FEDERAL REMEDIATION TECHNOLOGIES ROUNDTABLE

Meeting Summary - December 17, 1991
Ramada Renaissance Hotel, Arlington, Virginia

Agenda

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I. Introduction

The Federal Remediation Technologies Roundtable (FRTR) meeting was called to order by Roundtable Chairman Kovalick at 8:45 a.m. at the Ramada Renaissance Hotel in Arlington, Virginia.
Dr. Kovalick (Director of EPA's Technology Innovation Office (TIO)) opened the meeting with introductory remarks and requested that the Roundtable members introduce themselves. A list of attendees and other interested parties is included as an attachment to this summary.

Dr. Kovalick reviewed the handout materials provided to the Roundtable members. The first item discussed was a memorandum (11/1/91) from EPA's Deputy Administrator Henry Habicht to Don Clay (EPA/OSWER Assistant Administrator), who runs the waste programs for EPA, including enforcement. The memorandum was a letter of congratulations for producing the three Roundtable documents, that have had widespread distribution:

Bibliography of Federal Reports and Publications Describing Alternative and Innovative Treatment Technologies for Corrective Action and Site Remediation, EPA/540/8-91/007

Accessing Federal Data Bases for Contaminated Site Clean-up Technologies, EPA/540/8-91/008

Synopses of Federal Demonstrations of Innovative Site Remediation Technologies , EPA/540/8-91/009

The memorandum indicates that Mr. Habicht is pleased with the publications and is looking forward to additional collaborative demonstrations.

Dr. Kovalick then presented a copy of an advertisement for the Roundtable publications in the October 1991 issue of Chemical Engineering magazine (circulation of approximately 80,000 worldwide). Dr. Kovalick stated that advertising in trade publications is an additional mechanism to make the achievements of the Roundtable more widely known. He explained that many publications contain reply cards (referred to as bingo cards), that can provide EPA with the address labels of readers interested in the publications. EPA has already received 100 labels from this type of advertisement. Dr. Kovalick believes that this was a significant number considering that the small advertisement was contained in the middle of a products/services section of the magazine. EPA will seek to increase the use of publications (bingo cards and deck cards) and mailers to reach developers and the general public.

Dr. Kovalick stated that the Roundtable was instrumental in creating a cooperative program with the American Academy of Environmental Engineers. The Academy has been engaged to create national standards of practice for remediation treatment technologies. Dr. Kovalick indicated that the two page prospectus provided to the Roundtable members captures the Academy's cooperative agreement application and summarizes the project. EPA can provide more detailed information if necessary. Dr. Kovalick stated that the EPA Office of Research and Development (ORD), and the Departments of Energy (DOE) and Defense (DOD) have agreed to co-fund the project and also staff the steering committee. He explained that the American Academy of Environmental Engineers is the umbrella organization for many professional societies in the country and that the documents prepared

through this project will receive the peer review of these other organizations.

Dr. Kovalick presented the Report of Proceedings from the Workshop on Private and Public Cooperation in Innovative Technology (he indicated that the complete minutes are available to Roundtable members by request). The workshop was funded by EPA/TIO with Clean Sites (a non-profit educational organization). Clean Sites organized 30 Fortune 100 companies' staff members along with Mr. Robert Bartell (DOD/USATHAMA) and Col. James Owendoff (U.S. Air Force (USAF)) to discuss greater cooperation between the public and private sectors in developing and testing innovative treatment technologies. During the workshop, Col. Owendoff offered private firms an opportunity to collaborate in evaluating innovative technologies at Air Force sites. The proposal was offered because companies feel constrained by the liability of testing innovative technologies on their own property. When accepted, this proposal will provide the companies an opportunity to test a technology on sites that match the problems faced at the companies' own sites, with minimal liability. Through cooperative demonstrations, both parties (public and private) will learn the technologies' advantages and limitations, and which processes may be effective for common problems. Six to eight companies have indicated they are interested in the offer. The Army is now searching for candidate sites; McClellan Air Force Base has been identified as one possible site by the Air Force.

Dr. Kovalick also reviewed the agenda for the meeting, and indicated that it was developed through input from the Roundtable members. One topic that has continually recurred is site characterization; this will be the theme for the morning agenda. Dr. Kovalick then introduced the first speaker, Mr. Eric Koglin from EPA's Environmental Monitoring Systems Laboratory (EMSL) in Las Vegas. Dr. Kovalick concluded his introductory remarks by describing Mr. Koglin's involvement in the development and use of innovative site characterization and monitoring technologies.

II. New Technology Developments in Characterizing the Subsurface

Mr. Koglin (EPA/EMSL) presented new developments in characterizing the subsurface, focussing on field screening technologies. Mr. Koglin prefaced his presentation by indicating that EMSL is involved in a variety of site characterization and monitoring activities. He indicated that there are 200 federal employees at the EMSL facility, supported by approximately 400 contractor staff.

Mr. Koglin began his presentation by stating that the primary site characterization objective is to collect the appropriate information to assess risk, to determine the need for remedial actions, the extent of any remedial action, the feasibility of remedial action alternatives, and then to conceptually plan the remedial action. The fundamental activities that occur during site characterization include:

Identifying the types and amount of contaminants
Determining the extent of contamination
Describing the physical setting
Delineating the ecosystem.

Mr. Koglin explained that field screening means more than a rough examination of the site, as the name implies. He presented his own definition for field screening as, "rapid, low cost test methods to determine whether a contaminant of interest is present or absent, above or below a predetermined threshold at a given site, or in a concentration within a predetermined range of interest." Field screening can be used to support decisions in the field, especially in determining if and where additional sampling is needed. Advantages of field screening identified during the presentation included: faster results (real-time data), reduced costs, shortened investigation timeframes, effective detection of hot spots, and greater sample density-providing a greater confidence in the site characterization.

Mr. Koglin indicated that field screening and analysis techniques are not well developed. He recognized that there are major challenges in site characterization posed by complex environmental media and the interplay of different media. In addition, there is an abundance of organic, inorganic, radionuclides, and mixtures of contaminants at sites making it difficult for an instrument to sort out signals from all the potential chemicals. Mr. Koglin then summarized tradeoffs and considerations in choosing site characterization techniques.

Mr. Koglin recognized that there also are institutional problems associated with the development and implementation of field screening technologies. He identified the following challenges for practitioners and developers:

No set equipment specifications
No guidelines for choosing analytical procedures for field methods
No EPA approved field methods (currently under development)
No single method or technology that meets the many diverse needs.

Mr. Koglin then provided an assessment of the technologies that currently exist. He stated that there are a number of field screening technologies that exist today, and identified the following as the most mature field screening technologies:

Portable/mobile gas chromatographs (for VOCs in water, soil, sediment, air)
Portable x-ray fluorescence spectrometers (for inorganics in soil and water)
Portable photo/flame ionization devices (for VOCs in soil and water)
Catalytic surface oxidation devices (for organics in vapor and air)
Wet chemistry kits (for inorganics in soil and water)
Detector tubes.

Mr. Koglin stated that the mature field screening methods focus on VOCs (in air, water and soil) and inorganics (in soil and water). However, VOCs and inorganics account for only 44 percent of the chemical classes of the 200 priority substances. He stated that currently there are no mature field screening technologies for all other non-volatile organic compounds in all environmental media, although, some optical and chemical sensing technologies are now emerging for the non-volatile organics.

