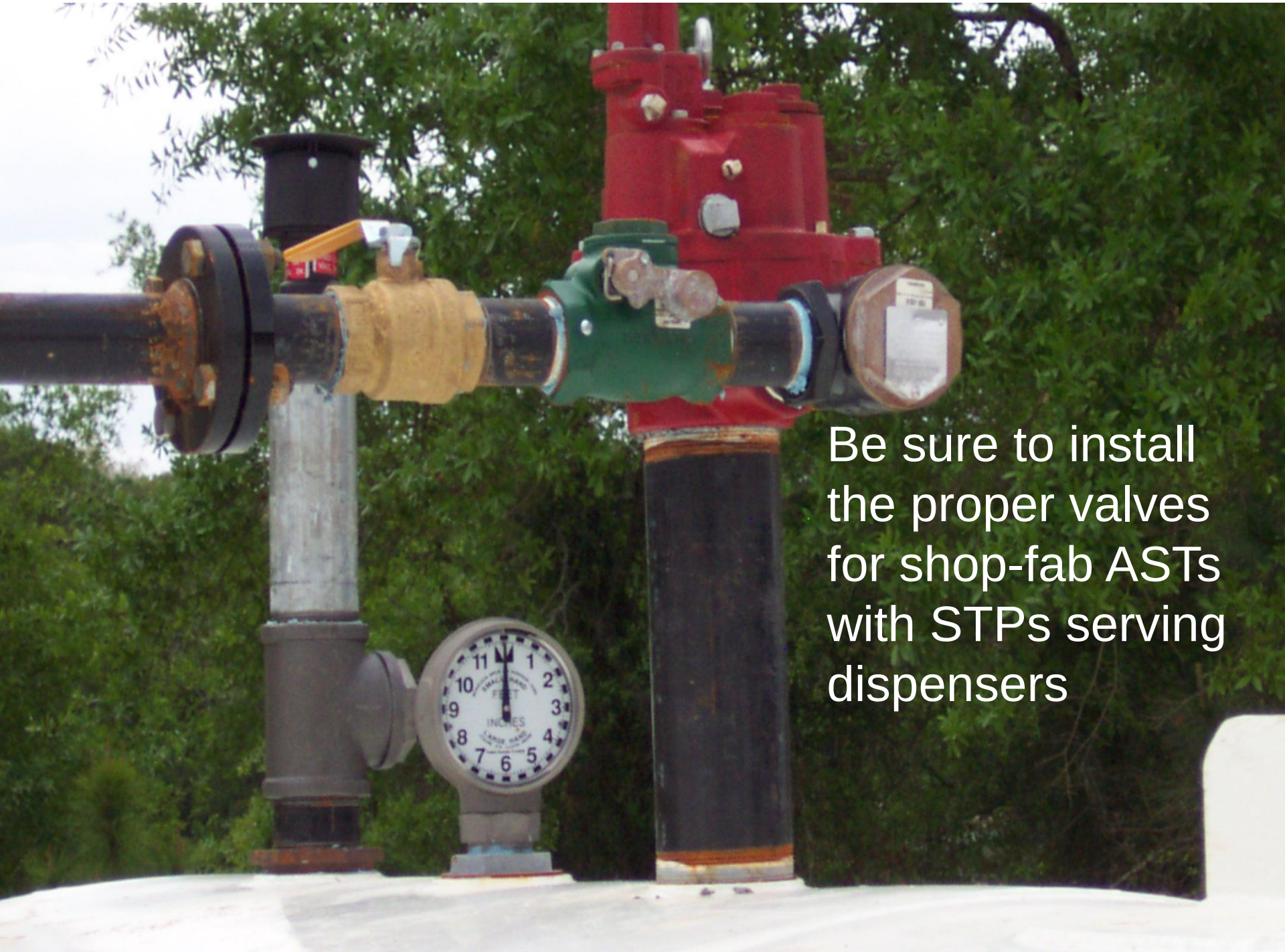
Piping -

The major source of Field-erected AST leaks...



