



Environmental Inc.



A History of Dual Phase Remediation in Mississippi

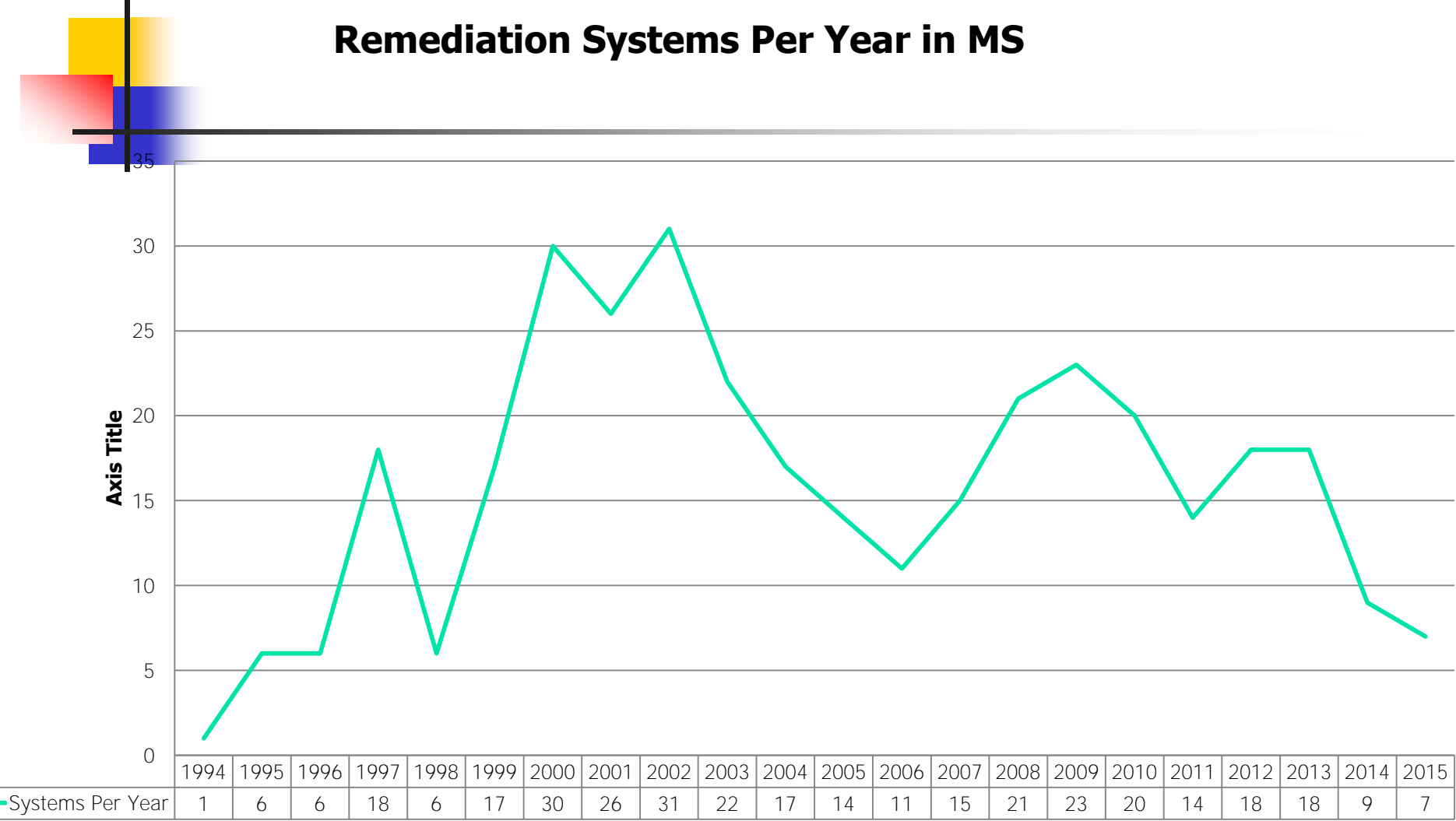
Edward Tung, P.E.



