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GROUND WATER SAMPLING • WATER LEVEL & PRESSURE • WATER SAMPLE FILTRATION • GROUND WATER REMEDIATION • GEOPHYSICAL MEASUREMENTS
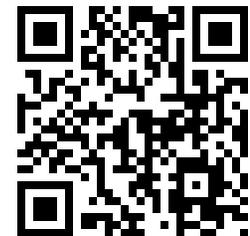
The Nielsen Environmental Field School, Inc.

2012 North American Environmental Field Conference & Exposition

AVOIDING THE 10 BIGGEST MISTAKES IN GROUND-WATER REMEDIATION

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…a world leader in environmental technology, manufacturing and product training since 1978.

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- an environmental industry products leader since 1978

- partners with federal, state, local and international government agencies

- over 20,000 private sector clients worldwide

- distribution in 100 countries

- provides products and product training to colleges, universities and technical schools around the globe

UNITED STATES DEPARTMENT OF COMMERCE
EXPORT ACHIEVEMENT CERTIFICATE

Presented to
Geotech Environmental Equipment
For recent accomplishments in the global marketplace.

Secretary of Commerce

Informal Online Survey*

- Environmental Professionals
  - Owners
  - Hydrogeologists
  - Environmental Consultants

- 245 responses

- 188 People

- 32 Countries

- 45 US States

agree approach based best better biggest characterization clients concentrations consultant contamination cost data design due effect extraction field flow ground groundwater investigation lack level mass mistake model money monitoring phase point problem process project remediation results site soil source subsurface system technology testing think understanding

*This survey summary is not necessarily the opinion of Geotech Environmental Equipment.

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#10: Mineral Build-up

- Builds up on air stripper components and pipes
- Builds up on electrodes in pump controllers
  - Shuts off the system
  - Inhibits conduction

#9: Temperature

- Temperature affects Henry's Law (vapor phase) because it makes contaminants more likely to volatilize.
- pH probes will freeze and break when too cold
- Pumps will freeze and break when too cold
- If water sampling equipment is not completely purged and dried it can freeze and break
- PID lamps fog up when moved from warm to cold
- FID's have problems lighting in cold or windy environments
- Heat can also be problematic, causing equipment to overheat, fail and even be ruined

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#8: Viscosity

- Product characteristics not considered in equipment purchase
- Seasonal variability with product recovery
- Product too thick for remediation system to pump/sparge
- Using *in-situ* heat enhancement excludes electric pumps
- Product viscosity tested at room temperature or worse, at surface temperature in sun
  – Much less viscous than at groundwater temperature

#7: Air Flow (CFM)

- Product not reaching surface
- Altitude not considered

#6: Total Dynamic Head

- Sample is a trickle of what is necessary
- Need to replace pump sooner than expected

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#5: Water Table Fluctuation

- Volatile and trace metal contaminants are removed from the well when high-flow pumping methods purge the wells dry and highly aerate water samples.
- Pumping saltwater or water not just product
- SVE system is sucking water
- Costs are increased due to treating accumulated water
- Product layer typically disappears at high water levels
  - Air exposure to smear zones can reduce product recharge rate when bio growth and heavy oil sludge build up collects on open screen interval

#4: Salt Water Intrusion

- Inconclusive results from sample findings occur when the pumping test is not of a long enough time period to result in true results of water migration into the well bore from a close proximity body of salt water.

- Brackish water can lead to corrosion of equipment that is not designed for salt water applications

#3: Well Construction/Placement

- Locations are incorrect to detect groundwater contamination

- Assumptions made on topography instead of subterranean geology

- Water table column is inaccurate because wells are drilled too shallow to discern true extent of aquifer

- Too few monitoring wells in place in a remediation plan resulting in too little data and too many assumptions

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#2 Pilot Tests – Lack thereof

- Require assumptions made based on similar sites which may or may not be valid
- Too short of a duration can lead to inconclusive, inaccurate or improper data

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#1 Site Characterization

- Budget restrictions are probably the biggest factor in limiting proper site characterization
- Proper analysis – the right test for the right contaminants of concern (COC)
- Full Lab Analysis of water and soil(organics and inorganics)
- Viscosity tests for free phase hydrocarbons
- Delineation of Contaminant Plume = Amount of contaminant expected to be remediated
- Product recharge rates calculated based on pump test on entire well, not just on product layer thickness. Separate hydrocarbon bail down test required to determine recharge of product only when a ground water extraction pump is utilized to enhance product recovery

Summary

- Planning will save money in the long-run
- Be prepared to change your plans based on accumulating site data. Don't write yourself into a corner.

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