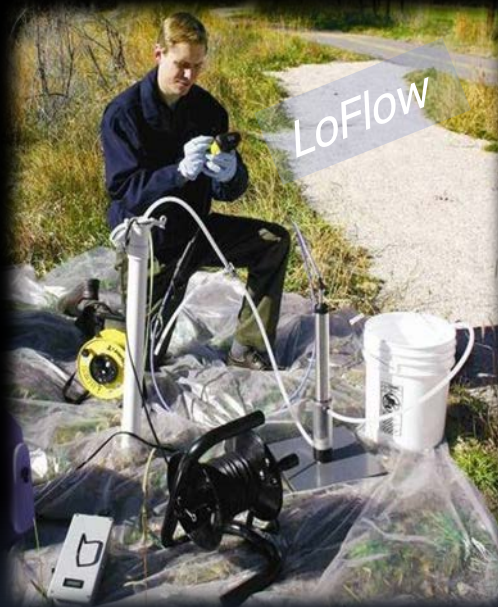


The Continuing Evolution of Groundwater Sampling



MoFlow

Volume Purge



LoFlow

Low-Flow



NoFlow

No-Purge/Passive

Kent Cordry



Highly Condensed Ground Water Sampling History

Volume Purging

1970's-Present

Low-Flow

1990's-Present

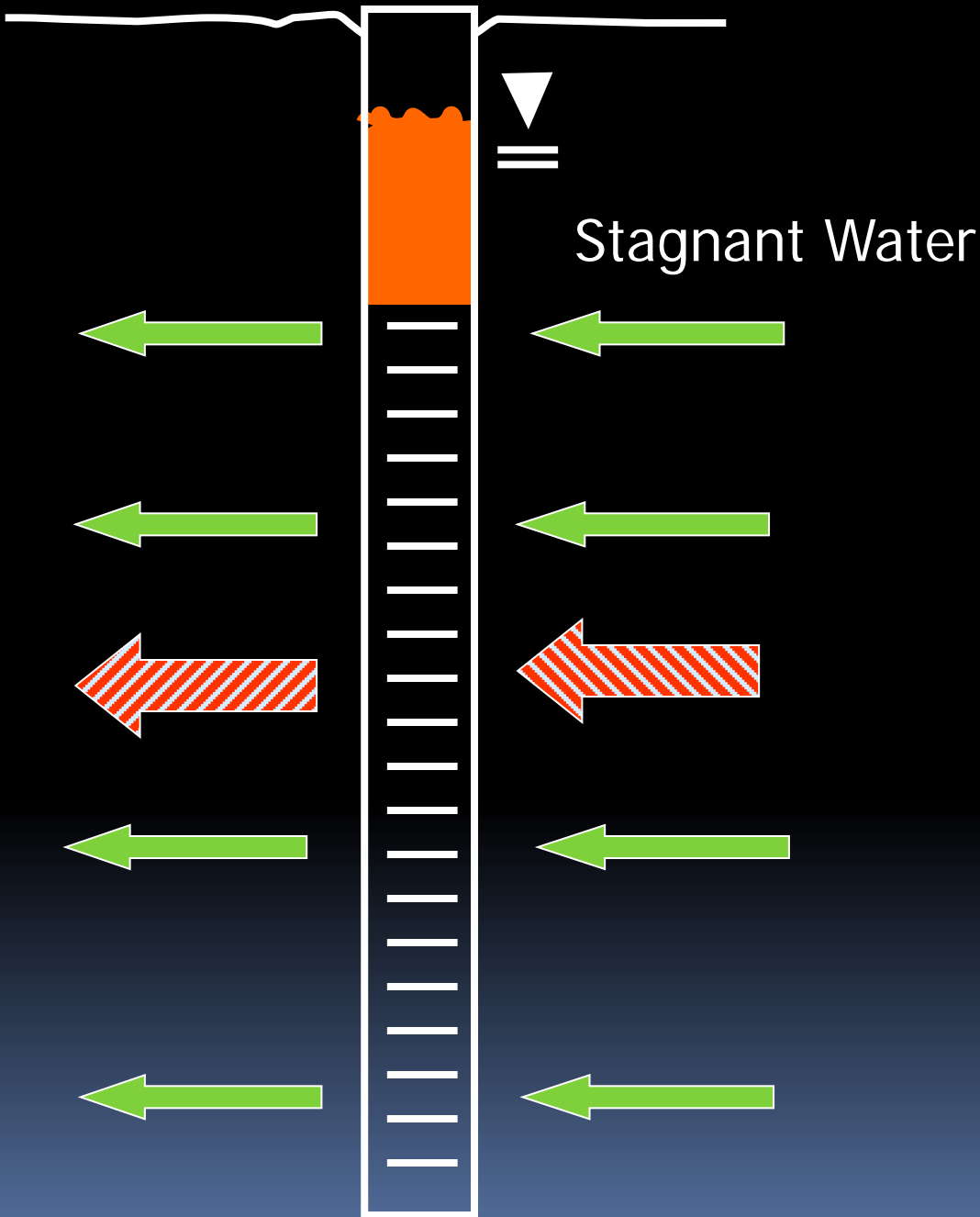
No-Purge (Passive)

