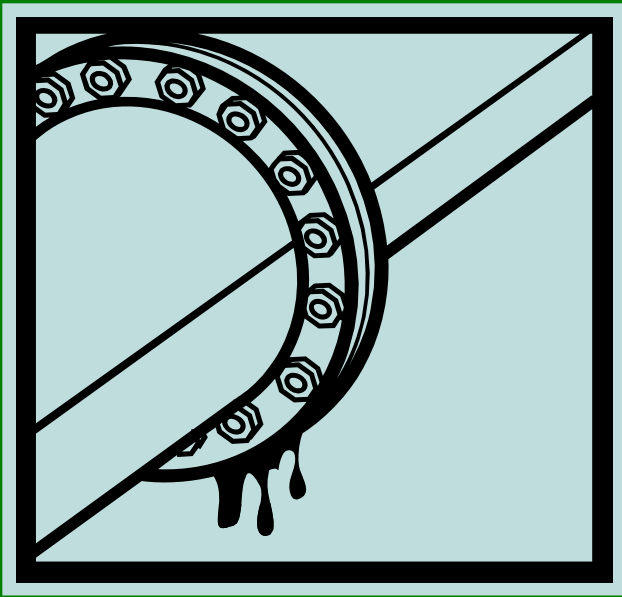




(850) 245-8889

Suncom 205-8889

Donna Burmeister, P.G.

Team 2

DEP, Tallahassee

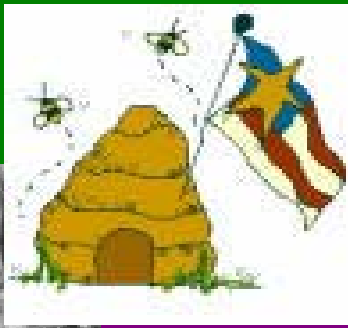
Donna.Burmeister@Dep.State.Fl.Us

Local program liaison for assessment



FUNDAMENTALS OF SITE ASSESSMENT





GOALS



To develop as accurate a picture as possible of the horizontal and vertical extent of contamination in both groundwater and soil, the site lithology, and the groundwater flow characteristics to support the development of the most efficient and cost effective strategy to clean up the site.

RULE:

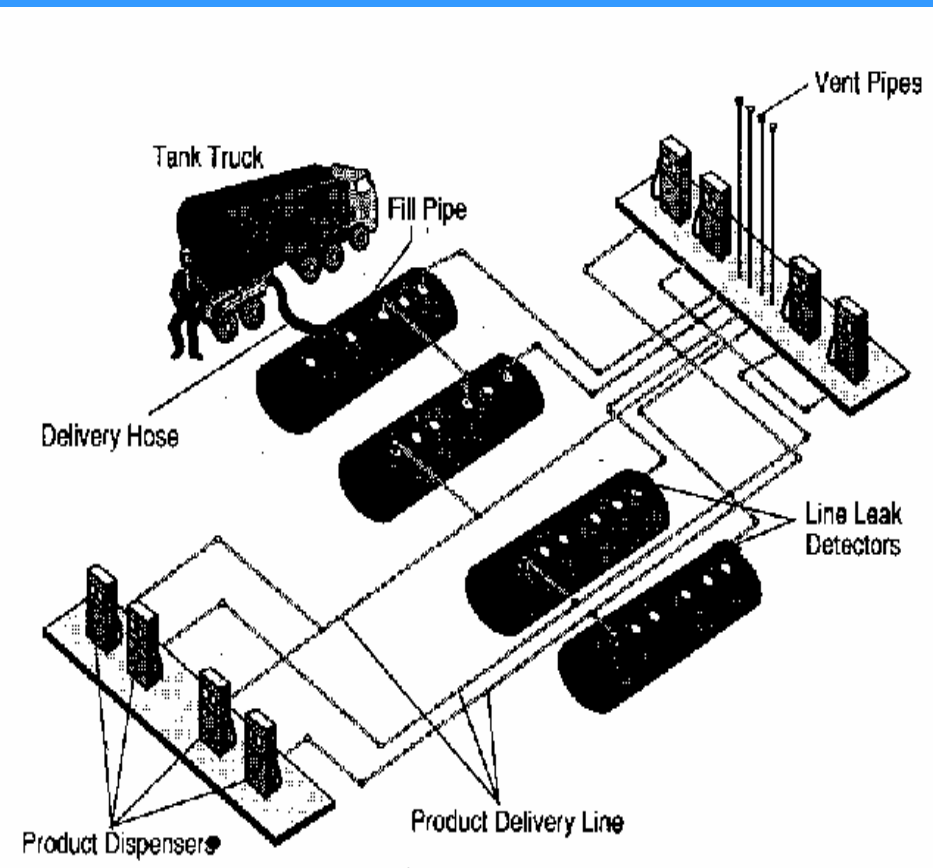
Chapter 62-770 Florida Administrative Code



Typical Gas Station

Identification of Source Areas

Tanks Lines Dispensers



Methodology We Use

HAND AUGERING
that first four feet



Drill Rigs historically were the first to enter the subsurface.



Hollow Stem Auger Drill Rig And split Spooning

NO AUGER
FLIGHT
SOIL SAMPLING



Mud Rotary Drill Rig



Sonic Drilling

It's expensive but
sometimes
necessary
but lately,
maybe not that
expensive

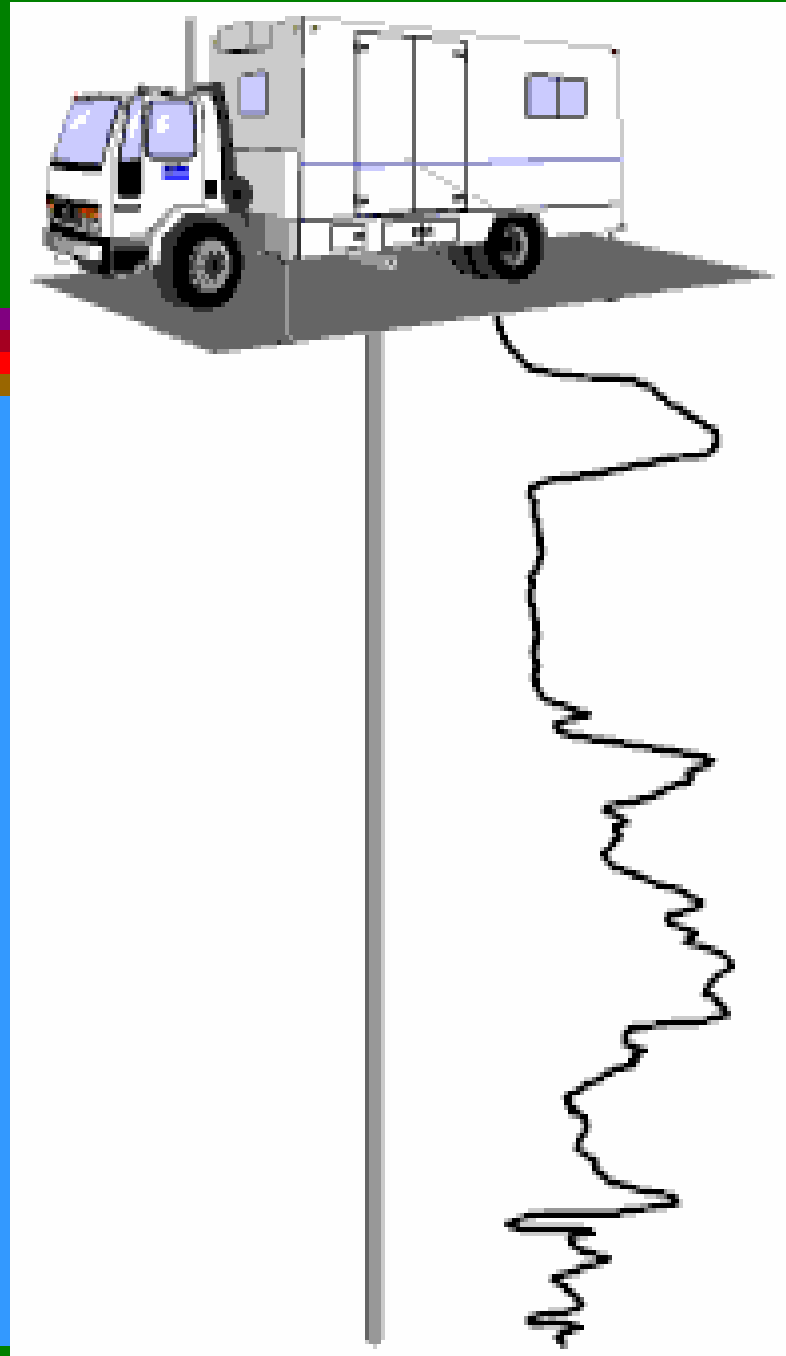


SONIC DRILLING

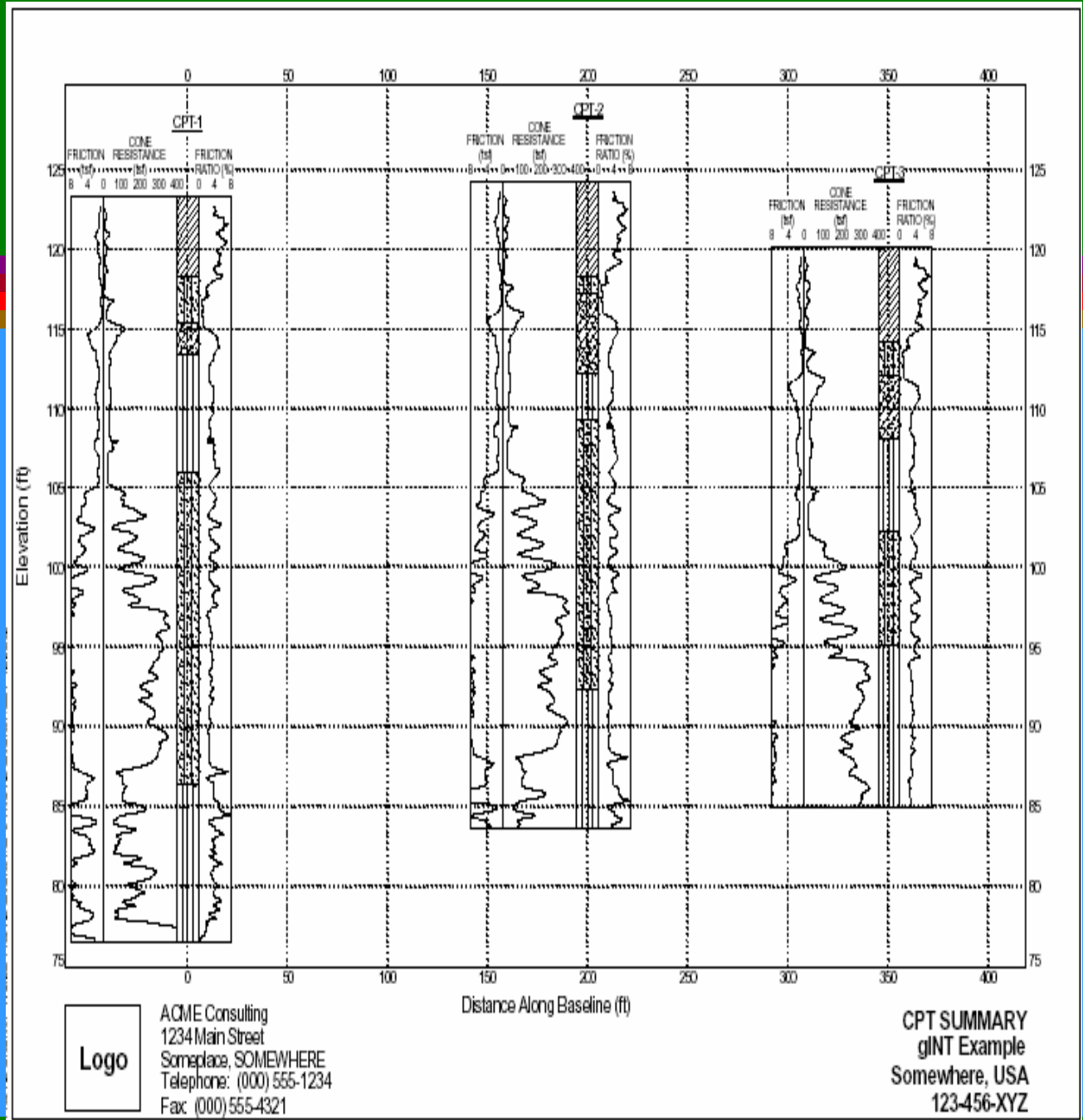


Cone Penetrometer Testing (CPT)

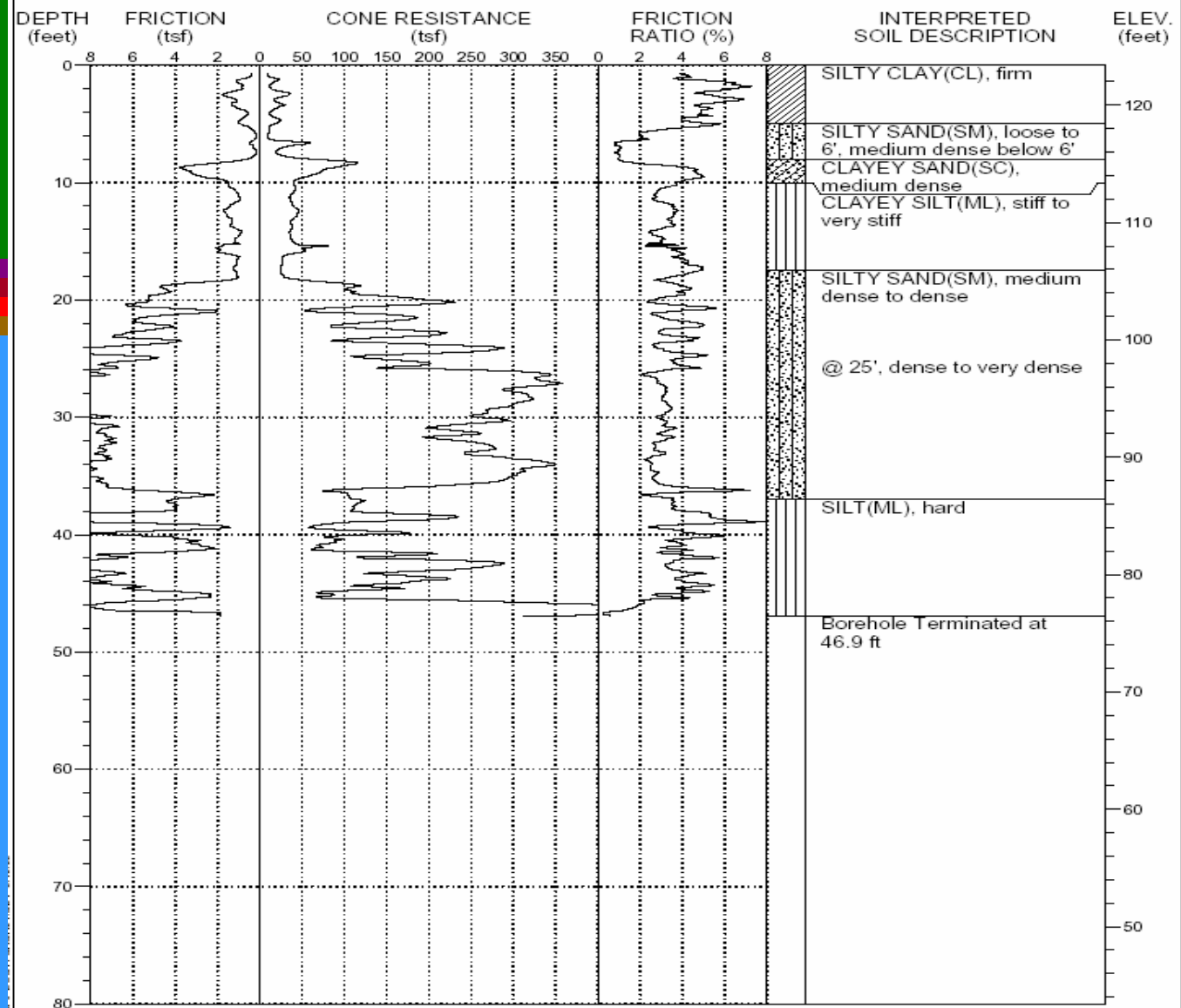
CPT is great for mapping complex lithologies that will influence remediation design



CPT data



CPT data



LOGO

ACME Consults
1234 Main Street
Sometown, SOMEWHERE
Telephone: (000) 555-1234
Fax: (000) 555-4321

LOG OF CPT NO. CPT-1

gINT Example
Somewhere, USA

PROJECT NO.:
123-456-XYZ

DRILLED BY:
AAAAA Drillers

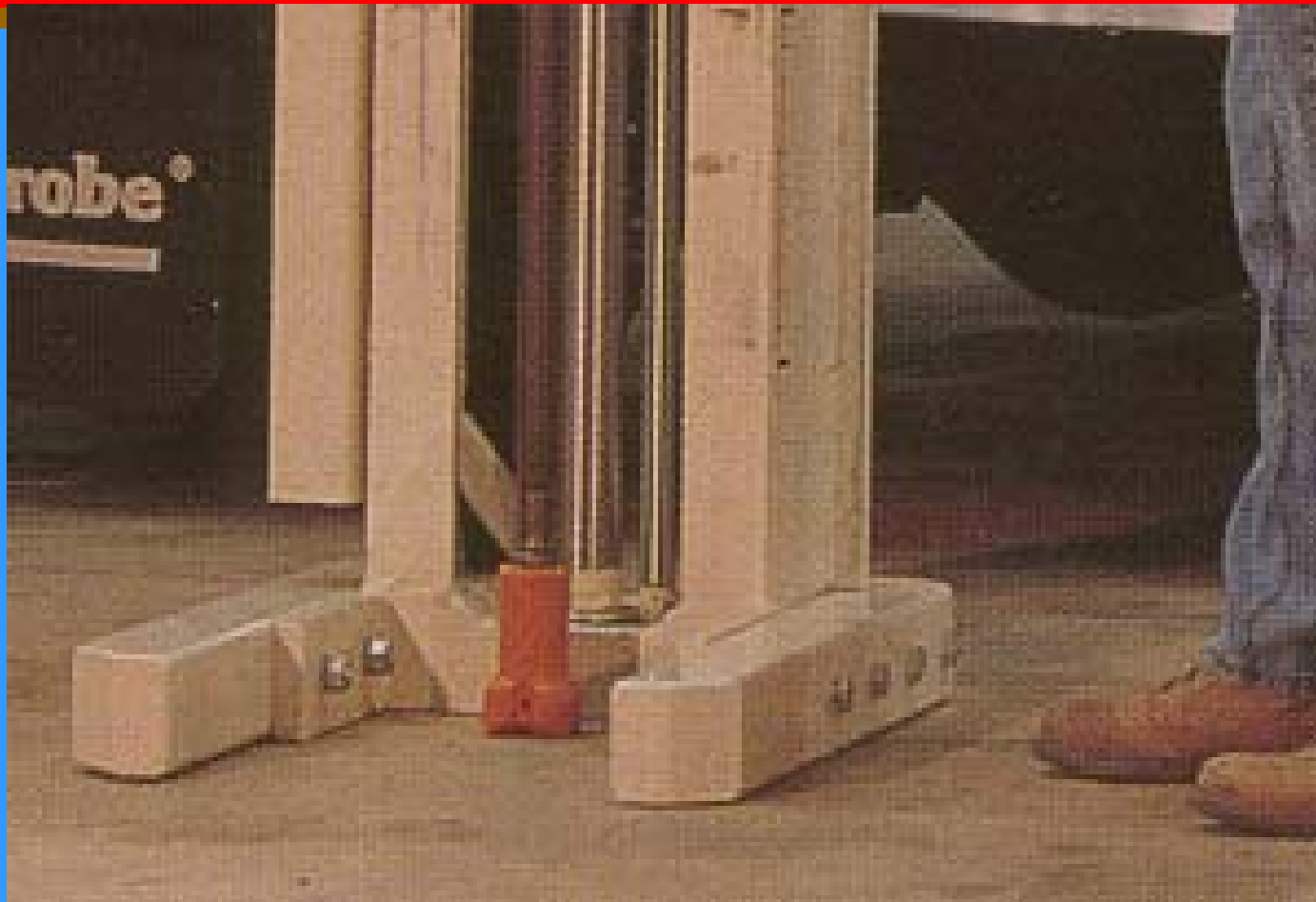
DATE DRILLED:
11/29/2002

DIRECT PUSH (DPT) (Percussion Probe Units)



- DPT's are similar to cone penetrometers and are popular since the development of vibration resistant tools.

Direct push has been used to perform many functions to depths of 100 feet or more.



DIRECT PUSH RIGS

The size of the Direct Push Rig is extremely important.





small portable
cart size

Need to get into a building?

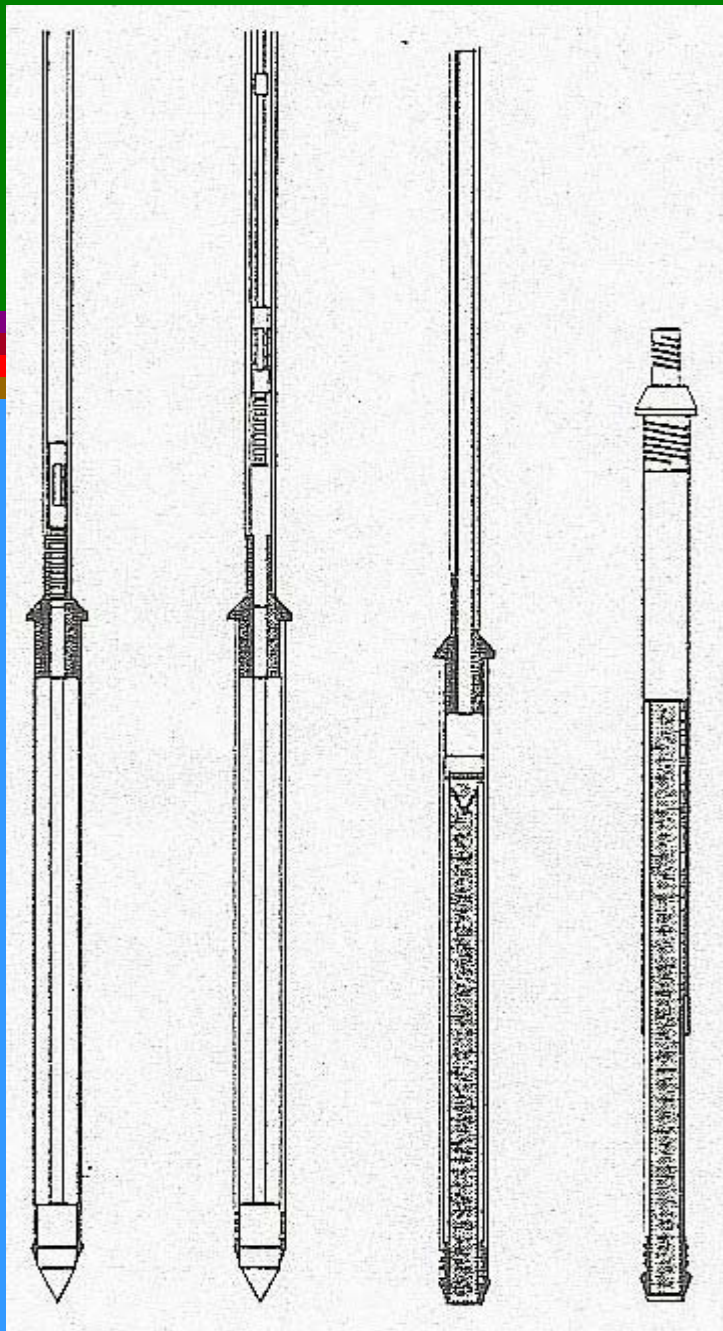


What we see most often



For The Tough Jobs





Tools You Attach

A Soil Conductivity Probe

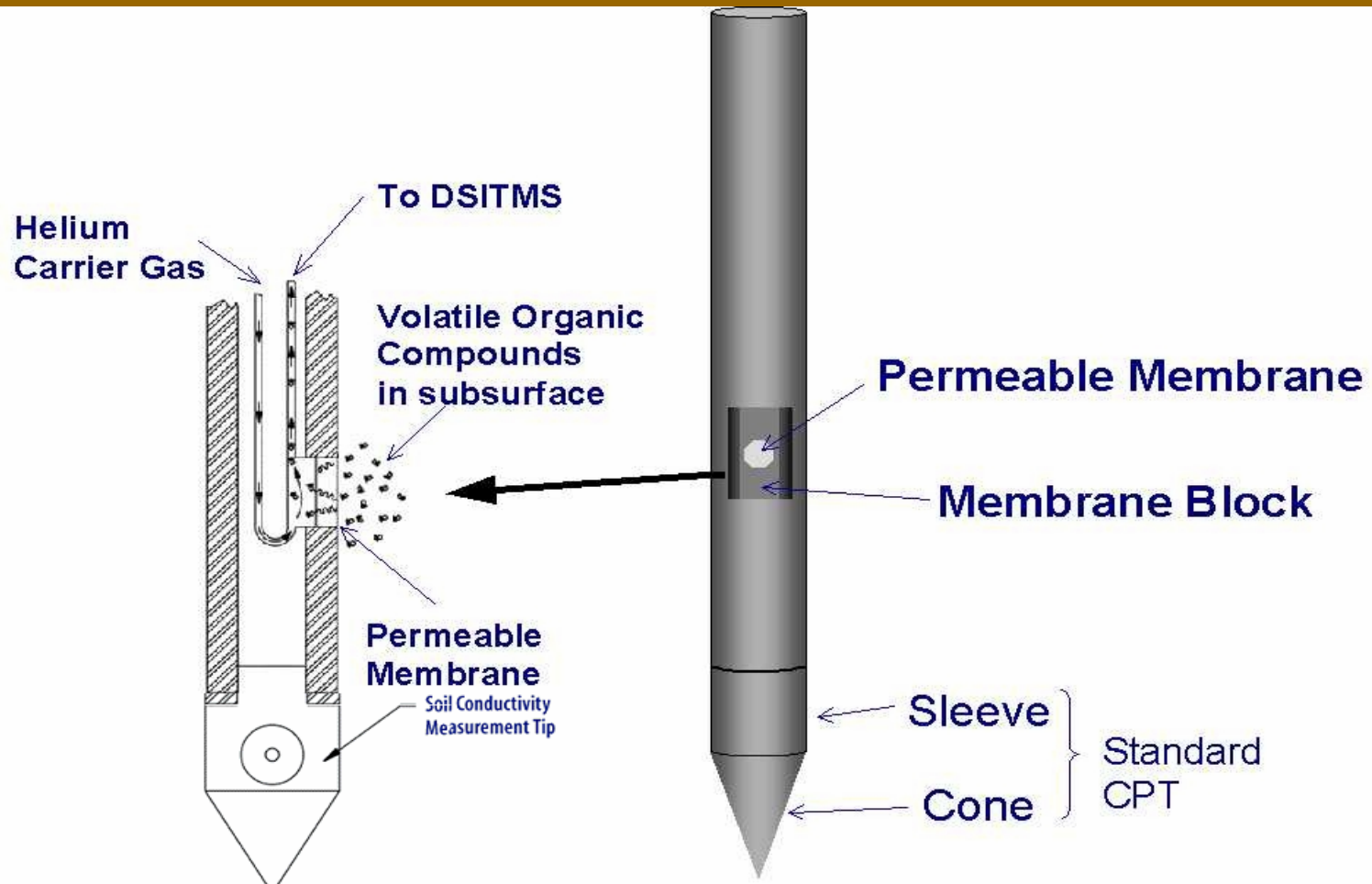
Clays - high conductivity

Silts - intermediate conductivity

Sand/Gravel - low conductivity,



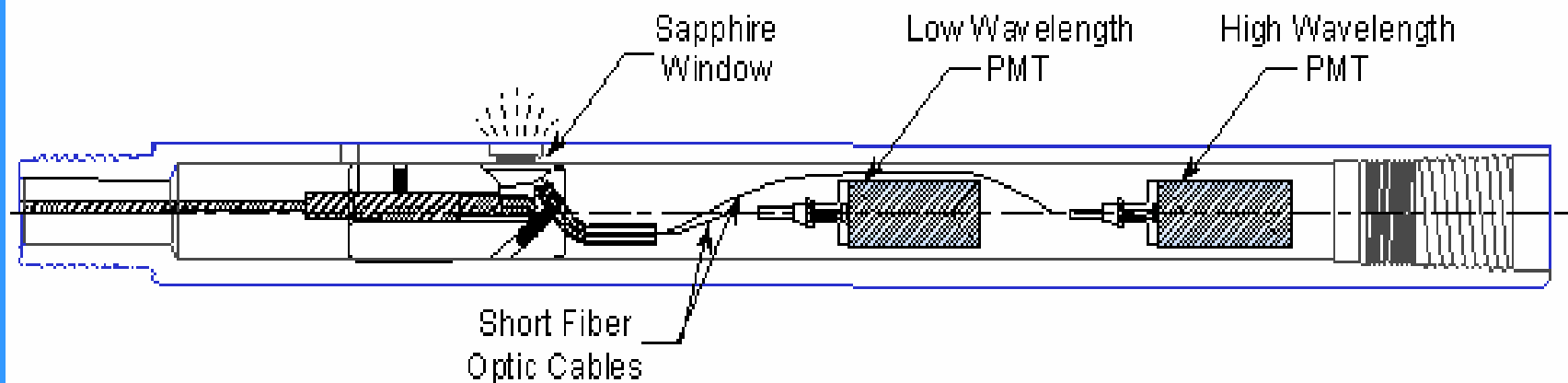
The Membrane Interface Probe (MIP) Finding VOC's



FFD (Fuel Fluorescence Detector)

Pushed with Cone Penetrometer
Technology (CPT) equipment

New Dual Downhole Fuel Fluorescence Detector



Examples of some Direct Push soil samplers are:

The Large Bore Soil Sampler

Simply drive it to depth, open it, and retrieve a core.