Overview

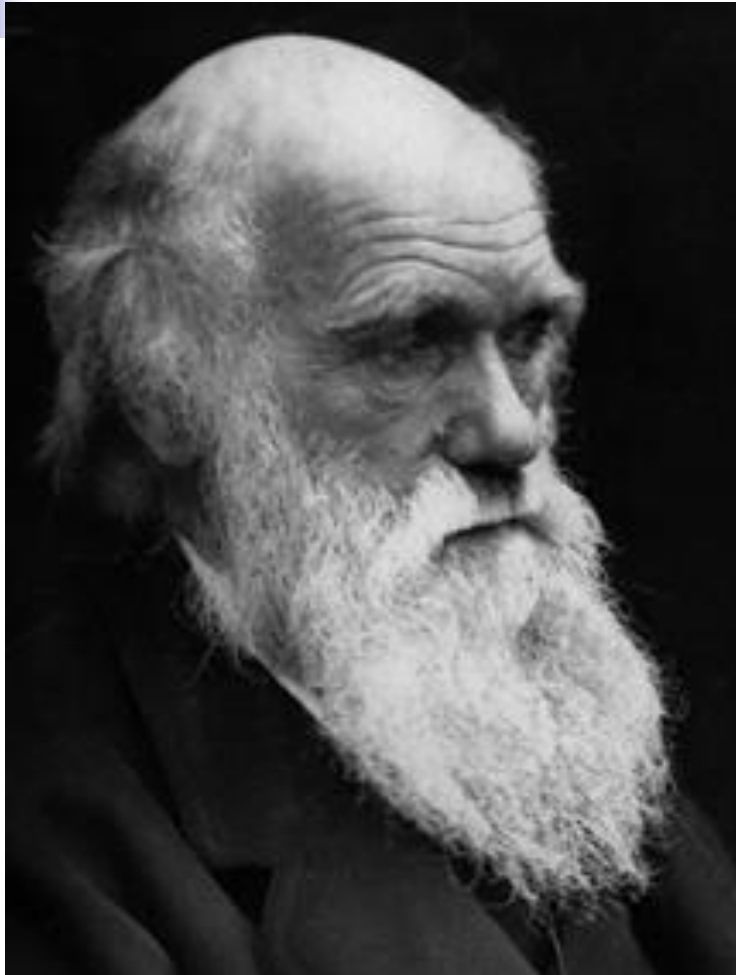
- Approximately 367 sites with remediation equipment installed since 1994
- Vast majority of sites Dual Phase
- >95% uptime
- MS early adopter of uptime mandate
- Most likely led the nation

Remediation Systems Per Year in MS





EVOLUTION OF DUAL PHASE



- Market Forces
- UpTime
- Efficiency
- Life Cycle Costs
- Reuse/refurbish



Forced a Change in Design Philosophy

- Design for the field technician, not the engineer.
- Ease of maintenance
- User friendly logic
- Remediation partner
- **We have “skin in the game”**



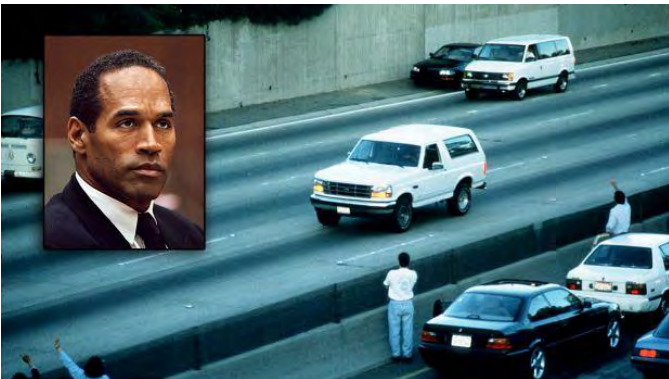
Dual Phase Extraction Evolution of Design

