

Oil Refinery Partnership Meeting

August 8 - 9, 2000

Casper, Wyoming

Summary Report

Prepared for:

U.S. Environmental Protection Agency
Technology Innovation Office

Prepared by:

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Reston, Virginia

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Purpose

Randy Breeden (EPA Region 8) gave a brief welcome and outlined the purpose and goals of the meeting. After the last meeting in Denver, Colorado, the group decided it would like to pursue the possibility of forming a partnership. Texaco offered its Casper, Wyoming site as a potential site for testing and evaluating an innovative remediation technology. Therefore, this meeting was scheduled to provide group participants with a site visit to Texaco's Casper site. The meeting began with Texaco and their contractor, TriHydro, presenting background information and descriptions on the Casper, WY site.

The purpose of the meeting was to discuss the group's goals and to focus on how the group would like to move forward. Then, discussions on logistics, funding, resource issues, and the formation of a technical team would follow.

Randy Breeden also mentioned that there are additional people who would like to participate in this group, such as other regional EPA staff who are also working with refineries. In the future, there will probably be greater participation at meetings, especially from regulators and applied evaluators.

Texaco Site Overview Presentation

Jeff Hostetler, Vice President of Resources at TriHydro, provided an environmental restoration overview on the Texaco Casper Refinery South Property. He began by explaining the history of the Texaco Casper refinery and what Texaco has done with the project over the past four years (1996-2000). He distributed hard copies of the presentation to attendees. Please contact Jeff Hostetler (TriHydro) for a copy of the presentation.

Texaco Site Tour

The group went on a site tour of the South Property at the Texaco Casper Refinery. The group saw existing remediation / containment systems, including SVE, total fluids vacuum extraction system, groundwater pump and treat system and the barrier wall.

Site Discussion

The site tour gave the group the opportunity to learn more about the site history and what has gone on in terms of environmental restoration up to this point. Texaco had removed the refinery and all the sources of materials with the interest of protecting the North Platt River. The next step was to assess what they have left to tackle on the site.

One attendee asked if there are any impacts from the former loading dock area along the railroad tracks or from the plant that is on the other sides of the tracks. There are areas where Texaco knows there are free-phased hydrocarbons that go all the way to the South boundary. Texaco does not know whether these hydrocarbons came from the refinery or if they are related to some of the off-site pipeline corridors that run along the south east side. There are approximately two wells on the site that have occurrence of free-phased hydrocarbons.

What kind of time frame is Texaco looking at in terms of remediation?

The desired time frame may drive the type of remediation technology chosen. Randy Jewett (Texaco) explained that Texaco has not set a specific time frame. The company will be looking at the most cost-effective solution and what it can accomplish in five years versus what it can do in ten years. With the barrier wall in place, Texaco is not in an urgent situation to implement a new remediation technology since there is currently no impact on the river. Jeff Hostetler (TriHydro) asked if there are any emerging technologies that can shorten the time frame and put “real” years on the time frame for cleanup rather than a thirty year minimum.

Mobility Analysis / Site Characterization

Texaco is looking at mass removal as a significant part of the overall corrective action at their site to get them to the point when they can turn off their pumps. Jeff Hostetler (TriHydro) believes that if they can get rid of the free-phased hydrocarbons, then they probably would have come a long way in eliminating the dissolved phase. Is this the first thing Texaco should attack?

Mark Adamski (BP Amoco) raised the point that it may be premature to set a goal until the group knows more about the free phase on the site and the subsurface migration. Randy Breeden (EPA Region 8) suggested that the group start looking at Texaco’s data and the data gaps and begin to assess mobility at different parts of the site.

The group discussed whether it is necessary to understand the mobility and behavior of the hydrocarbons for all of the innovative technologies or if it is only applicable to certain innovative technologies. For instance, you may not need to understand mobility if you are going to use the six phase technology, but it is helpful to understand mobility when using pump and treat. Jeff Hostetler (TriHydro) stated that more study and understanding on the behavior of the hydrocarbons is beneficial as long as the technology the group is going to choose rests on that understanding.

Randy Parker (EPA SITE Program) and John Meyers (ThermoRetec) felt that it is important to know as much as you can about the product, so that you can make an informed decision when choosing a remediation technology. One of the advantages of the investigation performed at Conoco was that it quantified mobility and helped determine where the remediation efforts should be focused. Characterization of the site may be the first step for Texaco.