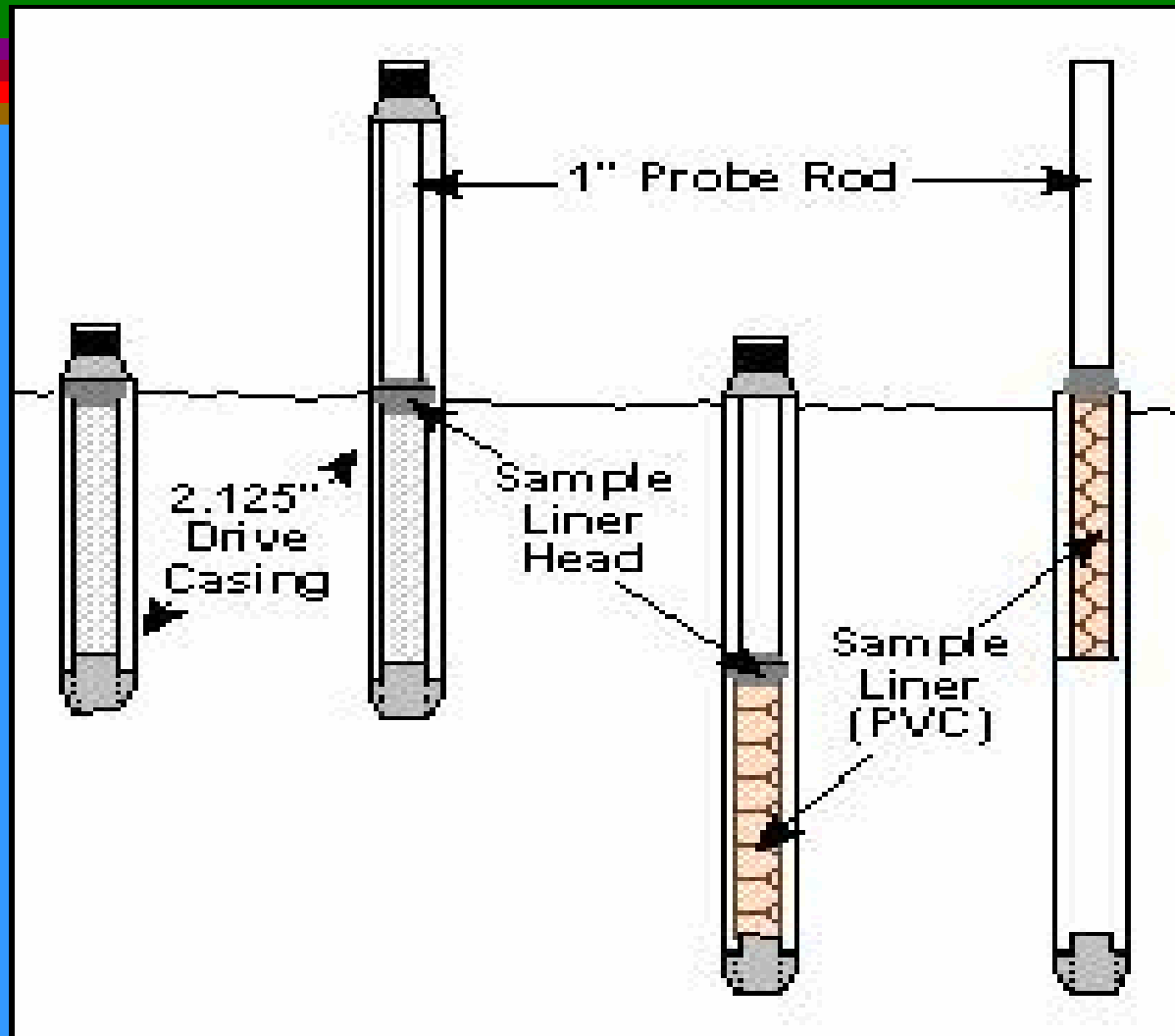
The Large Bore Sampler



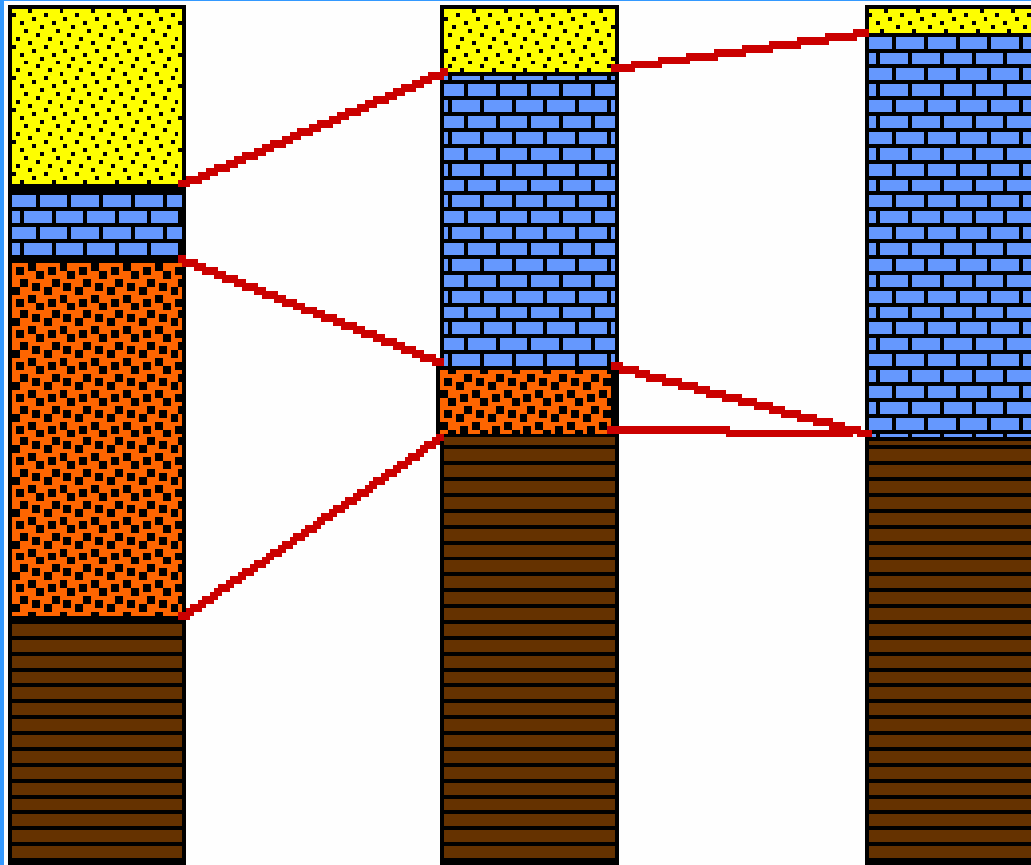
The Dual Tube Sampling System



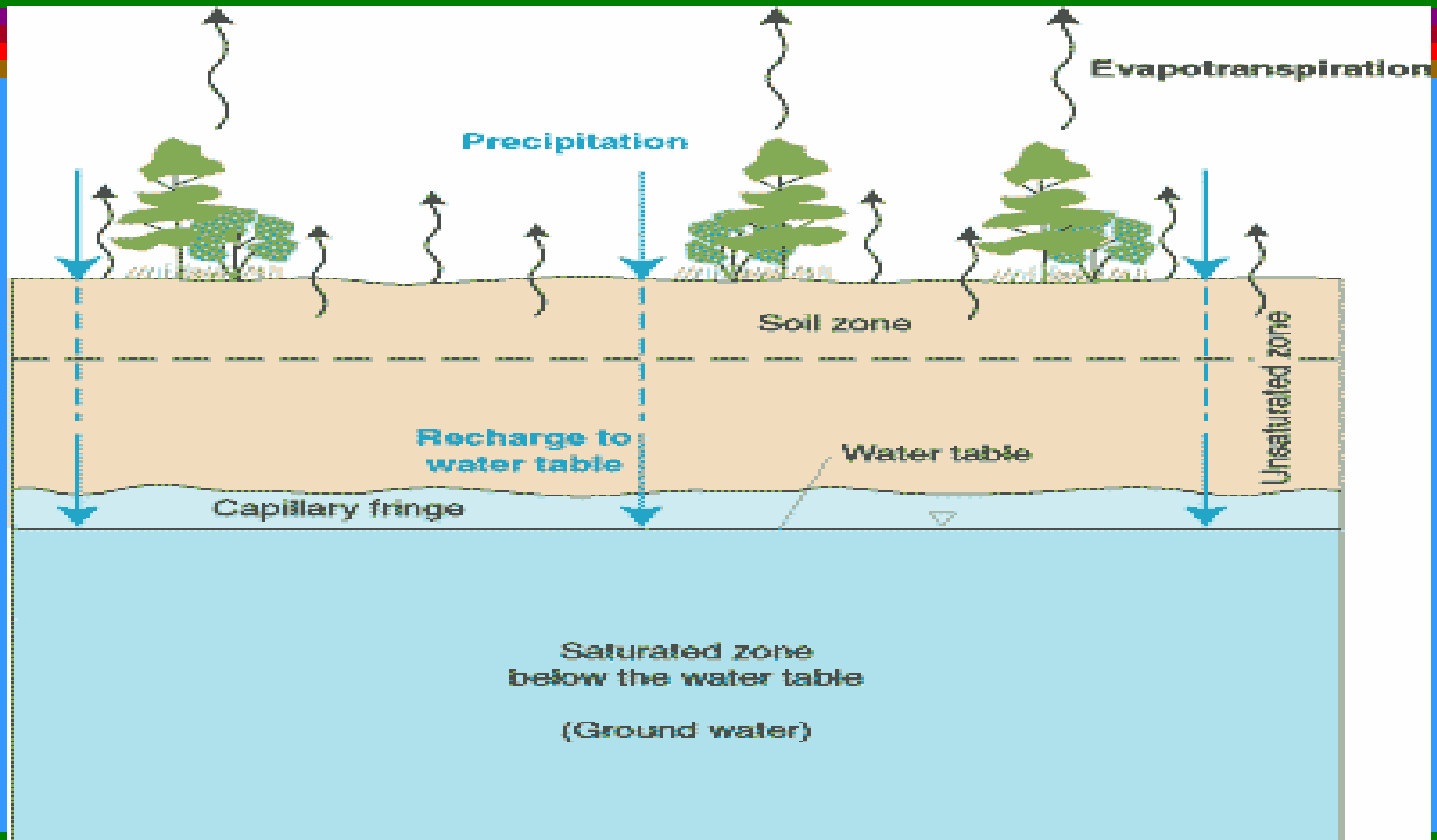
Dual Tube Sampling System



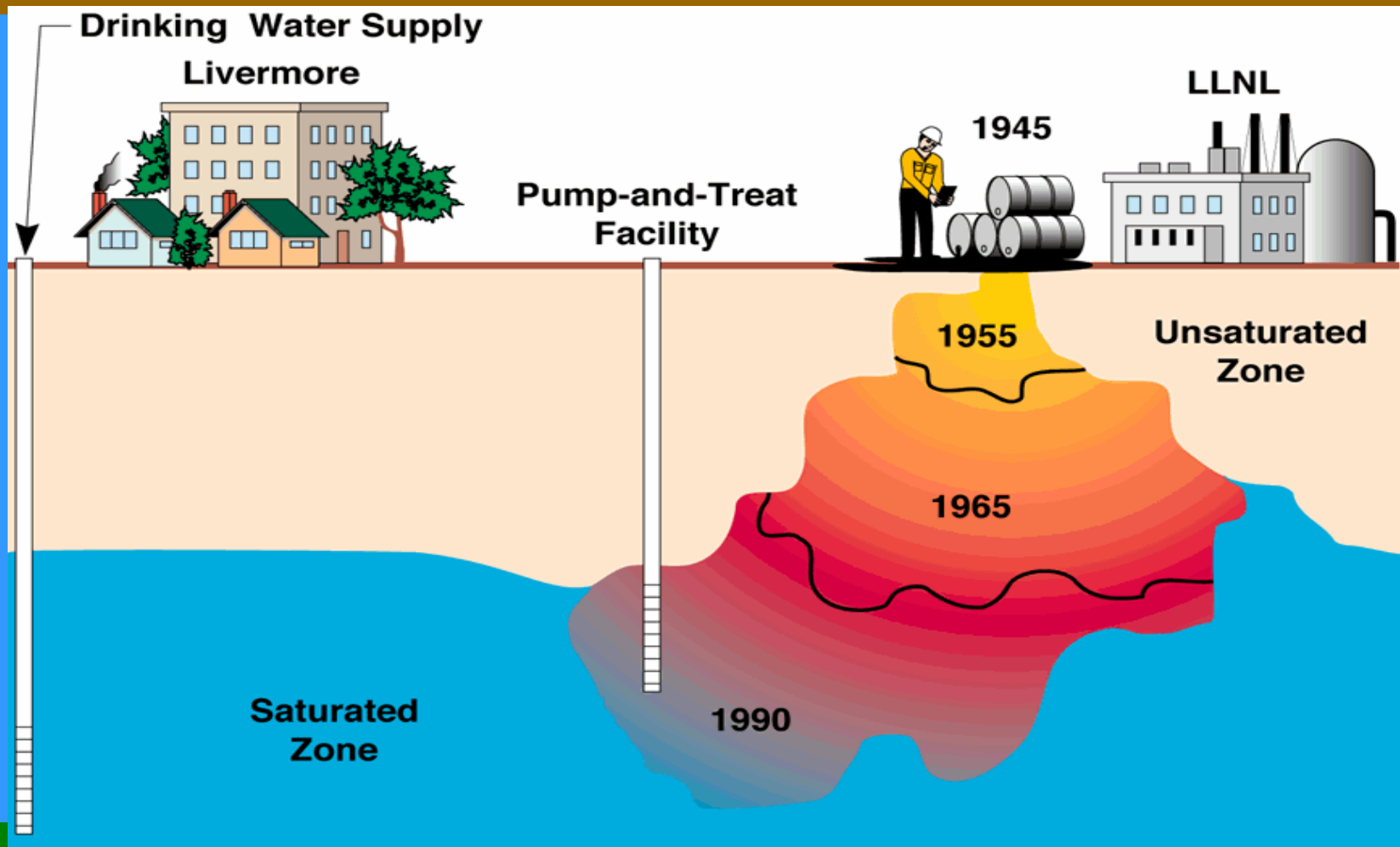
Lithologic Controls



The Unsaturated or Vadose Zone

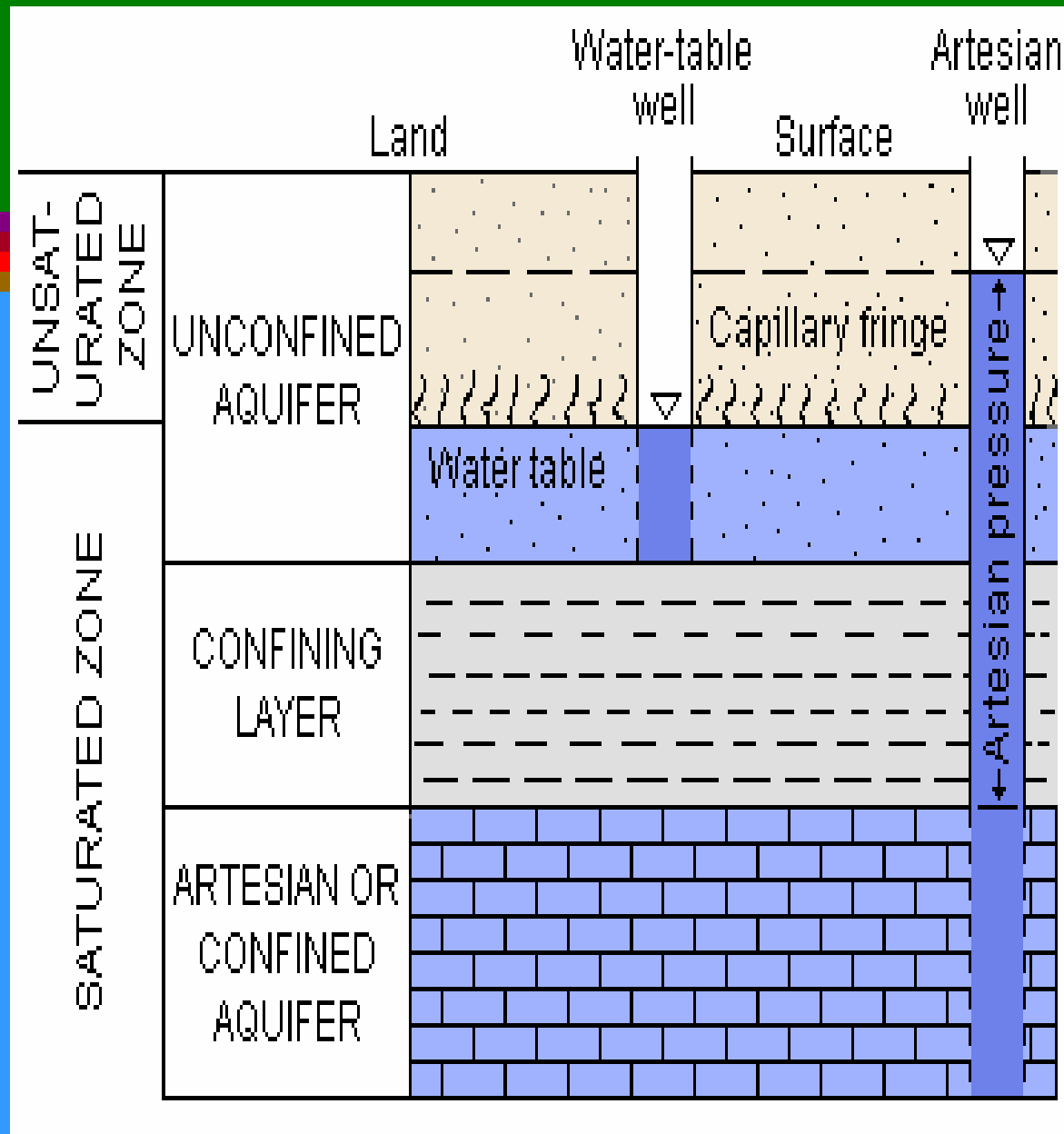


The Saturated Zone



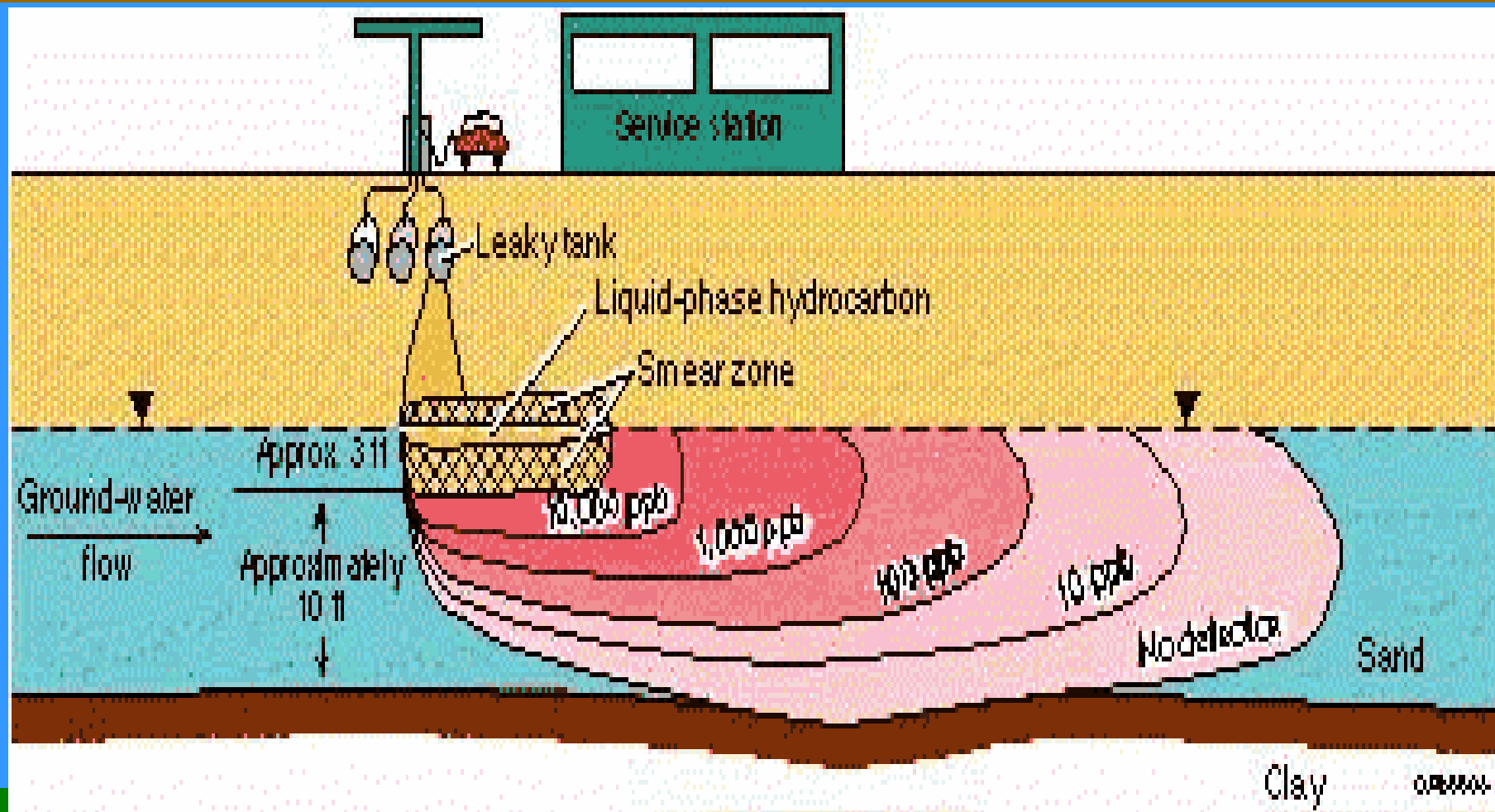
SMEAR ZONE

Reflection of the fluctuation in groundwater.



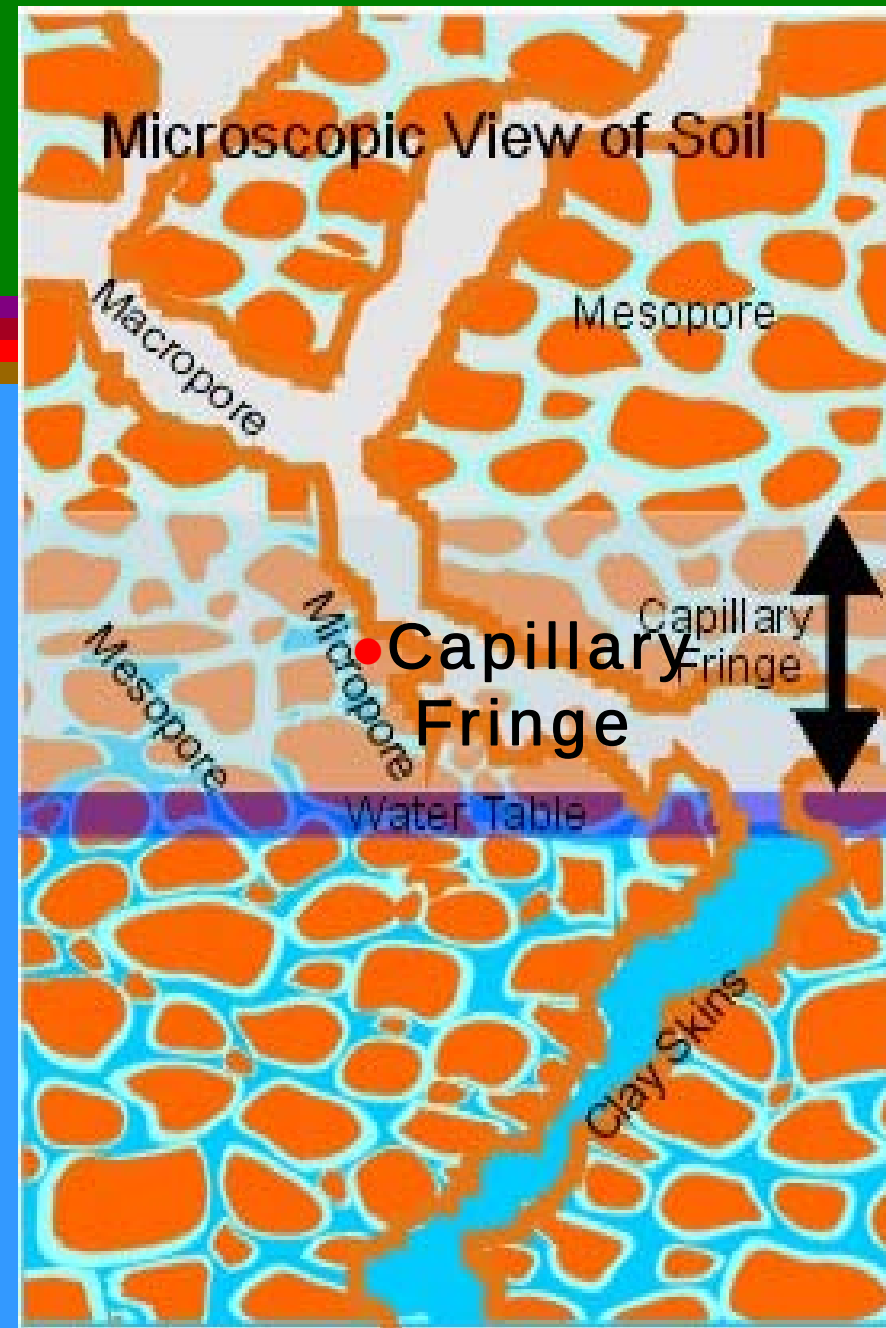
Smear Zone

OVA readings can begin to rise as you near the water table



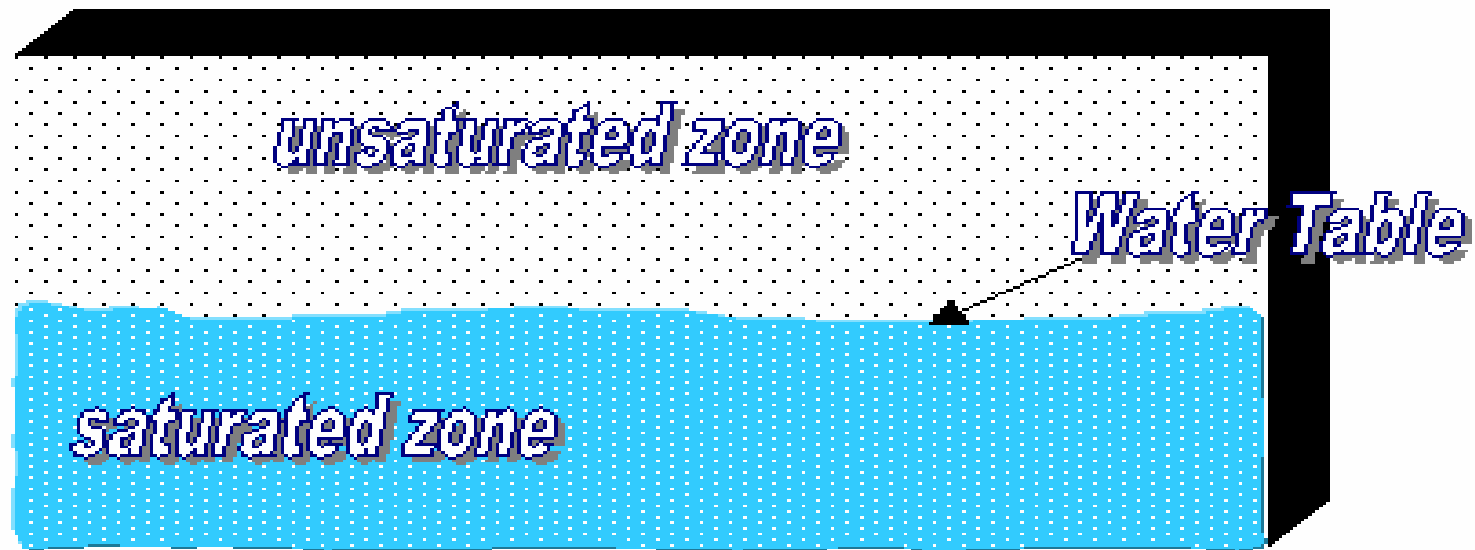
Capillary Fringe

contaminated groundwater
can 'wick up' on the soil
above it.



