GROUTING

Why?

- Protect the valuable ground water resource and aquifer
- Prevent migration of contaminants down hole after boring completed or well installed (protect sample integrity and quality)
- Avoid possibility of monetary fines or loss of drilling license or both

How?

- Re-entry grouting - especially for single tube soil sampling activities
- Pressure grouting through primary rod string - SP15 or SP16 sampler, expendable dipole used in electrical logging. Injection of materials for remediation, etc.
- Bottom-up tremie grouting - following dual tube soil sampling or monitoring well installation, may also be used with SP15 and SP16.

Grout Mixes: Some advantages and limitations.

Bentonite Slurries

- Relatively inexpensive and easy to mix
- Generally mixed at 20% to 30% solids by weight
- Can provide grout seals with hydraulic conductivity < 1X10⁻⁷ cm/sec
- Recommend use of powdered bentonite to prepare slurries for use through small diameter tremie tubes
- Bentonite may be susceptible to desiccation by NAPLs, especially chlorinated VOCs
- In dry climates bentonite above the saturated zone may dry out and crack providing voids and pathways for rapid movement of fluids down hole.
Neat Cement

- Widely available
- Does not dry out in unsaturated soil like bentonite
- Shrinks on setting and may form pathways for movement of fluids due to this behavior under some conditions.
- If large volumes of cement used the heat of reaction may actually damage well casing.
- High chloride/sulfate content in ground water may result in poor setting of cement

Cement + Bentonite

- Used to minimize shrinkage of neat cement grouts
- Usually added in proportions of 3% to 7% bentonite by weight.
- Often considered to compromise the quality of the cement grout.

Specialty Cements - e.g. sulfate tolerant for high sulfate waters

Other
Grouting/Injection through Probe Rod String

Grouting/Injection Tools (for use through rod string)

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<tr>
<th>PC</th>
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<tr>
<td>GS</td>
<td>GS1051</td>
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<td>GS</td>
<td>16698</td>
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<td>GS</td>
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- High-Pressure Grout Hose Assembly, 10 ft. (3 m) GS GS1051
- Injection Pull Cap, for 1.5 in. probe rods GS 16698
- Injection Pull Cap, for 1.25 in. probe rods GS 16697
- Grout Pressure Gauge/Ball Valve Assembly GS GS1090
- Grout Hose Holder, magnetic GS GS1095
Grouting with the SP15 & SP16 Groundwater Sampler

Grouting the SP15 / SP16 Sampler
With GW1520 or GW1530 Screen

High-Pressure Grout Hose Assembly, 10 ft. (3 m) ....... GS GS1051
Grout Tubing Adapter, for 3/8 in. OD tubing .......... AD GS1060
Grout Tubing Clamp, 3/8 in. ......................... GS GS1065
Nylon Tubing, high pressure, 3/8 in. OD, 100 ft. (30 m) roll — TB 11633
Grout Nozzle ................................................. SP GW1545
Grout Plug Push Adapter .................................. SP GW1540
Bentonite, powdered, 200 mesh, 50 lb. (23 kg) bag .......... ATC AT92
Grouting
Prepack Screen
Monitoring
Wells

PVC Top Cap (GW-2055)
or Vinyl Cap, shown
(AT-441)

1) Fill Probe Rods with
Grout from Bottom Up

2) Continue Operating
Grout Pump While
Withdrawing Rods

High-Solids Bentonite Slurry
or Neat Cement Grout

Nylon Tubing
3/8-in. O.D.
(11633)

Bentonite Seal

Grouting Well Annulus with Geoprobe
Model GS-1000 Grout Machine

Grouting Tools (for prepacked screen monitoring wells)  

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<td>Grout Tubing Adapter, for 3/8 in. OD tubing</td>
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<td>Grout Tubing, 5/8 in.</td>
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<td>Grout Tubing Clamp, 3/8 in.</td>
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<td>Polyethylene Tubing, low density, 5/8 in. OD, 100 ft. (30 m) roll</td>
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<tr>
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<td>Nylon Tubing, high pressure, 3/8 in. OD, 100 ft. (30 m) roll</td>
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