2000- Present

Volume Purging

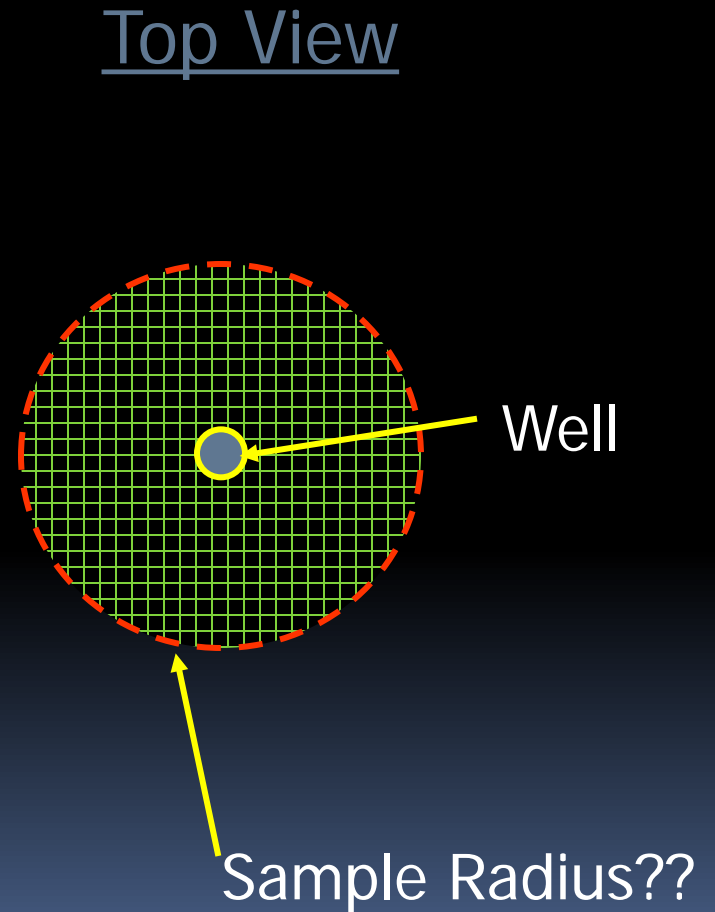
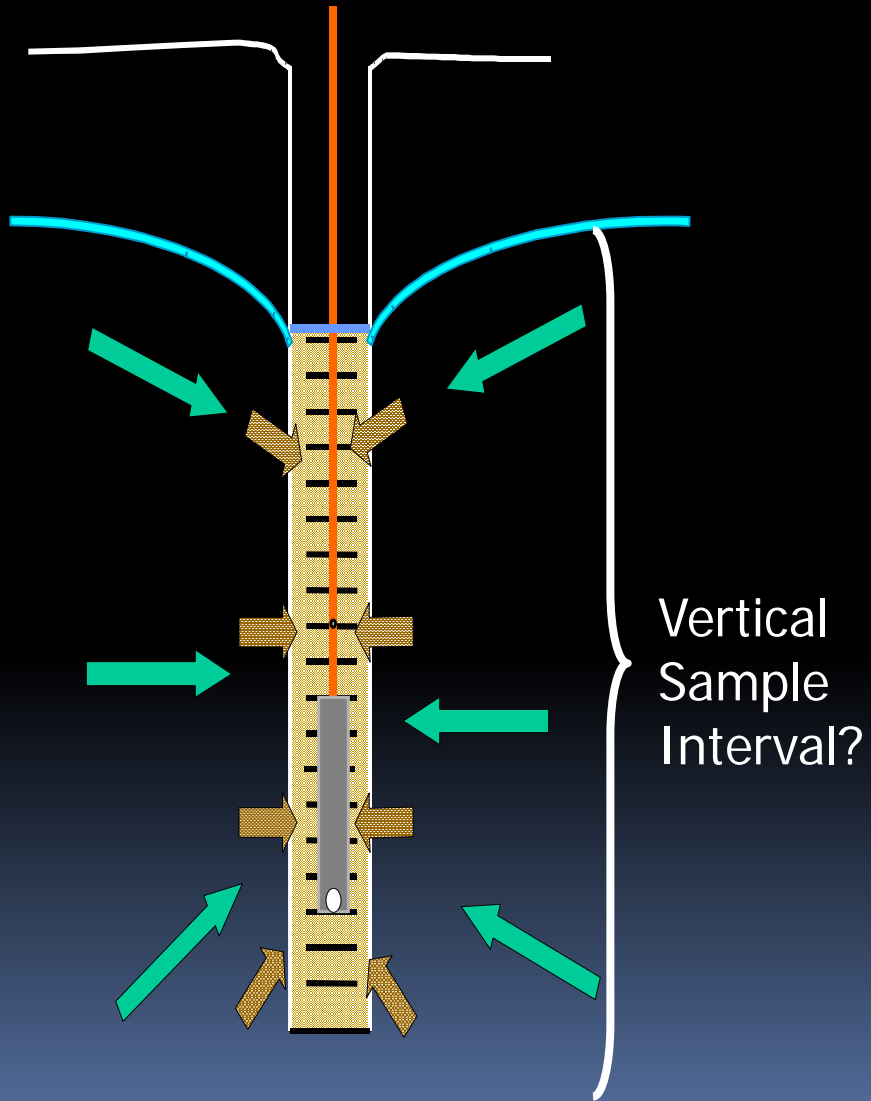
Purge 3 to 5 times the water contained in the well and surrounding filter pack, collect sample.





Well Under
Static
Conditions

Volume Purging Effects



Advantages-Volume Purging

1. Standard and accepted method.
2. Easy to understand and implement.
3. Averages full screened interval.
4. Unlimited sample volume.*

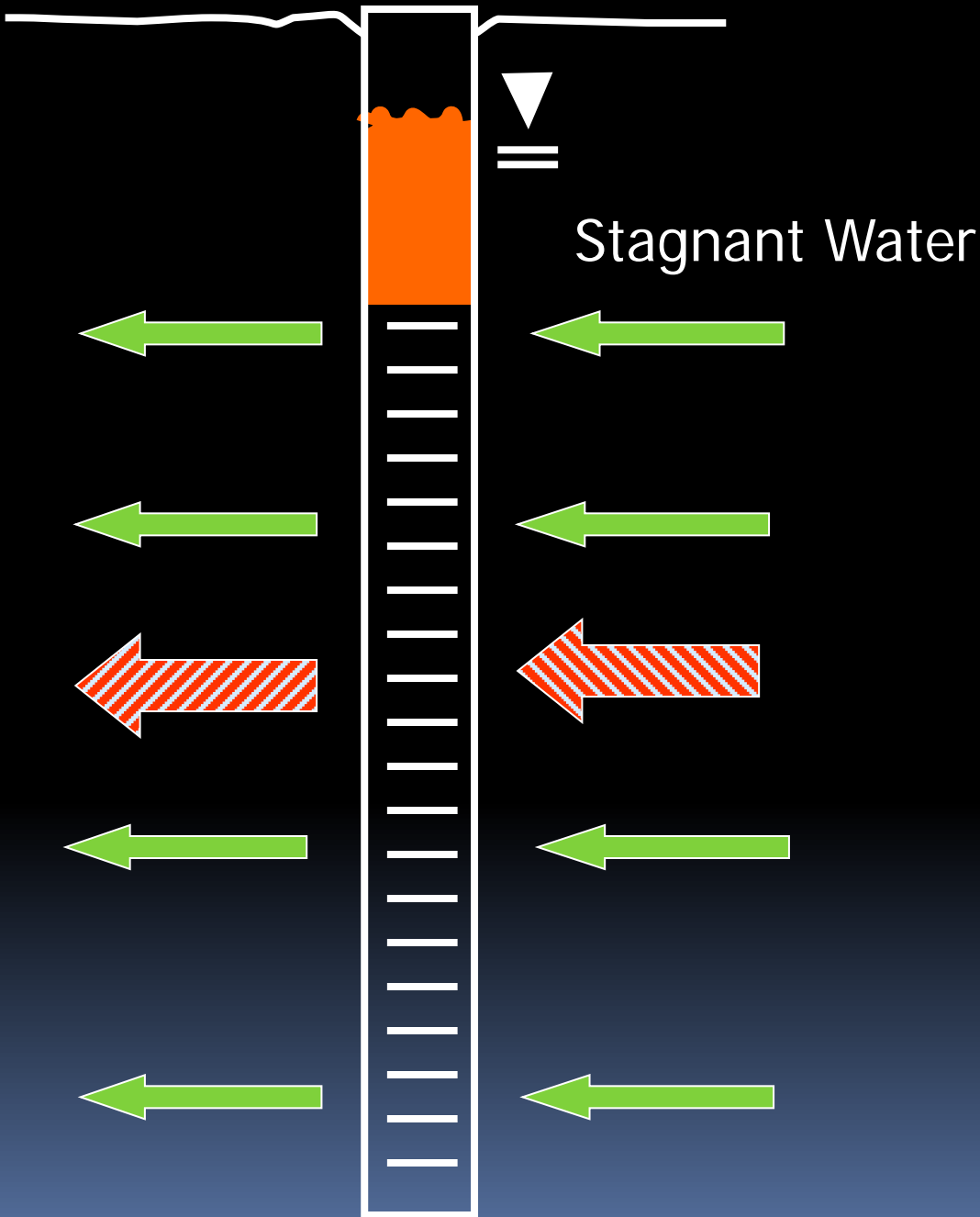
Disadvantages

1. Data quality, prone to inconsistency.
2. Expensive and time consuming.
3. Large volume of purge water.
4. Samples full screen, and more.
5. Mobilizes solids, increased turbidity.