The Unconfined Aquifer

Groundwater System



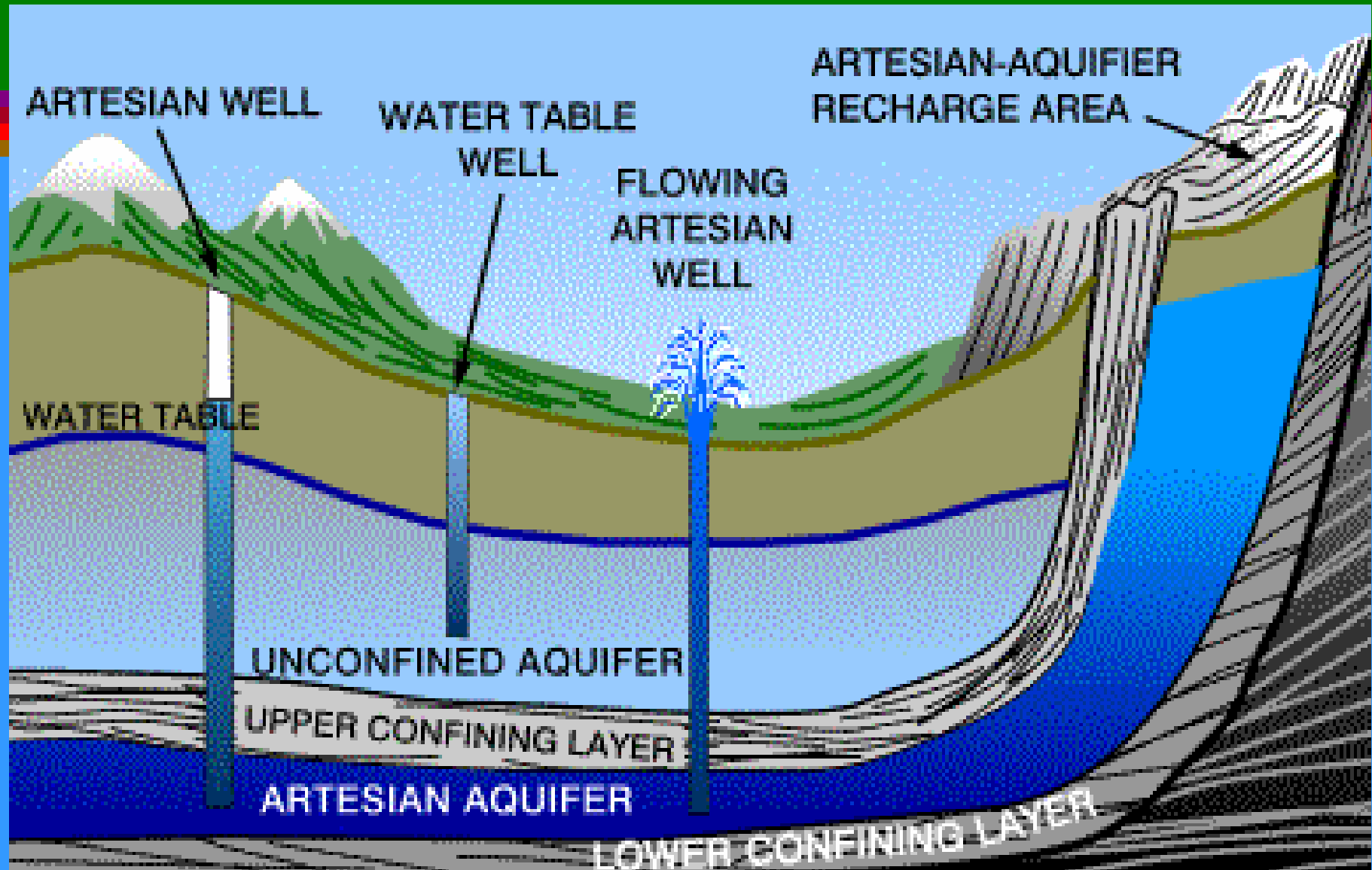
Review past wet and dry years:



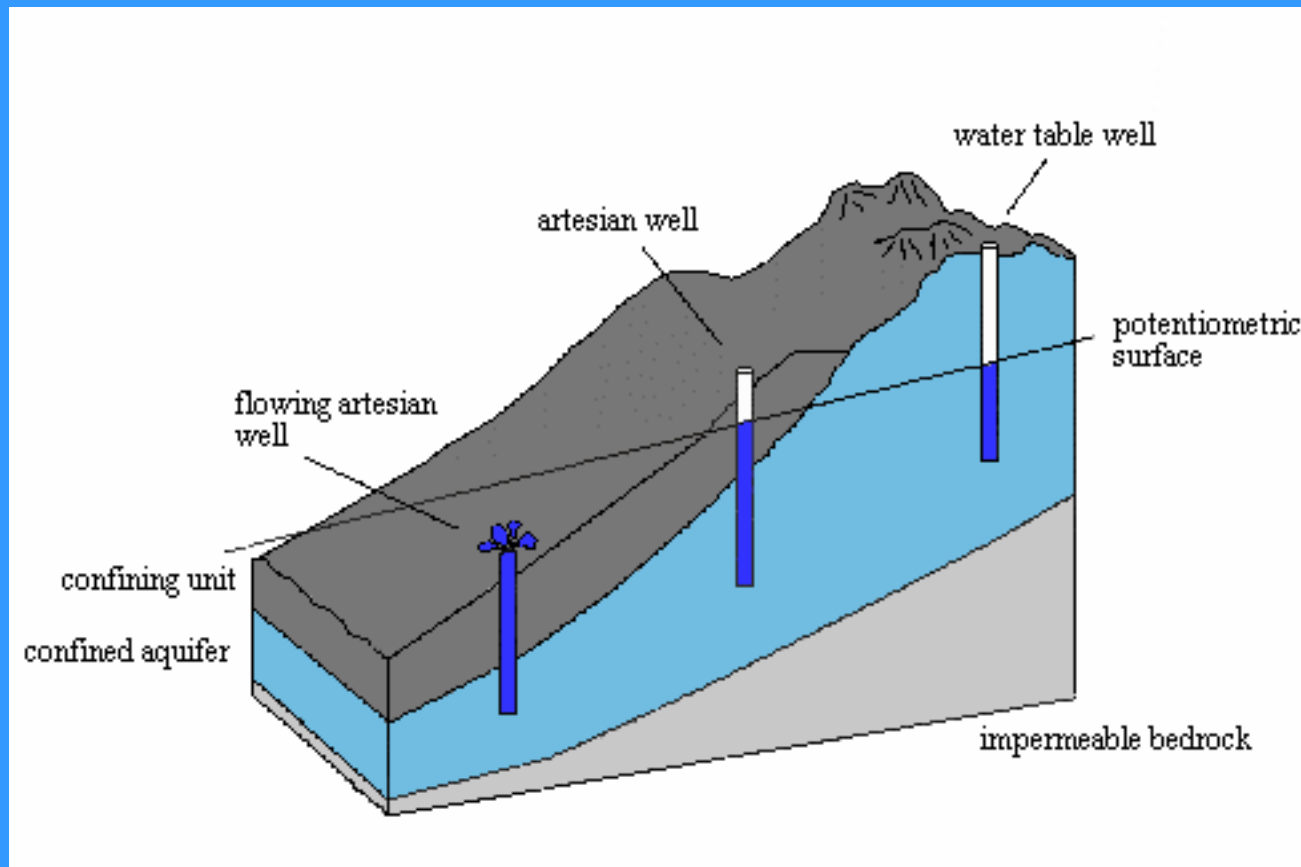
1989-1993 dry
1994-1997 wet
1998-2001 dry



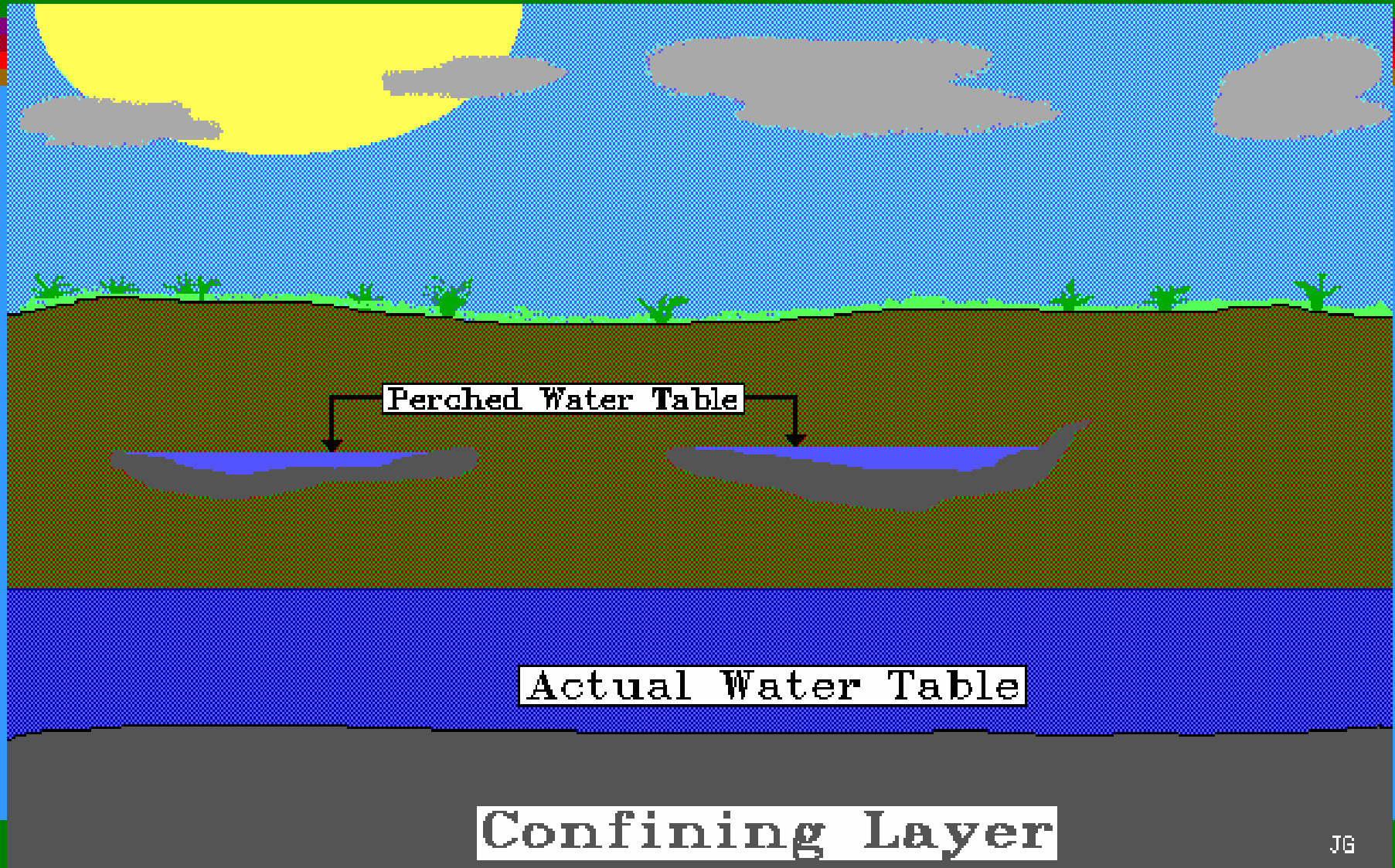
Confined Aquifers



Potentiometric Surfaces

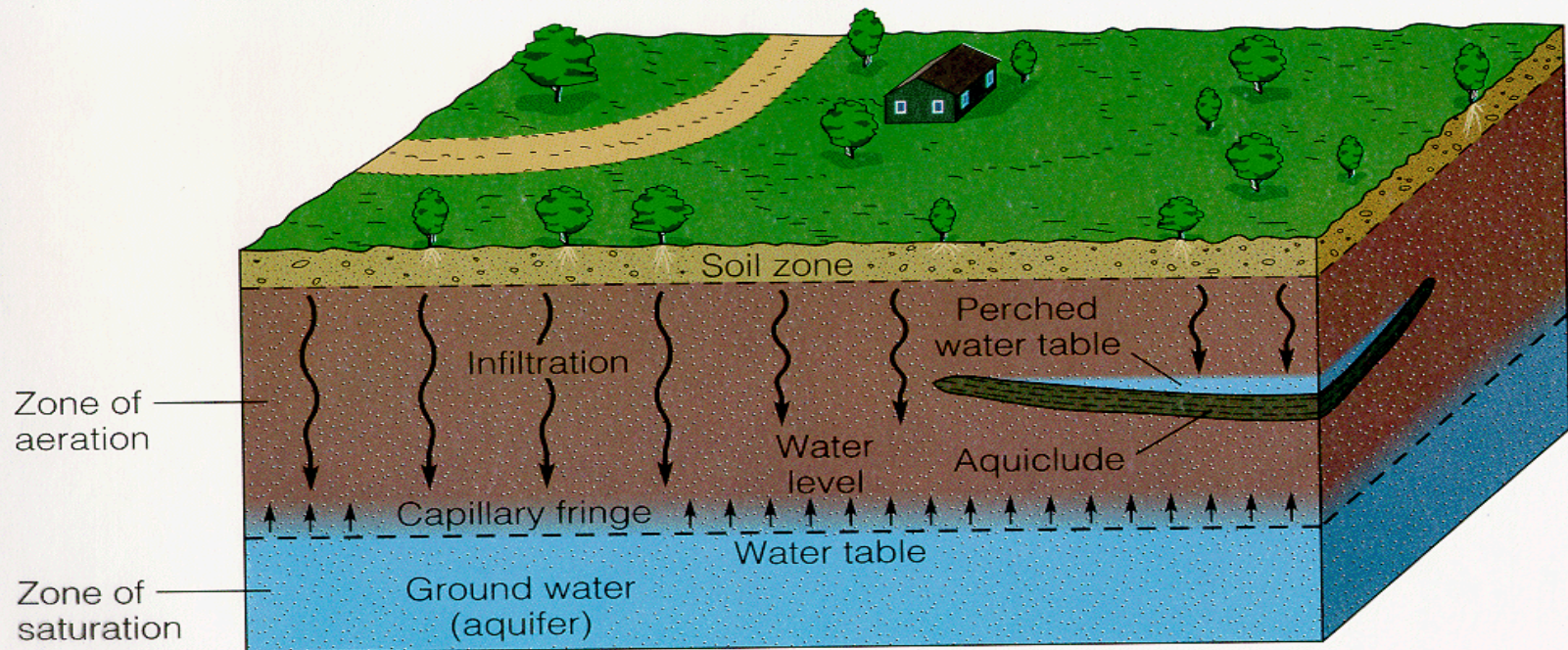


Perched Aquifer System

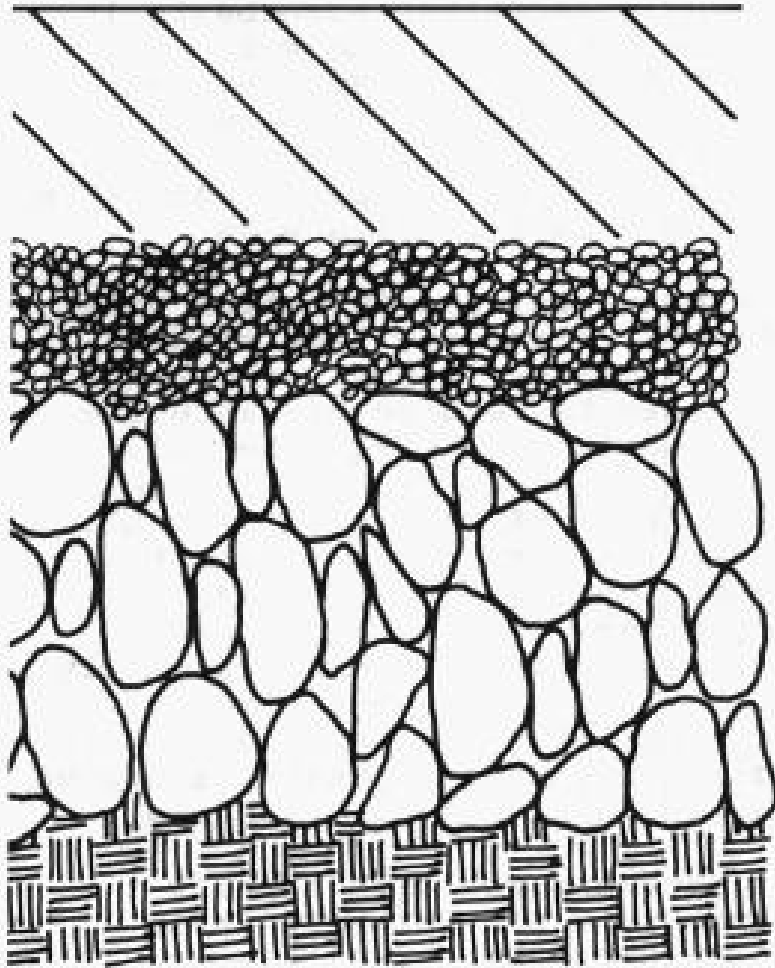


Perched Aquifers

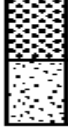
Schematic cross-section of ground-water zones



Soil Description (Lithology)



The Unified Soil Classification And Symbol Chart

UNIFIED SOIL CLASSIFICATION AND SYMBOL CHART			
COARSE-GRAINED SOILS (more than 50% of material is larger than No. 200 sieve size.)			
GRAVELS More than 50% of coarse fraction larger than No. 4 sieve size	Clean Gravels (Less than 5% fines)		
		GW	Well-graded gravels, gravel-sand mixtures, little or no fines
		GP	Poorly-graded gravels, gravel-sand mixtures, little or no fines
	Gravels with fines (More than 12% fines)		
		GM	Silty gravels, gravel-sand-silt mixtures
		GC	Clayey gravels, gravel-sand-clay mixtures
SANDS 50% or more of coarse fraction smaller than No. 4 sieve size	Clean Sands (Less than 5% fines)		
		SW	Well-graded sands, gravelly sands, little or no fines
		SP	Poorly graded sands, gravelly sands, little or no fines
	Sands with fines (More than 12% fines)		
		SM	Silty sands, sand-silt mixtures
		SC	Clayey sands, sand-clay mixtures
FINE-GRAINED SOILS (50% or more of material is smaller than No. 200 sieve size.)			
SILTS AND CLAYS Liquid limit less than 50%		ML	Inorganic silts and very fine sands, rock flour, silty of clayey fine sands or clayey silts with slight plasticity
		CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays
		OL	Organic silts and organic silty clays of low plasticity
SILTS AND CLAYS Liquid limit 50% or greater		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts
		CH	Inorganic clays of high plasticity, fat clays
		OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS		PT	Peat and other highly organic soils

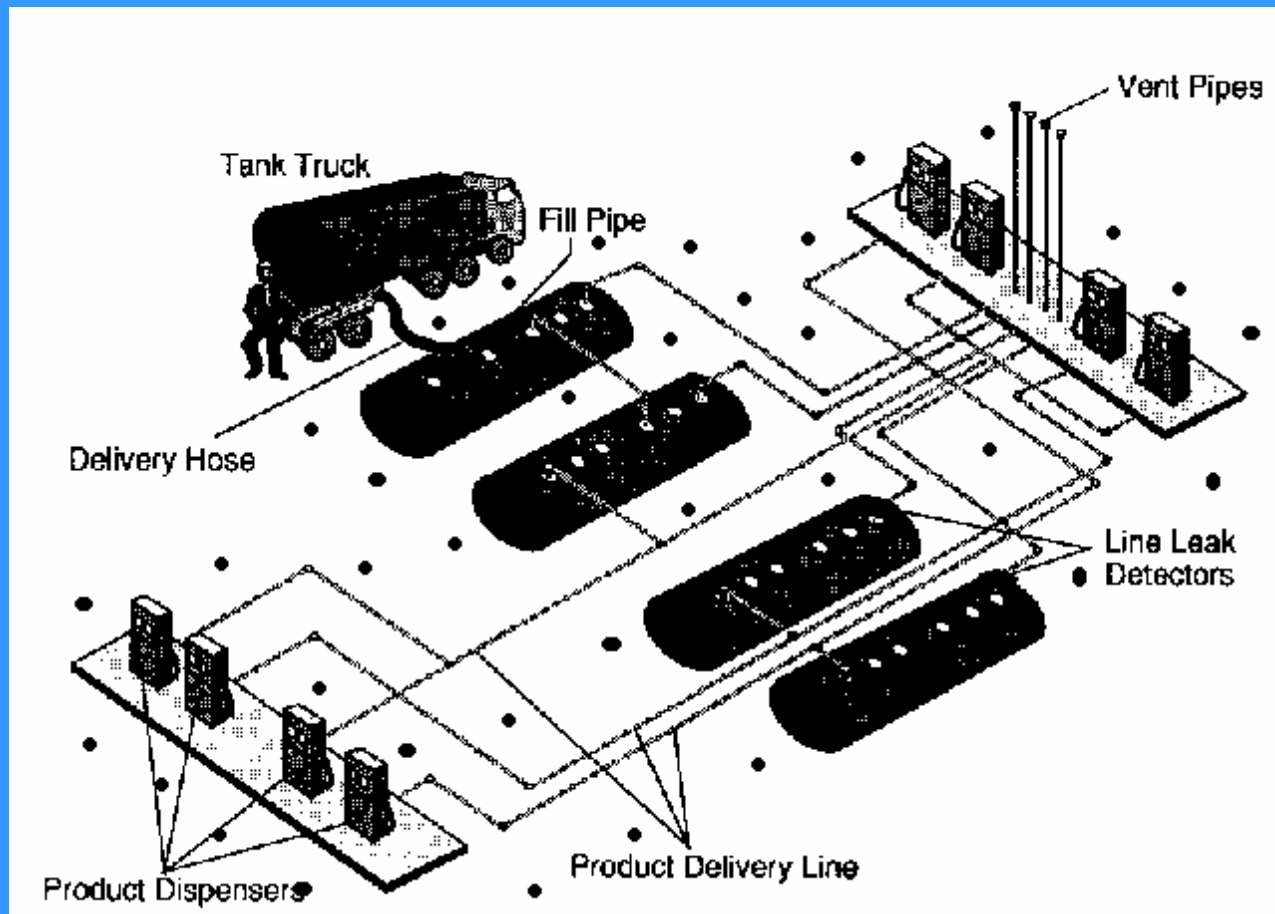
The Mansell Color Chart



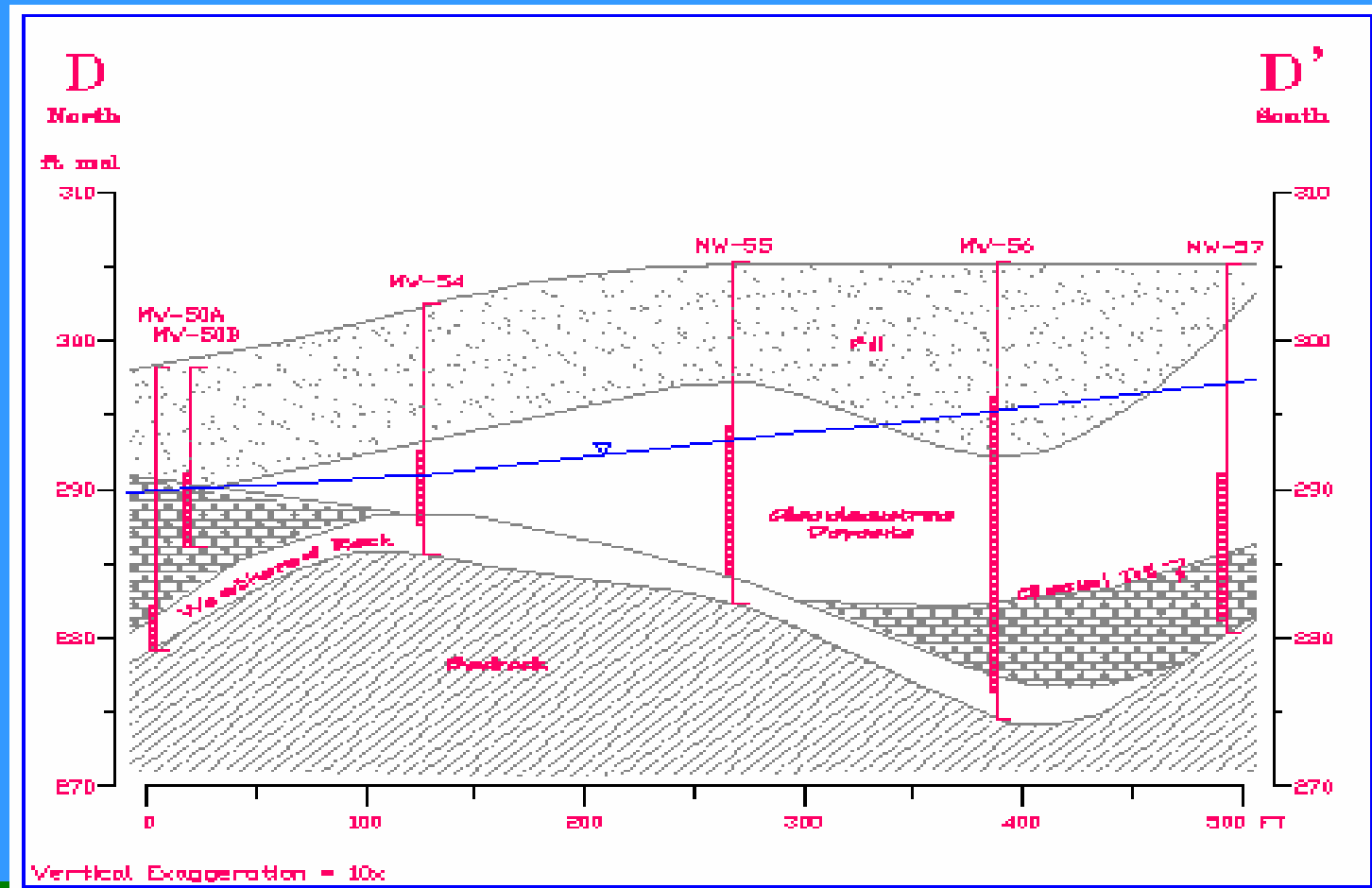
Moisture Content



Searching for contaminated soil Horizontally “Boring Spacing”



Taking Vertical OVA samples



soil samples can be collected in a number of ways



How to take OVA Readings



The OVA/FID jar headspace method is the quickest method for collecting OVA data.