Mr. Koglin discussed field screening technologies that have been developed. He classified field screening instruments and devices under development as either "being improved" or "emerging." Being improved refers to technologies that are not mature but are at a stage of development close to being field demonstrated. Mr. Koglin briefly described how the following technologies are being improved for field screening:

Mass spectrometers - standalone units for air monitoring
Gas chromatograph/mass spectrometer - improved mobility for field use
Long path infrared or ultraviolet sensing systems that work over large areas, from meters to as such as a kilometer to detect fugitive emissions during remediation. The system also can be used to detect contaminants at the surface if the concentrations are high enough.
Wet chemistry kits - based on chemical reactions or immunoassays. (EPA has demonstrated kits for pentachlorophenol and will be demonstrating polychlorinated biphenyls.) Filter photometers use color reactions and a portable spectrophotometer to sort out the signal from the color reaction.

Mr. Koglin then identified many of the "emerging" technologies that are at an earlier stage of

development than those discussed above. Chemical sensors are being developed employing mass selective devices, optical sensing, or electrochemical detection devices. A variety of spectrometric techniques also are being investigated including:

Ion mobility spectrometery - discovered through the Army's chemical detection and monitoring activities, is being adapted to hazardous site cleanup and site characterization
Ultraviolet spectrometery
Luminescence
Surface enhanced Raman
Laser-induced breakdown, using a high powered laser into a substance that can be detected
Inductively coupled optical techniques
Photo-acoustic devices
Infrared techniques using laser diodes over a short path and a smaller scale using optical fibers
Differential scattering and absorption of light using longer path systems that have been adapted for monitoring agents but have not been routinely used for characterizing chemical contaminants at sites.

Mr. Koglin identified the high priority needs for the development of field characterization technologies. He hopes to get industry excited about the marketplace in order to stimulate the commercialization of these technologies. There is a need to focus more on in-situ devices in the analysis of chemicals at the surface and in the subsurface. Mr. Koglin reemphasized that non-volatile organic compounds need more attention, and indicated that there is a move towards lower powered, more robust, and miniaturized instrumentation. More attention also needs to be placed on mixed wastes to determine if there is any impact on the data quality due to the presence of radionuclides. Another high priority need is in the area of characterizing the contamination of building and structures.

Mr. Koglin concluded his presentation by examining the current opportunities for practitioners. Many technologies are emerging, but they are emerging slowly. EPA is working with developers through the Superfund Innovative Technology Evaluation (SITE) program to excite the marketplace for field screening technologies. A field analytical methods catalogue is being developed by EPA through the Office of Emergency and Remedial Response (OERR). This catalogue will include approximately 60 field methods for the use of primarily portable gas chromatographs and other laboratory equipment. Mr. Koglin stated that university and industrial communities are amenable to partnerships and aggressive in demonstrating technologies, and that the Federal government is

committed in forwarding technology transfer through a variety of programs. Therefore, a practitioner should find a variety of tools over the next few years to assist in site characterization.

Discussion and questions occurred intermittently throughout Mr. Koglin's presentation focusing on field characterization recommendations. In response to questions from Dr. Kovalick regarding the selection of VOC field screening methods, Mr. Koglin indicated that methods are differentiated by various considerations such as speed and quantitative capabilities. Any combination of methods may be used for a given media. In fact, all of the methods may be necessary for an unknown contaminant matrix. Mr. Koglin also stated that sample preparation has been problematic. However, EPA is in the process of developing standard field methods for sample collection and preparation.

Stan Wolf (DOE/Office of Technology Development (OTD)) asked about the amount of capital expenditure required for VOC field screening systems. Mr. Koglin stated that the capital expenditure for a gas chromatograph (GC) with detector and other ancillaries is approximately $50,000, and the cost for a GC/mass spectrometer will range from $150,000 to $200,000. Although the capital costs are high, the cost per sample is actually lower than conventional laboratory methods.

Following his presentation, Mr. Koglin solicited questions from the Roundtable members. Rick Newsome (DOD/U.S. Army) asked whether we were attempting only to develop faster technologies or if there were efforts to concentrate on targeting indicator parameters or indicator contaminants. Mr. Koglin responded that the ability to screen for indicators depends on the data quality objectives. A tiered approach is typically applied for initial screening to determine classes of contaminants. After initial screening, only selected samples will be sent to the laboratory for chemical-specific analysis. However, analysis of individual chemicals is necessary for risk assessment purposes.

Mr. Wolf asked Mr. Koglin about possible collaboration whereby sites using field screening could share information on the results of various field screening methods, or by establishing a clearinghouse for methods applied and their results. Mr. Koglin stated that establishing a clearinghouse is something he hopes to do, and that technology transfer is one component of the SITE program. Mr. Koglin stated that a clearinghouse providing actual field results of field

screening methods does not yet exist. He has established his own data base of vendors and analytical technologies. However, his data base would not be useful in the clearinghouse context because actual performance data rather than vendor claims are necessary to evaluate the use of a technology.

Col. Owendoff questioned whether EPA has a field screening methods and technologies workshop for contractors. Mr. Koglin indicated that an educational workshop or exchange has not be developed, but a symposium was recently held where field screening issues were discussed. Col. Owendoff suggested that if EPA would set up such a workshop, the Air Force would provide the funding. Mr. Koglin stated that EPA could possibly conduct a workshop. Col. Owendoff felt it was important to provide the remedial investigation/ feasibility study (RI/FS) contractors with the information on available field screening techniques and to obtain their feedback because they are the end users of the technologies. Mr. Koglin agreed that the users are the remedial contractors and that they need to be aware of the technologies.

Mr. Newsome stated that obtaining regulatory acceptance was also critical because the contractors look to regulatory agencies for acceptance of certain technologies. Col. Owendoff suggested including the key regulatory personnel in the workshop, along with research and design (R&D) personnel. Mr. Koglin concurred that acceptance by the regulatory agency is crucial otherwise the equipment will remain on the shelf. Education of regulatory personnel on the availability of the technologies is one of EPA's goals. Col. Owendoff stated that the first step towards user acceptance is to get regulatory approval, or there should be cooperative discussion between the practitioners, regulatory personnel, and technology developers. Dr. Kovalick requested the Roundtable to revisit the discussion during the session on user acceptance scheduled for 11:30 am.

III. New Developments in Characterization from the Underground Storage Tanks Program

Dr. Kovalick opened the session by introducing Stephanie Bergman and Tom Schruben (EPA/Office of Underground Storage Tanks (OUST)), who briefed the Roundtable on a new field screening technology called "Lab in a Bag." Ms. Bergman began the presentation by reminding the Roundtable members that a brochure on "Lab in a Bag" has been provided in the handout materials. She stated that "Lab in a Bag" prepares soil and water samples in a way that allows an organic

vapor
detector to make reliable measurements of contamination.

Ms. Bergman stated that the UST program is committed to using field screening methods because they have far too many sites (approximately 120,000 release sites so far) to characterize by
conventional approaches. The development of the "Lab in a Bag" technology was stimulated by a
need to get quick results in the field without the timely and costly delays of laboratory analyses. Through EPA funding to perform site assessment research, Gary Robbins at the University of Connecticut conceptualized the technology and developed the first prototype. EPA was anxious to
commercialize the new technology and entered into a Federal Technology Transfer Act (FTTA) agreement with In-Situ Inc. Under this agreement, EPA worked with In-Situ Inc. for two years to
develop and market the technology. Ms. Bergman stated that the agreement enabled EPA to commercialize the technology much more quickly than could have been done otherwise. The agreement required EPA to write a user's manual and develop a video for the "Lab in a Bag" device.
The agreement also required EPA to deploy units to selected states and conduct follow-up reviews
on their use in the field. In exchange, In-Situ Inc. would provide EPA with 100 units for distribution. Ms. Bergman said that she now needs to identify who should receive the units and determine what type of follow-up is necessary.