Low-Flow Sampling



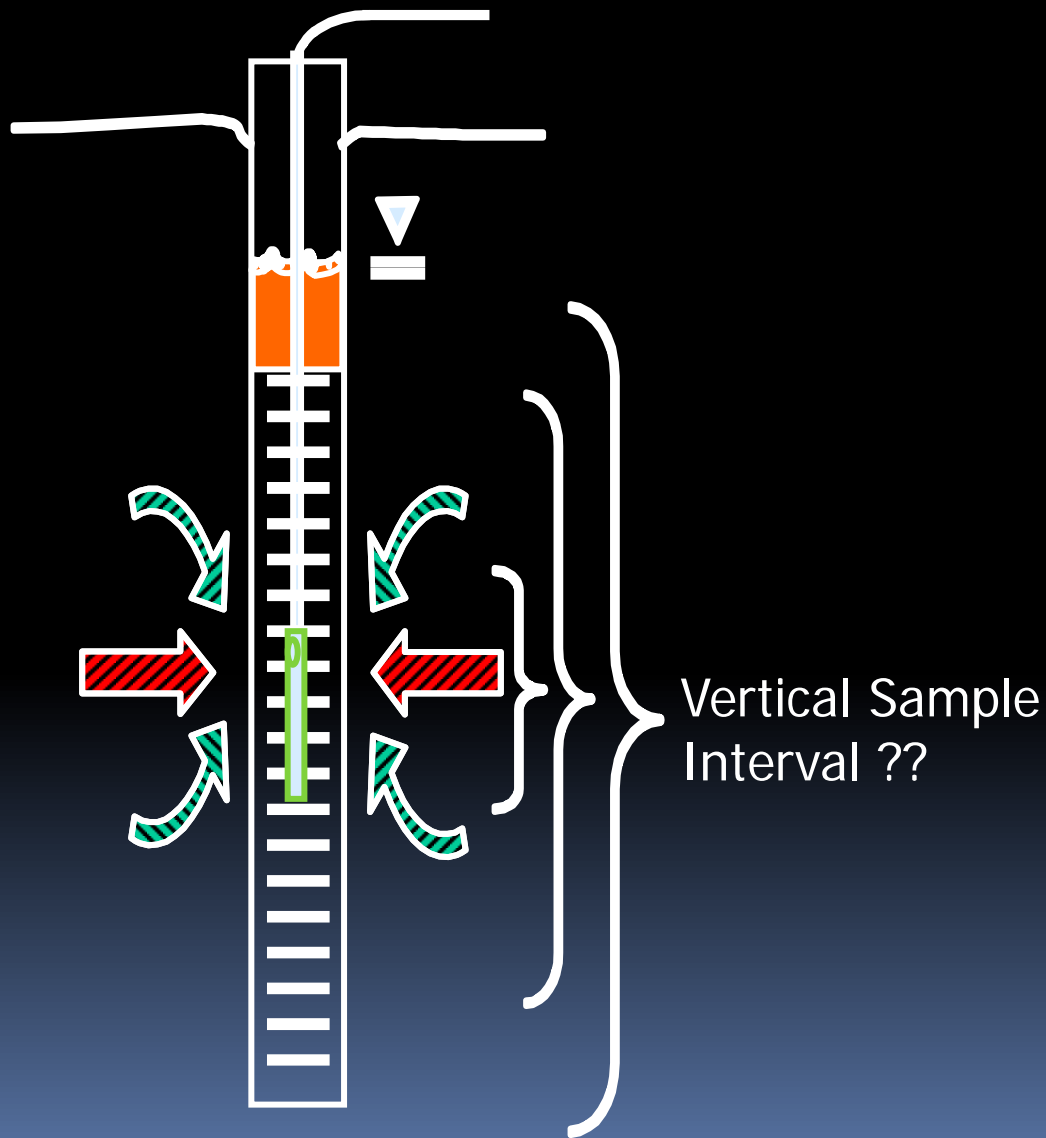


Well Under
Static
Conditions

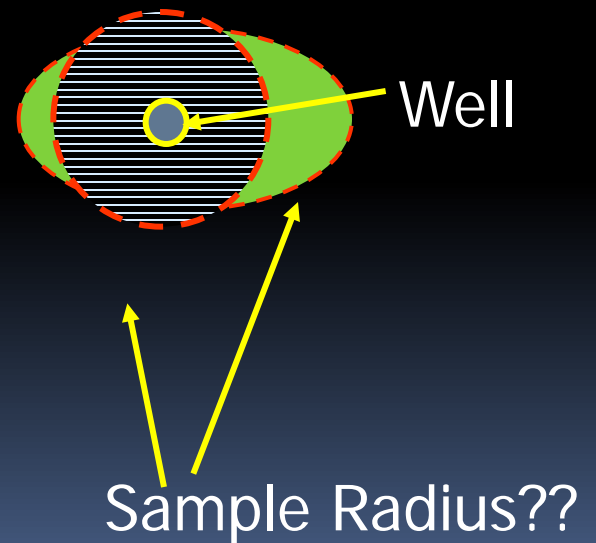
Low Flow Sampling

1. Very slow pumping rate.
2. Minimize drawdown in well.
3. Monitor indicator parameters.

Low Flow Sampling



Top View



Advantages, Low Flow Sampling

1. Better data.
2. Lower sample turbidity
3. Reduced purge water volume.
4. Can be less expensive than purging.
5. Normally accepted by regulators.
6. Unlimited sample volume.*

Disadvantages

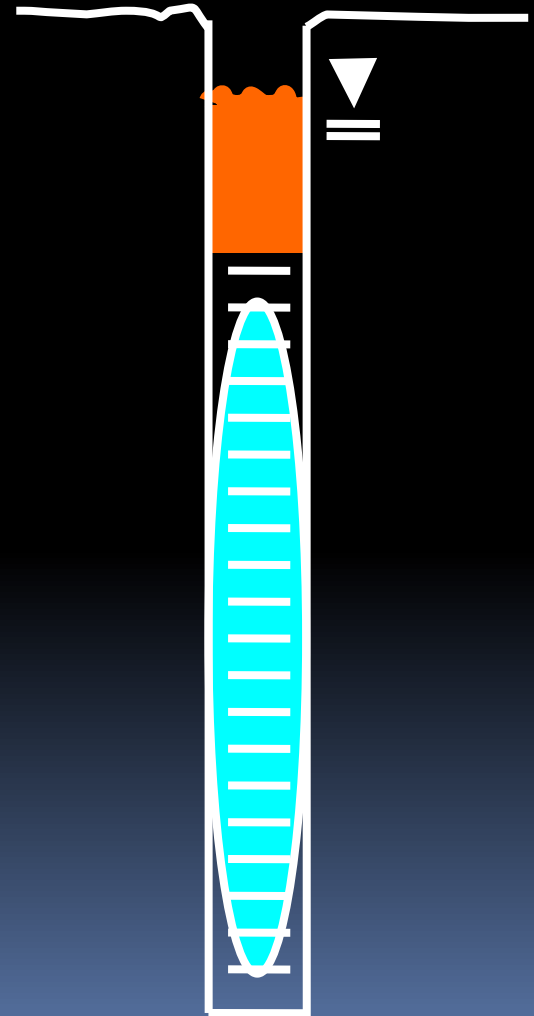
1. High initial equipment cost.
2. Requires operator training.
3. Sometimes no faster than volume purging.
4. Sample comes from undefined interval.