Instrument Calibrations

Were the FID or the PID
field instruments
calibrated properly

FID (Flame Ionization Detector)

The most common detector is the FID

The FID uses a hydrogen flame to ionize organic vapors.



Using the FID



The PID

Photo
Ionization
Detector



Performing headspace screening with FID



No cigarette breaks



5 minutes, but no more than 15 minutes.



puncture the foil seal



record the highest meter
response



Head Space Screening



SOIL ASSESSMENT REFERENCE MATERIALS FROM DEP

1. SOP Standard Operating Procedures PCS-004
SOIL ASSESSMENT AND SAMPLING METHODS FOR FLORIDA
BUREAU OF PETROLEUM STORAGE SYSTEM SITES
New and Effective October 1, 2001
2. "Guidelines for Assessment and Source Removal of
Petroleum Contaminated Soil," dated May 1998.
3. "Chapter 62-770, F.A.C. Table IV Interpretation, " dated July
13,1998.
4. "New Soil Sampling Procedures and Recommended EPA
Methods (per changes to USEPA SW-846) and other Quality
Assurance Issues for the Division of Waste Management," dated
July 15, 1998.

[http://www.dep.state.fl.us/waste/
categories/pcp/default.htm](http://www.dep.state.fl.us/waste/categories/pcp/default.htm)

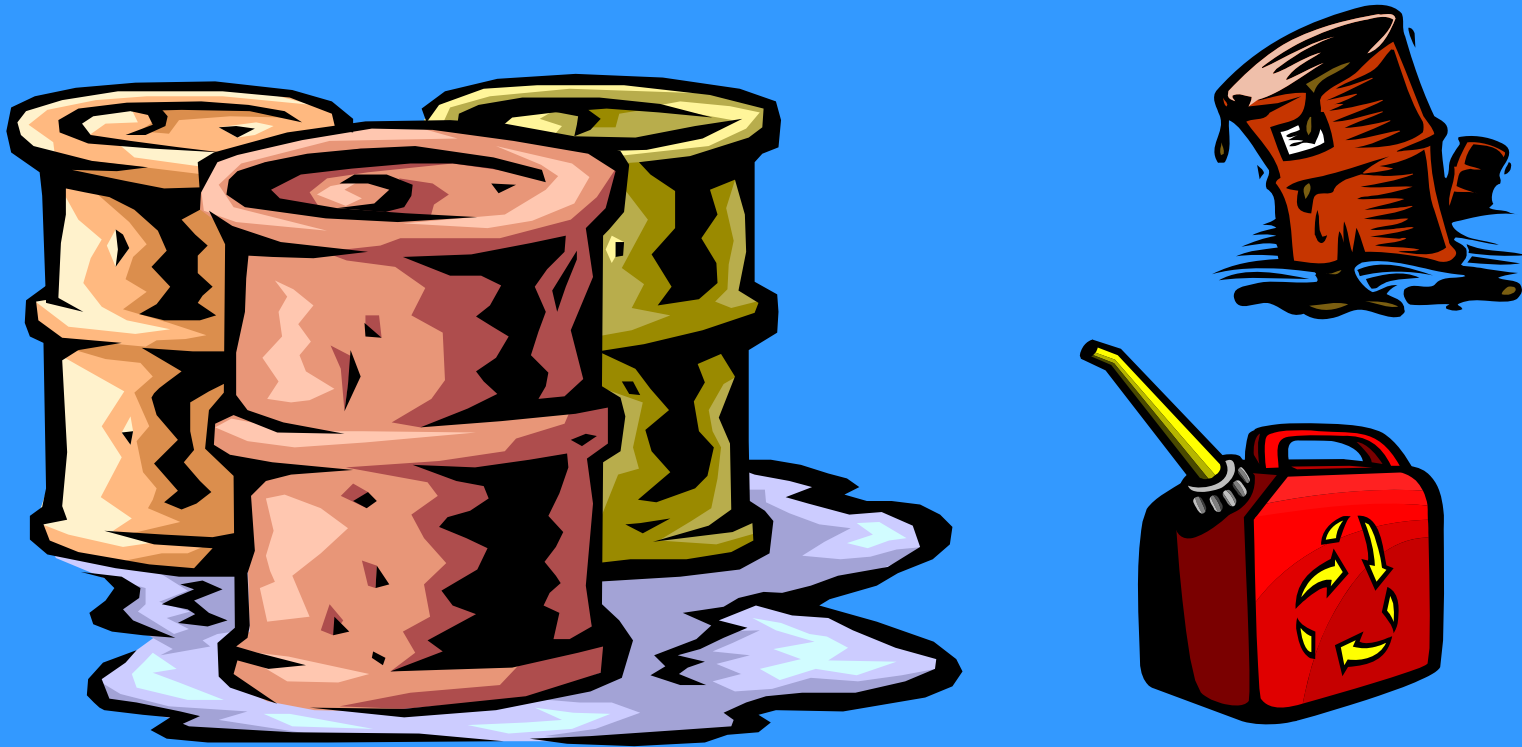
How to find our web site

bureau of petroleum storage system

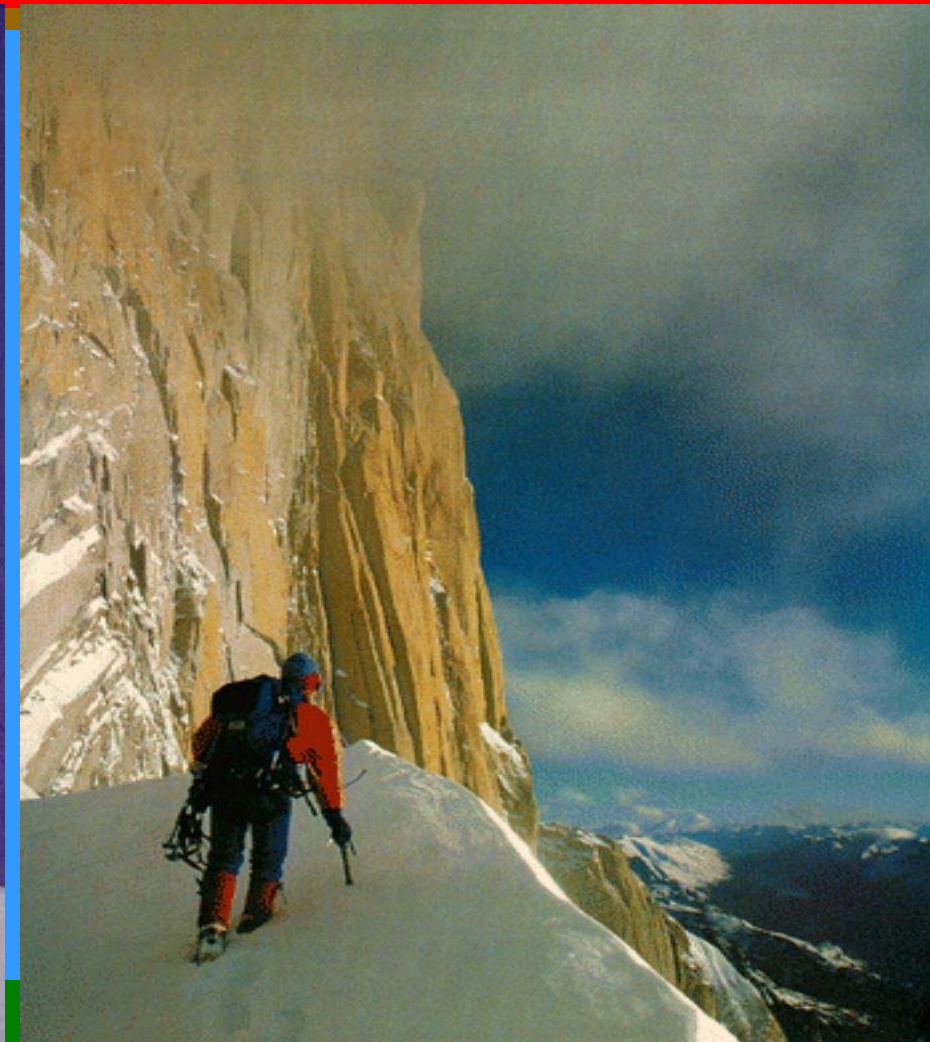
High, Medium and Low –
lab confirmation of field OVA data.



High, Medium and Low Soil Samples per source area.



“High”



“Medium”



“Low”



February 3, 1998 Memo

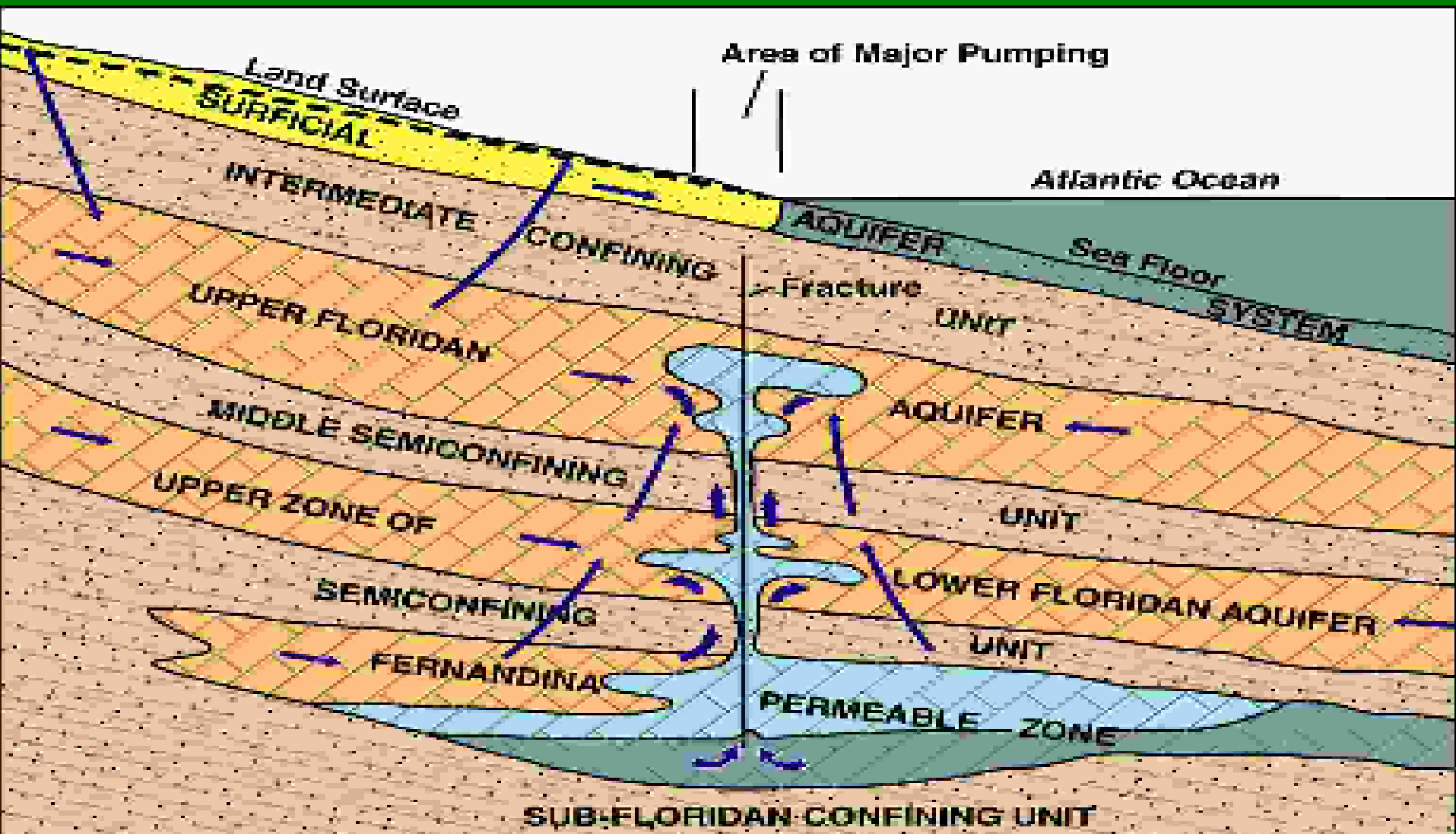
How do you get the soil samples
to the lab?

How To Collect High, Medium and Low OVA Reading Soil Samples In *Shallow Water Tables*

Groundwater System



In Deep Water Tables (using a drill rig/direct push)



Open Pits and Excavations



‘Interested Parties Memo’ July 15, 1998

Soil Sampling Procedures
and
Recommended EPA Analytical
Methods
for
the Division of
Waste Management”

Extreme care must be
taken to minimize
volatilization.

● This end is
cut off



using a disposable plastic syringe

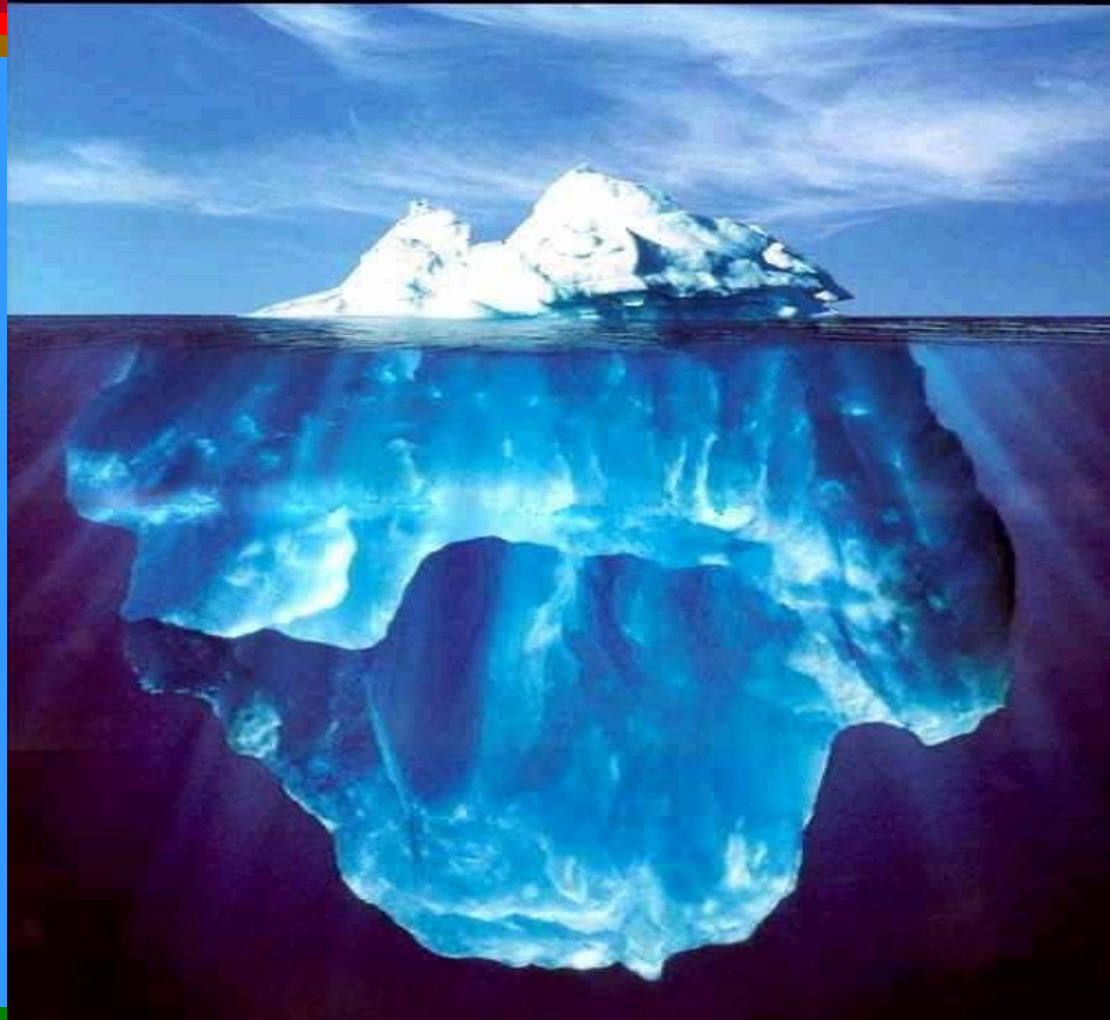
transfer immediately (within 10 seconds) into
the VOC vial.



7.1.2002

Samples placed immediately on ice
(not dry ice)
to minimize biodegradation

ice



On arrival at the laboratory



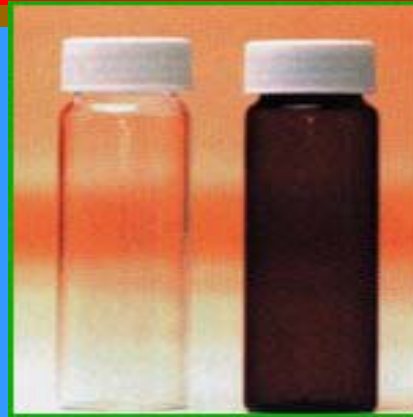
RECOMMENDED SOIL SAMPLING PROCEDURES:



In the field: Order of soil sample collection

Fill

1. VOC vials



2. OVA screening jars



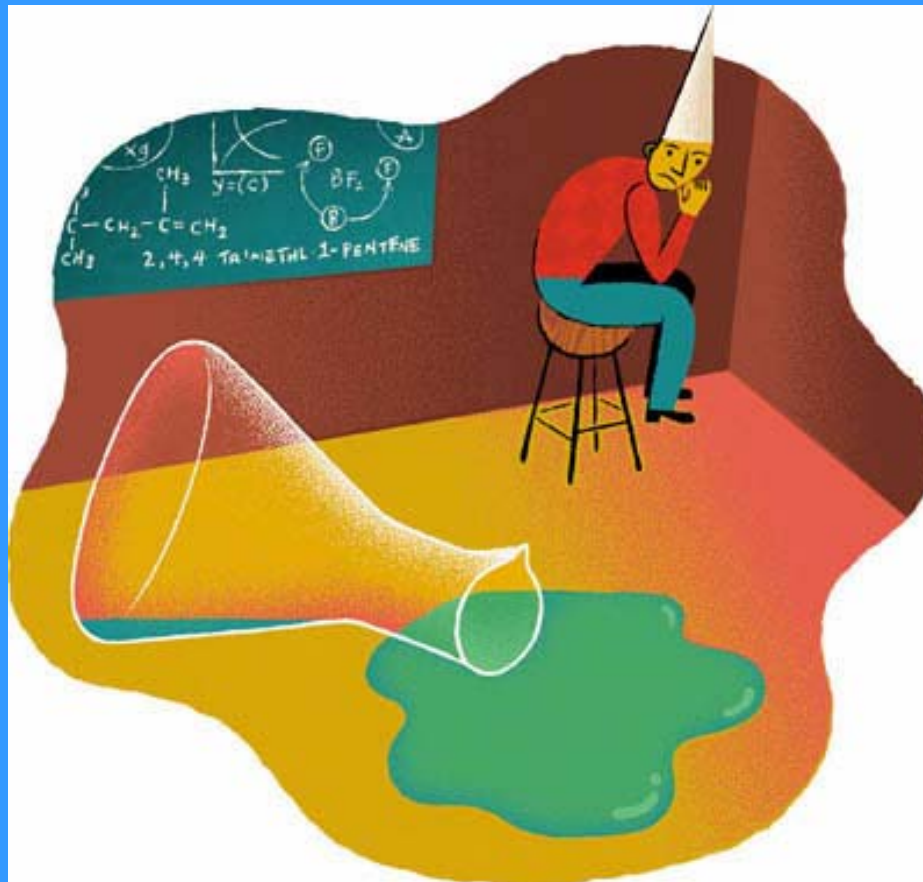
3. Soil bulk jar for
moisture content or
TRPH fractionation

Other precautions
include:



DEP's requirement and The EPA's requirement

ARE TWO SEPARATE THINGS



Preservatives used for Analysis



For High Level

Methanol
and/or
Polyethylene
Glycol.

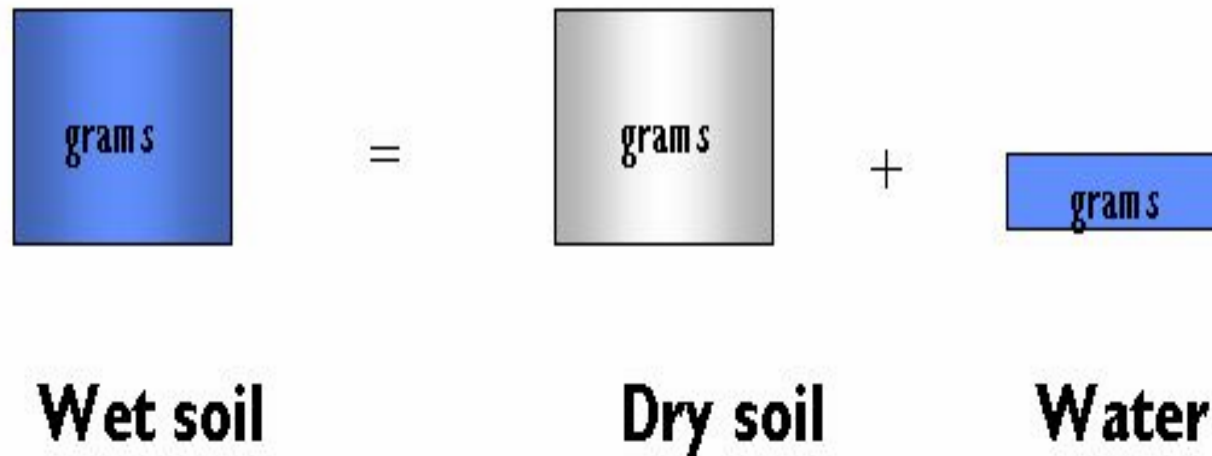
Low Level Analysis Preservative -

reagent grade
water



Soil Moisture Content

Dry Weight Basis



Bulk Sample for determination
of the moisture content

- Soil Equipment Blanks, Trip Blanks and Duplicate samples

- are not required for any soil sampling event



Mobile Lab for Soil analysis?

Usually not done!



SPLP

Synthetic Precipitation Leaching Process

Soil Cleanup Target Levels

Table II

CHAPTER 62-777

SPLP?

If so, add two costs for lab analysis to the work order (or add it in a VCO);



Cost One - for extraction
(EPA Method 1312)



Cost Two – for analysis

Fractionation of TRPH

*Total Recoverable Petroleum Hydrocarbons (TRPHs)
in Diesel*

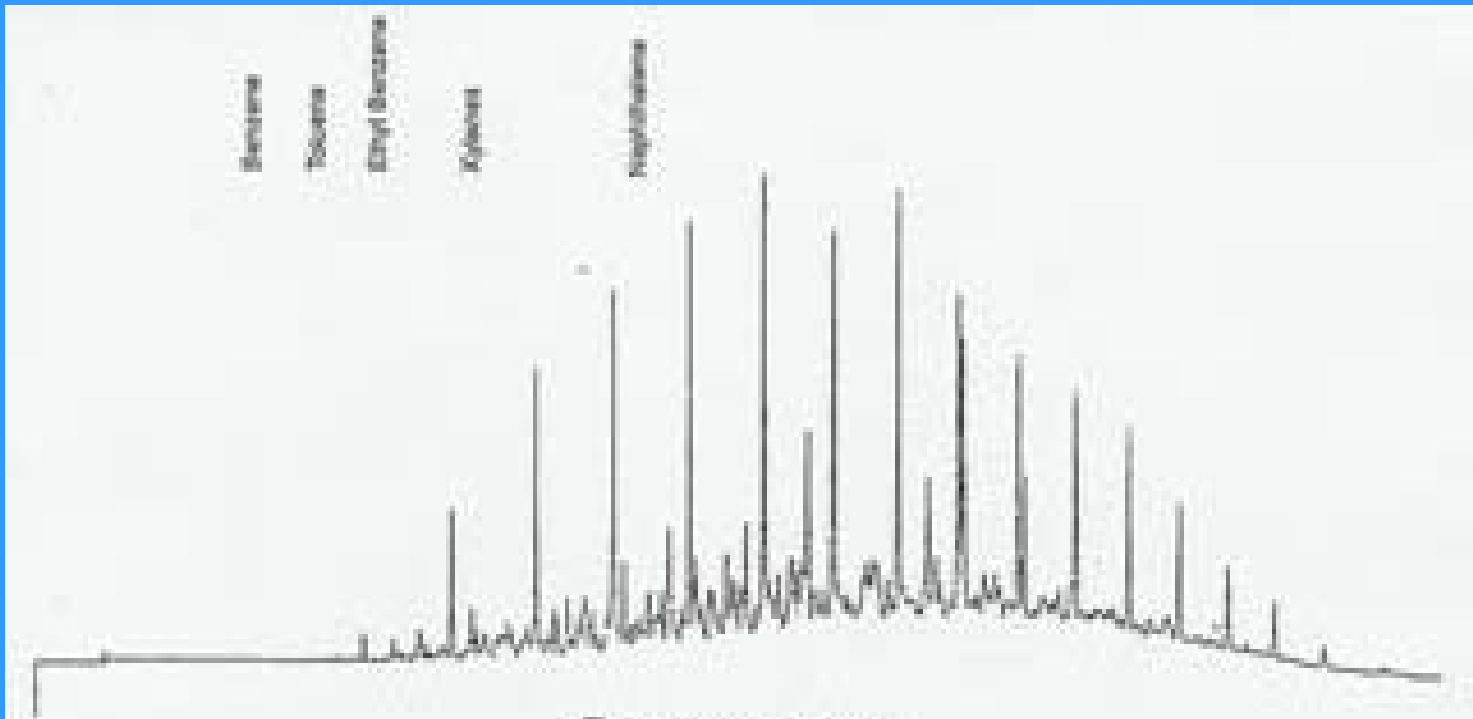


Figure 3. Typical Diesel.

