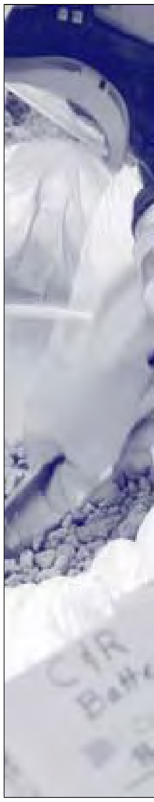
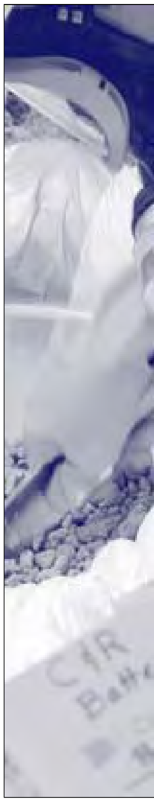


Targeted Data Collection

TARGETED DATA COLLECTION



Module Overview

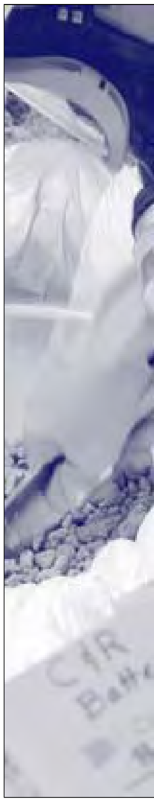
Objectives Of Targeted Data Collection

- Develop and implement a performance-based approach
- Streamline submittal approval and oversight procedures

Approach Steps

- Early planning among stakeholders
- Development of dynamic work plan
- Implementation of targeted data collection effort
- Document procedures, changes, and results

First bullet: Performance based approaches select the minimum data required to make an informed decision for cleanup with a high certainty that the decision is correct and minimum does not mean not much. For example a release of PCB oil can be best defined by testing for concentrations of oil in real time. Having defined where the oil (and PCBs) are by the inexpensive TPH method, a select resampling or analysis of selected TPH splits for PCBs can be done for risk assessment/cleanup. This approach can be contrasted with sampling the area for PCBs alone where the number of samples required to define where the PCBs are would be prohibitively expensive even using immunnoassay.



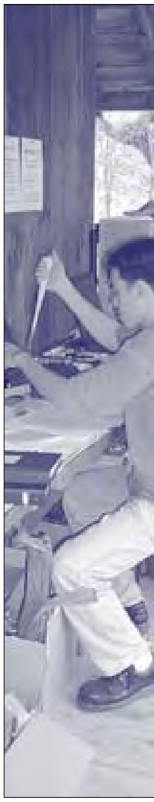
Module Overview (con’t)

Presentation

- Background on planning and equipment
- How to apply these tools in the approach

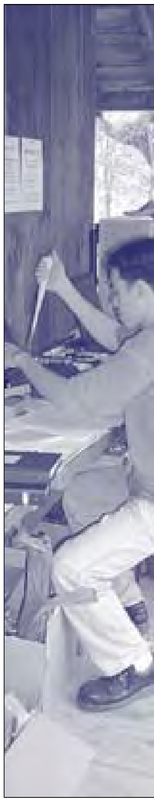
8/14/2003 TARGETED DATA COLLECTION 3

The module is organized in two major parts. Targeted data collection requires a systematic planning approach and the use of collection and analysis equipment that promote on-site decisionmaking. This module spends a good deal of time delving into proper planning and choice of equipment before talking about how these tools can be applied to a targeted data collection effort and its expected outcome.



Objectives Of Targeted Data Collection

- Develop and implement a more flexible performance-based approach
- Provide procedures for streamlining work plan submittals, approval, and oversight



Elements of a Flexible Performance Based Approach

- Use of systematic planning for data analysis and collection
- On-site decision making based on near-real time data generation
- Effective communication among stakeholders to reduce operating at risk

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Bullet one: We will get into some elements of systematic planning here. However a more detailed explanation can be found on the TRIAD webpage .

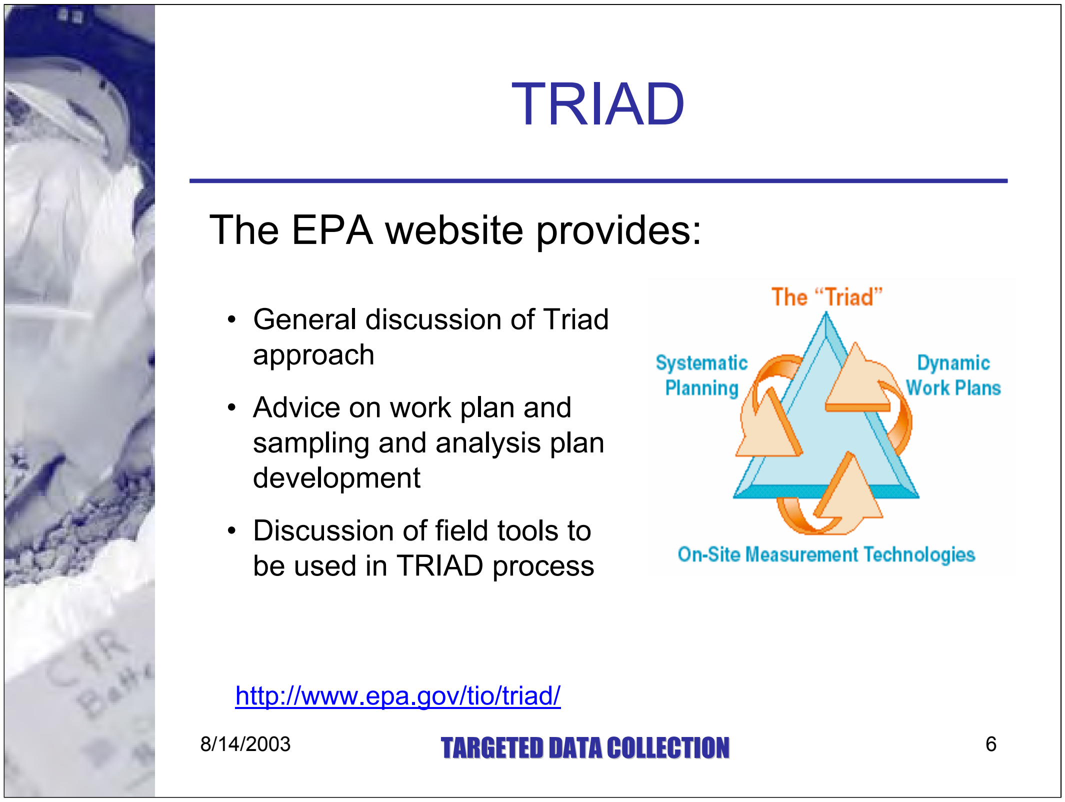
Bullet two: We also will be emphasizing this approach but a more detail can be found on the dynamic field activities webpage.

Bullet three: Since we are emphasizing on-site decision making it is very important that everyone is on the same page throughout the field work.

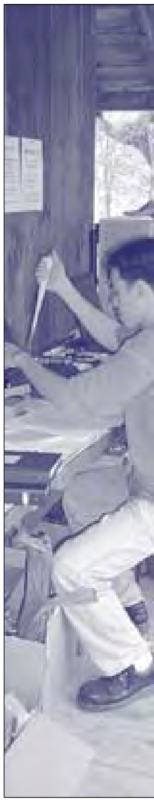
Bullet 1. Systematic planning ensures that your data collection approach is well thought out and that you have contingencies in place in the event that the original approach is not performing as planned.

Bullet 2. This is key to streamlining the collection effort. The production of near real time data allows the data collection effort to proceed by giving the investigator the information she needs to base decisions on. The concept is the same as the currently used phased approach except that you get your data hours after you take it instead of weeks.

Bullet 3. Before you can convince owner/operators that the targeted data collection approach is best, you will have to convince them that they will not be making on-site decisions at the risk of having you say well that's all well and good that you did that but now I want…



The Triad approach uses systematic planning, dynamic work plans, and on-site measurement technologies to obtain better representativeness from the sampling effort and reduce uncertainties in the decision making. This approach can reduce the time to perform a characterization or remediation and in general, but not always, will reduce costs. It will always reduce uncertainties in the field sampling program.