- increased hp
- More wells
- Larger diameter piping
- 75' deep
- Performance based design

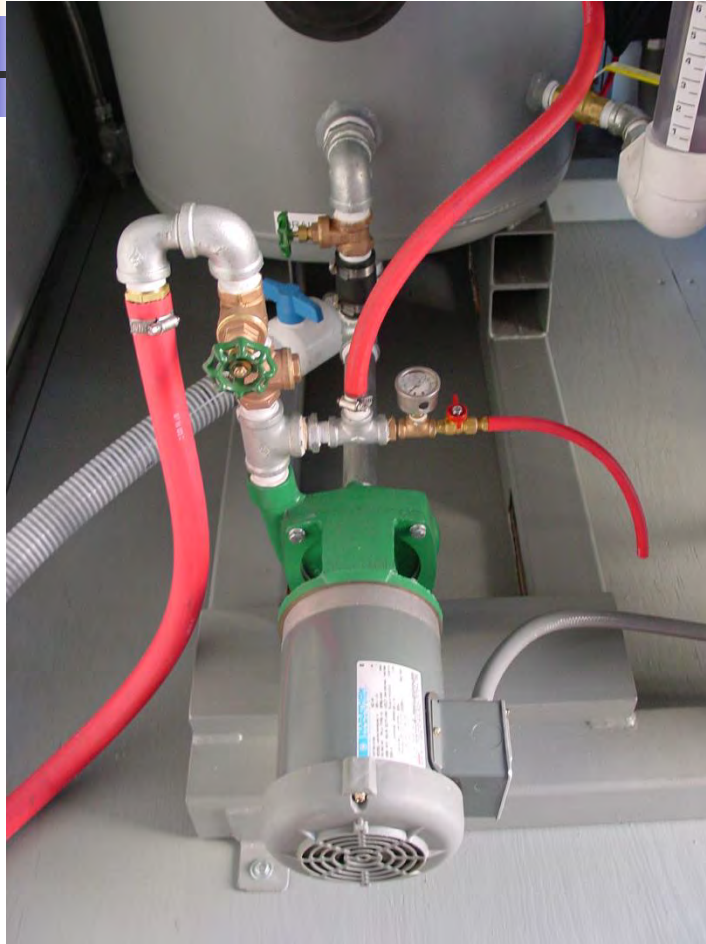


1994

First Remediation System in MS



Soil Vapor Extraction



Solid Walls – Hard to Clean



FLUID VAC



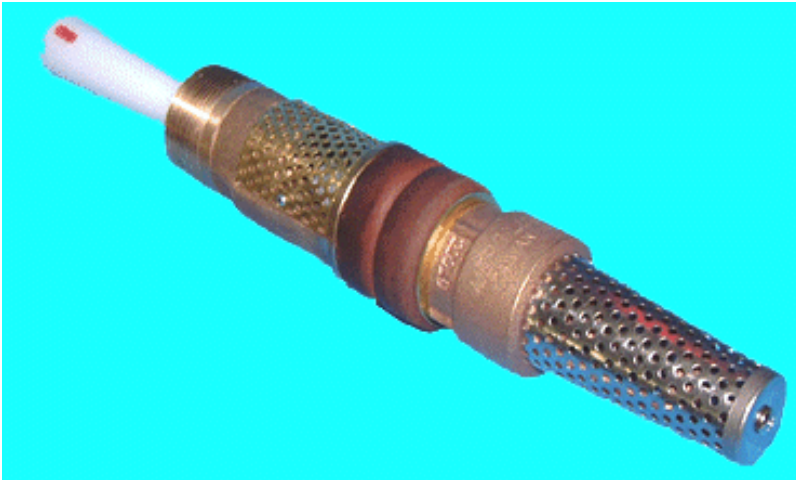
- First to tap the environmental market
- No knock out tank needed
- Pull groundwater and vapors right through the pump
- No heat exchanger needed
- Worked Great – Initially
- Many failures due to pump failure