Fractionation of TRPH

Total Petroleum Hydrocarbon Criteria Working Group
(TPHCWG) method

or the

Massachusetts Department of Environmental
Protection
(MADEP) method

Fractionation of TRPH

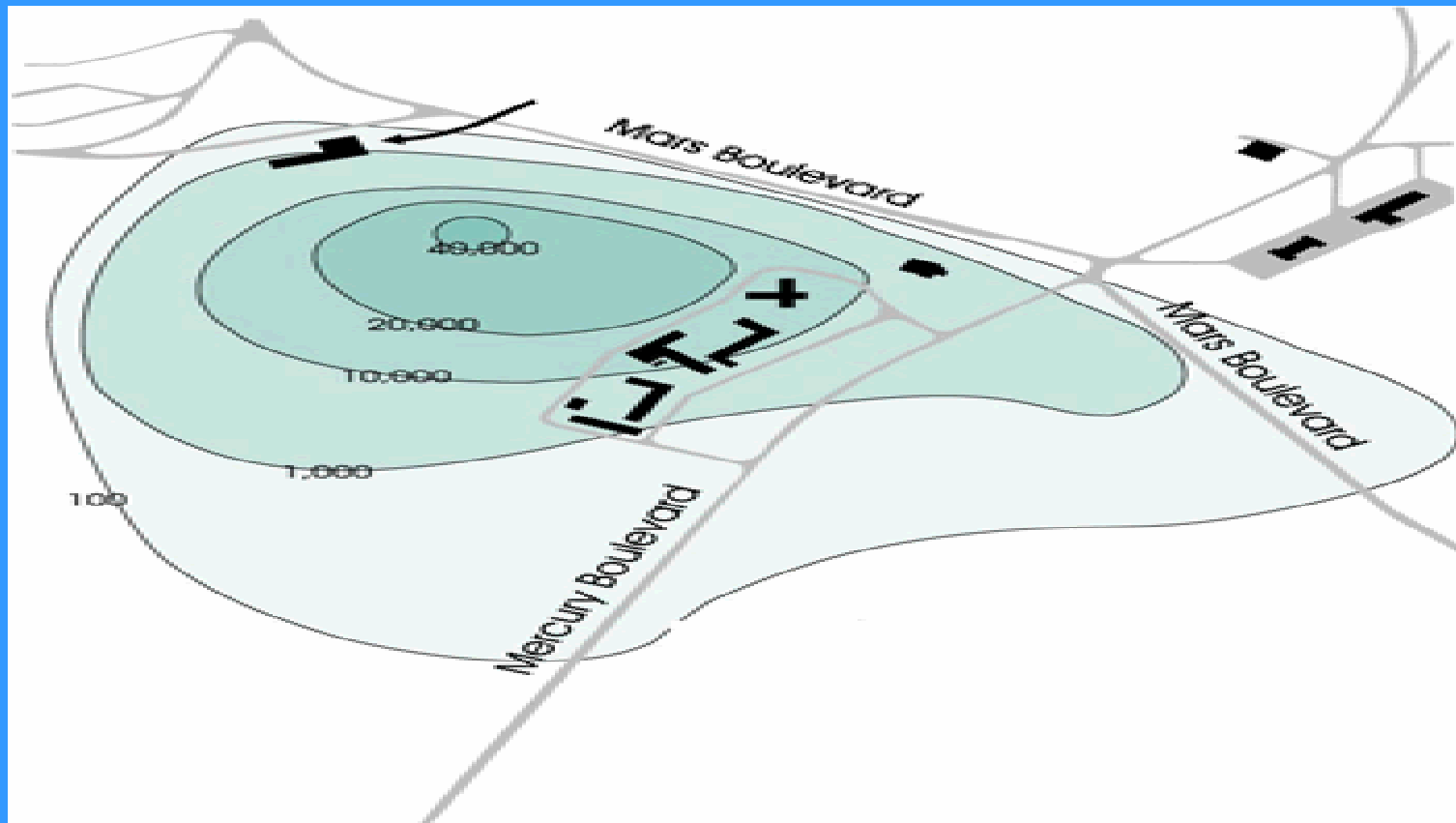
If the TPHCWG method is
performed

or

if the MADEP is performed

Plot the Soil OVA data

contour by consecutive depths



DETERMINING THE DEGREE AND EXTENT OF THE GROUNDWATER CONTAMINATION

Monitoring Well Placement



The Efficient Placement of Monitoring Wells

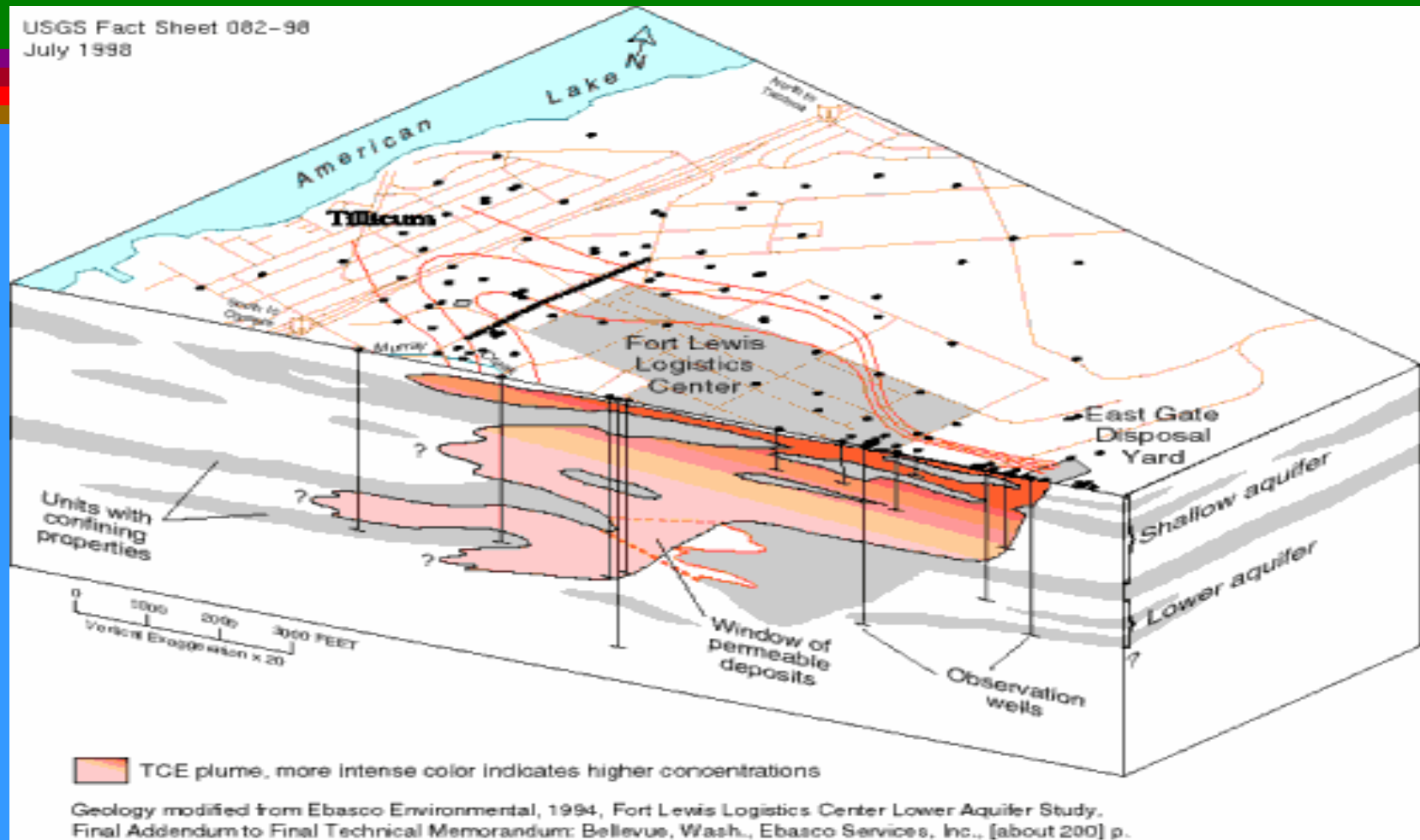
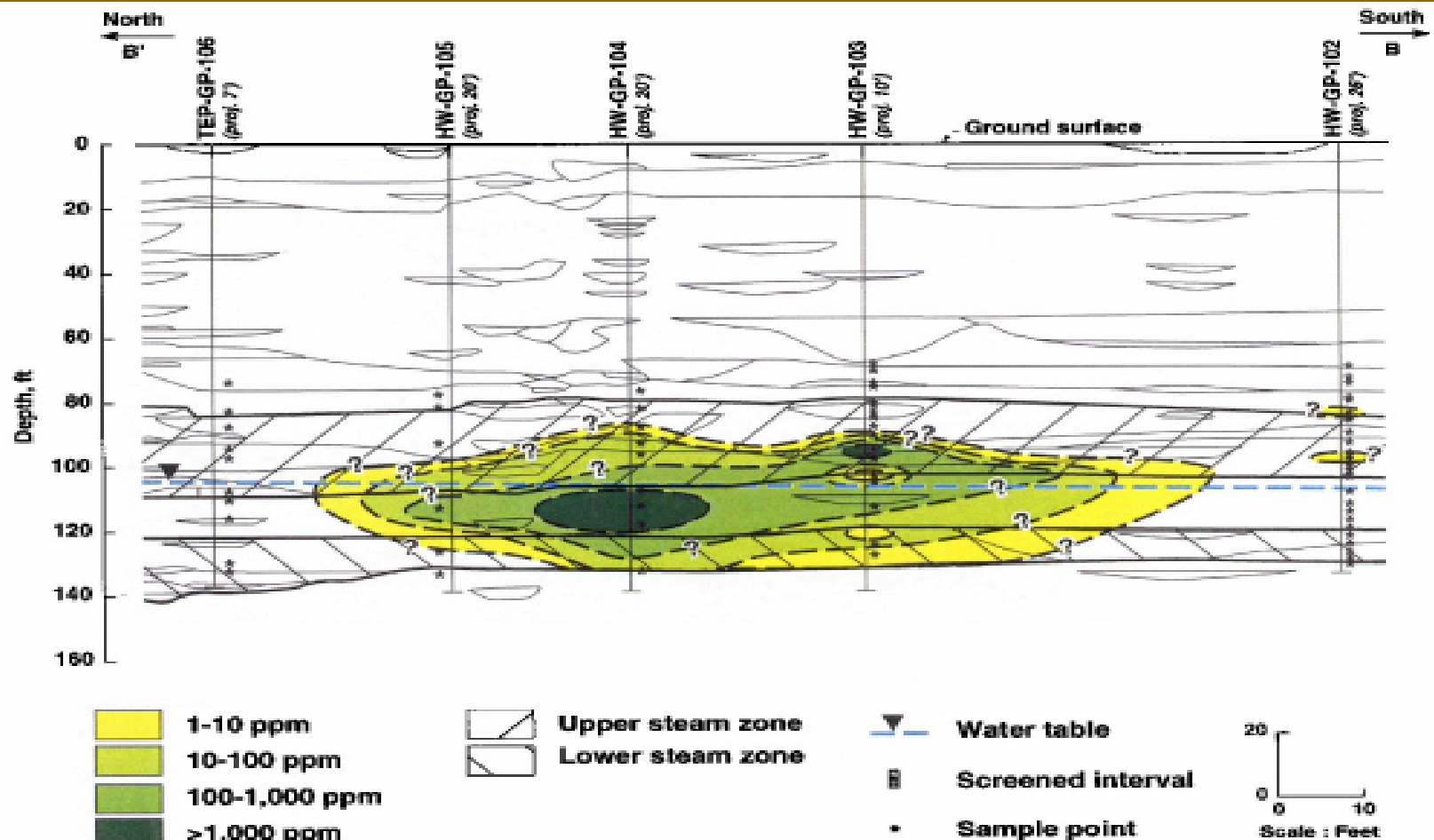
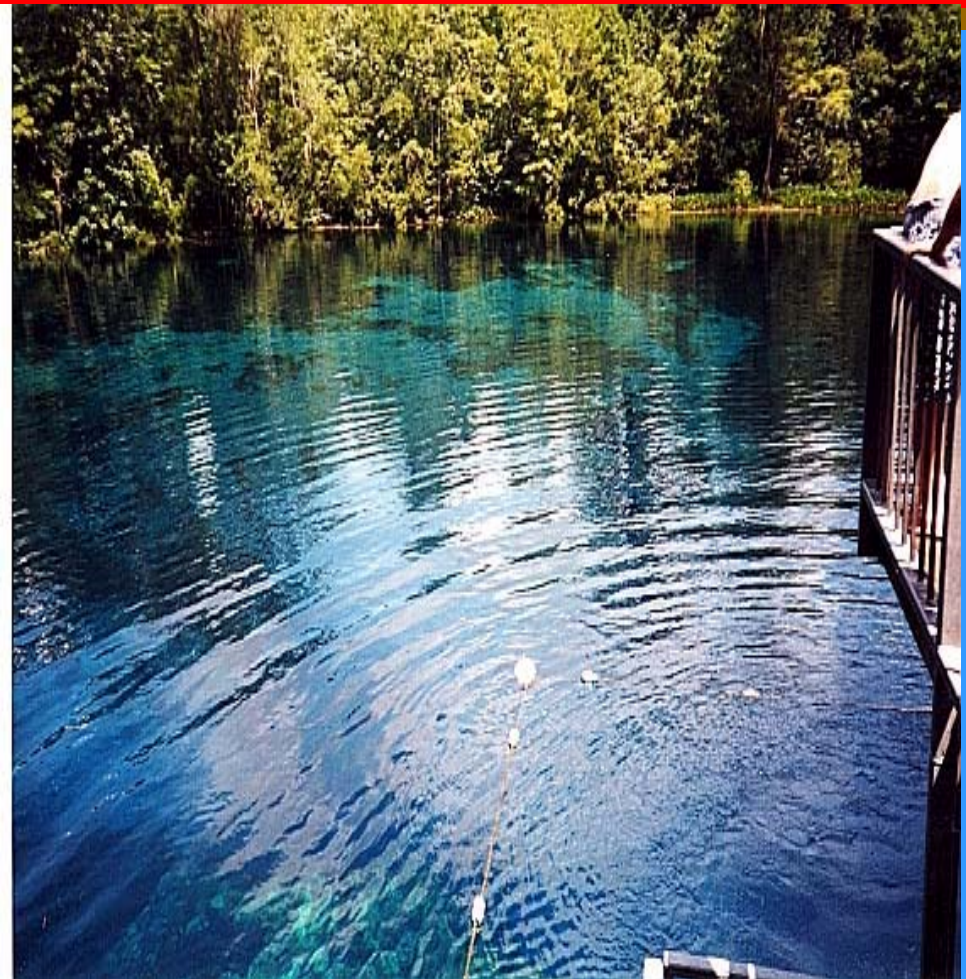
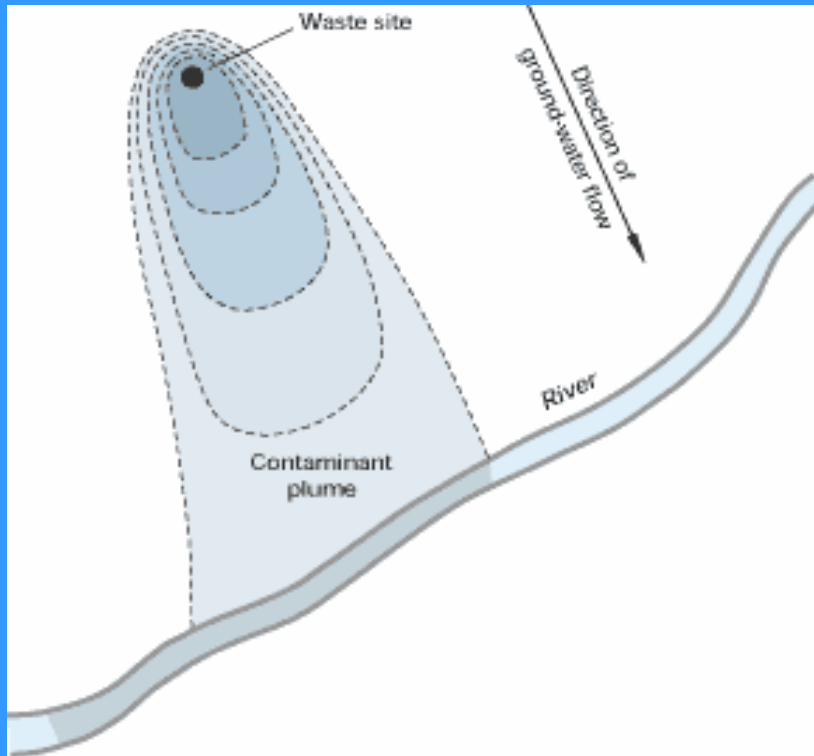


Figure 2. Part of the TCE plume flows from the shallow aquifer through a permeable window in the confining layer and into the lower aquifer.

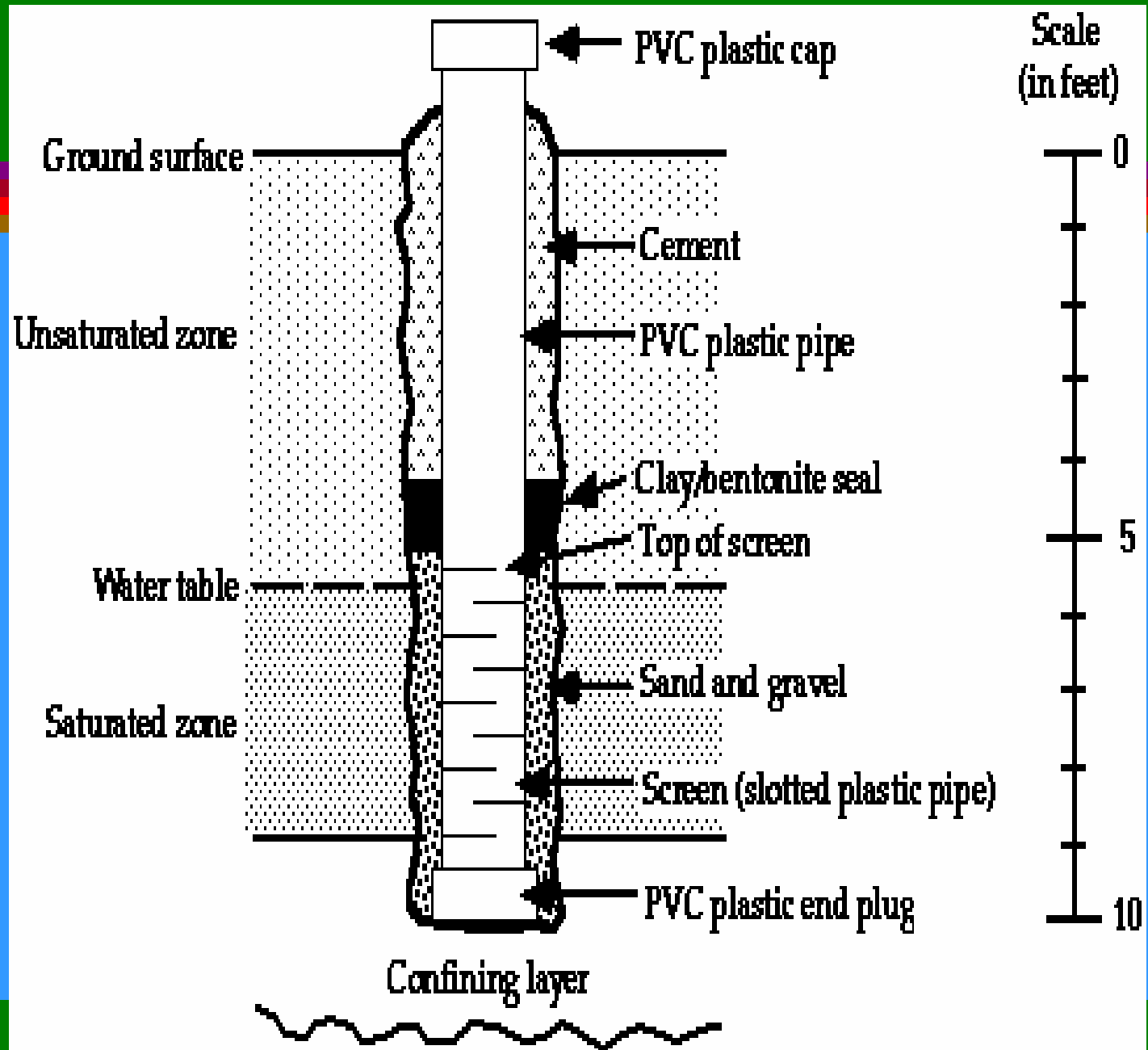
Wells used to develop a 3D geological and hydrological model of the site.



Is there a downgradient surface water body?



Monitoring Well Construction



Water level measurements



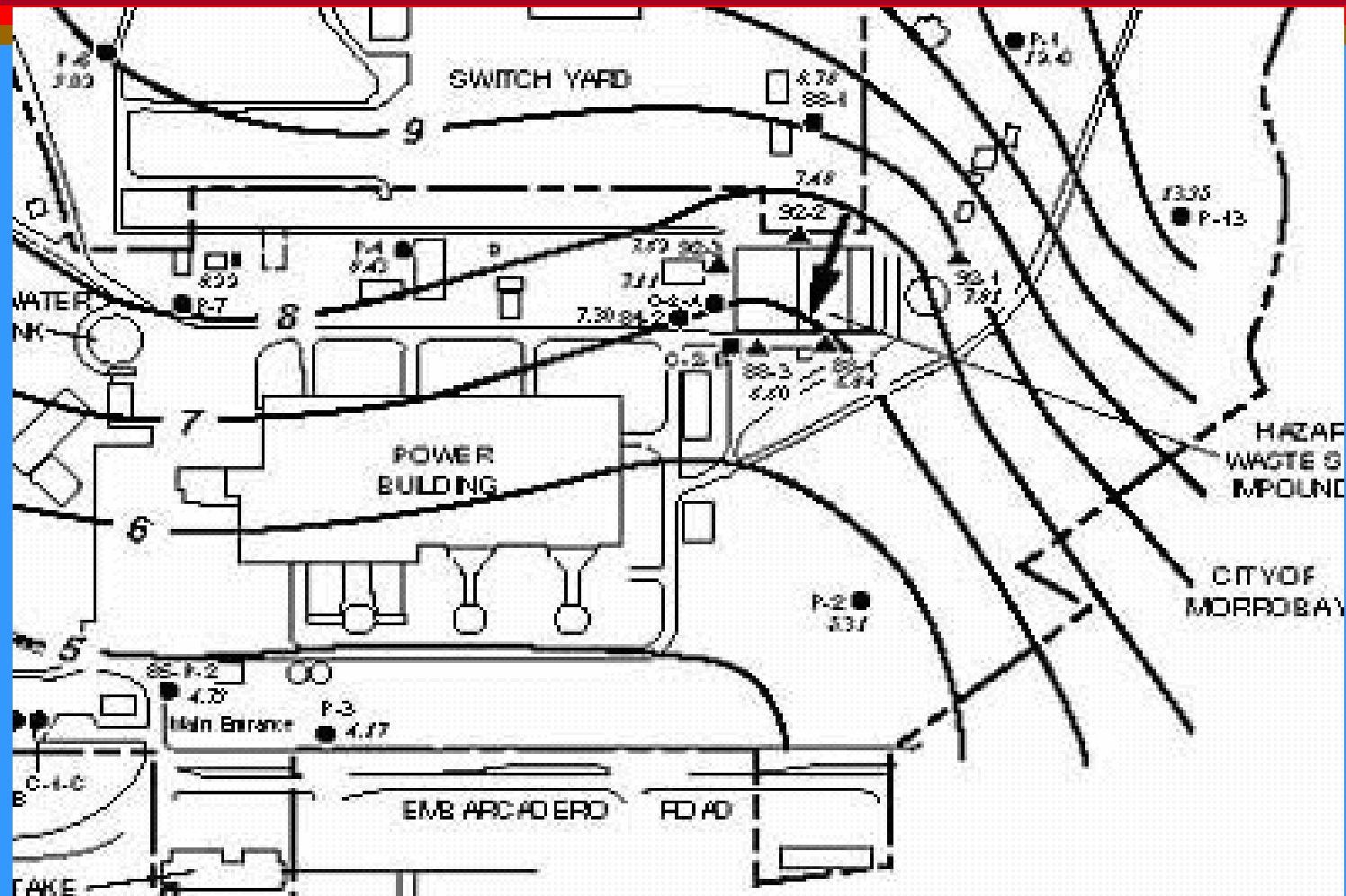
Source Wells

the degree of contamination
source area wells



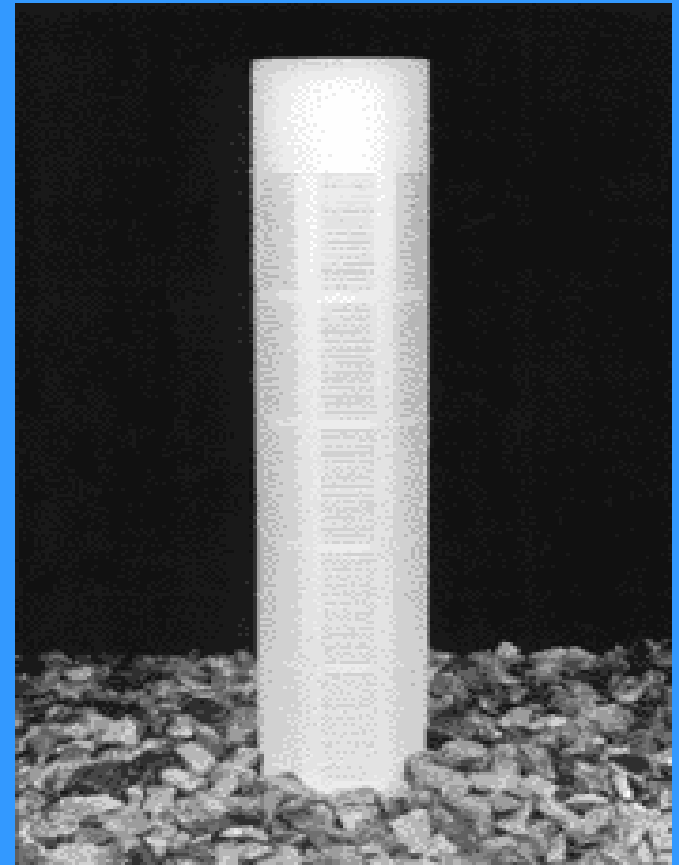
remediation strategy

Groundwater Flow



Screened Intervals

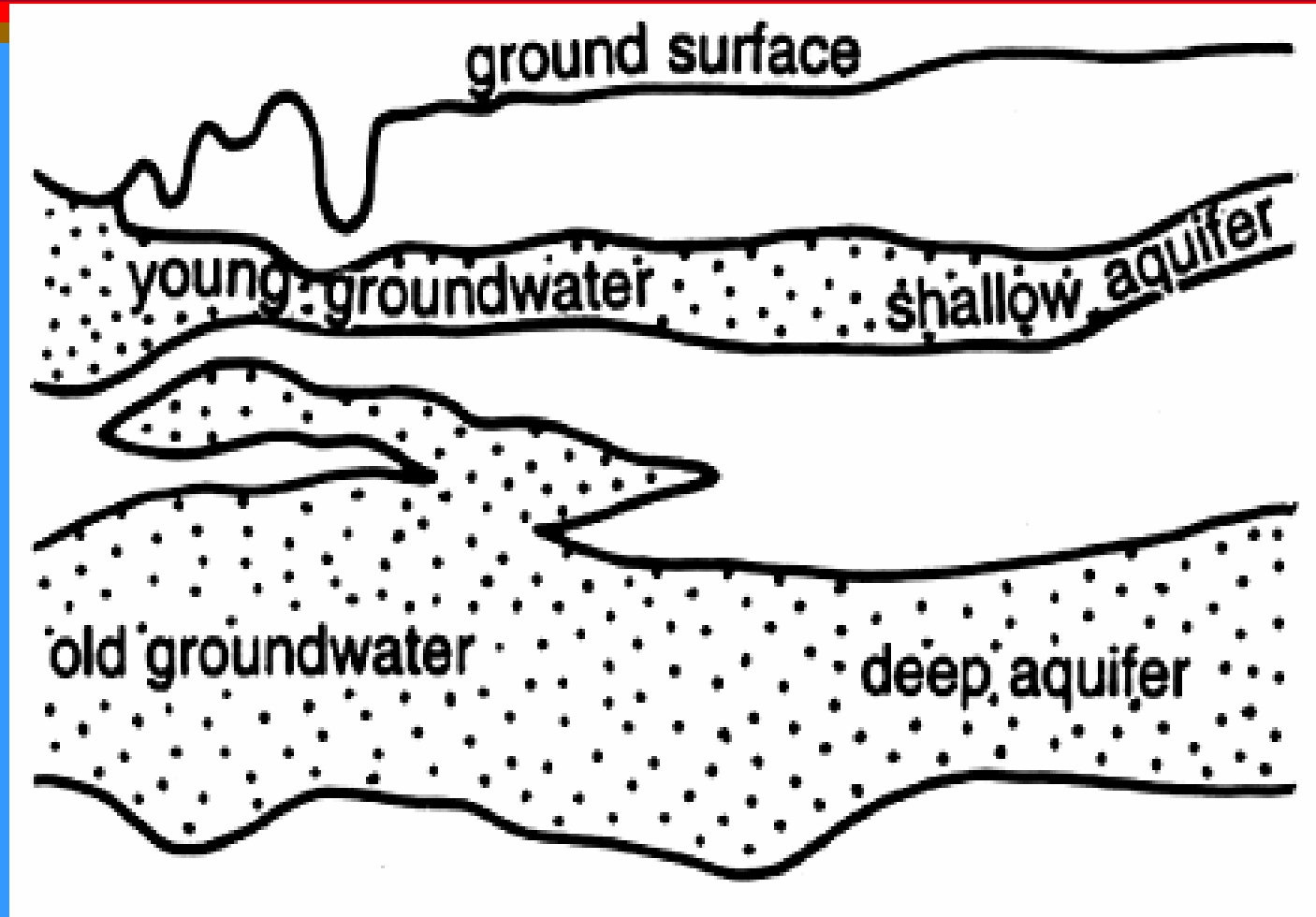
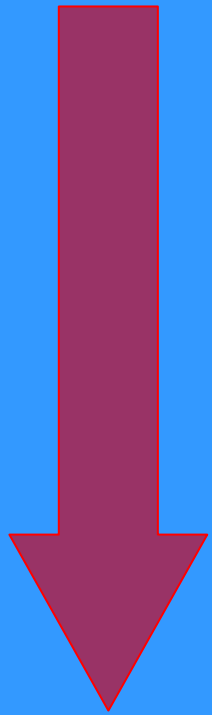
especially important.