Dynamic Field Activities

EPA website provides:

- Guidance manual on dynamic field activities
- Case histories on their use
- Links to other sites

http://www.epa.gov/superfund/programs/dfa/index.htm

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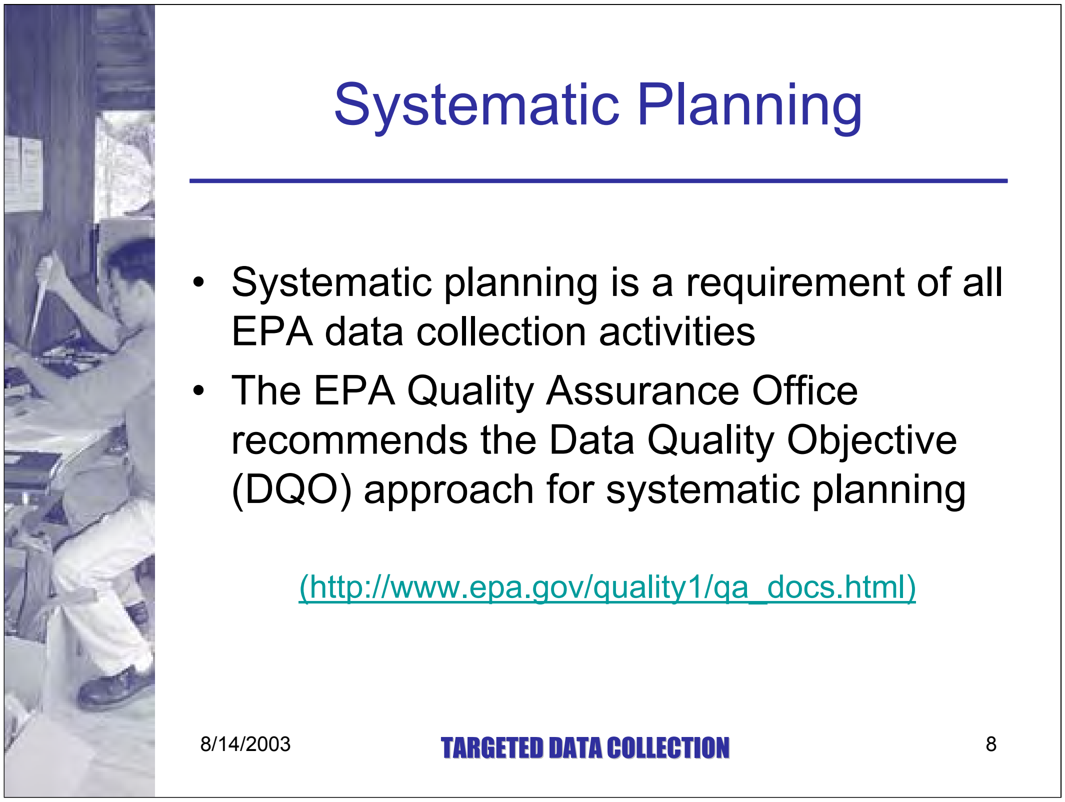
Dynamic field activities are hazardous waste site assessment, characterization, and remediation activities that combine on-site data generation with on-site decision making. It is an iterative field work process that is designed to increase the information available to reach a site decision while at the same time reducing the number of mobilizations necessary to get to that point.



Heading. Systematic planning is not new to data collection activities. It has been a requirement for a number of years. You can find guidance on data quality objectives at the website listed here it is QA/G4 and QA/G4HW (hazardous waste) There are also documents on this webpage that address sampling design, modeling, and preparation of standard operating precedures.

Bullet 2.

How Is This Done?

- Study available data on the site
- Develop a site conceptual model
- Identify data needs and analytical detection limits
- Identify analytical instrumentation and methods (both field and fixed laboratory)
- Identify field sampling methods
- Identify sampling strategies that will optimize decision certainty and cost

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How is systematic planning using DQOs done.

1st Bullet. The first step is to determine if you have sufficient data to understand where the problems are and their likely distribution on the site to form a solid conceptual model? If you do not then the data needed to at least frame the problem will need to be collected. This data includes identifying potential exposure points such as the existence of private wells near the site.Then you develop a conceptual site model.

Third bullet: Remember that data needs are not only related to the collection of chemical data related to risk assessment but also to hydrogeologic data for fate and transport assessment, and remedial/corrective action evaluation.

Conceptual Site Model

- What are the release and transport mechanisms for potential chemicals of concern (PCOC)?
- What are the potential exposure routes for PCOCs?
- What are the possible remedial/corrective action methods for PCOCs?

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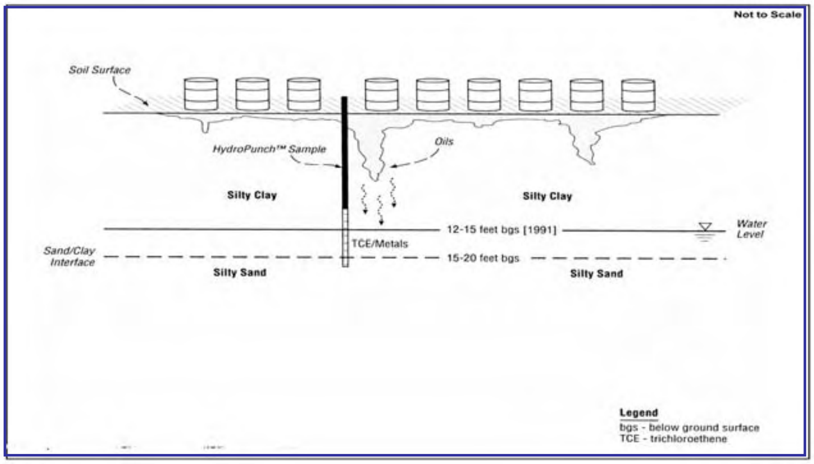
Title. They are generally two integral items that go into a conceptual site model and these are usually displayed differently. They are the release and transport mechanisms model and the potential exposure completion route model for all potential chemicals of concern.

Third bullet: During the construction of the conceptual model you should identify potential remedial/corrective actions so that the data needed for evaluating them will be included in the data collection process and not wait until the end of the field effort.

Release And Transport



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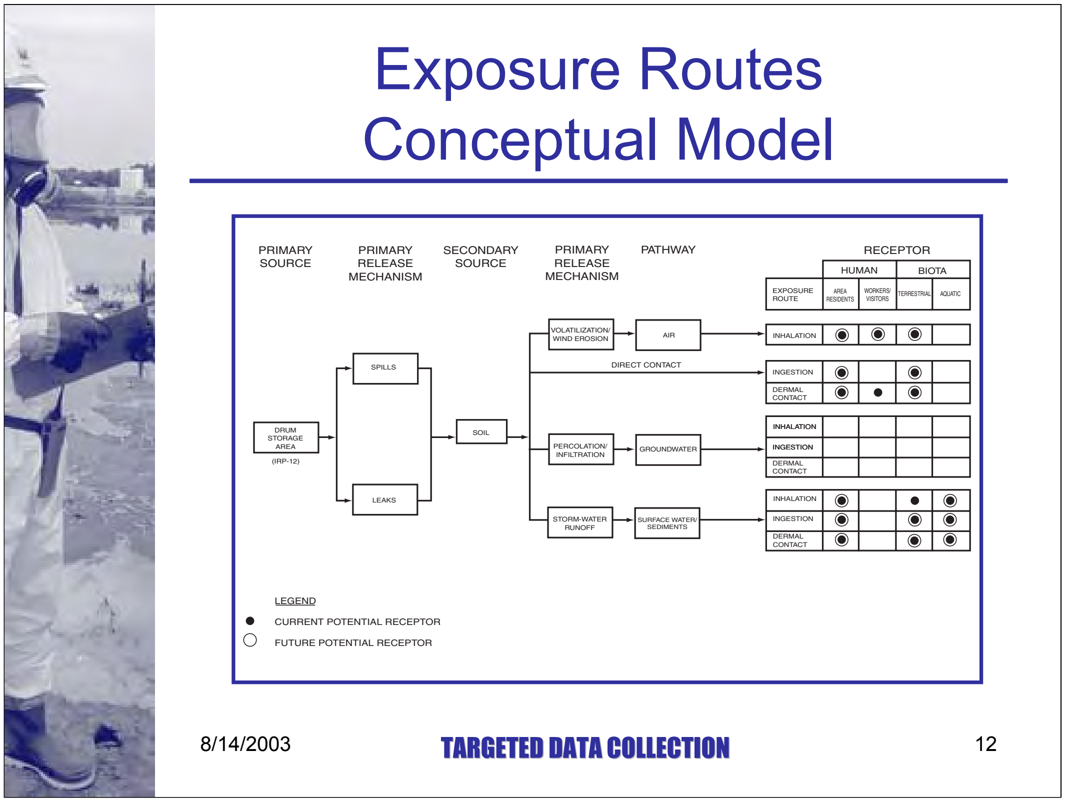
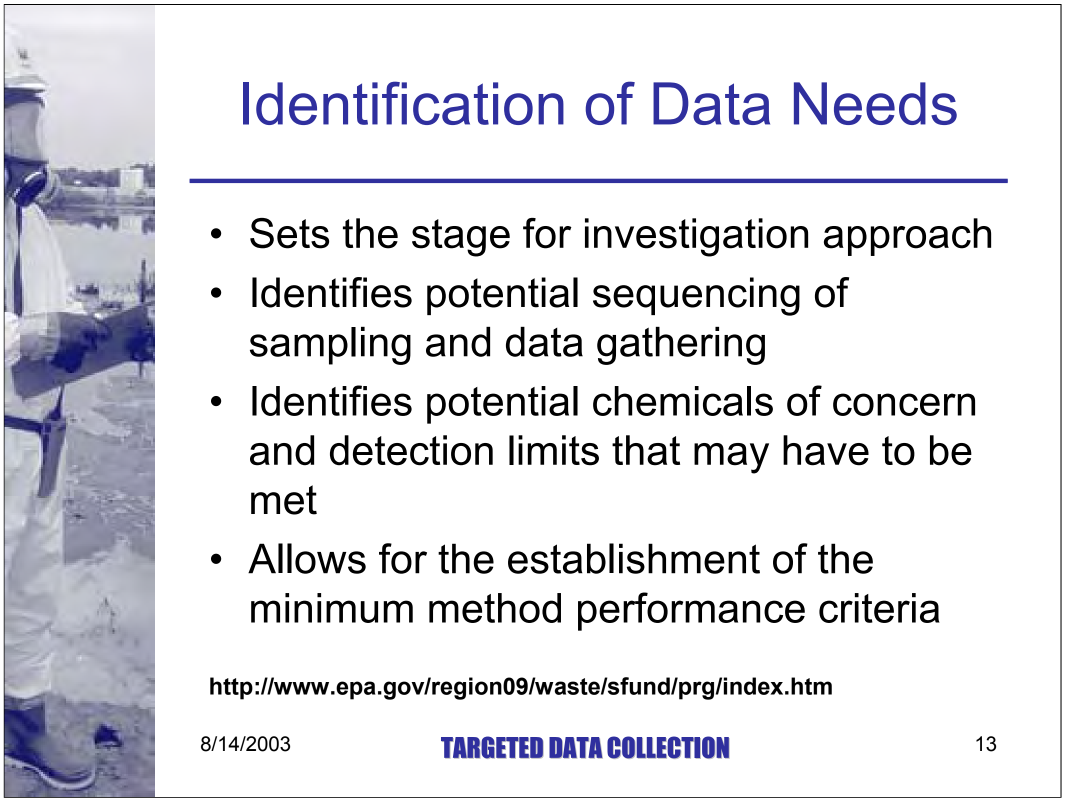
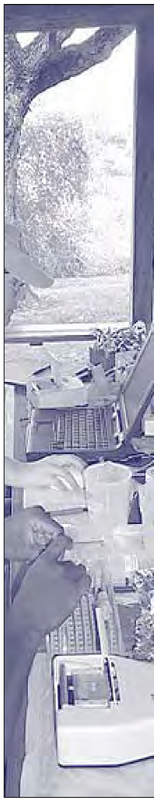
Provides a pictorial that presents what can be gleaned from existing data. The release mechanism (leaking drums) the chemical of concern (TCE) its properties combined with the site hydrogeology information to estimate where it might go. Here you can identify potential data gaps that relate to both where the release occurred and the hydrogeologic construct.