No-Purge/Passive Sampling

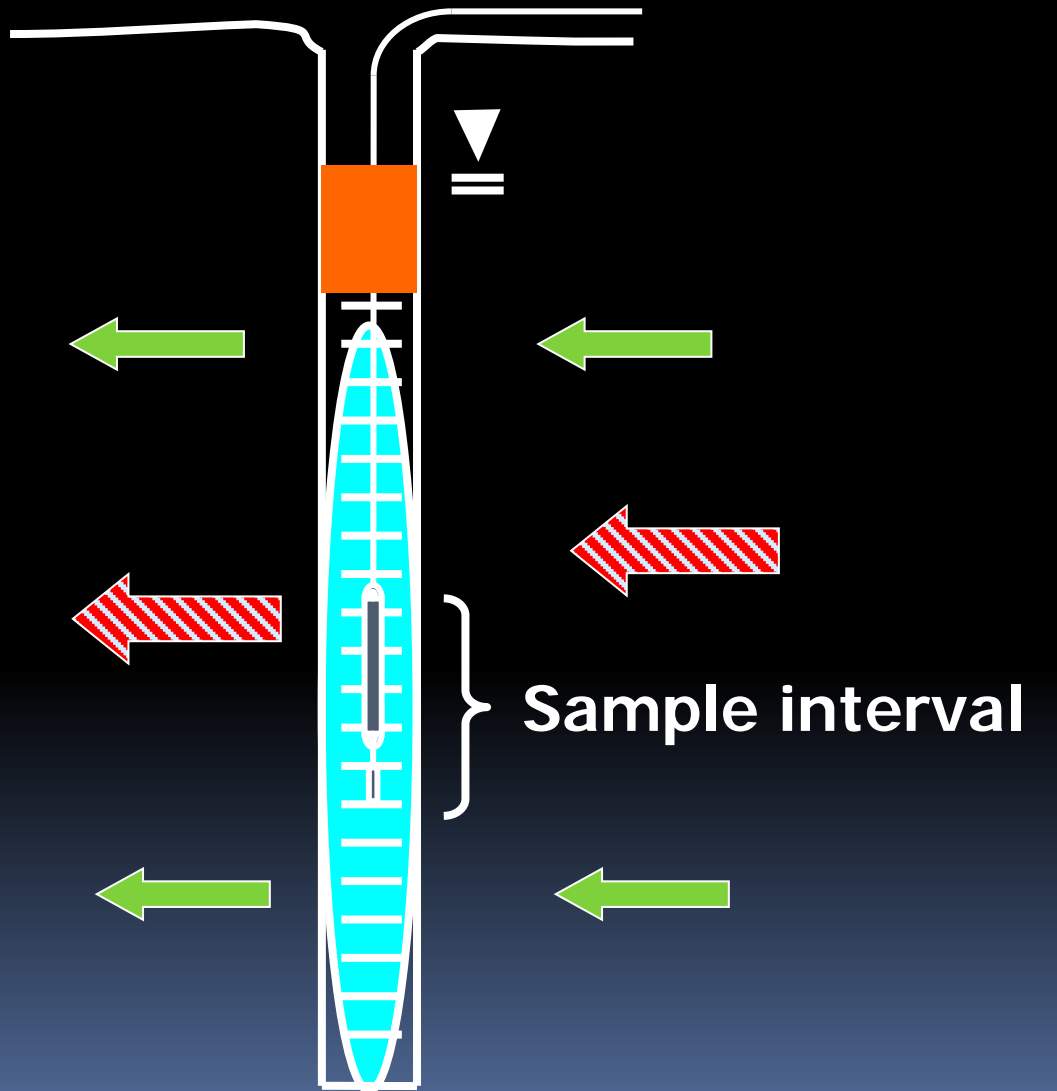


What is No-Purge Sampling?

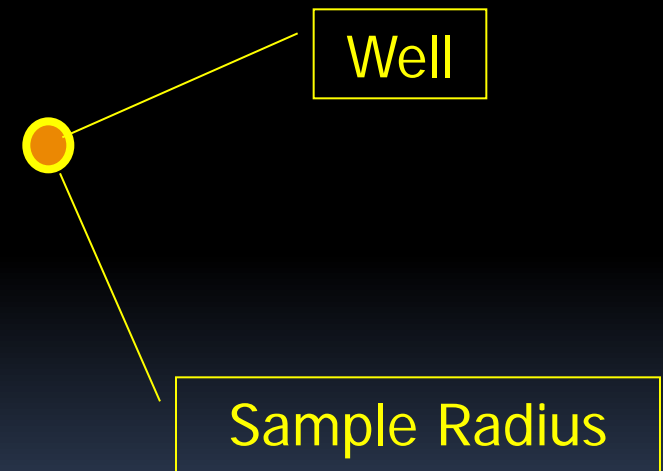
- Collect a sample from a user defined interval within the well screen without prior purging.