Vertical Extent Well

How deep does the contamination

go?



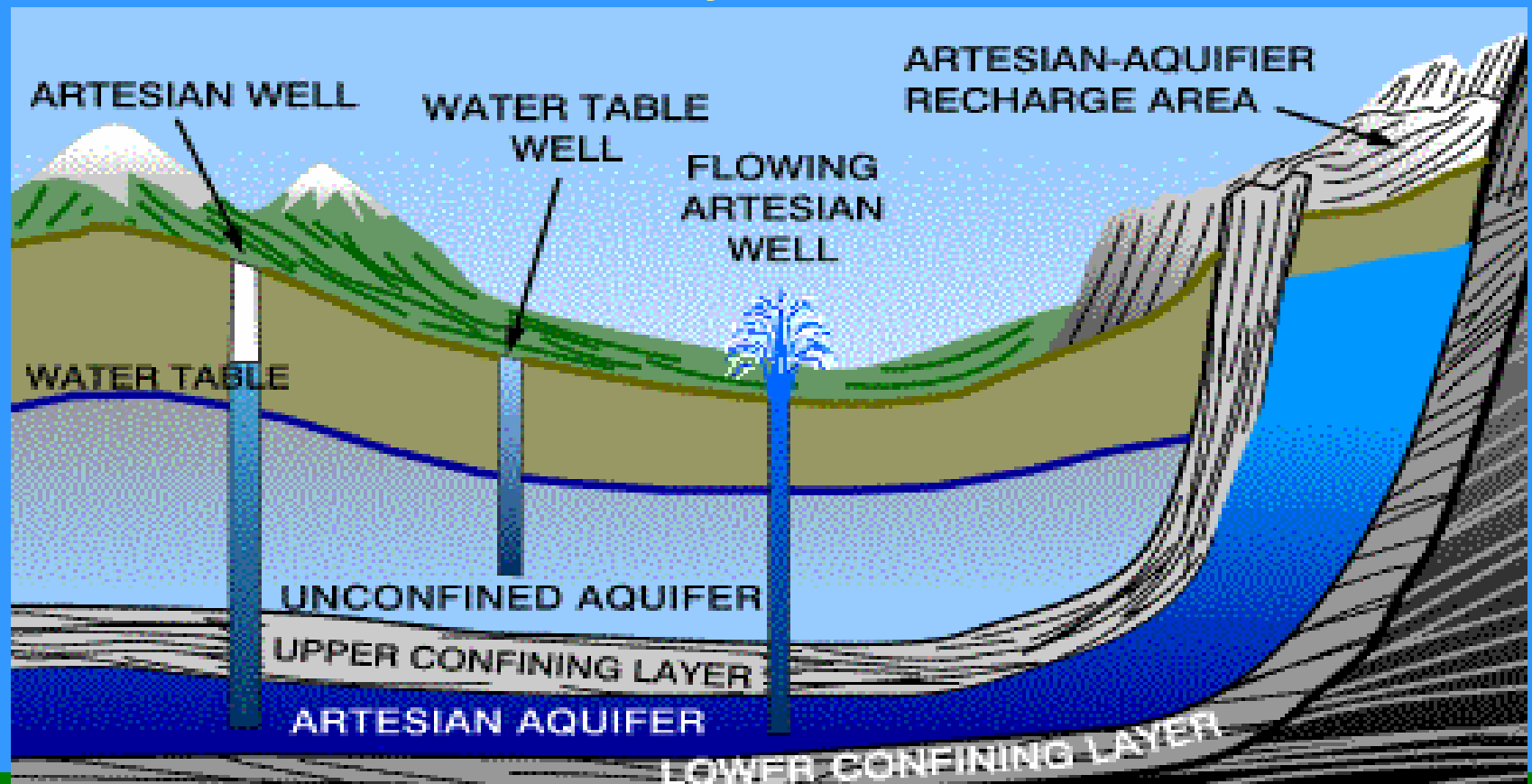
Vertical Extent Wells



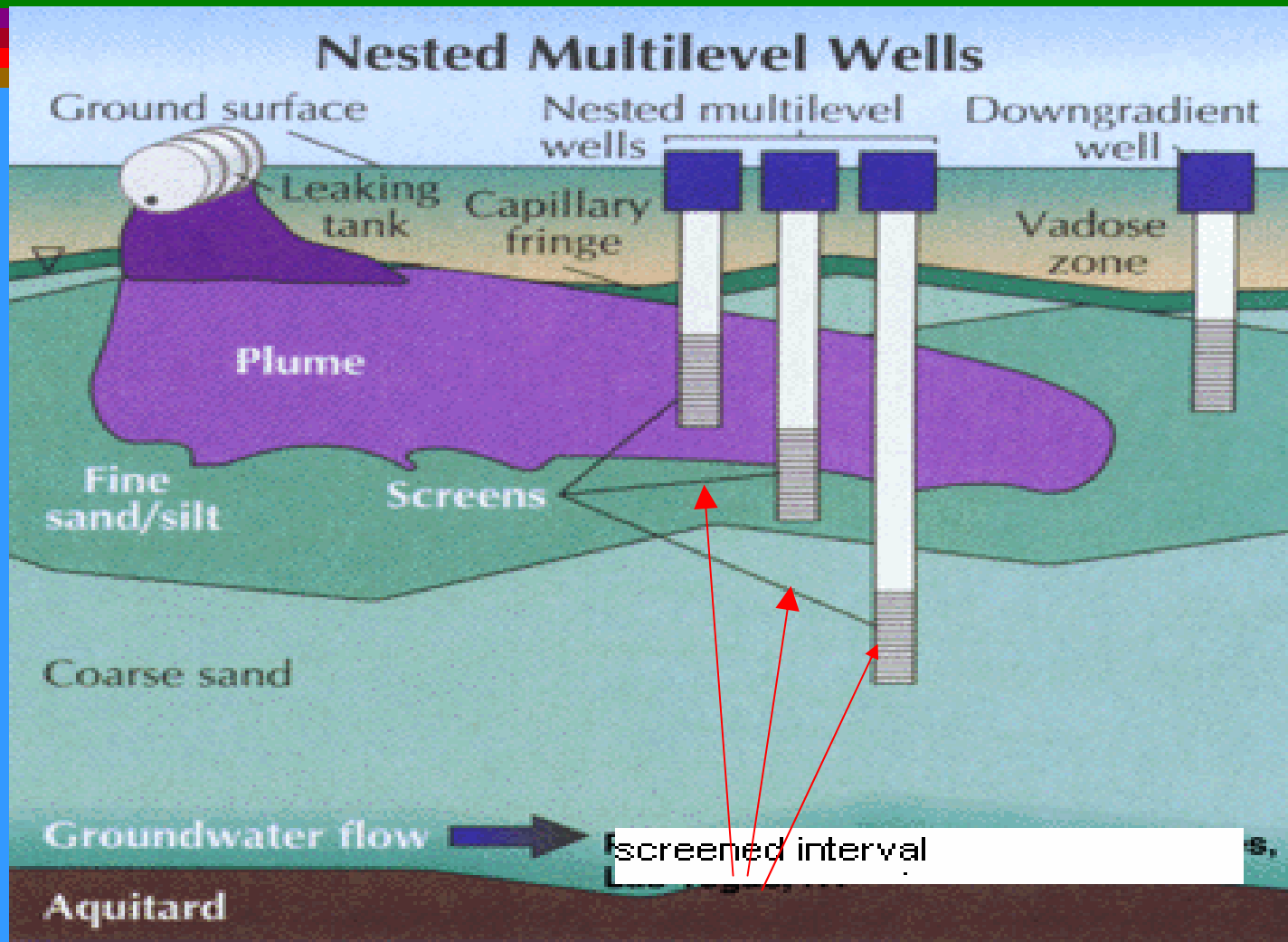
Vertical Extent Well BUT

If Natural Attenuation Default Concentrations

are **barely** exceeded

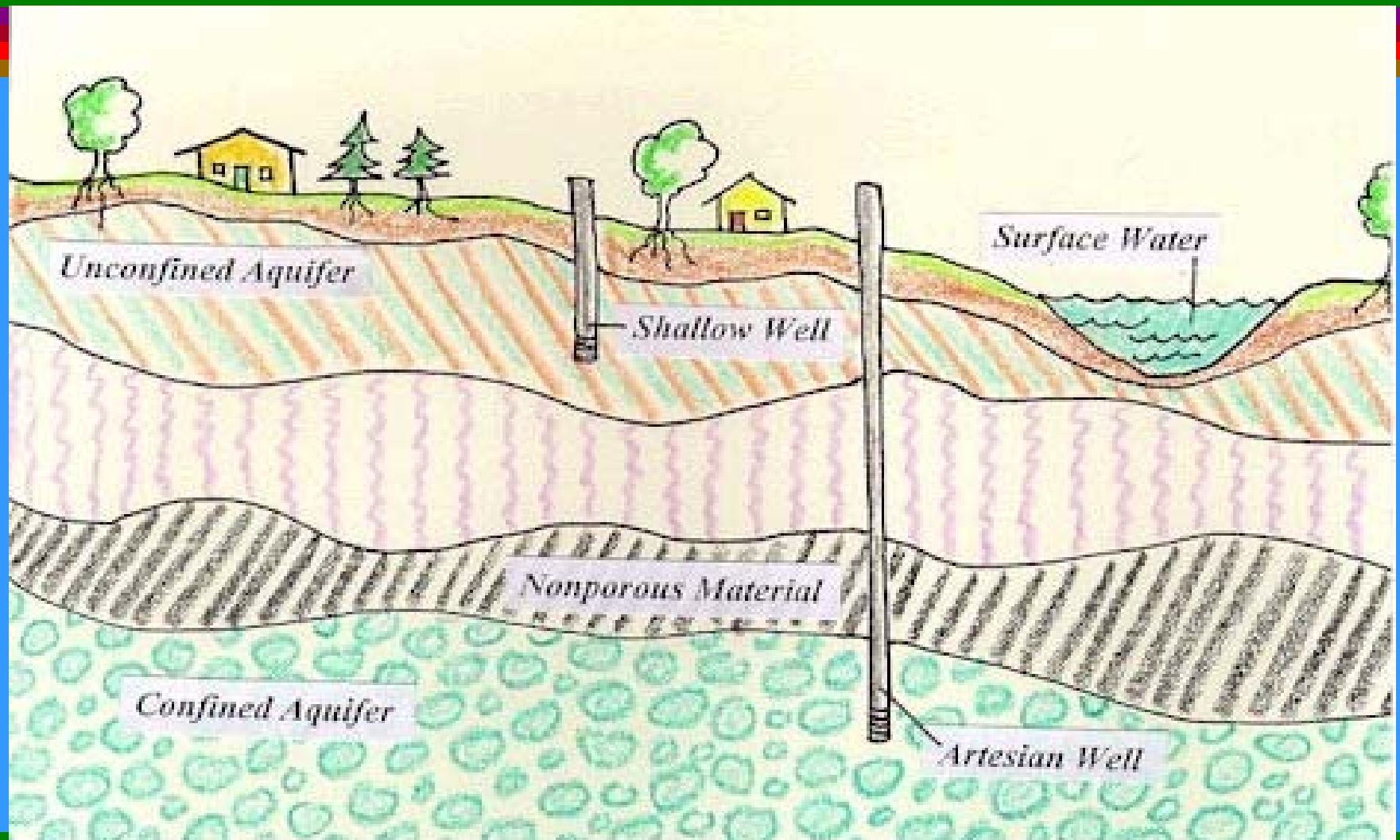


Vertical Extent Well



Vertical Extent Wells

Double Casing



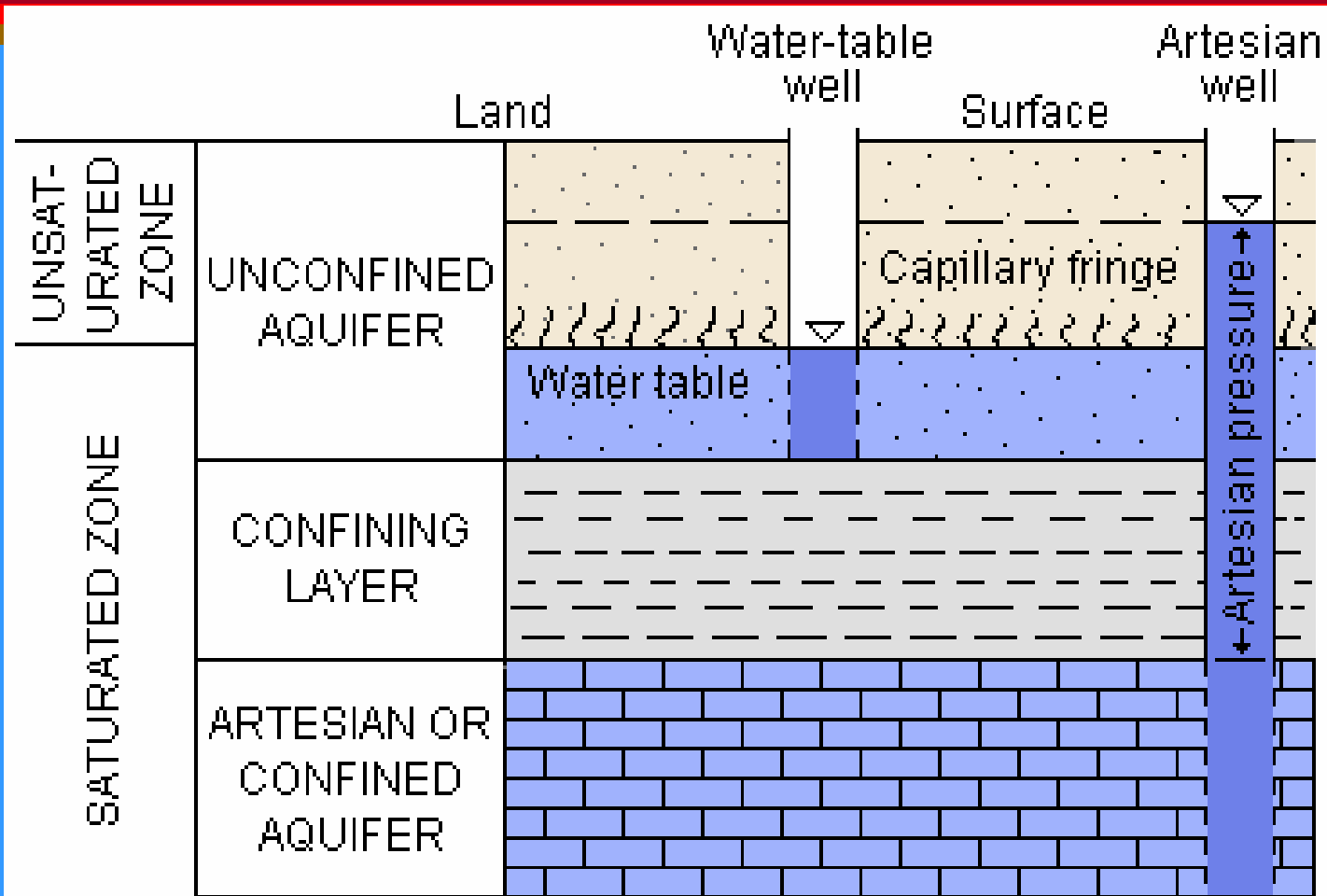
Note



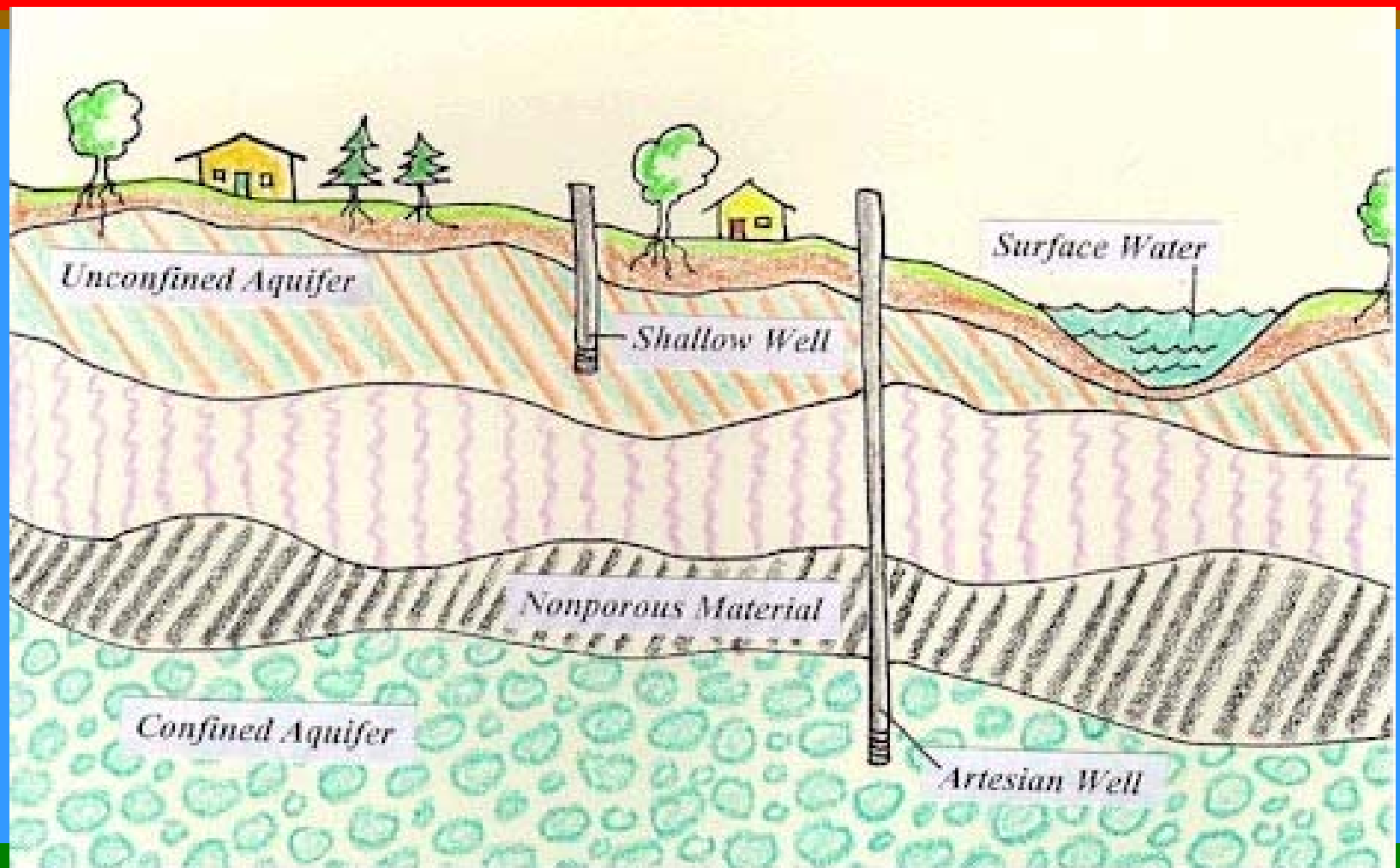
Vertical Extent Well



Vertical Extent Well



Vertical Extent Wells



Procedures

Groundwater Sample Collection



Procedures Groundwater Sample Collection



Water Sampling Log



DEP Form # 62-770,900(3)
Form Title: Petroleum or Petroleum Products
Water Sampling Log
Effective Date: September 23, 1997

Petroleum or Petroleum Products Water Sampling Log

FDEP FACILITY NO.:	WELL NO.:	SAMPLE ID:	DATE: / /
SITE NAME:		SITE LOCATION:	

PURGE DATA								
WELL DIAMETER (in):		TOTAL WELL DEPTH (ft):		DEPTH TO WATER (ft):		WELL CAPACITY (gal/ft):		
1 WELL VOLUME (gal) = (TOTAL WELL DEPTH - DEPTH TO WATER) x WELL CAPACITY = = (-) x =								
PURGE METHOD:					PURGING INITIATED AT:		PURGING ENDED AT:	
WELL VOLS. PURGED	CUMUL. VOLUME PURGED (gal)	pH	TEMP. (°C)	COND. (µmhos)	PURGE RATE (gpm): COLOR	ODOR	TOTAL VOLUME PURGED (gal): APPEARANCE	OTHER

SAMPLING DATA						
SAMPLED BY / AFFILIATION				SAMPLER(S) SIGNATURE(S)		
SAMPLING METHOD(S):				SAMPLING INITIATED AT:		SAMPLING ENDED AT:
FIELD DECONTAMINATION: Y N			FIELD-FILTERED: Y N		DUPLICATE: Y N	
SAMPLE CONTAINER SPECIFICATIONS			SAMPLE PRESERVATION			INTENDED ANALYSIS AND/OR METHOD
NO.	MATERIAL CODE	VOLUME	PRESERVATIVE USED	TOTAL VOLUME ADDED IN FIELD (ml)	FINAL pH	
REMARKS:						
MATERIAL CODES: AG = AMBER GLASS; CG = CLEAR GLASS; HDP = HIGH DENSITY POLYETHYLENE; O = OTHER (SPECIFY)						
WELL CAPACITY: 1.25" = 0.06 gal/ft; 2" = 0.16 gal/ft; 4" = 0.65 gal/ft; 6" = 1.47 gal/ft; 8" = 2.61 gal/ft; 12" = 5.88 gal/ft						

NOTE: this does not constitute all the information required by Chapter 62-160, F.A.C.

Mandated by Ch. 62-770, F.A.C. when submitting sampling results for review. This record contains the following:

TABLE B
For Gasoline and Kerosene Analytical Groups

Contaminants of Concern	Groundwater and Surface Water	Soil and Sediment
Benzene, Ethylbenzene, Toluene, total Xylenes and MTBE	602, 624, 8021 or 8260	8021 or 8260
1-methylnaphthalene, 2-methylnaphthalene, and the 16 method-listed PAHs included in Table A	610, 625, 8100, 8270 or 8310	8100, 8270 or 8310
1,2-dichloroethane and other listed Priority Pollutant Volatile Organic Halocarbons	601, 624, 8021 or 8260	NOT REQUIRED
1,2-dichloroethane and other listed Priority Pollutant Volatile Organic Halocarbons	601, 624, 8021 or 8260	NOT REQUIRED
1,2-dibromoethane (EDB)	601 with electron capture detector substituted for electrolytic conductivity detector and 2-column confirmation, or 504 or 8011	NOT REQUIRED
Total Lead	200.7, 200.8, 239.2, 6010 or 7421	NOT REQUIRED
TRPHs	FL-PRO	FL-PRO

NOTE 1: All methods listed (except for FL-PRO) are USEPA methods and the detection limits shall meet the specified cleanup target levels.

NOTE 2: Appropriate sample preparation and cleanup methods (e.g., extraction, digestion) shall be performed prior to analysis.

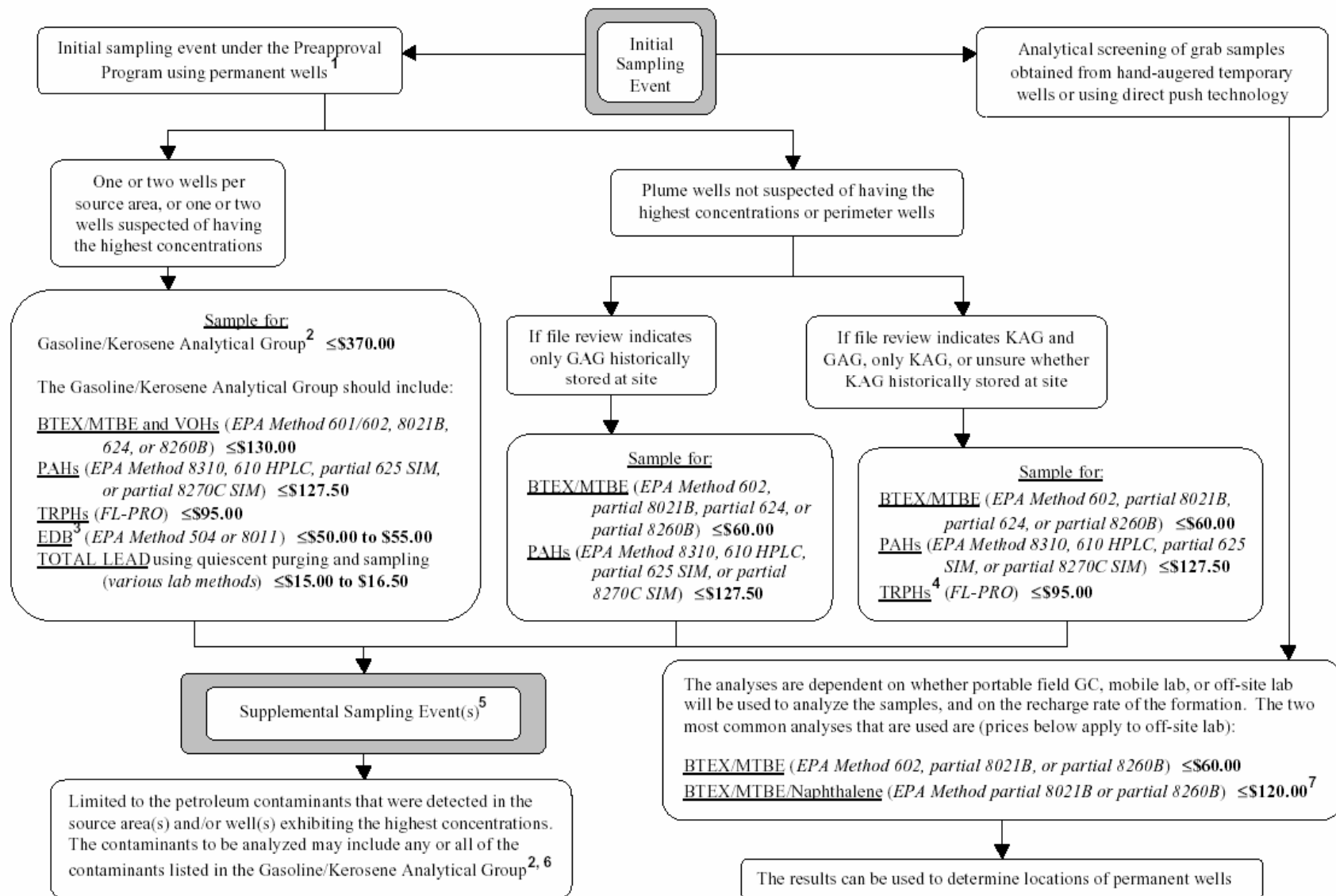
NOTE 3: The quiescent sampling technique for metals shall be used if turbidity is affecting the total metal results.

