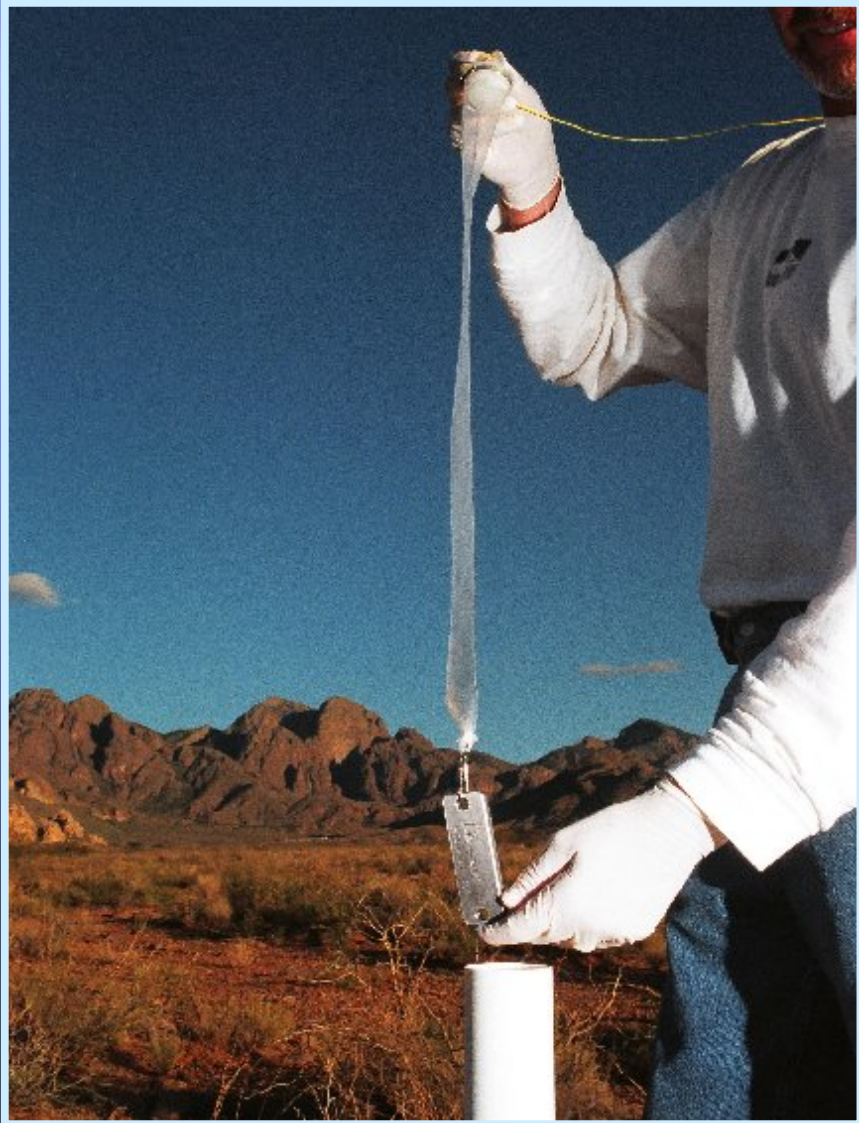


# HydraSleeve

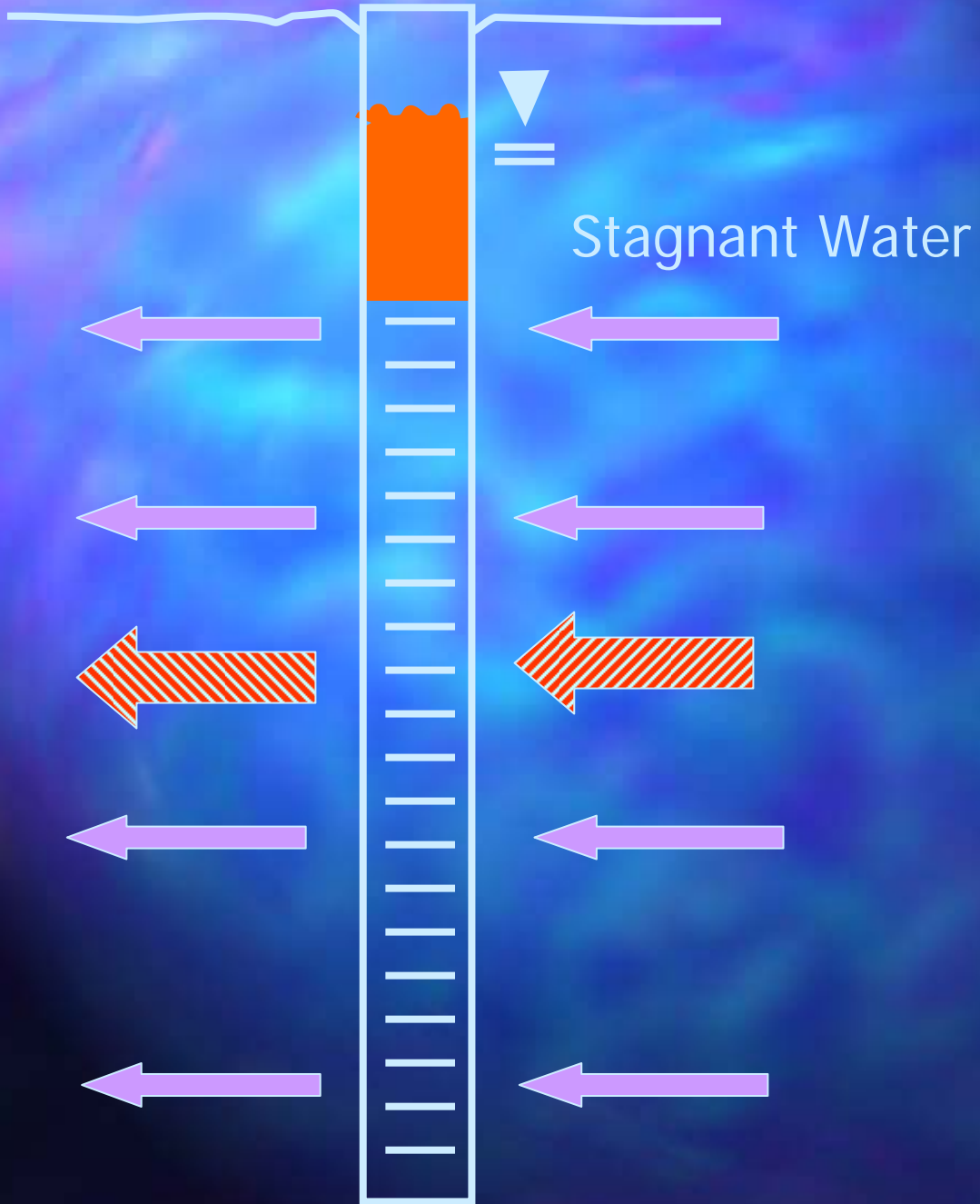


A New, Passive, No-Purge,  
Ground-Water Sampler for  
All Contaminants

# A "very" Brief History of Ground-Water Sampling



In the  
Beginning  
(Circa 1980)