Is this a good site for potential demonstration?

Randy Breeden (EPA Region 8) stated that the goal of the group is to apply a new technology, assess its applicability and obtain cost and performance data. He believes that the Texaco Casper site is a good site for the demonstration because it is well engineered, monitored and instrumented. In addition, the site is protected due to the barrier wall. Texaco feels comfortable that any new technology that they apply will not have a more detrimental effect than anything else they would try. Other items to address in determining a good site:

- Is this an environment in which the group expects to have a good return on the investment?

- Does the group have the potential to get the facility to its final clean up goals so that the company can turn off the pumps in a cost effective manner?
- Is the site representative of the types of cleanups that would be encountered in a wide range of refinery sites?
- How could the results and knowledge be applied to other sites?

John Meyers (ThermoRetec) felt that due to the size of the site it will be difficult to sort out the true effects of what is done on a pilot basis. The group agreed that it would only be working on a small portion of the site. However, some felt that it is more difficult to measure the performance of the technology when working with a small section. The focus of the group is to look at scaling up pilot tests for large scale applications, like refineries. The group wants to know how these technologies work on large sites and if they are cost effective. Real world conditions consist of large complex areas. By testing the technology in an isolated corner, it will not be tested in real world conditions.

Ali Tavelli (WY DEQ) suggested that it might be worth the group's time and effort to do a mobility study of fifty acres to isolate the parts of the site where the hydrocarbons are most mobile.

In addition, economic evaluation will be an important step in scaling up the information from small pilot scale studies to large scale application.

Potential Goals for the Group and the Site Demonstration

Mark Adamski (BP Amoco) stated that his goal is the development of a process, procedure and precedent for cleaning up and closing large LNAPL sites. He does not necessarily need a winning technology. In addition, he would like the group to determine what is "technically practicable." He wants to understand the endpoints and how to get to those endpoints. The group agreed that it would like to form a conceptual template on the procedure of cleaning up and closing a site. Defining the process and the decision-making framework is something the group can work towards and develop over time.

Jim Cummings (EPA TIO) mentioned that a single technology is not going to get you to the endpoints. It may take several technologies.

John Meyers (ThermoRetec) sensed a disconnect between what may be done at Texaco versus what really needs to be done at Texaco versus what this group is really trying to accomplish. The technology that might get Texaco to their goals may not be what the group wants to test.

Kent Udell (University of California - Berkeley) suggested that the group needs a technical goal. The group could state that it wants to be able to remove enough mass at the site so that Texaco can document natural attenuation in a timescale of less than fifty years. Fifty years seems to be a reasonable number for planning purposes and economic analyses. This number will simply be used as a starting point to gather cost information. John Meyers (ThermoRetec) disagreed with the idea of picking a number at this point in time. He said it is necessary to understand the concept on the natural attenuation half lives before picking a

number like that. The group determined that fifty years was an acceptable number to start out with but that the actual bracket may range from five years to one hundred years.

Ali Tavelli (WY DEQ) stated that in Wyoming, Texaco would have to meet MCLs in order to be off the hook. Ideally it would be good to find a technology that works and could be applied full-scale on the rest of the site. Until the groundwater meets MCLs, Texaco will be required to monitor the site. The goal is to remove enough mass to a point where monitoring natural attenuation is acceptable. Mark Lyverse (Chevron) believed this should be the goal for this site. John Meyers (ThermoRetec) thought that this is only part of the goal. He also would like the goal to address the time frame.

Mark Lyverse (Chevron) suggested that the group become familiar with the 3008H Order, which is usually based on MCLs, in order to determine a technical goal.

Kent Udell (University of California - Berkeley) raised the question of conducting a pilot scale study right at the heart of one of the really big plumes or doing a small plume, tracking natural attenuation and showing long-term applicability of the technology.

The group discussed the types of technologies that might be applicable to the Casper site. Lynn Wood (EPA ORD) mentioned that if the group is just considering innovative technologies for mass removal then that would limit the list somewhat. The group determined that it is not limited to using an “innovative technology.” The group will choose the most cost-effective technology.

Kathy Yager (EPA TIO) proposed the development of two leaders: one to focus on the cost and effectiveness of the technologies and the other to focus on the goals and additional site analysis.