Here we have the primary release source as a drum storage area. The release mechanisms are spills during material transfer and leaking drums. The secondary release is from residuals in the soil where the material can become airborne, percolate into groundwater, or get to surface water/sediments by runoff or groundwater discharge. The receptor analysis shows current and potential exposures as well as where it is unlikely to happen.



When putting together the first conceptual model you will be confronted with data gaps. The approach will differ if you are dealing with one chemical or many, one source area or many, large release or intermittent. In addition to this, the sequencing of the sample taking will depend upon how much is known about the site specific hydrogeology and this might affect contaminant transport. If you know what the chemicals of concern are you can obtain some preliminary risk numbers that at some point in the investigation field effort your analytical equipment will have to be able to attain. There is a good list of preliminary remediation goal risk numbers on the EPA Region 9 webpage. The last bullet is for the performance of the analytical program which is generally associated with precision, accuracy, completeness, extraction recovery efficiencies etc.



Identify Analytical Instrumentation

- Can field screening instrumentation be used to determine extent of contamination?
- Can on-site laboratory instrumentation be used and is it cost effective?
- What off-site methods are suitable and can they be used in conjunction with the on-site methods to minimize costs?

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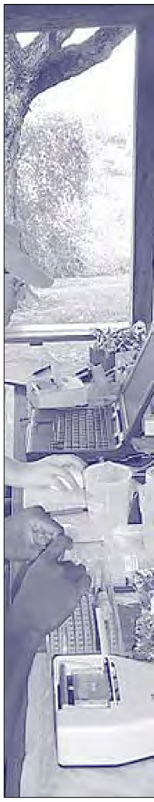
First bullet: In establishing the detection limits and performance that an analytical instrument sampling program must achieve you should keep in mind what the objective of the data is. If you are looking for free product or heavy residuals you are far better off with a blunt instrument than something that is trying to measure at the ppb level. Also think about whether you need to know a precise number or is anything above a risk cutoff level in and anything below out. This might work with say PCBs but would not work if you have to calculation a hazard index for multiple COCs.



Field Screening Equipment

Qualitative *ex situ*:

- Organic vapor analyzer for screening soil samples
- Hydrophobic dyes for identifying non-aqueous phase liquids

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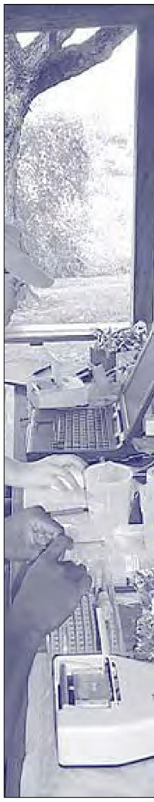
You all have used OVAs and PIDs for health and safety and sometimes for screening drill cuttings. If you are looking for organics, continuous coring DPs which we will talk about latter, provide a good opportunity to scan an undisturbed core and select sections for further testing. This replaces hollow stem augering with samples taken at preset intervals or pulling samples from the cuttings.

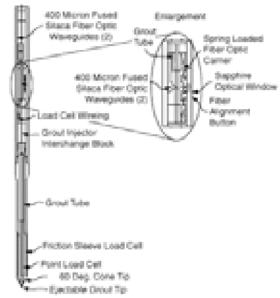
If you have DNAPLs onsite, dyes are a handy way to test for their presence that is somewhat better than eyeballing the soil sample. We define qualitative ex situ screening equipment as those devices that provide total readings of a given type of contaminant—VOCs, oil, halogens etc. We do not include instruments, even those with high detection limits, that can speciate individual compounds or elements such as hand held XRFs.

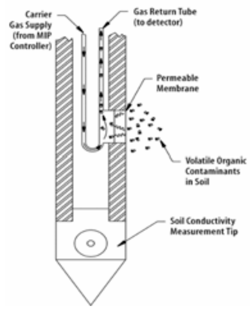


Field Screening Equipment (cont…)

Qualitative *in situ*:

- Induced fluorescence





- Membrane interface probe

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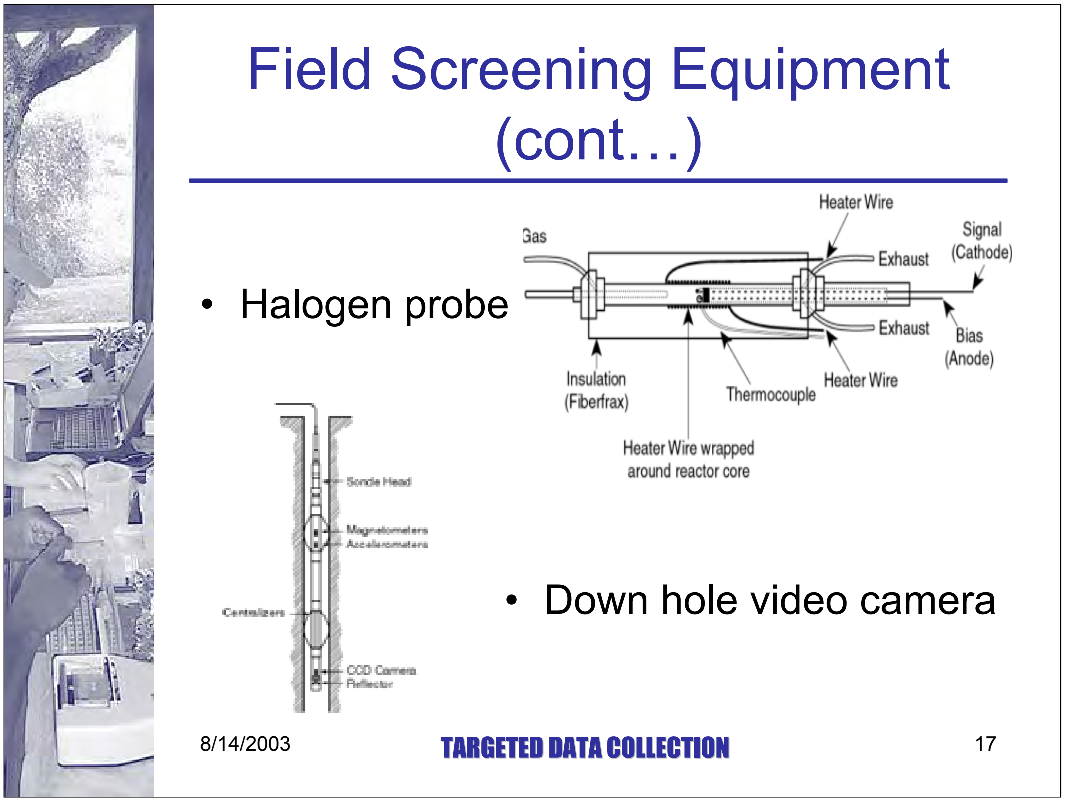
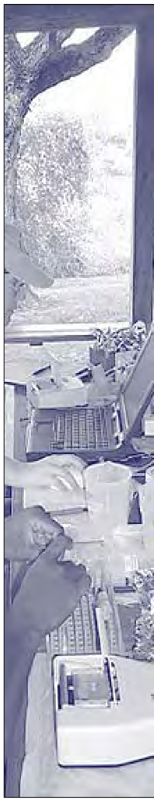
IF: Developed by the military for primarily fuel releases. It relates the fluorescence of polyaromatic compounds to the presence/concentration of fuels. It is mounted on a DP or cone penetrometer rig and provides near continuous readings as it is pushed into the subsurface—thus providing a concentration profile. It has been used in coal tar and creosote investigations.