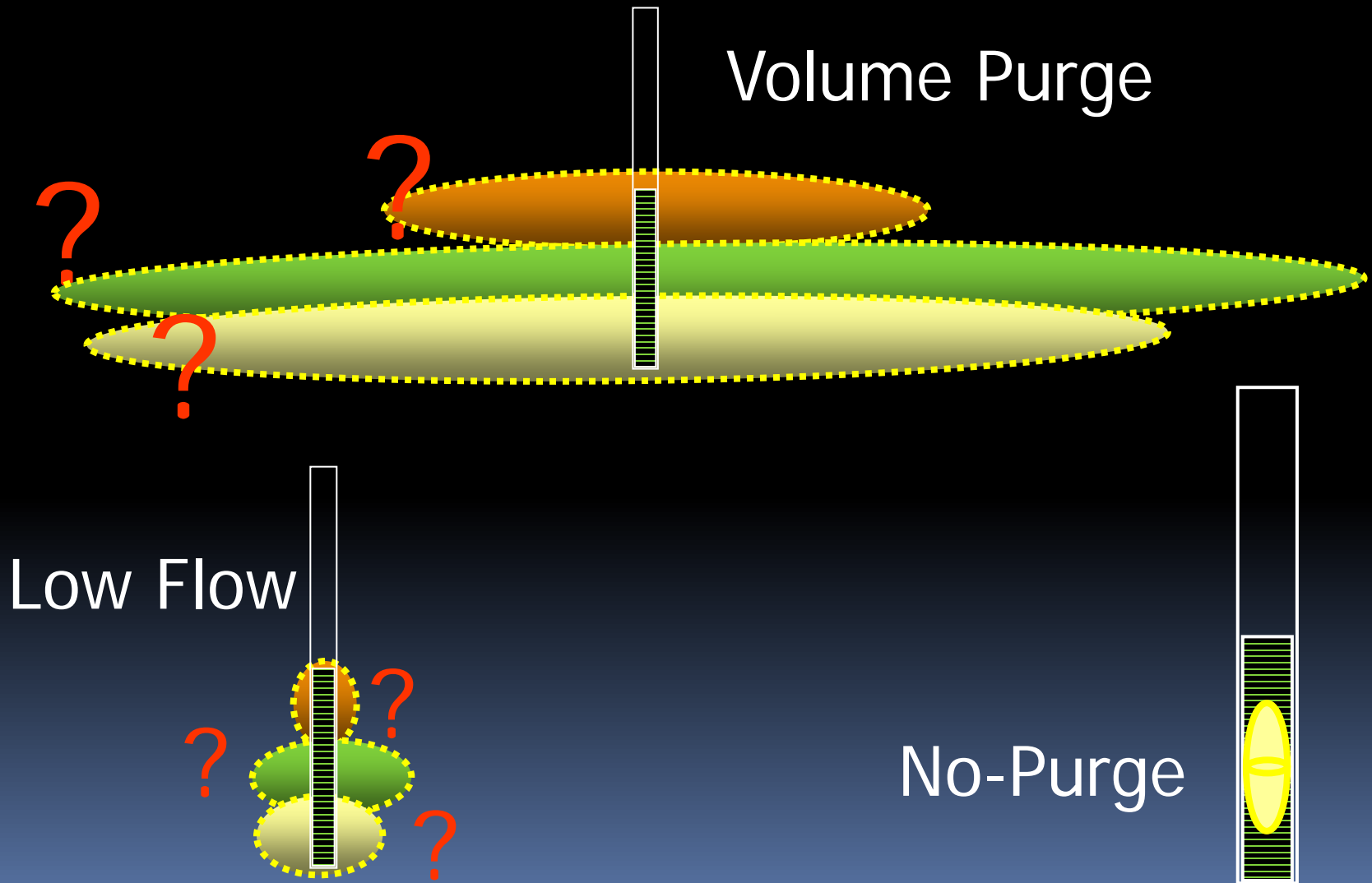
No-Purge Sampling



Top View



Where Does the Sample Come From?



HydraSleeve



HydraSleeve

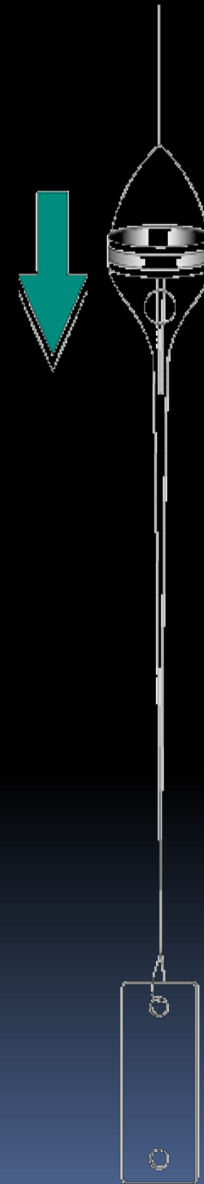
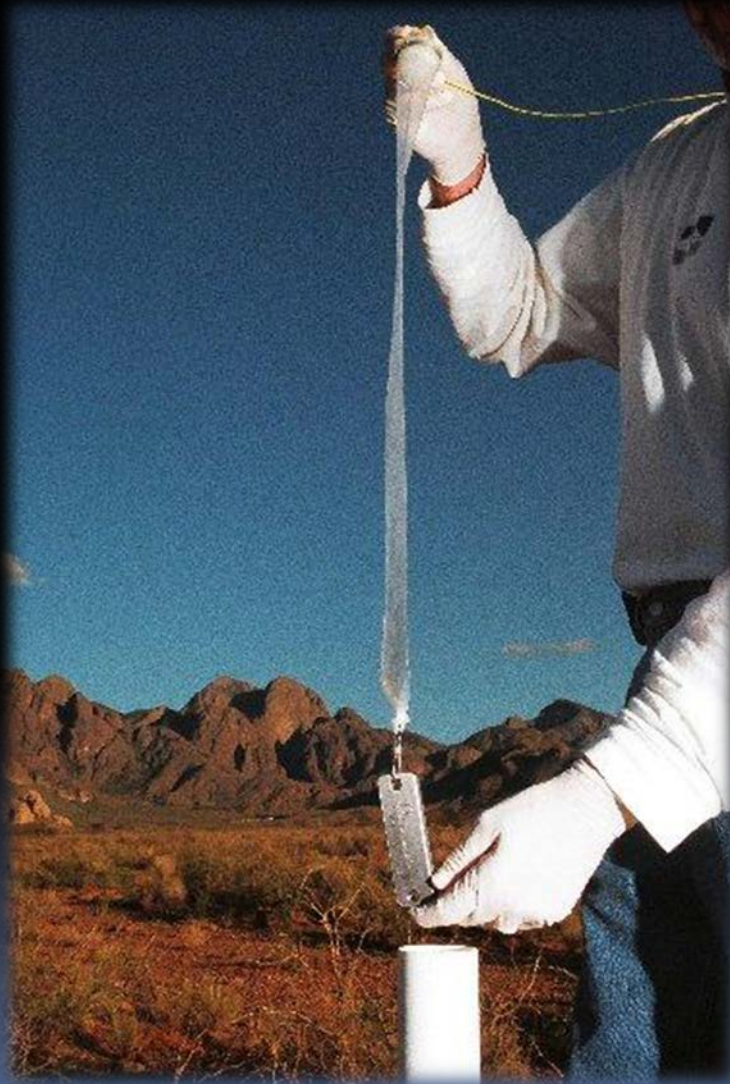
Discharge
Straw