NOTE 4: Equivalent methods may be used if approved through protocols described in Rules 62-160.400(6), (7) and (8), F.A.C.

GROUNDWATER SAMPLING

**Gasoline Analytical Group (GAG; motor gasoline, aviation gasoline, and gasohol)
and Kerosene Analytical Group (KAG; diesel, kerosene, Jet-A, Jet-B, JP-4, and JP-5) Discharges (Page 1 of 2)**

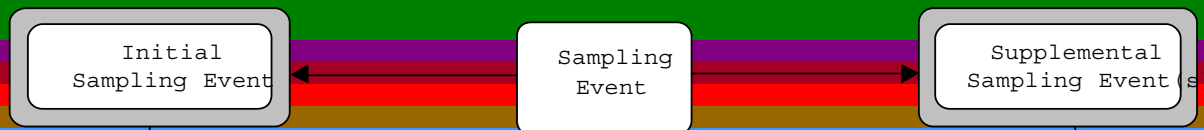
Note: Prices listed represent the maximum allowable compensation under state funding



SOIL SAMPLING

Gasoline Analytical Group (GAG; motor gasoline, aviation gasoline, and gasohol) and Kerosene Analytical Group (KAG; diesel, kerosene, Jet-A, Jet-B, JP-4, and JP-5) Disch

Note: Prices listed represent the maximum allowable compensation under state funding



At minimum one high, one medium, and one low (above background) soil samples (based on OVA readings) should be collected per source area tanks, remote dispensers, from above the smear¹ zone. If all corrected (unfiltered minus fi OVA readings are below background (generally less than on the OVA), then only one soil sample should be collected for confirmation²

Additional soil samples for lab analyses may need to be collected

- Confirm the initial sampling event results.
- Better determine the range of OVA readings that indicate the soil at levels above the SCTLs.
- Collect initial or additional soil samples from the smear zone for soil samples selected from the smear zone for lab analyses should to high OVA readings and not to medium and low OVA readings
- Delineate the soil contamination with lab samples if it is determined not a valid screening tool for the site.

Analyses conducted after the initial sampling event can be limited to contaminants that were detected in the initial sampling event

The soil samples should be analyzed for all of the following

BTEX/MTBE EPA Method partial 821B or partial 8260B ³ \$100.00
PAHs⁴ EPA Method 8310, 8100, or partial 8270C
 ≤\$135.00 8310, ≤\$127.50 8100, ≤\$135.00 partial 8270C
TRPHs FL-PRO) ≤\$97.50

The soil samples that will be analyzed for partial 821B or partial 8260B should be collected in the EPA Method 15035 (see memorandum dated July 15, 1998). EnCore samplers syringes should be included in the cost of a site visit and the number of samples to be collected. For example, if one medium sample, and one low soil sample will be collected, then the number of EnCores needed per sample is 2. The maximum number of EnCores that may be included in the work order is 18 (3x3x2). syringes are not necessary for every sampling event and determined based on site-specific criteria such as depth

¹ More than one high sample, one medium sample, and one low soil sample can be collected during the initial event. a work order could include the collection of two high samples, two medium samples, and one low sample (or some other combination) from a source area above the smear zone. the collection of one high sample from the smear zone.

² If the corrected OVA readings are undetermined due to a high biogenic (methane) vapor component in the soils, then subsequent soil sampling events must utilize an OVA/FID that has a maximum upper measuring limit of at least 5,000 ppm.

³ The price that should be included in the work order is for the low-level analysis of \$100.00. If a high level analysis of \$66.50 is performed, then a cost reduction should be requested by the consultant at invoicing if the low level price is higher than the level price.

⁴ The lab may analyze PAHs using Method partial 8270C, but the price should not exceed \$150.00 (what is allowed EPA Method 8310). The method detection limits in undiluted samples should be equal to, or better than, the soil cleanup target level.

GROUNDWATER SAMPLING

Used Oil / Unknown Product Group Discharges

Note: Prices listed represent the maximum allowable compensation under state funding.

Used oil, an identified product not listed in the Gasoline and Kerosene Analytical Groups, or an unknown product that has been historically stored at the site

Initial Sampling¹ Event
Under the Preapproval² Program

Sampling
Event

Supplemental Sampling Event(s)

USED OIL / UNKNOWN PRODUCT GROUP³ ≤\$665.00

• The Used Oil / Unknown Product Group should include:

PRIORITY POLLUTANT VOLATILE ORGANICS (EPA Method 624 or 8260B) ≤\$150.00

PRIORITY POLLUTANT EXTRACTABLE ORGANICS (EPA Method 625 or 8270C; \$297.50⁴25), ≤\$300.00⁴270C

NON-PRIORITY POLLUTANT ORGANICS WITH >100 µg/L TIC (EPA Method 624/625 or 8260B/8270C) ≤\$130.00⁴24/625 ≤\$115.00⁴260B/8270C

TRPHs (FL-PRO) ≤\$95.00

TOTAL ARSENIC various methods ≤\$15.00 to \$17.00⁴

TOTAL CADMIUM various methods ≤\$15.00 to \$17.50⁴

TOTAL CHROMIUM various methods ≤\$15.00 to \$16.50⁴

TOTAL LEAD various methods ≤\$15.00 to \$16.50⁴

New well(s) and perhaps some or all well(s) previously sampled for the Used Oil / Unknown Product Group

Limited to the petroleum contaminants that were detected in the source area(s) and/or well(s) exhibiting the highest concentrations. The contaminants to be analyzed may include any petroleum contaminants listed in the Used Oil / Unknown Product Group³

¹ Generally restricted to one or two source wells installed in the area with the highest OVA readings, visual staining, or other former used oil/unknown product tank area.

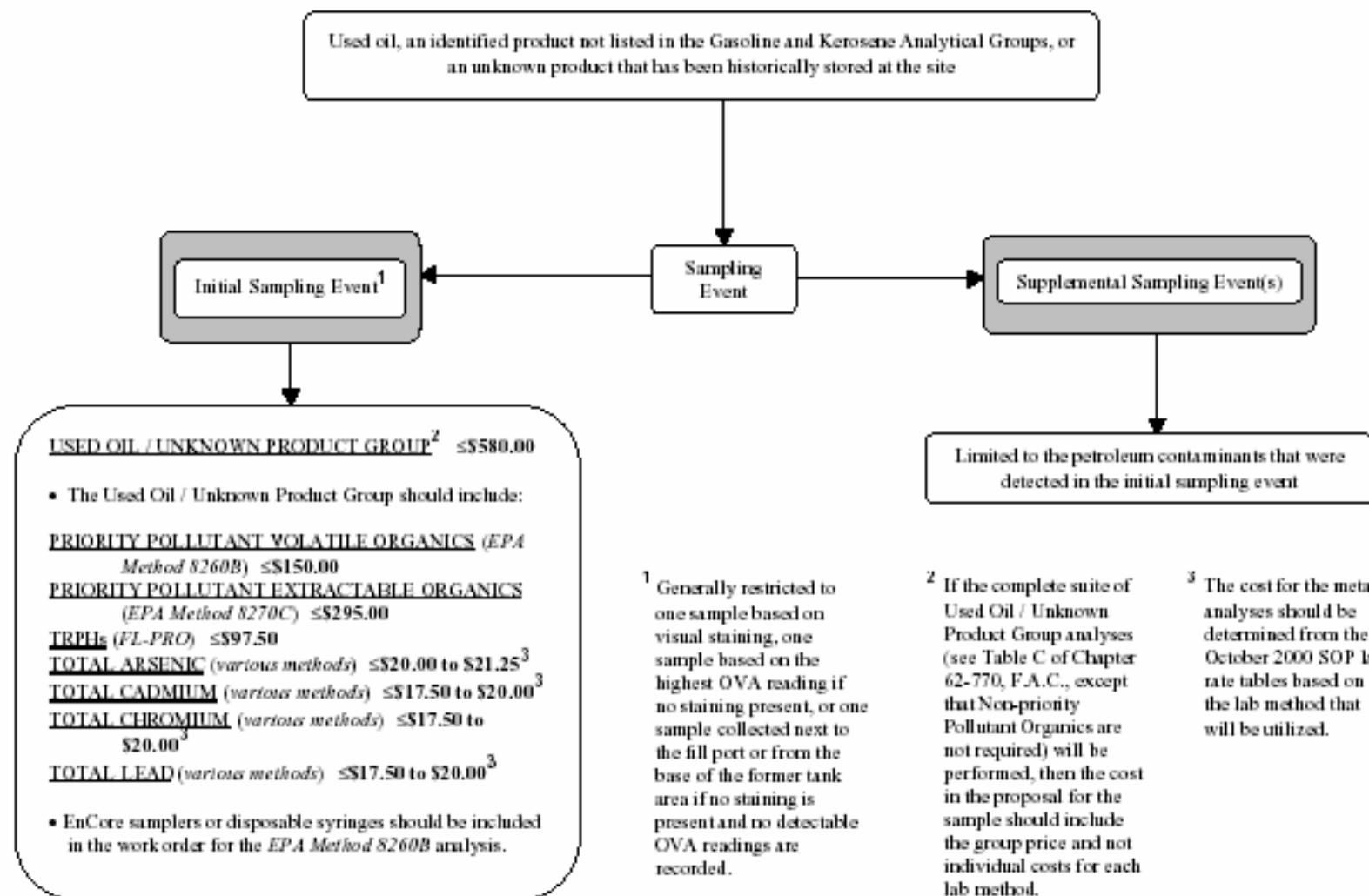
² A detailed file review for the site should always be conducted for determining the wells to be sampled and the contaminants to be analyzed for under the Preapproval Program. If groundwater analyses were obtained prior to the site being eligible for the program and are available in the file, then the contaminants to be analyzed at the wells to be sampled should be based on the analyses previously conducted and on the contaminants that were detected.

³ If the complete suite of petroleum contaminants is analyzed, the cost for the Used Oil / Unknown Product Group analyses should be determined from the 62-770, F.A.C.) will be October 2000 SOP. If only a subset of contaminants is analyzed, the cost should be determined from the lab rate tables by the number of wells, then the cost in the lab method proposal for the well(s) that will be utilized should include the group price and not individual costs for each lab method.

SOIL SAMPLING

Used Oil / Unknown Product Group Discharges

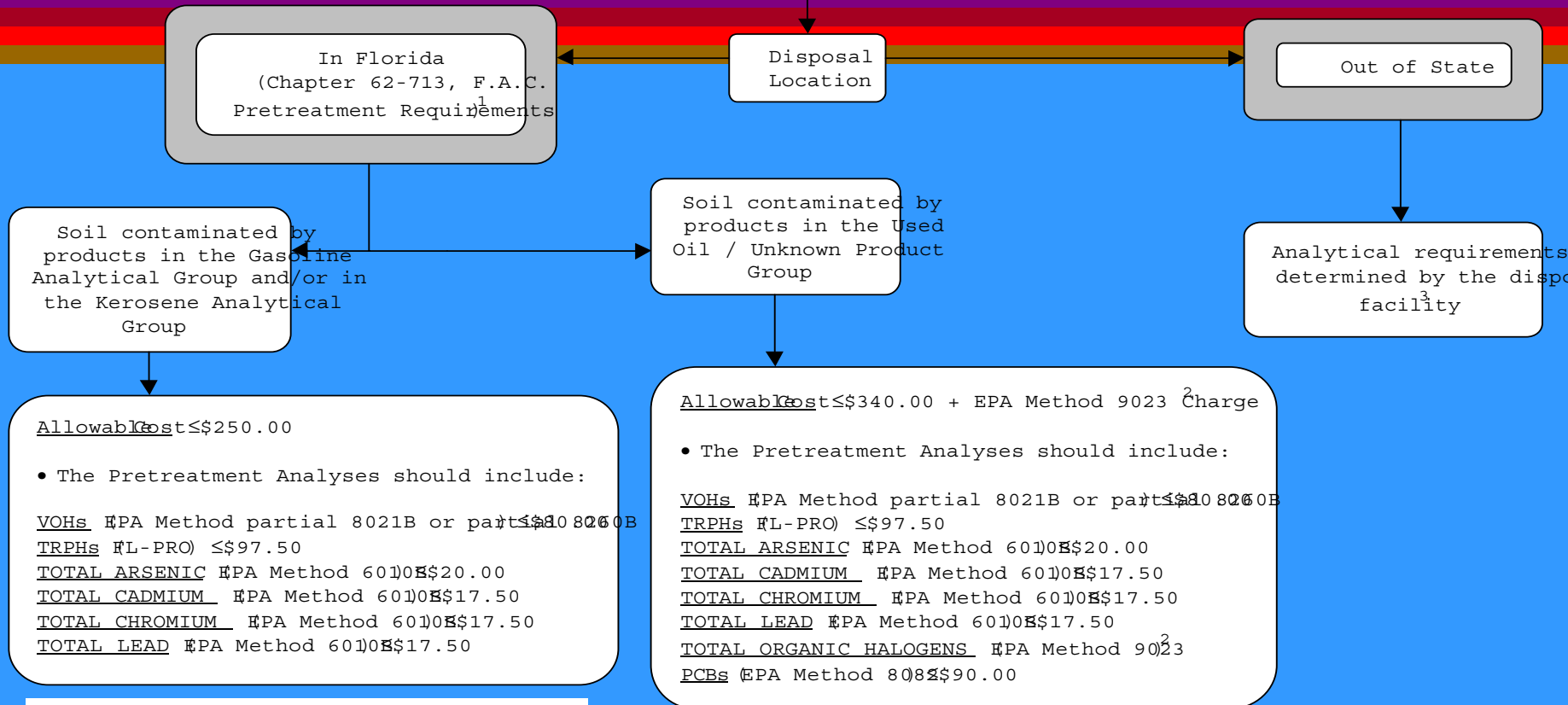
Note: Prices listed represent the maximum allowable compensation under state funding



PRETREATMENT SOIL SAMPLING

Note: Prices listed represent the maximum allowable compensation under state funding.

Samples for pretreatment analyses required by the thermal treatment facility or landfill should be collected during the drilling event and the cost for the pretreatment analyses should be included with the drilling work order.



The treatment facility may not require all analyses to be completed for the pretreatment characterization. assessment data or pretreatment analytical data obtained for the site may be utilized at the disposal facility. The cost proposal by the contractor should include the analyses that are requested by the disposal facility.

² A maximum allowable cost for EPA Method 9023 has not been established by the BPSS in the October 2000 EPA lab rate table. The cost for the Method 9023 analysis will be evaluated on a case-by-case basis.

³ Typically, the analyses may include one or more of the following:

- BTEX/MTBE
- PAHs
- 8 RCRA Metals

What About Additives?

Lead

EDB

1-2 DCA

Oxygenates

Equipment Blanks

Trip Blanks



©Disney

are not
required

unless

Duplicates



METHOD DETECTION LIMITS (MDLs):

Make Sure

METHOD DETECTION LIMITS (MDLs):

This requirement must be met
unless...

METHOD DETECTION LIMITS (MDLs):

For Surface Water

Procedures for Chain of Custody

Chain of custody begins
when the bottles are
delivered from the lab to the
consultant.

Preservatives & Holding Times



Transport Temperatures

Check the Chain of Custody



Lab Cost Quotes

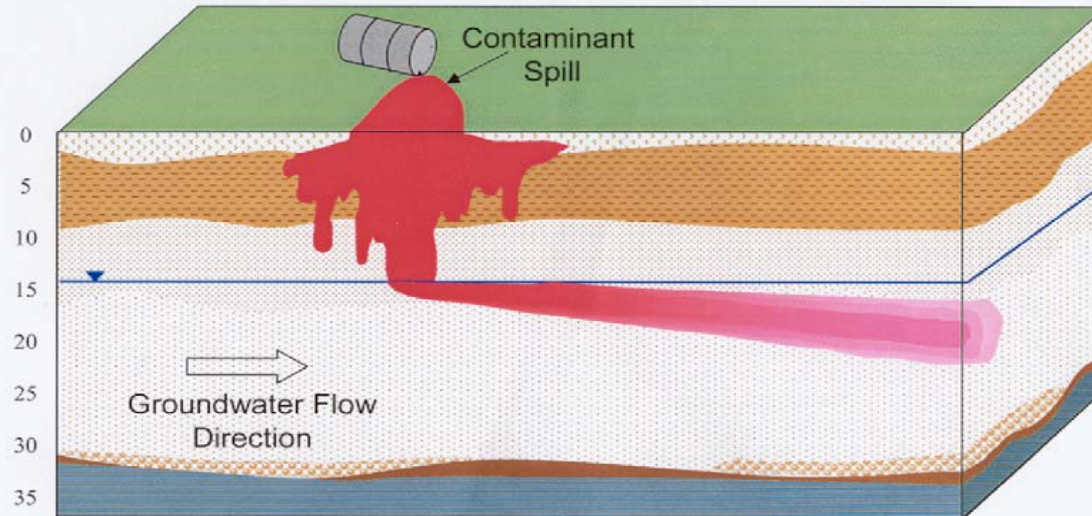
“

”



The Degree And Extent Of Groundwater Contamination

Release of Dissolved Phase VOCs to Shallow Groundwater

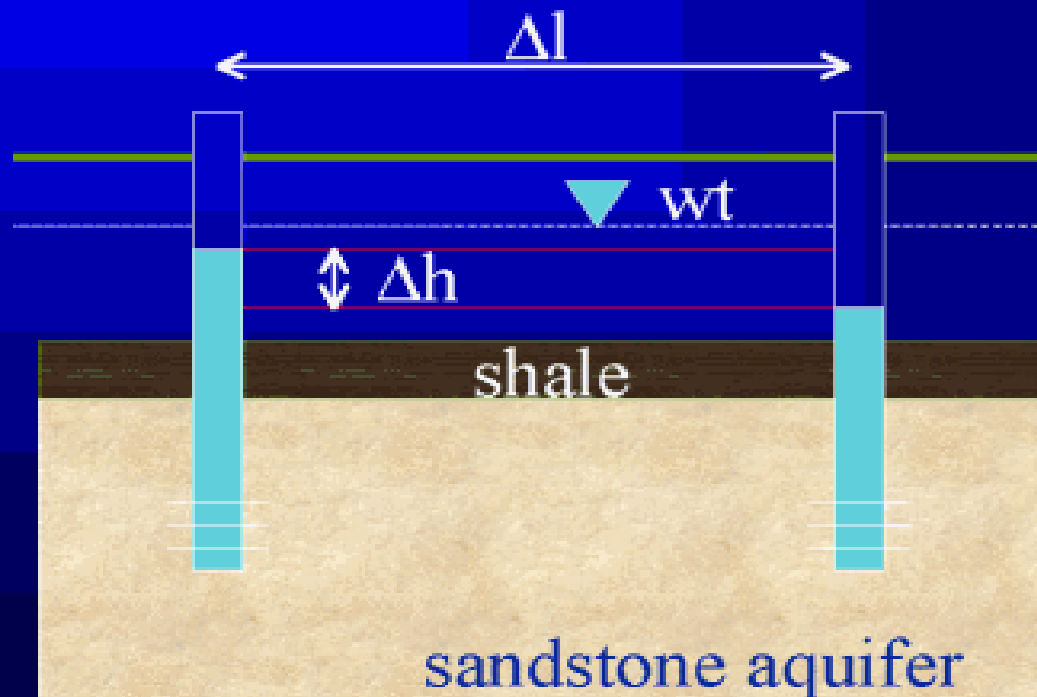


TIDAL INFLUENCE



Compare shallow wells to deep wells

Hydraulic gradient, $\Delta h / \Delta l$

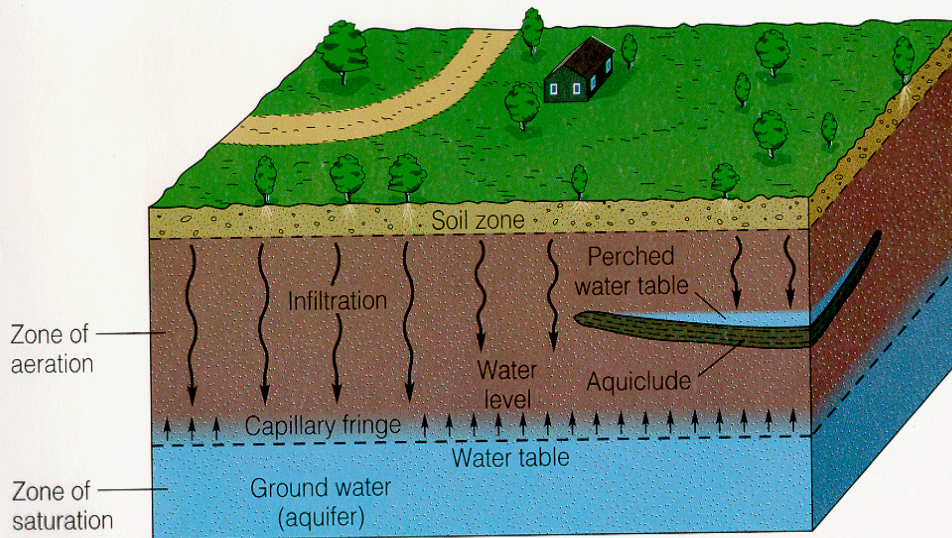


Δh is the difference in hydraulic head in the two wells; Δl is the distance between the two wells.

The Horizontal Hydraulic Gradient(s)

Perched water table

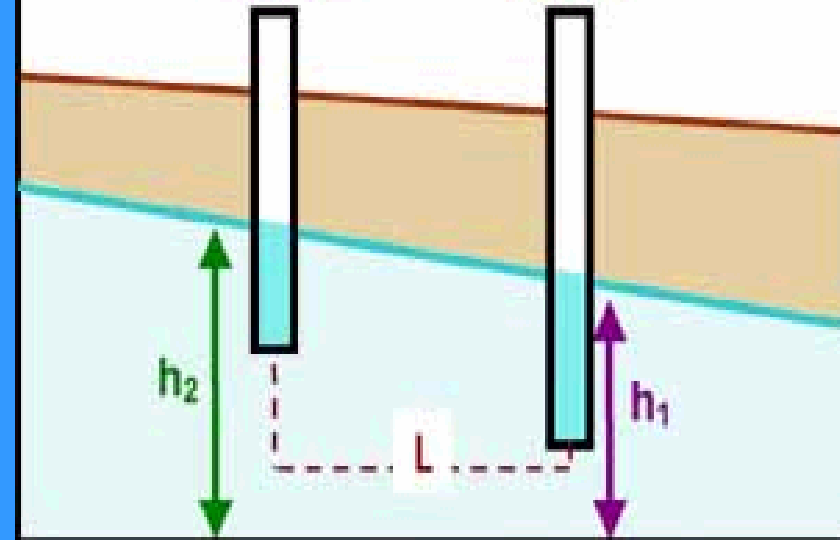
Schematic cross-section of ground-water zones