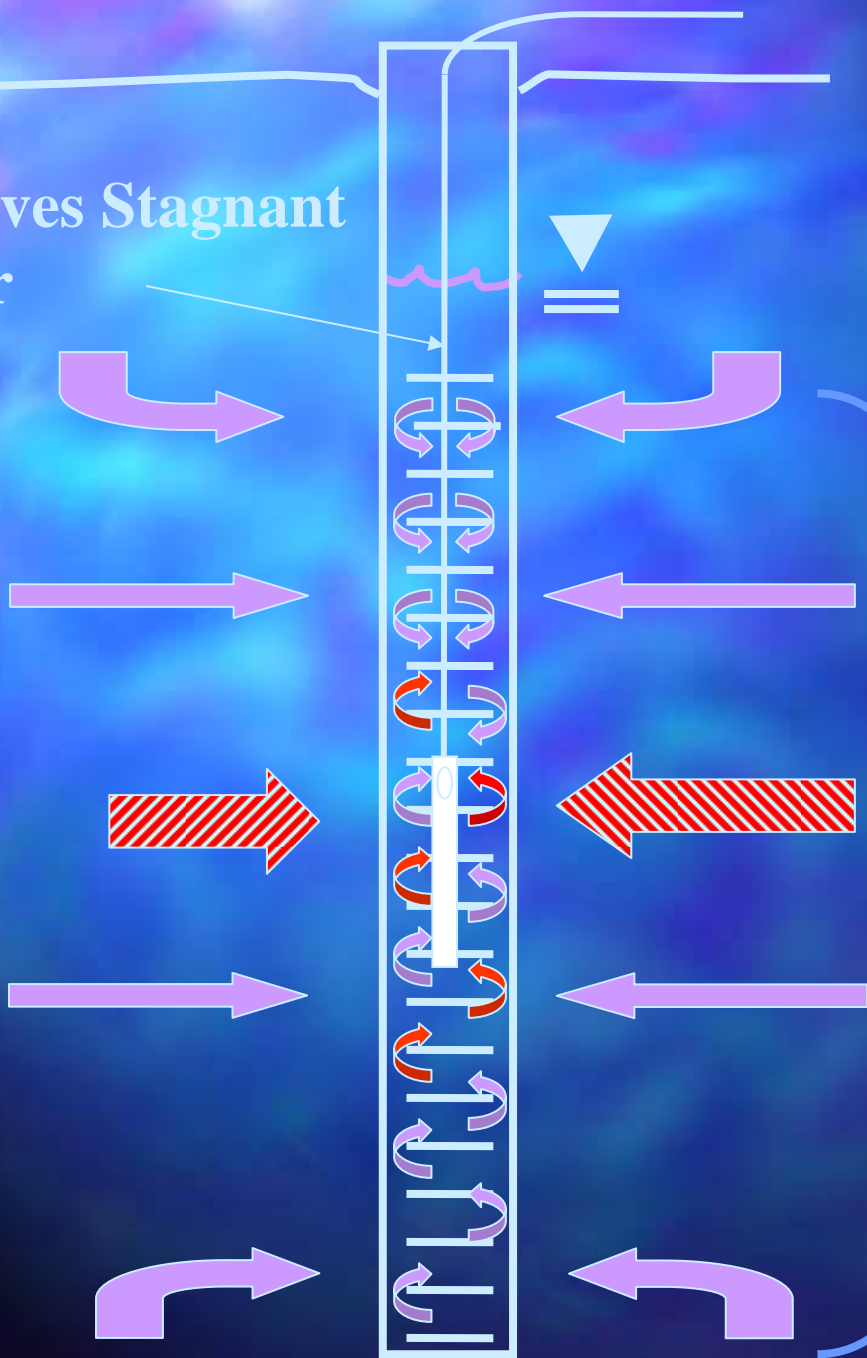


Well Under  
Static  
Conditions

# Purge and Sample

- Purge 3 to 5 times the water contained in the well and surrounding filter pack.
- Sample the well.

Removes Stagnant Water



Purge and Sample

Sample Interval ??



# Purge and Sample

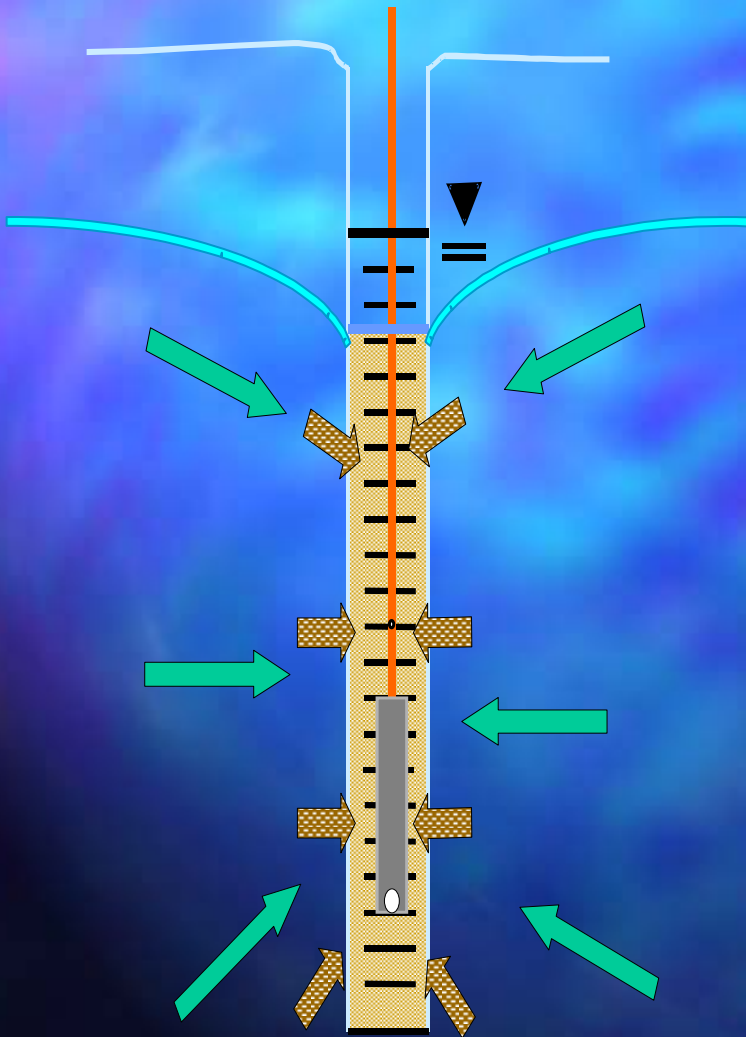
# Advantages, Purge and Sample

- Standard method.
- Easy to understand and implement.
- Averages full screened interval.

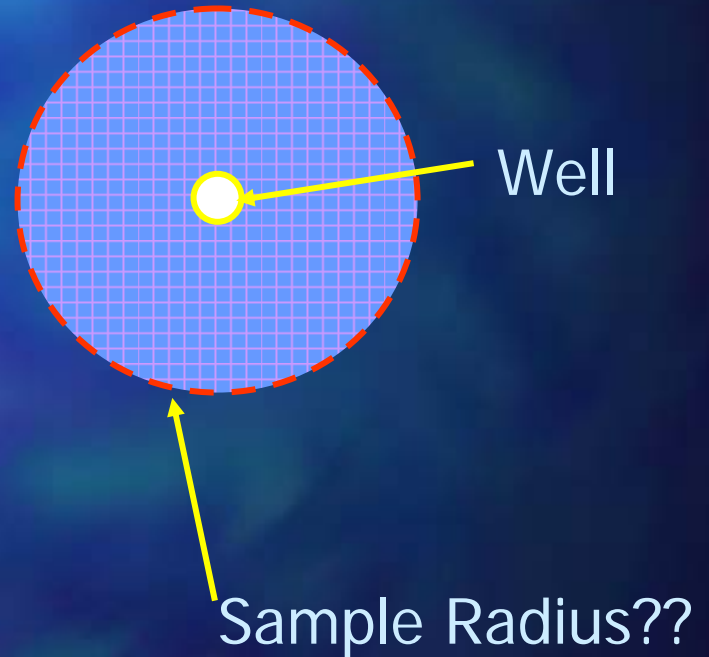
# Disadvantages, Purge and Sample

- Data quality, prone to inconsistency.
- Expensive and time consuming.
- Large volume of purge water.
- Averages full screened interval.
- Mobilizes solids, increased turbidity