The MIP is another DP/CPT method-- a heated membrane volatilizes chemicals at its surface which are drawn into a carrier gas and taken to the surface where they are analyzed by an ion trap mass spectrometer. It, like the LIF, provides a semi-quantitative vertical profile of contamination in real time. The ion trap provides quantitative results for single contaminants but may have difficulty with multiple chemicals that have a major ion in common.



HP is another DP/CPT tool that provides a "total" halogens present as it is pushed into the subsurface. It has a membrane like MIP but a different detection system.

DHC provides a 360 degree profile that is very useful in fractured rock contaminant studies when looking for preferential pathways.



Field Screening Equipment (cont.…)

Semi-quantitative *ex situ*

- X-ray fluorescence (XRF)
- Field gas chromatography
- Immunoassay

Semi-quantitative *in situ*

- Ion specific electrodes

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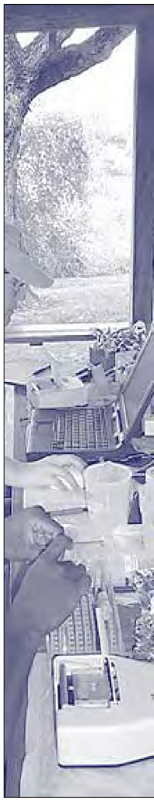
XRF provides real time concentrations of metals. It generally has ppm level detection limits.

Field GCs are very good when you know what you are looking for. PPB detection limits on volatile and semivolatile organics with 30-40 sample per day throughputs.

Immunnoassays are good screening tools for a limited number of chemicals or chemical classes.

There is a vendor (Sentek) that offers a good range of electrodes for cation/anion detection. The electrode is self calibrating and comes on a 30 meter line so it can be lowered into a well, open hole, or surface water to obtain real-time data. The electrodes are self calibrating.



On-site Laboratory Instrumentation

- Field or transportable GC (increased QA/QC burden same quality as off-site lab)
- Gas chromatograph/mass spectrometer
- XRF (QA/QC burden higher than semi-quantitative method)
- Inductively coupled plasma (ICP)
- For water measurements: inline pH, specific conductance, dissolved oxygen, turbidity, reduction/oxidation potential

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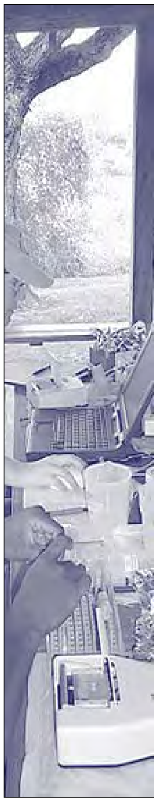
On site instrumentation can provide quantitative data that is equivalent to off-site laboratory data. The issue is what data quality objective you have chosen for the instrument. For example, the field or transportable GC that provides semi-quantitative data also can provide off site laboratory grade data by using the same QA/QC burden and run times that off site GC uses. However, in this mode there is much lower throughput.

On-site GC/MS usually uses the same method as an off-site laboratory with same day turn around of 12-16 samples per day depending upon volatile or semi-volatile analysis. The costs are roughly the same as off-site except it doesn't take 4-6 weeks to get the data back.

XRF: Higher QA/QC and higher sample preparation requirements than semi quantitative with less throughput (generally ppm detection limits).

ICP: There are vendors offering onsite ICP analysis, but they are expensive and stabilizing the optics can be dicey although the detection limits can be in the low ppb to high ppt levels.

Water parameters: These all in one inline systems provide a world of information for corrective measures and fate and transport evaluation.



Off-site Methods

- Use as a quality control check of on-site methods
- Use when on-site method is unavailable
- Can be considered for on-site decision making when turn around time is appropriate and costs are favorable

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Both the TRIAD and Dynamic Field Activities guidance emphasize that off site quality control samples should be used sparingly and not on a preset basis such as one for every 20 on site samples. At the Loring Air Force Base case study found on the DFA webpage the on-site GC was used for risk decisions on whether an area met PCB, pesticide, and PAH cleanup goals or not. They did not use an off-site lab for "confirmation" sampling. However, one can setup the sampling program where the on-site instrumentation is used to identify samples or areas for off site confirmation.

Identify Field Sampling Methods

- Soil sampling
- Groundwater sampling
- Sediment/surface water sampling
- Air sampling

Mix and match the analytical tools with the sampling tools to obtain the most effective approach.

Soil Sampling

- Conventional Rigs
  - hollow stem auger
  - dual tube air percussion
  - sonic
- Cone penetrometer test rig (CPT)

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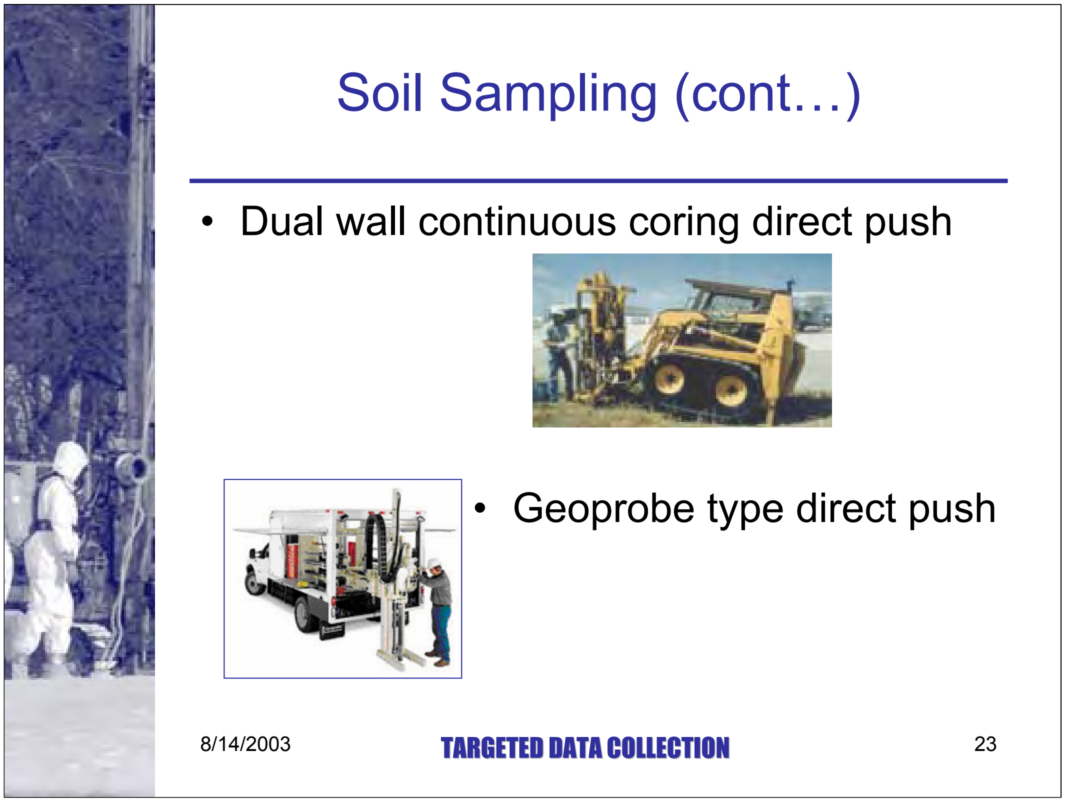
The old stand by hollow stem auger which is slow—soil sampling can be done by using the cuttings if volatiles are not an issue or by split spoon or barrel samplers. These cost extra money for each one you take and can be time consuming

Dual Tube air percussion are larger rigs and cost more than hollow stem. However they give you continuous cores and provide an outside drive casing that is good for preventing cross contamination

Sonic are excellent for putting in wells and they do give you continuous cores. Unfortunately they give you very hot cores and are not generally suitable for volatile organic sampling. Also many drillers will want to introduce outside water into the borehole to try to control the heat.