Ms. Bergman explained that the "Lab in a Bag" is used to make quick decisions in the field on
the degree and extent of contamination at primarily petroleum-contaminated sites. The "Lab in a Bag" is a controlled method that allows for reproducible results. Ms. Bergman then turned the presentation over to Tom Schruben for a technology demonstration.

Mr. Schruben described the conventional Mason jar technique for headspace sampling of volatile
organic compounds (VOCs) in soil samples. The mason jar technique involves adding a soil sample
to a jar, placing foil over the top, then using an instrument to sample the VOCs in the headspace of
the jar. Mr. Schruben stated that the "Lab in a Bag" device is a controlled version of the Mason jar
technique. Mr. Schruben then proceeded to demonstrate how to use the technology. One of the key
breakthroughs with the use of this device involves the preparation of daily standards to determine contaminant concentrations from the unit readings provided by the detector. In addition, the method
has successfully detected inoperable field instruments. Accurate field determination of contaminant

concentrations is critical to user and regulatory acceptance.

During the demonstration, Roundtable members asked several questions regarding the technology. Dr. Kovalick asked if the equipment is battery operated. Mr. Schruben stated that it was battery operated and runs approximately three days without charging. Field crews carry a recharger and a cigarette lighter battery charger cord. Mr. Newsome asked if this technology is only applicable for petroleum products. Mr. Schruben responded by saying that the UST program is primarily interested in petroleum products, but the technology can be useful for other volatile contaminants such as trichloroethylene (TCE). In addition, any type of organic vapor detector may be used with the technology. "Lab in a Bag" has even been successfully tested with a Draeger tube.

Mr. Koglin asked what the data quality expectations were and how will the technology be used (e.g., will it be used to determine that hydrocarbons are present or to make cleanup decisions)? Mr. Schruben stated that the method can reliably determine if the site has been remediated below a cleanup threshold value before the construction equipment would normally be demobilized. In addition, although it may be necessary to backup the field results with laboratory analysis, a small percentage of the field samples will be sent to a laboratory for confirmatory analysis. The laboratory analysis can serve as a quality check on how the company or field personnel are applying the field method.

Mr. Koglin questioned what types of people were being trained by the UST program. Mr. Schruben indicated that state regulatory personnel, usually field personnel, have been trained. The training tends to be sufficient to encourage people to use or allow field measurements in the program.

In response to Mr. Newsome's question, Mr. Schruben stated that some bags do have a background level of VOCs (of less than 1 ppm). The background level can be checked before starting the measurements and accounted for in determining contaminant concentrations. However, this background level is generally low relative to the contamination concentrations found at the site or the action level for petroleum spills.

Dr. Fran Kremer (EPA/ORD) asked how well this technology has been received by the states. Ms. Bergman responded that at a recent conference, a "Lab in a Bag" was raffled off in order to collect marketing information. Generally, everyone was at least interested in learning more

about the technology. The State of Connecticut is actively using "Lab in a Bag," and the States of Minnesota and Wisconsin have written regulations to explicitly allow for the use of this technology. Some states are currently examining the use of the technology and comparing the performance against conventional methods. Ms. Bergman said that she is now translating this interest in the technology and targeting training needs in the states, in order to make them more comfortable with the technology. Mr. Schruben elaborated by saying that the state personnel are so overwhelmed with their workload, that they are receptive to anything that will reduce the cost and speed the cleanup.

IV. Subsurface and Soil Characterization Technologies

Dr. Kovalick introduced Caroline Purdy (DOE/Office of Technology Development (OTD)) who gave the Roundtable an overview of some of the subsurface and soil characterization technologies that DOE is developing at specific sites. Dr. Purdy began by describing the myriad of facilities and wastes that must be characterized to illustrate the complexity of DOE's problems. DOE's sites cover thousands of square miles in 35 states. DOE complexes involve weapons research, testing, and production facilities, and requires the characterization of all types of disposal units, leaks, and spills at these facilities. She reiterated what Mr. Koglin stated earlier, that site characterization is critical to all stages of the cleanup process.

Dr. Purdy explained that OTD develops and integrates the technologies needed to solve the problems at a given site. She then presented four DOE facilities with integrated demonstrations to illustrate the mix of new characterization technologies required to address the complex site problems.

At their facility in Idaho Falls, DOE recognized that the use of boreholes to characterize the boundaries and contents of waste trenches would be too costly and ineffective, therefore, DOE is applying four non-invasive geophysical techniques to characterize the subsurface:

Electromagnetic conductivity (EM)
Ground penetrating radar (GPR)
Magnetometer
Seismic refraction.

Each of these methods examines anomalies in some form of signal that indicates the presence of a contaminant or barrel. These methods can be applied at the surface or from two boreholes to examine signals from a cross-section of the area. EM and GPR look at the conductivity of the

soil,
and, therefore, can detect differences in the moisture in the soil (e.g., distinguishing organic contamination from water). Conversely, the magnetometer looks at the effect of the intensity of the
magnetic field. One of the major limitations of the magnetometer technique is that the orientation of
a container will give a different signal, requiring a huge library of anomalous signals. The second
limitation is that a combination of geophysical techniques will be needed to confirm the results. However, since those types of technologies prevent exposure to contaminants, the safety issue is a
driving factor toward continued development.

At the Savannah River facility, DOE is faced with the problem of characterizing VOC contamination in a very complex geology. Dr. Purdy discussed how the characterization techniques
are evolving towards more sophisticated methods that give a better subsurface characterization. In
the past, characterization technologies used at the site included a near surface soil gas survey and clusters of 5-6 vertical wells screened at different depths (costing approximately $15,000 per well) to
characterize the contaminant plume.

DOE is improving its subsurface characterization capabilities and reducing the costs associated
with drilling and sampling of multiple wells. Presently, DOE is continuing to use soil gas surveys.
However, DOE is now drilling only one well and using sensors in a cone penetrometer to characterize the geology and chemistry of the subsurface. This approach provides much more information with less effort. Monitoring is still occurring, but with less frequency although ground
water samples are taken to the laboratory for analysis.

In the future, DOE anticipates the subsurface characterization techniques will include:

Continuing near surface soil gas surveys
Drilling a single well coupled with a cone penetrometer and chemical sensors
Placing in-situ chemical sensors in the ground with fiber optics
Testing the improved technologies
- Non-invasive sampling (e.g., examining electrical resistivity across boreholes, high frequency
electromagnetic conductivity, ground penetrating radar)
- Chemical fiber optic sensors
- Well borescopes (using a camera to visually examine the subsurface)

Onsite ground water analysis combined with more depth-discrete sampling.

DOE has applied a different combination of technologies in characterizing the metal contamination at a chemical landfill located at the Sandia National Laboratory in Albuquerque. The new technologies applied at this site include:

Boreholes placed horizontally or at an angle (directional boreholes) rather than vertically
Membrane liners (nylon or flexible pvc) for the boreholes rather than metal casings allowing absorption pads and sensor instrumentation to be used in the borehole without the metal affecting the signal
Soil pore liquid absorption pads for liquid sampling
Down hole sensors for detecting metal contamination (e.g., x-ray fluorescence, neutron activation analysis).