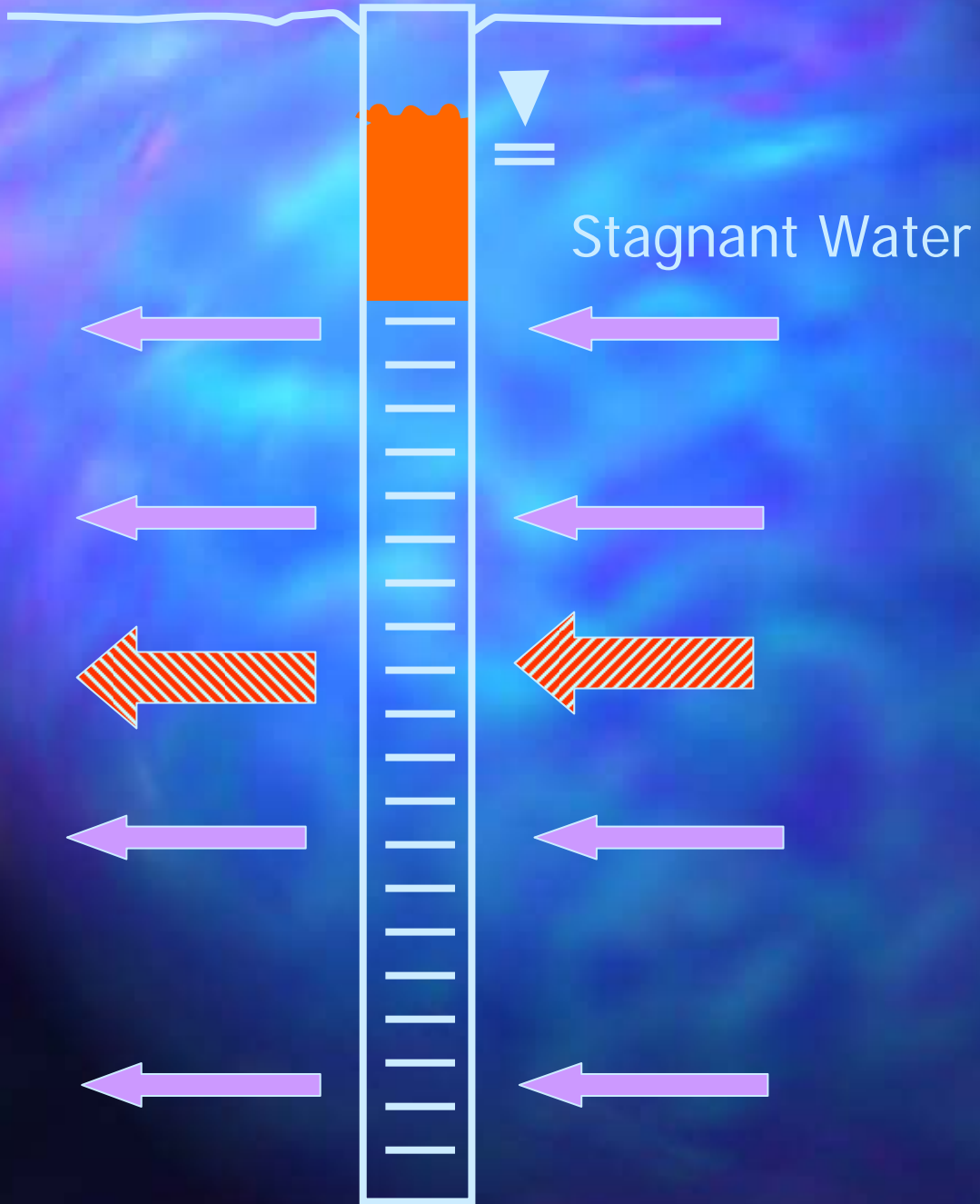
# Purge and Sample Effects



Top View



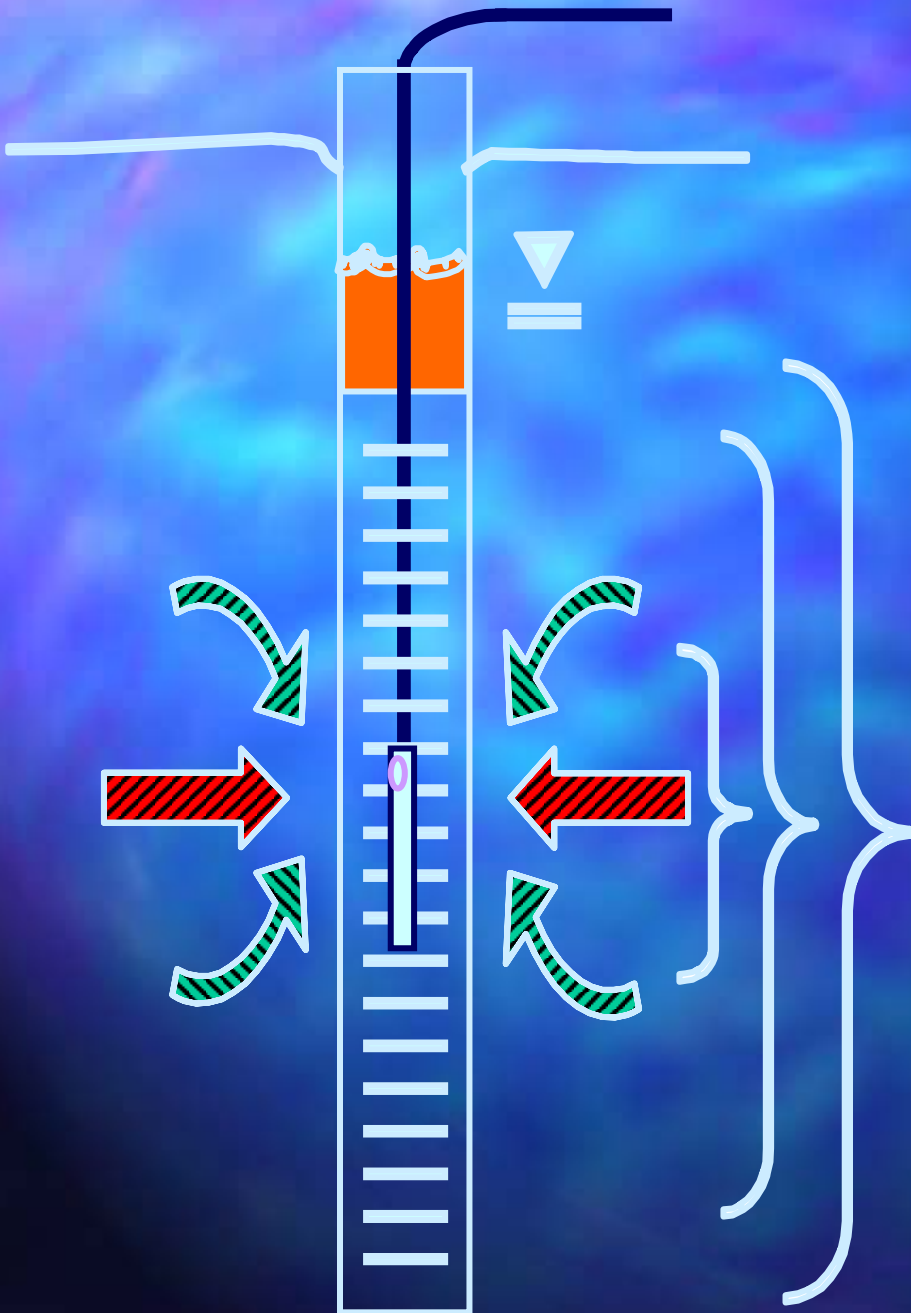
# Low-Flow Sampling



Well Under  
Static  
Conditions

# Low Flow Sampling

- Very slow pumping rate.
- Minimal drawdown in well.
- Monitor indicator parameters.



# Low Flow Sampling

Sample Interval ??

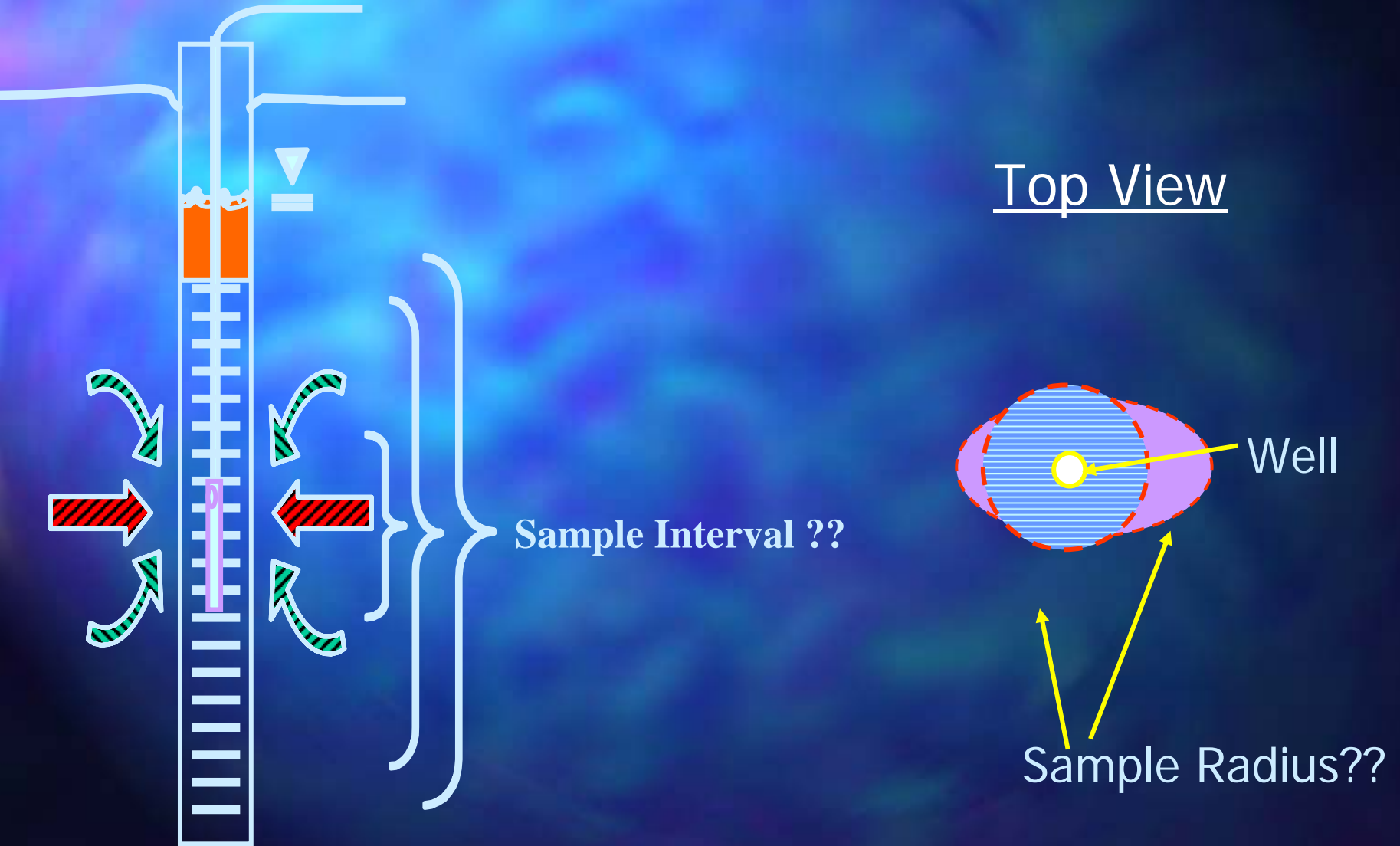
# Advantages, Low Flow Sampling

- Better data.
- Reduced purge water volume.
- Reduced turbidity
- Normally accepted by regulators.