Reusable Weight and Clip

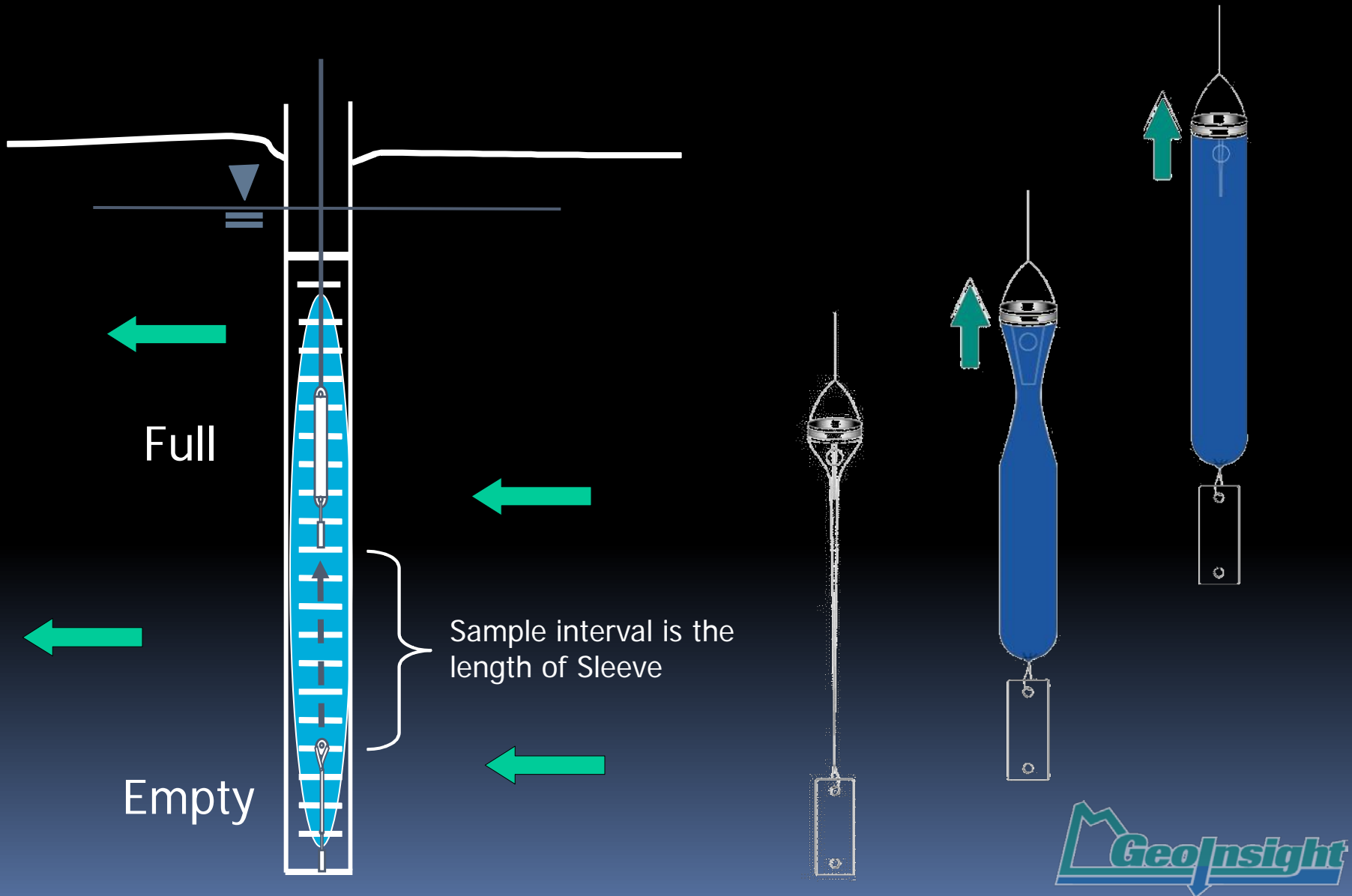


Check Valve

Deployment



Sample Collection





Bailed



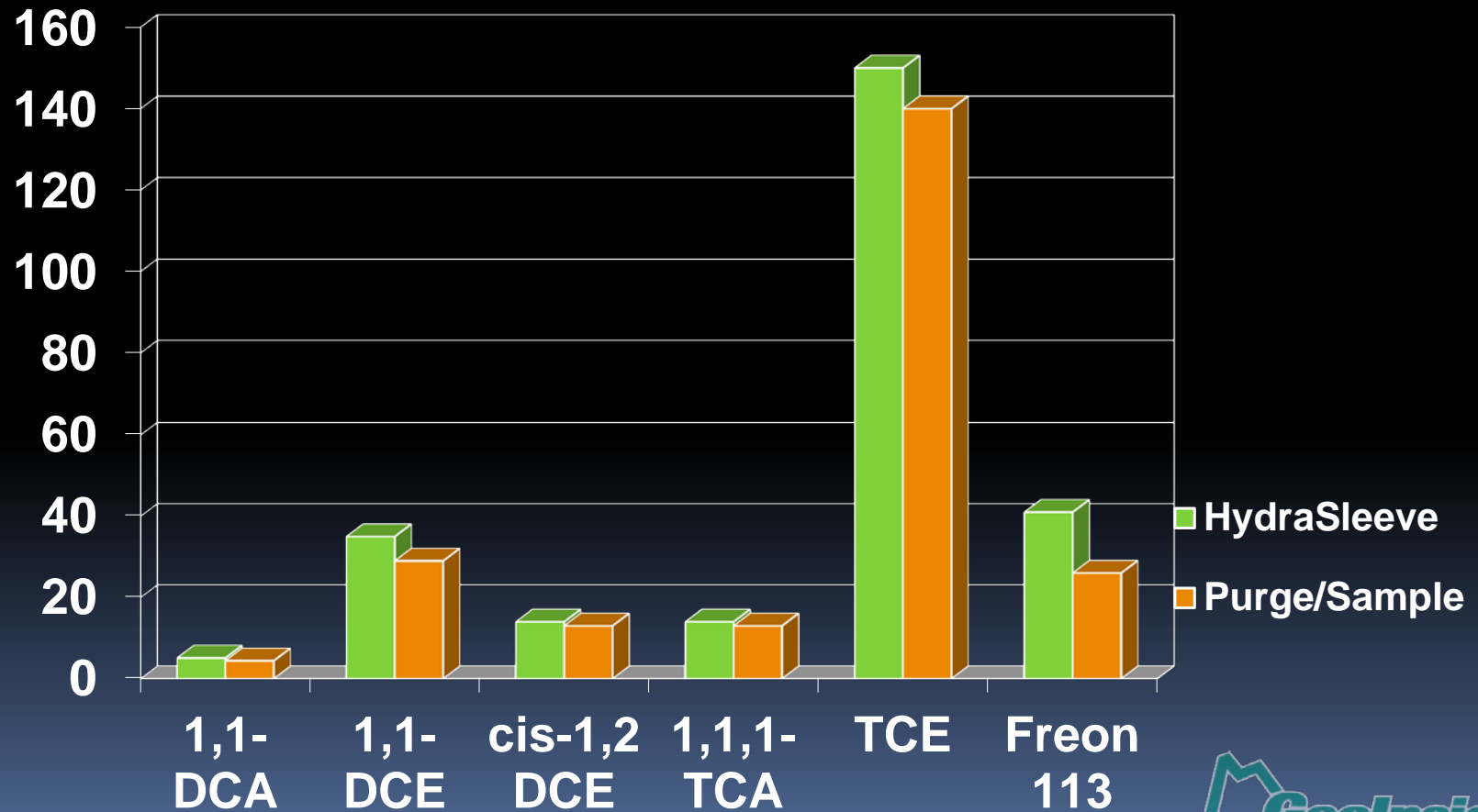
No-Purge

Why No-Purge Sampling?