CPT rigs come in all sizes and shapes like the all terrain ones shown here. Originally developed for identifying soil behavior types in geotechnical applications they now can be fitted with a variety of sampling and analytical tools. Environmental equipped rigs can cost between $3,000 and $4,500 a day depending upon the vendor and the tools he is offering.



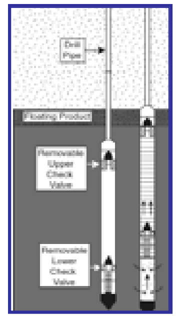
Dual wall direct push rigs provide continuous cores, with the outside tube guarding against cross contamination and caving. The soil samples can be taken in thin walled metal sleeves or clear plastic. The clear plastic allows for visual examination of contamination and preferential pathways and can be cut open to allow screening with an OVA or PID.

Geoprobe rigs have a variety of probes for sampling and analysis of soils. DP rigs cost about $1500 a day and depending on the type of rig can push 7-12 20 foot holes in that time period.

Groundwater Sampling

Point in time versus temporal monitoring

- Point in time equipment
  - HydroPunch
  - Waterloo Profiler



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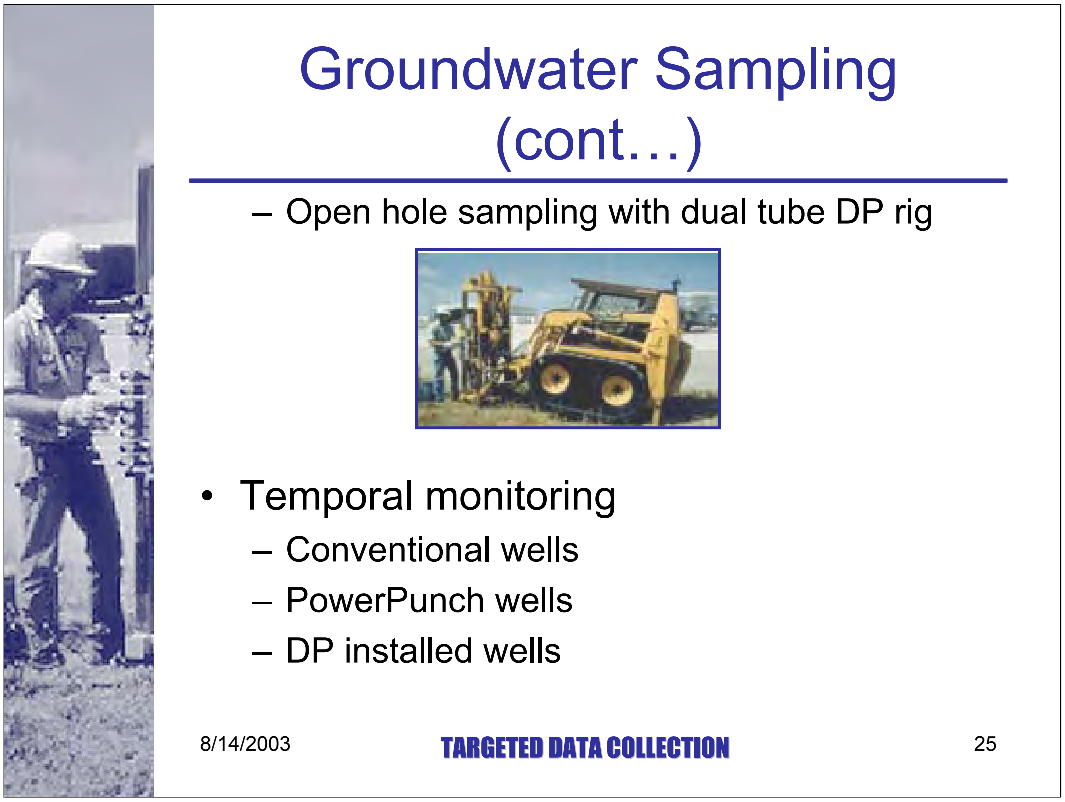
Point in time sampling is used in targeted data collection to provide water samples from discrete intervals and can be very useful in defining residual or pool DNAPL architecture. There are two general types—those that take one sample per punch like the HydroPunch which has a screen within a drill rod and when the appropriate depth is reached the rod is pulled back and water enters the screen. The other type such as the Waterloo Profiler can take multiple samples at the same station as it is driven down. These vertical profiles can identify potential subsurface hot spots and preferential pathways that are often missed with conventional sampling in wells. When combined with an on-site GC you can know within a couple of hours whether and where the groundwater is contaminated.



With a dual tube DP rig the outer tube keeps the hole open and the groundwater can be sampled through it. The samples taken this way are generally turbid so it is not a good technique for metals unless you intend to filter them. Under some hydrogeologic conditions you can purge the well and obtain a relatively clean sample.

The advantage of the point in time over temporal sampling is it gives you an opportunity to obtain vertical and horizontal transects of a plume's geometry which makes for a more effective corrective measures design as well as a less expensive and more representative temporal monitoring system. The o/o should also appreciate this advantage because he will have to install fewer permanent wells with their attendant sampling and analysis costs.

You can install temporal wells with DP equipment. The PowerPunch is a small diameter driven well point that can be developed and sampled like a conventional well and is used for discrete interval monitoring. The DP rig in the picture can push a three-inch OD tube in the ground where a well can be completed with a prepacked filter. The screens on these wells can be whatever length desired.

Surface Water/Sediment Sampling

- Surface water sampling
- Sediment sampling

Methods for Collection,Storage,and Manipulation of Sediments for Chemical and Toxicological Analyses: Technical Manual (2002)

http://www.epa.gov/OST/cs/pubs.htm#technical

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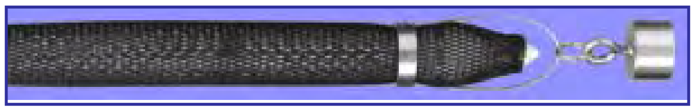
Surface water: Traditional surface water sampling for streams and rivers has generally been designed around the outfall concept with a transect of samples taken at two or more depths to determine mixing and dilution. This may not be sufficient for ecological risk assessment where the full strength of the contaminant needs to be known where the impacts are most likely to happen at the surface water sediment interface. It should also be remembered that eco-risk numbers can often be orders of magnitude less than those for human health.

Sediment: Sediment sampling is usually done with a scoop or hand corer in shallow water and more elaborate and heavier devices for deeper sampling. The manual on the screen is recent and very comprehensive and it demonstrates two very different purposes in sediment sampling. Typically a sediment sample is grabbed, placed in sample bottles and tested for a suite of total contaminants. This is fine for a human health assessment, but if the sample is contaminated, the numbers obtained are generally not applicable to an eco-risk assessment which may require that the redox conditions of the sample be retained. Remember when developing the workplan to consult with an eco-risk person to get an idea of what she may need from your sampling effort.

Sediment/ Surface Water Sampling (cont…)