Outdoor Systems



Jet Pumps

- Low cost “Econo pump”
- Good for water extraction
- Very low vapor extraction
- Excessive pipe fouling





Wooden Shed







1996

- Amory, MS – Meet Gary Hill
- **Cooper's Grocery** 1st DPVE in MS, 15hp
- 13 systems total





Sliding Removable Wall Design



MK On-Site Platform



- 8.5' w x 16' l x 9.5' h Building (as shown)

Dual Phase “ACTION”



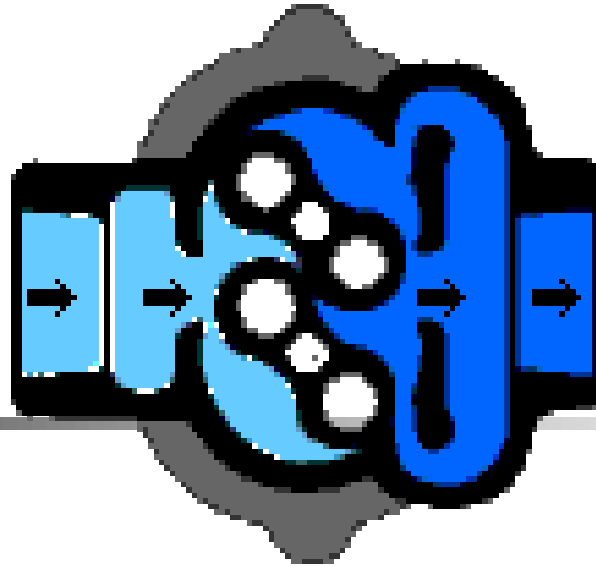


1998

- 6 new systems in Mississippi
- 37 systems total



High Vacuum Dry Blower



- Can achieve over 25" hg
 - Expensive
 - Very noisy
 - High maintenance
- Susceptible to water carry-over