At the Hanford plant in Richland, Washington State, DOE must determine the integrity of large underground storage tanks, characterize the unknown high-level radioactive mixed waste contained in the tanks, and determine the quantity of materials that have leaked from the tanks, and whether ground water is endangered. In the past determining the contents of these tanks has involved visual inspections by remote camera and extracting drilling cones of the waste (salt cake and sludge). Cones have then been remotely analyzed in hot cells. Each cone sample costs about $1M. Thermocouples have been used to measure the temperature within the tanks. In the future, DOE anticipates applying innovative characterization technologies, including:

Laser Raman spectroscopy to characterize the surface material of the tank
Neutron activation
External mapping of the tanks using remote sensing technology
Cone penetrometer with chemical sensors and fiber optics
Acoustic characterization to determine the viscosity of the material
Laser ablation/fiber optics/chemical analysis.

Dr. Purdy concluded by discussing a major study conducted in the DOE complex that identified DOE's high priority technology needs. The results of this study, DOE's Technology Needs Assessment, were organized by both site-specific priorities and complex-wide priorities. One of the major findings of the study was the need for real-time site characterization and field analytical systems. The site characterization needs identified in DOE's Technology Needs Assessment Study can be summarized as:

Improved on-site analytical systems

- Field deployable analytical technologies (real-time)
- Mobile labs for decision quality data
- Fixed based labs on-site.

Non-invasive investigative methods

Uniform data quality objectives

Improved sampling methods

- collecting deep ground water samples
- remote sampling
- sampling soil under buildings
- continuous monitoring methods.

Following the presentation, Dr. Kovalick questioned what OTD's role is in the site characterization activities of the integrated technology demonstrations. Specifically, do the labs make proposals to OTD, or does OTD orchestrate what is to be done to address problems across all of DOE? Dr. Purdy responded by saying that the integrated demonstration is one mechanism to address site-specific problems and the integrated program is focussed on complex-wide problems.

Dr. Wolf explained that most of the integrated demonstrations are testing technologies developed at the DOE laboratories. However, DOE is attempting to seek out private participation in technology demonstrations (including site characterization) to move beyond having only DOE labs participate in the program. OTD is also attempting to coordinate site characterization techniques from site to site.

Mr. Bartell inquired whether the DOE Technology Needs Assessment for FY 1991 is available.

Lawnie Taylor (DOE/Environmental Restoration and Waste Management) confirmed that the information on the study is available in two parts: a large site-specific notebook and a summary document that integrates the results. To obtain a copy of the study, Roundtable participants can contact Mr. Tim Carlson with Chem-Nuclear Geotech, Inc. at (303) 248-6485 or (FTS) 326-6485.

V. U.S. Army/DOE Development of the Cone Penetrometer

Dr. Kovalick introduced Mr. Wayne Sisk (U.S. Army Toxic and Hazardous Materials Agency) who presented an overview of the development of the Site Characterization and Analysis Penetrometer System (SCAPS), commonly referred to as the cone penetrometer. The cone penetrometer was jointly developed by DOD and DOE. Mr. Sisk distributed a three page fact sheet that provides an update on SCAPS development, testing, and technology transfer efforts.

Mr. Sisk began his presentation by explaining that the cone penetrometer was developed because DOD recognized conventional subsurface characterization was too costly, slow, and generally ineffective. Mr. Sisk identified areas targeted for improvement for DOD's site characterization efforts, including limiting the number of monitoring wells, improving their effectiveness, and reducing the amount of ongoing ground monitoring. They determine that a system was needed that could help in determining where to place boreholes and monitoring wells. Mr. Sisk explained that the penetrometer was developed to meet the following development objectives:

Detect and delineate contamination in the subsurface
Provide real-time data
Develop fluid and gas sampling
Exploit innovative technologies such as fiber optics
Provide the means to push a probe into the subsurface without drilling
Provide the means to seal the hole.

Mr. Sisk briefly described the cone penetrometer as a subsurface characterization technology mounted on a truck that pneumatically drives meter-long rods containing optical and other sensors into the ground. The sensors use a sapphire window combined with a nitrogen laser as light source in the cone tip. The light is carried to the surface via a fiber optic wire contained in the rods. The cone can be driven into the ground at any rate up to 2 centimeters per second. The system also has a grouting capability to seal the hole. The system has pushed down to 158 feet (at a cost of $10 per foot) but will stop when a large cobble or rock is detected. In a typical day, the penetrometer can drive seven holes at least 75 feet deep compared to only two with conventional drilling. The penetrometer can characterize the geology in real-time to within 2 centimeters. With the semi-specific fluorescence capabilities, the penetrometer also can characterize the type of contaminants present. A resistivity sensor can be placed in the tip to detect contamination. In addition, the system provides powerful, real-time data reduction capabilities.

During the presentation, Mr. Sisk also described the areas for future development and testing for the penetrometer. He indicated that the list of new technologies identified in the earlier presentations are the same technologies that will be tested and placed in the penetrometer (e.g. magnetometer, Raman scattering, soil gas analysis, etc).

In response to Dr. Kovalick's question, Mr. Sisk indicated that the performance of the penetrometer was validated with a side-by-side comparison with monitoring wells. He also

indicated
that standards are prepared for comparison with field results to improve data validity. Mr. Bartell
elaborated by saying that results are also self-validated by comparing the daily results with data previously collected at the site.

Dr. Kovalick stated that regardless of the number of pushes into the ground, you would still be
faced with the problem of horizontally discontinuous geologic units. Mr. Sisk concurred with Dr.
Kovalick, but stated that the penetrometer could place a much greater density of pushes per day to
provide fairly thorough cross-sectional characterization.

Mr. Newsome inquired if a supercomputer is required to generate the graphics on the plume.
Mr. Sisk indicated a supercomputer is required to analyze the data and generate the three-dimensional graphics from the data generated. Information can be supplied to the computer at
the end of the day via disk or modem for quick-response analyses. In addition, the operator can determine and chart the soil types while drilling.

Dr. Kovalick asked if there are any technical limitations, other than not being able to push through rock. Mr. Sisk stated that the penetrometer is not the panacea for site characterization. Although the penetrometer can be used to characterize the extent of the contamination, its sensor capabilities are limited.

In response to another question from Mr. Newsome, Mr. Sisk stated that the patent rights to the
penetrometer belong to the Waterways Experiment Station (WES). Legal staff at WES are sorting
out the intelligence property rights, and plan to license the technology to the private sector within 6
months. They are already being approached by firms interested in developing and commercializing
the technology.

Mr. James Cook (DOI - Bureau of Mines) inquired whether the integrity or degradation of the
grout has be examined. Mr. Sisk stated that they have not, but the subsurface pressure would close
the holes even without the grout.

Col. Kenneth Cornelius (DOD) asked how much has been spent on the development of the technology and whether they have received regulatory acceptance of the data generated by the penetrometer. Mr. Sisk responded by saying that EPA Region IV was on-site when the

penetrometer
was tested at Savannah River, and Region IV wants the technology back on-site in their Region. He
emphasized that the penetrometer was not a substitute for monitoring wells but serves to ensure proper placement of a fewer number of wells. A unit in the field costs about $600,000, while research and development costs for the system have totalled between $7 and $8 million.

Before closing the session on the cone penetrometer, Mr. Koglin added that a DOE report is available on the cost effectiveness of the cone penetrometer versus monitoring wells. {Contact Mr.
Koglin at FTS-545-2432 or 202-798-2432 for a reference on this report - from Joy Schroeder in Los
Alamos}

VI. User Acceptance of New Technologies

Dr. Kovalick reopened the discussion of user acceptance of new site characterization technologies. He informed the Roundtable that Mr. Koglin drafted a three-page paper on user acceptance of site characterization technologies (11/25/91) that was distributed to Roundtable members prior to the meeting. Mr. Koglin then briefed the Roundtable on the paper.