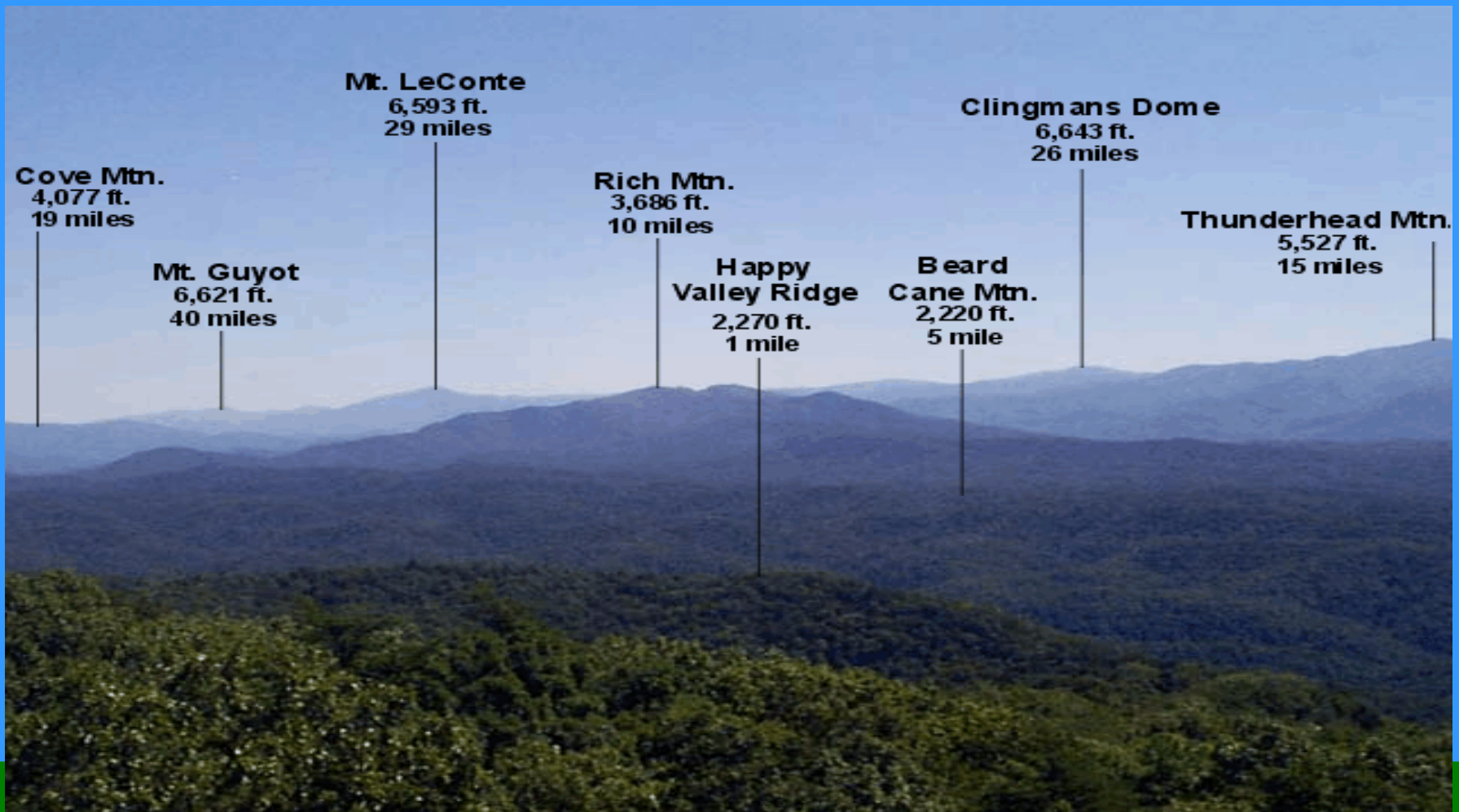
Horizontal Hydraulic Gradient

Well 2

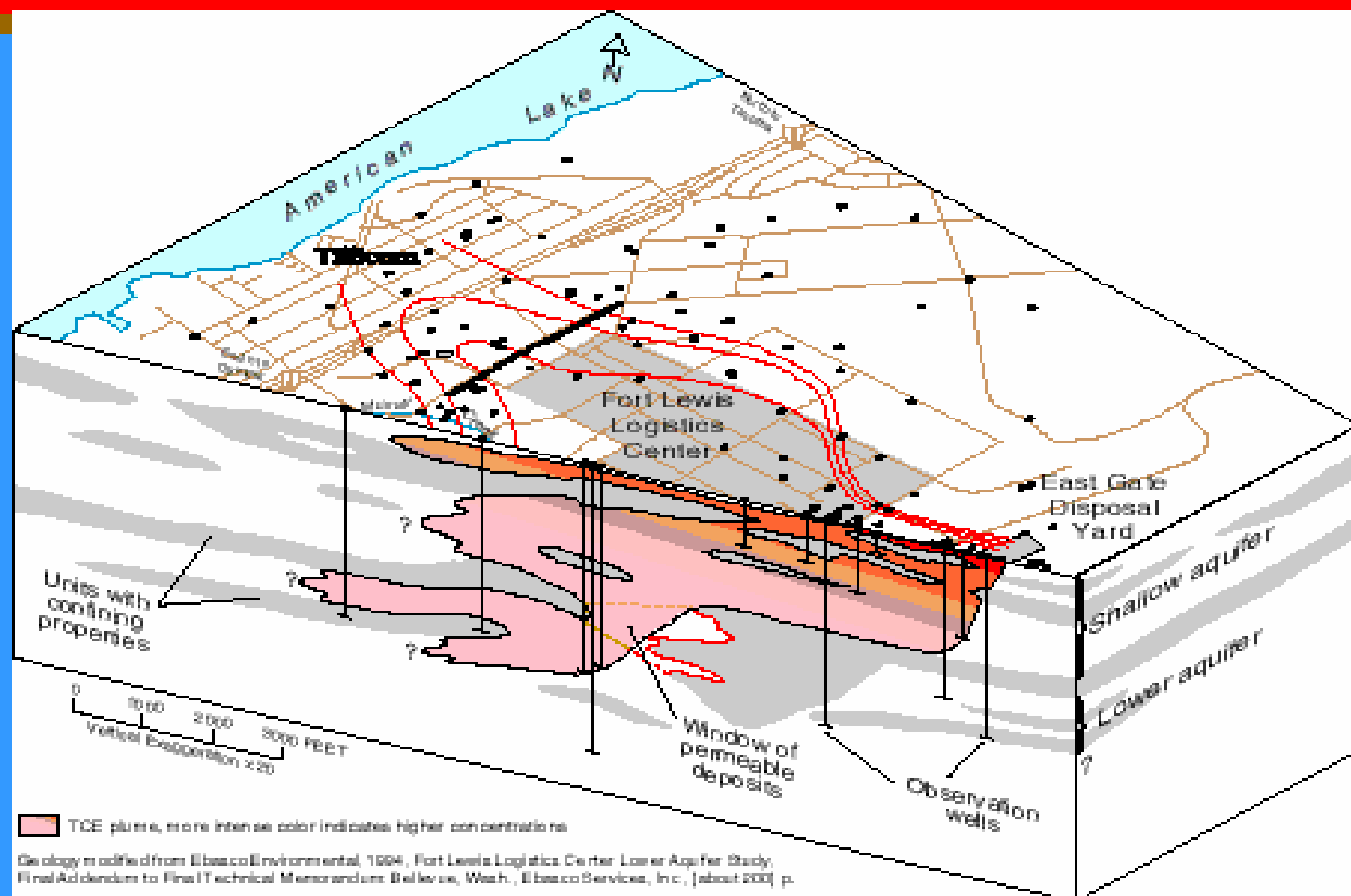
Well 1



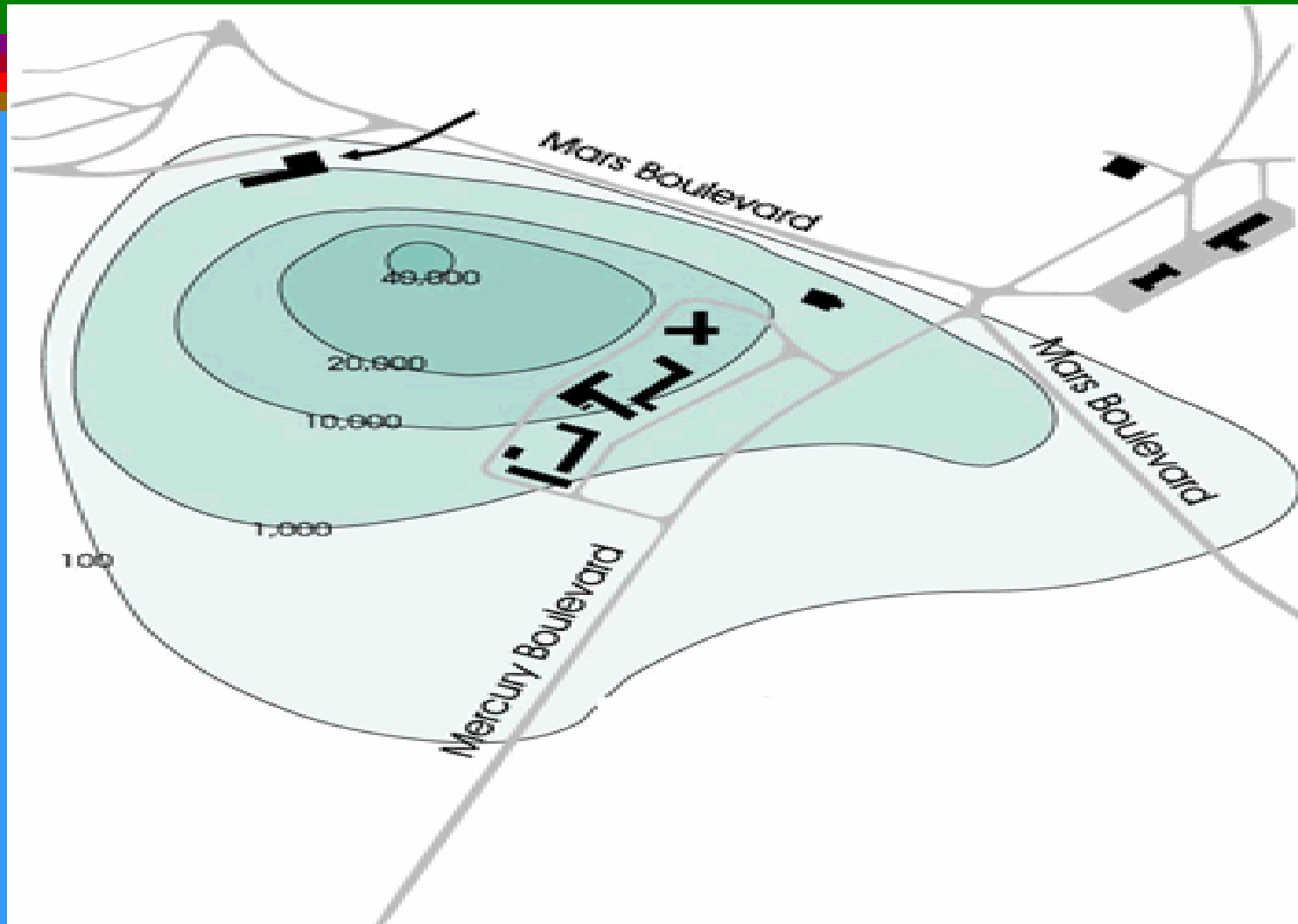
Distance Between Wells



Plot the Data



Plot The Data



Plot The Data



✓ Use the original lab sheets

INTERPRETATION

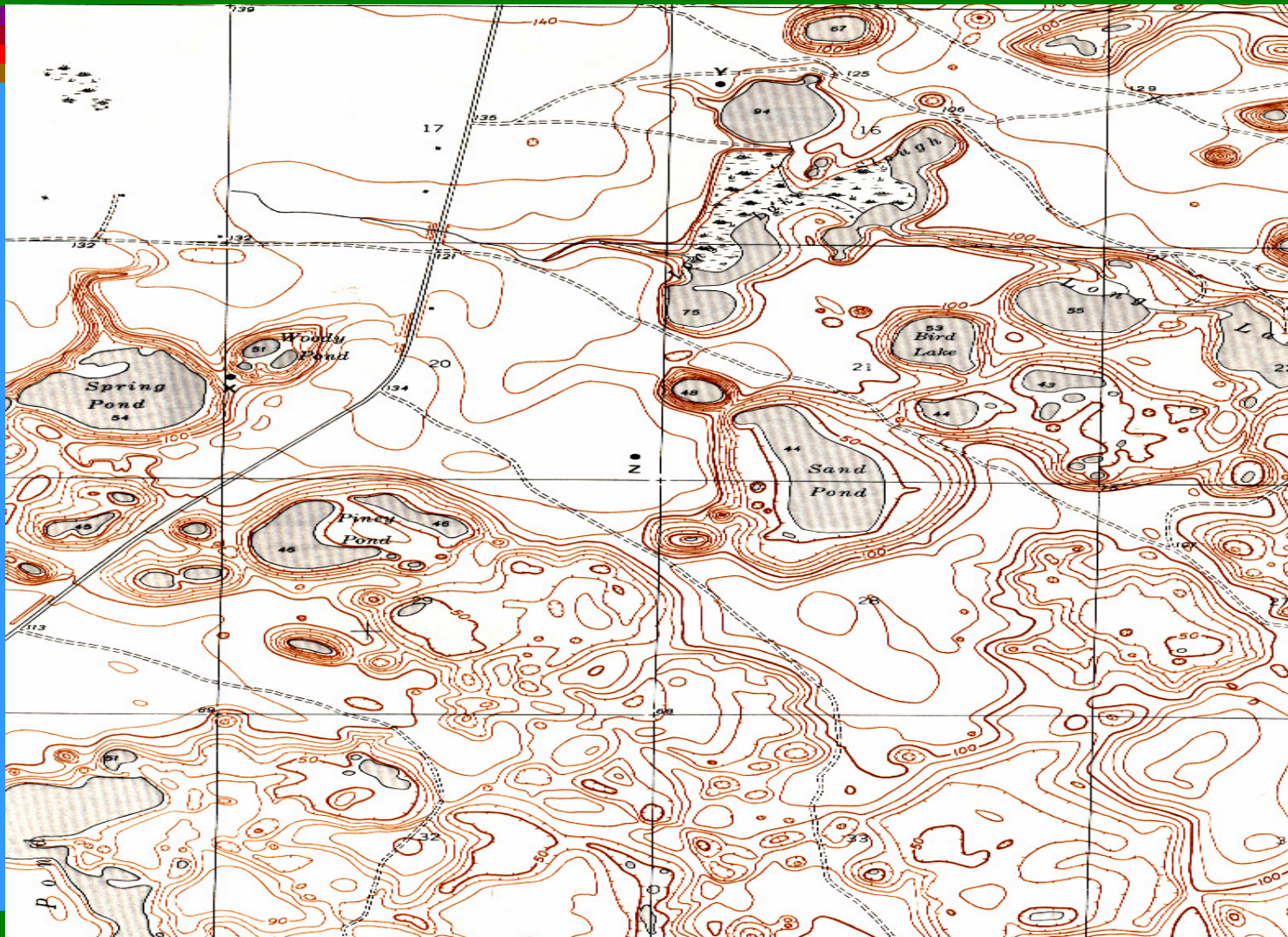
Trends in the Water Data



TRENDS IN THE WATER DATA



Land Surface Topography

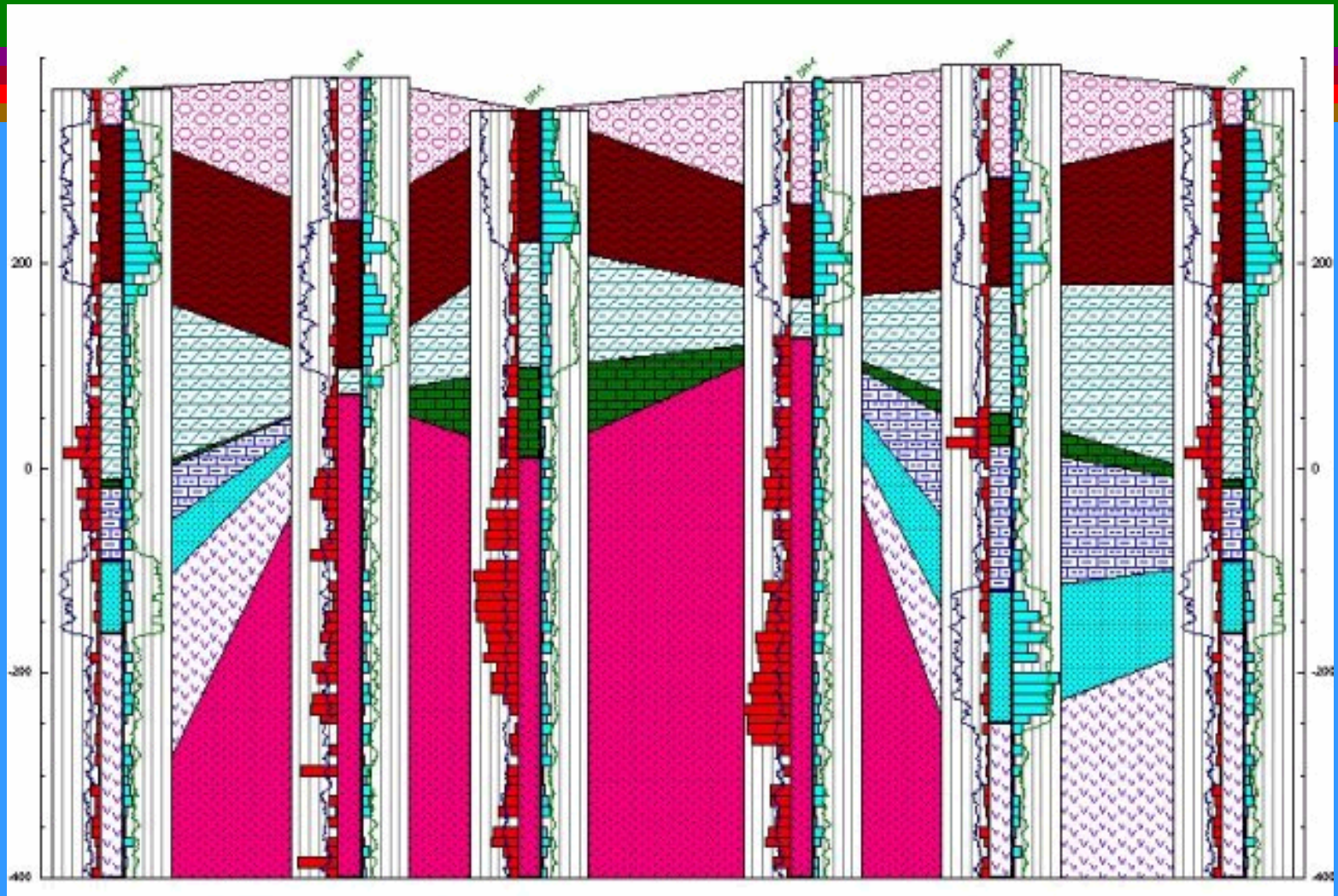


TRENDS IN THE WATER DATA



Do the contaminant concentrations
make sense in relation to the
plume?

Lithologic Descriptions

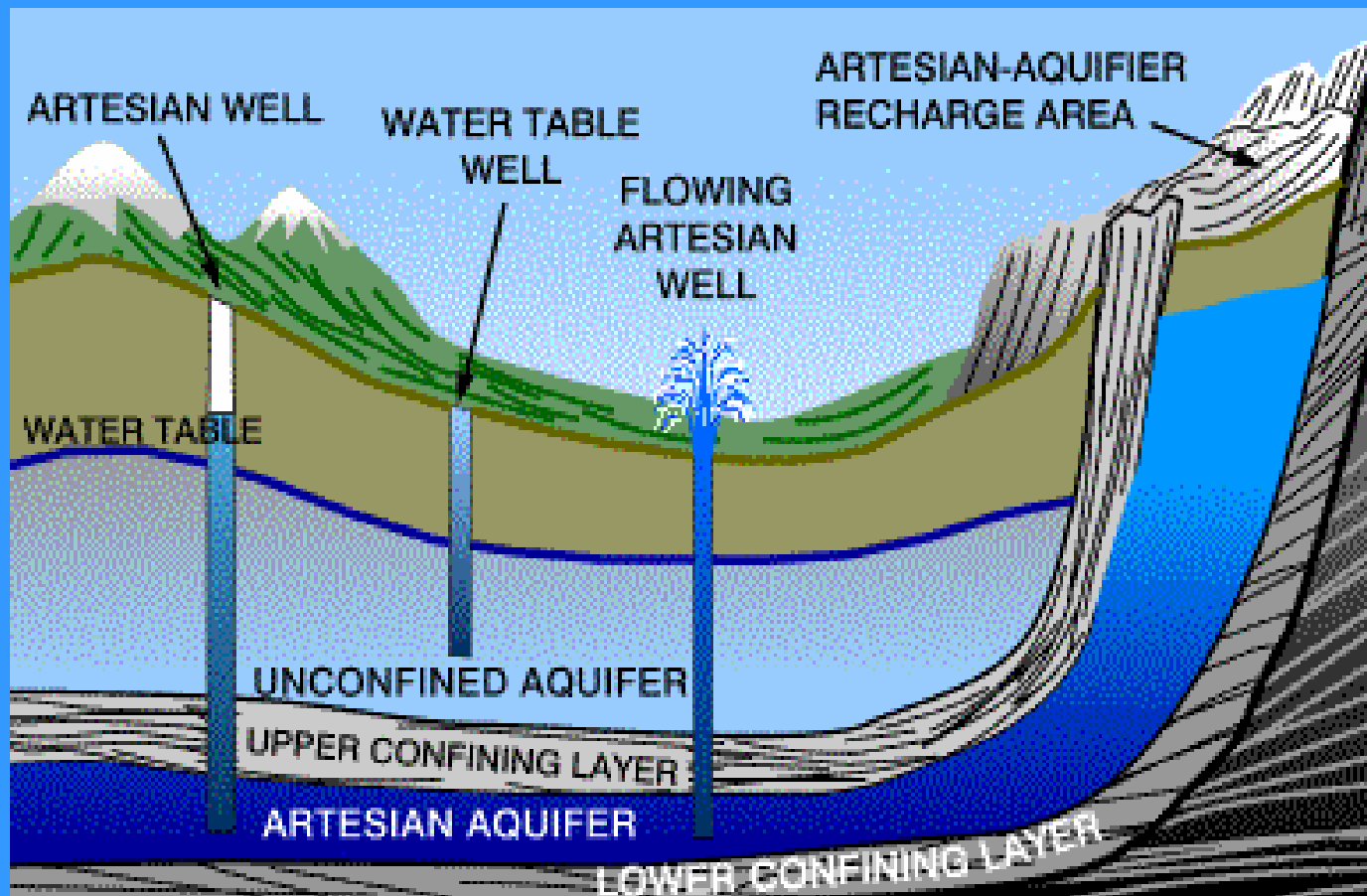


Lithologic Descriptions

Permeability for Sediments

Material	Permeability
well-sorted gravel	10^{-2} to 1
well-sorted sands, glacial outwash	10^{-3} to 10^{-1}
silty sands, fine sands	10^{-5} to 10^{-3}
silt, sandy silts, clayey sands, till	10^{-6} to 10^{-4}
clay	10^{-9} to 10^{-6}

Aquifer Descriptions



Aquifer Characteristics

Darcy's Law

$$Q = KA[(h_A - h_B) / L] \text{ OR } Q = KA(dh/ dl)$$

where:

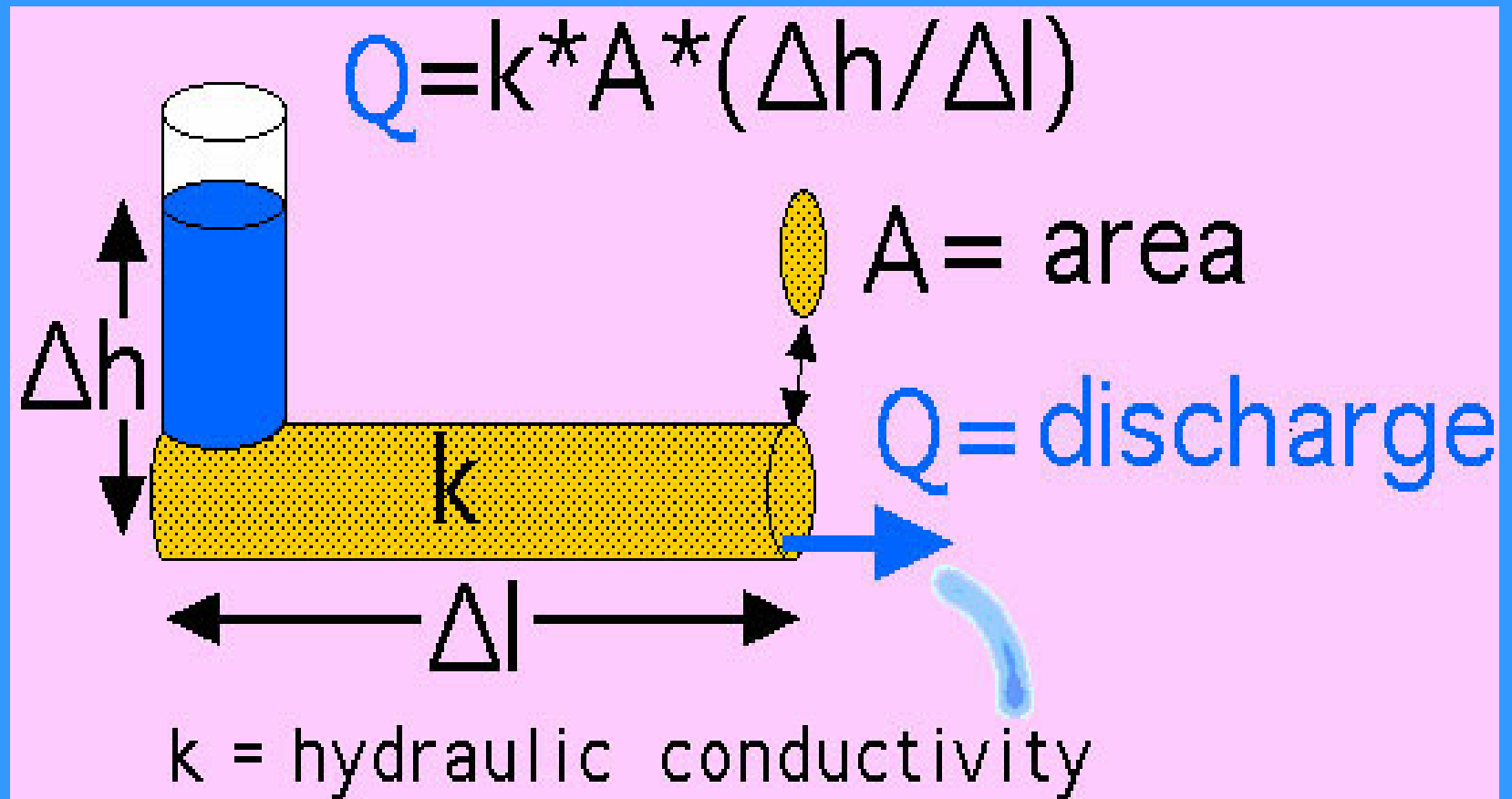
Q=volume of water flow in ft³/day

K=hydraulic conductivity in ft/day

A=cross-sectional area in ft²

dh/dl=hydraulic gradient Darcy's Law

Aquifer Characteristics



Potable Well Survey



Surface Water Concerns

Were samples collected at potential effluent outfalls?



Original storm water outfall discharged sediment into the lake.

Surface Water Concerns



FREE PRODUCT ASSESSMENT



FREE PRODUCT ASSESSMENT

Non Eligible Spills



FREE PRODUCT ASSESSMENT

If funded, within funding range;

If funded, out of funding range;



FREE PRODUCT ASSESSMENT

Assessment of FP Varies based on;



FREE PRODUCT ASSESSMENT



FREE PRODUCT ASSESSMENT



TSAR

Templated Site Assessment Report





NO FURTHER ACTION

NATURAL ATTENUATION

REMEDIAL ACTION PLAN?



NFA

Considering No Further Action?



NFA



NFA

Has the contaminated soil been defined?

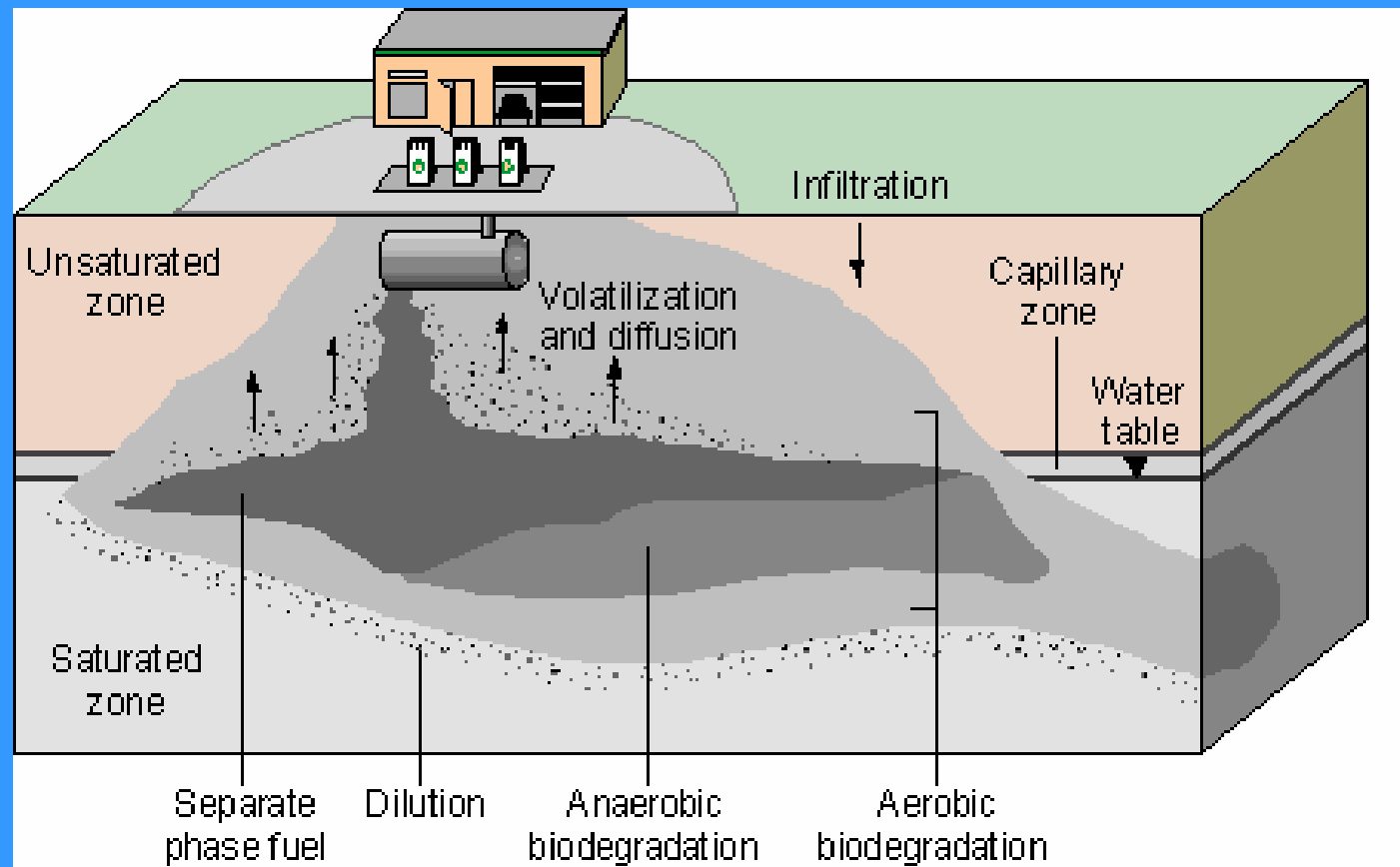
TOXIC SOIL

NATURAL ATTENUATION

Criteria



NATURAL ATTENUATION Criteria



RAP

Remedial Action Plan



THE END

UNIT