- Probe profiling for ground-water to surface water flux

- Diffusion samplers



http://www.irtcweb.org

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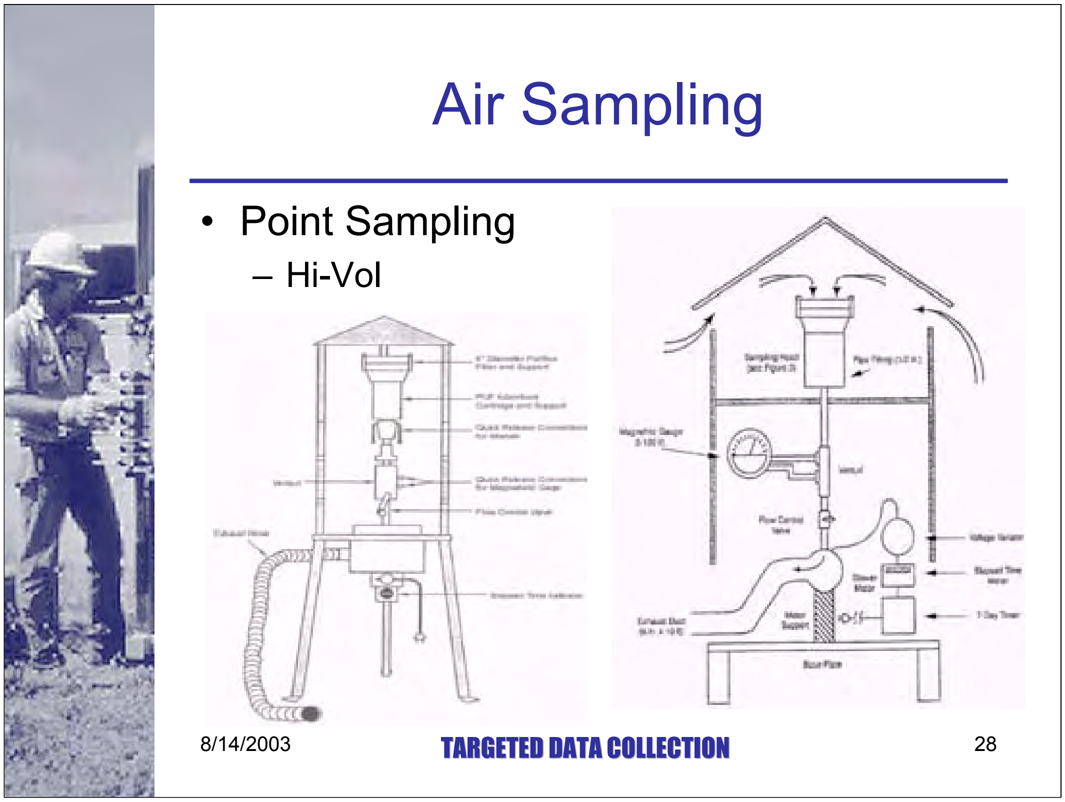
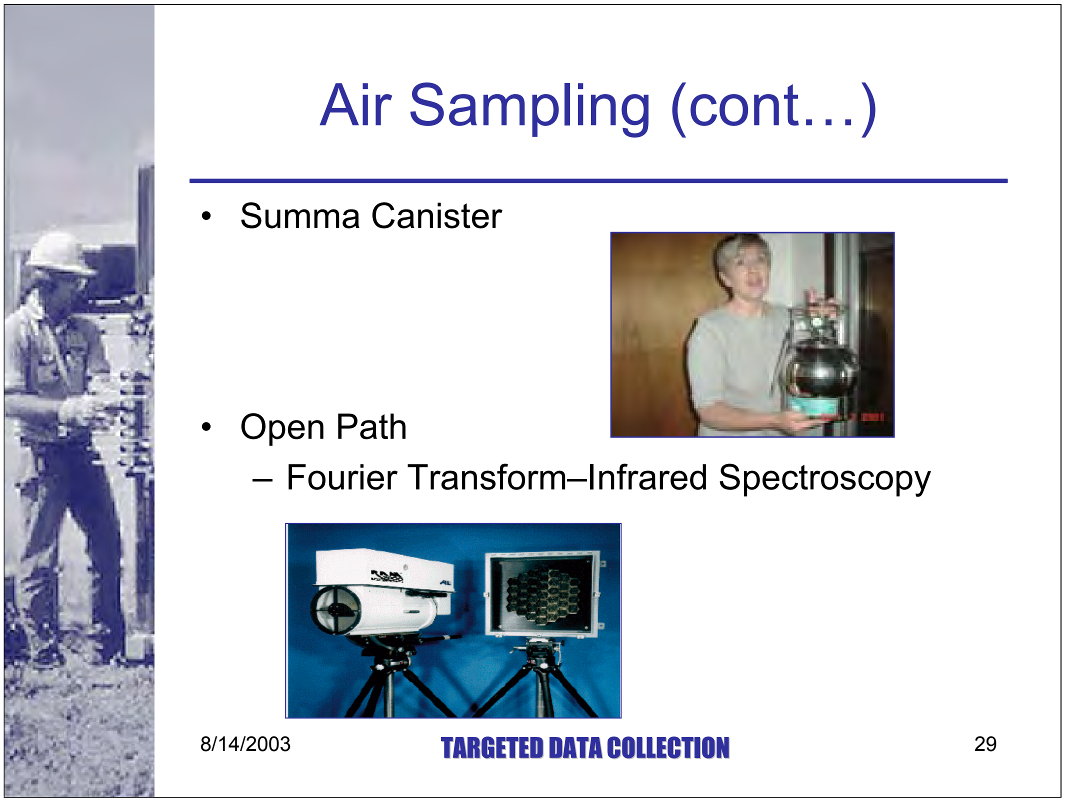
For a gaining water body, the sampling effort should examine the impact the contaminated groundwater is having on the water and the sediment and because there can be radically different redox conditions in sediments than in the groundwater soil matrix it is not necessarily accurate to use groundwater quality in a well near the surface water as a surrogate. The top device is a stainless steel tube with small openings (screen) at the bottom and a plastic rod insert to keep sediments and water out until the sampling depth in the sediments is achieved. It can be sampled several different ways, the technician here is using a syringe. When coupled with an on-site GC a profile on very tight centers can be had of the concentrations and entry points of organic contaminants. Remember the sediments can also have preferential pathways.

Diffusion samplers buried in the sediments can also be used to determine interface water quality and potential preferential pathways. The one pictured here was originally designed for groundwater wells. The ITRC website has a guidance document on the use of vapor diffusion samplers.

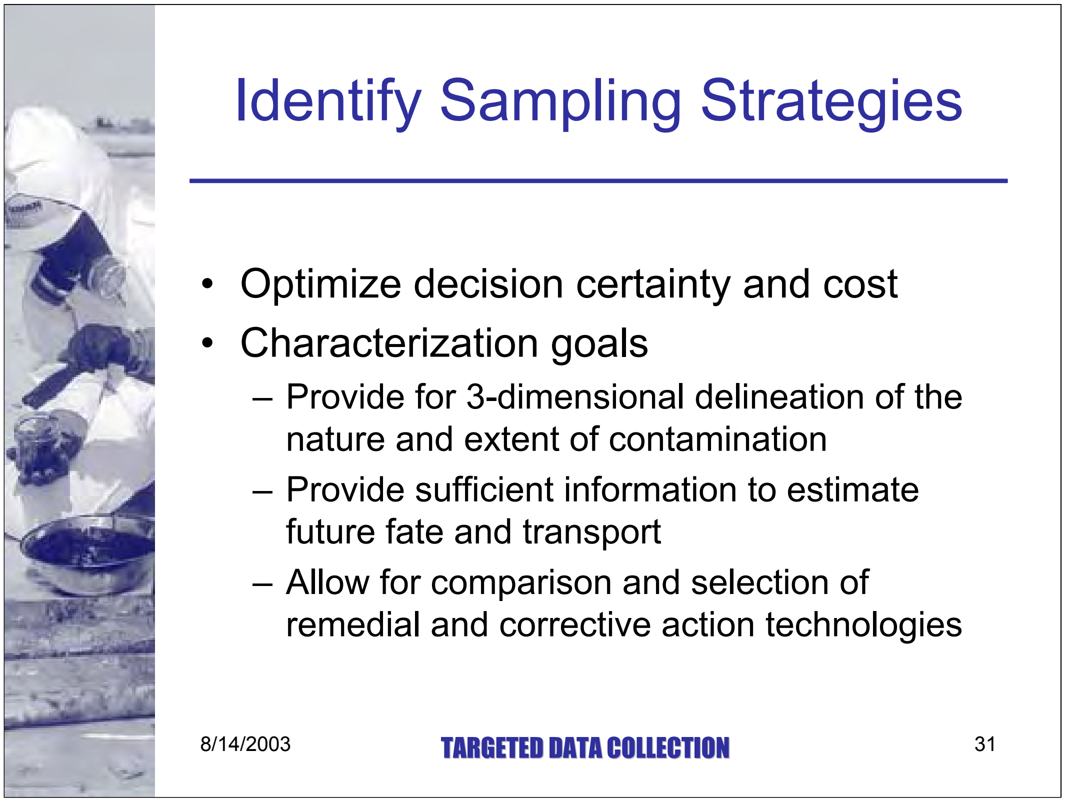


Two traditional ways of collecting air quality samples are the Hi-Vol and Puff. Hi-Vol collects particulate and the Puff organic gases. Generally when these are used the sample prep method done before analysis needs a fixed laboratory.