John Meyers (ThermoRetec) thought it would be beneficial to get spec sheets on the technology. For example, technology A will cost “x” amount to get to “y” oil saturation per acre. This will help the group to determine which technologies can do what is needed and at what costs. However, it may be difficult to get this information for some technologies.

Lynn Wood (EPA ORD) stated that it will be relatively easy to predict how effective a technology will be at removing mass, but it will be much more difficult to predict what the impact of the mass removal will be with respect to contaminants in floods from the site or how that will interface with monitoring natural attenuation.

Guadalupe Oil Field Pilot Test Panel

Kent Udell (University of California - Berkeley) presented information on the Guadalupe Oil Field. The interaction between the regulator, the California Regional Water Quality Control Board (RWQCB), and the operator, Unocal, was one of great distrust and legal manipulation. This was an extremely visible site with very viscous oil. The Cleanup or Abatement Order (CAO) required a pilot test panel, which was an independent technical panel who would suggest what to do with the site. The Pilot Test Panel consisted

of three experts in various fields of remediating subsurface petroleum pollution, with one chosen by the RWQCB, one by Unocal and the third by the first two panelists selected.

The mission of the Pilot Test Panel was to facilitate the implementation of a pilot-test program and to recommend, within six months of its initial deliberation, up to three technologies to be pilot tested at the Guadalupe Oil Field for the removal of separate-phase diluent without excavation.

The panelists assessed what they knew about the site, what could be done given the site history, the problems, the natural attenuation and the ground water flow. They needed to figure out what technologies made sense in terms of implementation on a pilot scale basis. They needed to understand how each of the technologies would work and their limitations.

Kent Udell discussed how the independent panel looked at what cost effective method could be used in an appropriate time-frame.

When looking at natural attenuation, an optimistic time scale is 37,000 years. The geologic time scale is 10,000 years. When realizing that the natural attenuation time scale is much longer than the geologic time scale and the fact that the geology will change, the natural attenuation time scale needs to be reduced. When looking at aggressive technologies, such as steam injection, the time scale is reduced to 3,700 years (which is still a very long period of time). If it is possible to get oxygen delivery at 100 times what the natural rate is, then the natural attenuation time scale could be reduced to a 50 year period using something that is aggressive in the beginning, small-scale, long-term, and without a huge amount of cost.

The panel still did not know how this would work and would not take risks with large amounts of money. Therefore, the first thing they did was conduct more treatability studies by going back to the lab to make sure that the calculations (in terms of how much can be removed with steam) were valid and ones that everybody could agree on. Unocal brought in people to conduct the research. Then, the next step was the modeling. If the modeling made sense, then they could move forward and do the pilot scale study. The pilot scale study would probably be designed so that they would do steam injection, then probably end up with long-term air sparging. They would collect data that would help them understand the natural attenuation process. They tried to get a holistic picture and an idea of time frame, looking at expensive technologies on a small-scale so that they would not run up the costs. The overall picture would help them get to cleanup in a relatively short period of time and with a minimum amount of costs. The Water Quality Control Board took all of their recommendations.

They had accomplished a reasonable step-by-step, cautious process with an endpoint that made everyone happy. It went from a controversial interaction with lawyers to a reasonable approach driven by technology and based on what was possible at the site and the overall holistic picture. It was based on getting the data that they needed to get the answers, not spending money where money did not need to be spent, and being able to make the right decisions for the long-term future of the property.

What can be done in a reasonable time period that makes sense economically and ends up being long-term protection of human health and the environment?

The technical goal of the project was created in the Cleanup and Abatement Order. It was to look for technologies that had potential to get risk reduction comparable to excavation. Their experience with excavation was that they were getting out about 90% of the hydrocarbons.

The Final Report is located at <http://www.concurinc.com/gofptp>.

Roles and Responsibilities

Cost Sharing and Resources

Randy Breeden (EPA Region 8) asked if it would be possible for the group to share costs for the purpose of obtaining real world cost and performance information on innovative technologies. Several members of the group felt that they would be unable to get money from their management to contribute towards cleaning up the Texaco site. Jim Cummings (EPA TIO) discussed how the same situation is occurring in the utility industry. It is very hard for industry organizations to pool money to conduct a demonstration at someone else's site. However, there are other things that members could contribute. A company could potentially offer an additional site to the group.