# Disadvantages, Low Flow Sampling

- High initial equipment cost.
- Requires operator training.
- Often no faster than purge and sample.
- Sample comes from undefined interval.

# Low Flow Sampling



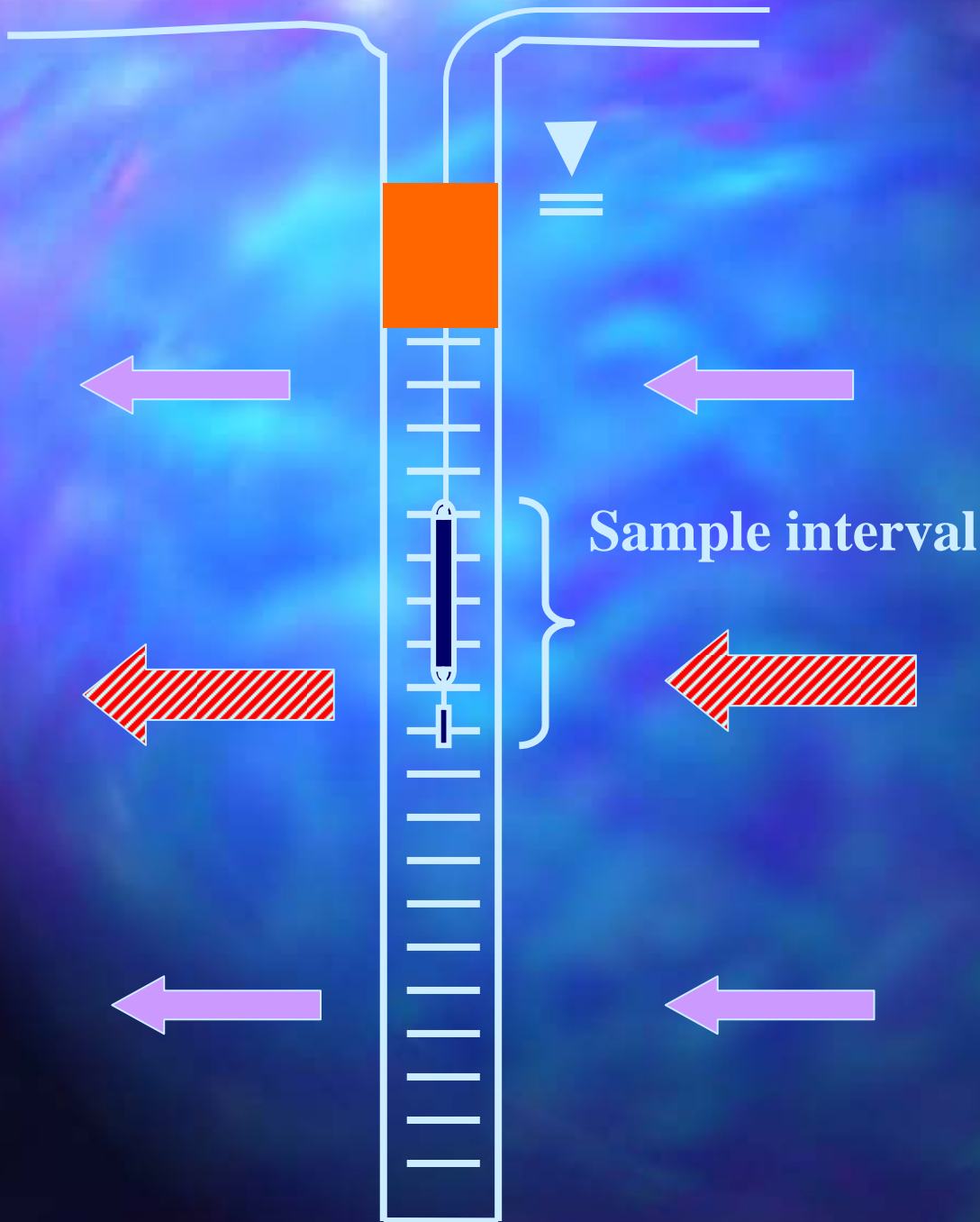
# Passive Diffusion Bag Sampler (PDBS)

- Diffusion of contaminants across a membrane (usually PE) into a sealed container.

# Passive Diffusion Bag Sampler



# Passive Diffusion Bag



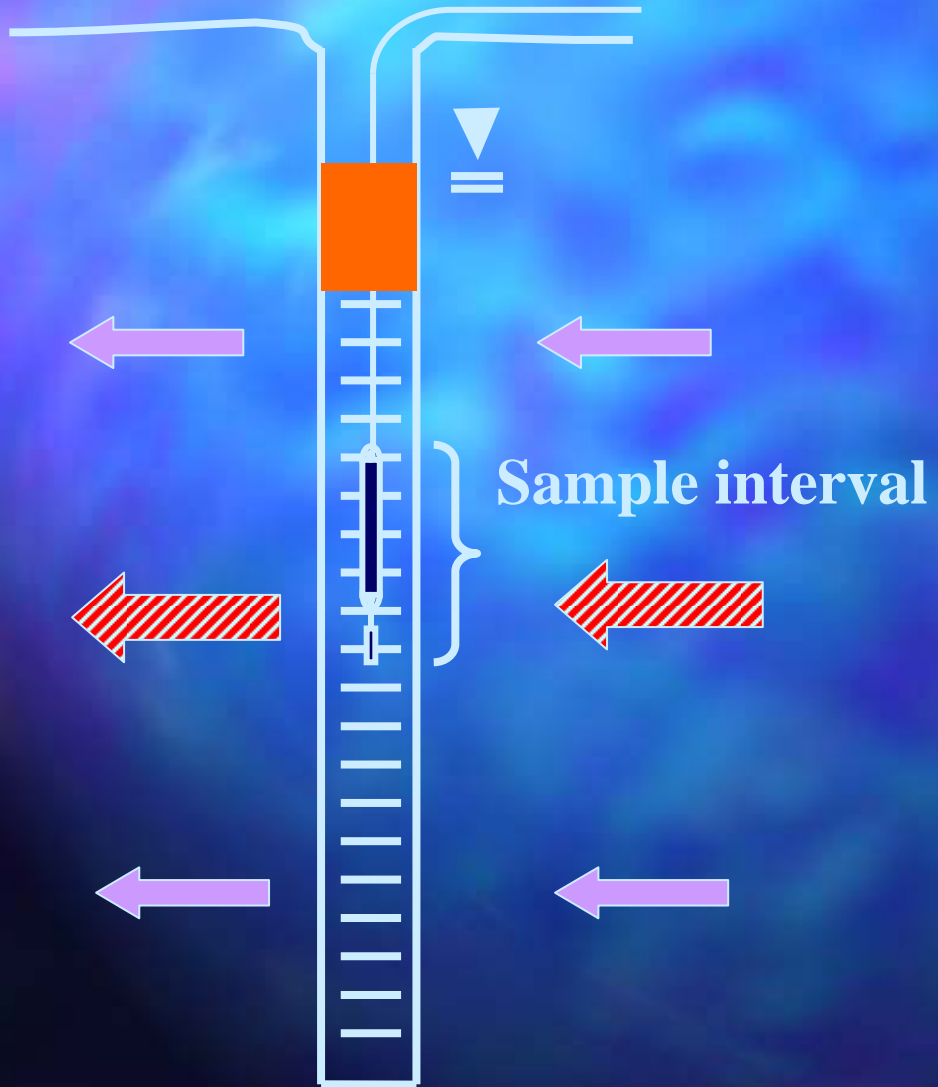
# Advantages, Passive Diffusion Bag Samplers

- Easy to use.
- No purge water generated.
- Fast and inexpensive.
- Sample comes from very discrete interval.
- Simple vertical profiling.

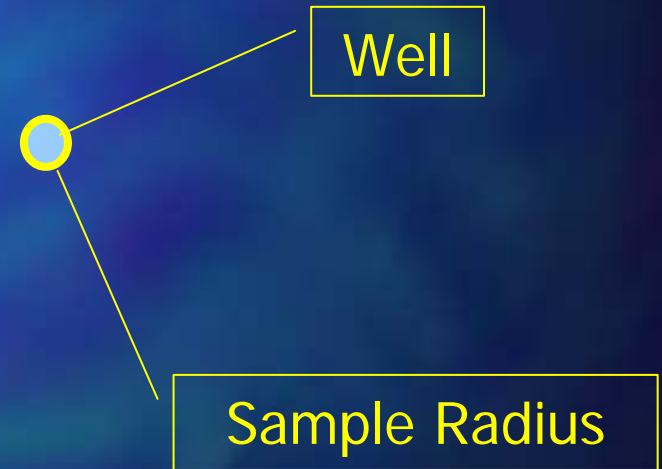
# Disadvantages, Passive Diffusion Bag Samplers

- Can only be used for specific VOC's.
- Samples very discrete interval.
- Takes time for diffusion to occur.