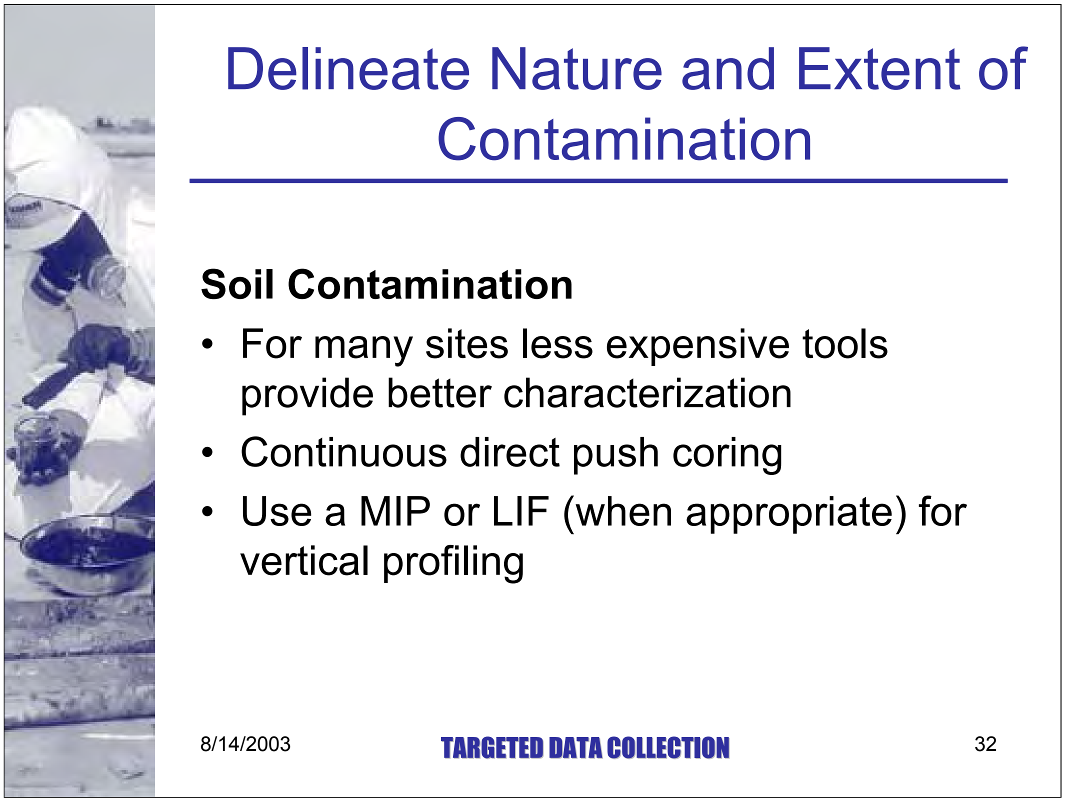


Summa canisters are used in the field for storing soil gas samples that will probably be shipped to an off-site lab (a Tedlar bag would probably be preferred for on-site use). In the picture is one that is being employed in an indoor air survey for potential groundwater contamination becoming an indoor air issue. The open path capabilities of FTIR allow for a near continuous recording of the concentrations averaged over a preset distance of a number of chemicals at one time. It can be used as a fence line monitor or in basement surveys and has the advantage over summa canisters of tracking concentration changes over time in the entire room.

Another plug for innovative technology. This device allows for point in space as well as point in time measurements of a variety of chemicals. Its drawback is it can only detect them one at a time and it does not cover the entire range of chemicals that may be in the target area. It has been used to provide concentration contour maps at a port fuel storage terminal and identify the bad actors (tanks with defective floating roofs)



Choosing the best sampling strategy is the heart of any investigation. It is here where you put together your sampling toolbox that applies the appropriate sampling and analysis tool for a given data quality objective. In many soil investigations the sampling strategy is done using statistics to allow you to estimate the uncertainties associated with the number of samples taken and their spatial distribution. Fewer samples are generally equated with higher uncertainties.



First bullet: There is always uncertainty in sampling and analysis as to how close the number you ultimately have is to the true value at the site. However, the largest part of that uncertainty is on the sampling side not the analytic even if you are using a method that may not have the detection limits or precision and accuracy of off-site methods. This is because obtaining a truly representative average concentration of a chemical in a specific area of a site may take a large number of samples especially if the areal extent of a given release is small compared with that of the area under investigation. For example, you might be able to afford 10 off-site GC/MS analysis of volatiles at $150 a piece plus shipping and handling and of course you get the data back in 6 weeks, but that same amount of money might get you far more on-site portable GC analyses. The tighter sampling grid improves your chances of not missing hotspots.

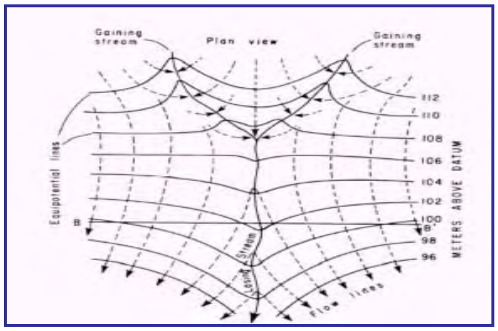
Second Bullet: Screening of continuous cores is an excellent way to detect contaminated areas in the subsurface. It can be done with OVA, XRF, and visually.

Third bullet: A vertical profile of contaminants allows a corrective measures design engineer to choose the best cleanup technology.

Delineate Nature and Extent of Contamination (cont…)

Groundwater Contamination

- Requires understanding of vertical and horizontal groundwater flow



http://www.epa.gov/correctiveaction/resource/guidance/gw/gwhandbk/gwhbfinl.pdf

For unconsolidated materials, continuous coring by DP or soil behavior type determinations by CPT generally provide a better picture of the subsurface for less money than conventional drill rigs. Regardless, however, of how the data are collected if you cannot produce a hand drawn flownet drawing depicting both horizontal and vertical flow patterns the site has not been well characterized. Remember a model, if asked, can take three data points and construct a 50 square mile 3-d flow diagram.

Delineate Nature and Extent of Contamination (cont…)

Groundwater Contamination

- For many sites less expensive tools provide better characterization
- Perform vertical profiling and horizontal transects with analysis by on-site GC or XRF to delineate plume

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For example, at a TCE release into shallow groundwater, a transect of groundwater samples is taken perpendicular to groundwater flow across the plume until there are non-detects. This defines your initial plume width. Another set of transects in the direction of the groundwater flow and down the middle of the defined plume width is taken until non-detects are found at each end. This defines the initial plume length and provides you with an idea of where the source is. The water samples can be tested by an on-site GC and give near real time data. We say initial here because with a DNAPL a deeper plume might be in a somewhat different area. You will need to check that with the hydrogeologic model you develop from the continuous cores and further sampling.

Estimate Future Fate and Transport

- Usually done by model (e.g. ModFLOW) but numerical modeling is not necessary
- The more data points (lithological and chemical) available the better the estimate

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Models can be useful in predicting future exposure in the risk assessment. Unfortunately they can also be used to predict whatever outcome you want. This is especially true when data are more sparse than model assumptions. DP/CPT can provide a wealth of lithological information for shallow unconsolidated formations as well as providing good spatial coverage of chemical concentrations with which to calibrate your model.

Estimate Future Fate and Transport (cont…)

- Additional information and software links can be found at:

http://chl.wes.army.mil/software/gms/
http://www.epa.gov/region5fields
http://www.epa.gov/ada/csmos/models.html
http://www.epa.gov/ceampubl/gwater/index.htm
http://www.epa.gov/athens/onsite/index.html
http://water.usgs.gov/nrp/gwsoftware/

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Selection Of Remedial/Corrective Action Technologies

- The Targeted Data Collection Approach provides a better volume and concentration estimate
- Use of CPT or continuous coring direct push rigs provide a better understanding of preferential pathways and lithology changes that may affect technology selection

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As with fate and transport, targeted data collection provides a better volume and concentration estimate and a more robust lithology description. This allows for a much better evaluation of available technologies for their relative cost and effectiveness.

On-Site Decision Making

- Build on-site decision making into the work plan
- Specify sampling strategy to be used at the site
- The sampling and analysis approach should be flexible
- Guidance on dynamic work plan development:

http://www.epa.gov/superfund/programs/dfa/

http://www.epa.gov/tio/triad/

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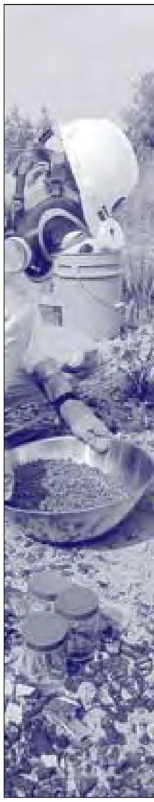
Bullet 1: The key to having this work is the ability of the investigation team to make field decisions based on the information they are generating. An example would be a dig and haul cleanup where the depth of contamination over a several acre area is not known with certainty and the plan is to remove the dirt in lifts and sample on a statistically valid grid to determine if another lift needs to be removed. The on-site analytical capabilities provide same day results so the expensive removal machinery can be kept moving with no down time. The Loring case history on the DFA website and the Tree Fruit case history on the TRIAD website are examples of this.

Bullet 2: The work plan should lay out the sampling algorithms that will be used to conduct the investigation. For example, in a soil investigation of multiple small former storage pads the sampling strategy could be to take one sample on each side and one in the middle of the first six inches of soil. If nothing is found then the investigation ends. If however, something is found the hole will be taken deeper and other soil samples will be collected at a pre-selected distance out from where the contamination was found. The algorithm might also say one hole on the down gradient side of the pad will be taken to ground water (if it isn't 500 feet down) and a water sample gathered and analyzed on-site. If it is contaminated the method given for delineating groundwater plumes will kick in and a groundwater investigation is started. The approach is not much different than the phased approach that is advocated in the 1988 RFI guidance manual except that now instead of getting a look at your data in 5-6 weeks after it was taken you see it the same day.