Mr. Koglin stated that the paper was prepared because there was general concern regarding regulatory and user acceptance of technologies that are being demonstrated. This paper examines
how to gain acceptance of technologies that have been demonstrated to be successful. Users generally look to EPA to provide an endorsement or blessing of a technology before they will embrace it. The SITE program has gone a long way to accomplish this for a few technologies. Unfortunately, EPA does not have the resources to evaluate, to write reports, and to supply training
materials on all the site characterization technologies available. Mr. Koglin has thought about how
EPA can work jointly with the demonstrations to establish a working relationship in order to:

Develop and agree upon technology demonstration protocols for site characterization technologies

Assist in testing and evaluating site characterization technologies in the demonstration programs

Establish a joint clearinghouse of literature and performance results.

Dr. Kovalick asked the Roundtable what should be done to achieve greater user acceptance of
these technologies. Dr. Kovalick suggested adding a new section to the Roundtable document on the
demonstration of treatment technologies when it is updated, or publishing a separate document on

characterization technologies. Another option is to create some form of ad hoc or formal group with an interest in this area to examine what should be done to promote acceptance of the technologies.

Mr. Fred Lindsey (EPA/Office of Research and Development) questioned who are the end-users: regulatory personnel, On-Scene Coordinators (OSCs), or contractors. What do we need to do to provide credibility to any monitoring technology? What do the users need to determine that a technology is acceptable? Mr. Koglin responded by stating that a side-by-side analysis with conventional methods is necessary. It also may require having some sanctioned body review the technology's performance. However, to gain acceptance, we must go beyond producing reports or fact sheets on the results; acceptance will require interchanges with the users, maybe going Region by Region to show the regulatory and contractor personnel how the technology performs. Once EPA agrees to use a technology, then states and responsible parties also will use it. Mr. Koglin indicated that Regional staff are satisfied if they can refer to an EPA document on the use of the technology.

Col. Owendoff believes that EPA has the knowledge of the technologies and it should be part of EPA's role and mission to inform the users of the available technologies. Col. Owendoff sees an opportunity for cooperative funding/efforts for characterization and monitoring efforts at Air Force sites (such as McClellan AFB where an agreement is already in place). He has attempted to locate an EPA employee that is willing to go to an Air Force installation and evaluate if the methods and technologies applied at the site are appropriate. Col. Owendoff stated that the Air Force wants assistance in the field on the technologies that currently could be applied to their sites and are presently available. Dr. Kovalick and Mr. Koglin discussed the limited extent of assistance that currently could be provided to the Air Force under the SITE program.

Mr. James Ballif (USACE) asked if EPA could conduct a demonstration program for site characterization technologies. Mr. Koglin indicated that such a function is part of the SITE program. Dr. Kovalick clarified that EPA's innovative site characterization portion of the SITE program is small, consisting only of Mr. Koglin and a budget of less than a $1 million. Currently, only two demonstrations of site characterization are performed annually in EPA's SITE program.

Mr. Koglin explained that part of a demonstration of an innovative monitoring technology resulted in the development of a method. If we could use this method as a recognized field method

for an SW-846 process, then this would be all the assurance that EPA field personnel need. Mr. Koglin also stated that there are two potential risks with developing protocols: 1) blacklisting vendors when their technologies fail a demonstration; or 2) recognizing technologies that do not work effectively. Currently, Mr. Koglin estimates that there is a list of 200 innovative technologies
awaiting evaluation. Unlike treatment technologies, characterization technologies will be widely distributed, therefore, a structured approach is needed for evaluating what is available and getting the
appropriate information to the user.

Col. Karl Kneeling (DOD/USAF) suggested investigating other avenues or groups to promote
these innovative technologies. He stated that there are numerous demonstrations that could be tapped for assistance. Mr. Koglin stated that testing of monitoring technologies is too decentralized,
and efforts should be focused at a centralized location to improve communication and coordination.

Dr. Kovalick stated that the purpose of this discussion is to determine if there is some activity
that the Roundtable should sponsor to promote new monitoring technologies. Dr. Kovalick then asked Col. Owendoff what he felt should be done to satisfy the interests of the Air Force. Col. Owendoff questioned what the role of the Roundtable should be in promoting these technologies and
their acceptance. Dr. Kovalick responded that although the topic is important, it is outside of the Technology Innovation Office's mission. Mr. Newsome suggested employing the existing sub-committee on new technologies or establishing a new sub-committee to pick the five or six most
promising technologies and demonstrate their performance. Dr. Kovalick responded by saying if the
sub-committee selects the types of technologies then it would be possible to select a site for testing.
Dr. Kovalick emphasized that the sub-committee should identify the most promising technologies for
common problems so that the members' interest are reflected. The Roundtable generally agreed that
a sub-committee should be used to identify the most promising monitoring technologies for testing,
and Dr. Kovalick asked for nominees for the sub-committee. The Roundtable then began to discuss
the role of the sub-committee. Finally, it was agreed that a written motion should be prepared on the
purpose of the sub-committee and discussed in the afternoon before committing to the effort of convening a sub-committee.

VII. The Bioremediation Field Initiative

Dr. Kovalick opened the discussion by informing the Roundtable members that EPA is conducting a Bioremediation Field Initiative. The purpose of the Initiative is to showcase bioremediation; to provide timely information regarding new developments in the application of bioremediation at hazardous waste sites; and to increase the amount of cost and performance available data on bioremediation. As a result of this initiative and the Roundtable contacts, two USAF sites have been chosen to demonstrate bioremediation treatment technologies. Another result of this initiative the newsletter, Bioremediation in the Field, has had four publications: November 1990, March 1991, August 1991, and December 1991. Each of these publications was handed out at the Roundtable meeting. The Initiative originated from the influence of Mr. William Reilly, EPA's Administrator. Mr. Reilly convened a summit challenging the Nation's biotechnology industry and related companies to move the country forward in developing bioremediation treatment technologies especially for oil spill cleanup. As a result, five task forces were developed. One consists of members of each agency on the National Response Team. This workgroup is ready in Region VI, waiting for a "spill of opportunity" to test bioremediation protocols and to empower the OSC and Regional Response Team to implement bioremediation.

Dr. Kovalick then introduced Dr. Fran Kremer (EPA/ORD), coordinator of the Bioremediation Field Initiative (513-569-7346) and a member of Biosystems Research Committee. Dr. Kremer began by explaining the Bioremediation Initiative as a cooperative effort among Office of Research and Development (ORD), Office of Solid Waste and Emergency Response (OSWER), and the EPA Regional Offices. The ORD participants include Office of Technology Transfer and Regulatory Support, Office of Environmental Engineering and Technology Demonstration (Cincinnati, Ohio Laboratory), and the Office of Environmental Process and Effects Research (Ada, Oklahoma; Athens, Georgia; and Gulf Breeze, Florida Laboratories). These laboratories conduct research, development and demonstration of bioremediation.

Specifically, the Ada Laboratory (Contact: John Wilson, 405-332-8800 ext. 254) investigates subsurface and ground water treatment. The Athens Laboratory's (Contact: John Rogers, 404-546-3592) emphasis is on sediments treatment, anaerobic treatment, and fate and process characterization. The Gulf Breeze Laboratories (Contact: Dr. Hap Pritchard, 904-934-9200) implement fate and process characterization, genetic engineering, and marine systems analysis.

The
Cincinnati Laboratory (Contact: Dick Brenner 513-568-7657) investigates the engineering aspects
for treatment in reactors and surface soils.