Mark Adamski (BP Amoco) envisions that the company with the site would need to do something about the problem either way, but would enlist the expertise of the different companies in helping to solve the problem. The group determined that it is a lot more realistic to ask companies for sweat equity rather than cash.

Jim Cummings (EPA TIO) suggested that perhaps five projects be conducted over a period of time. In year 1, everyone would put in equal money to conduct a project at Texaco. In year 2, everyone would put in equal money to conduct a project at a different site and so forth. Annual expenditures would be less and everyone would get a project conducted at one of their sites.

Kathy Yager (EPA TIO) asked: Assuming that the ultimate goal is to have several companies commit resources to one project, can this group work on a demonstration plan that would satisfy everyone? We need a project that would be worthwhile and meaningful to everyone so that group members would be willing to make direct or in-kind contributions. The group agreed that at this point they are willing to make a commitment of time.

Dawn Kaback (CTC) suggested that we should collect information from each of the oil companies in terms of what their top priorities and needs are. Then we could develop a plan that covers everybody's needs and addresses the bigger picture.

Randy Breeden (EPA Region 8) emphasized that corrective action can minimize liability and resource expenditure for the long term. He believes that it makes sense for the companies to combine resources to conduct a demonstration because they all could benefit from the experience and the knowledge of the results. If the group does not approach this from a cost-sharing and mind-sharing perspective, then it is likely that Texaco will conduct a demonstration and not necessarily share their information. BP Amoco might even try the same thing. If the technology fails, they will have wasted resources. Working as a group, one technology would be focused on in one particular environment that may be transferable to other facilities around the country. This could be done on several sites so that five technologies might be studied in about ten years.

Randy Jewett (Texaco) expressed concern that his costs could be driven up by a large group of people making various suggestions on what should be done at the site. With a group of this size, there is likely to be disagreement and it will be hard to please everyone. Mark Adamski (BP Amoco) stated that it would not be in anyone's best interest to drive up costs. The goal is to figure out the best low-cost solution to meet the environmental end points for the site. The group must find the most cost-effective way to achieve the environmental goals.

Randy Jewett (Texaco) would really like to see other sites offered up. The idea of the partnership would be more saleable to his management if various technologies were being tested at different sites. He could explain he is going to spend "x" amount of dollars and that there is an advisory committee that will be giving advice and input on the technology demonstration. Another technology will be tried at a different site and a third technology will be tried at a third site.

Mark Adamski (BP Amoco) believes he will have a hard time convincing his management of the benefit of working together with a group and working with regulators. Adding costs to the project is not an option for him. The biggest concern of his management is that the group does this work and not end up closing the site or taking care of the problem. The goal he would want to see would be the evaluation of five technologies, determining which one worked the best and closing out Texaco's Casper refinery. If the project with Texaco goes well, then it would be a lot easier to get management from other companies on board.

Kent Udell (University of CA - Berkeley) stated that the group needs to get their management to think proactively in terms of getting the liability of these sites off their books.

EPA TIO is willing to provide contractor support (meeting planning, technical work, etc.) if the group wants. In addition, EPA ORD may be able to provide assistance with some equipment, testing or expertise. Anything anyone can do to reduce Texaco's cost will help make the partnership work.

Where does Texaco stand?

The Texaco site would be used as a baseline for the group to develop a methodology or a decision tree that could be used to define the process for different scenarios. Texaco is committed to moving forward

in applying a technology other than pump and treat. They are committed to learning how to more aggressively attack the problems that are out there. Texaco will continue moving forward with work on the internal part of their site (with or without the group).

Randy Breeden (EPA Region 8) asked if Texaco has done the full projection of what the costs would be over “x” amount of years to get to the cleanup goals that the state of Wyoming is going to require. This analysis would have to be done as part of this project.

Jeff Hostetler (TriHydro) stated that they need more information about the nature and the behavior of the hydrocarbons. Texaco will begin scoping that investigation.

Randy Breeden (EPA Region 8) asked: Is Texaco willing to put together a technical team from the people that are present to help pull together the scoping of the ROST? Does Texaco want to move forward with what has been discussed? If so, the group would help Texaco develop their technical goal.