Small Diameter Piping with Secondary Containment




Be sure to install the proper valves for shop-fab ASTs with STPs serving dispensers

Single-wall Large Diameter Piping Above Ground

Steel Bulk Product Piping with Secondary Containment for Piping in Contact with the Soil



Steel Bulk Product Piping with Secondary Containment - Installation concerns


HDPE Pipe
Semi-Rigid Pipe
UPP
Rheomax

IPP HDPE Semi-Rigid Petrol Pipe

Release Detection Standards

Internal Release Detection for Single-wall Systems

NONE

External Release Detection for Single-wall Systems

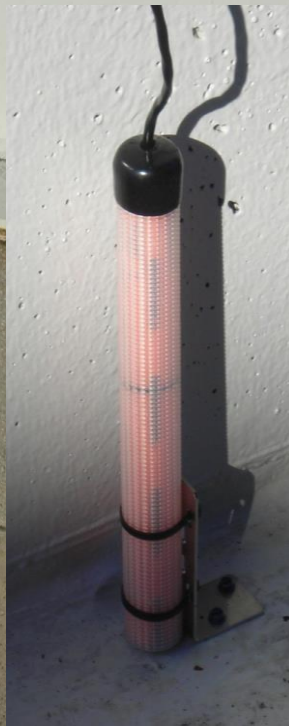
- Well construction
- Site Suitability
- Groundwater monitoring wells