# Passive Diffusion Bag



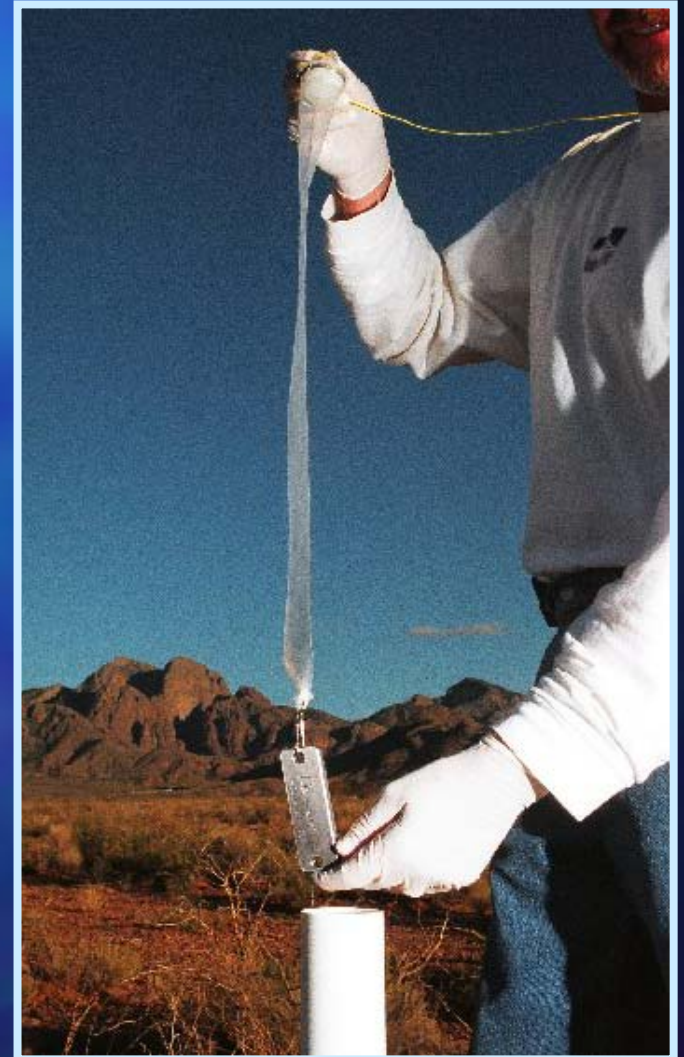
## Top View



# HydraSleeve

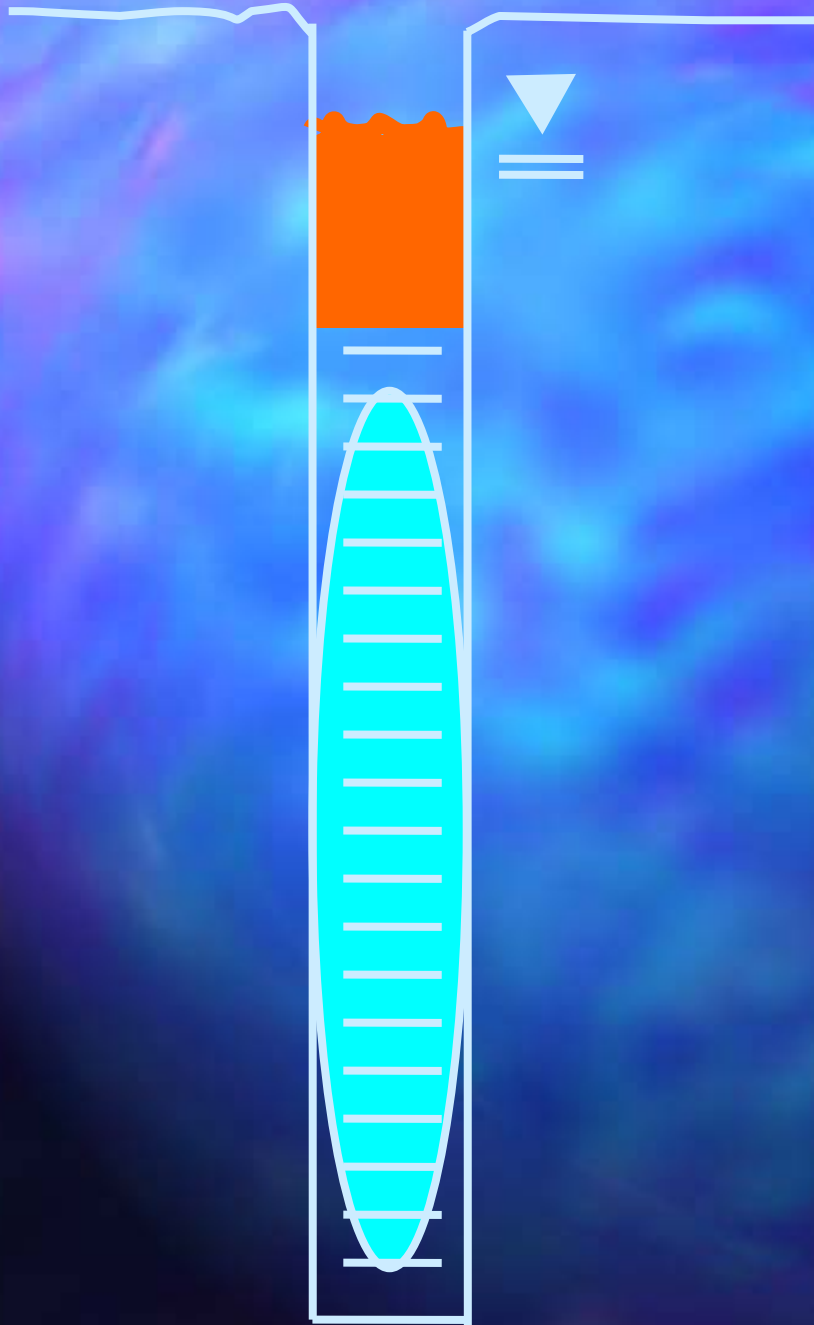


# HydraSleeve Components



# How does it work?

HydraSleeve “cores” a water sample from a defined interval within the well screen, then seals itself.