Dr. Kremer stated the Bioremediation Initiative was developed with three components in mind:
1) evaluation of full-scale bioremediation operations; 2) assistance on treatability and field pilot studies; and 3) development of a bioremediation database. In evaluating full-scale biosystems the
Initiative is especially interested in sites using in-situ treatment for surface and subsurface, as well as
treatment in reactors. In addition to observing the full-scale operations, the Initiative is interested in
long-term technical assistance. By working with site managers in the initial stages of the remedial
process and in the RI/FS stages, the Initiative could continue its involvement into the full-scale stages. Finally, the bioremediation database, contains approximately 150 sites where bio-treatment is
being used around the country. The information provided by the database includes the particular contaminants, the media, and the cleanup objectives. This information is updated quarterly and published in the Bioremediation in the Field bulletin. It will be available later this year in a computerized data base to enable users to search for sites based on contaminants, media, etc.

Presently, the Bioremediation Initiative is evaluating seven sites. The seven sites include two
creosote sites (Champion Wood Preserving in Libby, Montana and Brookhaven Wood Preserving in
Brookhaven, Mississippi); one solvent site (Allied Signal in Saint Joseph, Michigan); and four petroleum product sites (Eielson Air Force Base (AFB) in Alaska; Hill AFB in Utah; Park City Pipeline in Kansas; and Public Service and Electric in Denver, Colorado). Dr. Kremer continued by
discussing each site in detail:

Champion Wood Preserving Site - is using three biotreatment applications including land treatment, fixed film reactor, and in-situ treatment. Effluent will be percolated through the land
treatment unit to supply additional nutrients and moisture. The ground water will then be treated
by fixed film reactor, while the upper aquifer is under going in-situ treatment.

Brookhaven Wood Preserving Site - is a three-acre site consisting of an evaporative pond containing waste sludge pile. The site was contaminated by a hazardous waste management unit
and accumulated sludge from wastewater treatment. Brookhaven Wood Preserving facility is the

only site where non-indigenous organisms and white rot fungus are being added to treat polychlorinated phenols (PCPs). The objective of the study is to evaluate three fungal species and three innoculum loading rates.

Allied Signal Site - is a key site with respect to site characterization and a former brake manufacturing facility. The degreasing operations resulted in TCE contamination of the ground water. The site characterization relied on initial RI/FS data, therefore, problems arose when recent studies revealed TCE contamination ten times greater than initial RI/FS studies. As a result the site is under re-evaluation to determine the ability of the indigenous organisms to degrade the TCE. Evaluation of Passive Biodegradation is being considered to determine the ability of the indigenous organisms to degrade the TCE without intervention.

Park City Pipeline Site - consists of an oil refinery that developed an underground pipeline leak on the facility. A Federal Technology Transfer Act (FTTA) Cooperative Research and Development Agreement provided partial funding from Coastal Remediation Company. With nutrient addition and recirculation of the water, the Bioremediation Initiative is evaluating fermentation of benzene, toluene, ethylene, and xylene (BTEX) compounds. Remediation is planned to begin in January 1992 and is expected to take approximately one year.

Public Service and Electric Site - an underground storage tank site, consists of a leak in the oil catch basin at the service facility in downtown Denver. Ground Water Technology and Region VIII asked the Bioremediation Initiative staff to participate in the remediation process and to assist in the determination of "How clean is clean." The facility location, downtown Denver, created impediments as to what technology could be used in remediating the site. The treatment selected includes nutrient and hydrogen peroxide addition systems, an infiltration gallery, and installation of infusion well points. Remedial action began in 1989 with completion expected in the end of 1991.

Eielson Air Force Base Site - located near Fairbanks, Alaska, an extremely cold climate, bioventing of the shallow vadose zone is being evaluated for remediating JP-4 jet fuel spills. Bioventing involves air injection through the vadose zone to enhance biodegradation.

Activities at Eielson AFB include observation of the injected air and potential contaminant dissipation, soil gas monitoring at the perimeter of the air injection wells, and surface monitoring.

Dr. Kremer presented the progress and milestones of the Eielson AFB. One significant event is the in-situ respiration tests, which involves taking vapor samples using gas probes to measure carbon dioxide and oxygen content before and after treatment. This will assist in the determination of the amount of hydrocarbons that have been converted to carbon dioxide.

The Eielson AFB site consists of a one-acre area of contamination that is divided into three segments including the control area, the passive area, and the active treating area. The Initiative is responsible for the active soil warming area, involving the addition of heated water. The Initiative evaluation on the Eielson AFB site commenced in July 1991 and involvement is expected to continue for two years.

Hill Air Force Base Site - in Salt Lake City, Utah also is undergoing bioventing but this project is targeting the deep vadose zone using variable air flow injection rates. The contamination of the site occurred over a period of 40 years; it consists of one-acre of contaminated land caused by JP-4 jet fuel spills. The depth of contamination ranges from 30 to 100 feet. In-situ respiration tests, soil-gas surveys, gas flow rate evaluation, and helium tracer surveys are being conducted. The USAF began bioventing activities in December of 1990, and the EPA Bioremediation Initiative commenced in July of 1991; it is expected to continue for two years.

Dr. Kremer emphasized the high degree of activity around the site, therefore, the design of the treatment facility was a key consideration. Also, the soil profile of the site consists of sand, silty clay, sand with gravel and clay, and sand with clay clots. This combination of media presents complex and challenging evaluation.

The EPA project managers for these two Air Force sites are Dr. Gregory Sayles 513-569-7607 and Richard Brenner 513-569-7657. Dr. Sayles and Mr. Brenner are located in Cincinnati, Ohio.

Dr. Kremer concluded by encouraging the Roundtable members to continue to introduce sites to

the Initiative. The Initiative is interested in sites presently using bioremediation treatment technologies.

Discussions and questions occurred intermittently throughout Dr. Kremer's presentation, covering areas about procurement, costs, the addition of air and micro-organisms, the rate of biodegradation, and air emissions. Mr. Bartell questioned Dr. Kremer about the status of sites when the bioremediation evaluation is introduced. Dr. Kremer stated that most sites are on-going with the exception of Eielson and Hill AFB sites, where bioremediation has already been selected and a contract has already been established for full-scale remediation. Col. Owendoff continued to add that the Initiative does not have the responsibility of cleaning up the site, and the responsibility still remains with the USAF or other responsible parties. The Initiative provides the responsible party with analytical support; its long-term purpose is to apply the successful technology to another site.

Col. Michael Fellows (USACE) questioned how the Bioremediation Initiative has pursued projects and what types of contracts where obtained. Dr. Kremer indicated that Regional division directors were asked to nominate sites for the evaluations. The response provided about 20 sites, which had to undergo screening for the most viable in terms of type of contaminant, media, and reasonable estimation of success. Following the selection, others have responded with additional site nominees for bioremediation evaluation. Dr. Kovalick also added that Nancy Dean is project manager for a new study to understand the obstacles of innovative technology procurement.

Col. Owendoff stated that the USAF intends to establish bioventing at approximately 20 more sites in 1992 because of the economical and effective results. In response to Col. Fellows question about funding and procuring a contractor, Col. Owendoff stated that Battelle-Columbus will provide oversight and technical support to the USAF through a research contract. Through cooperation with PRPs and EPA's Regions, additional sampling, site characterization, and overall performance evaluation was made possible by accessing data previously gathered at the site. The only expenditures incurred by the Initiative are sampling and analytical costs.