Release Detection for Double-wall Systems

Internal
Interstitial
Monitoring

- Visual
- Vacuum
- Pressure
- Hydrostatic
- Sensors & Probes

Leak Detection with Interstitial Monitoring for Tanks and Piping

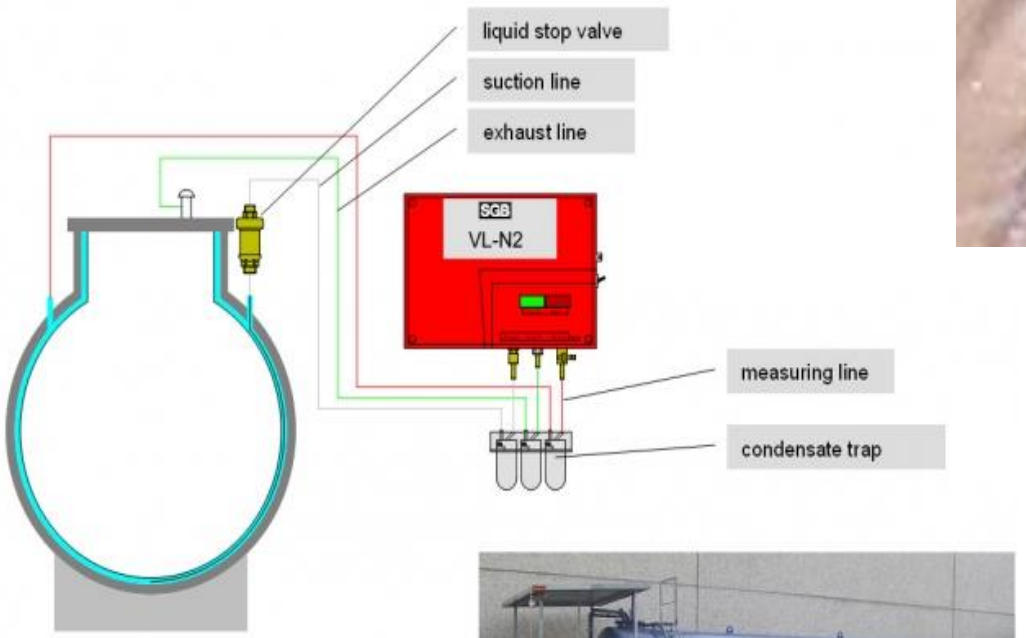



PLUS!
VEEDER-ROOT
TLS-350

Recommendation for Release Detection…

“First Class” Version

Vacuum or Pressure Continuous Monitoring



The “Economy” Version

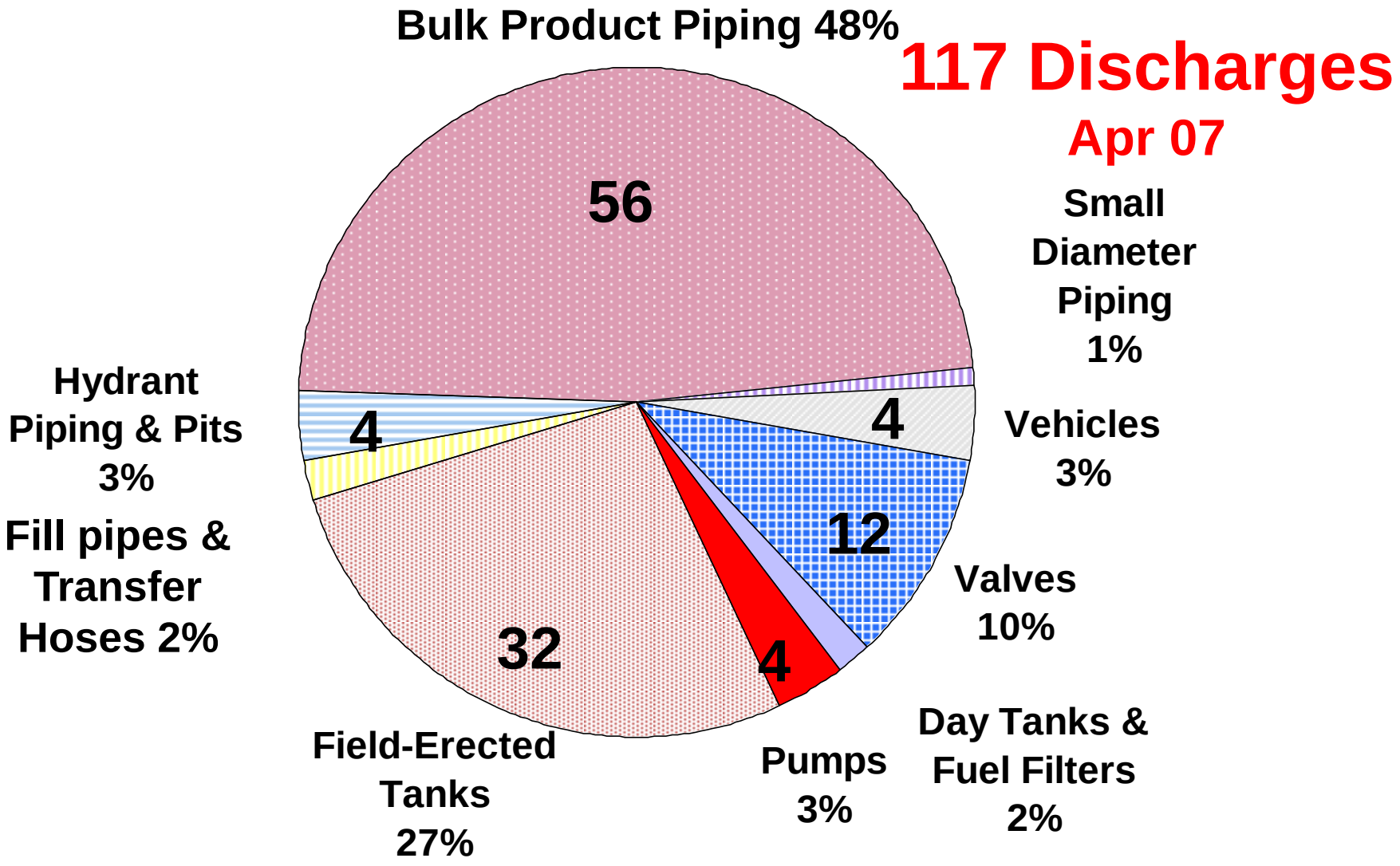
Visual Inspections!