- Collect a Formation Quality Sample

Collect a Formation Quality Sample.

ppb



Why No-Purge Sampling?

- Collect a Formation Quality Sample
- Simple Logistics

1st Shipment to Install 45 Wells



2nd Round



Why No-Purge Sampling?

- Collect a Formation Quality Sample
- Simple Logistics
- Save Time and Money (50 to 80%)

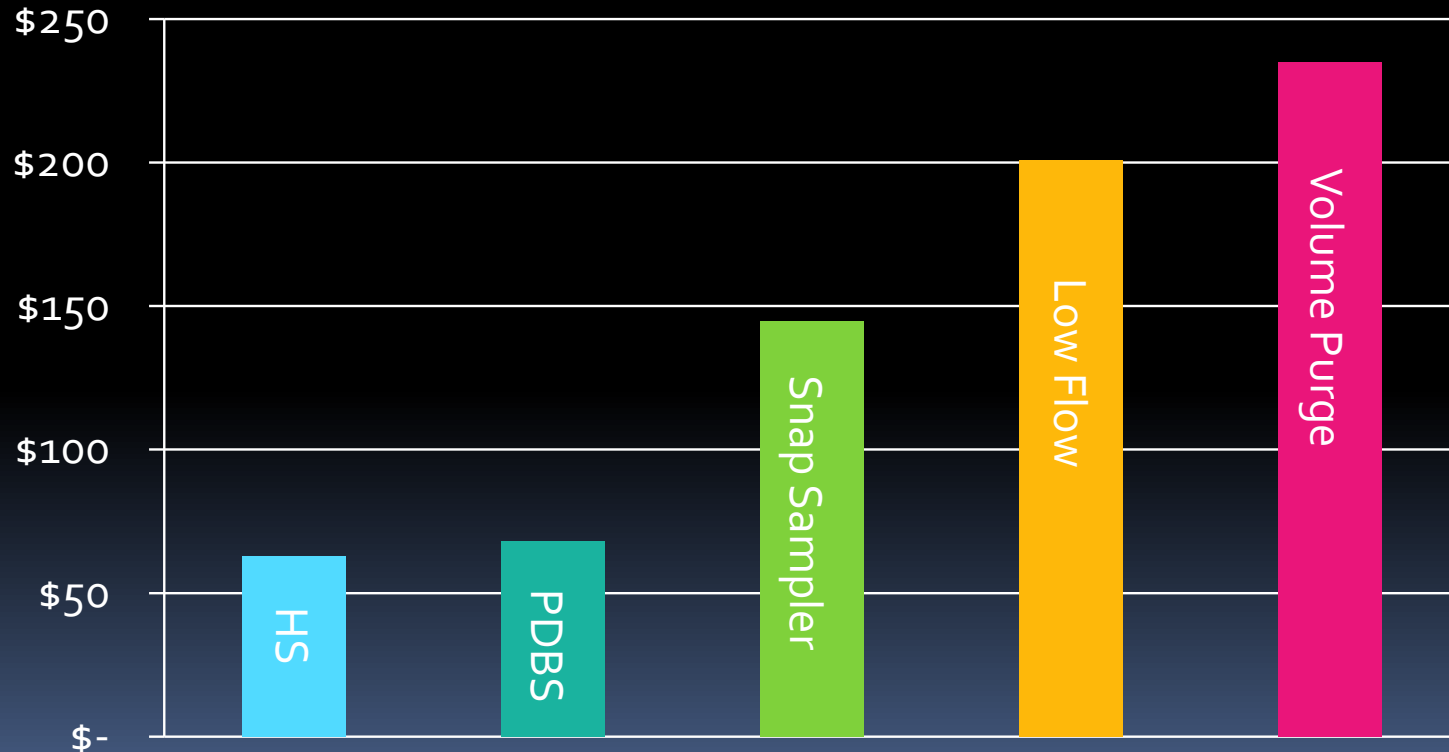
Case Study-New England

- Low Flow Sampling - Required 2 weeks with 4 people.
- No-Purge - Required 4 days with 2 people.

Sampling Costs

From McClellan AFB Report 2005

**Based on 2-person team.*

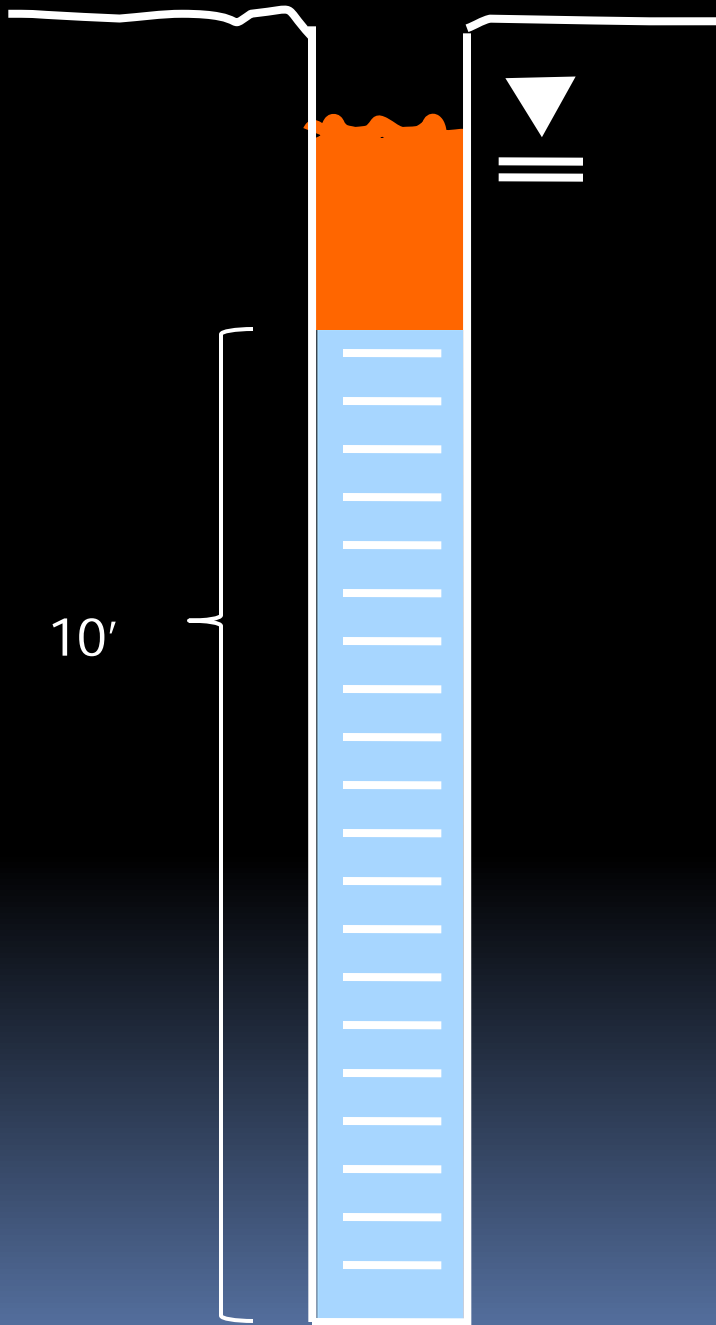


Why No-Purge Sampling?