Mr. Newsome inquired about any cases where microorganisms need to be added and whether the biodegradation rate can be increased by microorganisms addition and a temperature increase. Dr. Kremer explained most studies reveal few cases requiring exogenous bacteria addition, because microbial activity can more effectively be found on the perimeter of a hot zone. The organisms on the hot zone are the best organisms because these organisms have had time to acclimate to the

surrounding waste, are more adapted to surviving in that environment, and are able to withstand an attack from predators organisms. Of the 150 sites under bioremediation evaluation, less than 5 percent require microbial addition.

Mr. Bartell inquired about the amount of emissions and volatization in bioventing. Dr. Kremer stated this is a major concern and crucial factor in bioventing technology. The air flow rate must be controlled to avoid volatile air emissions and an excess in air pressure from the injection.

Dr. Kovalick emphasized that opportunities are available to evaluate and demonstrate any bioremediation technology at an agency's site. Should an agency know of a site(s) with the potential for bioremediation, they should contact Dr. Fran Kremer at 513-569-7346 or FTS-684-7346, or Nancy Dean (EPA/TIO) at 703-308-8797 or FTS-398-8797.

Mr. Newsome inquired about the existence of a division strictly responsible for the dissemination of all technical information pertaining to bioremediation. In a combined response by Dr. Kovalick and Dr. Kremer, the Roundtable members were informed that technical assistance for specific sites can be obtained through Ada Laboratories or the Cincinnati Office for bioremediation activities. Remedial Project Managers (RPMs) and OSCs use the technical support center in Cincinnati for above-ground bioremediation and soil washing, and Ada Laboratories for below-ground bioremediation. For information on EPA's research in bioremediation and technology transfer activities, contact Dr. Kremer.

Dr. Kovalick stated that National Environmental Technical Applications Center (NETAC), a non-profit organization in Pittsburgh, is developing protocols on remediation of oil on beaches and in water, as well as for bioremediation in soil and hazardous waste. Dr. Kremer stated that Ben Blaney (ORD) is publishing a set of guidance documents for screening, remedy selection, and remedy design on a variety of technologies. When published these documents will be listed in A Bibliography of EPA Information Resources (EPA 540/8-91/092).

VIII. Update of Roundtable Documents

The Roundtable Documents are:

Bibliography of Federal Reports and Publications Describing Alternative and Innovative Treatment Technologies For Corrective Action and Site Remediation, EPA/540/8-91/007
Accessing Federal Data Bases for Contaminated Site Clean-Up Technologies, EPA/540/8-91/008
Synopses of Federal Demonstrations of Innovative Site Remediation Technologies, EPA/540/8-91/009

Dr. Kovalick questioned the members on the usefulness of the Roundtable documents and the response to the documents each agency has received. He stated that in his experience, engineering professionals have commended the documents, finding them quite useful and informative in providing an insight to the federal agencies innovative technology activities. Most members agreed to the documents' usefulness and excellent field applicability. In response to Mr. Newsome's question about the degree of popularity of each of the documents, Dr. Kovalick stated that, in his opinion, the Synopses of Federal Demonstrations of Innovative Site Remediation Technologies would be most popular overall, however, each document has its own target audience. Mr. Bartell added that the distribution of the advertisement flyer has been successful, and that they use it extensively at conferences and exhibitions.

Dr. Kovalick proposed to the members that the next FRTR project encompass updating the Roundtable documents. He stated that updating the documents will be less expensive than the initial production because only data gathering needs to be addressed, rather than document data formatting.
Ms. Dean continued the discussion (in Dan Powell's (EPA/TIO) absence) with the proposed schedule to update the Roundtable documents and the need for technical points of contact at Tyndall AFB, Port Hueneme, THAMA, and HAZWRAP. Mr. Powell has suggested that the technical contacts be designated by January 3, 1992.

Col. Owendoff and Mr. Bartell agreed on the issue that the time proposed in the tentative schedule for gathering data is inadequate, therefore, a deadline, March 30, 1992, was decided upon, allowing 90 days for gathering of comments and proposed modifications/additions to the Roundtable documents. The comments on the first draft are due on June 12, 1992, allowing 45 days for review of data gathered. A final timetable is provided below. Col. Owendoff then questioned whether it has been specified which treatments are to be included in the data gathering activities. Dr. Kovalick responded and informed the members that any alternative and innovative technology excluding

land
disposal is to be included.

Timetable for Updating Roundtable Documents

Begin Update Process/1st Edition Sent to Roundtable Members for Comment
January 3, 1992

Technical Contacts Designated
January 3, 1992

Update Information Sent to Technical Contacts
January 3, 1992

Comments/Proposed Modifications Due from Roundtable Members/Technical Contacts
March 31, 1992

1st Draft of Updates Sent to Members/Technical Contacts for Review
April 30, 1992

Comments on First Draft Due
June 12, 1992

Update Sent to Printer
July 10, 1992

Final, Printed Updates Completed
August 21, 1992

IX. Future Funding of Roundtable Costs

Dr. Kovalick opened the discussion addressing the EPA expenditures associated with the Roundtable functions. The costs include contractor support and document production. Contractor support encompasses meeting support for logistics, meeting materials, and meeting summary development. Dr. Kovalick added that he often receives inquiries from the media and newsletters about the activities of the FRTR and that he uses these materials in support of such requests.

Dr. Kovalick projects that given last years figures, $150,000, will enable the Roundtable to continue operation for 18 months; $25,000 from each participating agency. Each agency will coordinate

with Mr.
Powell to identify a funding mechanism in providing these funds. Mr. Bartell will coordinate with the
USATHAMA/USACE contracting officer. Col. Owendoff requested that the Military Interdepartmental
Procurement Request (MIPR) be sent to him, and he will further coordinate the allocation of the funds
required using a vehicle already in place between USAF and EPA.

X. Joint Government and Private Sector Technology User Group Approach

In coordination with Stone & Webster, Col. Owendoff promoted a remediation technology evaluation protocol to be used in accelerating commercial availability of innovative technologies, not
limited to bioremediation. The purpose is to collect information on innovative remediation technologies
and to share that information with the private sector and other interested parties. Stone & Webster
proposes to perform a Petroleum Environmental Research Forum (PERF)-funded study in conjunction
with a joint PERF/government user group. The study has been titled Evaluation of Remediation Technology Applications at Fuel-Contaminated Sites.

Col. Owendoff elaborated by explaining that the Air Forces' and oil companies' contribution in this
effort is to provide useful field information. Should this be a successful endeavor with the petroleum
industry, then further procurement efforts will be more competitive throughout all industries concerned
with effective and efficient remediation using innovative technologies. Col. Owendoff suggested that
requiring the oversight contractor to evaluate the treatment technology performance and prepare a
synopses of the evaluation is another alternative for pursuing and implementing this effort.

The scope of work for this study will include four tasks: 1) to define those interested and to develop
the work plan and a list of representative technology applications; 2) to compile information on representative technological applications; 3) to evaluate the remediation technologies; and 4) to prepare
a final report on each particular site using the remediation technology.

Col. Owendoff presented a model summary of the McClellan AFB as an example of a site-specific
performance evaluation. This proposed document would summarize the remediation technology

performance and will provide data to demonstrate its success or failure. The summary evaluation of a site-specific technology application could include site characteristics (e.g., contaminants, media, and geology), treatment system description and performance, costs, schedule, regulatory data, and lessons learned. Based on a site-specific synopses, cleanup and cost objectives can be evaluated and modified as needed. Col. Owendoff emphasized that he is open for suggestions on the model summary presented.