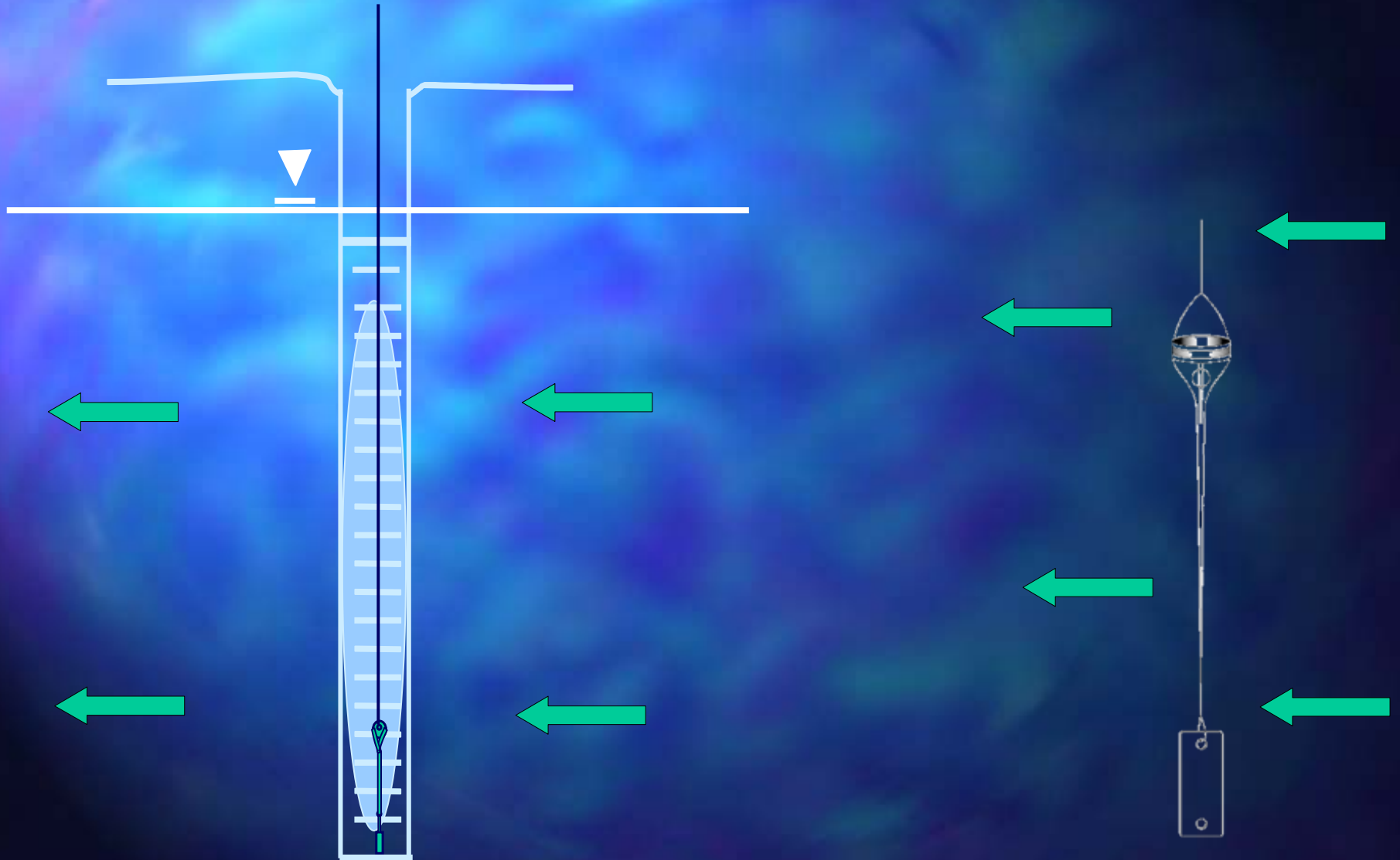


Preferred Sample  
Zone

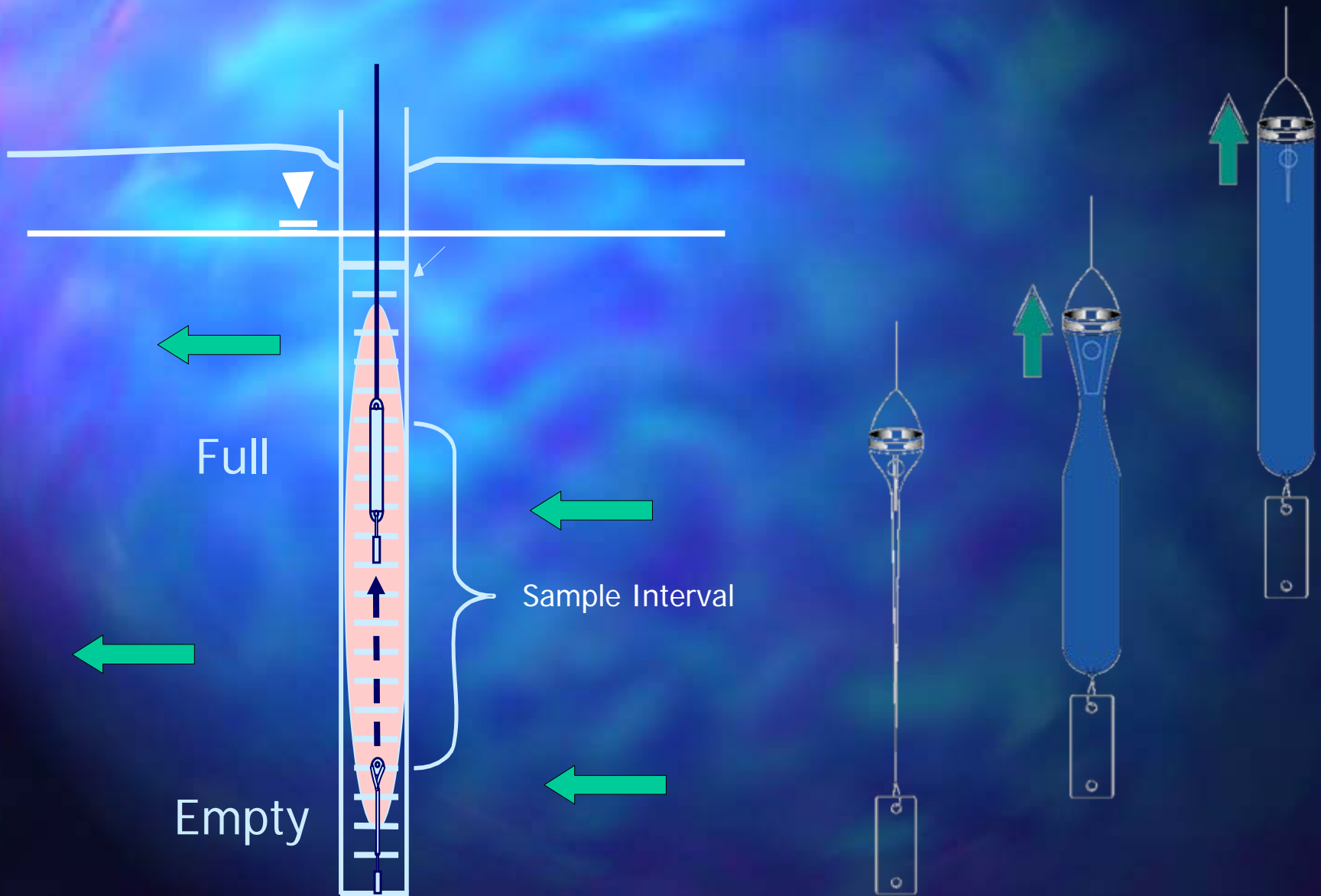
# HydraSleeve Placement



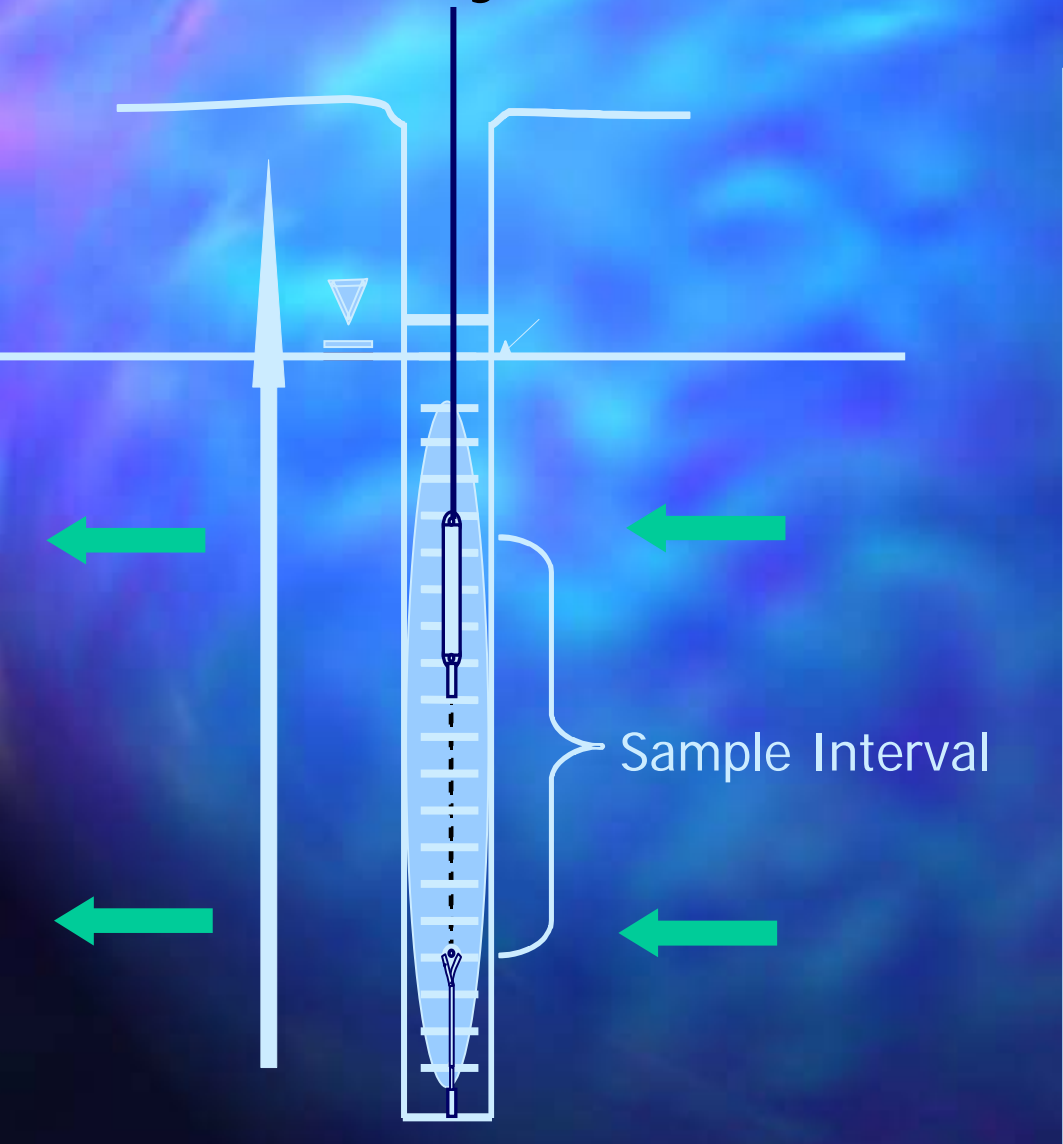
# HydraSleeve Equilibration



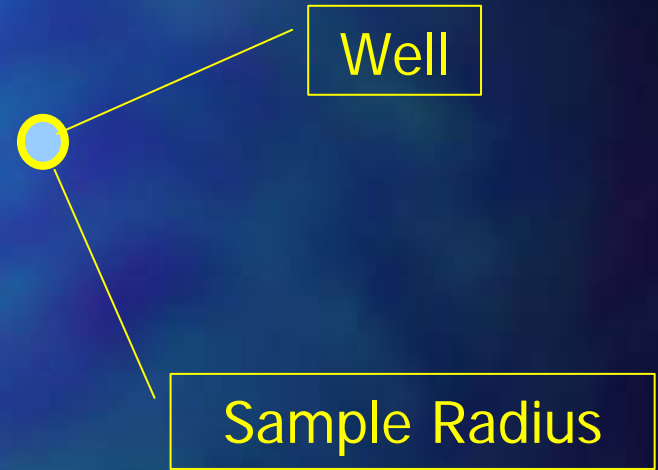
# HydraSleeve Sample Collection

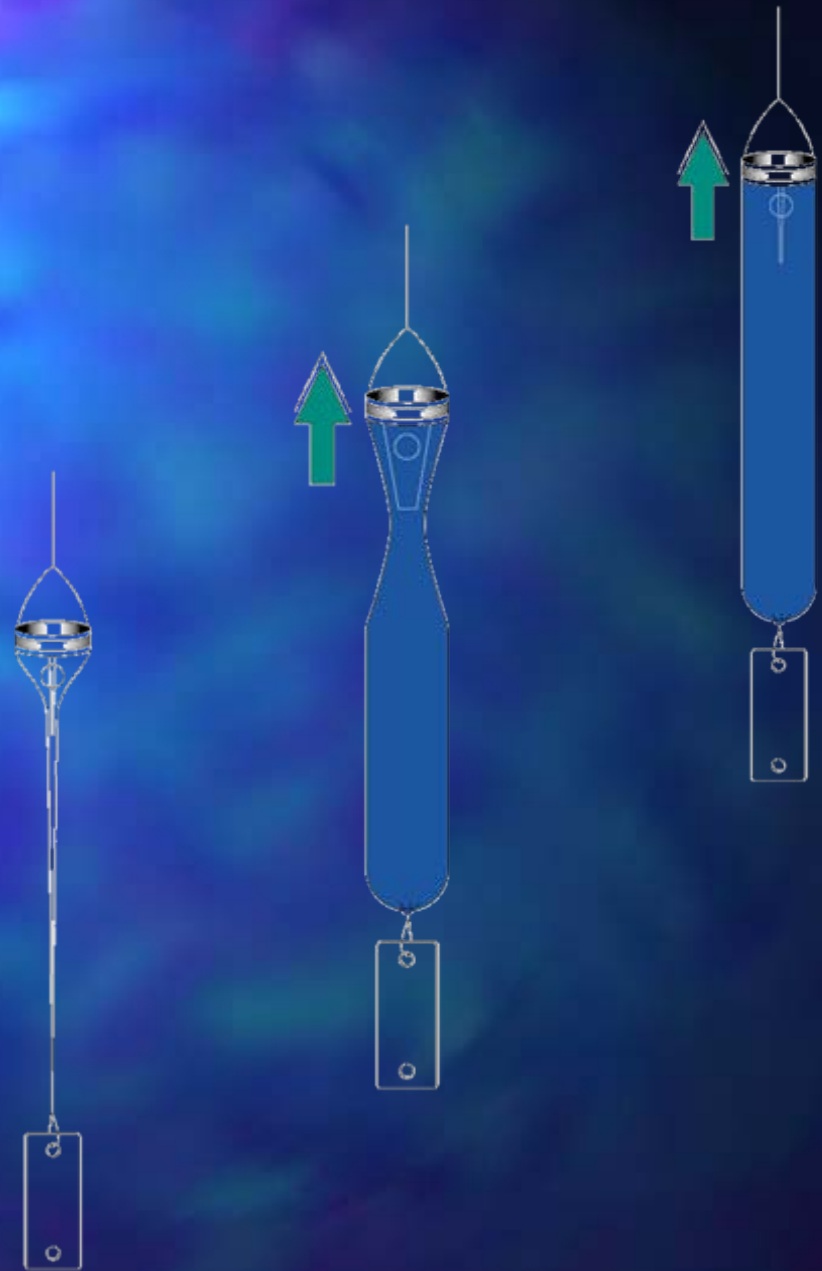


# HydraSleeve Sample Collection



## Top View





# Recovered HydraSleeve





# Turbidity Comparison

Bailer  
> 1000 NTU



HydraSleeve  
8.2 NTU



# Field Filter

Bailer



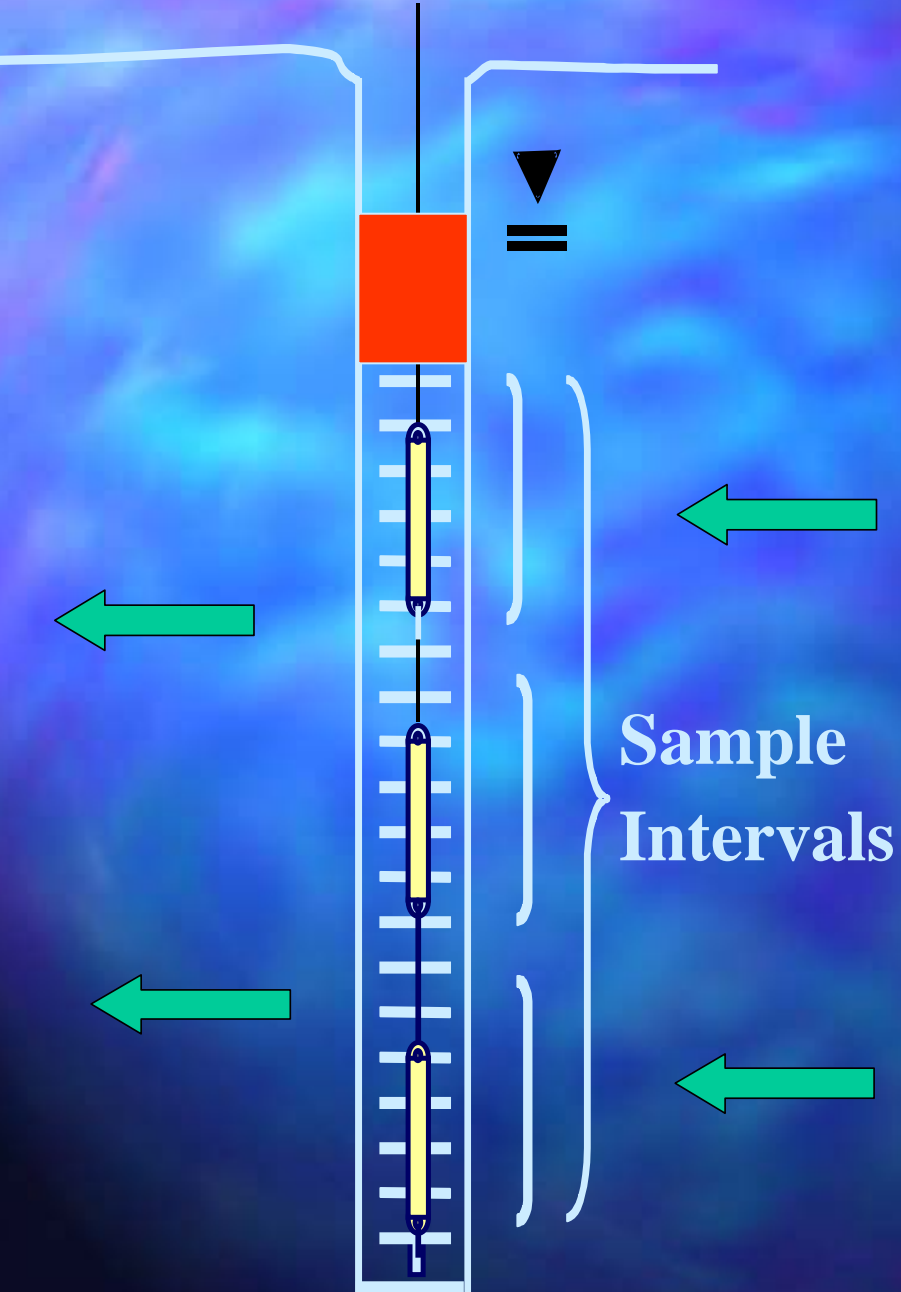
HydraSleeve



# Sample Discharge



# Vertical Profiling-Multiple Samplers

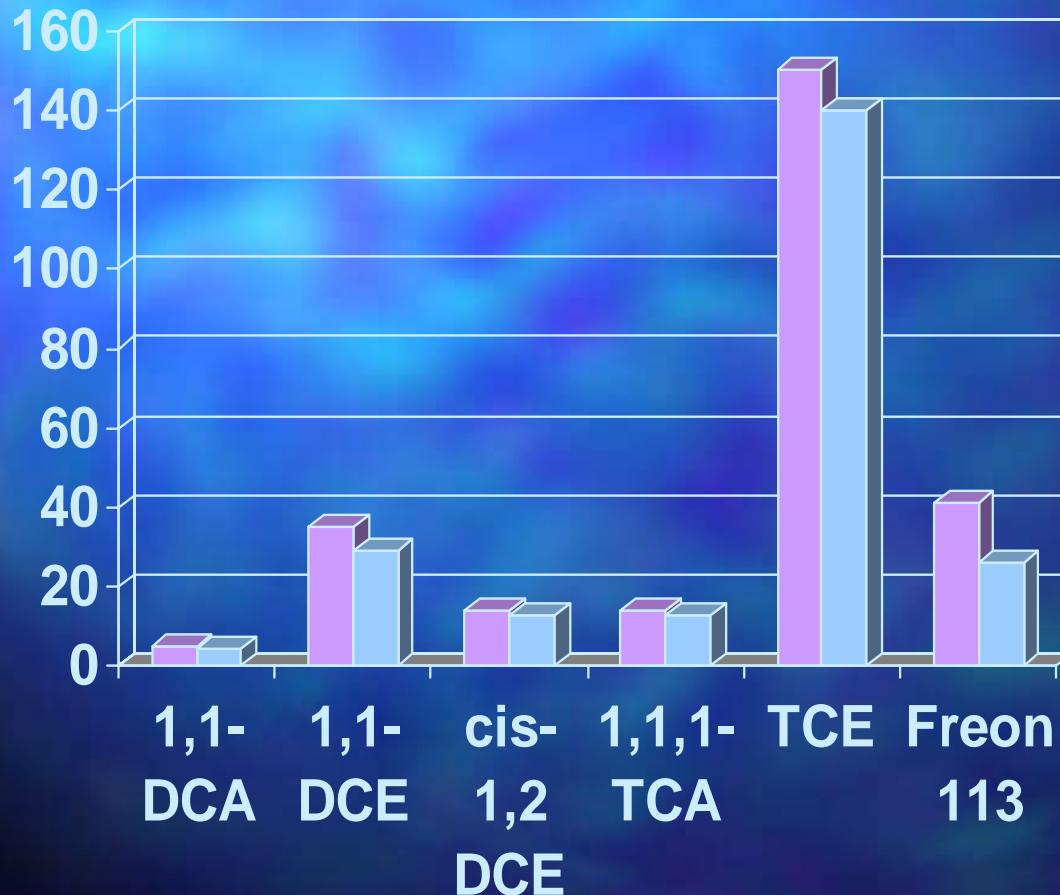


# Why use the HydraSleeve?

- Collect a Representative Sample
- Save Time and Money

# How do Analytical Results Compare? (2-Inch Well, Northern California)

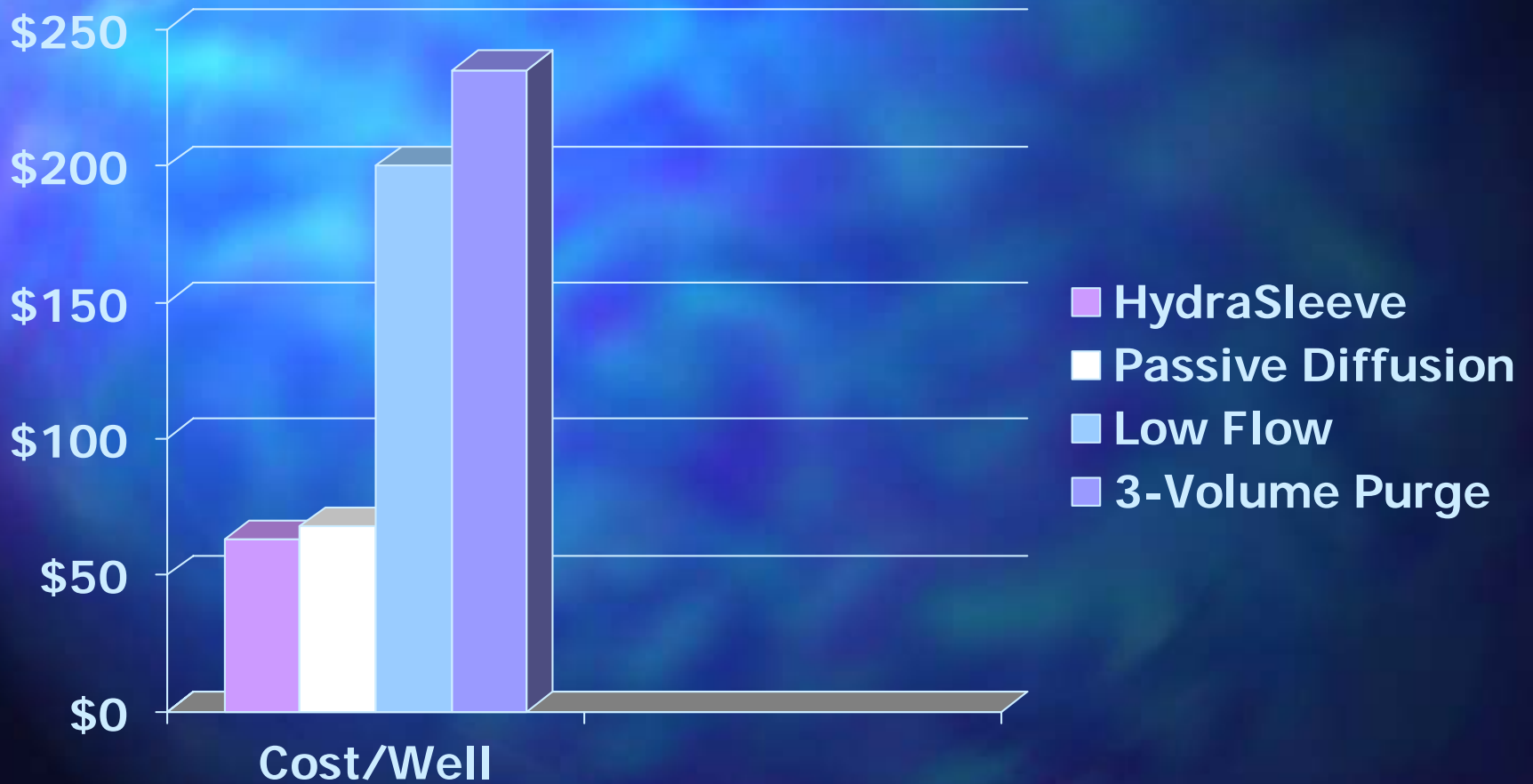
*ppb*



■ HydraSleeve  
■ Purge/Sample

# Sampling Costs

## From McClellan AFB Demonstration



# HydraSleeve Limitations

- *Limited sample volume.*
- One shot sample method.

# HydraSleeve Features

- Representative sample.
- Simple and inexpensive to use.
- No purge water.
- Lower turbidity than purge and sample.
- Minimal downside.