1998 Lessons Learned





2001 Training Classes

26 new systems

110 systems total

Certified Technician

Regulator Testing

Subsurface Chemistry



2001 Training



2001 Outdoor Lecture



2001 The Enforcers





2002 Our Ferrari (crane)



Dual Phase Extraction – Oil Seal

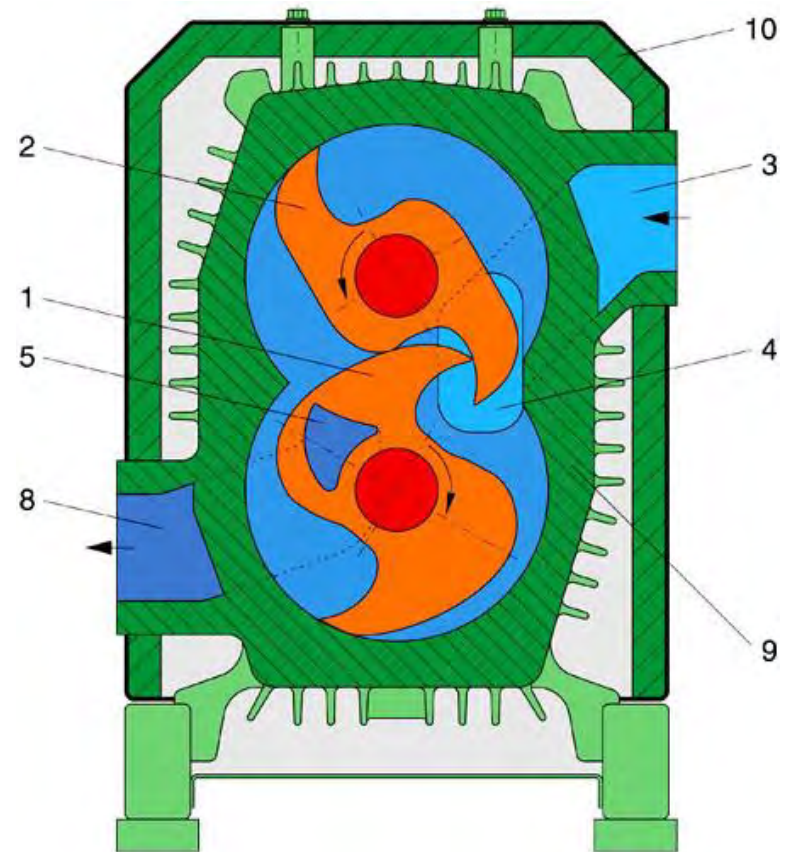


- aws-1clear pvc stilling well & inlet



- 40.0 hp lrp skid
- 550 ACFM air flow

Claw PD Blower



2004 Robotic Manufacturing



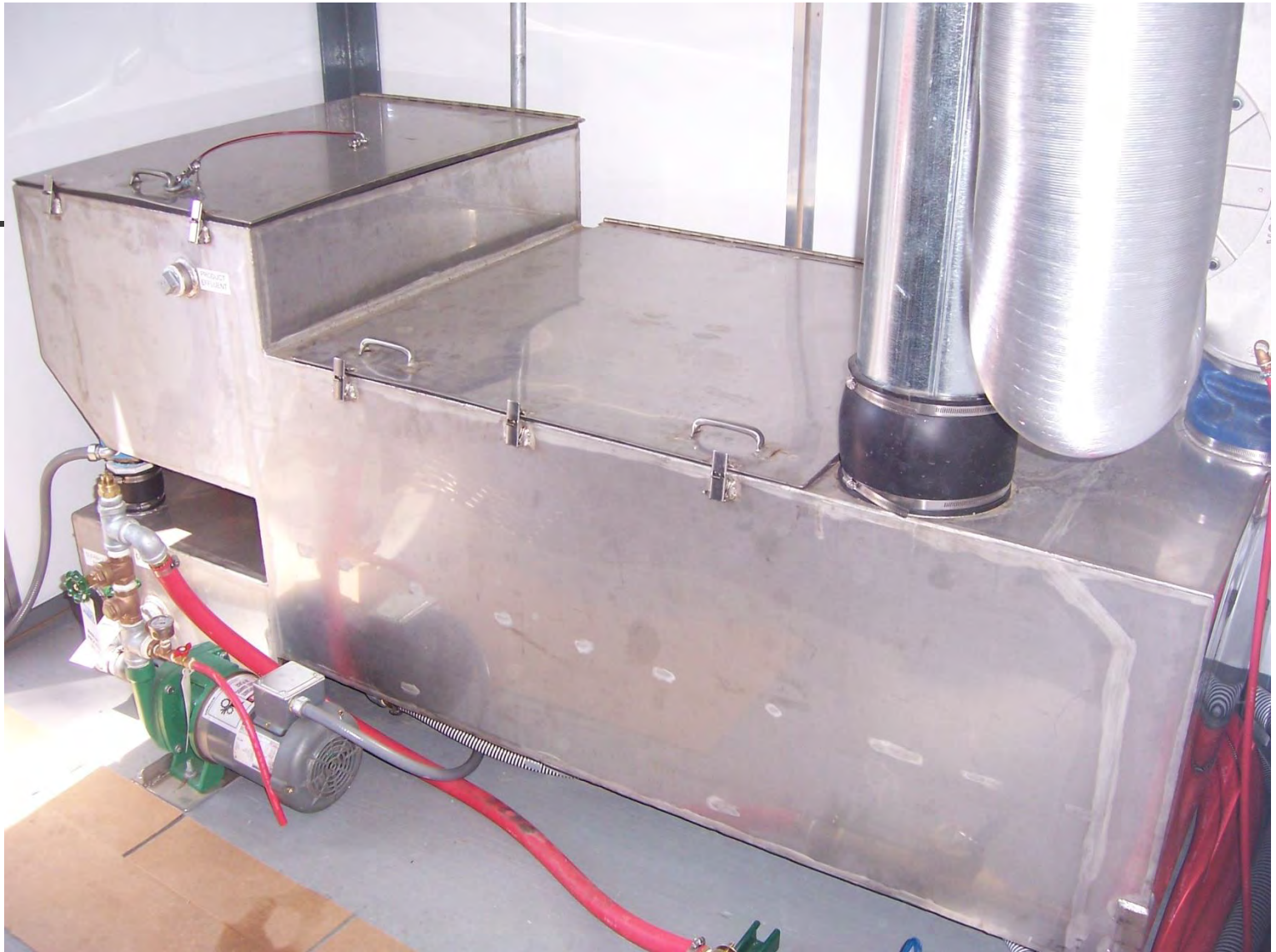
2004 Robotic Manufacturing







The MK Stripperator, Version 3



- OWS, cascade air stripper & sump (3 tanks in 1)
- Hinged lid design for easy access during operation
- 20 gpm model, 800 cfm blower