Mr. Bartell questioned the difference between the Joint Government/Private Sector User Group forum and Clean Sites activities. Dr. Kovalick responded by stating that Clean Sites is an initiative for common problem workshops between companies in a variety of industries, and Federal facilities and the Air Force Joint Government/Private Sector User Group is an initiative to promote specific innovative technologies among the petroleum industry, while providing informative synopses of innovative technology performances.

XI. Establishment of "Site Characterization Sub-Committee"

After a thorough discussion, the purpose and objectives of the "Site Characterization Sub-Committee" were discussed and decided upon. The sub-committee will work together, to refine this charter. The statement below defines the purpose and objective of the sub-committee as discussed by the Roundtable.

The Site Characterization Sub-Committee is a joint agency sub-committee that will enhance the number of available and acceptable innovative site characterization technologies.

Its purpose is to develop and implement a plan to demonstrate a selected number of innovative site characterization technologies in order to gain EPA and State recognition, and to promote the use of the accepted site characterization technologies.

Eric Koglin has tentatively scheduled the first meeting of the sub-committee to convene in late

February, 1992 in Washington, D.C. Further information on the meeting will be provided by Mr. Koglin to all interested members as it becomes available.

XII. Incorporating State Participation in UST Research at Federal Facilities

Tom Schruben presented information on OUST's approach to the field technology demonstration issue. He stated that it is his responsibility to assist state program development and to increase the effectiveness of these programs by coordinating with the federal agencies. Mr. Schruben offered to act as a liaison in coordinating site characterization demonstrations between federal and state agencies.

Mr. Schruben stated that OUST, a small organization, began demonstration projects about a year ago. Mr. Schruben elaborated on two problems the OUST program faces: 1) the large number of sites they are responsible for remediating and 2) their difficulties with the regulatory process. Mr. Schruben continued to describe the OUST program as consisting of college graduates reviewing site assessments and remediation plans with an unmanageable workloads and little to no field experience. Because of these circumstances site managers lack the time to thoroughly evaluate new technologies in the market, therefore, they are skeptical about and apprehensive of new technology application. As a result, OUST has developed a demonstration program for new site characterization and remediation technologies. The primary purpose of the demonstration program is to provide a source of education to site managers and to invoke interest in the use of these technologies.

The OUST program targets responsible parties (RP) that are experiencing difficulties with the regulatory process, i.e. gaining permits. OUST identifies those RPs willing to experiment with potentially acceptable technologies and a particular state open to learning about the same technology. Once the RP and state have been identified as possessing a common interest, OUST introduces the parties to one another. Potential results of this endeavor are to promote change within the states, to provide an education and awareness of new technologies to the states and their personnel, and to

establish a more cooperative system between RPs and the states. This endeavor has proven to be effective based on experience from cooperative efforts in Massachusetts, Ohio, Wisconsin, and Georgia.

Col. Owendoff stated that at USAF facilities, EPA staff overseeing permits and remediation activities are on site frequently and that coordinating with the RCRA program may be an appropriate vehicle for OUST and states to gain access to Federal agency sites and the technologies being implemented at those sites. In response to Col. Owendoff's statement, Mr. Schruben requested that the Federal agencies remain open and willing to interact and exchange information with OUST and the states in an effort to educate site managers. In conclusion, Mr. Schruben stated that parties interested in furthering OUST's educational efforts can contact him at FTS-698-8875 or 703-308-8875.

XIII. EPA Efforts to Encourage Regions in Use of Federal Facilities for the Testing and Evaluation of Innovative Technologies

Dr. Kovalick introduced Mr. Gordon Davidson (EPA/Office of Federal Facilities Enforcement (OFFE)). Mr. Davidson, chairman of Leadership Council, began by stating that OFFE supports the development of innovative technologies and has identified a need in the area of site characterization. The Leadership Council is composed of regional section chiefs, branch chiefs, and lawyers with the responsibility of managing the Federal facility's remedial oversight program and negotiating interagency agreements (IAGs) in reducing the liability present in remedial action scoping. The Leadership Council, established to address the concerns of remedial action scoping and the costs of collecting associated data, is now concentrating on implementing procedures, minimizing costs, and maximizing efficiency at Federal facilities.

Mr. Davidson's overall purpose in his presentation was to inform members about the Council and to solicit input to the Leadership Council to ensure agreements and other limiting factors in remediation activities are identified and resolved. Mr. Davidson stated that the Council is interested in providing

an avenue to the Federal facilities for the development of effective negotiated agreements for NPL sites.
The Leadership Council also is working to develop better communication between all Federal agencies
in accelerating Federal agency cleanups. He expressed a concern for more cooperation between Federal
facilities and to formalize enforcement activities. He then opened the issue for discussion among the
Roundtable members.

Col. Owendoff initiated the discussion by expressing three concerns. First, regulators are apprehensive in giving agencies the liberty to implement innovative technologies because of the possibility of causing more damage at the site. The second concern is the issue of IAGs and the time
required to finalize these agreements. Col. Owendoff's final concern is the lack of incentives for the
contractor to minimize the volume of comments on the RI/FS and, therefore, the overall site costs.

Mr. Davidson understood Col. Owendoff's point of view and further elaborated on the purpose of
the Leadership Council. The group consist of approximately 20 people and the meetings are oriented
towards a discussion forum, as opposed to briefings and presentations. The approach is to determine
more efficient methods of doing business and gaining feedback among the agencies and the Regions
concerning Federal agency site characterization and cleanup (e.g., base closures scheduling). Mr. Davidson stated that he would like to convince the private sector and regulators of the efficiency of
innovative technologies by proving performance in site demonstrations. These successes can only be
achieved through cooperative efforts among the agencies.

XIV. Closing Discussion

Dr. Kovalick summarized the day's discussions before closing the meeting at 4:30 p.m. He invited
the members to participate in contributing to the development of the agenda, particularly Mr. Cook on
the activities at Sanganaw River Site. Finally, he concluded by reviewing all action items covered
throughout the day:

Roundtable documents will be updated and Mr. Powell will be contacting members

The designated federal agency contacts are:

Tyndell AFB	Lt. Col. Michael Shelley
Port Hueneme	Dr. William Powers
THAMA	Robert Bartell
DOE	Lawnie Taylor

The agency contacts to establish funding of the Roundtable expenditures and Interagency agreements (IAG) are or can be attained from:

USATHAMA/USACE	Robert Bartell
USAF	James Owendoff
USN	David Olson
DOE	Lawnie Taylor
DOI	James Cook
EPA	Daniel Powell

Eric Koglin will be convening a "Site Characterization Sub Committee" meeting. Those interested in participating in the sub-committee and for more information contact Mr. Koglin at FTS-545-2432 or 702-798-2432. Members included on the sub-committee are: Eric Koglin (EPA/EMSL), Rick Newsome (USACE), Caroline Purdy (DOE), and Marsha Davis (DOE)

Tom Schruben can be reached at 703-308-8875 for information concerning OUST and state staff interaction with federal facility site characterization and remediation activities.

Dr. Kovalick then presented the Roundtable members with the following possible agenda items for the next meeting:

Site Characterization Sub-Committee progress report and discoveries
DOI's Bureau of Mines reports on soil washing or other technologies
The next Roundtable Meeting will be scheduled for the April/May timeframe.

The following Attachments are provided:

Innovative Treatment Technologies: A New Forum for Cooperation, by Daniel M. Powell and Walter W. Kovalick, Jr., Ph.D.

USATHAMA Fact Sheet on Site Characterization and Analysis Penetrometer System (SCAPs).