# Other Uses

- Low yield wells.
- Sample crooked or damaged wells.
- Vertically define contaminant concentrations in wells.
- Collect samples from discrete intervals in surface water bodies and tanks.

# FINAL

## Results Report for the Demonstration of No-Purge Groundwater Sampling Devices at Former McClellan Air Force Base, California

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Prepared For



U.S. Army Corps of Engineers  
Omaha District



and

Air Force Center for Environmental Excellence

and

Air Force Real Property Agency



U.S. AIR FORCE



Contract F44650-99-D-0005  
Delivery Order DK01

October 2005

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# Summary of Conclusions

- The HydraSleeve and Snap Sampler produced results most similar to the higher concentrations obtained by low-flow and 3 volume purge/sample.

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- HydraSleeve was least expensive.

**TABLE 5.2**  
**SUMMARY OF COST ANALYSIS RESULTS**  
**NO-PURGE SAMPLER DEMONSTRATION**  
**McCLELLAN AFB, CALIFORNIA**

Sampling Method	Per Well, Per Event Cost
3-Volume Purge	\$235
Low-Flow Purge	\$200
Snap Sampler <sup>1a</sup>	\$145 <sup>M</sup>
RPPS	\$121
PsMS	\$111
RCS	\$96
PDBS	\$68
HydraSleeve <sup>®</sup>	\$63

<sup>a/</sup> Assumes use of 3 samplers per well per sampling event.

“The PDBS and HydraSleeve® were the least expensive sampling methods, with the primary cost difference between the two being the time required to refill a new PDBS that is not necessary when using the HydraSleeve®.”

# Summary of Conclusions

- The HydraSleeve and Snap Sampler produced results most similar to the higher concentrations obtained by low-flow and 3 volume purge/sample.
- HydraSleeve was least expensive.
- **HydraSleeve was simplest to deploy and retrieve.**

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- **HydraSleeve permits larger sample volume.**

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- The HydraSleeve and Snap Sampler produced results most similar to the higher concentrations obtained by low-flow and 3 volume purge/sample.
- HydraSleeve was least expensive.
- HydraSleeve was simplest to deploy and retrieve.
- HydraSleeve permits larger sample volume.
- HydraSleeve appears to be technically viable method for monitoring all of the compounds in the demonstration.

# IF THE DATA FITS YOU MUST ACQUIT



The End