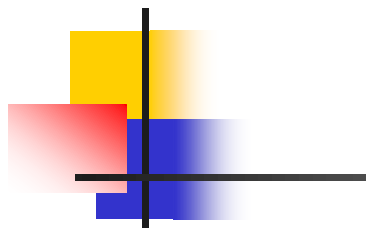


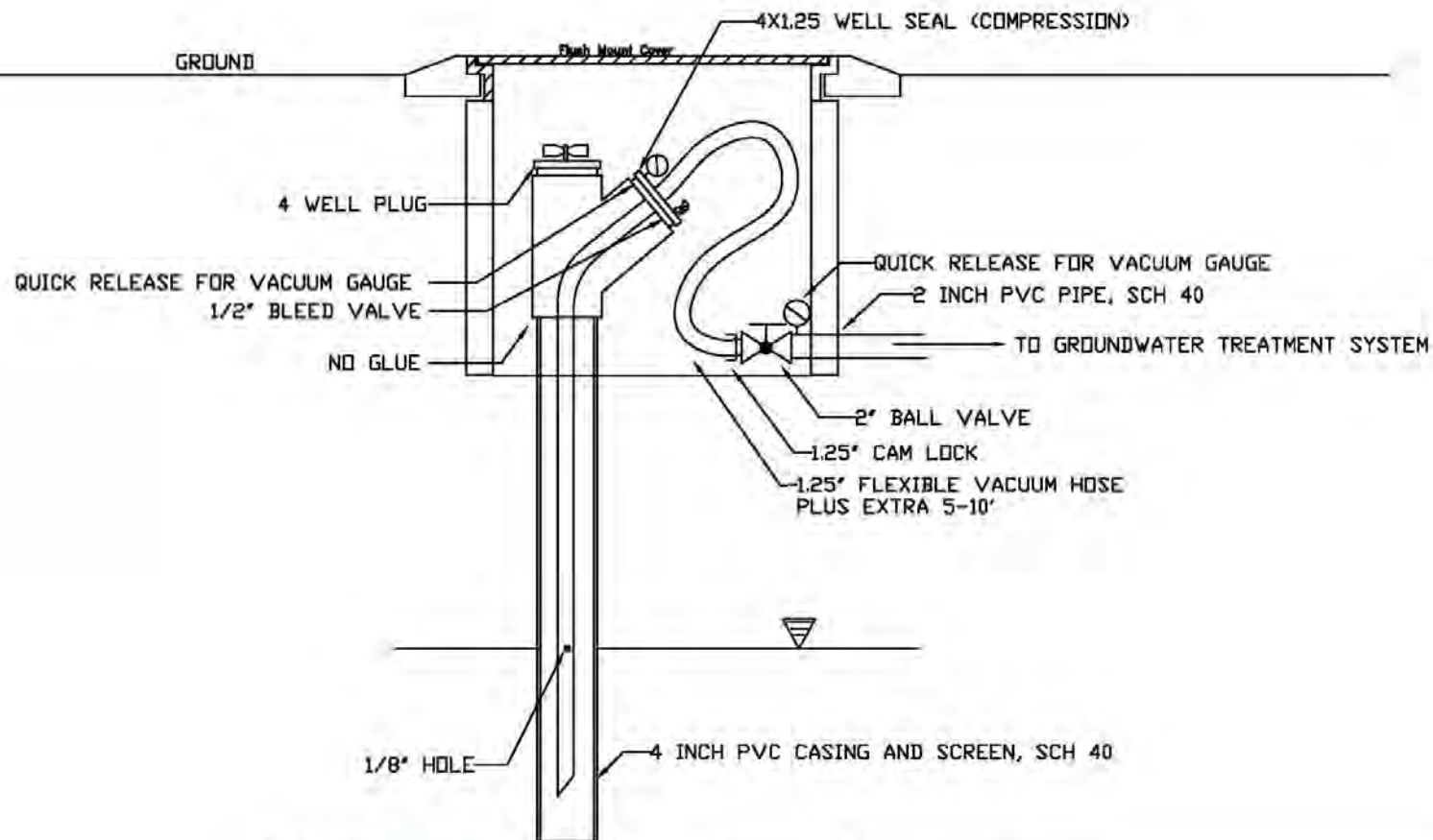
Dual Phase Inlet Headers



Manifold





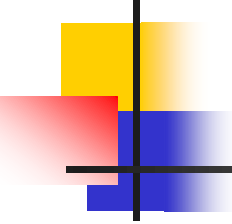


2004- 2005 MK Goes Thermal









2006 Safety & Certifications

- UL 508A & UL 698A control panel
- MET Laboratories, Class 1, Div 2., Group D. for the entire system
- UL 73 & NFPA 70 electrical fire and shock hazard
- Quarterly and random surveillance
- Tested with 2,000 volts (Hi Pot)



2007

- 15 new systems in Mississippi
- 220 systems total