Jeff Hostetler (TriHydro) discussed how Texaco has not really looked at the site in terms of pieces of the property that are good candidates for redevelopment or alternative use faster than others. Texaco knows roughly what areas are impacted more than others. Randy Jewett (Texaco) and Jeff Hostetler (TriHydro) will begin looking at pieces of property that they would like to focus on first. Then, they could do high level characterization on a particular portion of the property. This does not mean that the group will tackle the easiest parts first. It just means that real estate value will be taken into consideration.

Mark Lyverse (Chevron) suggested that Texaco begin collecting site data so that the group can better understand the site. This would go in parallel with everyone else compiling data on the remediation technologies. Texaco will look at different scenarios and degrees of removal.

Jeff Hostetler (TriHydro) explained that Texaco does not have the budget appropriations to do a high level characterization right now. It probably will not happen until next spring, however the group can begin planning for it.

Texaco will work on putting together a report with data on the hydrocarbons in various geographic areas of the site. They will include what they know about the product in those areas. Texaco will also work on developing their goals, through conversations with Ali Tavelli (WY DEQ). Then, they will share the goals with the group and ask for comments/suggestions.

Charter / Agreement

Jeff Hostetler (TriHydro) brought up the point that there will have to be charter or agreement among the group. The people who are going to be members will have to stand on a level playing field. They are all going to have to commit sites or commit resources. Minimum commitments will have to be determined.

The charter / agreement will include the following: a mission statement, a statement of operations, levels of

commitment, an organizational chart, boundaries on what this group's decisions will effectuate. Ali Tavelli (WY DEQ) suggested that the charter also incorporate what the group does not want to happen and what it wants to avoid.

Dawn Kaback (CTC) will try to obtain some examples for the charter. Dawn Kaback (CTC), Randy Breeden (EPA Region 8), Ali Tavelli (WY DEQ) and Kathy Yager (EPA TIO) will work on developing a draft to be circulated within a couple of months.

Collection of Technology Information

Dawn Kaback (CTC) suggested the group turn to the Summary of Remediation Expertise document to see what technologies each company has experience in. She believed sharing all of this experience would be a good first step. The group decided to begin gathering the existing information on the technologies that may be considered applicable to the Texaco Casper site. Everyone should send the information to SAIC for compilation. This information should include recommendations, descriptions, experiences and lessons learned. Facility reports can be draft or final. Technology evaluations would be helpful to give an idea of the appropriateness and applicability of the technology. If management has a problem with the distribution of this information, please let EPA know. There may be a way to keep the company name confidential.

Ali Tavelli (WY DEQ) and Kathy Yager (EPA TIO) suggested that the group limit the information to items that pertain to the Texaco Casper site and that perhaps the group should start narrowing down the list of technologies.

John Meyers (ThermoRetec) said that it is difficult to identify technologies until the group knows the goals of the technology and has more information about the site. Site characterization is a pre-requisite for selecting a technology. Dawn Kaback (CTC) suggested the group focus on recommendations for characterizing the site before we focus on recommendations for remediation technologies. Randy Breeden (EPA Region 8) clarified that the group is not selecting a technology at this time. The task is simply to gather information on the different technologies.

Kathy Yager (EPA TIO) stated that many pilot scale studies have been done already. The first step should be pulling all of this information together to review it and better understand the limitations and issue of scaling up to large applications. This information should be made available to everyone.

Jeff Hostetler (TriHydro) suggested that the group start with one-page abstracts or executive summaries describing the location of the site, the nature of contamination, the technologies looked at, limitations, and the time frame. The abstracts should include citations referencing the actual reports. Due to the large amount of information and reports that could be collected on the various remediation technologies, this method will make the task more manageable for the group.

Mark Lyverse (Chevron) suggested that the group eliminate some of the technologies from the list based

on what the group has learned about the site. For instance, Texaco is not going to use permeable reactive barriers, phytoremediation, in situ bioremediation or groundwater circulation wells. To decide between air sparging and SVE, Texaco needs to know how much of the NAPL is below the water table and the saturations.

After reviewing the Summary of Remediation Expertise document, the group decided to list the technologies that get the site below residual saturation. The group determined that there is a lot of information out there on the conventional technologies. It decided to focus the information gathering efforts on the emerging technologies: in situ chemical oxidation, steam stripping, six phase soil heating, microwave technologies, surfactant / cosolvent flooding, water flooding and warm/hot water flooding.