Unusual Release Detection Situations

Passing Regulatory (Fire Code and Environmental) Inspections

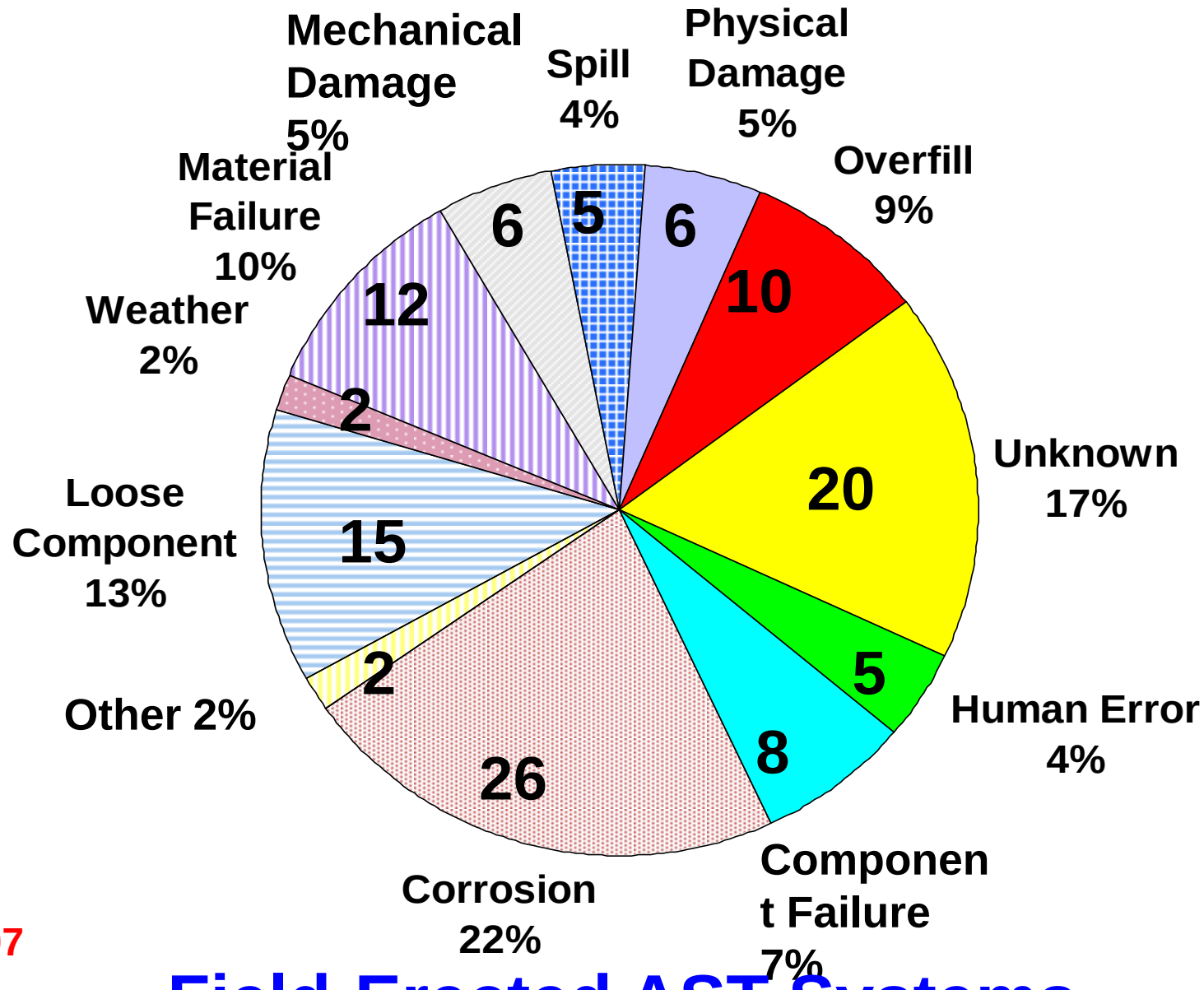
Canadian Tank Inspectors

Sources of Discharges - Field-Erected AST Systems