- MK Brings Benni to UST Market
- Gasoline tops \$3 per gallon
- Apple I Phone debuts

2007 Training





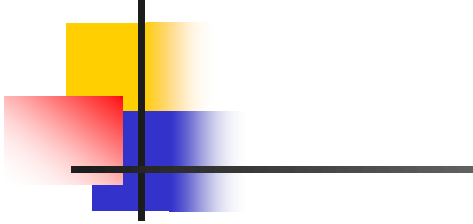


Redesigned DPVE, Version 4



Redesigned Strippertor, V.4







2009

- 23 new systems in Mississippi
- 264 systems total
- Refurbished systems become the new normal
- **3" pipe as the standard for DPVE**
- Gasoline drops below \$1.75

2009 1-1/4" Valves, 30% Reduction













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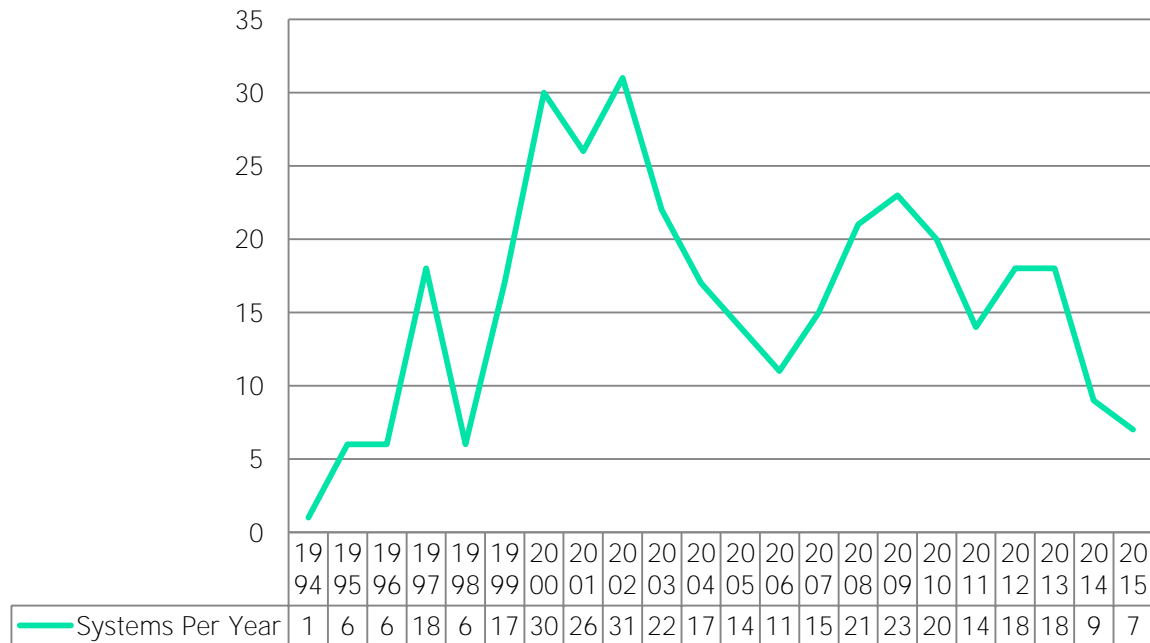