Dawn Kaback, Randy Parker, Lynn Wood, Randy Breeden, Kathy Greene, Kathy Yager, Ali Tavelli, Randy Jewett, and Jeff Hostetler will receive all information collected. Ali Tavelli, Randy Breeden and any other volunteers will go through the information and create abstracts that would be applicable to the Texaco site. Everyone else will get the abstracts for the technologies.

Jeff Hostetler (TriHydro) suggested that we start with the experience of the members of the group instead of trying to obtain boxes of reports on sites that are not similar to the Texaco site. It will be very time consuming for the group to make sense of projects if no one is familiar with them. We should start with the information around the table. He suggested having each person spearhead the research efforts on one technology to spread the load of work.

Technical Team

Randy Breeden (EPA Region 8) discussed the formation of a technical team that would assist Texaco. The technical team would review the information collected and determine what is applicable to the Casper site. The team would probably hold a conference call to discuss the next steps for Texaco.

Should the group become a RTDF?

Randy Breeden (EPA Region 8) and Kathy Yager (EPA TIO) discussed the possibility of the group becoming a Remediation Technology Development Forum (RTDF). An RTDF is a joint industry/EPA partnership. RTDFs are industry led and there is an EPA co-chair. Usually RTDFs tend to focus on a specific technology, however the format is open and flexible. The benefits of being an RTDF is that it brings recognition and credibility to the group. The RTDFs put out newsletters and the co-chairs of the various groups have a conference call about every six months to report on what they are doing.

Kathy Yager (EPA TIO) described how a partnership of states and dry cleaning programs did not use the RTDF format. They have developed their own structure and have a web site. This group could also choose to develop their own structure.

Dawn Kaback (CTC) is concerned that the other RTDFs focus on one technology. This group would be different in that it wants to focus on the goal of cleaning up refinery sites.

According to the FACA (Federal Advisory Committee Act), the federal government cannot meet with industry representatives to create policy. Walter Kovalick, Director of TIO, has made it possible under the RTDF umbrella for industry and government to discuss whatever they want as long as they do not formulate policy for the federal government. This also means that meetings have to be open to anyone who would like to come and listen, although not everyone would be active participants. The group expects that its technical activities will make a significant contribution to the ongoing efforts to develop more relevant policy, therefore it may be important for the group to become an RTDF.

In addition, results would be presented with a stamp of evaluation from industry, government, and academia that the group evaluated a technology, showed what it can do, and determined the cost and performance data. Lastly, the RTDF can be dissolved at any time.

Once an RTDF is formed, a CRADA is a legal mechanism that could describe how information will be shared and how costs would be shared. It can allow EPA to access funds for travel and use of contractors.

The group agreed to become an RTDF, but to have a broad name. Suggestions and ideas for the group name should be sent to Dawn Kaback (CTC).

The industry co-chair will be Mark Lyverse (Chevron). There will be a working group for each site. Randy Jewett will chair the Texaco Casper Site working group.

Sensitive Information

Mark Adamski (BP Amoco) asked if there is some type of rule that we can form that states that nothing shared within the group can be used in any shape or form outside of the group. The issue of sensitive information should be addressed. EPA will look into this further if the group desires. The group would need to discuss how to handle its information and what would be publicly available.

Action Items

Collection of Technology Data / Information

The group will gather information on the technologies listed below, including recommendations, descriptions, experiences, and lessons learned. This information can include reports from facilities (draft or final) and technology evaluations. Group members should develop a 1-page abstract or executive summary that includes the location of the site, nature of contamination, technologies used, limitations, and time frame.

- 1 - In situ chemical oxidation
- 2 - Steam stripping
- 3 - Six phase soil heating
- 4 - Microwave technologies
- 5 - Surfactant / Cosolvent Flooding

6 - Water flooding

7 - Warm/Hot water flooding

Steve Shoemaker (Dupont) - Provide information on chemical oxidation lab work, report on economic evaluation of the six phase technology, information on the microwave technology pilot and the surfactant/cosolvent pilot. His expertise is in economic evaluations.

Martin Johnson and Mark Adamski (BP Amoco) - Provide 1-page summaries on each technology except for six phase soil heating. Provide report on microwave technology pilot test.

Randy Parker (EPA Site Program) - Pull abstracts of off web site on surfactant/cosolvent flooding. Provide related reports.