Tanks are only 17% if overfills and other external factors are excluded

Causes of Discharges from All Sources



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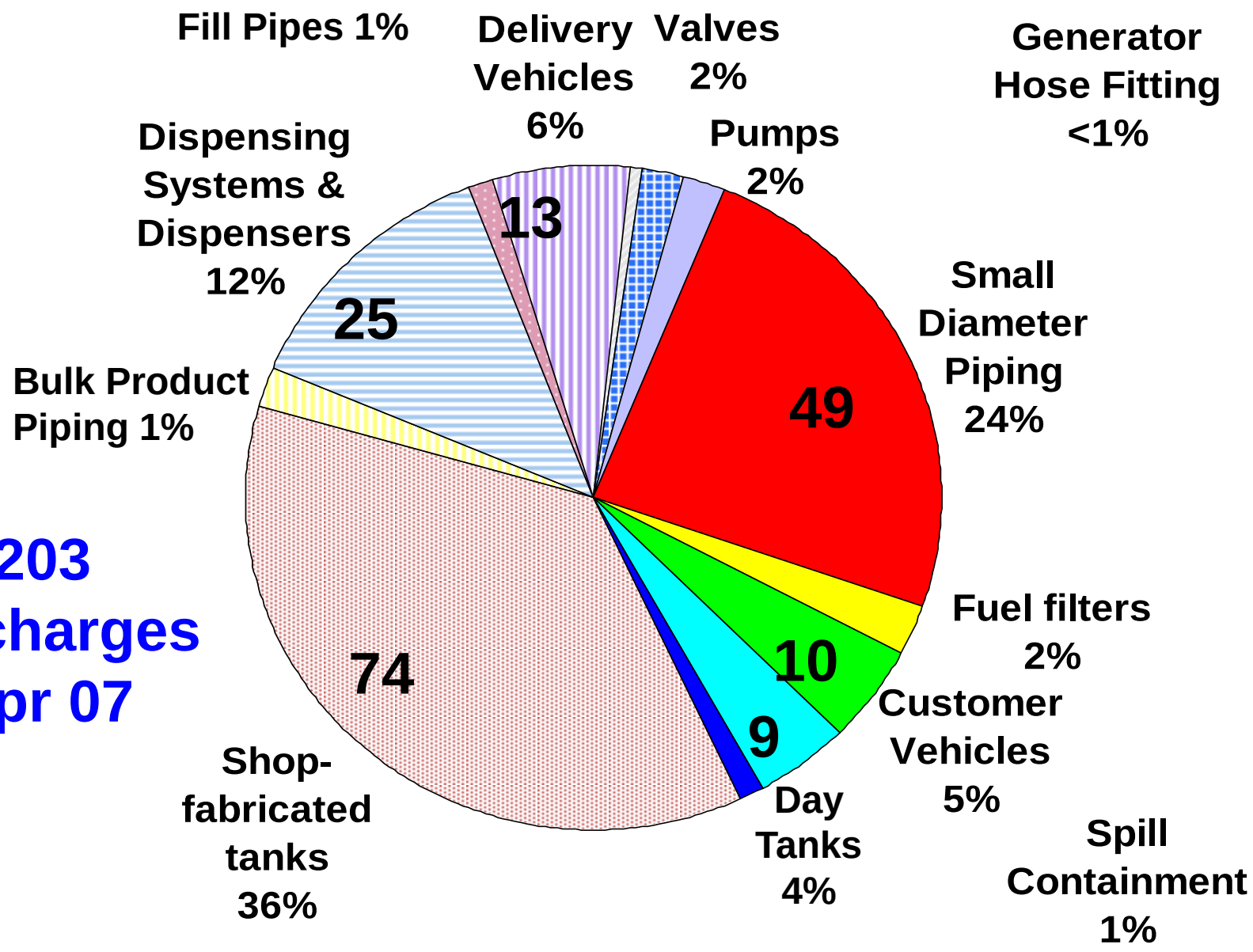