- Collect a Formation Quality Sample
- Simple Logistics
- Save Time and Money (50 to 80%)
- Greener Sampling Method
 - No purge water disposal.
 - Minimize energy consumption.
 - Less exposure to safety hazards.

No-Purge Limitations

- Relatively new.
- Limited sample volume. One shot sample method.
- Results don't always match other methods in all wells.



Total Volume of Saturated 10-Foot Schedule 40 Screen

(most collect less than 50%)

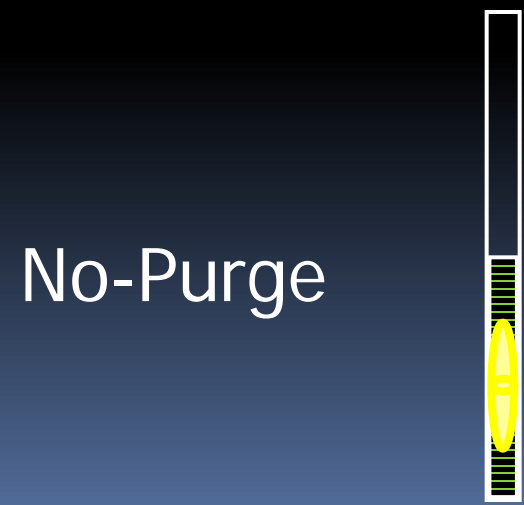
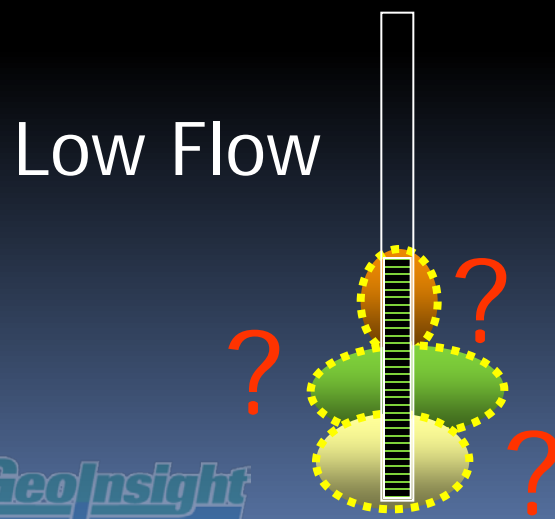
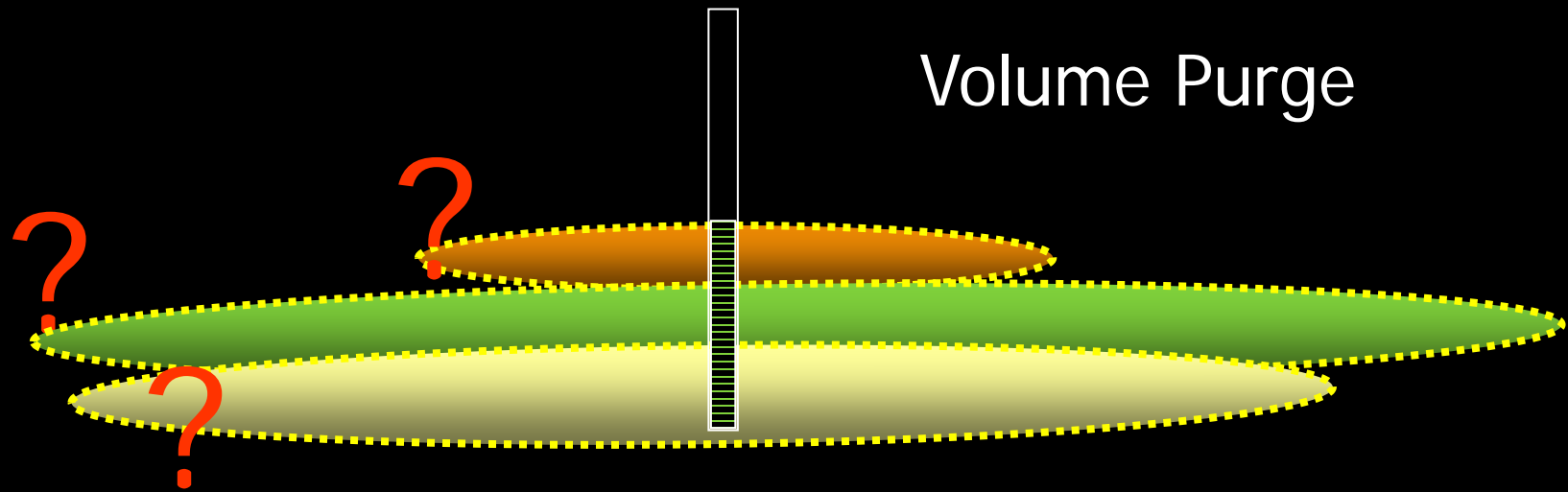
- * 4-Inch = 25 liters
- * 2-Inch = 6.4 liters (50% = 3-4 liters)
- * 1-Inch = 1.7 liters

ITRC Minimum Sample Volumes for Common Environmental Analytical Methods

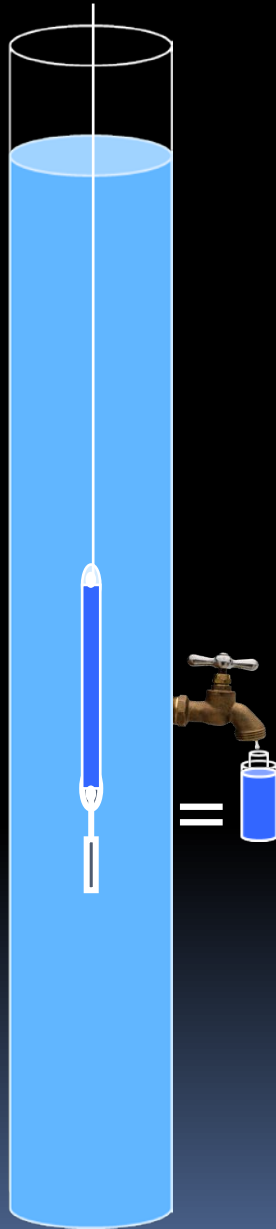
Parameter	Asked For	Easily Accepted Minimum Volume for One Analysis
Alkalinity	200 (mls)	10 (mls)
Hex Chromium	300	5
Perchlorate	50	25
Total Hardness	100	10
VOC's	140	20
BNAs	1000	250
Pesticides	1000	100
PCBs	1000	100
Total	3790	510

Why don't the different sampling methods always compare?

Source of the Sample?



STANDPIPE STUDIES



If you sample the same water,
you get the same results!

Why the increased use of no-purge sampling?

It provides formation quality groundwater samples with a 50-80 percent reduction in cost, time and energy consumption and improves site safety.



Innovative “Off Label” Uses...





Thank You!
Questions?

Kent Cordry
hydrasleeve.com