2014

- 9 new systems in Mississippi
- 343 systems total

Remediation Systems Per Year in MS

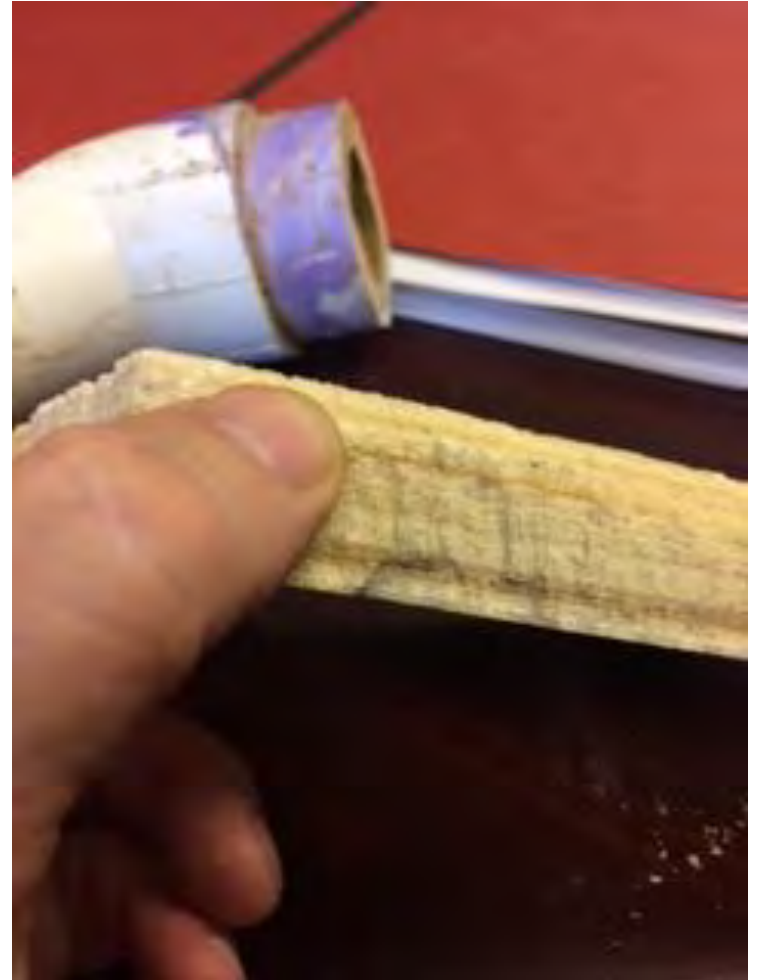




Water Quality Additives

- Obtain a water quality analysis
- Evaluate need for a sequestering agent
- Re evaluate
- Make dosage adjustments as needed

Walco



Iron Fouling



Reformulation of DPVE Oil

- Longer life
- More resistant to fouling
- Better temperature stability
- Same price





2016

- Work with our customers to roll out new refurbishment options
- More new major components
- Cellular based telemetry option