Bullet 3: Flexibility. While you can't anticipate everything, the approach should allow for most field changes to be made without having to ask for regulatory approval.



Effective Communication

- Frequent communication among all involved parties
- Data management/data sharing system that provides the stakeholders with progress to date
- Owner/operator evaluation of real time data and recommendations on next steps

http://www.epa.gov/superfund/programs/dfa/casestudies/

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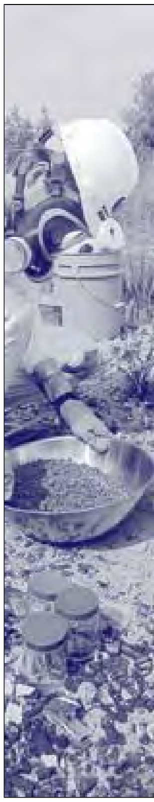
Bullet 1: How frequent is site specific. For example if the workplan specifies that the o/o will do a point in time transect across the minor axis of a suspected plume on 20-foot centers until he has non-detects at both ends and a bottom followed by a longitudinal transect along the direction of flow until non-detects are found at both ends you probably won't need to talk directly with him and other stakeholders unless there is a problem. Given the information he has just generated you would need to talk about what comes next like where he would like to place his temporal monitoring wells.

Bullet 2: Data management is also site specific and can range from hand drawn cross sections for simple sites to web based GIS CAD systems with daily data entry that all can view. An example of the latter can be found at the DFA website for a remedial action taken at Loring Air Force Base in Maine.

Bullet 3: It is important that the o/o recognizes that he and his consultants are responsible for evaluating the data as it is generated and providing you and other stakeholders with his understanding of what the data are showing, where there appears to be data gaps, and what he proposes to do to fill them.



Approach

- Need early planning meetings between facility, regulators and other stakeholders
- Develop a dynamic work plan
- Implement the targeted data collection effort
- Document the results

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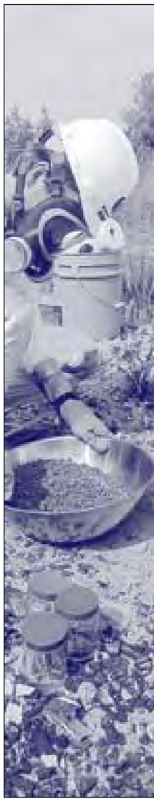
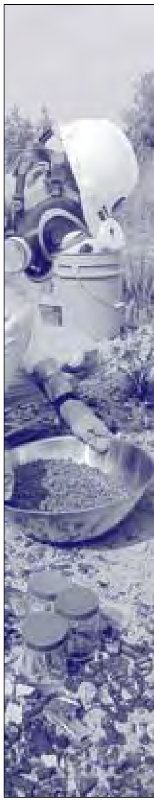
Title: We have identified four steps in conducting a targeted data collection activity.



Planning Meetings

- Gain a consensus on the conceptual model and targeted data collection approach
- Agree on a method to allow for data presentation, evaluation and exchange
- Agree on how field decision making will be done/approved
- Establish a broad brush outline of what the work plan and accompanying documents should contain



Gaining A Consensus

- Initial planning meeting with the owner/operator, their contractor, and any other stakeholders to discuss the overall approach
- At subsequent meetings the owner/operator presents findings from the DQO process

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Bullet 1: Before developing a work plan, the o/o and other stakeholders should be on the same page as to what the problem may be and how best to collect data to define and correct it.

Bullet 2: The findings from the DQO process should contain specific sampling and analysis strategies that the o/o wants to use at the site. A discussion and agreement on these will avoid problems during the actual work plan review.

Owner/ Operator DQO Plan

Proposed:

- Conceptual model
- Data to be collected
- Characterization action levels
- Sampling strategy
- Sampling tools
- Analytical tools

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Data Exchange

- How will the owner/operator keep the stakeholders up-to-date on field progress?
- How will the regulators keep the other stakeholders up-to-date on field progress?
- Data presentation

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Open communication of data results and evaluation where everyone knows what data have been collected and understands what they mean for the characterization and potential remedial/corrective actions.

First bullet: Since this is a dynamic process you will need to be more involved than with an approach where everything is preset.

Second bullet: For this approach to work the o/o must be assured that you are on-board with what is going on in the field –in other words he does not want to find out after the fact that his interpretation of an investigation algorithm is not yours.

Third bullet: The degree of complexity is project specific, but you should have an agreement as to whether decision making software such as the EPA FIELDS system will be used or simple hand drawn cross sections. Also the method of exchange should be decised upon e.g., web based, email, or fax.

On-Site Decision Making

- The sampling and analysis plan needs to be flexible and allow for in-field changes
- Decision trees allow for pre-approved step-outs (vertically and horizontally)
- The work plan should specify a regular consultation schedule to discuss findings and recommendations

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The targeted data collection approach emphasizes field decision making and in order for this to work the o/o must have a comfort level that he is not operating at risk.

Third bullet: It should also provide for non-scheduled consultations when field data dictate a non-approved course of action

The targeted data collection approach emphasizes field decision making and in order for this to work the o/o must have a comfort level that he is not operating at risk.

Outline of Work Plan

- Establish a broad brush outline of what the work plan should contain
- For example:
  - DQO discussion that includes conceptual model, PCOCs, and characterization approach
  - Characterization decision trees of sampling design and equipment to be used
  - Decision points and who will make them
  - SOPs for all field and analytical equipment (referenced when appropriate)
  - Potential corrective measures and data that will be collected to support their selection

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To ensure that everyone is on the same page a broad brush outline of what is expected in the work plan should be developed and agreed upon.

Fourth bullet: Pre approved SOPs such as those developed by the national emergency response team will save the o/o development money and you review time.

Develop Dynamic Work Plan

- From the DQO process:
  - Clearly defined conceptual model for the site
  - Clearly defined data objectives and sampling strategy
- How on-site decision making using near-real time analysis of samples is to be achieved and documented
- Data management and information exchange

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Third bullet: If the data management system uses decision assisting software there should be a provision for a dry run because failure of this system to keep up with the field work will defeat the purpose of doing a dynamic field activity.

Develop Dynamic Work Plan (cont…)

- Summary Tables:
  - Proposed tasks with rationale
  - Sampling and analysis
- Field sampling and analytical SOPs for all expected methods and techniques
- Anticipated schedule for activities

http://www.epa.gov/superfund/programs/dfa/

Field Sampling and Analytical SOPs

- When appropriate:
  - Reference previously approved field sampling SOPs
  - Reference previously approved analytical methods (both field and off-site)
- If referencing a field method, discuss how conditions are the same or similar
- If off-site method, provide assurances that the laboratory will use the method as described
- Some field methods may require site specific verification that they will work

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Second and third bullets: Be aware that some of the newer SW-846 methods (e.g., immunoassay) are generic and can not be referenced without kit specific details.

Implement the Targeted Data Collection Effort

- Review of draft work plan
- Data management and exchange system
- Quality control
- Establish project oversight activities

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Bullet one:reviewed by all stake-holders and differences of opinion resolved before field work begins

Bullet two: Pre-implementation dry run with dummy but similar data may be needed based on the complexity of the system and site.

Overall: During the implementation phase a feedback loop needs to be included such as continual checks against the DQOs and and the Dynamic Work Plan to ensure that the project is on track. This constant check is essential for success.

Document Procedures, Changes, and Results

- Document field work
- Document change orders
- Document decisions
- Final report:
  - Nature and extent of contamination
  - Fate and transport
  - Owner/operator's evaluation and interpretation of the data

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Bullet one: It is recommended that the o/o contractor provide a brief summary of the field work done during the day along with any comments on problems encountered and how they were solved. This can be done in a field log book with consecutively numbered pages or on a PC with the report being emailed to stakeholders at the end of the day or next morning.

Bullet two: Any procedural changes to SOPs due to unanticipated field or sample conditions should be documented

Bullet three: Use a decision memorandum or other device to document an agreement between stakeholders that a major task is complete

Nature and extent: This section is the basis for a baseline risk assessment and defines whether you need to do something immediately about exposure. It also provides the basis for a corrective measures selection by framing the contaminant levels in a hydrogeologic context.

Fate and transport: This section provides estimates of future distribution of contaminants and potential risk with and without intervention. It may or may not include numerical modeling. It is a section where assumptions should be clearly spelled out so that you can understand why a plume that has moved 2,000 feet in the past 10 years won't reach the fenceline which is 200 feet away in the next 100 years.

Evaluation: At the beginning of the characterization make it plain that you do not want a tombstone data report. Too often in these reports you get a we tested for lead and the values ranged from x to y. Next chemical. The consultant gets paid for and you want an evaluation of the data, not a summary that you can make by a 2 minute perusal of a data table.

Remember the final report should answer or fulfill all the DQOs.