Dawn Kaback (CTC) - Provide report on surfactant flooding, report/case study on chemical oxidation, DOE report on steam stripping, and DOE cost / performance report on six phase soil heating.

Lynn Wood (EPA ORD) - Provide information on surfactant flushing and air sparging. Gather information on steam stripping, hot water flooding, chemical oxidation from the experts in Ada.

Jack O'Donovan (DESC) - Provide information on steam stripping and pilot test information.

Kathy Greene (NFESC) - Provide information on phytoremediation, chemical oxidation, steam stripping, six phase soil heating and surfactant/cosolvent flooding.

Alliguori (ExxonMobil) - Provide information on the surfactant and cosolvent flooding pilot demonstration.

John Meyers (ThermoRetec) - Provide information on water flooding and surfactant floods, including cost and performance data.

Mark Lyverse (Chevron) - Provide information on steam stripping pilot test, bench scale chemical oxidation test, six phase soil heating (including cost data), surfactant flooding and PIT tests, and associated lab work.

Dick Woodward (Sierra) - Lyondell has information on six phase soil heating, chemical oxidation and surfactant/cosolvent flushing.

Gathering of Texaco Data / Information

Jeff Hostetler (TriHydro) and Randy Jewett (Texaco) - Discuss Texaco's goals and distribute information to the group. Compile site characterization data and distribute to the group.

[Note: Texaco's data will include spreadsheets and CAD drawings. If you do not have software on your computer to view CAD drawings, you can download Volo View Express for free. Visit their web site at <http://www.autodesk.com/prods/volo/download.htm>. Or, download ArcExplorer from <http://www.esri.com/software/arcexplorer/>.]

Charter / Agreement

Kathy Yager (EPA TIO), Dawn Kaback (CTC), Ali Tavelli (WY DEQ) - Develop draft charter which will include the purpose of the group and its goals.

Everyone - Think about what you would like to name the group and send suggestions to Dawn Kaback (CTC).

Time line

Texaco will compile site information and their goals within two months. The group will compile technology information and data and send it to SAIC within one month. A draft of the charter will be completed within one month and then will be distributed to the group for review.

The information will be synthesized into abstracts and the abstracts will be distributed to the group. A technical evaluation team will review the information and have a conference call with Texaco to discuss the next steps. Eventually there will be a meeting where vendors and experts are invited to educate the group on the cost and performance of particular technologies.

Appendices

Appendix A: Final Agenda

Appendix B: Final List of Attendees

Appendix C: Remediation Expertise Spreadsheet

Appendix D: Summary of Remediation Expertise

EPA's Oil Refinery Partnership Meeting

Agenda

August 8 - 9, 2000

Casper, Wyoming

Tuesday, August 8, 2000

8:00 AM – 5:00 PM

8:00 AM - 9:30 AM
Oak Room

Texaco Site Overview Presentation - *Jeff Hostetler, TriHydro Corporation*

- Site description and summary of existing infrastructure
- Current subsurface conditions
- Description of areas that may be candidates for application of innovative technology

9:30 AM - 11:30 AM

Texaco Site Tour

- Site tour of South Property and existing remediation / containment systems (SVE, total fluids vacuum extraction system, groundwater pump and treat system and barrier wall)

11:30 AM - 1:00 PM

Box Lunch at Garden Creek Falls (at the foot of Casper Mountain)

1:00 PM – 5:00 PM
Oak Room

General Site Discussion - All

- Is this a good site for potential demonstration?
- What are potential goals of a site demonstration?
 - Mobility analysis
 - Technology evaluation
- What additional information do we need on site?
- What types of technologies may be applicable?
- Overview of relevant expertise

Wednesday, August 9, 2000

8:00 AM - 12:00 Noon

8:00 AM - 12:00 Noon
Oak Room

Roles and Responsibilities - All

What would you like to commit to this project?

- Industry/EPA chairpersons
- Core technical evaluation team
- Mobility calculation team
- Laboratory/analytical assistance
- Technical review
- Funding

Action Items

Next meeting, conference call, etc.

U.S. EPA's OIL REFINERY PARTNERSHIP MEETING

August 8 - 9, 2000

Casper, Wyoming

LIST OF ATTENDEES

Mark Adamski

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U.S. EPA's OIL REFINERY PARTNERSHIP MEETING

August 8 - 9, 2000

Casper, Wyoming

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