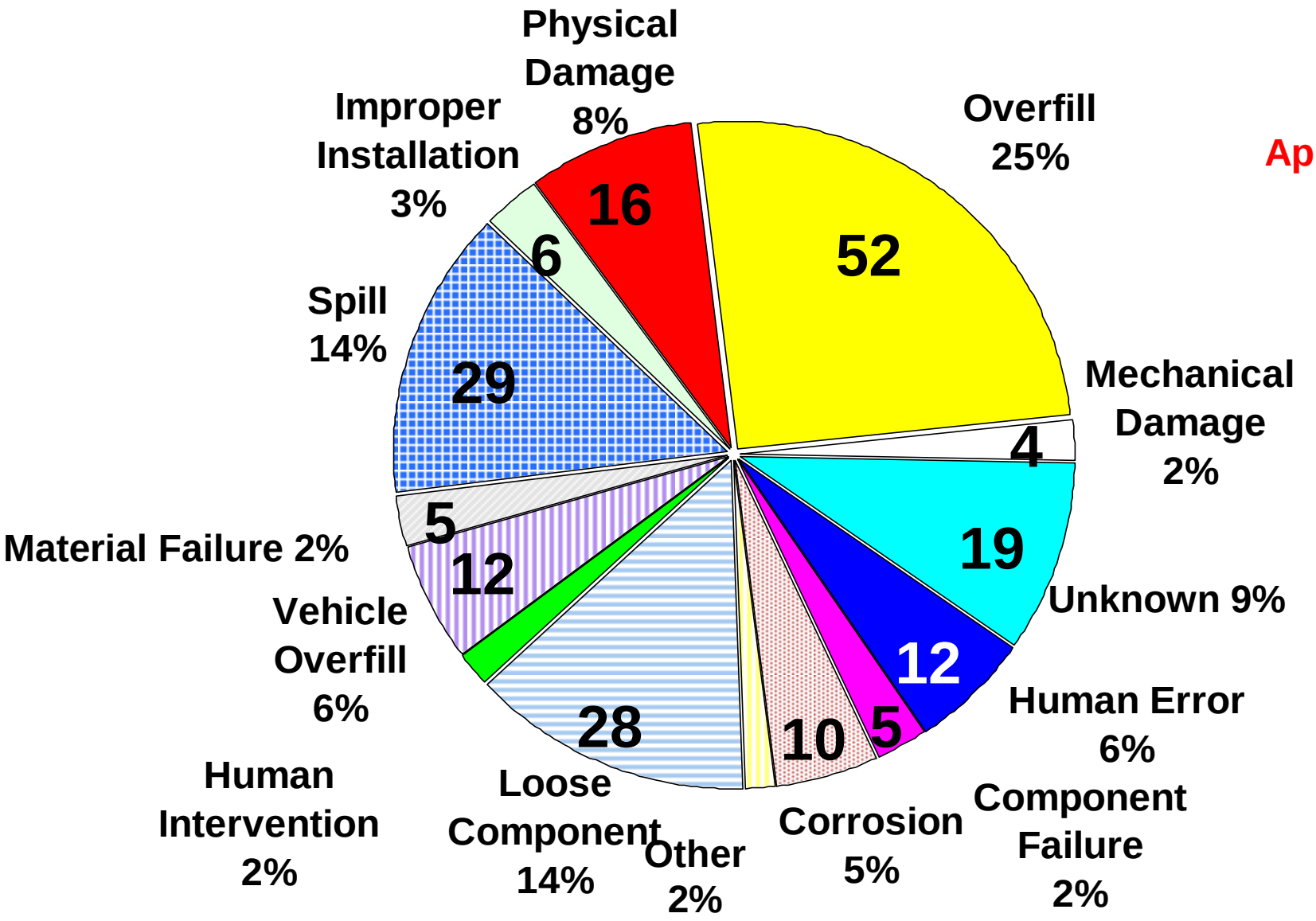
Field-Erected AST Systems

Sources of Discharges - Shop-fabricated ASTs



Causes of Discharges from All Sources



Shop-fabricated AST Systems

The End